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2 February 2010

New York State of Department
of Environmental Conservation
21 South Putt Corner Road
New Paltz, NY 12561

ATTENTION: **JOHN RASHAK, PROJECT MANAGER**

SUBJECT: **TOWN OF NEW WINDSOR LANDFILL NYSDEC SITE NO. 336019**
AMENDED SITE MANAGEMENT PLAN

Dear Mr. Rashak:

Enclosed under cover of this letter, please find the amended site management plan for the subject project. This site management plan has been modified and updated in accordance with the Town of New Windsor's proposal to reduce sampling of monitoring wells on the site from the current quarterly monitoring in the original site management plan to a modified schedule. The Town's proposal is as follows: The 4 (6S,6D,9S and 11S) monitoring wells which exhibit slightly elevated levels of site related contaminants will be sampled quarterly while the remaining monitoring wells will be sampled annually.

This proposal is based on 15 years data and operation of the test site. The site is in good condition with ongoing monitoring performed by Envirotest and maintenance performed by the Town of New Windsor and it's various contract operators and consultants.

Please feel free to contact the undersigned should you have any questions, comments or require any additional information regarding this matter. A copy of this report has been placed in the Town of New Windsor file for the Landfill Closure.

Respectfully submitted,

McGoey, Hauser and Edsall
Consulting Engineers, P.C.

Patrick J. Hines
Associate

Cc: George Green, Supervisor
Richard D. McGoey, P.E., Town Engineer
Michael Bythe, Town Attorney

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New Windsor Landfill

ORANGE COUNTY, NEW YORK

Site Management Plan

NYSDEC Site Number: 336019

Prepared for:
New York State Department of Environmental Convservation
625 Broadway
Albany, New York 12233-0001

Prepared by:
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1-845-567-3232

Revisions to Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date
1	12/11/2009	General Revisions	
2	1/8/2010	General Revisions	
3	2/3/2010	General Revisions	

JANUARY, 2010

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SITE MANAGEMENT PLAN

1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM

1.1 INTRODUCTION

This document is required as an element of the remedial program at Town of New Windsor Landfill (hereinafter referred to as the "Site") under the New York State (NYS) Inactive Hazardous Waste Disposal Site Remedial Program administered by New York State Department of Environmental Conservation (NYSDEC). The site was remediated in accordance with Order on Consent Index #W3-0079-8704, Site # 336019, which was executed 2 February 1989.

1.1.1 General

The Town of New Windsor, NY entered into an Order on Consent with the NYSDEC to remediate an 18.52 acre property with approximately 10 acres of landfill located in New Windsor, New York. This Order on Consent required the Remedial Party, Town of New Windsor to investigate and remediate contaminated media at the site. A figure showing the site location and boundaries of this 18.52 acre site is provided in Figure 1. The boundaries of the site are more fully described in the metes and bounds site description that is part of the Environmental Easement (Appendix B).

After completion of the landfill closure based on an approved Landfill Closure Plan, some contamination was left in the subsurface at this site, which is hereafter referred to as 'remaining contamination." This Site Management Plan (SMP) was prepared to manage remaining contamination at the site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. A 30-year monitoring plan was approved by NYSDEC during initial site remediation. All reports

associated with the site can be viewed by contacting the NYSDEC or the Town of New Windsor Town Clerk.

This SMP was prepared by McGoey, Hauser and Edsall, on behalf of Town of New Windsor, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, year of latest revision, and the guidelines provided by NYSDEC. This SMP addresses the means for implementing the Institutional Controls (ICs) and Engineering Controls (ECs) that are required by the Environmental Easement for the site.

1.1.2 Purpose

The site contains contamination left after completion of the remedial action. Engineering Controls have been incorporated into the site remedy to control exposure to remaining contamination during the use of the site to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC, and recorded with the Orange County Clerk, will require compliance with this SMP and all ECs and ICs placed on the site. The ICs place restrictions on site use, and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP specifies the methods necessary to ensure compliance with all ECs and ICs required by the Environmental Easement for contamination that remains at the site. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

This SMP provides a detailed description of all procedures required to manage remaining contamination at the site after completion of the Remedial Action, including: (1) implementation and management of all Engineering and Institutional Controls; (2) media monitoring; (3) operation and maintenance of all treatment, collection, containment, or recovery systems; (4) performance of periodic inspections, certification of results, and submittal of Periodic Review Reports; and (5) defining criteria for termination of treatment system operations.

To address these needs, this SMP includes three plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and

recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual for complex systems).

This plan also includes a description of Periodic Review Reports for the periodic submittal of data, information, recommendations, and certifications to NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the environmental easement;
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the Order on Consent Index #W3-0079-8704, Site # 336019 for the site, and thereby subject to applicable penalties.

1.1.3 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. In accordance with the Environmental Easement for the site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.2 SITE BACKGROUND

1.2.1 Site Location and Description

The site is located in the Town of New Windsor, County of Orange, New York and is identified as Section 3 Block 1 and Lot 2 on the Town of New Windsor Tax Map. The site is an approximately 18.52-acre area bounded by US Air National Guard property to the north, a privately owned parcel to the south and US Interstate 87 to the east and a vacant parcel to the west (see Figure 1).

1.2.2 Site History

The Town of New Windsor landfill was operated by the Town from approximately 1962 to 1978 reportedly accepting both municipal and industrial waste. Available information indicates the site received up to 3000 drums of paint sludge and 6000 drums from a drum recycling company. Other local industries reputedly utilized the

site to dispose of industrial materials. A phase I investigation was undertaken in 1983. A phase II study was completed by a NYSDEC contractor in 1985. A remedial investigation was initiated by the Town of New Windsor in 1990 and a landfill closure plan and construction activities proceeded during 1993 resulting in closure of the landfill and reclassifying the site from a 2A classification to a 4 classification. Maintenance and monitoring of the site have been undertaken since completion of the landfill cap. As a note, the Order on Consent is Index #W30079-8704 signed on 18 January 1989. The site does not contain any structure with the exception of a small materials shed storing supplies for the leachate collection system and pump station.

Approximately 16000 cubic yards of material belonging to the landfill were identified on lands of the New York State Air National Guard and subsequently removed. This material was excavated from the adjoining property and placed on the landfill site for final grading material (Shown on Figure 1). The excavated area was filled with clean material in order to remove the volume of fill that had been placed off site. A 2 +/- acre parcel to the west of the site owned by a private entity was purchased by the Town of New Windsor in order to allow for capping of material that had been placed off site on the adjoining property. Additional buffer area was purchased in order to provide adequate control around the landfill perimeter.

1.2.3 Geologic Conditions

1.2.3.1 Water Supply and Distribution

Three major water supply systems service areas in the vicinity of the NWLF. The New Windsor Consolidated Water District (NWCWD) supplies the eastern part of the Town of New Windsor bounded by the New York State Thruway and Silver Stream on the west, parts of the Town and City of Newburgh on the north, the Hudson River on the east, and the Town of Cornwall to the south, altogether an area of approximately 8 square miles.

No water is supplied to the residential areas west of the New York State Thruway except for part of the Stewart Airport Complex and a couple of homes on Silver Stream Road southwest of the NWLF. Two homes on Liner Rd east of the NYS Thruway and NWLF are not served by the New Windsor Water District.

The Town of New Windsor's principal water source is the New York City Catskill Aqueduct. Auxiliary sources owned by the district include three Little Falls wells and a well located in the vicinity of Route 32 in the south-central portion of the New Windsor Water District (NWCWD).

The City of Newburgh water system provides water service throughout the city. In past years, water service was also provided, on a limited basis, to adjacent areas in the Towns of Newburgh and New Windsor. The outside service has been discontinued in recent years because both of the towns have developed their own sources of supply of sufficient capacity to meet their present needs, while at the same time, the city system has been deficient in supply in dry years to meet use within the city.

The City of Newburgh's water supply is obtained entirely from surface water reservoirs located in the central and northerly parts of the Town of New Windsor. The principal source is Washington Lake located 2.5 miles southeast of Newburgh's business district and immediately east of the New York State Thruway and the NWLF at the New Windsor –Newburgh Town line. Brown's Pond is also used and is located to the west of the NYS Thruway in the middle of the Town of New Windsor.

The second major water supply system is The Newburgh Consolidated Water District (NCWD) which supplies the urbanized area of the Town of Newburgh and includes most residential developments. The district extends from the Newburgh Town-City boundary in an arc from Stewart Airport and the New Windsor town line, clockwise, through the Interstate 84 interchange with Route 17K to the Hudson River. The NCWD presently uses Chadwick Lake as its sole source of supply. The lake is located in the northern part of the Town.

The third major water system is composed solely of groundwater sources. Several small non-municipal community groundwater systems are located in the Town of New Windsor in the vicinity of the NWLF, which include four small water systems (all trailer parks) are located approximately 1-2 miles southwest of the site, and serving between 50-115 people.

1.2.3.2 Physiography

Orange County has a land area of 850 square miles. Based on variations in bedrock lithology, Orange County has been divided into three distinct physiographic provinces: New England (southeast), Valley and Ridge (central) and Appalachian Plateau (west). Two mountain ranges extending in a northeast-southwest direction bound the County to the southeast and west. The Hudson Highlands and Ramapo Mountains, extending across the southeast portion of the county, lie within the New England Province. The Shawangunk Mountains in the western corner of the County lie within the Appalachian Plateau. The central portion of Orange County, which includes the NWLF and the Newburgh area, is characterized by low, gently rolling relief and is part of the Valley and Ridge Province.

The topography of the area immediately around the NWLF can be characterized as gentle to moderately rolling. The hills and drainage basins are aligned in a general northeast-southwest direction. The relief ranges from an elevation of 301 feet (MSL) at Washington Lake east of NWLF to over 600 feet (MSL) on Stewart Airport property to the west. The NWLF is at a slightly higher elevation than the natural surrounding low-lying wetlands area in which it was built. The average elevation of the landfill is 350 feet (MSL) which (on average) is 10 feet higher than the wetlands immediately to the west, north and northeast. The hills to the west and south rise to about 440 feet MSL in a relatively short distance.

1.2.3.3 Regional Geology

Orange County may be divided into three main areas characterized by distinguishing geologic features:

1. *The rugged Hudson Highlands and Ramapo Mountains adjacent to the Rockland County Line and the Hudson River.* These formations were caused by the folding and faulting of granite, gneiss and limestone rocks dating from the Cambrian and pre-Cambrian periods.

2. *The wide, gentle sloping valleys of the Wallkill River, Quassaick Creek and parts of the Moodna Creek drainage basins.* This area, located in the central portion of the county, is a wide band which comprises 2/3 of the county extending from southeast to northwest. The area is underlain by Ordovician Age shales and siltstone of the Normanskill Formation.

The area surrounding the NWLF is underlain by alternating layers of siltstone and shales of the Normanskill Formation. These rocks were compressed and folded by pressure exerted from the southeast. As a consequence, the long axis of the isoclinal folds trend slightly east of north.

Directly southeast and northeast of the site, there are isolated areas underlain by Cambrian Age crystalline rocks. These isolated rock masses, called "klippers," resulted from the erosion of thrust planes which separated these rocks from the rocks of the Hudson Highlands to the southeast.

The majority of the bedrock in Orange County is overlain by unconsolidated material which was deposited in part by glaciers in Pleistocene time and in part by the present day streams. Stream-laid deposits of recent origin, however, are thin and restricted to a few, narrow, discontinuous valley areas, whereas the glacial deposits are widespread, more continuous, and relatively thick in lowland areas.

The deposits of Pleistocene Age (stratified and unstratified drift) comprise the following: (1) till (unstratisfied drift) consisting of a mixture of rock materials deposited directly by the ice; and (2) stratified drift, including sorted and stratified gravel, sand, silt and clay laid down in melt-water streams and lakes.

Till is a glacial deposit consisting generally of an unstratified and unsorted mixture of rock fragments ranging in size from clay to large boulders, wherein the relative proportions of clay and boulders are highly variable form place to place. Most of Orange County is mantled by deposits of till whose thickness varies spatially. Till thickness is usually greatest in valleys and on the lower slopes of hillsides, and least on the hilltops.

Most of the till in the county appears to have been laid down as lodgement till which consists of highly compressed, poorly drained clay-rich glacial sediment deposited

directly on the ground beneath the ice sheet as it invaded the area from the north during the Pleistocene period. The remainder is ablation till deposited when the ice melted. Lodgement till may be extremely compact and hard; such till is usually called "hardpan" by well drillers in the area. Ablation till is relatively loose material, as it simply was dropped onto the underlying ground when the ice melted.

Stratified deposits of gravel, sand, silt and clay, also called stratified drift, were laid down to a varying thickness in most of the valleys in the county by glacial melt-water streams and lakes during the Pleistocene Epoch. Deltas of sand and gravel were built into the lakes where streams entered them and silt and clay were deposited in deeper portions.

1.2.3.4 Regional Geology

Monitoring wells located above the 350' elevation were installed as part of remediation of a different site located on Stewart Airport properties and are no longer monitored as part of the New Windsor Landill Site. These wells are shown on Figure 3 with either an MW or JMW prefix.Figure 3 is for reference only to this section of the report and are not the same as the monitoring wells shown in Figure 1.

The bedrock underlying all but a small portion of the site is part of the Normanskill Formation. These rocks consist of dense, medium dark gray argillaceous shale interbedded with siltstone. The southeast corner of the site is underlain by a light gray dolomite-limestone bedrock of the Wappinger's Group. A combination of thrust and gravity faults separates these lithological units.

The shale was hard, thinly laminated with lenses of secondary calcite deposits filling fractures throughout the upper portion of the rock. The shale northeast and northwest of the landfill was fragmented from a depth of 0-2 feet, becoming more competent with depth. Only slight weathering was observed along fracture surfaces in the upper portion of the rock. The shale below 2 feet is moderately fractured with most of the fractures and core breaks dipping 40-60 feet degrees vertical, and generally follows bedding surfaces. There were areas of rust-colored oxidation present in the upper 3-10 feet of the rock. The shale bedrock along the eastern border of the site was soft, brittle, thinly laminated, very

fractured, and highly weathered. The fractures dip approximately 40 degrees from vertical. Rust-colored oxidation and secondary calcite deposits were evident throughout the upper portion of the rock.

Bedrock encountered underlying the southeast corner (NW-6D) of the site was a dense, fine-grained, light gray dolomite-limestone. There were many fractures and core breaks throughout the upper 15 feet of the rock. The fractures and core breaks were generally horizontal and had secondary calcite deposits on most surfaces. Areas of rust-colored oxidation were evident scattered throughout the upper 10 feet of the bedrock.

The transition from unconsolidated deposits to competent, unweathered bedrock is fairly abrupt, generally from 0 to 2 feet. Only at NW 5D was the transition gradual, where the shale bedrock was very weathered to a depth of 10 feet. Well locations are shown in Figure 1. In general, the bedrock surface west of the site slopes steeply to the southeast and east, from a bedrock high along the side slope of the hill northwest of the NWLF. The bedrock surface continues to slope to the southeast and east under the site; however, the slope becomes gradual beneath the NWLF.

The unconsolidated deposits overlying bedrock at the site consist of unstratified glacial till deposits, stratified glacial drift deposits, and marsh deposits.

The till deposits consisted of an unsorted heterogeneous mixture of rock fragments ranging in size from clay to large boulders. Both lodgement and ablation tills were present at the site. Lodgement till consisted of a highly compressed, poorly drained, silt-rich gray glacial sediment which was very hard, widely graded, and contained a high percentage of angular gravel, as well as some sand, cobbles, and boulders. Lodgement till was present directly overlying the bedrock beneath the southern portion of the site. The thickness of this deposit ranges from 50 feet at NW-6D and NW-5D and pinches out to the north. No till deposits were encountered at NW-2D or NW-4D located in the northwest and northeast portion of the site, respectively. Till, however, was encountered at MW-3D north of the NWLF underlying the stratified drift deposits. The other type of till present at the site is ablation till which consisted of a medium-dense, brown unsorted deposit of silt, sand, gravel and clay. Ablation till is present overlying the lodgement till in the southern portion of the site. At NW-6D, this deposit is 25 feet thick and thins west

to 15 feet at NW-1D and north to 11 feet at NW-5D. Ablation till was not encountered in any of the boring drilled in the northern portion of the site.

Stratified drift deposits a the site consisted of sorted gravel, sand, silt and clay. Stratified drift deposits are present in the northern portion of the site directly overlying bedrock at NW-2D and NW-4D and overlying lodgement till at NW-3D. It appears these deposits were laid down in a lake at the till at NW-3D. It appears these deposits were laid down in a lake at the valley floor which had streams entering from the west. There were approximately 25 feet of stratified fine to coarse deposits present at NW-2D. Towards the center of the valley at NW-3D and NW-4D, there was 15 feet interfingered with coarser sand and gravel deposits. The stratified deposits at NW-3D and NW-4D are overlain by marsh deposits consisting of dark brown peat which contained some black silt. The peat deposit is 7 feet thick at NW-3D and thickens to 17 feet to the southeast at NW-4D. The marsh deposits are also present underlying the fill in the northern portion of the landfill. The thickness of the marsh deposit varied from 5 feet at NW-3D to 15 feet at NW-2D. These marsh deposits are high in organic content and have a high capacity to attenuate various contaminating compounds which may reduce their environmental impact. These deposits were underlain by gray lacustrine silt and clay deposits. A geologic section is shown in Figure 2. A bedrock groundwater flow figure is shown in Figure 3.

1.3 SUMMARY OF REMEDIAL INVESTIGATION FINDINGS

A Remedial Investigation (RI), dated August 1990, was performed to characterize the nature and extent of contamination at the site. The results of the RI are described in detail in The Remedial Investigation and Feasibility Study (RI/FS), which can be found at the Town of New Windsor Town Hall.

Underground Storage Tanks

No underground storage tanks were identified on the site or are known to exist on the site today.

1.4 SUMMARY OF REMEDIAL ACTIONS

The following is a summary of the Remedial Actions performed at the site:

1. Removal of drum nests identified during Magner Thomaner surveys (1990).
2. Excavation of 16000 cubic yards of offsite materials and placement of material over existing landfill (1991).
3. Construction and maintenance of cover system consisting of engineered cap system to prevent human exposure to remaining contamination (1991-2).
4. Installation of leachate collection system and associated pump station to convey collected leachate to Town of New Windsor publicly owned treatment works (POTW) (1991-2).
5. Installation of fence to control access to entire capped landfill (1991-2)

1.4.1 Site-Related Treatment Systems

A leachate collection system has been installed on the Town of New Windsor landfill site in accordance with the approved design plans. Leachate collection along the western portion of the cap as well as the northern portion of the cap conveys leachate to a leachate pump station located at the northwestern portion of the site. The leachate pump station conveys collected leachate via a 4 inch diameter ductile iron pipe to the existing Town of New Windsor sanitary sewer system located at the crest of the hill southwest of the landfill site within Silver Stream Road. Monitoring of the leachate is performed monthly in accordance with a permit issued by the Town of New Windsor POTW.

1.4.2 Remaining Contamination

No specific analysis of the remaining contamination on the Town of New Windsor landfill site has been prepared. Ongoing monitoring of the site groundwater was required by the general operation and maintenance manual approved by NYSDEC dated October 18, 1993.

2.0 ENGINEERING AND INSTITUTIONAL CONTROL PLAN

2.1 INTRODUCTION

2.1.1 General

Since remaining contaminated soil, groundwater and soil vapor exist beneath the site, Engineering Controls and Institutional Controls (EC/ICs) are required to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of all EC/ICs at the site. The EC/IC Plan is one component of the SMP and is subject to revision by NYSDEC.

2.1.2 Purpose

This plan provides:

- A description of all EC/ICs on the site;
- The basic implementation and intended role of each EC/IC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the features to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of EC/ICs, such as the implementation of the Excavation Work Plan for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the site remedy, as determined by the NYSDEC.

2.2 ENGINEERING CONTROLS

2.2.1 Engineering Control Systems

2.2.1.1 Soil Cover and Cap

Exposure to remaining contamination in soil/fill at the site is prevented by a soil cover system placed over the site. This cover system is comprised of 24 inches of clean soil as well as the engineered cap system and gas venting layer. The Excavation Work Plan that appears in Appendix A outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed and any underlying remaining contamination is disturbed. Procedures for the inspection and maintenance of this cover are provided in the Monitoring Plan included in Section 4 of this SMP.

Procedures for operation and maintenance are documented in the Operation and Maintenance Manual (Section 4 of this SMP). Procedures for monitoring the system are included in the Monitoring Plan (Section 3 of this SMP). The Monitoring Plan also addresses severe condition inspections in the event that a severe condition, which may affect controls at the site, occurs.

2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when effectiveness monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.6 of NYSDEC DER-10.

2.2.2.1 Composite Cover System

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

2.2.2.2 Passive Soil Vapor Venting System

The New Windsor Landfill has been designed and constructed with a passive gas venting system consisting of an 8-ounce geotech style system, a geonet spatial system

and an additional 8-ounce geotech style system. These are tied into perforated 'schedule 40' 6" PVC gas vents which are capable of venting gas from the gas venting layer and under the cap system. Perforations extend to the base of the landfill geomembrane cap. The passive gas venting system is monitored periodically for explosive gases. During initial construction, flame arresters were installed on all gas detection devices to prevent accidental ignition of the contaminant source. The venting system has functioned as designed over the last 15 years providing a method of venting gases from under the landfill cap. Periodic monitoring of well headspace for monitoring wells surrounding the landfill is utilized to confirm functioning of the passive gas venting system. No explosive gases have been recorded in the wellspace or in the headspace of any well during routine monitoring. Landfill gas vents consistently are identified as venting gases to the atmosphere. A copy of the original design detail for the passive gas venting system is shown in Figure 9.

2.3 Institutional Controls

A series of Institutional Controls is required by the ROD to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the site to open space with restricted access uses only. Adherence to these Institutional Controls on the site is required by the Environmental Easement and will be implemented under this Site Management Plan. These Institutional Controls are:

- Compliance with the Environmental Easement and this SMP by the Grantor and the Grantor's successors and assigns;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- All Engineering Controls on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP;
- Groundwater, soil vapor, leachate and other environmental or public health monitoring must be performed as defined in this SMP;

- Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP;

Institutional Controls identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement.

The site has a series of Institutional Controls in the form of site restrictions. Adherence to these Institutional Controls is required by the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- The property is currently vacant open fields with no use permitted. Any change in use will be submitted to NYSDEC for approval prior to any potential change in use. It is not anticipated any use of the site will be proposed.
- The property may not be used for a higher level of use, other than vacant open space without additional remediation and amendment of the Environmental Easement, as approved by the NYSDEC;
- All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- The use of the groundwater underlying the property is prohibited without treatment rendering it safe for intended use;
- Vegetable gardens and farming on the property are prohibited;
- The site owner or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable.

2.3.1 Excavation Work Plan

The site has been remediated for restricted open space use. Any future intrusive work that will penetrate the soil cover or cap, or encounter or disturb the remaining contamination, including any modifications or repairs to the existing cover system will be performed in compliance with the Excavation Work Plan (EWP) that is attached as Appendix A to this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) prepared for the site. A sample HASP is attached as Appendix C to this SMP that is in current compliance with DER-10, and 29 CFR 1910, 29 CFR 1926, and all other applicable Federal, State and local regulations. Based on future changes to State and federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP will be updated and re-submitted with the notification provided in Section A-1 of the EWP. Any intrusive construction work will be performed in compliance with the EWP, HASP and CAMP, and will be included in the periodic inspection and certification reports submitted under the Site Management Reporting Plan (See Section 5).

The site owner and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all intrusive work, the structural integrity of excavations, proper disposal of excavation water from de-watering activities, control of runoff from open excavations into remaining contamination, and for structures that may be affected by excavations (such as building foundations and bridge footings). The site owner will ensure that site development activities will not interfere with, or otherwise impair or compromise, the engineering controls described in this SMP.

2.3.2 Soil Vapor Intrusion Evaluation

The Town of New Windsor has no intention of requesting or allowing any structures on the site; therefore, no soil soil vapor intrusion evaluation will be required.

2.4 INSPECTIONS AND NOTIFICATIONS

2.4.1 Inspections

Inspections of all remedial components installed at the site will be conducted at the frequency specified in the SMP Monitoring Plan schedule. A comprehensive site-wide inspection will be conducted annually, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether Engineering Controls continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria;
- Sampling and analysis of appropriate media during monitoring events;
- If site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring systems.

Inspections will be conducted in accordance with the procedures set forth in the Monitoring Plan of this SMP (Section 3). The reporting requirements are outlined in the Periodic Review Reporting section of this plan (Section 5).

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the EC/ICs implemented at the site by a qualified environmental professional as determined by NYSDEC.

2.4.2 Notifications

Notifications will be submitted by the property owner to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the Order on Consent 6NYCRR Part 375, and/or Environmental Conservation Law.
- 15-day advance notice of any proposed ground-intrusive activities pursuant to the Excavation Work Plan.

- Notice within 48-hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the site, including a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser has been provided with a copy of the Order on Consent, and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing.

2.5 CONTINGENCY PLAN

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions.

2.5.1 Emergency Telephone Numbers

In the event of any environmentally-related situation or unplanned occurrence requiring assistance, the Owner or Owner's representative(s) should contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel should be contacted. Prompt contact should also be made to the Town Engineer. These emergency contact lists must be maintained in an easily accessible location at the site.

Table 1: Emergency Contact Numbers

Medical, Fire, and Police:	911
One Call Center:	(800) 272-4480 (3 day notice required for utility markout)
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362
Town of New Windsor Town Supervisor (George Greene)	(845) 563-4610
Town Engineer (Dick McGoey)	(845) 563-4616
Town of New Windsor Police	(845) 565-7000

* Note: Contact numbers subject to change and should be updated as necessary

2.5.2 Map and Directions to Nearest Health Facility

Site Location: North End of Square Hill Road

Nearest Hospital Name: St Lukes Hospital

Hospital Location: 70 Dubois St, Newburgh, NY 12550-4898

Hospital Telephone: (845) 562-5428

Directions to the Hospital:

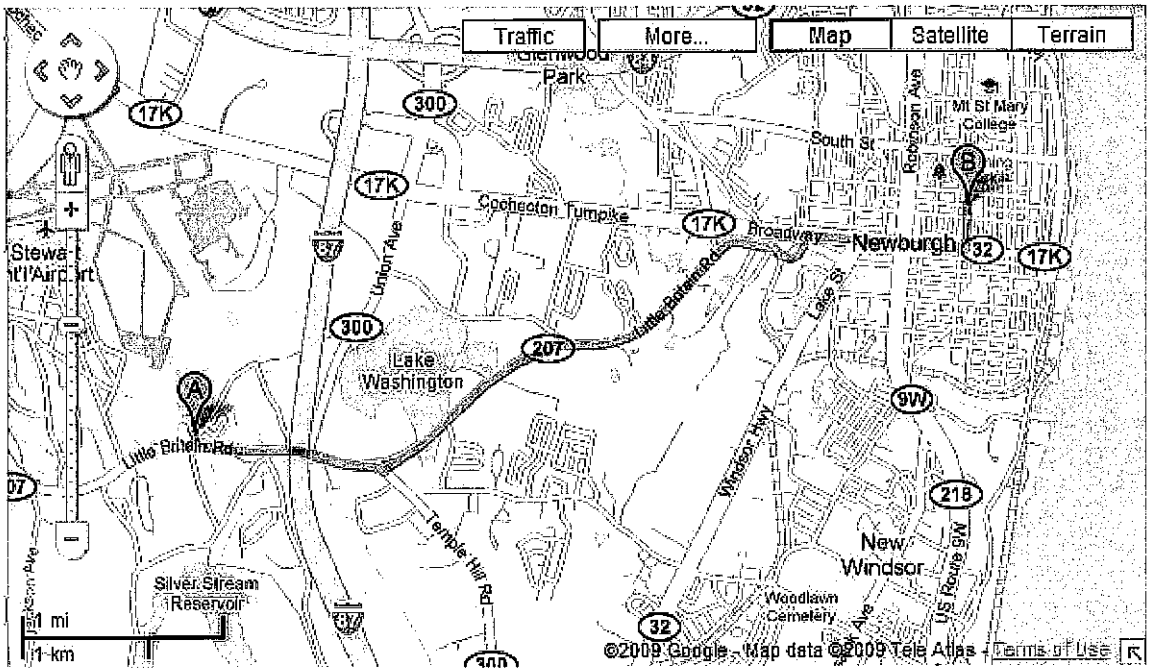
1. Head **southwest** on **Square Hill Rd** toward **Little Britain Rd/NY-207** — 144 ft
2. Turn **left** at **Little Britain Rd/NY-207** — 1.0 mi
   Continue to follow NY-207

3. Turn **left** at **Little Britain Rd/NY-207** Continue to follow Little Britain Rd	2.4 mi
4. Continue on **West St**	0.2 mi
5. Turn **right** at **Broadway**	0.5 mi
6. Take the 3rd **left** onto **Robinson Ave**	0.2 mi
7. Take the 2nd **right** onto **Carter St**	0.3 mi

Total Distance: 4.6 Miles

Total Estimated Time: 12 Minutes

Map Showing Route from the site to the Hospital:



2.5.3 Response Procedures

As appropriate, the fire department and other emergency response group will be notified immediately by telephone of the emergency. The emergency telephone number list is found at the beginning of this Contingency Plan (Table 1). The list will also be posted prominently at the site and made readily available to all personnel at all times. No structures exist on the site. The evacuation plan will consist of leaving the fenced area while locking the gate and awaiting emergency response personnel.

3.0 SITE MONITORING PLAN

3.1 INTRODUCTION

3.1.1 General

The Monitoring Plan describes the measures for evaluating the performance and effectiveness of the remedy to reduce or mitigate contamination at the site, the soil cover system, and all affected site media identified below. This monitoring plan may only be revised with the approval of NYSDEC.

3.1.2 Purpose and Schedule

This Monitoring Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater, leachate and soil vapor);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance, particularly ambient groundwater standards and Part 375 SCOs for soil;
- Assessing achievement of the remedial performance criteria;
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment; and
- Preparing the necessary reports for the various monitoring activities.

To adequately address these issues, this Monitoring Plan provides information on;

- Sampling locations, protocol, and frequency;

- Information on all designed monitoring systems (e.g., well logs);
- Analytical sampling program requirements;
- Reporting requirements;
- Quality Assurance/Quality Control (QA/QC) requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Quarterly and Annual monitoring of the performance of the remedy and overall reduction in contamination on-site will be conducted for the first 30 years, 15 of which have been completed. The frequency thereafter will be determined by NYSDEC. Trends in contaminant levels in air, soil, and/or groundwater in the affected areas, will be evaluated to determine if the remedy continues to be effective in achieving remedial goals. Monitoring programs are summarized in Table 3 and outlined in detail in Section 3.2 below.

Table 2: Monitoring/Inspection Schedule

Monitoring Program	Frequency*	Matrix	Analysis
Groundwater	Quarterly for wells 6S, 6D, 9S and 11S	Groundwater	Part 360 baseline with VOCs
Groundwater	Annually for all other wells	Groundwater	Part 360 baseline with VOCs
Air Monitoring	Annually	Gas vents	Explosive gas
Leachate	Quarterly	Water	Per pretreatment permit by POTW
Site Security and general condition	Quarterly		Field Review

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC and NYSDOH

3.2.1 Groundwater Monitoring

Groundwater monitoring wells were installed during the Remedial Investigation/ Feasibility Study (RI/FS) as well as the post-construction phase in order to adequately monitor groundwater in and around the landfill. Figure 1 contains a map depicting the location of each of the groundwater monitoring wells. Reference to S and D on the map indicates whether they are shallow or deep bedrock monitoring wells. Appendix D contains the installation logs for each of the monitoring wells except for MW-7D. Fifteen years of sampling have been performed on the wells at the site. Based on extensive groundwater monitoring performed on the site to date, the following table of wells and sampling parameters are proposed as of the date of approval of this Site Management Plan.

Table 3 – Sampling Parameters

Monitoring Well	Reporting Frequency	Metals Tested
1S	Annually	Part 360 Baseline with VOCs, Refer to Methods Summary Appendix F
1D	Annually	
3S	Annually	
3D	Annually	
4S	Annually	
4D	Annually	
6S	Quarterly	
6D	Quarterly – Broke between 1998 and 2006	
7D	Annually	
8S	Annually – no sample since 2003	
8D	Annually	
9S	Quarterly	
10S	Annually	
10D	Annually	
11S	Quarterly	
LCMH-2	Visual Inspection Only	
LCMH-4A	Visual Inspection Only	

A well with an "S" suffix denotes a shallow well, while a well with a "D" suffix denote a deep well, which may be a bedrock well. The deep wells, which are bedrock wells, are MW-4D, MW-6D, MW-7D,MW-8D and MW 10D.

The sampling frequency may be modified with the approval NYSDEC. The SMP will be modified to reflect changes in sampling plans approved by NYSDEC.

Deliverables for the groundwater monitoring program are specified below.

3.2.1.1 Sampling Protocol

All monitoring well sampling activities will be recorded in a field sheet with chain of custody and a groundwater-sampling log presented in Appendix E. Other observations (e.g., well integrity, etc.) will be noted on the well sampling log. The well sampling log/chain of custody will serve as the inspection form for the groundwater monitoring well network.

3.2.1.2 Monitoring Well Repairs, Replacement and Decommissioning

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced (as per the Monitoring Plan), if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of monitoring wells for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent periodic report. Well decommissioning without replacement will be done only with the prior approval of NYSDEC. Well abandonment will be performed in accordance with NYSDEC's "Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC. There has been no repair or decommissioning.

3.2.1.3 Surface Water Samples

Surface Water samples will be taken in shallow, moving water. Two surface water sampling points are located on the site; SW-1 is at the discharge from the former sediment pond west of monitoring wells 3D and 3S and at the upstream side of the NYS Thruway culvert (SW-2). Care should be taken to avoid collection of sediment or turbid discharges. If no water is present at the sampling points during the sampling event, this should be noted in the sample log. Each time a point is sampled, the previous methods must be consistently applied.

3.3 SITE-WIDE INSPECTION

Site-wide inspections will be performed on a regular schedule at a minimum of once a year. Site-wide inspections will also be performed after all severe weather conditions that may affect Engineering Controls or monitoring devices. During these inspections, an inspection form will be completed (Appendix E). The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection;
- Compliance with permits and schedules included in the Operation and Maintenance Plan; and
- Confirm that site records are up to date.

3.4 MONITORING QUALITY ASSURANCE/QUALITY CONTROL

All sampling and analyses will be performed in accordance with the requirements of the Quality Assurance Project Plan (QAPP) prepared for the site (Appendix G). Main Components of the QAPP include:

- QA/QC Objectives for Data Measurement;

- Sampling Program:
    - Sample containers will be properly washed, decontaminated, and appropriate preservative will be added (if applicable) prior to their use by the analytical laboratory. Containers with preservative will be tagged as such.
    - Sample holding times will be in accordance with the NYSDEC ASP requirements.
    - Field QC samples (e.g., trip blanks, coded field duplicates, and matrix spike/matrix spike duplicates) will be collected as necessary.
- Sample Tracking and Custody;
- Calibration Procedures:
    - All field analytical equipment will be calibrated immediately prior to each day's use. Calibration procedures will conform to manufacturer's standard instructions.
    - The laboratory will follow all calibration procedures and schedules as specified in USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.
- Analytical Procedures;
- Preparation of a Data Usability Summary Report (DUSR), which will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method;
- Internal QC and Checks;
- QA Performance and System Audits;
- Preventative Maintenance Procedures and Schedules;
- Corrective Action Measures.

3.5 MONITORING REPORTING REQUIREMENTS

Forms and any other information generated during regular monitoring events and inspections will be kept on file. All forms, and other relevant reporting formats used during the monitoring/inspection events, will be (1) subject to approval by NYSDEC and (2) submitted at the time of the Periodic Review Report, as specified in the Reporting Plan of this SMP.

All monitoring results will be reported to NYSDEC on a periodic basis in the Periodic Review Report. The report will include, at a minimum:

- Date of event;
- Personnel conducting sampling;
- Description of the activities performed;
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air, etc);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether groundwater conditions have changed since the last reporting event.

Data will be reported in hard copy or digital format as determined by NYSDEC. A summary of the monitoring program deliverables are summarized in Table 4 below.

Table 4: Schedule of Monitoring/Inspection Reports

Task	Reporting Frequency*
Site Plan	Quarterly
Site Inspection Reports	Quarterly
Pump Station Reports	Daily; Report Quarterly
Tabular and Graphical analytical reports	Quarterly
Surface Water Sample	Annually
Gas Vent Monitoring	Annually
Groundwater Elevation Analysis	Annually
Town of New Windsor POTW/DMR's	Annually
Laboratory Backup Data	Annually

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC

4.0 OPERATION AND MAINTENANCE PLAN

No additional engineering controls exist at this site.

5. INSPECTIONS, REPORTING AND CERTIFICATIONS

5.1 SITE INSPECTIONS

5.1.1 Inspection Frequency

All inspections will be conducted at the frequency specified in the schedules provided in the Monitoring Plan found in Section 3 of this Site Management Plan. At a minimum, a site-wide inspection will be conducted annually. Inspections of remedial components will also be conducted when a breakdown of any treatment system component has occurred or whenever a severe condition has taken place, such as an erosion or flooding event that may affect the ECs.

5.1.2 Inspection Forms, Sampling Data, and Maintenance Reports

All inspections and monitoring events will be recorded on the appropriate forms contained in Appendix E. Additionally, a general site-wide inspection form will be completed during the site-wide inspection (see Appendix E). These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including all media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format in the Periodic Review Report.

5.1.3 Evaluation of Records and Reporting

The results of the inspection and site monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- EC/ICs are in place, are performing properly, and remain effective;

- The Monitoring Plan is being implemented;
- Operation and maintenance activities are being conducted properly; and, based on the above items,
- The site remedy continues to be protective of public health and the environment and is performing as designed in the RAWP and FER.

5.2 CERTIFICATION OF ENGINEERING AND INSTITUTIONAL CONTROLS

After the last inspection of the reporting period, a qualified environmental professional will prepare the following certification:

For each institutional or engineering control identified for the site, I certify that all of the following statements are true:

- The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;
- The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;
- Nothing has occurred that would impair the ability of the control to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;
- Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;
- If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;
- Use of the site is compliant with the environmental easement;
- The engineering control systems are performing as designed and are effective;

- To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program [and generally accepted engineering practices]; and
- The information presented in this report is accurate and complete.
- I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner's Designated Site Representative] [I have been authorized and designated by all site owners to sign this certification] for the site.

The signed certification will be included in the Periodic Review Report described below.

For each institutional control identified for the site, I certify that all of the following statements are true:

- No new information has come to my attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and

Every five years the following certification will be added:

- The assumptions made in the qualitative exposure assessment remain valid.

The signed certification will be included in the Periodic Review Report described below.

5.3 PERIODIC REVIEW REPORT

A Periodic Review Report will be submitted to the Department every year . A single Periodic Review Report will be prepared that addresses the site described in Figure 1 . The report will be prepared in accordance with NYSDEC DER-10 and submitted within 45 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site;
- Results of the required annual site inspections and severe condition inspections, if applicable;
- All applicable inspection forms and other records generated for the site during the reporting period in electronic format;
- A summary of any discharge monitoring data and/or information generated during the reporting period with comments and conclusions;
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends;
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted electronically in a NYSDEC-approved format;
- A site evaluation, which includes the following:
    - The compliance of the remedy with the requirements of the site-specific RAWP, ROD or Decision Document;
    - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
    - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;
    - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan; and
    - The overall performance and effectiveness of the remedy.
- A performance summary for all treatment systems at the site during the calendar year, including information such as:
    - The number of days the system was run for the reporting period;
    - The average, high, and low flows per day;

- The contaminant mass removed;
- A description of breakdowns and/or repairs along with an explanation for any significant downtime;
- A description of the resolution of performance problems;
- A summary of the performance, effluent and/or effectiveness monitoring; and
- Comments, conclusions, and recommendations based on data evaluation.

The Periodic Review Report will be submitted, in hard-copy and electronic format to the NYSDEC Central Office and Regional Office in which the site is located, and in electronic format to the NYSDOH Bureau of Environmental Exposure Investigation.

APPENDIX A – EXCAVATION WORK PLAN (EWP)

A-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the Department. Currently, this notification will be made to:

John Rashak at NYSDEC Region 3, 21 S Putt Corners Rd, New Paltz, NY 12561

Project Manager

COMMUNITY AIR MONITORING PLAN

A Community Air Monitoring Plan (CAMP) will be provided to the New York State Department of Environmental Conservation should excavation into the landfill mass be undertaken. The site has been closed for an excess of 15 years and no excavation activities have been required. A specific plan for any activities which may potentially compromise the cap will be submitted prior to undertaking such activities. The site currently contains a gas venting layer which functions to release vapors from the cap landfill. Ongoing monitoring of the gas venting system is performed periodically in accordance with the General Operation, Maintainence and Monitoring Manual. As previously identified, an excavation workplan will be submitted should physical removal of the cap be required for some unforeseen condition. Part of the excavation plan will be a community air monitoring plan specifiacally tailored for the activities proposed.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent, plans for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control,

- A summary of environmental conditions anticipated in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work,
- A summary of the applicable components of this EWP,
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120,
- A copy of the contractor's health and safety plan, in electronic format, if it differs from the Health and Safety Plan (HASP) provided in Appendix C of this document,
- Identification of disposal facilities for potential waste streams,
- Identification of sources of any anticipated backfill, along with all required chemical testing results;
- The site has been remediated since 1993 with no need to perform excavation activities on the site. It is not anticipated that excavation activities will occur on the site. Should excavation of materials be required a specific plan and report will be submitted for review and approval to NYSDEC prior to any excavation activities on the site. The site owners and contract personnel are aware of the system components and the fact that excavation of the site is not permitted without the notification outlined above.

A-2 STOCKPILE METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC.

A-3 MATERIALS EXCAVATION AND LOAD OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

A-4 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks will be washed prior to leaving the site. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Truck transport routes will be determined if excavation becomes necessary. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

A-5 MATERIALS DISPOSAL OFF-SITE

All soil/fill/solid waste excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the

NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at a minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

A-6 FLUIDS MANAGEMENT

All liquids to be removed from the site, including excavation dewatering and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, but will be managed off-site.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

A-7 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities, the cover system will be restored in a manner that complies with the Record of Decision. The demarcation layer, consisting of orange snow fencing material or equivalent material will be replaced to provide a visual reference to the top of the 'Remaining Contamination Zone', the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this Site Management Plan. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by

asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the 'Remaining Contamination'. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in any updates to the Site Management Plan.

A-8 BACKFILL FROM OFF-SITE SOURCES

It is not anticipated that material will be brought in from off site for any reason. However, if this occurs, all materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

A-9 STORMWATER POLLUTION PREVENTION

Site is in stabilized condition. If work is proposed, the work will be performed in compliance with the item specified below. Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

A-10 CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the periodic reports prepared pursuant to Section 5 of the SMP.

A-11 ODOR CONTROL PLAN

No nearby receptors exist in vicinity of landfill. No nuisance odors have been reported since landfill closure in early 90s. Odor control plan will be submitted to DEC if odor issues are identified.

A-12 DUST CONTROL PLAN

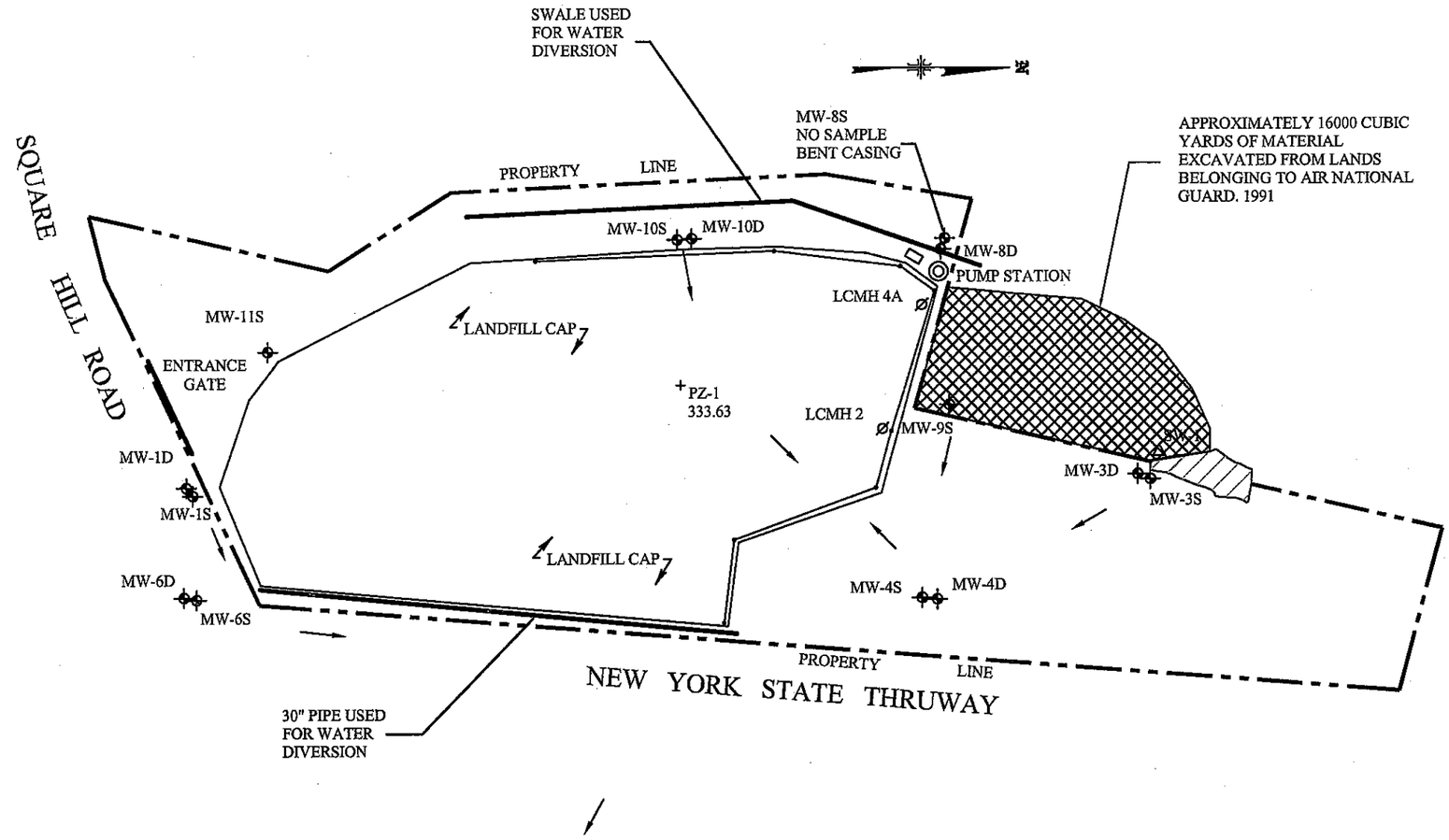
A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

A-13 OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.



WELL	ELEVATION TOP OF WELL CASING (FEET)	DEPTH (FEET)
MW-1S	358.44	21.5
MW-1D	357.29	30.0
MW-3S	336.87	14.5
MW-3D	336.53	28.0
MW-4S	338.31	14.0
MW-4D	338.31	38.0
MW-6S	357.73	23.5
MW-6D	356.51	93.0
MW-7D	351.23	95.0
MW-8S	340.20	15.0
MW-8D	339.15	45.0
MW-9S	339.29	14.5
MW-10S	339.80	15.0
MW-10D	339.16	60.0
MW-11S	359.64	15.0
PZ-1	352.43	21.5
LCMH-2	344.89	12.42
LCMH-4A	341.88	8.85

SW-2 △

48" C.M.P. CULVERT

LEGEND:

⊕MW-	MONITORING WELL
⌀ LCMH-	LECHATE COLLECTION MANHOLE
+ PZ-	PIEZOMETER
△SW-	SURFACE WATER SAMPLE LOCATION
⟵	SHALLOW GROUNDWATER FLOW

NOTE:

Lechate collection trench is located on the west and north ends of the landfill cap. Consists of a perforated pipe with gravel backfill discharging to lechate pump station wet well via gravity. Pump station discharges via force main to existing town collection system within Silver Stream Rd.

GROUNDWATER ELEVATION PLAN

McGOEY, HAUSER and EDSALL CONSULTING ENGINEERS, P.C.
33 Airport Center Drive, Suite 202, New Windsor, New York 12553, (845) 567-3100
111 Wheatfield Drive, Suite 1, Milford, Pennsylvania 18337, (570) 296-2765
540 Broadway, Monticello, New York 12701, (845) 794-3391

Revision	Date	Description

Plan for:

TOWN OF NEW WINDSOR LANDFILL POST CLOSURE

Town of New Windsor, Orange County, New York

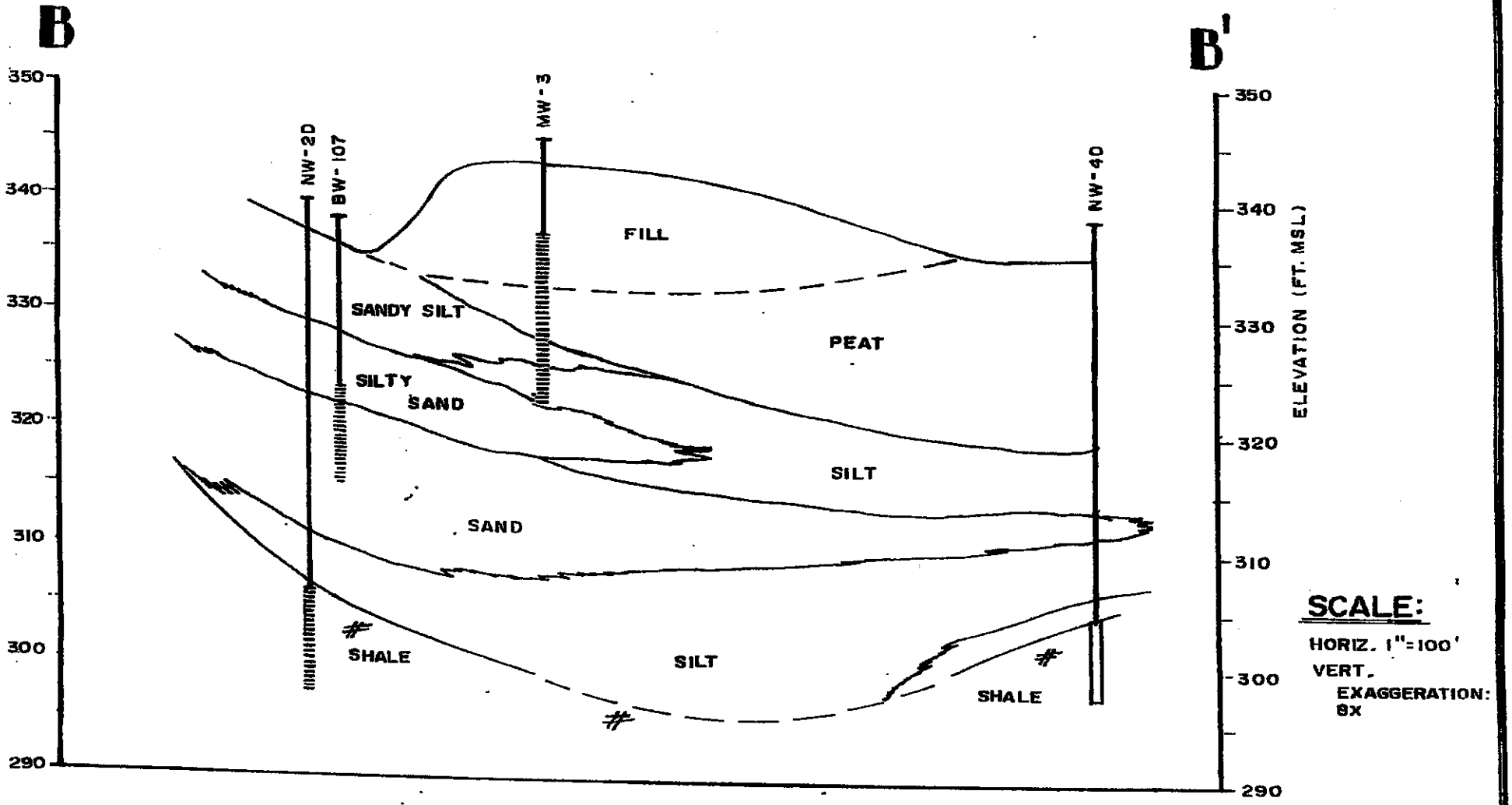
Design: P.J.H./J.R.S.
Drawn: D.J.S.
Checked: M.J.E.
Scale:
Date: 15 September 2009
Job No: 94-116

ENVIRONMENTAL MONITORING PLAN FOURTH QUARTER 2007

Sheet: 1 Of:

file: 4-2007(1)

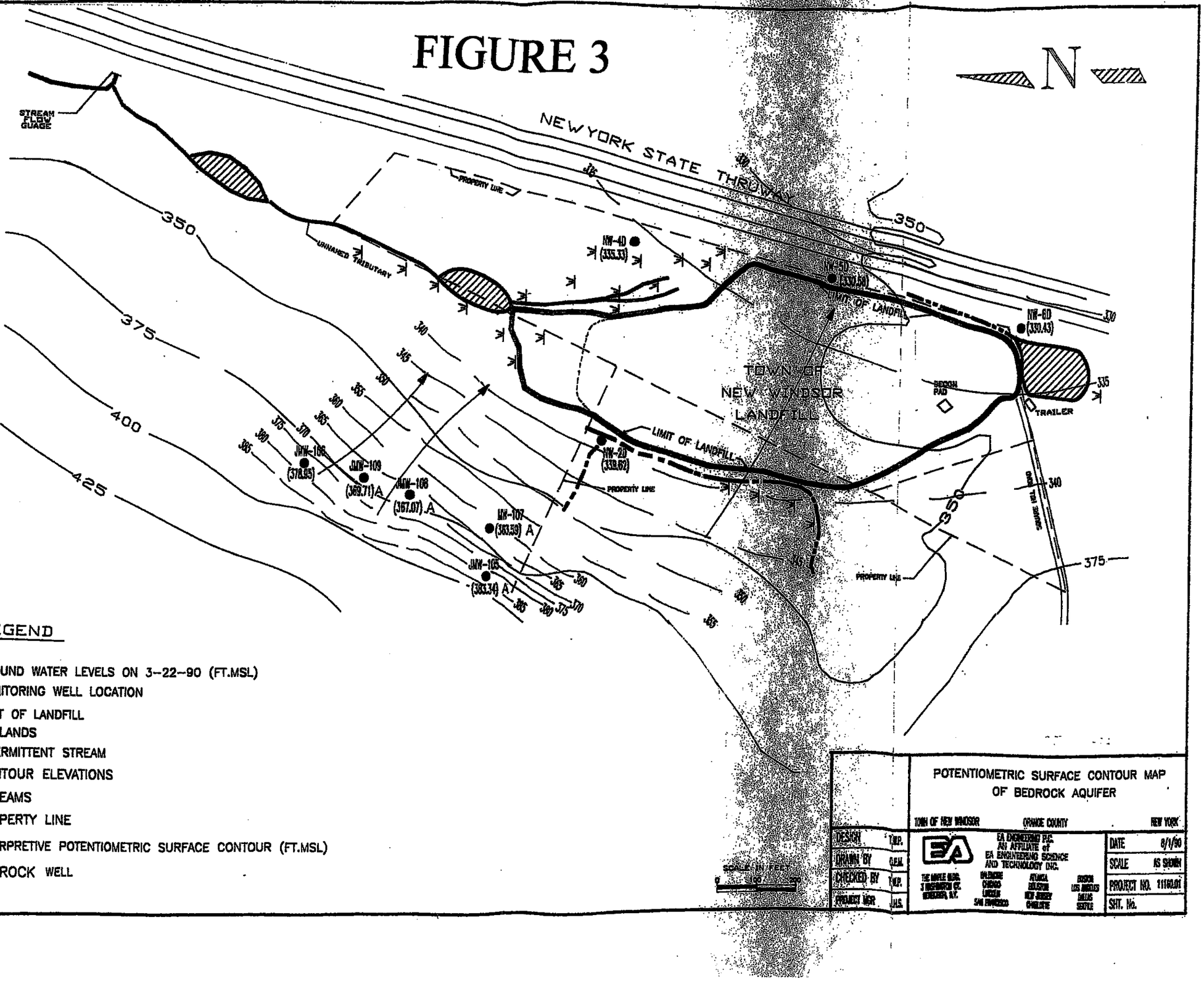
FIGURE 2



Interpretive Geologic Profile B-B'

EA ENGINEERING P.C.
AN AFFILIATE of
EA ENGINEERING SCIENCE
AND TECHNOLOGY INC.

FIGURE 3



POTENTIOMETRIC SURFACE CONTOUR MAP OF BEDROCK AQUIFER

TOWN OF NEW WINDSOR ORANGE COUNTY NEW YORK

DESIGN	T.M.P.
DRAWN BY	C.E.M.
CHECKED BY	T.M.P.
PROJECT MGR.	J.M.S.

EA ENGINEERING P.C. AN AFFILIATE of EA ENGINEERING SCIENCE AND TECHNOLOGY INC.

THE MAPLE BLDG. 3 WASHINGTON CT. NEWBURGH, N.Y.

BALTIMORE CHICAGO LINCOLN SAN FRANCISCO

ATLANTA DALLAS NEW JERSEY OAKLAND

BOSTON LOS ANGELES DENVER SEATTLE

DATE	8/1/90
SCALE	AS SHOWN
PROJECT NO.	11160.01
SHT. No.	

FIGURE 4

SUMMARY OF RESULTS FROM ORGANIC ANALYSES OF TEST PIT SOILS FOR THE TOWN OF NEW WINDSOR LANDFILL

Parameter	Frequency of Detection	Mean[1,2]	Range[1]
Ethylbenzene	1/9	3,250[3]	ND-450J
Xylene	2/9	4,800	ND-12,000
Toluene	2/9	97,800	ND-880,000
Acetone	3/9	7,200[3]	ND-200J
Naphthalene	3/9	2,600	ND-6,400
2-methylnapthalene	4/9	1,960[3]	ND-1,800J
Acenaphthene	4/9	1,600	ND-2,300
Dibenzofuran	4/9	1,990[3]	ND-1,400J
Fluorene	5/9	2,200	ND-2,500
Phenanthrene	7/9	7,800	ND-21,00
Anthracene	6/9	2,400	ND-4,600
Fluoranthene	8/9	10,400	ND-25,000
Pyrene	7/9	9,100	ND-21,000
Benzo(a)anthracene	7/9	5,260	ND-13,000
Chrysene	7/9	4,800	ND-12,000
Benzo(b)fluoranthene	7/9	5,300	ND-13,000
Benzo(k)fluoranthene	7/9	3,900	ND-9,100
Benzo(a)pyrene	8/9	4,560	ND-11,000
Indeno(1,2,3-cd)pyrene	6/9	2,800	ND-4,200
Dibenzo(a,h)anthracene	2/9	2,200[3]	ND-1,600
Butylbenzylphthalate	3/9	4,180	ND-17,000
Bis(2ethylhexyl)phthalate	7/9	21,700	ND-190,000
Acenaphthylene	2/9	2,670[3]	ND-420J
Di-n-butyl phthalate	1/9	2,100[3]	ND-1,000
Benzo(g,h,i)perylene	5/9	2,300	ND-3,000
N-nitroso-diphenylamine	1/9	1,600	ND-11,000
2-methyl phenol	1/9	1,900[3]	ND-400J
Alpha-BHC	1/9	39[3]	ND-9.2
44'-DDD	1/9	82[3]	ND-51

1. All concentration units are in µg/kg (ppb).
2. Mean calculated setting non-detects at 0.5 sample quantitation limit.
3. Mean exceeded maximum value due to elevated detection limits in certain samples.

NOTE: J = reported concentration is an estimated value following QA/QC review of data.

FIGURE 5

SUMMARY OF RESULTS FROM ORGANIC AND INORGANIC ANALYSIS OF WEST PROPERTY GROUND-WATER SAMPLES[1] FOR THE TOWN OF NEW WINDSOR LANDFILL

Parameter	BW-102	BW-106	BW-107	BW-108
Volatile organics	ND[2,3]	ND	ND	ND
PCBs	ND	ND	ND	ND
TPH	ND	ND	ND	ND
Arsenic	11	29	8.6	ND
Barium	340	670	200	130
Cadmium	ND	12	ND	ND
Chromium	40	70	10	60
Lead	150	16	87	47
Mercury	0.45	0.70	0.45	ND

1. Data from Tectonic (1989).
2. Concentration units are in µg/ℓ (ppb).
3. ND = not detected.

Figure 5 (cont.)

SUMMARY OF RESULTS FROM SURFACE WATER QUALITY PARAMETERS FOR THE TOWN OF NEW WINDSOR LANDFILL

Parameter	Frequency of Detection	Mean[1,2]	Range[1]
Chloride	6/6	171	135 - 250
Fluoride	0/6	---	---
Ammonia (as N)	4/6	5.8	ND - 11.1
Nitrate	0/6	---	---
Sulfate	3/6	19.0	ND - 73.7
Alkalinity	6/6	199.3	108-252
Hardness	6/6	238.3	131-293
pH	6/6	6.81	6.12-7.2

[1] All concentration units are in mg/ℓ.
[2] Mean calculated setting non-detect at 0.5 SQL.

FIGURE 6

SUMMARY OF RESULTS FROM *TENAX TRAP SOIL VAPOR ANALYSES FOR THE TOWN OF NEW WINDSOR LANDFILL

Parameter	Frequency of Detection	Mean[1,2]	Range[1]
Chloroform	1/10	3.9	ND-30
1,1,1-trichloroethane	5/10	3.2	ND-14
Heptane	10/10	1,740	6-9,300
Benzene	10/10	126	6-546
1,2-dichloroethane	1/10	21	ND-200
Trichloroethene	8/10	348	ND-3,100
Toluene	10/10	9,160	130-36,000
Tetrachloroethene	4/10	2	ND-8
Chlorobenzene	3/10	25.2	ND-110
Ethylbenzene	10/10	216	10-960
Total xylenes	10/10	850	43-3,700
Isopropylbenzene	9/10	39	ND-104

1. All concentration units are in $\mu g/m^3$.
2. Mean calculated setting non-detects at 0.5 SQL.

* A device used to sample air on a time-weighted average

August 1990

Figure 7

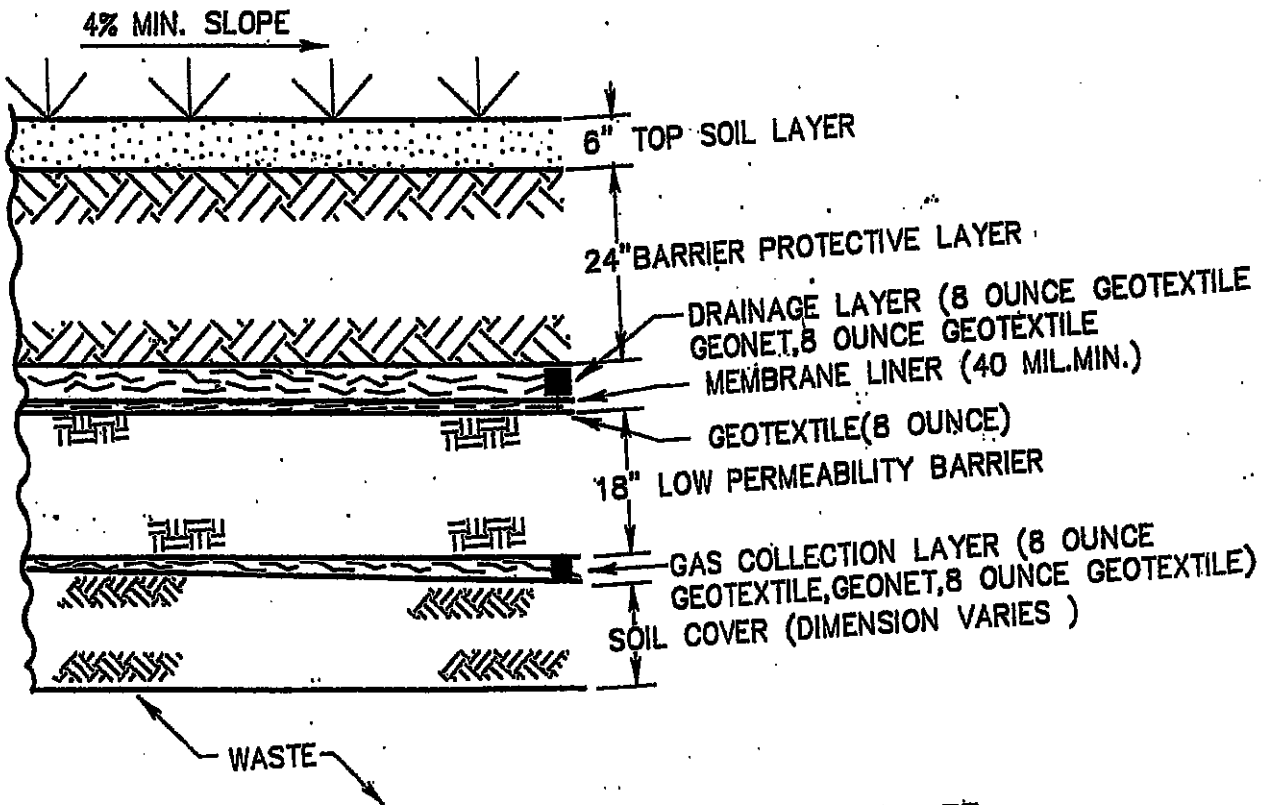
Exceedences for Annual Sampling Event

Antimony	UG/L	3
Arsenic	UG/L	25
Barium	UG/L	1000
Beryllium	UG/L	4
Cadmium	UG/L	5
Calcium	UG/L	N.S.
Chloride	MG/L	250
Chromium	UG/L	50
Color (Pt/Co. Units)	PT/CO	15
Copper	UG/L	200
Cyanide, Total	UG/L	200
Iron	UG/L	300
Magnesium	UG/L	35000
Mercury	UG/L	0.7
Nickel	UG/L	100
Selenium	UG/L	10
Silver	UG/L	50
Sodium	UG/L	20000
Sulfate	MG/L	250
Thallium	UG/L	2
Zinc	UG/L	5000

1,2 Dichlorobenzene	UG/L	5
1,4 Dichlorobenzene	UG/L	5
Acetone	UG/L	5
Acrylonitrile	UG/L	5
Benzene	UG/L	5
Carbon Disulfide	UG/L	5
Chlorobenzene	UG/L	5
Chloroethane	UG/L	5
Chloromethane	UG/L	5
Chorobenzene	UG/L	5
Hexanone	UG/L	5
m,p-Xylene	UG/L	5
Methyl Ethyl Ketone	UG/L	5
Methylene Chloride	UG/L	5
m-Xylene	UG/L	5
o-Xylene	UG/L	5
p-Isopropyltoluene	UG/L	5
Tetrachloroethane	UG/L	5
Toluene	UG/L	5

FIGURE 8

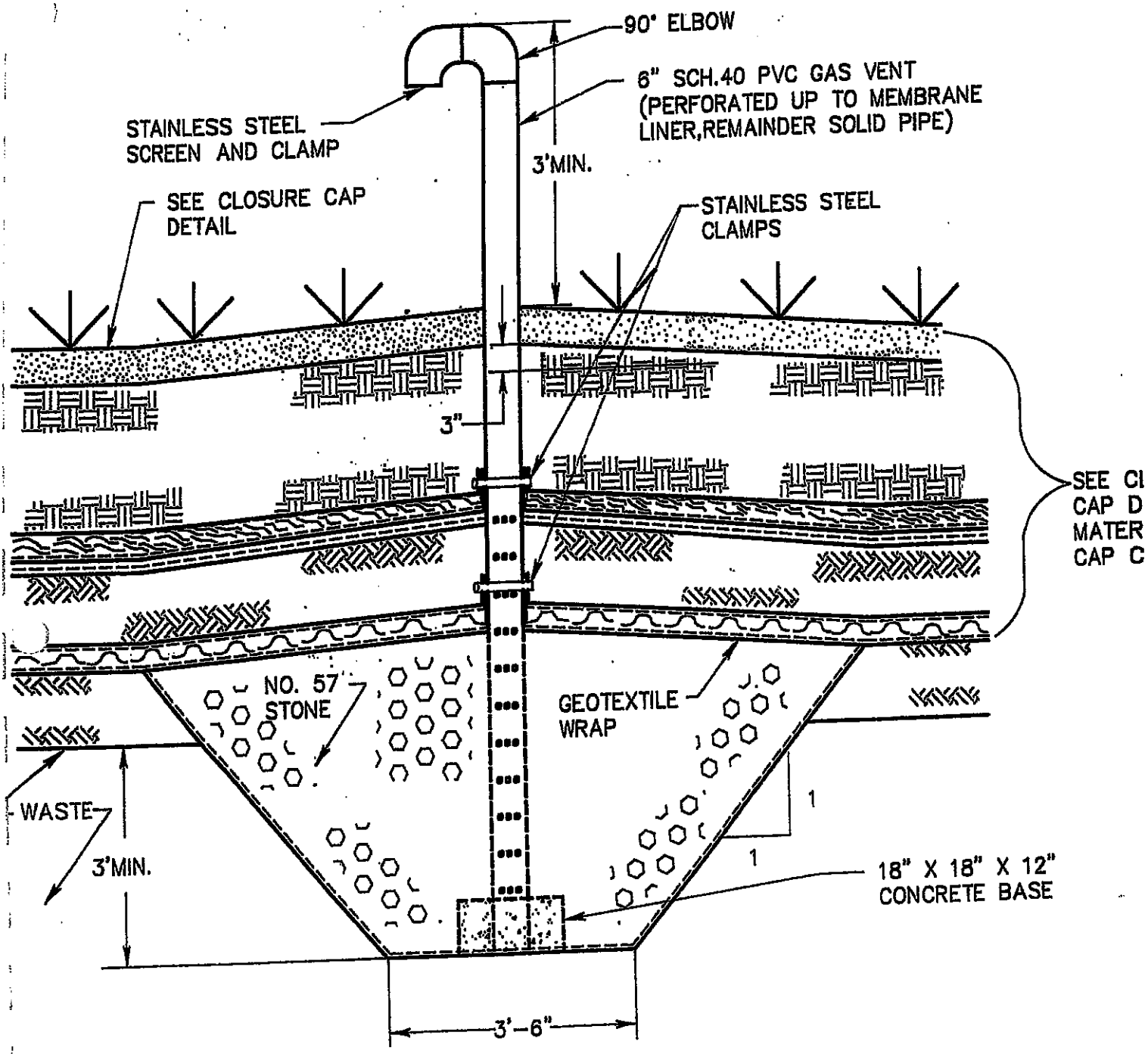
CLOSURE CAP AND GAS VENTING DETAILS (2 PAGES)



CLOSURE CAP DETAIL

SCALE : NONE

FIGURE 8 (cont).



GAS VENT RISER DETAIL

SCALE + NONE

APPENDIX A

APPENDIX A – EXCAVATION WORK PLAN (EWP)

A-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the Department. Currently, this notification will be made to:

John Rashak at NYSDEC Region 3, 21 S Putt Corners Rd, New Paltz, NY 12561

Project Manager

COMMUNITY AIR MONITORING PLAN

A Community Air Monitoring Plan (CAMP) will be provided to the New York State Department of Environmental Conservation should excavation into the landfill mass be undertaken. The site has been closed for an excess of 15 years and no excavation activities have been required. A specific plan for any activities which may potentially compromise the cap will be submitted prior to undertaking such activities. The site currently contains a gas venting layer which functions to release vapors from the cap landfill. Ongoing monitoring of the gas venting system is performed periodically in accordance with the General Operation, Maintainence and Monitoring Manual. As previously identified, an excavation workplan will be submitted should physical removal of the cap be required for some unforeseen condition. Part of the excavation plan will be a community air monitoring plan specifiacally tailored for the activities proposed.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent, plans for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control,

- A summary of environmental conditions anticipated in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work,
- A summary of the applicable components of this EWP,
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120,
- A copy of the contractor's health and safety plan, in electronic format, if it differs from the Health and Safety Plan (HASP) provided in Appendix C of this document,
- Identification of disposal facilities for potential waste streams,
- Identification of sources of any anticipated backfill, along with all required chemical testing results;
- The site has been remediated since 1993 with no need to perform excavation activities on the site. It is not anticipated that excavation activities will occur on the site. Should excavation of materials be required a specific plan and report will be submitted for review and approval to NYSDEC prior to any excavation activities on the site. The site owners and contract personnel are aware of the system components and the fact that excavation of the site is not permitted without the notification outlined above.

A-2 STOCKPILE METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC.

A-3 MATERIALS EXCAVATION AND LOAD OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

A-4 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks will be washed prior to leaving the site. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Truck transport routes will be determined if excavation becomes necessary. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

A-5 MATERIALS DISPOSAL OFF-SITE

All soil/fill/solid waste excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the

NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at a minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

A-6 FLUIDS MANAGEMENT

All liquids to be removed from the site, including excavation dewatering and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, but will be managed off-site.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

A-7 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities, the cover system will be restored in a manner that complies with the Record of Decision. The demarcation layer, consisting of orange snow fencing material or equivalent material will be replaced to provide a visual reference to the top of the 'Remaining Contamination Zone', the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this Site Management Plan. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by

asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the 'Remaining Contamination'. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in any updates to the Site Management Plan.

A-8 BACKFILL FROM OFF-SITE SOURCES

It is not anticipated that material will be brought in from off site for any reason. However, if this occurs, all materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

A-9 STORMWATER POLLUTION PREVENTION

Site is in stabilized condition. If work is proposed, the work will be performed in compliance with the item specified below. Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

A-10 CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the periodic reports prepared pursuant to Section 5 of the SMP.

A-11 ODOR CONTROL PLAN

No nearby receptors exist in vicinity of landfill. No nuisance odors have been reported since landfill closure in early 90s. Odor control plan will be submitted to DEC if odor issues are identified.

A-12 DUST CONTROL PLAN

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

A-13 OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

APPENDIX B

ENVIRONMENTAL EASEMENT TO BE ADDED AT A LATER DATE

APPENDIX C

EA Report No. 11160.03

Draft

Health and Safety Plan
Post-Closure Period
Town of New Windsor Landfill
New Windsor, New York

Prepared for

Town of New Windsor
55 Union Avenue
New Windsor, New York 12553

Prepared by

EA Engineering, P.C.
The Maple Building
3 Washington Center
Newburgh, New York 12550

And Its Affiliate EA Engineering, Science, and Technology

John H. Samuelian, Ph.D., Project Manager Date

Kris H. Holem, Certified Industrial Hygienist Date

September 1993

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1. INTRODUCTION

1.1 PURPOSE

The purpose of this Health and Safety Plan (HSP) is to provide personnel with protection standards and mandatory safety practices, procedures, and contingencies while performing site inspections, sample collections, and maintenance of the Town of New Windsor Landfill (NWLF). This HSP addresses the following regulations and guidance documents:

- Occupational Safety and Health Administration (OSHA) Standards for General Industry, 29 CFR 1910 (especially 29 CFR 1910.120 "Hazardous Waste Operations and Emergency Response").
- OSHA Standards for Construction Industry, 29 CFR 1926 (particularly 29 CFR 1926.652 for trenching requirements).
- National Institute of Occupational Safety and Health (NIOSH), OSHA, U.S. Environmental Protection Agency (U.S. EPA), and U.S. Coast Guard "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," October 1985.

Several sections of the HSP are not pertinent to routine activities at the site, i.e., non-invasive site inspections or general maintenance such as lawn mowing. Activities which would be classified as invasive, such as inspection of the leachate collection system piping and pump house, repair of the cap and gas vents, or repair of the leachate piping, where there is the potential for partial cap removal or waste excavation, would require compliance with all sections of the HSP.

1.2 RESPONSIBILITIES

The chain of command for health and safety-related issues during post-closure monitoring and maintenance activities at the NWLF site is delineated below.

1.2.1 All Personnel

All personnel who may perform invasive inspections, maintenance activity requiring disturbance of the cap or closure system, and sampling must follow the requirements of this HSP. Any unsafe conditions, accidents, injuries, or illnesses must be promptly reported to the Project Manager appointed by the Town.

1.2.2 Project Manager

Prior to the initiation of certain maintenance procedures, replacement, and/or construction operations, the Project Manager may assign industrial hygiene support personnel to execute

health and safety measures during project work, if required. The Project Manager will keep the Town officials informed of any substantial changes in HSP requirements.

Other Project Manager responsibilities include:

- Providing overall supervisory control for all health and safety protocols in effect for the project.
- Establishing and ensuring compliance of Town employees, subcontractor personnel, and visitors with site control areas and health and safety procedures.
- Investigating accidents and preparing any incident reports required.

1.2.3 Site Health and Safety Officer

If required, a Site Health and Safety Officer (SHSO) will be onsite during major maintenance and replacement activities and will be responsible for daily compliance with site health and safety requirements. It is not anticipated that an SHSO will be required during routine inspections, monitoring, or maintenance (e.g., lawn mowing). The SHSO will report directly to the Project Manager on all project-related health and safety matters.

Responsibilities of the SHSO include the following:

- Stopping work when unacceptable health or safety risks exist.
- Providing a health and safety briefing to all onsite personnel, including visitors.
- Conducting and documenting any necessary monitoring, including collection of air samples and heat stress monitoring.
- Supervising decontamination to ensure complete decontamination of all personnel, tools, and equipment.
- Supervising the distribution, use, maintenance, and disposal of personal protective clothing and equipment.
- Ensuring that personnel, including subcontractor personnel, assigned to the project meet the medical and training requirements for hazardous waste operations as delineated in the regulations and guidance listed in Section 1.1.
- Determine and implement any changes in personal protective clothing or respiratory protection.

2. KEY PERSONNEL

Listed below are the key personnel assigned by the Town Officials to the NWLF:

Title	Name
Project Manager	Town Engineer
Site Health and Safety Officer	To be provided with notification of excavation plans
Current Operator	Town of New Windsor
Involved Town Employees	Camo Pollution Control

3. PURPOSE AND SCOPE OF WORK

The work to be conducted during the post-closure period at the NWLF primarily includes:

- Routine site maintenance (e.g., lawn mowing)
- Groundwater well sampling
- Surface water sampling
- Leachate sampling
- Gas vent monitoring
- Site inspection (e.g., cap, fencing)
- Inspection of surface water outfall and retention pond.

During the post-closure period, operating personnel may be required to maintain and/or replace the following site components:

- The perimeter fencing
- Gas venting systems
- Vegetative cover
- Protective capping sections
- Stormwater controls (diversion trenches, swales, retention pond)
- Access roads
- Leachate collection
- Leachate pump station hardware
- Leachate force main
- Monitoring wells.

4. SITE DESCRIPTION

The NWLF is a former, sanitary landfill located in the Town of New Windsor, Orange County, New York. The site is bordered on the east by the New York State Thruway and on the west by the Stewart International Airport. The site received municipal and industrial waste from 1962 to 1976.

A Remedial Investigation/Feasibility Study was performed from 1989 to 1991 that identified an appropriate site closure remedy. Landfill closure involved waste mass consolidation and capping; with gas vent controls, leachate collection system, and surface water diversion system being installed in 1992-1993 as per the NYSDEC-approved Plans and Specifications developed by EA Engineering, P.C.

5. HAZARD ANALYSIS

Routine site inspections and maintenance are not anticipated to result in contact with site wastes. This chapter discusses the chemical and physical hazards that may be created during invasive disturbance of the cap, excavation into the waste, and sample acquisition.

5.1 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) ensembles will be assigned by work task as per Section 8 of this document to protect employees from potential exposure to contamination during the post-closure activities at the NWLF site. In addition, routine engineering controls and safe work practices will be implemented at these sites to reduce and maintain employee exposure at or below the OSHA-regulated permissible exposure limits or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values for specific hazardous materials.

5.2 CHEMICAL HAZARDS

A summary of the exposure symptoms and exposure guidance for substances detected at the site is provided in Table 1. Chemical exposure to personnel is dependent upon the activities performed. Therefore, the exposure of personnel to site-related contamination is discussed below by work task.

5.2.1 Inspection

Typical site inspection includes a comprehensive evaluation of the facility's working components. In general, the infrastructure and special construction items can be approached with sensible caution adhering to the protective measures pertaining to the sampling procedures. If major problems are discovered (i.e., torn or damaged liner, damaged gas vent riser, etc.), inspection personnel shall monitor air conditions and approach the area from the upwind direction. The inspection of the leachate pump chamber only requires a visual determination. The chamber threshold should not be broken for the task.

TABLE 1 HAZARDOUS SUBSTANCES LIST - NEW WINDSOR LANDFILL

Contaminant[1]	Maximum Concentration Detected in Soil or Water	PEL/TLV[2]	Signs and Symptons of Exposure
Benzene	ND - leachate water ND - soils 546 $\mu g/m^3$ - soil vapors	10 ppm 32 mg/m^3	Eye, nose, respiratory irritant; giddiness; headache; nausea
Toluene	240,000 $\mu g/\ell$ - leachate water 280,000 $\mu g/\kappa g$ - soils 36,000 $\mu g/m^3$ - soil vapors	50 ppm 147 mg/m^3	Fatigue, confusion, dermatitis, nervousness, insomnia, dizziness, headache
Total xylenes	ND - leachate water 12,000 $\mu g/\kappa g$ - soils 3,700 $\mu g/m^3$ - soil vapors	100 ppm 434 mg/m^3	Dizziness; excitement; drowziness; eye, nose, throat, irritant; nausea
Chloroethane	74 $\mu g/\ell$ - leachate water ND - soils ND - soil vapors	1,000 ppm 2,600 mg/m^3	Uncoordination, abdominal cramps, cardiac arrhythmias, cardiac arrest, liver/kidney damage
1,2-Dichloroethane	ND - leachate water ND - soils 200 $\mu g/m^3$ - soil vapors	1 ppm 4 mg/m^3	Eye irritant, CNS depression, dermatitis, vomiting
Trichloroethene	ND - leachate water ND - soils 3,100 $\mu g/m^3$ - soil vapors	50 ppm 269 mg/m^3	Eye irritant, visual disturbance, giddiness, nausea
Tetrachloroethene	ND - leachate water ND - soils 8 $\mu g/m^3$ - soil vapors	25 ppm 170 mg/m^3	Eye, nose, throat irritant; nausea; headache; vertigo; dizziness

1. Only contaminants found to be in excess of the analytical limits are reported.
2. Permissible Exposure Limit (OSHA from 29 CFR 1910.1000) or Threshold Limit Value (ACGIH from Threshold Limit Values and Biological Exposure Indices), whichever is lower, for time-weighted average exposure for an 8-hour work day or 40-hour work week.

TABLE 1 (Continued)

Contaminant[1]	Maximum Concentration Detected in Soil or Water	PEL/TLV[2]	Signs and Symptons of Exposure
Ethylbenzene	ND - leachate water 450 µg/kg - soils ND - soil vapors	100 ppm 434 mg/m^3	Eye irritant, sensitization, dermatitis, mucous membrane irritation
Total C-PAHs	76 µg/ℓ - leachate water 63,700 µg/kg - soils ND - soil vapors		Dermatitis, bronchitis, carcinogen
Napthalene	ND - leachate water 6,400 µg/kg - soils ND - soil vapors	10 ppm 50 mg/m^3	Eye irritation, headache, confusion, malaise, nausea
Barium	6,000 µg/ℓ - leachate water ND - soils ND - soil vapors	0.5 mg/m^3	Eye irritant, skin burns, upper respiratory irritant, spasm, slow pulse
Chromium	912 µg/ℓ - leachate water ND - soils ND - soil vapors	0.5 mg/m^3	Sensitization dermatitis
Copper	2,600 µg/ℓ - leachate water ND - soils ND - soil vapors	0.1 mg/m^3	Mucous membrane/pharynx irritation, nasal perforation, eye irritation, metal taste, dermatitis
Iron	1,799,000 µg/ℓ - leachate water ND - soils ND -soil vapors	5 mg/m^3	Benign pneumoconiosis, X-ray shadows indistinguishable from fibrotic pneumoconiosis
Zinc	112,000 µg/ℓ - leachate water ND - soils ND - soil vapors	5 mg/m^3	Metal fume fever, nausea, chills, shortness of breath, chest pain
Cyanide	167 µg/ℓ - leachate water ND - soils ND - soil vapors	5 mg/m^3	Skin and eye irritant, weakness, confusion, headache, nausea, vomiting

5.2.2 Sampling

During the post-closure period, operating personnel are required to conduct periodic environmental sampling. These recurrent tasks are itemized per event in the following sections.

5.2.2.1 Leachate Collection Sampling

Leachate samples will be obtained from the leachate chamber. In reference to Table 3 of the General Operation, Maintenance, and Monitoring Manual, heavy metals and several volatile organics are expected constituents. Therefore, the pump chamber is considered a confined space and not to be entered during sampling events. Personnel should remain upwind a safe distance from the entrance port while monitoring and recording organic vapor level, and measuring explosiveness. Recorded values shall warrant a continuous sampling procedures. Direct contact and inhalation should be avoided. Adverse effects include, but are not limited to, eye and respiratory irritation along with fatigue, giddiness, nausea, and confusion. Protective measures are presented in Table 2.

5.2.2.2 Groundwater Sampling

Previous groundwater samples indicate the presence of volatile organics. An organic vapor level and combustible gas reading are required prior to sampling the well. Acceptable conditions and protective measures (Table 2) will assure safety. Direct contact and/or inhalation may cause eye and respiratory irritation, as well as nausea, dizziness, and confusion.

5.2.2.3 Surface Water Sampling

It is expected that surface water sampling will not pose a threat or result in significant exposure. Contaminant levels are expected to be nil. Precautions and protection required are presented in Table 2.

5.2.2.4 Gas Vent Monitoring

The recorded levels of explosive gases necessary for periodic reports must be obtained with an organic vapor analyzer and combustible gas indicator. In doing so, the technician should position themselves upwind of the sampling area. Protective measures are presented in Table 2.

5.2.3 Maintenance Installation and/or Replacement

Known pump station maintenance schedules, as determined by the manufacturers, will require extreme caution. The pump chamber services leachate that contain various heavy metals and volatile organic compounds. A contained condition and possible explosion hazard exists. Prior to entry, the involved personnel must comply with the confined space entry guidelines presented as Attachment A.

TABLE 2 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

Work Task	Initial Level of Protection	Specific PPE
Pump chamber maintenance	C[1]	Tyvek coveralls, steel toe/shank boots, boot covers, safety glasses, latex inner gloves, nitrile outter gloves, and full-face respirators with organic vapor cartridges containing high efficiency particulate filters
Gas monitoring; site inspection; groundwater, leachate, and surface water sampling.	D[2]	Tyvek or cotton coveralls, steel toe/ shank boots with latex boot covers, latex inner gloves, nitrile outter gloves, and safety glasses
Required trench excavation and/or component replacement	C[1]	Tyvek coveralls, steel toe/shank boots, boot covers, safety glasses, latex inner gloves, nitrile outter gloves, and full-face respirators with organic vapor cartridges containing high efficiency particulate filters

1. If monitoring indicates, PPE may be upgraded to Level B by the SHSO, and personnel must then wear SCBA; Saranex coveralls, steel toe/ shank boots, latex boot covers, latex inner gloves with nitrile outer gloves, hard hat.
2. If monitoring indicates, PPE may be upgraded to Level C by the SHSO, and personnel must then wear full-face respirators with organic vapor cartridges containing high efficiency particulate filters.

During the facility's operational life, it may be necessary for personnel to replace deteriorating or damaged components. It is impossible to determine the condition or extent of unforeseen problems. Any discussion would be based on conjecture and should be resolved as they occur on a case-by-case basis.

5.3 PHYSICAL HAZARDS

Authorized Town of New Windsor personnel and/or a subcontractor performing an inspection or maintenance installation or replacement may be subject not only to the hazards of contaminant exposure, but also to dangers posed by the various task activities. In addition, heat stress caused by working in protective clothing may be encountered.

The physical hazards expected to be present at the site during sampling, maintenance, and any construction operating activities include:

- Snapping cables, slings, and rope
- Excavation equipment
- Sharp objects
- Open pits or ditches
- Excessive noise
- Fire/explosions
- Buried utility lines
- Energized overhead and underground power lines
- Heat stress
- Cold exposure
- Trench excavation
- Biological hazards (ticks, snakes)
- Sunburn and/or sun glare
- Confined space entry.

5.3.1 Abatement of Physical Hazards

Most of the physical hazards identified above will be abated through the use of good construction/excavation safety practices and common sense. Some of the hazards, however, require special precautionary procedures discussed in detail below.

5.3.2 Fire/Explosion

Whenever excavation involves exposure of fill material from the buried wastes, the potential for a fire/explosion may be present. The primary sources of flammable gases/vapors are methane, a by-product of the decay of organic material, and vapors from volatile organic compounds in the fill. If continuous monitoring of flammable gases in the area of any excavation exceed 10 percent of the lower explosive limit (LEL), work may proceed with caution. If concentrations reach 25 percent of the LEL or greater, spark-producing operations shall immediately cease and site workers shall leave the area of the excavation

until concentrations are reduced below 25 percent of the LEL. Details concerning onsite monitoring are discussed in Section 9.

Fire extinguishers will be provided to onsite personnel who will be trained in their use.

5.3.3 Buried Utility Lines

All utility companies will be contacted prior to site activities to ascertain the presence and location of underground cables, utility lines, pipes, and storage vessels at the proposed sites where drilling and excavating activities will take place if information on buried utilities is not available in existing project files. In addition, the as-built plans will be reviewed to determine the presence of underground cables, utility lines, pipes, and storage vessels. Drilling sites will also be screened for underground utilities using a pipe and cable locator prior to any drilling activities.

5.3.4 Drilling

As stated previously, selected locations for additional or replacement monitoring wells shall take into account buried utility pipes, wires, conduits, tanks, or other potentially dangerous structures. Overhead power lines and obstructions will also be surveyed. Prior to raising the rig mast, those areas overhead and surrounding the rig will be checked for clearance.

If, during drilling activities, there is any indication that underground tanks, drums, or other containers are being encountered, the drilling will be halted immediately and the Project Manager notified. Indications that a waste container may have been encountered include:

- Change in the speed or momentum of the auger
- Visual examination of auger cuttings
- Odor noted in the cuttings
- Presence of airborne total volatile organics as measured with a direct reading instrument.

5.3.5 Trench Excavation

Site health and safety procedures that must be followed during trenching must comply with OSHA standards and are discussed in detail in Attachment B.

5.3.6 Heat Stress

All personnel entering an established Exclusion Zone should be familiar with the signs and symptoms of heat stress.

These include:

- Heat Cramps - Painful contraction of voluntary muscles.
- Heat Exhaustion - Dizziness, lightheadedness, slurred speech, rapid pulse, confusion, fainting, fatigue, copious perspiration, cool skin that is sometimes pale and clammy, and nausea.
- Heat Stroke - Hot, dry, flushed skin; delirium, and coma (in some cases).

Heat stress can be prevented by resting frequently in a shaded area, and consuming large quantities of fresh, potable water and electrolyte replenishing fluids (i.e., Gatorade). If heat exhaustion symptoms are observed, the person will be required to rest in a shaded area and consume liquids. If symptoms are widespread or observed frequently, an appropriate work/rest regimen will be instituted. This may involve limiting the work period so that after one minute of rest, a person's heart rate does not exceed 110 beats per minute.

If the heart rate is higher than 110 beats per minute, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the heart rate is 110 beats per minute at the beginning of the next rest period, then the next cycle should be shortened by another 33 percent. Resting heart rate should be determined prior to starting onsite activities. A healthy individual's resting heart rate is usually 60-72 beats per minute.

If symptoms of heat stroke are observed, the victim will be transported to the nearest hospital immediately. Workers should not hesitate to seek medical attention if heat stroke is suspected.

5.3.7 Cold Exposure

Ambient temperatures at the site combined with the effects of wind and water may contribute to cold exposure. Temperatures need not be below freezing before the symptoms of cold exposure develop. Cases of hypothermia are often reported at temperatures ranging between 45 and 50 F when conditions are wet and gusty. Pain in the extremities is often the first early warning of danger to cold stress. Severe shivering indicates that the body temperature has fallen to 95 F; immediate removal to a warmer area is advised. Other symptoms indicating a need to enter a warm shelter include frostnip (the feeling of excessive fatigue, drowsiness, irritability, or euphoria).

As recommended by ACGIH, when temperatures are at or below 10 F (with wind chill considered), SHSO will be in attendance at all times, work involving heavy sweating will be avoided, and sitting or standing still in the cold temperatures will be minimized. In addition, a work-warming regimen as recommended by ACGIH in the ACGIH Threshold Limit Values and Biological Exposure Indices for 1988-1989 may be implemented by the SHSO.

5.3.8 Ticks and Lyme Disease

Lyme disease is a potentially serious disease that can affect the skin, joints, nervous system, and heart. The responsible infectious agent is a corkscrew-shaped bacteria which is transmitted to man by the deer tick (*Ixodes dammini*).

Lyme disease has been reported in 43 states. Specifically, the ticks are found in tall grass and brush and attach themselves to animals such as deer and mice, and sometimes humans. Through the biting and feeding of infected ticks, the bacteria enter man and thereby cause Lyme disease. Animal studies suggest that a tick usually needs to be attached for 24 hours or longer to transmit the disease.

Tick bites and resultant Lyme disease may occur any month; however, because of the tick's life cycle, most cases occur from May to November with the peak incidence of bites in June and July.

About 3-14 days after the tick bite, an expanding red round rash develops at the site of the bite. The rash may expand to several inches in diameter. The rash usually disappears in about four weeks. Many patients may develop flu-like symptoms with fever, headache, muscle stiffness, and joint pains.

Early generalized disease occurs several weeks to months later in untreated patients. Irregular heart beat may occur in about 8 percent of untreated patients. Approximately 15 percent of untreated patients develop neurological disturbances which may include headaches, or paralysis of facial muscles.

Months to years after the initial tick bite, late generalized disease may occur consisting of progressive arthritis, intellectual deterioration, or psychiatric disease.

The proper early diagnosis of Lyme disease is based upon recognizing the characteristic rash. Antibody blood studies are only reliable 4-6 weeks after a tick bite. The best treatment is prevention of tick bites. Antibiotics, oral penicillin, or tetracycline are effective in treating Lyme disease.

In later stages, intravenous antibiotics may be necessary.

To protect yourself from tick bites, avoid wooded or grassy areas that are inhabited by deer. When you must enter such areas, observe the following preventive measures:

- Wear long-sleeved shirts, long pants, and pull socks over the pant leg so ticks cannot attached themselves to exposed skin. Wear white or light colors and tightly woven fabrics.

- Use a repellent containing the ingredient DEET on exposed skin. Also, spray permethrin (sold as Permanone) on your clothes, particularly on pants legs and socks.

- Shower after exposure and check your body for ticks. The ticks are about the size of a pinhead; but after a meal of blood, they may increase to many times their original size. If you find any, promptly remove them with a pair of tweezers by grasping the tick as close to the mouth as possible and gently pull it away from your skin. Do not use matches or nail polish which may leave part of the tick behind.

6. TRAINING

6.1 SITE WORKERS

Site workers involved in site inspections and routine maintenance (e.g., lawn mowing) require no special training beyond general good work practices.

Personnel who may be performing invasive onsite tasks, such as sampling and site repairs, shall be trained as required by U.S. Department of Labor OSHA Standard, 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response." Training will include:

- A minimum of 40 hours of initial offsite instruction.

- A minimum of 3 days of actual field experience under the direct supervision of a trained, experienced supervisor.

- An 8-hour "refresher" training period annually.

- Additional training which addresses any unique or special hazards.

The date of training for each site worker will be documented on the Site Worker Training and Physical Examination Record presented in Table 3.

Onsite management and supervisors who are directly responsible for or who supervise employees shall receive at least 8 additional hours of specialized training on managing such operations. The date of this training will be documented on the Site Worker Training and Physical Examination Record presented in Table 3.

6.2 PRE-ENTRY ORIENTATION SESSION

Prior to entering the site, personnel shall attend a pre-entry orientation session presented by the SHSO. All personnel shall verify attendance at this meeting by signing the HSP Review Record shown in Attachment C.

TABLE 3 SITE WORKER TRAINING AND PHYSICAL EXAMINATION RECORD

SITE: _____

Name	Date Training Completed			Date of Last Physical Examination
	Initial	Annual	(*)	

SUBCONTRACTORS:

Name	Date Training Completed			Date of Last Physical Examination
	Initial	Annual	(*)	

Visitors entering designated work areas will be subject to all applicable health and safety regulations during field operations at the site. The SHSO is responsible for briefing the personnel onsite of potential contamination that may be encountered on the site, site health and safety plans, and emergency response plans. Visitors will be under the direct supervision of the SHSO or his/her representative.

At a minimum, the pre-entry orientation session shall discuss the potential health effects and hazards associated with exposure to chemicals known or suspected to be present onsite. The physical/chemical properties and likely routes of exposure to these chemicals will also be discussed. Personnel shall be instructed in the use, care, maintenance, limitations, and fitting of PPE. Respirator training shall conform to ANSI Z88.2 (1980) and OSHA 29 CFR 1910.134. Personnel shall not be fit-tested or issued a respirator if facial hair interferes with the face-to-facepiece seal of the respirator. Qualitative fit-testing shall be performed annually. Records of the fit-testing shall be maintained.

Positive/negative fit-testing shall be performed by the user each time a respirator is donned. Other items to be discussed include decontamination procedures, safe work practices, emergency procedures, and medical and training requirements.

7. MEDICAL REQUIREMENTS

All workers who may perform invasive inspections or repairs must have satisfactorily completed a comprehensive physical examination within the past 12 months as per 29 CFR 1910.120. The protocol for medical examinations is determined by the examining physician.

The date of the physical examination of each site worker, including subcontractors, will be documented on the Site Worker Training and Physical Examination Record shown on Table 3.

8. PERSONAL PROTECTIVE EQUIPMENT

PPE will not be required for routine maintenance (e.g., lawn mowing) or non-invasive inspection of the site. For those activities such as invasive inspection or cap repair, the levels of personal protection and specific PPE are shown in Table 2.

All respiratory protective equipment must be approved by NIOSH/Mine Health and Safety Administration. Minimum protective equipment requirements for each area identified in Section 10 are described in Table 2. All subcontractors will be responsible for providing their own PPE and personal decontamination equipment.

8.1 PERSONAL PROTECTIVE EQUIPMENT UPGRADE/DOWNGRADE CRITERIA

The level of PPE required may be upgraded/downgraded at the discretion of the SHSO based upon the total volatile organics readings and/or visible dust emissions.

8.2 MAINTENANCE AND IN-USE INSPECTION

Effective use of protective equipment requires that the equipment be properly used, maintained, and inspected periodically throughout the day. Procedures will be presented during pre-entry training.

8.2.1 Gloves/Body Coverings

Gloves and coveralls will be regularly inspected and replaced promptly if torn. Disposable coveralls will be replaced daily as a minimum requirement. Reusable cotton coveralls will be laundered daily. Reusable gloves will be decontaminated whenever exiting the Exclusion Zone or Contamination Reduction Zone.

8.2.2 Respirators

Respirators will be inspected and checked daily for leaks both visually and with negative or positive pressure checks on the wearer. Respirator cartridges will be replaced immediately if found that they have been subjected to gross contamination or if excessive resistance develops. All respirator maintenance will be performed by the employee with assistance and periodic inspection by the SHSO.

Respirator exteriors will be wet-wiped whenever exiting work areas, as specified in Section 11.4. Respirators will be rinsed with a solution containing a sanitizer recommended by the respirator manufacturer. Respirators will then be hung to drip dry and, if not used daily, placed inside plastic bags for protection against dust.

9. ENVIRONMENTAL MONITORING

9.1 GENERAL

Environmental monitoring will not be required for routine maintenance (e.g., lawn mowing) at the site. For any inspections or invasive activities, a total volatile organics analyzer instrument (e.g., HNu system) shall be used to periodically monitor airborne concentrations of contaminants on the site. The HNu system consists of a photoionization detector used to screen excavated areas for volatile organic compound contamination, to measure employee breathing zone levels of organic vapors and gases, and to avoid measurement of normal landfill methane gas.

Monitoring for flammable/combustible gases shall be performed using a combustible gas indicator/oxygen analyzer. All onsite work tasks will be monitored as detailed in Table 4. Measurements taken for each instrument will be logged in the Environmental Monitoring Record shown in Table 5.

9.2 REAL-TIME AIR MONITORING

The Air Monitoring Program will include sufficient monitoring of air quality in work zones and other onsite areas to assess levels of employee exposure, to determine that the work zone designations are valid, and to verify that the respiratory protection being worn by personnel is adequate. The Air Monitoring Program is also designed to ensure that contaminants are not migrating offsite to minimize exposure of nearby populations and/or workers.

Monitoring must be conducted:

- When work begins on a different portion of the site
- When contaminants other than those previously identified are being handled
- When a different type of operation is initiated
- If personnel are handling leaking drums or containers, or are working in areas with obvious liquid contamination
- When a sufficient, reasonable interval (e.g., at least every 2 hours) has passed so that exposures may have significantly increased.

Instruments shall only be used by employees who have been trained in the proper operation, use limitations, and calibration of the monitoring instrument and who have demonstrated the skills necessary to operate the instrument.

9.2.1 Perimeter Monitoring

Monitoring shall be conducted during invasive activities at the site at least twice each day with a total volatile organics direct-reading instrument at locations upwind and downwind at the site perimeter. Measurements shall also be taken periodically downwind of each active task site to assess the potential for offsite migration. If airborne levels of contaminants exceed background levels for a sustained period of time (i.e., 5 minutes) at the perimeter of the Exclusion Zone, then the Exclusion Zone shall be expanded to encompass all areas subjected to the elevated levels. If airborne levels of contaminants exceed background levels at the perimeter of the site, the work will be stopped, the suspected source of contamination will be covered to eliminate emissions, and the Project Manager will be notified. A decision will then be made as to how to proceed with the work and how to more fully characterize the airborne emissions.

TABLE 4 MONITORING INSTRUMENTS AND USAGE

Instrument	Work Tasks	Frequency and Location
HNu*	All site work	At the perimeter of the site at least twice daily or whenever conditions change
	Trench excavation and replacement procedures	Continuously in the breathing zone and at drum level
	Decontamination of equipment	At the perimeter of the Decon area
CGI/OA**	Drilling	2 in. above the auger opening before each flight is added
	Trench excavation and replacement procedures	Continuously in the work area
HCN Monitor***	Trench excavation and replacement procedures	Continuously in the work area

* If levels of total organics in the breathing zone exceed background levels for a sustained period of time (>5 minutes), personnel must wear respiratory protection (Level C Protection as detailed in Chapter 8). If total organics persist at levels greater than or equal to 5 ppm in the breathing zone, personnel must leave the site and contact the Project Manager. For tasks other than test pits or drum sampling, a determination must be made to continue work at Level C.

** If the LEL ranges between 10 and 25 percent, work may continue with extreme caution. If levels of combustible gases exceed 25 percent LEL, then all spark-generating operations must cease, and personnel must evacuate the Exclusion Zone until levels subside. The monitoring program may be increased, reduced, or modified by the SHSO, based on site conditions and monitoring results.

*** If cyanide levels exceed 2.5 mg/m^3 based on direct reading, then Level B PPE must be worn for the remainder of site activities in the area until levels fall below 2.5 mg/m^3 for a sustained period of time (e.g., 15 minutes).

TABLE 5 ENVIRONMENTAL MONITORING RECORD

SITE: _____

INSTRUMENT: _____

Time	Description of Location	Reading

Calibration Information:

Comments:

Technician: **Date:**

9.2.2 Calibration and Maintenance

All direct-reading instruments must be calibrated on a daily basis with a known concentration of calibration gas (typically isobutylene or methane, depending on the instrument). Instructions in the manufacturer's operations manual regarding cleaning and maintenance of the instruments shall be followed.

9.2.3 Recordkeeping Requirements

The results of air monitoring readings for each instrument shall be recorded on standard air monitoring data forms as illustrated by Table 5. For measurements taken continuously, readings at the anticipated source and in the breathing zone must be recorded at least twice for each new operation. More frequent recording may be done at the discretion of the SHSO. At the end of each workday, the SHSO will document each instance of non-compliance (if any) with the corrective action specified, and whether responsible employees responded to the corrective action. All exposure monitoring records will be attached to the master copy of this HSP and submitted to the Town. A calibration and maintenance log for each monitoring instrument shall also be maintained.

9.3 HEAT STRESS MONITORING

Ambient temperatures at the site combined with the requirements for PPE use may contribute to heat stress. When ambient temperatures reach or exceed 70 F, body temperatures will be monitored using fever strips or oral thermometers, and heart rates will be monitored when heat stress conditions occur. Work-rest regimes will be adjusted accordingly (Section 5.3.7).

9.4 COLD EXPOSURE MONITORING

Ambient temperatures at the site combined with the effects of wind and water may contribute to cold exposure. Temperatures need not be below freezing before the symptoms of cold exposure are exhibited. Cases of hypothermia are often reported at temperatures ranging between 45 and 50 F when conditions are wet and gusty. When such conditions develop or when ambient temperatures fall below freezing, increased onsite medical surveillance will be performed to detect the development of signs or symptoms, including shivering, apathy or lethargy, and numbness of the extremities.

Those personnel exhibiting early signs or symptoms shall have their body temperature monitored using an oral thermometer and shall receive further monitoring and first aid as necessary.

10. SITE CONTROL

Site control measures will be required when any invasive maintenance or replacement activities is to be performed at the site. These measures will not be required for routine inspections, sampling, or maintenance (e.g., lawn mowing).

A check-in and check-out system will be used to control and record each employee and piece of equipment inside the site boundaries. Only personnel identified as "authorized" will be permitted to enter the site. A master list of authorized personnel will be available and will only include personnel who have received the appropriate training and medical certification required by this HSP and OSHA requirements.

10.1 WORK ZONES

Work zones are designed to prevent employees, visitors, and the surrounding environment from exposure to contamination during all aspects of site activities. All work zones and support areas will be established by the SHSO. Movement of personnel and equipment between zones and on and off the site will be controlled by means of designated access points. All personnel who enter any of the work zones must sign the Site Entry and Exit Log as shown by Attachment D. Minimum PPE for work in each zone is described in Section 8. The following categories are the work zones:

- The Exclusion Zone - encompasses the surface areas around the location of invasive operations within a 50-ft radius.

- The Contamination Reduction Zone - will be established as a buffer zone between the Exclusion Zone and the Support Zone of each work site. All personnel and equipment leaving the Exclusion Zone will do so through the Contamination Reduction Zone. Personnel and equipment decontamination stations, described in Section 11, will take place in this zone.

- The Support Zone - will be established near the entrance gate. No special clothing or protective equipment is required in this area. Operational direction and support facilities (supplies, equipment, storage, and maintenance areas) will be located in this area. No equipment or personnel will be permitted to enter the Support Zone from the Exclusion Zone without removal of all potentially contaminated PPE.

10.2 SITE ENTRY AND EXIT

All persons entering an Exclusion Zone will be required to wear the PPE specified in Section 8.

The following protocols will be followed when leaving the Exclusion Zone and Contamination Reduction Zone:

- All personnel will exit through the designated exit points.
- All personnel will proceed through appropriate decontamination, as specified in Section 11.
- All protective equipment will be removed in the Contamination Reduction Zone.

10.3 COMMUNICATIONS

Standardized hand signals will be used to maintain communications between personnel in the various work zones throughout the duration of each specific operation when necessary. At least one person full trained in first aid and CPR must be in continuous visual and verbal contact with personnel who are working in test pits and handling drums.

10.4 "BUDDY" SYSTEM

All work in the Exclusion Zone will be scheduled so that no employee works alone in this zone at any time. Each team worker will maintain visual contact with another specified team worker at all times. The "buddy" system will ensure against an employee's becoming stressed without a co-worker being aware of his or her condition. Workers must "watch out" for each other while working close to potential chemical and physical hazards.

10.5 SAFE WORK PRACTICES

10.5.1 Site-Specific Practices

Safe work practices, which must be followed by all site workers, include:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited in the Exclusion and Contamination Reduction zones.
- No sitting or kneeling in areas of obvious contamination.
- Hands and face must be thoroughly washed upon leaving the work area.
- Any defective PPE must be repaired or replaced immediately.
- Prescription drugs must not be taken by personnel unless specifically approved by an occupational physician. Controlled or unauthorized drugs will not be permitted at any time.
- When respirators are required, facial hair that interferes with the face-to-facepiece fit of the respirator will not be permitted.

- Personnel onsite must use the buddy system; visual contact must be maintained between team members at all times.

10.5.2 Daily Startup and Shutdown Procedures

The following protocols will be followed daily prior to the start of work activities:

- The site SHSO will review site conditions to determine if modification of work and safety plans is needed.
- Personnel will be briefed and updated on any new safety procedures.
- All safety equipment will be checked for proper function.
- The site SHSO will ensure that first-aid equipment is readily available.
- The site SHSO will initiate appropriate monitoring.

The following protocol will be followed at the end of daily operations and before breaks:

- All personnel will proceed through appropriate decontamination procedures and facilities.
- The SHSO under this site HSP will follow up on the corrective action specified, and whether the reposnsible employee responded to the corrective action ;

11. DECONTAMINATION

11.1 GENERAL

Decontamination procedures of site workers will be required when any invasive maintenance or replacement activity is to be performed at the site. These procedures will not be required for routine inspections or maintenance (e.g., lawn mowing).

Employees will be trained in decontamination procedures that will be implemented when employees or equipment enter Exclusion or Contamination Reduction zones. Decontamination will be performed to minimize potential contamination of equipment and the spread of contamination from one zone to another.

11.2 PERSONNEL

No worker, except in an emergency situation, will leave the Exclusion Zone without going through the proper decontamination sequences.

Upon leaving the Exclusion Zone, personnel will wash non-disposable boots and outer gloves at the decontamination station located at the Exclusion Zone/ Contamination Reduction Zone boundary. The wash solution will be a simple detergent/water solution. Outer disposable clothing will be removed and placed in sealed 6-mil plastic bags for disposal. Tyvek coveralls may be worn out of the Exclusion Zone if there is no evidence of gross contamination. Exterior surfaces of respirators will be wet-wiped, then respirators will be removed and placed in a plastic bag for temporary storage and cleaning.

During decontamination, personal protective clothing and equipment will be removed in the following order:

- Outer gloves
- Boot covers
- Coveralls
- Inner gloves or respirator (depending on which clothing/equipment is most heavily contaminated).

11.3 DECONTAMINATION NOTICE TO EMERGENCY PERSONNEL

Local emergency medical personnel, ambulance crews, and hospital room staff will be notified by the Town before operations begin. They will be advised and warned of the possibility of having to handle contaminated clothes and/or injured workers; they will be advised of appropriate decontamination procedures.

11.4 RESPIRATOR DECONTAMINATION

Respirators will be cleaned daily by the individuals to whom they have been assigned. Each individual will be responsible for cleaning and maintaining his/her own respirator. A wash basin or sink of a solution containing sanitizer recommended by the manufacturer must be provided by the drilling subcontractor for final rinsing of respirators at the end of the day. Respirators will then be hung to drip-dry and, if not used daily, will be placed inside plastic bags for protection against contamination. Respirator cartridges will be changed if contaminated, if sampling data indicate potential saturation concentrations exist, or if breathing resistance becomes difficult. The SHSO will also spot check respirators to ensure that all are properly cleaned, maintained, and stored.

11.5 EQUIPMENT DECONTAMINATION

Any excavation equipment, down-hole tools, and other equipment that has come in contact with the waste shall be steam-cleaned at the site's designated cleaning area prior to performing work and prior to leaving the site. Decontamination will be conducted at a centralized decontamination area. The decontamination area, at a minimum, shall consist of a pad of sufficient size to properly decontaminate all equipment anticipated to be onsite. In addition, it must be capable of containing all decontamination fluid and soil removed from

the onsite equipment and must have provisions for containerization of all decontamination fluid and soil. All decontamination fluid and soil shall be collected and stored in drums that will remain onsite in a secure area for subsequent disposal.

11.6 DISPOSAL OF WASTES GENERATED DURING REMEDIATION ACTIVITIES

Waste solids generated by the work activities (including used respirator cartridges and disposable protective coveralls) will be bagged, labeled, and stored onsite for subsequent disposal. Waste fluids will be stored for final disposal.

11.7 LAUNDERING

Non-disposable work clothing and undergarments will be laundered during the hazardous waste handling aspects of this project. All potentially contaminated articles will be washed separately from other laundry items.

12. EMERGENCY RESPONSE PLAN

Onsite emergencies will ultimately be handled by offsite emergency support personnel. Initial response and first-aid treatment, however, should be available onsite.

In case of a hazardous materials emergency, the senior supervisor on the work site will assume full control and direction of the emergency response as the Incident Commander. The Incident Commander will work with the SHSO to identify and evaluate hazards. All emergency responders and communications will be coordinated and controlled through the Incident Commander.

12.1 EMERGENCY EQUIPMENT

Emergency equipment should be provided by the Town or contractor performing site activity. Emergency equipment for the Exclusion Zone will be kept in the Contamination Reduction Zone. The equipment will include:

- Portable emergency eye wash
- Two multipurpose (ABC-rated) fire extinguishers
- An adequately stocked first-aid kit.

Another adequately stocked first-aid kit and an emergency siren will be available in the Support Zone (if present).

12.2 PRE-EMERGENCY PLANNING

Prior to the start of invasive work which may require excavation in the waste, the Town or designee should contact local authorities to inform them of the start date and anticipated scope of work.

12.3 EMERGENCY RECOGNITION AND PREVENTION

Emergency conditions that may be anticipated at the NWLF site include:

- Explosion
- Medical emergency
- Heavy equipment accident
- Discovery of unanticipated buried hazards
- Overexposure of personnel to onsite contaminants
- Heat stress
- Cold exposure.

To ensure that hazard recognition and accident prevention protocols are being maintained, personnel must follow the requirements of this site HSP particularly the hazard evaluation in Section 5, PPE requirements in Section 8, and the site control requirements described in Section 10.

12.4 OPERATIONS SHUTDOWN

Operations shutdown may be mandated by the Town, the SHSO, or by the emergency response Incident Commander. Conditions warranting work stoppage will include (but are not limited to):

- Uncontrolled fire
- Explosion
- Uncovering potentially dangerous buried material
- Any condition immediately dangerous to life and health or the environment
- Heat stress illness exhibited by the crew
- Potential for electrical storms
- Treacherous weather-related conditions
- Limited visibility
- Air contaminant concentrations in excess of the protection factors afforded by the respirators in use.

When any of these conditions exist, operations will be stopped and the work site area secured. All personnel will leave the work area until the Incident Commander has determined that operations may resume.

12.5 FIRE AND EXPLOSION RESPONSE PROCEDURES

Fires onsite can be started by natural events, work activities, or the activities of others. Personnel should be instructed in the use of multipurpose (ABC-rated) fire extinguishers which will be on hand at all times. They will be advised to attempt to control only very small fires. The procedure for using a fire extinguisher is to pull the safety pin, point the extinguisher at the base of the flames, and discharge the extinguisher by sweeping the flames from a distance of about 6 ft. The extinguisher operator should move in as the flames are being put out. The local fire district must be informed immediately in case of any fire where its help will be necessary.

12.6 EVACUATION FROM WORK ZONES

If an onsite emergency occurs, all workers will meet at an area designated during the pre-entry briefing and located in the Support Zone. An employee headcount will be performed to ensure that all workers are accounted for.

In case of emergency, evacuated employees may be decontaminated rapidly by removing exterior clothing. If a worker is critically injured in the Exclusion Zone, the worker may be removed immediately from the area--DO NOT take time to decontaminate an injured worker. Seek medical attention immediately.

12.7 REPORTING INCIDENTS

Incidents should be reported to local, state, and federal agencies in accordance with all applicable regulations. The Town representatives must be notified of all accidents and near-miss accidents.

12.8 EMERGENCY MEDICAL TREATMENT AND FIRST-AID

At least one representative employee must be trained in both first aid and CPR. Only minor injuries will be treated onsite with the first-aid kit available.

For major injuries contact (911 The phone numbers for the hospital, fire, police, and ambulance are provided on the form in Attachment E. If an injury is serious but not an emergency or life-threatening, the phone numbers in Attachment E may be used. The victim must be transported to the nearest hospital for an examination.

13. CONFINED SPACE

At no time will any site employee, including subcontractors, enter any confined spaces without the prior approval of the Town. Confined spaces are spaces with any of the following characteristics:

- Limited openings for entry and exit
- Unfavorable natural ventilation
- Subject to accumulation of toxic or combustible agents or oxygen deficiency
- Design prohibiting continuous worker occupancy.

Confined spaces include, but are not limited to:

- Aboveground or underground storage tanks, process vessels, and tank trailers
- Trenches >4 ft deep, test pits, bins, vaults, vats, and silos
- Ventilation or exhaust ducts, manholes, sewers, tunnels, and pipelines
- Building or room with limited means of access/egress.

- Manholes , Pump Station Components and Valve Vaults.

REFERENCES

American Conference of Governmental Industrial Hygienists. 1989. ACGIH Threshold Limit Values and Biological Exposure Indices for 1988-1989.

American National Standards Institute (ANSI). 1980. American National Standard Practices for Respiratory Protection Z88.2.

National Institute of Occupational Safety and Health (NIOSH), OSHA, U.S. Environmental Protection Agency (U.S. EPA), and U.S. Coast Guard. 1985. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. October.

New York State Department of Environmental Conservation (NYSDEC). 1985. Division of Spill Response. Correspondence - analytical results.

NYSDEC Division of Spill Response. 1988. Correspondence - analytical results.

NYSDEC Division of Environment Enforcement. 1988. Correspondence - analytical results.

NYSDEC Division of Environment Enforcement. 1989. Correspondence - analytical results.

Occupational Safety and Health Administration (OSHA). 1981. Standards for Construction Industry, 29 CFR 1926.

OSHA. 1986. Respiratory Protection 29 CFR 1910.134.

OSHA. 1987. Standards for General Industry, 29 CFR 1910.120 - Hazardous Waste Operations and Emergency Response.

Attachment A

Confined Space Entry Procedures

ATTACHMENT A

CONFINED SPACE ENTRY PROCEDURES

A.1 DEFINITION

A space which is large enough and so configured that an employee can bodily enter and perform work, has limited or restricted means for entry or exit, is not designed for continuous employee occupancy, and has one or more of the following characteristics:

- Contains a potentially hazardous atmosphere due to accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere.
- Contains a material with the potential for suffocation of an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor that slopes downward and tapers to a smaller cross-section.
- Contains other recognized health or safety hazard.

Confined spaces include, but are not limited to, storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open top spaces more than 4 ft in depth such as pits, tubs, vaults, and vessels.

A.2 CONFINED SPACE ENTRY

No entry will be permitted into a confined space except with authorization of the Program Health and Safety Officer. The site-specific Health and Safety Plan will include a confined space entry program meeting the requirements of this Health and Safety Plan OSHA 1910.146 Permit-Required Confined Spaces, and any state standard.

A.3 PERMIT SYSTEM

Personnel required to enter a confined space will require a permit authorizing the entry. A new permit will be issued by the Site Health and Safety Officer at the start of each work shift during which confined space entry will be required. The permit will meet OSHA 1910.146.

A.4 TESTING AND MONITORING

Prior to entry, the atmosphere of the confined space will be tested for oxygen content, explosibility, and toxic chemicals. Monitoring will be continuously conducted while the confined space is occupied.

A.4.1 Qualified Person

Testing and monitoring will be conducted by a qualified person under the direction of an Industrial Hygienist.

A.4.2 Equipment

Equipment required to conduct the testing and monitoring will consist of a combination oxygen/combustible gas meter and may also include the following monitoring capabilities for toxic substances:

- Direct reading instruments for specific gases and vapors such as combination oxygen/combustible gas meter and monitoring capabilities for toxic substances.
- A photoionization detector (PID) for the monitoring of ionizable compounds.
- Detector tubes appropriate for the suspected contaminants within the confined space.

A.5 EMERGENCY RESCUE

A person trained in emergency rescue and assigned to remain on the outside of the confined space and to be in communication with those working inside will be designated as the standby person and have primary responsibility to perform emergency rescue. Rescue procedures will be specifically designed for each confined space entry and recorded on the permit.

A.6 PURGING AND VENTILATION

Purging and ventilation shall be performed to remove hazardous atmospheres whenever they are detected prior to or during a confined space entry. Ventilation, if required for entry, shall continue during entry, even if monitoring indicates a safe atmosphere. Every reasonable effort shall be made to provide sufficient ventilation for a safe atmosphere, but if ventilation is not completely effective, it shall be supplied to reduce the atmospheric hazard and entrants shall wear appropriate respiratory and other personal protective equipment.

The permit shall specify the necessary purging and ventilation procedures to be used for the confined space operation, if any. If required by the confined space entry permit, mechanical ventilation such as fans or blowers shall be provided prior to initial entry and for the duration of the permit to ensure that an atmosphere contains sufficient oxygen, is not explosive, and does not contain toxic chemical levels. When ventilation is performed, the blower controls shall be at a safe distance from the confined space. Initial testing of the atmosphere shall be performed from outside the space to determine precautions needed for purging and ventilation. Ventilation systems shall be designed to protect workers in the surrounding area from exposure to contaminated air. If flammable concentrations are present, electrical equipment shall comply with the requirements of the National Electrical Code. Permit-required continuous general ventilation shall be maintained where toxic atmospheres are produced as part of the work procedure or are likely to develop due to the nature of the confined space. When ventilation is not possible or feasible, other protective measures shall be specified in the permit.

A.7 EQUIPMENT

Minimum equipment required to perform work within a confined space will consist of the following:

- Level of protection described by Table 2 contained within the Health and Safety Plan. Real time air monitoring may dictate modification of protection required.
- A harness with attached lifeline.
- A tripod with block and tackle or winch.

A.8 TRAINING

No person will enter a confined space until they have been trained in the nature of the hazards associated with the confined space, informed of the emergency rescue procedures and equipment and necessary precautions to be taken, and trained in the use of personal protective equipment.

ATTACHMENT A

CONFINED SPACE ENTRY PROCEDURES

SITE: _____

Work Task	Entry Procedure

Confined Space Entry Permit

Project No.: _____

Effective Dates: Start _____ Expire _____

Location & Desciption of CS: _____

Purpose of Entry: _____

Project Manager: _____
SSHS: _____
CS Attendant(s): _____
_____
EA Subcontractors: _____
_____

Site Manager: _____
CS Entrant(s): _____
_____
_____
Rescue Team: _____
Needed as onsite standby? Yes ____ No ____

Potential Hazards	Yes	No
Oxygen Deficiency		
Combustible Atm.		
Toxic Materials		
Type		
Heat Stress		
Pressure System		
Unstable Structures		
Electrical		
Mechanical		
_____		

Special CS Requirements	Yes	No
Lockout/Isolation		
Blank/Disconnect		
Purge-Flush & Vent		
Ventilation		
Barricade/Secure Area		
Warning Signs		
Lighting		
_____		
_____		
_____		

Personal Protective Equipment	Yes	No
Respirators		
Type _____		
Escape Air Supply		
Chem-resistant Coveralls		
Type _____		
Chem resistant Gloves		
Type _____		
Hearing Protection		
Eye/Face Protection		

Emergency Equipment	Yes	No
Tripod/Lifeline/Harness		
Fire Extinguisher		
1st Aid Kit		
Eye Wash Station		
Communication Equipment		
Type _____		
_____		
_____		
_____		

Note: Hard hat, safety glasses, and safety boots are required.

Emergency Phone Numbers:

Fire/Rescue _____
Police _____
Hospital _____

Ambulance _____
Project Manager _____
CHSO or Designer _____

Emergency Procedures: _____

CS Communication Requirements:	Yes	No	Description
Hand Signals	____	____	_____
Audible Signals	____	____	_____
Life Line Signals	____	____	_____

Air Monitoring Requirements:*

Instrument	Yes	No	Action Level	Frequency	Action to be Taken
_____	____	____	_____	_____	_____
_____	____	____	_____	_____	_____
_____	____	____	_____	_____	_____
_____	____	____	_____	_____	_____
_____	____	____	_____	_____	_____

*Observed levels for all air monitoring must be documented on an Environmental Monitoring Record.

Vehicle Exclusion Perimeter: _____

Authorizing Signatures (Permit not active without ALL signatures):

Project Manager: _____ Date: _____

CSHO or Designated Representative: _____ Date: _____

CS Attendant (May be signed only on site): _____ Date: _____

Permit Requirements Understood: (Signed by all CS field personnel)

_____ _____

_____ _____

_____ _____

Permit Canceled by: _____ Date: _____

Copy to: Project File
HWOC

Attachment B

Trench Excavation Procedures

ATTACHMENT B

TRENCH EXCAVATION PROCEDURES

During the post-closure period, trenching may be required to replace or maintain existing piping networks (leachate collection, stormwater diversion). Acute awareness by all personnel during trench excavation is imperative due to the possible release of organic vapors and the potential fire hazard.

Entry in the Exclusion Zone will be limited to the subcontractor backhoe operator, a subcontractor employee to guide the backhoe operator, a Town employee to document what is unearthed, and the SHSO who will continuously monitor volatile organic levels and explosive conditions of the excavated materials. All workers in the Exclusion Zone, including the backhoe operator and helper, will initially be in Level D PPE, with preparation to upgrade.

It is imperative that all personnel at this task have completed the OSHA required 40-hour Safety and Health training and annual 8-hour refresher courses (if needed), be currently fit-tested for wearing respirators, and be certified in the use of SCBA and gear (Level B).

All excavations will be made in accordance with 29 CFR 1926.652 specific trenching requirements. Stable slopes must be maintained during all excavation activities to avoid collapse and to protect employees working in the area. Special attention should be paid to areas where ground material is not highly compacted but rather soft or unstable, areas where water may be encountered at a depth of less than 5 ft, areas near a railroad, highway (such as Interstate 87), or machinery operation where vibrations may induce cave-ins or slides. Attention should also be paid to the appropriations and condition of materials.

Personnel are not allowed to enter the trench excavations except in case of emergency. In an emergency situation, should it become necessary for anyone to enter a test pit, especially with a depth greater than 4 ft, an adequate means of exit, such as a ladder, must be available.

The SHSO will stop all work if this site HSP is not followed or if conditions warrant.

Attachment C

Site Health and Safety Plan Review Record

ATTACHMENT C

SITE HEALTH AND SAFETY PLAN REVIEW RECORD

SITE: New Windsor Landfill

I have read the Site Health and Safety Plan for this site and have been briefed on the nature, level, and degree of exposure likely as a result of participation in this project. I agree to conform to all the requirements of this Plan.

Name	Signature	Affiliation	Date

Attachment D

Site Entry and Exit Log

ATTACHMENT D

SITE ENTRY AND EXIT LOG

SITE: _____

Name	Date	Time of Entry	Time of Exit	Initials

Attachment E

Emergency Telephone Numbers

ATTACHMENT E

EMERGENCY TELEPHONE NUMBERS

SITE: New Windsor Landfill

Emergency Contact		Telephone Numbers
Police:	Town of New Windsor	(845) 565-7000
Fire:	Town of New Windsor Cornwall	911 911
Ambulance:	New Windsor Ambulance Corp	(845) 561-4400
Hospital:	St. Luke's Emergency	

Directions to hospital (Figure E-1):

Exit site on access road to Silver Stream Road. Turn left onto Little Britain Road (Route 207). Travel east on Little Britain Road 2.5 mi to Wisner Avenue. Turn left onto Wisner Avenue. Proceed approximately 3 blocks to Broadway (17K). Turn right onto Broadway traveling east approximately 2.25 mi. Turn left onto DuBois Street. Travel north on DuBois Street for 3 blocks to hospital.

Emergency Personnel Contact	Telephone Numbers
NOTE: Emergency personnel contacts and telephone numbers to be determined by Town of New Windsor.	

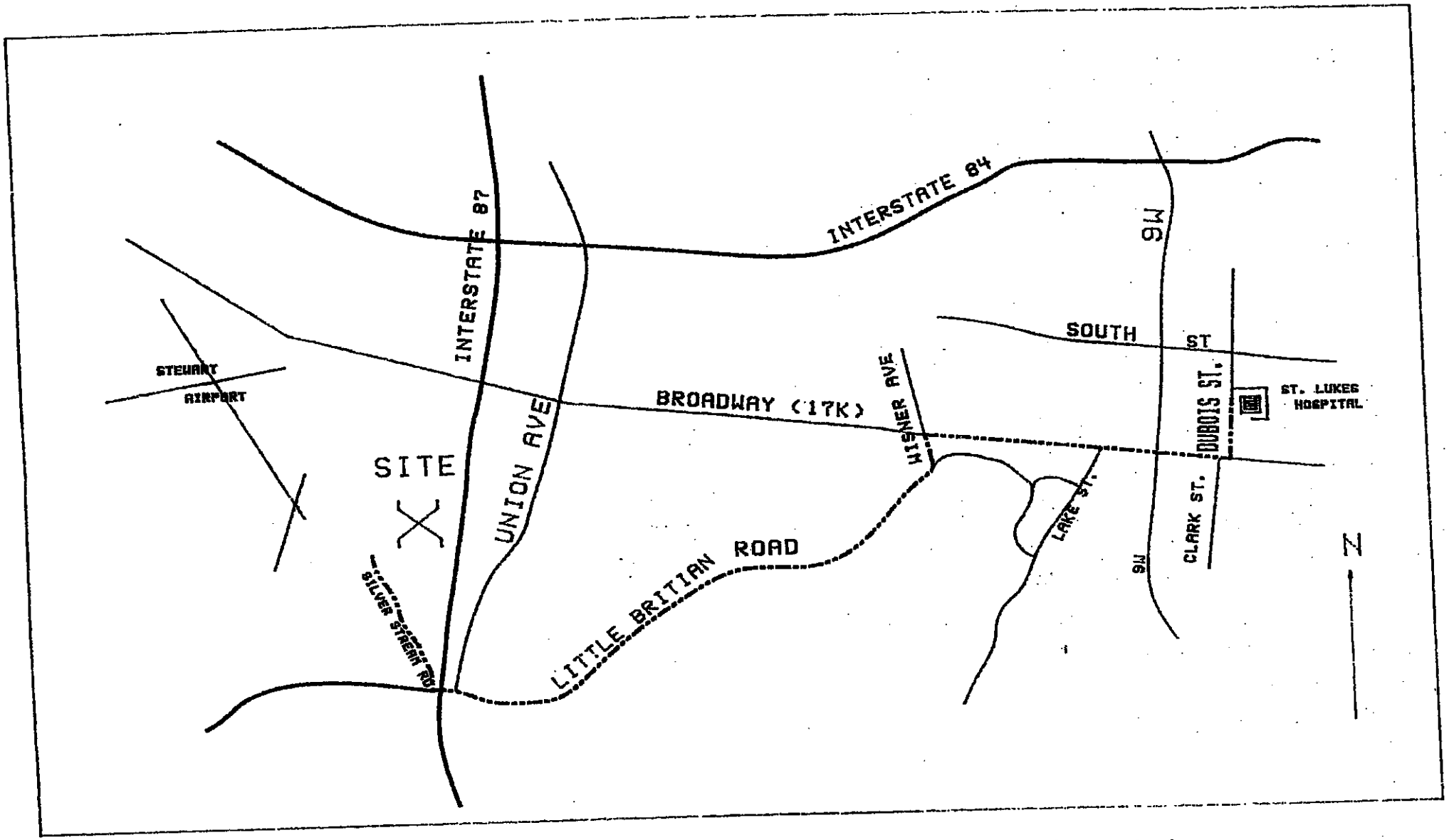


Figure E-1. Route from New Windsor Landfill to St. Luke's Hospital.

APPENDIX D

WELL CONSTRUCTION OF MW-1S

- 21.5 ft deep from top of casing
- Schedule 40, 2-in. diameter, threaded PVC pipe
- Factory slotted PVC screen (screened interval not available)
- Slotted screen packed with sand
- Bentonite pellet seal placed above sand pack
- Remaining annular space above bentonite pellet seal to ground surface filled with bentonite-cement grout.

EA TECHNOLOGY
A Division of EA Engineering, Science and Technology, Inc.

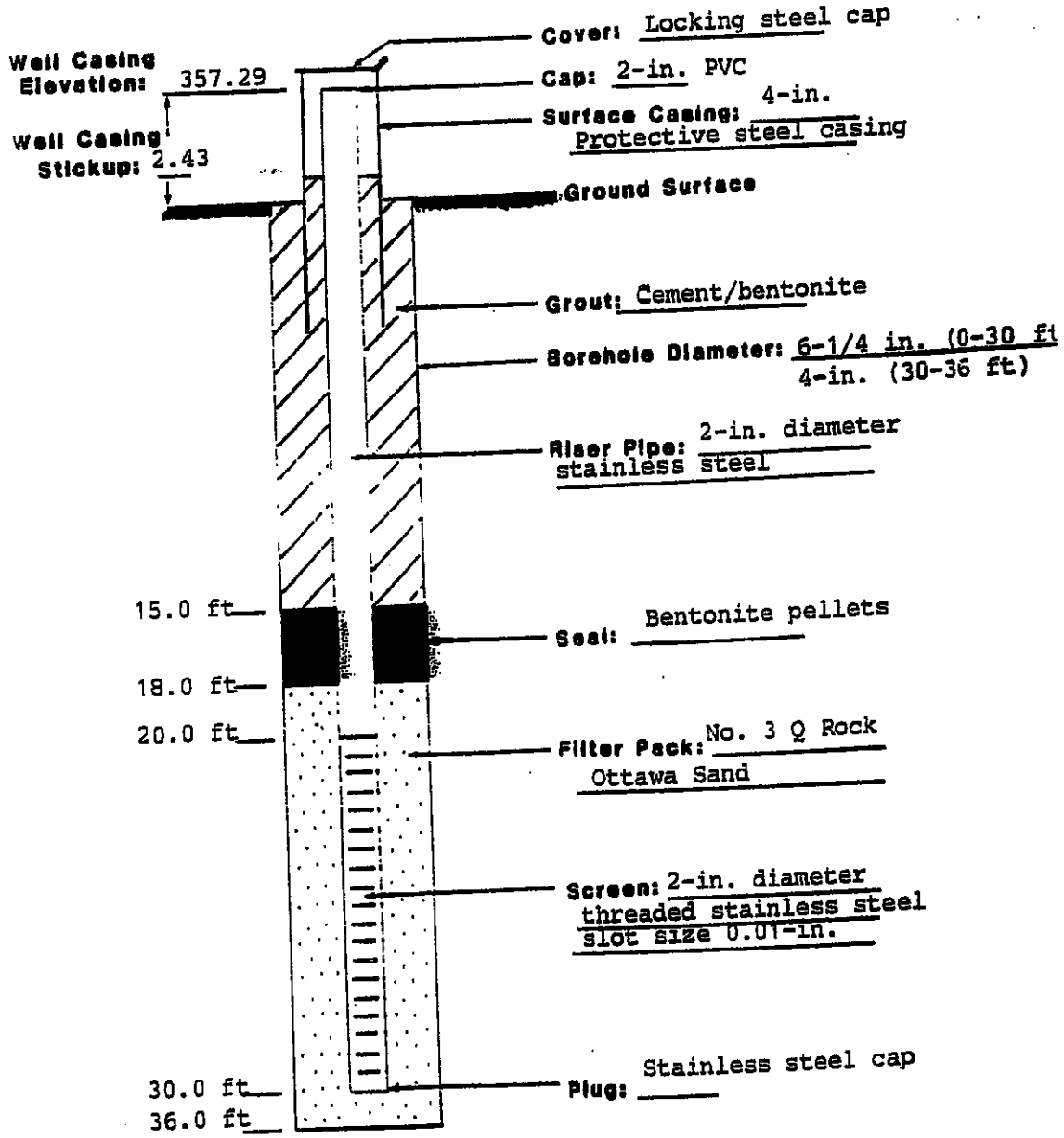
Site: New Windsor Landfill

Job No.: 11160.01

Date Installed: 22 February 1990

COMPLETION DIAGRAM

WELL NW-1D



EA SCIENCE AND TECHNOLOGY

A Division of EA Engineering, Science and Technology, Inc.

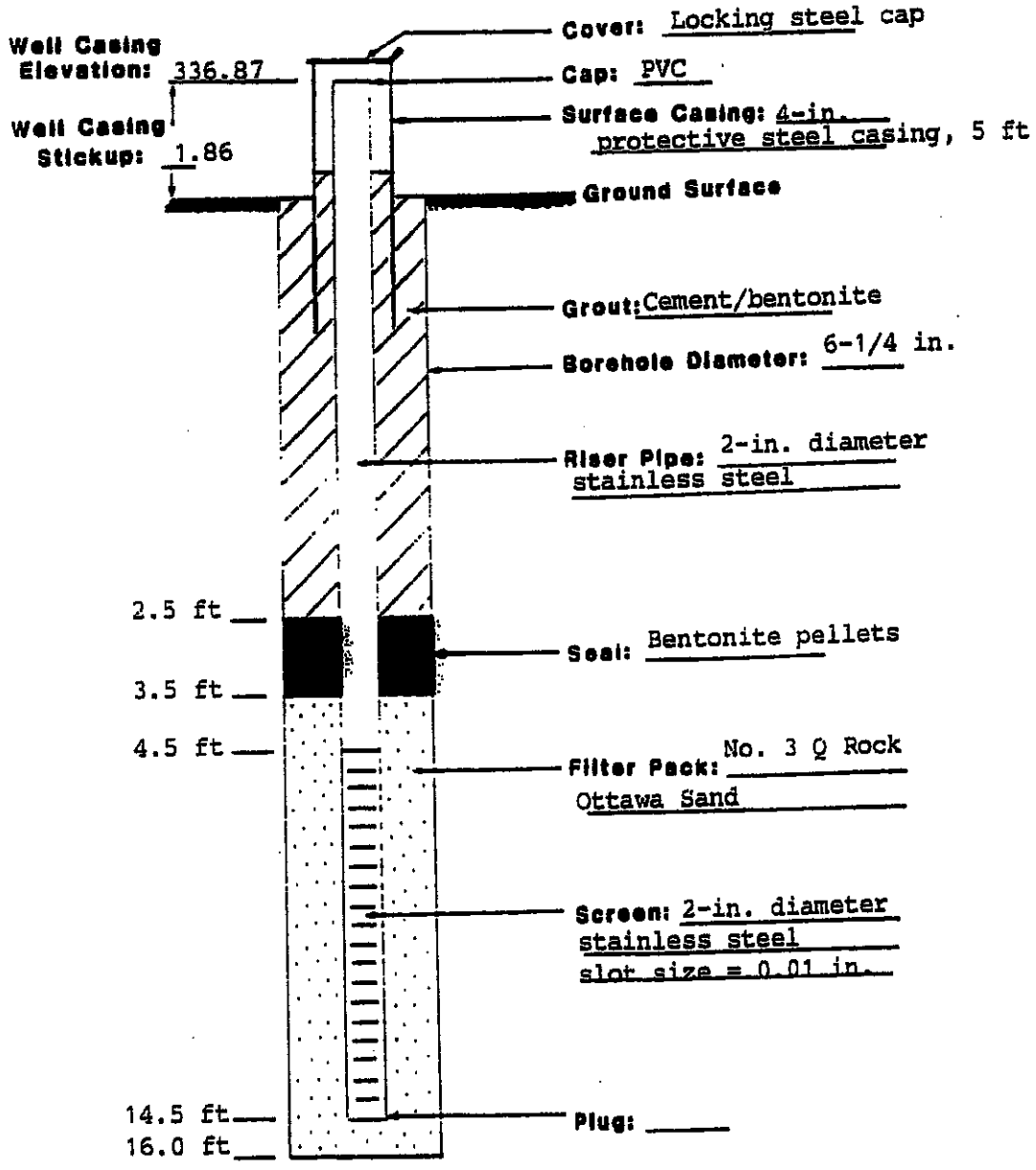
Site: New Windsor Landfill

Job No.: 11160.01

Date Installed: 21 February 1990

COMPLETION DIAGRAM

WELL NW-3S



EA SCIENCE AND TECHNOLOGY

Division of EA Engineering, Science and Technology, Inc.

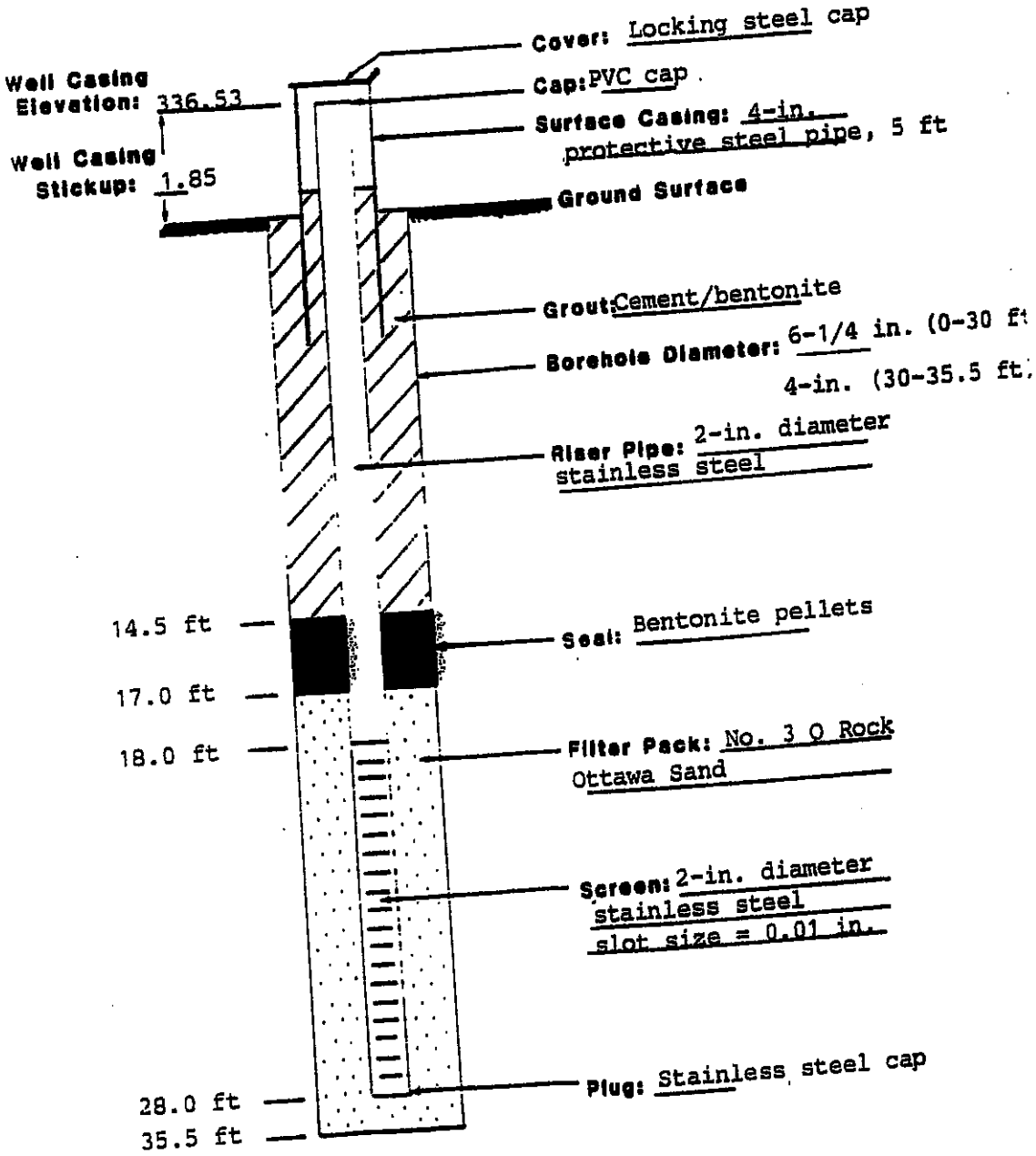
Site: New Windsor Landfill

Job No.: 11160.01

Date Installed: 22 February 1990

COMPLETION DIAGRAM

WELL NW-3D



EA SCIENCE AND TECHNOLOGY

Division of EA Engineering, Science and Technology, Inc.

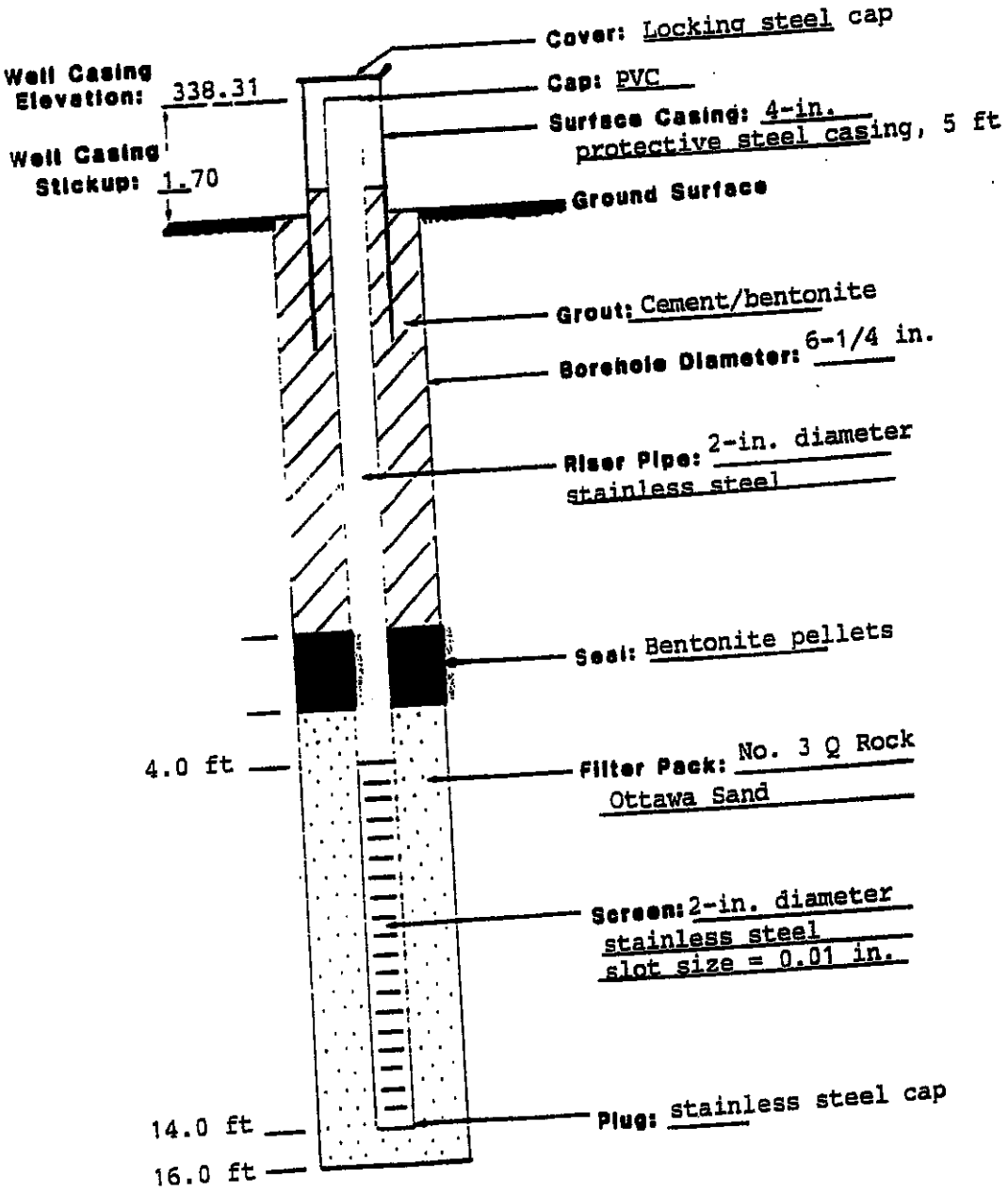
Site: New Windsor Landfill

Job No.: 11160.01

Date Installed: 28 February 1990

COMPLETION DIAGRAM

WELL NW-45



TECHNOLOGY
Division of EA Engineering, Science and Technology, Inc.

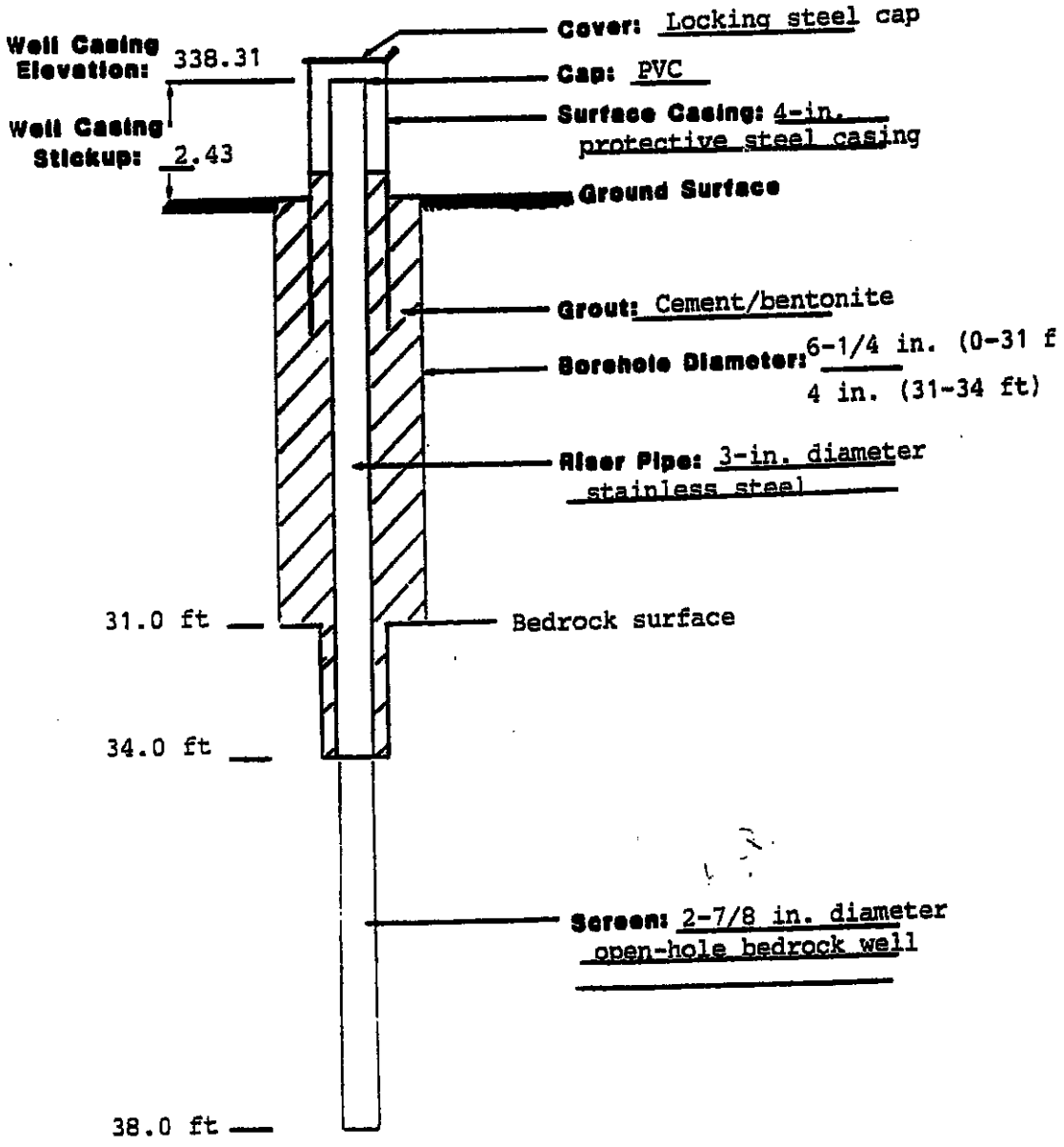
Site: New Windsor Landfill

Job No.: 11160.01

Date Installed: 28 February 1990

COMPLETION DIAGRAM

WELL NW-4D



EA SCIENCE AND TECHNOLOGY

A Division of EA Engineering, Science and Technology, Inc.

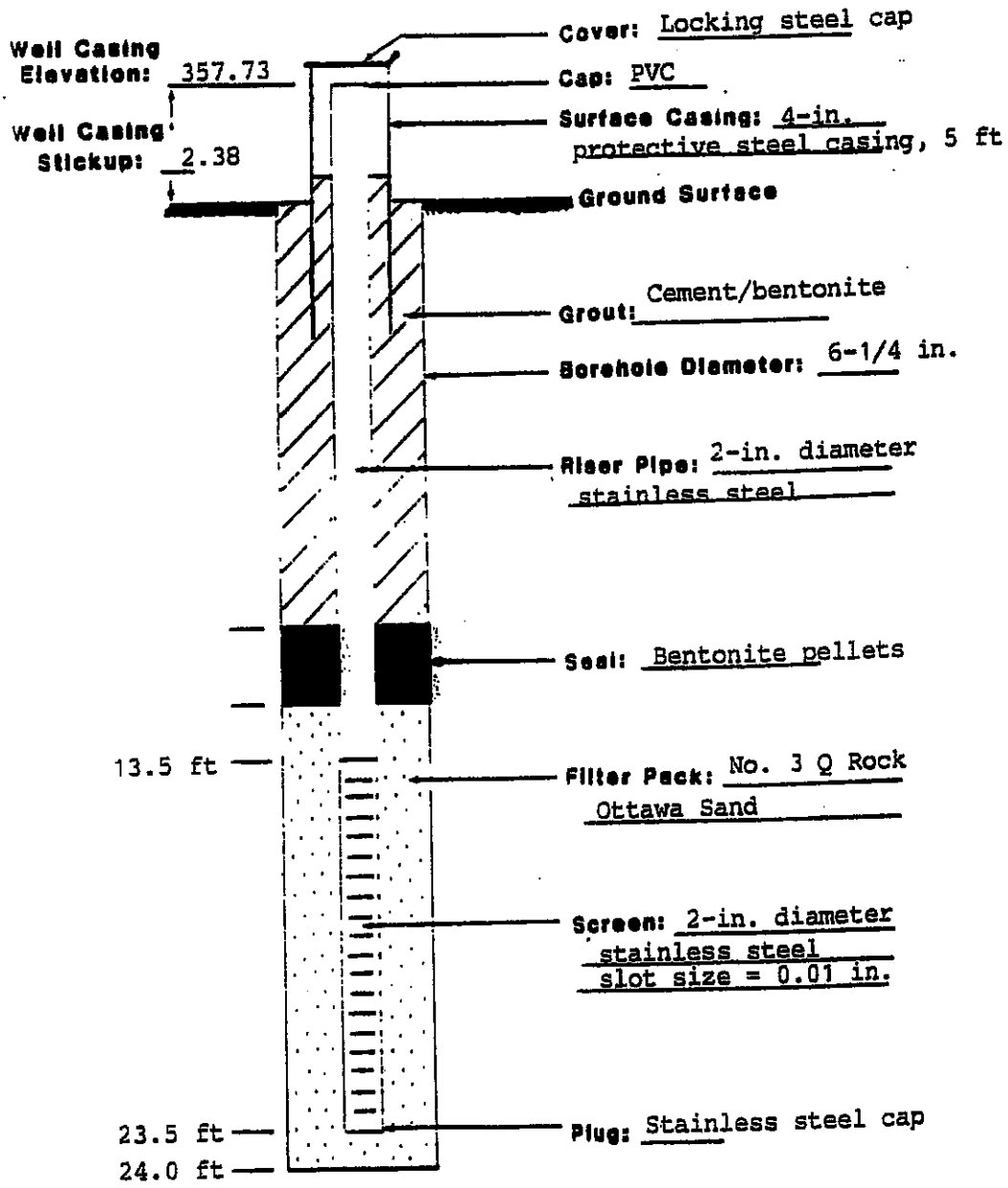
Site: New Windsor Landfill

Job No.: 11160.01

Date Installed: 20 February 1990

COMPLETION DIAGRAM

WELL NW-6S



EA SCIENCE AND TECHNOLOGY
Division of EA Engineering, Science and Technology, Inc.

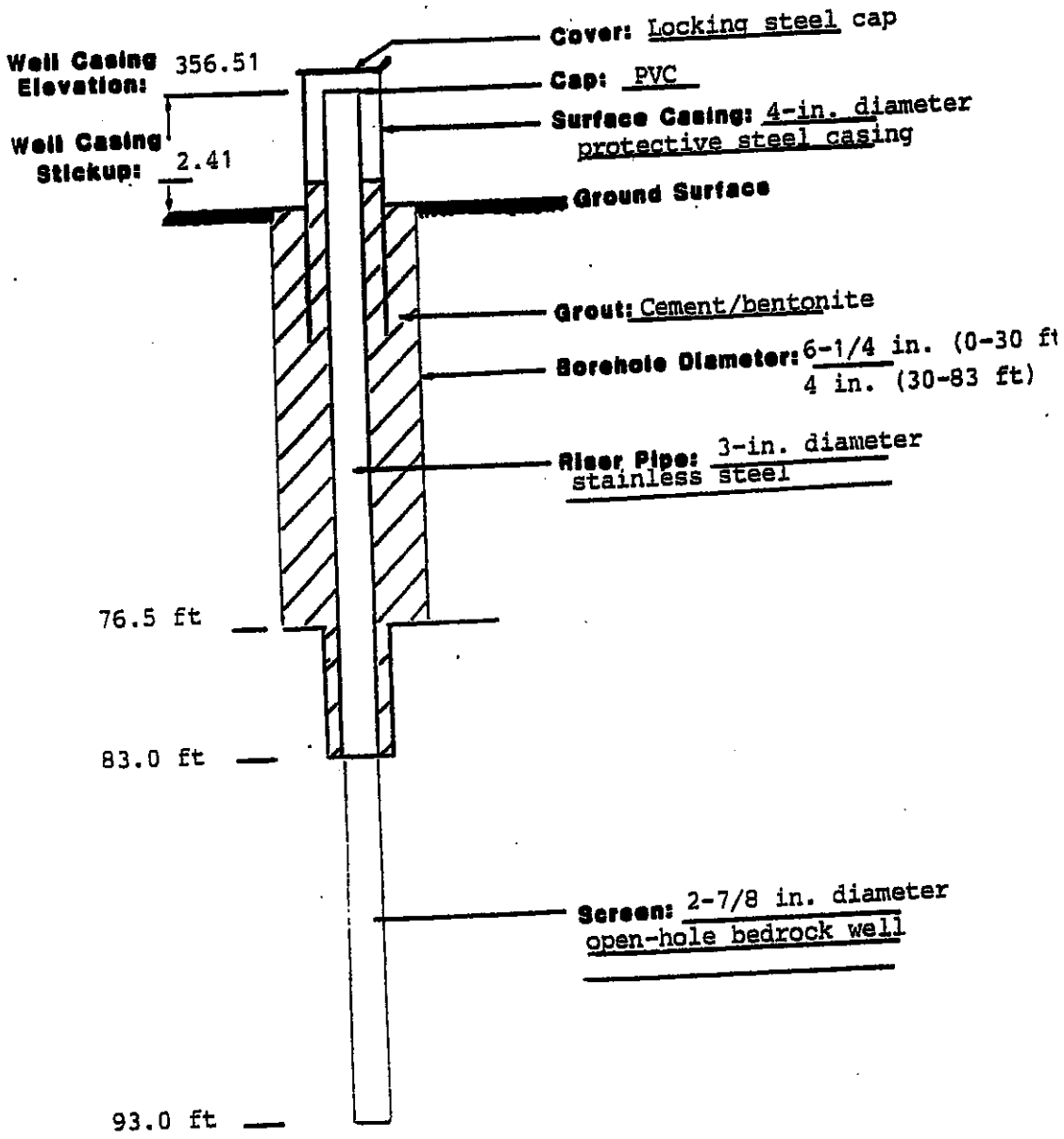
Site: New Windsor Landfill

Job No.: 11160.01

Date Installed: 5 March 1990

COMPLETION DIAGRAM

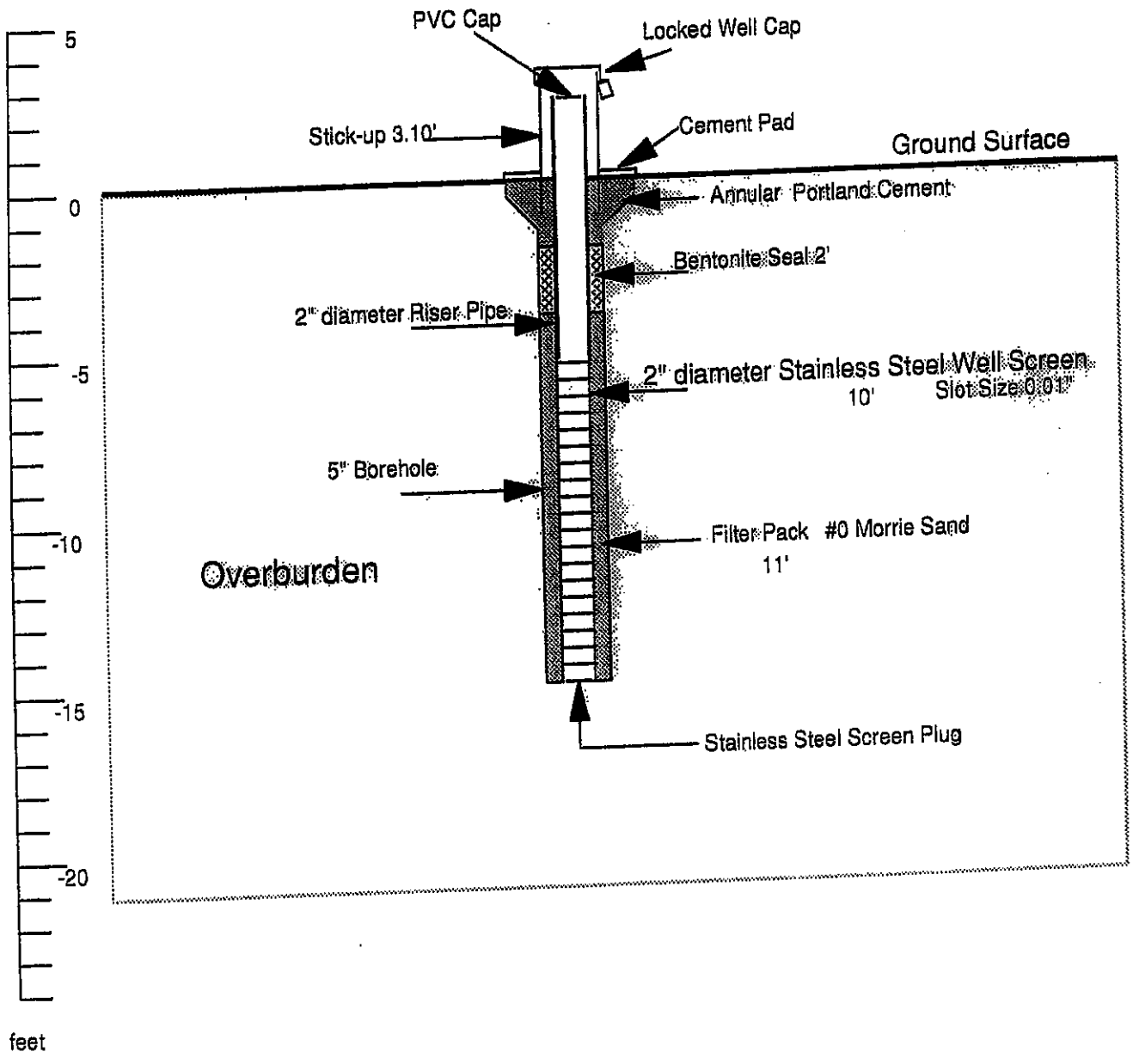
WELL NW-6D



TOWN OF NEW WINDSOR LANDFILL

Overburden Monitoring Well NW-8S

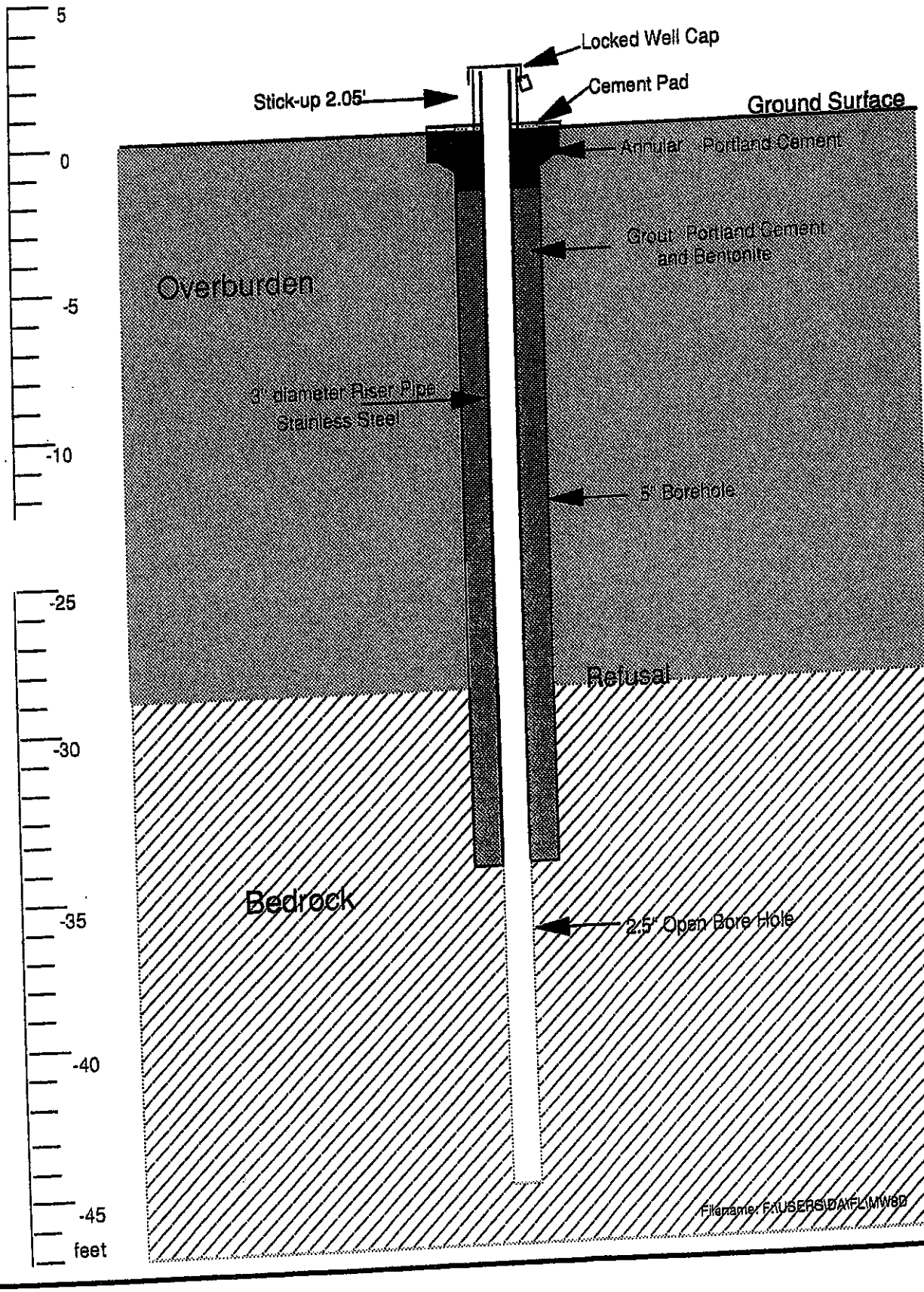
Job No.: 11160.05
Date Installed: 2 September 1993



TOWN OF NEW WINDSOR LANDFILL

Bedrock Monitoring Well NW-8D

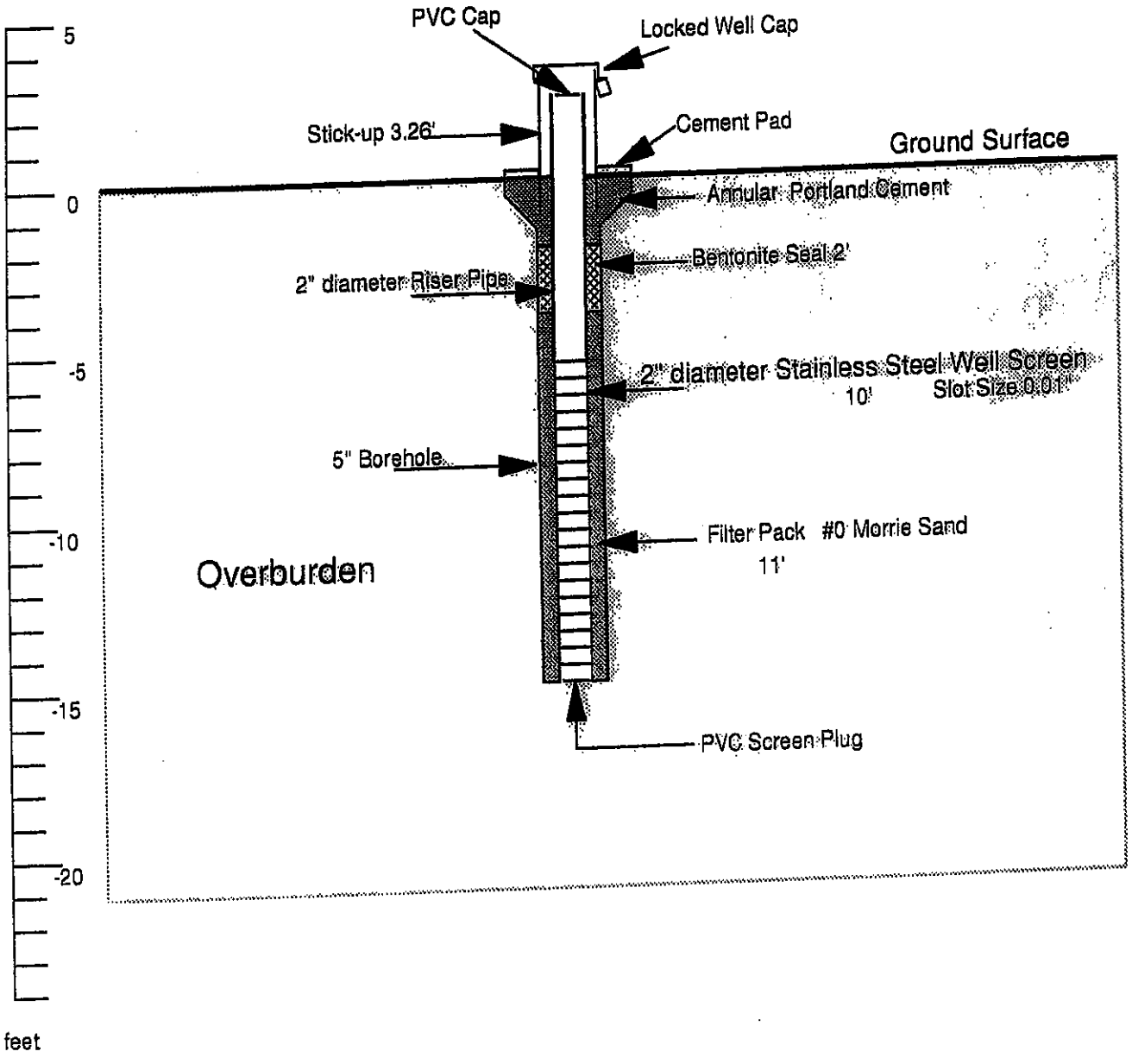
Job No.: 11160.05
Date Installed: 8 September 1993



TOWN OF NEW WINDSOR LANDFILL

Overburden Monitoring Well NW-9S

Job No.: 11160.05
Date Installed: 3 September 1993

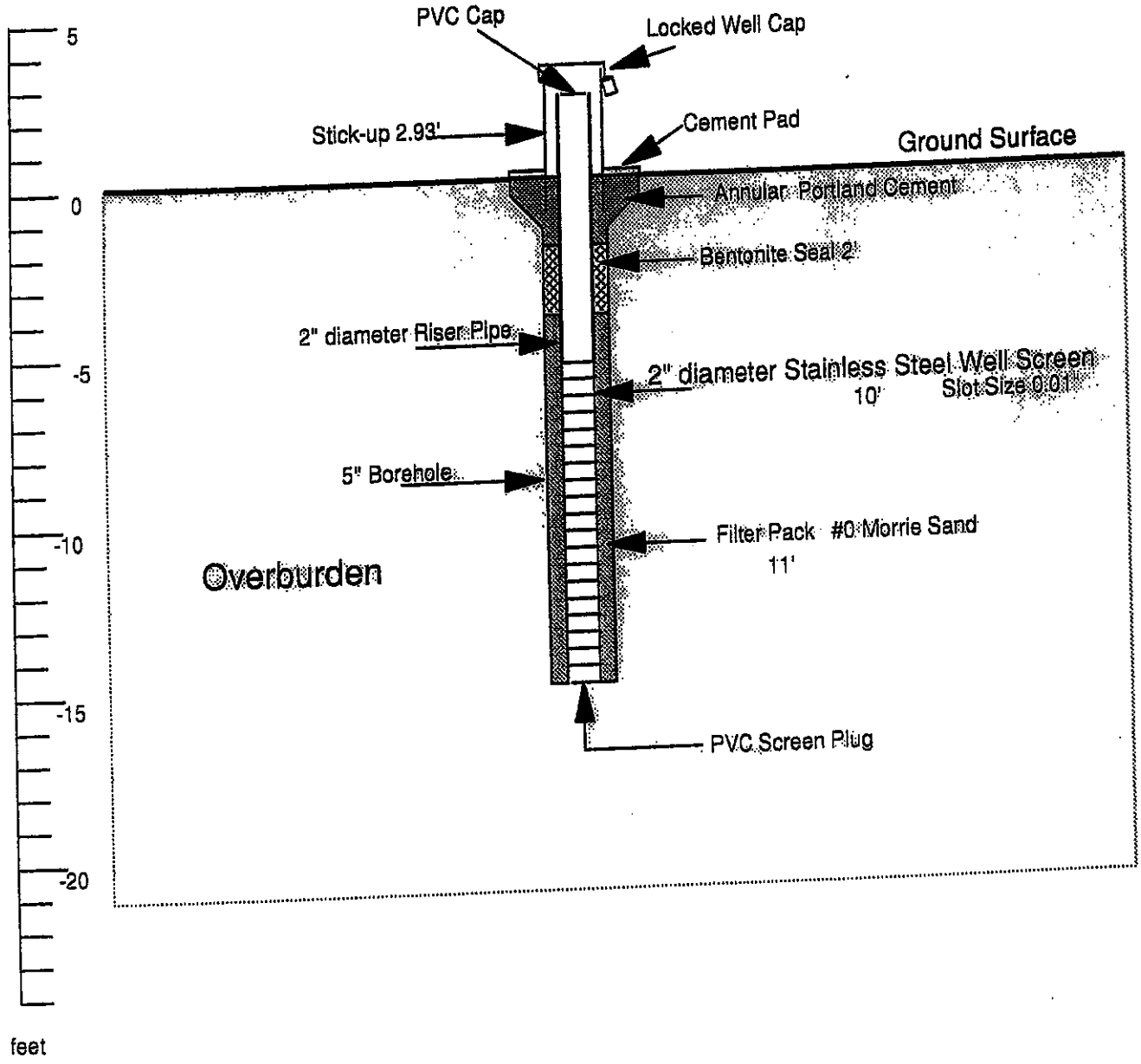


Filename F:\USERS\DA\FL\MW9S

TOWN OF NEW WINDSOR LANDFILL

Overburden Monitoring Well NW-10S

Job No.: 11160.05
Date Installed: 2 September 1993

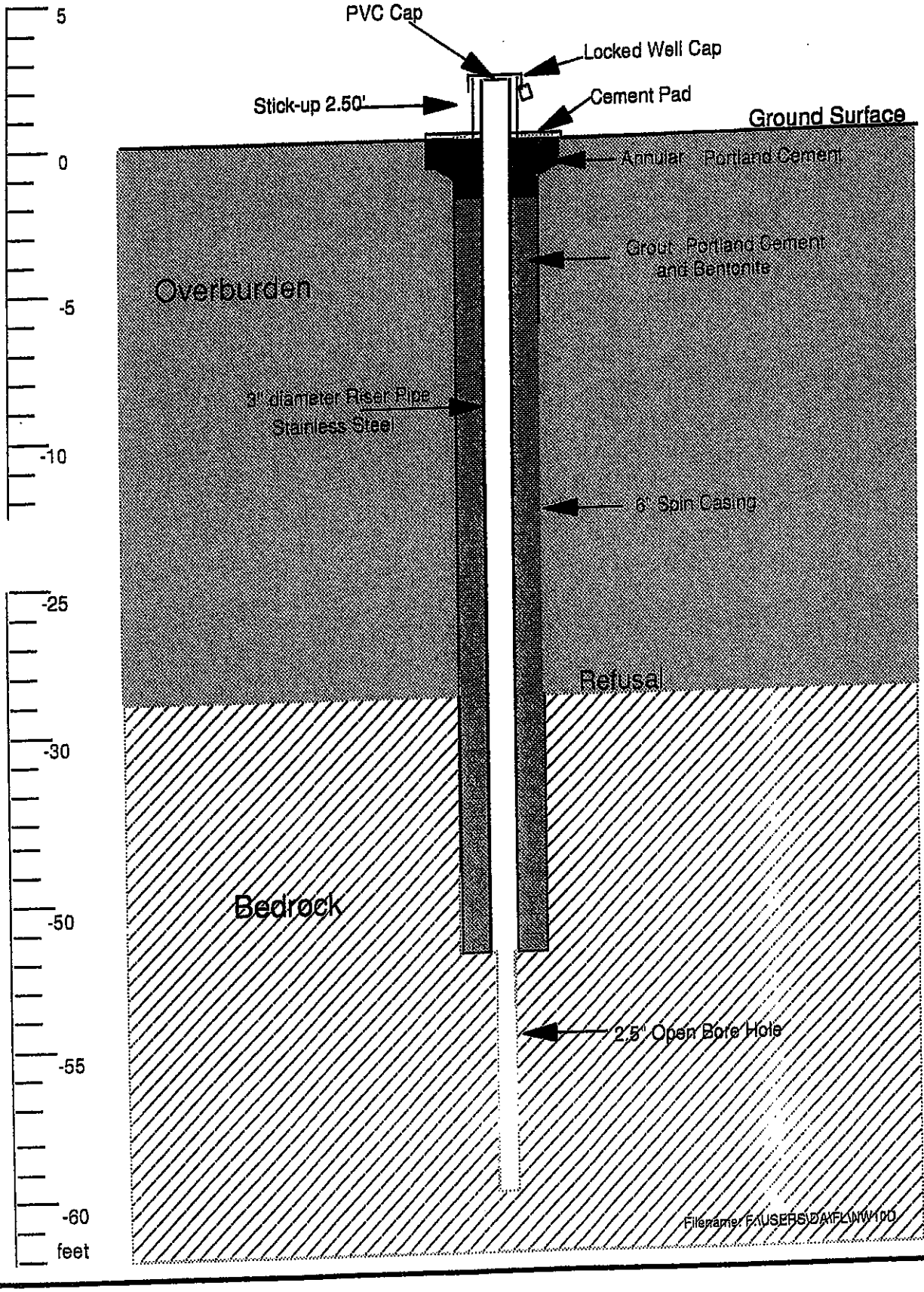


Filename f:\USERS\DA\FL\MW10S

TOWN OF NEW WINDSOR LANDFILL

Bedrock Monitoring Well NW-10D

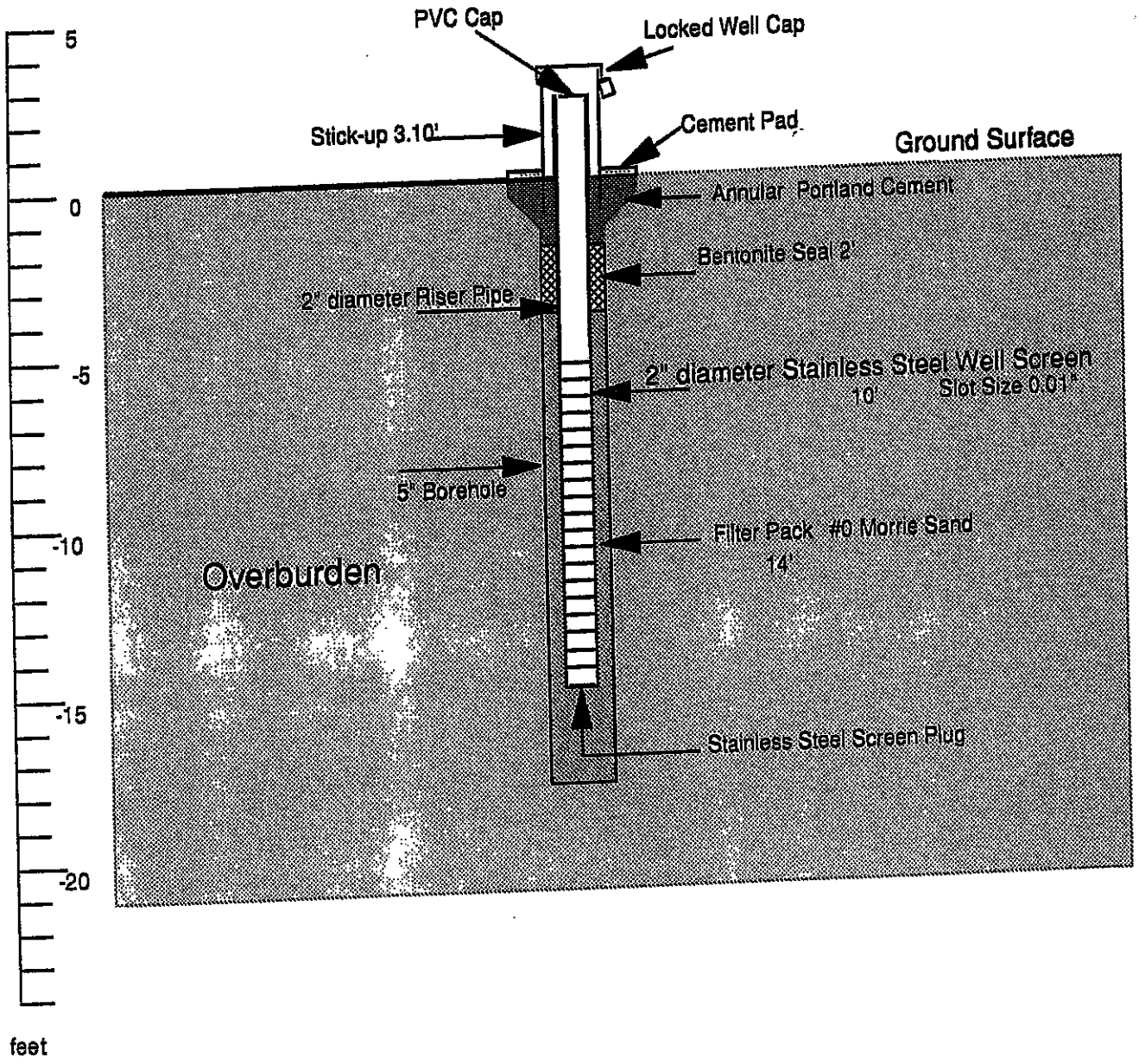
Job No.: 11160.05
Date Installed: 9 September 1993



TOWN OF NEW WINDSOR LANDFILL

Overburden Monitoring Well NW-11S

Job No.: 11160.05
Date Installed: 7 September 1993



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APPENDIX E

INSPECTION AND MAINTENANCE CHECKLIST FOR THE TOWN OF NEW WINDSOR LANDFILL

INSPECTOR: _____ DATE: _____

PREVIOUS INSPECTION: _____ WEATHER: _____

SIGNIFICANT RECENT EVENTS (FLOODING, DROUGHT): _____

Category	Item	Condition/Observation	Corrective Measures	Personnel (contractors, consultants, etc.)
Landfill Cap	Vegetative Cover (sparse, stressed)			
	Settlement			
	Extensive Erosion			
Monitoring Point	Groundwater Monitoring Wells (caps, locks, seals, grouting)			
	Gas Vents			
Stormwater Runoff	Swales and Berms			
	Interceptor Trench			
	Protective Rip Rap			
	36-in. HDPE Pipe, Catch Basins, End Sections, Sediment Basin, Outlet Structure			
General	Perimeter Fencing			
	Leachate Pump Station*			
	Vehicle Access Road			
	Vermin and Vector			

* The leachate pump station is in confined space. Visual inspection does not require entry. Any maintenance procedures involving installed equipment must comply with the Confined Space Entry Program included in the Health and Safety Plan (Appendix C).

FIELD RECORD OF GROUNDWATER PURGING AND SAMPLING

WELL I.D.: _____

WELL CONDITION: _____

GAUGE DATE: _____

SOUNDING METHOD: _____

STICK UP / DOWN (FT): _____

PURGE DATE: _____

PURGE METHOD: _____

SITE NAME: _____

WEATHER: _____

GAUGE TIME: _____

MEASUREMENT REF: _____

WELL DIAMETER (IN): _____

PURGE TIME: _____

WELL VOLUME

A. WELL DEPTH (FT): _____

B. DEPTH TO WATER (FT): _____

C. LIQUID DEPTH (FT) [A - B]: _____

D. WELL VOL / FT: _____

E. WELL VOLUME (FT) [C * D]: _____

SANDPACK VOLUME

F. LIQUID SCREEN LENGTH (FT): _____

G. BOREHOLE VOL / FT (SEE BACK): _____

H. BOREHOLE VOL (GAL) [F * G]: _____

I. SAND VOLUME (GAL) [H - (D * F)]: _____

J. LIQUID SAND VOL (GAL) [I * porosity]: _____

K. LIQUID VOLUME (GAL) [E + J]: _____

L. FIVE WELL VOLUMES (GAL) [K * 5]: _____

	BEGINNING	1	2	3	END	SAMPLE
TIME (MIN)						
DEPTH TO WATER (FT)						
RATE (GPM)						
VOLUME PURGED (GAL)						
pH						
TEMPERATURE (C)						
CONDUCTIVITY						

TOTAL QUANTITY OF WATER REMOVED (GAL): _____

SAMPLERS: _____

SAMPLING DATE: _____

SAMPLE TYPE: _____

SAMPLING TIME: _____

SPLIT SAMPLE WITH: _____

COMMENTS AND OBSERVATIONS: _____

SURFACE WATER SAMPLING CHECKLIST

TECHNICIAN: _____

COMPANY: _____

DATE: _____

PREVIOUS SAMPLE DATE: _____

Item	Surface Water
Immiscible layers (Y/N)	
Floaters or sinkers (Y/N), if yes sample	
Remove water containerized and discarded (description)	
Equipment decontamination (describe)	
Sample preservation (describe)	
Specific conductance	
Temperature (F)	
pH	
Eh	
Field observations (colors, odors, etc.)	
Dissolved oxygen	

COMMENTS: _____

_____

_____

_____

_____

LEACHATE WATER SAMPLING CHECKLIST

TECHNICIAN: _____

COMPANY: _____

DATE: _____

PREVIOUS SAMPLE DATE: _____

Item	Leachate Water
OVA reading (ppm)	
Explosimeter reading	
Immiscible layers (Y/N)	
Floaters or sinkers (Y/N), if yes sample	
Equipment decontamination (describe)	
Sample preservation (describe)	
Specific conductance	
Temperature (F)	
pH	
Eh	
Field observations (colors, odors, etc.)	

COMMENTS: _____

Chain-of-Custody Record

Company Na

Project Manager or Contact:

Phone:

Project No.:

Project Name:

Sample Storage Location:

Page of

Batch ID:

Parameters/Method Numbers for Analysis*

Reports/Deliverables Only

Date	Time	Water	Soil	Sample Identification (ID and Matrix) 19 Characters	No. of Containers	EA Labs Accession Number	Remarks

Sampled by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Received by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Holding Times for VOAs	Sample Shipped by: (Circle)

Fed. Ex. Puro. UPS

Other:

Air Bill Number:

Cooler Temp.: °C pH: Yes No Comments:

*NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory technicians.

EA 0398 White — EA Laboratories Yellow — EA Laboratories Pink — Project Manager Shaded Area for Lab Use Only

APPENDIX F

COPY

STANDARD OPERATING PROCEDURE

1.0 PROCEDURE TITLE: Field Sampling

Approvals and Signatures

Laboratory Director: Jessie Cusack Date: 11/6/09

QA Manager: Maria A. Pirkle Date: 11/6/09

Section Supervisor: [signature] Date: 11/6/09

EH&S Officer: Lisa M. Savage Date: 11/6/09

Control#: 10

2.0 AREA OF APPLICABILITY: Ground water monitoring wells, homeowners potable individual supply wells and industrial or municipal supply wells are the sources of these samples.

3.0 SCOPE: This procedure describes recommended methods as well as minimally acceptable methods for obtaining representative ground water samples for organic and metal analysis.

4.0 PRINCIPLE:

5.0 REFERENCES:

1. Environmental Laboratory Approval Program Certification Manual, NYSDOH Wadsworth Center for Laboratories and Research, "Field Analyses", Item No. 249, 5/1/92, p. 1-2.
2. Field Sampling Procedures Manual, New Jersey Department of Environmental Protection, February 1988.

6.0 PRESERVATION AND HOLD TIME: Refer to ELAP Manual Items: 241, 242 and 243 for a complete listing of preservation and holding times.

7.0 INTERFERENCES: Unclean sampling equipment will compromise the integrity of the sample.

8.0 APPLICABLE/ASSOCIATED SOPS

8.1 SAFETY

8.1.1 Employees must abide by the policies and procedures in the Corporate Safety Manual, Radiation Safety Manual and this document.

8.1.2 Disposable gloves and safety glasses will be worn by all personnel involved with any sampling. Gloves will be changed after each sample is collected. If sampling near roads or construction reflective clothing shall be worn as well as a hard hat near construction areas.

8.2 PRIMARY MATERIALS USED

8.2.1 The following is a list of the materials used in this method, which have a serious or significant hazard rating. **NOTE: This list does not include all materials used in the method. The table contains a summary of the primary hazards listed in the MSDS for each of the materials listed in the table.** A complete list of materials used in the method can be found in the reagents and materials section. Employees must review the information in the MSDS for each material before using it for the first time or when there are major changes to the MSDS.

Material (1)	Hazards	Exposure Limit (2)	Signs and symptoms of exposure
Hydrochloric Acid	Corrosive Poison	5 ppm-Ceiling	Inhalation of vapors can cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract, and in severe cases, pulmonary edema, circulatory failure, and death. Can cause redness, pain, and severe skin burns. Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Nitric Acid	Corrosive Oxidizer Poison	2 ppm-TWA 4 ppm-STEL	Nitric acid is extremely hazardous; it is corrosive, reactive, an oxidizer, and a poison. Inhalation of vapors can cause breathing difficulties and lead to pneumonia and pulmonary edema, which may be fatal. Other symptoms may include coughing, choking, and irritation of the nose, throat, and respiratory tract. Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and stain skin a yellow or yellow-brown color. Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Sodium Hydroxide	Corrosive Poison	2 ppm, 5 mg/m^3	This material will cause burns if comes into contact with the skin or eyes. Inhalation of Sodium Hydroxide dust will cause irritation of the nasal and respiratory system.
Sulfuric Acid	Corrosive Oxidizer Dehydra-dator	1 mg/m^3	This material will cause burns if comes into contact with the skin or eyes. Inhalation of vapors will cause irritation of the nasal and respiratory system.
1 – Always add acid to water to prevent violent reactions.			
2 – Exposure limit refers to the OSHA regulatory exposure limit.			

8.3 WASTE MANAGEMENT AND POLLUTION PREVENTION

8.3.1 All waste will be disposed of in accordance with Federal, State and Local regulations. Where reasonably feasible, technological changes have been implemented to minimize the potential for pollution of the environment. Employees will abide by this method and the policies in section 13 of the Corporate Safety Manual for "Waste Management and Pollution Prevention"

9.0 PROCEDURE

Any prep work that can be done in a lab atmosphere will be done so to preserve integrity.

9.1 Sampling Equipment

9.1.1 The equipment utilized for specific ground water sampling episodes can vary greatly depending on the following factors:

9.1.1.1 Type of well, e.g., monitoring, supply
9.1.1.2 Depth of well
9.1.1.3 Diameter of well casing
9.1.1.4 Contaminants likely to be encountered
9.1.1.5 Analytes of interest
9.1.1.6 Length of open hole (bedrock well)
9.1.1.7 Slot size of screen and screen type

9.1.2 Equipment to be utilized for ground water sampling generally falls into two categories; that used to evacuate the well casing and that used to collect a sample for analysis.

9.1.2.1 Types of equipment used for ground water sample collection may be the following:

9.1.2.1 Disposable 3" by 1.5" high density, Inert Polyethylene bailers from Environmental Rental or equivalent.

Groundwater (GW) Monitoring wells

A. Field meters used: The following meters are used when work at a monitoring well site begins: pH, temperature, conductivity, Eh, turbidity, water level meter. All meters are calibrated prior to the start of any work.
B. Field meter cleaning: All meters are cleaned after each use in the following manner:
   Wash with DI water and laboratory grade detergent
   Rinse with DI water
   Rinse with methanol (only when VOCs are present or suspect)
   Rinse with DI water
   Air dry
C. Sampling Equipment Used: All monitoring wells are sampled by using a precleaned disposable bailer.

D. Purging Procedure: Purging of wells is done by two different:
   1. Pumps: Any pumps used shall be cleaned after each use by the above protocol.
   2. Bailers: Any bailers used in the purging of wells shall be disposed of after each use.

E. Sampling Procedure:
   1. Depth of well is determined
   2. Water level is determined
   3. Diameter of pipe determined
   4. Calculate volume of water to be pumped out

      = (depth of well – distance to water level) x gallons per foot of depth x 3

      Note: gallons per foot of depth is based on the diameter of casting or hole

   5. Groundwater Sampling Record is completed

F. Sample containers: All samples shall be collected and preserved in accordance to ELAP Manual Items: 241, 424 and 243. All containers will be labeled with the following:
   1. Project name
   2. Sample ID
   3. Date and time of collection
   4. Parameters to be tested using that container

G. Chain of custody: A chain of custody form shall be completed listing all bottle types, preservatives, method parameters, clients name, project name, report type, turn around time and any known or suspected hazards.

Surface Waters/Leachate

A: same as GW
B: same as GW
C: Sampling Equipment: A clean dedicated Sample bucket will be used for each sample point to be collected.
E: same as GW
F: same as GW

Auto Samplers: When auto samplers are used clean virgin tubing is used for collection from the source. The collection container and tube weight is precleaned following procedures listed in GW section paragraph B. Upon completion of the sampling event sample water is poured into the proper container according to ELAP Manual Items: 241, 424 and 243.

Domestic Water

A. When sampling domestic water all samples are to be collected closest to the source as possible (raw water after filter and/or water softener).
B. Procedure for Bacteriological Sample Collection:
   1. Gloves to be worn at all times.
   2. Bacteriological samples must be collected in a sterile container provided by EnviroTest Laboratories. Keep bottle sealed until ready to use.
   3. If there is an aerator screen in use on the faucet, remove it prior to sample collection.
   4. Flame the faucet tap to prevent any contamination by handling.
   5. Turn on the cold water. Let it run 5 to 10 minutes or an hour if the system has not been used regularly.
   6. Unseal the sample bottle, making sure that only the water to be analyzed comes into contact with the inside bottle or the inside of the cap.
   7. Fill the bottle to the shoulder, taking care not to let the water contact the hands and then run into the bottle.
   8. Seal the bottle tightly and deliver to the laboratory within 24 hours. Samples to be mailed, must be taken to the Post Office early in the day any Monday through Thursday, and sent First Class Special Delivery in order to be received within the recommended time period.

Procedure for Collecting VOC

Cl2 is determined with disposable Cl2 strips. If no Cl2 is present containers can be filled after running water for 5 minutes. Using only 1+1 HCl as a preservative. If Cl2 is present sodium thiosulfate is used first to dechlorinate and then 1+1 HCl is added to a pH<2.

All other parameters: All other parameters can be collected after sufficient water has been purged through the system so that fresh water is obtained.

Procedure from GW Section Group F and G are to be followed for container types preservatives and COC forms.

Soil Sampling

A. In general soil samples will be collected at a depth of 6-8" unless specified otherwise by client.
B. Collection will be done with a precleaned trowel.
C. Any and all excavation and sampling tools will be cleaned following the procedures listed in GW Section Paragraph B.
D. All info shall be received following GW Section paragraphs F and G.
E. If necessary a detailed map is made to show sample locations.

COPY

APPENDIX F

METHOD SUMMARY

Client: McGoey, Hauser & Edsall

Job Number: 420-24951-1
Sdg Number: Q1

Description	Lab Location	Method	Preparation Method
Matrix Water			
Lachat - Total Kjeldahl Nitrogen	EnvTest	QuickChem 10-107-06-2	
Nitrogen, Total Kjeldahl (Colorimetric, Semi-Automated	EnvTest		MCAWW 351.2
Total Recoverable Phenolics. Colorimetri	EnvTest	QuickChem 10-210-00-1-A	
Distillation/Phenolics	EnvTest		Distill/Phenol
ICP Metals by 200.7	EnvTest	EPA 200.7 Rev 4.4	
Total Metals Digestion for 200.7	EnvTest		EPA 200.7
Anions by Ion Chromatography	EnvTest	MCAWW 300.0	
Anions by Ion Chromatography	EnvTest	MCAWW 300.0	
Chemical Oxygen Demand (Colorimetric, Automated; Manual)	EnvTest	MCAWW 410.4	
Chemical Oxygen Demand (Colorimetric, Automated: Manual)	EnvTest	MCAWW 410.4	
Volatile Organic Compounds by GC/MS	EnvTest	SW846 8260B	
Purge-and-Trap	EnvTest		SW846 5030B
Alkalinity, Titration Method	EnvTest	SM18 SM 2320B	
Hardness by Calculation	EnvTest	SM20 SM 2340B	
Total Dissolved Solids (Dried at 180 °C)	EnvTest	SM18 SM 2540C	
Chloride by Silver Nitrate Titration	EnvTest	SM18 SM 4500 Cl- B	
Ammonia - Titrimetric method	EnvTest	SM20 SM 4500 NH3 C	
Ammonia Distillation	EnvTest		SM20 SM 4500 NH3 B
5 Day BOD test	EnvTest	SM20 SM 5210B	
Total Organic Carbon/Persulfate - Ultraviolet Oxidation Method	EnvTest	SM18 SM 5310C	

Lab References:

EnvTest = EnviroTest

Method References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

QuickChem =

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

SM20 = "Standard Methods For The Examination Of Water And Wastewater", 20th Edition."

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD SUMMARY

Client: McGoey, Hauser & Edsall

Job Number: 420-25149-2

Description	Lab Location	Method	Preparation Method
Matrix Water			
Volatile Organic Compounds by GC/MS	EnvTest	SW846 8260B	
Purge-and-Trap	EnvTest		SW846 5030B
5 Day BOD test	EnvTest	SM20 SM 5210B	

Lab References:

EnvTest = EnviroTest

Method References:

SM20 = "Standard Methods For The Examination Of Water And Wastewater", 20th Edition."

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition. November 1986 And Its Updates

METHOD SUMMARY

Client: McGoey, Hauser & Edsall

Job Number: 420-25481-1
Sdg Number: Q1

Description	Lab Location	Method	Preparation Method
Matrix Water			
Lachat - Total Kjeldahl Nitrogen	EnvTest	QuickChem 10-107-06-2	
Nitrogen, Total Kjeldahl (Colorimetric, Semi-Automated	EnvTest		MCAWW 351.2
Total Recoverable Phenolics, Colorimetri	EnvTest	QuickChem 10-210-00-1-A	
Distillation/Phenolics	EnvTest		Distill/Phenol
ICP Metals by 200.7	EnvTest	EPA 200.7 Rev 4.4	
Total Metals Digestion for 200.7	EnvTest		EPA 200.7
Anions by Ion Chromatography	EnvTest	MCAWW 300.0	
Anions by Ion Chromatography	EnvTest	MCAWW 300.0	
Chemical Oxygen Demand (Colorimetric, Automated: Manual)	EnvTest	MCAWW 410.4	
Volatile Organic Compounds by GC/MS	EnvTest	SW846 8260B	
Purge-and-Trap	EnvTest		SW846 5030B
Alkalinity, Titration Method	EnvTest	SM18 SM 2320B	
Hardness by Calculation	EnvTest	SM20 SM 2340B	
Total Dissolved Solids (Dried at 180 °C)	EnvTest	SM18 SM 2540C	
Chloride by Silver Nitrate Titration	EnvTest	SM18 SM 4500 Cl- B	
Ammonia - Titrimetric method	EnvTest	SM20 SM 4500 NH3 C	
Ammonia Distillation	EnvTest		SM20 SM 4500 NH3 B
Dissolved Oxygen; Azide Modification	EnvTest	SMWW SM 4500 O C	
5 Day BOD test	EnvTest	SM20 SM 5210B	
Total Organic Carbon/Persulfate - Ultraviolet Oxidation Method	EnvTest	SM18 SM 5310C	

Lab References:

EnvTest = EnviroTest

Method References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

QuickChem =

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

SM20 = "Standard Methods For The Examination Of Water And Wastewater", 20th Edition."

SMWW = "Standard Methods for the Examination of Water and Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

APPENDIX G

EnviroTest Laboratories Q#3 **Groundwater Sampling Record**

Weather: 60° Sunny
Well ID: MW 61
Samplers: [illegible]

	Temp:	pH:	Turb:	Eh:	Spec.Cond.	Time:	Date:
Initial:	19.0	7.13	5.57	601	371	1.08	9/30/09
3 Volumes:	18.6	7.09	20.05	585	157	11.36	

Well Size: 3 0.361

PURGING METHOD:
_____ Bailer
X Submersible

Volume of Water Removed: 27.9 GAL.

71.7 >3 volumes yes / no
12 Gal. Removed

Sample Taken: 11.51

purged dry? yes / (no)

Depth of Well (from top of casing): 93.0
State of water level (from top of casing): 27.8
Water level before sampling (from top of casing): 27.1 Bent Casing

Free product NO
Sheen NO
Odor NO

Calibrated: Y/N 9/29/09
✓ pH
✓ Turbidity
✓ Eh
✓ Spec.Cond.

Weather:
Well ID: 6"S
Samplers:

	Temp:	pH:	Turb:	Eh:	Spec.Cond.	Time:	Date:
Initial:	16.0	6.99	45.99	3999	233	12.55	9/30/09
3 Volumes:	14.6	6.87	26.94	3999	170	1.22	

Well Size: 2 0.163

PURGING METHOD:
_____ Bailer
X Submersible

Volume of Water Removed: 2.6 GAL.

7.8 >3 volumes (yes) / no
10 Gal. Removed

Sample Taken: 1.30

purged dry? yes / (no)

Depth of Well (from top of casing): 23.5
State of water level (from top of casing): 7.4
Water level before sampling (from top of casing): 11.1

Free product NO
Sheen NO
Odor NO

Calibrated: Y/N
✓ pH
✓ Turbidity
✓ Eh
_____ Spec.Cond.

Weather:
Well ID: MW 111
Samplers: [illegible]

	Temp:	pH:	Turb:	Eh:	Spec.Cond.	Time:	Date:
Initial:	13.3	6.72	99.75	1659	-50	1.35	9/30/09
3 Volumes:	13.0	6.77	93.17	1499	-83	1.46	

Well Size: 2 0.163

PURGING METHOD:
_____ Bailer
X Submersible

Volume of Water Removed: 1.2 GAL.

3.8 >3 volumes (yes) / no
5 Gal. Removed

Sample Taken: 1.57

purged dry? yes / (no)

Depth of Well (from top of casing): 15.0
State of water level (from top of casing): 9.2
Water level before sampling (from top of casing): 14.7 Cloudy

Free product NO
Sheen NO
Odor NO

Calibrated: Y/N
✓ pH
✓ Turbidity
– Eh
– Spec.Cond

Weather:
Well ID: 95
Samplers: [illegible]

	Temp:	pH:	Turb:	Eh:	Spec.Cond.	Time:	Date:
Initial:	14.1	6.75	18.35	1370	111	2.12	9/30/09
3 Volumes:	13.8	6.73	5.0	1360	-77	2.36	

Well Size: 2 0.163

PURGING METHOD:
_____ Bailer
X Submersible

Volume of Water Removed: 1.2 GAL

3.8 >3 volumes (yes) / no
5 Gal. Removed

Sample Taken: 2.44

purged dry? yes / (no)

Depth of Well (from top of casing): 14.5
State of water level (from top of casing): 6.7
Water level before sampling (from top of casing): 8.0

Free product NO
Sheen NO
Odor NO

Calibrated: Y/N
✓ pH
✓ Turbidity
– Eh
– Spec.Cond.

EnviroTest Laboratories Q-3

Groundwater Sampling Record

Well Size:

		Temp:	pH:	Turb:	Eh:	Spec.Cond.	Time:	Date:
Weather:								
Well ID: Roadside #1	Initial:	14.4	6.79	2.64	193	-79	9:20	9/30/09
Samplers: JL	3 Volumes:							

PURGING METHOD:
_____ Bailer
_____ Submersible

Volume of Water Removed:
_____ GAL

_____ >3 volumes yes / no
_____ Gal. Removed

Sample Taken: 9:25

purged dry? yes / no

Depth of Well (from top of casing): _____
State of water level (from top of casing): 12.0
Water level before sampling (from top of casing): _____

Free product NO
Sheen NO
Odor NO

Calibrated: Y/N 9/14/09
_____ pH _____ Eh
_____ Turbidity _____ Spec.Cond.

		Temp:	pH:	Turb:	Eh:	Spec.Cond.	Time:	Date:
Weather:								
Well ID:	Initial:							
Samplers:	3 Volumes:							

Well Size:

PURGING METHOD:
_____ Bailer
_____ Submersible

Volume of Water Removed:
_____ GAL.

_____ >3 volumes yes / no
_____ Gal. Removed

Sample Taken: _____

purged dry? yes / no

Depth of Well (from top of casing): _____
State of water level (from top of casing): _____
Water level before sampling (from top of casing): _____

Free product _____
Sheen _____
Odor _____

Calibrated: Y/N
_____ pH _____ Eh
_____ Turbidity _____ Spec.Cond.

		Temp:	pH:	Turb:	Eh:	Spec.Cond.	Time:	Date:
Weather:								
Well ID:	Initial:							
Samplers:	3 Volumes:							

Well Size:

PURGING METHOD:
_____ Bailer
_____ Submersible

Volume of Water Removed:
_____ GAL.

_____ >3 volumes yes / no
_____ Gal. Removed

Sample Taken: _____

purged dry? yes / no

Depth of Well (from top of casing): _____
State of water level (from top of casing): _____
Water level before sampling (from top of casing): _____

Free product _____
Sheen _____
Odor _____

Calibrated: Y/N
_____ pH _____ Eh
_____ Turbidity _____ Spec.Cond

		Temp:	pH:	Turb:	Eh:	Spec.Cond.	Time:	Date:
Weather:								
Well ID:	Initial:							
Samplers:	3 Volumes:							

Well Size:

PURGING METHOD:
_____ Bailer
_____ Submersible

Volume of Water Removed:
_____ GAL.

_____ >3 volumes yes / no
_____ Gal. Removed

Sample Taken: _____

purged dry? yes / no

Depth of Well (from top of casing): _____
State of water level (from top of casing): _____
Water level before sampling (from top of casing) _____

Free product _____
Sheen _____
Odor _____

Calibrated: Y/N
_____ pH _____ Eh
_____ Turbidity _____ Spec.Cond

HIR VENTS / PIPE

MULTI-gas Detector (NHU)

4/30/09 - Q"3

A) % LEL 2 | % O2 19.6 | ppm Co ∅ | ppm H2S ∅

B) % LEL 100 | % O2 3.2 | ppm Co ∅ | ppm H2S ∅

C) % LEL 3 | % O2 20.8 | ppm Co ∅ | ppm H2S ∅

D) % LEL ∅ | % O2 20.8 | ppm Co ∅ | ppm H2S ∅

E) % LEL ∅ | % O2 20.8 | ppm Co ∅ | ppm H2S ∅

F) % LEL 1 | % O2 20.8 | ppm Co ∅ | ppm H2S ∅

G) % LEL 100 | % O2 0.1 | ppm Co ∅ | ppm H2S ∅

H) % LEL 100 | % O2 0.8 | ppm Co ∅ | ppm H2S ∅

I) % LEL 100 | % O2 2.1 | ppm Co ∅ | ppm H2S ∅

Leachate Pit

% LEL 100 | % O2 20.8 | ppm Co ∅ | ppm H2S ∅

North MANHOLE

% LEL 2 | % O2 20.8 | ppm Co ∅ | ppm H2S ∅

South MANHOLE

% LEL ∅ | % O2 20.8 | ppm Co ∅ | ppm H2S ∅

J) % LEL 100 | % O2 20.8 | ppm Co ∅ | ppm H2S ∅

HIR VENTS / PIPE (PID) 9/30/01 Q"3

Leachate Pit = ∅ ppm

4) ∅ ppm

3) ∅ ppm

North MANHOLE = ∅ ppm

2) ∅ ppm

1) ∅ ppm

South MANHOLE = ∅ ppm

J) ∅ ppm

I) ∅ ppm

H) ∅ ppm

G) ∅ ppm

F) ∅ ppm

E) ∅ ppm

EnviroTest Quality Manual

Revision: 6

Revised: August 15, 2008

EnviroTest Laboratories
315 Fullerton Avenue
Newburgh, NY 12550
845-562-0890

Approved: _____ Date: 8/18/08
EnviroTest President
Douglas O. Tawse

Approved: _____ Date: 8/18/08
EnviroTest Laboratory Director
Renee Cusack

Approved: _____ Date: 8/18/08
EnviroTest Quality Assurance Manager
Maria A. Pistole

Table of Contents

1.0 Introduction, Purpose and Scope

1.1 Quality Assurance Policy

It is EnviroTest Laboratories Policy to:

- Provide high quality, consistent and objective environmental testing services that meet all federal, state and municipal regulatory requirements.
- Generate data that are scientifically sound, legally defensible, meet project objectives, and are appropriate for their intended use.
- Provide ETL clients with the highest level of professionalism and the best service practices in the industry.
- Build continuous improvement mechanisms into all laboratory, administrative and managerial activities.
- Maintain a working environment that fosters open communication with both clients and staff and ensures data integrity.

1.2 Management Commitment to Quality Assurance

ETL management is committed to providing the highest quality data and the best overall service in the environmental testing industry. To ensure that the data produced and reported by ETL meet the requirements of its clients and comply with the letter and spirit of municipal, state and federal regulations, ETL maintains a Quality System that is clear, effective, well communicated, and supported at all levels in the company.

1.3 Purpose

The purpose of the Quality Manual (QM) is to describe the ETL Quality System and to outline how that system enables all employees of ETL to meet the Quality Assurance (QA) policy.

EnviroTest Laboratories Mission Statement

EnviroTest is a full-service, regional laboratory certified in New York, New Jersey and Connecticut. We perform a full suite of on-site environmental analytical tests – from wet chemistry to metals to volatile organics in drinking water, waste water and soil.

Since 1974, EnviroTest has built a reputation based on our quality and depth of service. Our senior staff average 20 years of experience in the environmental testing field, and the significant breadth of both our organic and inorganic systems allows us to provide our customers with a wide range of services here in Newburgh.

We pride ourselves in our commitment to our clients. Our core values reflect our belief in client satisfaction through superior service, quality and performance.

Dedication to excellence in three core areas:

1. Service – how we serve our clients
2. Quality – how we collect and report our data
3. Performance – how we perform as a business

Teamwork and personal accountability in delivering results that meet the needs of our clients.

Helping to provide environmental solutions that matter to our clients, our company, and the natural world.

2.0 Terms and Definitions

Accuracy: the degree of agreement between an observed value and an accepted reference value.

Audit: a systematic evaluation to determine the conformance to specifications of an operational function or activity.

Batch: environmental samples, which are prepared and/or analyzed together with the same process, using the same lot(s) of reagents. A preparation batch is composed of one to 20 environmental samples of the same matrix, meeting the above-mentioned criteria. An analytical batch is composed of prepared environmental samples, extracts, digestates or concentrates that are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.

Chain of Custody (COC): an unbroken trail of accountability that ensures the physical security of samples, data and records.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA/Superfund): legislation (42 U.S.C. 9601-9675 et seq., as amended by the Superfund Amendments and reauthorization Act of 1986 (SARA), 42 U.S.C. 9601et seq.

Compromised Sample: a sample received in a condition that jeopardizes the integrity of the results.

Confidential Business Information (CBI): information that an organization designates as having the potential of providing a competitor with inappropriate insight into its management, operation or products.

Confirmation: verification of the presence of a component using an additional analytical technique. These may include second column confirmation, alternate wavelength, derivatization, mass spectral interpretation, alternative detectors, or additional cleanup procedures.

Corrective Action: action taken to eliminate the causes of an existing non-conformance, defect or other undesirable situation in order to prevent recurrence.

Data Audit: a qualitative and quantitative evaluation of the documentation and procedures associated with environmental measurements to verify that the resulting data are of acceptable quality.

Equipment Blank: a portion of the final rinse water used after decontamination of field equipment; also referred to as Rinsate Blank and Equipment Rinsate.

Document Control: the act of ensuring that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly and controlled to ensure use of the correct version at the location where the prescribed activity is performed.

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA): legislation under 7 U.S.C 135 et seq., as amended.

Federal Water Pollution Control Act (Clean Water Act, CWA): legislation under 33 U.S.C. 1251 et seq., Public Law 92-50086 Stat. 816.

Field Blank: a blank matrix brought to the field and exposed to field environmental conditions.

Field of Testing (FOT): A field of testing is based on NELAC's categorization of accreditation based on program, matrix and analyte.

Good Laboratory Practices (GLP): formal regulations for performing basic laboratory operations outlined in 40 CFR Part 160 and 40 CFR Part 729 and required for activities performed under FIFRA and TSCA.

Holding Time: the maximum time that a sample may be held before preparation and/or analysis and still be considered valid as promulgated in the method.

Internal Chain of Custody: an unbroken trail of accountability that ensures the physical security of samples, data and records. Internal Chain of Custody refers to additional documentation procedures implemented within the laboratory that includes special sample storage requirements, documentation of all signatures and or initials, dates and times of personnel handling specific samples or sample aliquots.

Instrument Detection Limit (IDL): The minimum amount of substance that can be measured with a specified degree of confidence that the amount is greater than zero using a specific instrument. The IDL is associated with the instrumental portion of a specific method only, and sample preparation steps are not considered in is derivation. The IDL is a statistical estimation at a specified confidence interval of the concentration at which the relative uncertainty is +-100%. The IDL represents a range where the qualitative detection occurs on a specific instrument. Quantitative results are not produced in this range.

Initial Demonstration of Capability (IDC): procedure to establish the ability to generate acceptable accuracy and precision. Also referred to as Initial Demonstration of Proficiency.

Instrument Blank: a blank matrix that is the same as the processed sample matrix (i.e. extract, digestate, condensate) and introduced onto the instrument for analysis.

Laboratory Control Sample (LCS): a blank matrix spiked with a known amount of analyte(s), processed simultaneously with, and under the same conditions as, samples through all steps of the analytical procedure.

Laboratory Quality Manual (LQM): a document stating the quality policy, quality system and quality practices of the laboratory. The LQM may include by reference other documentation relating to the laboratory's quality system.

Limit of Detection (LOD): The minimum amount of substance that an analytical process can reliably detect.

Matrix: The substrate of a test sample. For purposes of batch and QC requirements determination, the matrix descriptions in Table 1 are used.

Table 1 Matrix Descriptions

Matrix		Description
Liquid		
	Aqueous	Aqueous sample excluded from the definition of Drinking Water or Saline/Estuarine source. Includes surface water, groundwater and effluents.
	Drinking Water	Aqueous sample that has been designated a potable water source.
	Saline	Aqueous sample from an ocean or estuary, or other salt-water source such as the Great Salt Lake.
	Liquid	Liquid with <15% settleable solids.
Solid		
	Solid	Soil, sediment, sludge or other matrices with ≥15% settleable solids.
Other	Waste	A product or by-product of an industrial process that results in a matrix not previously defined.

Matrix Duplicate (MD): duplicate aliquot of a sample processed and analyzed independently; under the same laboratory conditions; also referred to as Sample Duplicate.

Matrix Spike (MS): field sample to which a known amount of target analyte(s) is added.

Matrix Spike Duplicate (MSD): a replicate matrix spike.

Method Blank: a blank matrix processed simultaneously with, and under the same conditions as, samples through all steps of the analytical procedure.

Method Detection Limit (MDL): the minimum concentration of a substance (an analyte) that can be measured with 99% confidence that the analyte concentration is greater than (40 CFR Part 136 Appendix B).

Non-conformance: an indication, judgement, or state of not having met the requirements of the relevant specifications, contract, or regulation.

Precision: the degree to which a set of observations or measurements of the same property, usually obtained under similar conditions, conform to themselves; a data quality indicator.

Preservation: refrigeration and or reagents added at the time of sample collection to maintain the chemical and or biological integrity of the sample.

Proficiency Testing: determination of the laboratory calibration or testing performance by means of inter-laboratory comparisons.

Proficiency Test (PT) Sample: a sample, the composition of which is unknown to the analyst, that is provided to test whether the analyst/laboratory can produce analytical results within specified performance limits.

Proprietary: belonging to a private person or company.

Quality Assurance (QA): an integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence.

Quality Assurance (Project) Plan (QAPP): a formal document describing the detailed quality control procedures by which the quality requirements defined for the data and decisions pertaining to a specific project are to be achieved.

Quality Control (QC): the overall system of technical activities whose purpose is to measure and control the quality of a product or service so that it meets the needs of users.

Quality Control Sample: an uncontaminated sample matrix spiked with a known amount(s) of an analyte(s) from a source independent from the calibration standards. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

Quality Management Plan (QMP): a formal document describing the management policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an agency, organization or laboratory to ensure the quality of its product and the utility of the product to its users.

Quality System: a structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA/QC.

Quantitation Limit (QL): the minimum amount of a substance that can be quantitatively measured with a specified degree of confidence and within the accuracy and precision guidelines of a specific measurement system. The QL can be based on the MDL, and is generally calculated as 3-5 times the MDL, however, there are analytical methods and techniques where this relationship is not applicable. Also referred to a Practical Quantitation Level (PQL), Estimated Quantitation Level (EQL), Limit of Quantitation (LOQ).

Raw Data: any original information from a measurement activity or study recorded in a laboratory notebook, worksheets, records, memoranda, notes, or exact copies thereof and that are necessary for the reconstruction and evaluation of the report of the activity or study. Raw data may include photography, microfilm or microfiche copies, computer printouts, magnetic media, including dictated observations, and recorded data from automated instruments.

Record Retention: the systematic collection, indexing and storing of documented information under secure conditions.

Reference Standard: a standard, generally of the highest metrological quality available at a given location, from which measurements made at that location are derived.

Reporting Limit: the level to which data is reported for a specific test method and or sample. The RL is generally related to the QL. The RL must be minimally at or above the MDL.

Resource Conservation and Recovery Act (RCRA): legislation under 42 USC 321 et seq. (1976).

Safe Drinking Water Act (SDWA): legislation under 42 USC 300f et seq. (1974), (Public Law 93-523).

Sampling and Analysis Plan: a formal document describing the detailed sampling and analysis procedures for a specific project.

Selectivity: The capability of a method or instrument to respond to a target substance or constituent in the presence of non-target substances.

Sensitivity: the capability of a method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest.

Spike: a known amount of an analyte added to a blank, sample or sub-sample.

Standard Operating Procedure (SOP): a written document which details the method of an operation, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive tasks.

Systems Audit: a thorough, systematic, on-site, qualitative review of the facilities, equipment, personnel, training, procedures, record keeping, data validation, data management, and reporting aspects of a total measurement system.

Storage Blank: a blank matrix stored with field samples of similar matrix.

Test Method: defined technical procedure for performing a test.

Toxic Substances Control Act (TSCA): legislation under 15 USC 2601 et seq., (1976).

Traceability: the property of a result of a measurement that can be related to appropriate international or national standards through an unbroken chain of comparisons.

Trip Blank: a blank matrix placed in a sealed container at the laboratory that is shipped, held unopened in the field and returned to the laboratory in the shipping container with field samples.

Verification: confirmation by examination and provision of evidence that specified requirements have been met.

3.0 Management Requirments

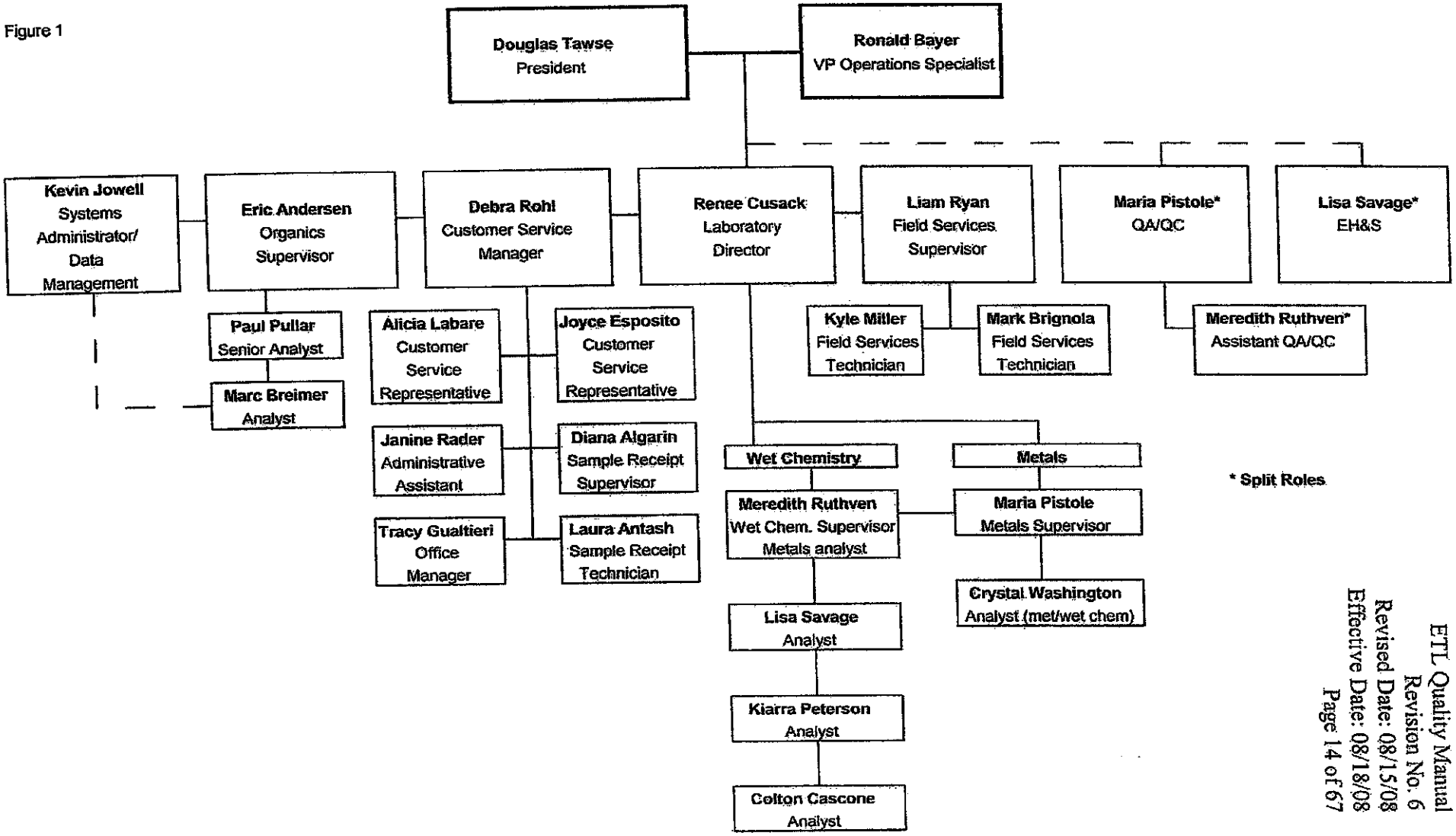
3.1 Organization and Personnel

3.1.1 Organization and Responsibilities

A functional organizational chart of the individuals associated with Quality Assurance Management follows. The responsibilities of the individuals associated with Quality Assurance Management are described below. A list of EnviroTest Laboratories personnel including education and experience is found in **Table 7**. **Figure 1** depicts a functional organizational chart of all EnviroTest Laboratories personnel

EnviroTest Laboratories Organization

Figure 1



3.1.2 Roles and Responsibilities

The President is directly responsible for the daily operations of EnviroTest Laboratories. The President's responsibilities include:

- Allocation of personnel and resources, long term planning, setting goals, and achieving the financial, business, and quality objectives of ETL.
- Ensures timely compliance with corporate management directives, policies, and management systems reviews.

The Laboratory Director oversees the daily operations of the laboratory. The duties and responsibilities of the Laboratory Director are to:

- Supervise staff, set goals and objectives for both the business and the employees.
- Achieve the financial, business, technical and quality objectives of the facility.
- Provide regulatory and technical updates to the ETL facility
- Assist in development of management plans and technical policies to be approved by the ETL President.
- Ensure timely compliance with audits and corrective actions.
- Maintain a working environment that encourages open, constructive problem solving and continuous improvement.
- Coordinate employee training within ETL.

The QA Manager is responsible for ensuring that the laboratory's quality system and Laboratory Quality Manual meet the necessary requirements. The duties and responsibilities of the QA Manager are to:

- Provide quality systems training to all new personnel.
- Maintain a Laboratory Quality Manual.
- Perform and oversee systems, data, special and external audits.
- Perform or supervise the maintenance of QA records, the maintenance of certifications and accreditations.
- Assist in reviewing new work as needed.
- The QA Manager shall have the final authority to accept or reject data and to stop work in progress in the event that procedures or practices compromise the validity and integrity of analytical data.
- Be available to any employee at the facility to resolve data quality or ethical operations.
- The QA Manager shall be independent of laboratory operations.
- Specify QA/QC procedures to be used during sample analysis.

- Implement quality control procedures and techniques to assure that the laboratory achieves established standards of quality.
- Evaluate data quality and maintain records on related QC charts and other pertinent information.
- Monitor laboratory activities to determine conformance with the authorized quality assurance policy, and to implement appropriate steps to ensure adherence to quality assurance programs.
- Coordinate internal audits
- Review performance evaluation results.
- Implement and communicate the Quality Manual
- Provide Quality Systems and Ethics training to all new personnel

The Customer Service Representative has overall responsibility for management of the analytical requirements for sample analysis. The duties and responsibilities of the Customer Service Representative (CSR) are to:

- Administer and supervise all requirements of the analytical tasks to ensure meeting the client objectives on schedule.
- Act as liaison between the laboratory and the client to discuss and resolve any problems that may occur.
- Work with laboratory supervisors in planning and conducting progress meetings.
- Take part in corrective actions.

The Sample Receipt Supervisor acts as sample custodian for the laboratory. The duties and responsibilities of the Sample Receipt Supervisor are to:

- Sign for the incoming field samples and verify the data entered on the chain-of-custody forms.
- Advise the Customer Service Manager of discrepancies, omissions or inappropriate samples.
- Prepare laboratory site sheet and internal chain-of-custody documents.
- Oversee sample information entry into the laboratory sample database.
- Generate computerized sample tracking data entry forms.
- Transfer sample and laboratory internal chain-of-custody documents to Laboratory Supervisors.

The System Administrator is responsible for:

- The management and quality control of all computing systems.
- The installation, operation and maintenance of software and programs

The Health and Safety Officer is responsible for implementing and communicating ETL's Health and Safety Policies and Manuals. The responsibilities of the Health and Safety Officer are to:

- Coordinate the investigations of all accidents and incidents.
- Maintain statistics on accidents and injuries.
- The Health and Safety Officer must review the OSHA Form 2000 for correctness and ensure it is posted as required.
- Assure that accidents are reported and Workers Comp. Requirements are followed.
- Approve Safety aspects listed in SOP's.
- Maintain MSDS records and make them available to all employees
- Ensure inspections of emergency equipment and fume hoods.
- Provide safety training for all employees
- Coordinate emergency response for activities for the facility.
- Conduct review of chemical usage in the facility.

The Laboratory Supervisors are responsible for meeting all the technical and analytical terms and conditions for sample analysis. Their areas of responsibilities are to:

- Organize the personnel, equipment and materials in a manner required to fulfill the analytical requirements of sample analysis.
- Oversee all aspects of laboratory analyses and provide technical support when necessary.
- Review analytical data for validity and clarity.
- Maintain contact with the Customer Service Manager in areas of technical concern, and advise the Customer Service Manager of analytical progress, needs, and of potential problems that occur.
- Advise the laboratory director of progress, needs and potential problems that occur.
- Inform laboratory director if the daily review indicates a decline in data quality and implement actions.

The Sample Analysts are responsible for the analysis of samples. The analysts will:

- Schedule, prepare and analyze samples according to the method specific requirements indicated by the chain-of custody.
- Advise the section supervisor of progress, needs and if potential problems occur.

- Verify that the laboratory QC and analytical procedures are being followed as specified.
- Review sample QC data, at least daily, including inspection of raw chromatograms and calibration curves.
- Inform section supervisors if the daily review indicates a decline in data quality and implement actions.

3.2 Quality System

3.2.1 Objectives of ETL Quality System

The goal of the ETL Quality System is to ensure that business and technical operations are conducted with the highest standards of professionalism in the industry.

To achieve this goal, it is necessary to provide ETL clients with not only scientifically sound, well documented, and regulatory compliant data, but also to ensure that ETL provides the highest quality service available in the industry with uncompromising data integrity. A well-structured and well-communicated Quality System is essential in meeting this goal. ETL's Quality System is designed to minimize systematic error, encourage constructive, documented problem solving, and provide a framework for continuous improvement within the organization.

The Quality Manual is the basis for ETL's quality and data integrity system. It contains requirements and general guidelines under which ETL conducts their operations.

3.3 Document Control Procedures

3.3.1 Document Type

The following documents, at a minimum, must be controlled at ETL:

- Laboratory Quality Manual
- Standard Operating Procedures (SOP)

3.3.2 Document Control Procedure

Security and control documents are necessary to ensure that confidential information is not distributed and that all current copies of a given document are from the latest revision. Unambiguous identification of a controlled document is maintained by identification of a controlled

document header: Document name, Document Number, Revision Number Effective Date, Number of Pages. Controlled documents are authorized by Management or the QA Department. Controlled documents are marked as such and records of the distribution are kept by the QA Department. Document control maybe achieved by either electronic or hardcopy distribution.

Controlled documents shall be are available at all locations where the operational activity described in the document is performed.

3.3.3 Document Revision

Quality System policies and procedures will be reviewed at a minimum of every two years and revised as appropriate. Changes to documents occur when a procedural change warrants a revision of the document. When an approved revision of a controlled document is ready for distribution, obsolete copies of the document shall be replaced with the current version of the document. The previous revision of the controlled document must be archived by the QA Department.

3.3.4 Official Documents

The ETL Corporate Operations staff issues Corporate Manuals, Standard Operating Procedures and Policies. These are collectively termed "Official Documents" and encompass the Policies and Procedures that all ETL facilities are required to employ. A detailed description of the procedure for issuing, authorizing, controlling, distributing and archiving Official documents is found in SOP S-Q-001.

3.4 Request, Tender, and Contract Review

3.4.1 Contract Review

For many environmental sampling and analysis programs, testing design is site or program specific and does not necessarily "fit" into a standard laboratory service or product. It is ETL's intent to provide both standard and customized environmental laboratory services to our clients. To ensure project success, technical staff shall perform a thorough review of technical and QC requirements contained in contracts. Contracts are reviewed for adequately defined requirements and ETL's capability to meet those requirements.

Contract review shall include a review of the clients requirements in terms of compound lists, test methodology requested, sensitivity, accuracy and precision requirements. The ETL representative ensures that the laboratory's test methods are suitable to achieve these requirements and must ensure that the laboratory holds the appropriate certifications and approvals to perform the work. The review also includes the laboratory's capabilities in terms of turnaround time, capacity and resources to provide the services requested, as well the laboratory's ability to provide the documentation whether hardcopy or electronic. If the laboratory cannot provide all services but intends to subcontract to an outside firm, this must be documented or discussed with the client prior to contract approval.

All contracts entered into by ETL are reviewed and approved by the appropriate personnel at the facility or facilities performing the work. Any contract requirement or amendment to a contract communicated to ETL verbally is documented and confirmed with the client in writing. Any discrepancy between the client's requirements and ETL's capability to meet those requirements is resolved in writing before acceptance of the contract. Contract amendments, initiated by the client and/or ETL, are documented in writing for the benefit of both the client and ETL.

All contracts, Quality Assurance Project Plans (QAPPs), Sampling and Analysis Plans (SAPs), contract amendments, and documented communications become part of the permanent project record.

3.4.2 Project Specific Quality Planning

Communication of contract specific technical and QC criteria is an essential activity in ensuring the success of site-specific testing programs. To achieve this goal, ETL assigns a Customer Service Representative (CSR) to each client. The CSR is the first point of contact for the client. It is the CSR's responsibility to ensure that project specific technical and QC requirements are effectively communicated to the laboratory personnel before and during the project.

EnviroTest Laboratories has established procedures in order to ensure that communication is inclusive and effective. These include project memos, designation and meetings of project teams, and meetings between the laboratory staff and the client. ETL has found it very effective to invite the client into this process. ETL strongly encourages our clients to visit the laboratories and hold formal or informal sessions with employees in order to effectively communicate client needs on an ongoing basis, as well as project specific details for customized testing programs.

3.4.3 Data Quality Objectives

Data quality objectives (DQO) are qualitative and quantitative statements used to ensure the generation type, quantity and quality of environmental data that will be appropriate for the intended application. Typically, DQO's are identified before project initiation, during the development of QAPP's and SAP's. The analytical DQO's addressed in this section are precision, accuracy, representativeness, completeness and comparability.

The components of analytical variability can be estimated when QC samples of the right types and at the appropriate frequency are incorporated into measurement process at the analytical laboratory. ETL incorporates numerous QC samples to obtain data for comparison with the analytical DQO's and to endure that the measurement system is functioning properly. The QC samples and their applications are selected based on regulatory, method or client-specific requirements. Analytical laboratory QC samples for inorganic and inorganic analyses may include calibration blanks, instrument blanks, method blanks, LCS, calibration standards, MS, MSD and surrogate spikes.

Every attempt will be made to have all data generated be valid data. The precision of laboratory analysis will be evaluated using sample duplicates and matrix spike duplicates. Analytical accuracy will be monitoring using recovery of analytes from system monitoring compounds, matrix spikes, blank spikes, EPA reference check standards and Performance Evaluation (PE) samples. These quality control measures and frequencies are summarized in **Section 4.8**. These QA efforts will assist in determining the reliability of the analytical data.

The DQO's discussed below ensure that data are gathered and presented in accordance with procedures appropriate for its intended use, that the data is of known and documented quality and are able to withstand scientific and legal scrutiny.

Precision is an estimate of variability. It is an estimate of agreement among individual measurements of the same physical or chemical property, under prescribed similar conditions. Precision is expressed either as Relative Standard Deviation (RSD) for greater than two measurements or a Relative Percent Difference (RPD) for two measurements. Precision is determined, in part, by analyzing data from aggregate LCS results, MS, MSD and MD.

Precision also refers to the measurement of the variability associated with the entire process, from sampling to analysis. Total precision of the process can be determined by the analysis of duplicate or replicate field samples and measures variability introduced by both the laboratory and field operations.

Accuracy is the degree of agreement between a measurement and the true or expected value, or between the average of number of measurements and the true or expected value. It reflects the total error associated with a measurement. Both random and systematic errors can effect accuracy. For chemical properties, accuracy is expressed either as a percent recovery (R) or as a percent bias (R-100). Accuracy is determined, in part, by analyzing data from LCS, MS, and MSD.

Representativeness is the degree to which data accurately and precisely represent a characteristic of population, a variation in a physical or chemical property at a sampling point or and environmental condition.

Data representativeness is primarily a function of sampling strategy; therefore, the sampling scheme must be designed to maximize representativeness. Representativeness also relates to ensuring that, though sample homogeneity, the sample analysis result is representative of the constituent concentration in the sample matrix. ETL makes every effort to analyze an aliquot that is representative of the original sample and to ensure the homogeneity of the sample before sub-sampling.

Completeness is defined as the percentage of measurements that are judged valid or useable. Factors negatively affecting completeness include the following: sample leakage or breakage in transit or during handling, loss of sample during laboratory analysis through accident or improper handling, improper documentation such that traceability is compromised, or sample result is rejected due to failure to conform to QC specifications. A completeness objective of greater than 90% of the data specified by the statement of work is the goal established for most projects.

Comparability is a measure of the confidence with which on data set can be compared to another. To ensure comparability, all laboratory analysts are required to use uniform procedures (e.g. SOP's) and a uniform set of units and calculations for analyzing and reporting environmental data.

3.5 Subcontracting

Subcontracting is arranged with the documented consent of the client, in a timely response that shall not be unreasonably refused. All QC guidelines specific to the client's analytical program are transmitted to the subcontractor and agreed upon before sending the samples to the subcontract facility. The originating laboratory shall obtain proof of certification from the subcontract facility and retain in ETL records. Where applicable, specific QC guidelines, QAPPs, and/or SAPs are transmitted to the subcontract laboratory. Samples are subcontracted under formal Chain of Custody (COC). A separate QAPP for the subcontract work will be prepared by the subcontract laboratory and submitted under separate cover.

Subcontract laboratories may receive an on-site audit by a representative of ETL's QA staff if it is deemed appropriate by the QA Manager. The audit involves a measure of compliance with the required test method, QC requirements, as well as any special client requirements. The originating laboratory may also perform a paper audit of the subcontractor, which would entail reviewing the Laboratory Quality Manual, the last two PT studies and a copy of any recent regulatory audits with the laboratory's responses.

Project reports from external subcontract laboratories are not altered and are included in original form in the final project report provided by ETL.

3.6 Purchasing Services and Supplies

Evaluation and selection of suppliers and vendors is done, in part, on the basis of the quality of their products, their ability to meet the demand for their products on a continuous and short term basis, the overall quality of their services, their past history, and competitive pricing. This is achieved through evaluation of objective evidence of quality furnished by the supplier, which can include certificates of analysis, recommendations, and proof of historical compliance with similar programs for other clients. To ensure that quality critical consumables and equipment conform to specified requirements, all purchases from specific vendors are approved by a member of the supervisory or management staff.

Chemical reagents, solvents, glassware, and general supplies are ordered as needed to maintain sufficient quantities on hand. Purchasing guidelines for equipment and reagents meet with the requirements of the specific method and testing procedures for which they are being purchased.

3.7 Service to the Client

3.7.1 Sample Acceptance Policy

EnviroTest Laboratories shall maintain a sample acceptance policy that describes compromised sample receipt. Samples shall be considered "compromised" if the following conditions are observed upon sample receipt:

- Cooler and/or samples are received outside of temperature specification.
- Samples are received broken or leaking.
- Samples are received beyond holding time.
- Samples are received without appropriate preservative.
- Samples are received in inappropriate containers.
- COC does not match samples received.
- COC is not properly completed or not received.
- Breakage of any Custody Seal.
- Apparent tampering with cooler and/or samples.
- Headspace in volatiles samples.
- Seepage of extraneous water or materials into samples.
- Inadequate sample volume.
- Illegible, impermanent, or non-unique sample labeling.

When "compromised" samples are received, it must be documented on the chain of custody and the client must be contacted for instructions. If the client decides to proceed with analysis, the project report shall clearly indicate any of the above conditions and the resolution.

3.7.2 Samples Tracking/Custody Procedures

- Sample are received at the laboratory by the sample custodian or designee who removes the samples from the shipping containers together with all accompanying documentation such as chain-of-custody (COC) forms, analysis request forms, etc.
- The condition of the custody seal is examined and recorded on the COC.
- The temperature of the samples upon receipt will be recorded on the COC.
- The sample will be tested for the presence of residual chlorine (when required) and recorded on the COC.
- The pH of the sample (when required) will be taken upon receipt. Any inappropriate pH reading will be recorded on the COC.

Necessary pH adjustments will be made as required and documented on the COC.

- The samples are inspected for general condition and the letter COC received with any samples is examined for discrepancies between package contents and the enclosed documents.
- Discrepancies, omissions, or inappropriate samples discovered will be noted and discussed with the Customer Service Representative who will contact the client to resolve the problem.
- If the client cannot be reached, the samples will be assigned to cold storage (4 degrees +- 2 degrees C) until the problem is resolved.
- Samples delivered directly by the sample collector are received and inspected by the Sample Receipt Technician or designee in the presence of the sample collector. Discrepancies, omissions, or inappropriate samples should be noted and discussed with the sample collector to resolve the problem.
- Samples receipted through COC by the Sample Receipt Technician or designee will be assigned an ETL laboratory number.
- The Sample Receipt Technician or designee will complete the ETL COC with the ETL laboratory number and corresponding individual sample number. The ETL sample number will be written on the client sample bottle or adhered via printed label to the client sample bottle.
- All documents will be reviewed a second time to ensure that there are no transposition errors. The Customer Service Representative or designee will validate the accuracy of the sample log-in procedure.
- The samples will be entered by sample entry into the laboratory sample data-base upon successful completion of the sample log-in procedure. Sample entry will prepare a laboratory chronicle for all projects that will be used for regulatory purposes. All documents, sample tags, shipping labels, etc. will be stapled to the original COC.
- Once in the possession of the Laboratory, all samples and extracts are stored and refrigerated in areas that are accessible only to Laboratory personnel. The building is locked during non-routine working hours.
- Access to the Laboratory facilities is limited to Laboratory personnel.
- All Samples are stored at the Laboratory for a minimum of 30 days after receipt and are not disposed of until at least one week after the final report has been issued.
- Samples are preserved per requirements or specific regulatory programs.

3.7.3 Client Confidentiality and Proprietary Rights

Data and sample materials provided by the client or at the client's request, and the results obtained by ETL, shall be held in confidence (unless such information is generally available to the public or is in the public domain or client has failed to pay ETL for all services rendered or is otherwise in breach of the terms and conditions set forth in the ETL and client contract) subject to any disclosure required by law or legal process. ETL's reports, and the data and information provided therein, are for the exclusive use and benefit of client, and are not released to a third party without written consent from the client.

3.8 Complaints

Client complaints shall be documented, communicated to management, and addressed promptly and thoroughly. Client complaints are documented by the employee receiving the complaint. The documentation can take the form of a corrective action report (**as described in Section 3.10.3**) or in a format specifically designed for that purpose. The Laboratory Director, Customer Service Representative, and QA Manager are informed of all client complaints, and assist in resolving the complaint.

The nature of the complaint is identified, documented, and investigated, and an appropriate action is determined and taken. In cases where a client complaint indicates that an established policy or procedure was not followed, the QA department is required to conduct a special audit to assist in resolving the issue. A written confirmation or letter to the client, outlining the issue and response taken is usually part of the overall action taken.
The number and nature of client complaints shall be reported to the QA Manager in the QA Monthly report. The overall number of complaints received is tracked and the appropriateness of the response to client complaints is assessed. Monitoring and addressing the overall level and nature of client complaints and the effectiveness of the solutions is part of the Management Systems Review.

3.9 Control of Non-conformances

Each ETL facility shall have a procedure to control and document non-conformances. Non-conformances include any out of control occurrence. Non-conformances may relate to client specific requirements, procedural requirements, or equipment issues. All non-conformances in the laboratory are documented at the time of their occurrence.

All non-conformances that affect a sample and/or sample data become part of the affected project's permanent record. When appropriate, reanalysis is performed where QC data falls outside of specifications, or where data appears anomalous. If the reanalysis comes back within established tolerances, the results are approved. If the reanalysis is still outside tolerances, further reanalysis or consultation with the Supervisor, Manager, Project Manager, Laboratory Director, or QA Manager for direction may be required. All records of reanalysis are kept with the project files.

Where non-conformances specifically affect a client's sample and/or data, the client shall be informed and action must be taken. Action can take the form of reporting and flagging the data, and including the non-conformance in the project narrative or cover letter.

3.10 Corrective Action

3.10.1 Initiation

Any employee shall be authorized to initiate a corrective action. The initial source of corrective action can also be external to ETL (i.e., corrective action because of client complaint, regulatory audit or proficiency test). When a problem that requires corrective action is identified, the following items are identified by initiator on the corrective action report: the nature of the problem, the name of the initiator, and the date. If the problem effects a specific client project, the name of the client and laboratory project number is recorded and the CRS is informed immediately.

3.10.2 Cause Analysis

When a corrective action report is initiated, the initiator works with the affected employee(s) and or department(s) to identify the root cause of the problem. An essential part of the corrective action process is to identify whether the problem occurred due to a systematic or isolated error.

If the initiator of the corrective action report is uncertain as to what would constitute appropriate corrective action or is usable to resolve the situation, the problem is identified to the Supervisor, Manager, Laboratory Director or the QA Manager who provides assistance in the corrective action process. The root cause of the problem and associated cause analysis is documented on the corrective action form.

3.10.3 Corrective Action

Once the root of the problem is identified, the initiator and affected employee(s) and or department(s) examine potential actions that will rectify the present problem to the extent possible and prevent reoccurrence of future similar occurrences. An appropriate corrective action is then recommended. Implementation of the corrective action and the date of implementation are documented on the corrective action report.

3.10.4 Preventative Action

Each ETL Facility shall maintain an established, documented preventative action process. Preventative action is defined as noting and correcting a problem before it happens, because of a weakness in a system, method, or procedure. Preventative action includes analysis of the Quality System to detect, analyze, and eliminate potential causes of non-conformances. When potential problems are identified, preventative action is initiated to effectively address the problem to eliminate or reduce the risk identified. The preventative action process takes the same format as the corrective action process

3.11 Records

3.11.1 Record Types

Table 2 ETL Record Types

Raw Data	Controlled Documents	QC Records	Project Records	Administrative Records
Calibration	LQM	Audits/ Responses	COC Documentation	Accounting
Computer Tapes/Disks	SOPs	Certifications	Contracts and Amendments	EH&S Manual, Permits, Disposal Records
QC Samples		Corrective Action	Correspondence	Employee Handbook
Sample data		Logbooks*	QAPP	OSHA 29 CFR Part 1910
Software (Version control)		Method & Software Validation, Verification	SAP	Personnel files, Employee Signature & Initials, Training Records
		Standards Certificates	Telephone Logbooks	Technical and Administrative Policies

*Logbooks: Maintenance, Instrument Run, Preparation (standard and samples), Standard and Reagent Receipt, Archiving, Balance Calibration, Temperature,

3.11.2 Record Retention

Table 3 outlines ETL's standard record retention time. For raw data and project records, record retention shall be calculated from the date the project report is issued. For other records, such as Controlled Documents, QC, or Administrative Records, the retention time is calculated from the date the document is formally retired. Records related to the programs listed in Table 4 have lengthier retention requirements and are not subject to ETL's standard record retention time.

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Table 3 ~~STL~~ Record Retention

Record Type		Archival Requirement
Raw Data	All*	5 Years from project completion
Controlled Documents	All*	5 Years from document retirement date
QC	All*	5 Years from archival
Project	All*	5 Years from project completion
Administrative	Personnel/Training	7 years
	Accounting	See Accounting and Control Procedures Manual

* Exceptions listed in Table 4.

3.11.3 Programs with Longer Retention Requirements

Specific client projects and regulatory programs have longer record retention requirements than the ETL standard record retention length. In these cases, the longer retention requirement must be noted in the archive. If special instructions exist such that client data cannot be destroyed prior to notification of the client, the container or box containing that data is marked as to whom to contact for authorization prior to destroying the data.

Programs with record retention requirements greater than five years are detailed in Table 4.

Table 4 Special Record Retention Requirements

Program	Retention Requirement
Commonwealth of MA – All environmental data 310 CMR 42.14	10 years
NY Potable Water NYCRR Part 55-2	10 years
OSHA - 40 CFR Part 1910	30 years
Pennsylvania – Drinking Water	10 years
TSCA - 40 CFR Part 792	10 years after publication of final test rule or negotiated test agreement

3.11.4 Archives and Record Transfer

Archives must be indexed such that records are accessible on either a project or temporal basis. Archives are protected against fire, theft, loss, deterioration, and vermin. Electronic records are protected from deterioration caused by magnetic fields and/or electronic deterioration. Access to archives is controlled and documented. On or off-site facilities may be used.

ETL ensures that all records are maintained as required by the regulatory guidelines and per the Quality Manual upon facility location change or ownership transfer. Upon ETL facility location change, all archives are retained by ETL in accordance with the Quality Manual. Upon ownership transfer, record retention requirements shall be addressed in the ownership transfer agreement and the responsibility for maintaining archives is clearly established.

3.12 Internal Audits

3.12.1 Audit Types and Frequency

A number of types of audits shall be performed at ETL to monitor quality. The audit type and frequency are categorized in table 5.

Table 5 Audit Types

Audit Type	Performed by	Frequency
Systems	QA Department or Designee	Annual
Data	QA Department or Designee	**Data Report Review:** As necessary to ensure an effective secondary review process. **Analyst Data Audits:** 100% of all analysts annually **Electronic Data Audits:** 100% of all organic instruments
Special	QA Department or Designee	As needed

3.12.2 System Audits

A system audit is an evaluation of the various components of a laboratory's measurements system to assess proper selection and use. This audit will consist of an on-site review of a laboratory's quality assurance system and physical facilities for sampling, calibration and measurements. System audits are performed on a regular basis by the various regulatory agencies and annually by the ETL QA Manager. The audit may include several or all of the components listed below:

- Personnel, facilities and equipment
- Chain - of - custody procedures
- Instrument calibration and maintenance
- Standards preparation and verification
- Analytical procedures
- Quality control procedures
- Data handling procedures
- Documentation control procedures
- Sample storage
- Instrument maintenance
- Documentation
- Precision
- Accuracy

The audit report is issued by the internal auditor within 30 calendar days of the audit. The audit report is addressed to the Laboratory Director and copied to the President. If the internal audit is performed by someone other than the facilities QA Manager, the report must also be addressed to the QA Manager.

Written audit responses are required within 30 days of the audit report issue. The audit response follows the format of the audit report, and corrective actions and time frames for their implementation are included for deficiency. The audit response is directed to all individuals copied on the audit report. Where a corrective action requires longer than 30 days to complete, the target date for the corrective action implementation is stated and the evidence of the corrective action is submitted to the QA Department in the agreed time frame.

3.12.3 Data Audits

Data audits assess the level of customer service, SOP compliance, regulatory compliance, accuracy and completeness of test results and reports, documentation, and adherence to established QC criteria, laboratory SOP's, technical policy and project specific QC criteria. Data audits may be accomplished through electronic instrument data audits, analyst data authenticity audits or through final project report reviews.

Records of the data shall be kept and the frequency of data audits shall be included in the monthly QA report. In performing data audits, it is essential that data be assessed in terms differentiating between systematic and isolated errors. Upon noting anomalous data or occurrences in the data audits, the QA department is responsible for seeking clarification from the appropriate personnel, ascertaining whether the error is systematic or an isolated error and overseeing correction and/or revision of the project report if necessary. Errors found in client project reports are revised and the revision sent to the client. The QA Department is also responsible for assisting in the corrective action process where a data audit leads to identification of the need to process evaluation and change.

Where specific clients and regulatory programs require more frequent data auditing, the individual facility must meet the data auditing frequency for the program.

3.12.3.1 Data Authenticity Audits

Data authenticity audits shall be performed on 100% of all analysts by the QA Department or designee independent from the operations. Performing data authenticity checks will typically include verifying raw data, evaluating calculation tools and independently reproducing the final results and comparing it to the Hard copy on randomly selected batches of data. The laboratory will report the percentage of analysts reviewed for the year in their monthly QA report and should average about 8% per month.

3.12.3.2 Electronic Data Audits

Electronic data audits shall be performed on 100% of all organic instruments by the QA Department or a designate independent of operations. They may include Mint Miner® scanning of randomly selected batches of electronic data followed by a chromatography system review. The laboratory will report the percentage of

instruments reviewed for the year in their monthly QA report and should average about 8% per month.

3.12.3.3 Final Report Reviews

The frequency of auditing reports depends on the effectiveness of the laboratory's secondary review process. If the laboratory infrequently finds report errors or there is a low percentage of revised reports due to analytical error, audits may be less frequent.

3.12.4 Special Audits

3.12.4.1 Performance Audits

Performance audits provide a systematic check of laboratory operations and measurement systems by comparing independently obtained data with routinely obtained data. To fulfill the PT requirements for NELAC accreditation, ETL routinely participates in laboratory performance evaluations received from the NYSDOH ELAP as part of the Potable and Non-Potable Water/Solid & Hazardous Waste/Air & Emissions Chemistry Proficiency Programs. A schedule for ETL participation in these performance evaluations is detailed in **Table 6.**

Table 6 Laboratory Performance Evaluation Schedule (1 year)

Source	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
NYSDOH Potable		X		X
NYSDOH Non-Potable Solid & Hazardous Waste Chemistry	X		X	

3.12.5 External Audits

ETL is routinely audited by clients and external regulatory authorities. ETL is available for these audits and makes every effort to provide the auditors with the personnel, documentation, and assistance required by the auditors. ETL recommends that the audits be scheduled with the QA Department so that all necessary personnel are available on the day of the

audit.

3.13 Management Reviews

3.13.1 Monthly QA Reports and Metrics to Management

By the 3rd day of the month, the QA Manager will prepare a monthly QA report. The report will be sent to the Laboratory Director and President. The report will contain a narrative summary and metrics spreadsheet. The reports include statistical results that are used to assess the effectiveness of the quality system. At a minimum, the report content will contain the items listed below in **figure 2**. During the course of the year, the Lab Manager or President may request that additional information be added to the report.

Figure 2 Monthly QA Report Format

1.	Audits Internal systems audits performed, significant and/or repeat deficiencies noted. External systems audits performed.
2.	Revised Reports/Client Complaints Revised reports in percent. Total number of client complaints, reason, and resolution. Client Compliments
3.	Certifications/parameters changes. Changes Losses/recovations
4.	Proficiency Testing Score for each PT as a percent. Note repeat failures and/or significant problems.
5.	SOP Status Report the percentage of SOP's that have been revised or reviewed within the last 24 months.
6.	Miscellaneous QA and Operational Issues Narrative outlining improvements, regulatory compliance issues and general concerns.

4.0 Technical Requirements

4.1 Personnel

4.1.1 Training

ETL is committed to furthering the professional and technical development of employees at all levels. Minimum training requirements for ETL employees are outlined in **Table 7**.

Table 7 ETL Employee Minimum Training Requirements

Required Training	Time Frame*	Employee Type
Environmental Health & Safety	Month 1	All
Ethics Data Integrity	Two Weeks	All Technical and CSR's
Ethics Refresher	Annually	All
Quality Assurance	Quarter 1	All
Initial Demonstration of Capability (IDC)	Prior to unsupervised method performance	Technical
Continuing Demonstration of Performance	Performed Yearly	Technical

*From the date of initial employment unless otherwise indicated.

Technical training is accomplished within each laboratory by management to ensure method comprehension. All new personnel shall be required to demonstrate competency in performing a particular method by successfully completing an Initial Demonstration of Capability (IDC) before conducting analysis independently on client samples.

IDCs are performed by analysis of four replicate QC check samples. Results of successive LCS analyses can be used to fulfill the IDC requirement. The accuracy and precision, measured as average recovery and standard deviation (using n-1 as the population), of the 4 replicate results are calculated and compared to those in the test method (where available). If the test method does not include accuracy and precision requirements, the results are compared to target criteria set by the laboratory. The laboratory sets the target criteria such that they reflect the data quality objectives of the specific test method or project data quality objectives. An IDC Certification Statement is recorded and maintained in the employee's training or personnel file.

Prior to an analyst assuming responsibility for an analysis, an Initial Demonstration of Capability (IDC) must be performed and approved by

the QA Supervisor. The Section Supervisor is responsible for the proper training of all analysts and technicians.

Continuing Demonstration of Performance must be performed yearly and documented by the QA Manager for all technical staff. The following can be used to demonstrate continuing performance:

- Batch specific QC samples such as laboratory control samples, method blanks and blank spikes.
- Proficiency Test Results
- The criteria for continued demonstration performance is the same as the IDC.

4.1.2 Ethics Policy

Establishing and maintaining a high ethical standard is an important element of a Quality System. In order to ensure that all personnel understand the importance the company places on maintaining high ethical standards at all times; ETL has established an Ethics Agreement. Each employee shall sign the Ethics Agreement, signifying agreed compliance with its stated purpose. ETL has established an Ethics Training Seminar. A twenty minute session is given to new employees on the first day of employment. Within 30 days of employment the new employee is given comprehensive ethics training and a refresher course will be given annually.

4.2 Facility

ETL is secure and access is controlled and documented. Access is controlled by locked doors, security codes and staffed reception areas. All visitors sign in and are escorted by ETL personnel while at an ETL facility. ETL is equipped with Heating, Ventilation and Air Conditioning systems appropriate to the needs of environmental testing laboratories. Environmental conditions in the facilities such as hood flow, are routinely monitored and documented.

Each ETL employee is familiar with the location, use and capabilities of general and specialized safety features associated with their workplace. ETL also requires the use of protective equipment including safety glasses, protective clothing, gloves, respirators, etc.

4.3 Test Methods

4.3.1 Method Selection

Most of the methods preformed at ETL originate from test methods published by the regulatory agencies such as the US EPA. The analytical procedures to be used in the analysis of samples may utilize one of the following references:

References

1. Methods for Chemical Analysis of Water and Wastewater", EPA-600/4-79-020, March 1983.
2. "Test Methods for Evaluating Soil Waste", USEPA-SW846, 3RD Edition, September 1986 with all current revisions.
3. Federal Register, V. 50, No.3, January 4, 1985.
4. Federal Register, V. 49, No.209, October 26, 1984.
5. "Standard Methods for the Examination of Water and Wastewater", 16th Edition, 1986.
6. "Methods for the Determination of Organic Compounds in Drinking Water EPS-600/4-88-039, December 1988.
7. The Analysis of Trihalomethanes in Finished Water by the Purge and Trap Method, EMSL, Cincinnati, Ohio 45268, November 6, 1979.
8. Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography, EMSL, Cincinnati, Ohio 45268, Revision 2.0, (1989).
9. Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Seriers, EMSL, Cincinnati, Ohio 45268, revision 2.0 (1989).
10. Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector, EMSL, Cincinnati, Ohio 45268, Revision 4.0 (1989).
11. "New York State Department of Environmental Conservation Analytical Services Protocol, Vol. 2, October 1995.
12. "Standard Methods for the Examination of Water and Wastewater", 17th Edition, 1989.
13. "ASTM, Petroleum Products, Lubricants, and Fossil Fuel, Vol. 5.01 D56-D1947, 1990.
14. "Analytical Handbook for the Laboratory of Organic Analytical Chemistry", Wadsworth Center for Laboratories and Research, New York State Department of Health, August 1991.

15. "Standard Methods for the Examination of Water and Wastewater", 19th Edition, 1999.

4.3.2 SOP's

Each ETL facility shall maintain an SOP Index for all standard, non-standard, and laboratory developed methods. SOPs are also maintained for describing processes that are not related to a specific method. Method SOPs are maintained to describe a specific test method. Process SOPs are maintained to describe function and processes not related to a specific test method.

Method SOPs contain the following information:

Title Page with Document Name, Revision Number, Effective Date, Page Numbers and Total # of Pages, Authorized Signatures and Dates.
Certification of Test Method

1. Identification of Test Methods
2. Applicable Matrix
3. Reporting Limit
4. Scope and Application, including test analytes
5. Summary of the Test Method
6. Definitions
7. Interferences
8. Safety
9. Equipment and Supplies
10. Reagents and Standards
11. Sample Collection, Preservation, Shipment and Storage
12. Quality control
13. Calibration and Standardization
14. Procedure
15. Calculations
16. Method Performance
17. Pollution Prevention
18. Data Assessment and Acceptance Criteria for Quality Control Measures
19. Corrective Actions for Out-of-Control Data
20. Contingencies for Handling Out-of-Control or Unacceptable Data
21. Waste Management
22. References

23. Tables, Diagrams, Flowcharts and Validation Data

Process SOPs contain the following information:

Title Page with Document Name, Document Number, Revision Number, Effective Date, Page Numbers and Total # of Pages, Authorized Signatures and Dates.

1. Scope
2. Summary
3. Definitions
4. Responsibilities
5. Safety
6. Procedure
7. References
8. Tables, Diagrams, and Flowcharts

The QA Department is responsible for maintenance of SOPs, archival of SOP historical revisions, maintenance of an SOP index and records of controlled distribution. SOPs, at a minimum, must undergo periodic review. Where an SOP is based on a published method, the laboratory maintains a copy of the reference method.

SOP Appendix

In some cases, a standard laboratory procedure is modified slightly for a specific client or project at the client or regulatory agency's request. In these cases, an Appendix to the SOP may be attached that indicates the modifications to the SOP that are specific to that project. SOP appendices shall not be used to alter test methods required by regulation such that the modifications would result in non-compliance with the regulation.

4.3.3 Method Validation

Before analyzing samples by a particular method, the method is validated. Validation of the method is required for standard methods, non-standard methods, and laboratory developed methods. While method validation can take various courses, the following activities are generally required as part of method validation. Method validation records are designated QC records and are archived accordingly.

4.3.3.1 Laboratory Developed Methods

Laboratory developed methods are validated and documented according to the procedure described in **section 4.3.5.**

4.3.3.2 Non-standard Methods

Non-standard methods are validated and documented according to the procedure described in **section 4.3.5.**

4.3.4 Method Verification

Method verification is required when a validated standard test method or a method modification is implemented. The level of activity required for method verification is dependent on the type of method being implemented, or on the level of method modification often takes advantage of a method's robustness, or the ability to make minor changes in a method without affecting the method's outcome. Method verification may require some but not all of the activities described in Section 4.3.5.1.

4.3.5 Method Validation and Verification Activities

Before analyzing samples by a particular method, method validation and/or method verification must occur. A complete validation of the method is required for laboratory developed methods. While method validation can take various courses, the following activities can be required as part of method validation. Method validation records are designated QC records and are archived accordingly.

4.3.5.1 Determination of Method Selectivity

Method selectivity is demonstrated for the analyte(s) in the specific matrix or matrices. In some cases, to achieve the required selectivity for an analyte, a confirmation analysis is required as part of the method.

4.3.5.2 Determination of Method Sensitivity

Sensitivity can be both estimated and demonstrated. Whether a study is required to estimate sensitivity depends on the level of method development required when applying a particular measurement system to a specific set of samples. Where estimations and/or demonstrations of sensitivity are required by regulation or client agreement, such as the procedure in 40 CFR Part 136 Appendix B under the Clean Water Act, these shall be followed. Instrument detection limits are

performed where required by specific data quality objectives or regulation. ETL must have an SOP that details their approach to estimation and or demonstration of sensitivity.

A number of procedures that can be used for estimating the Limit of Detection (LOD) and or MDL are reference below:

Critical Level Approach (Currie, 1968)
This approach estimates the MDL based on a critical level. The critical level is determined from the standard deviation and population characteristics of successive blank determinations.

Decision Limit Approach (Hubaux and Vos, 1970)
This procedure uses a decision limit and the confidence limits from a least squares fitted regression line to estimate the LOD.

Decision Limit Approach using Non-central t-Distribution (Clayton etal, 1987)
This approach estimates the LOD based on a decision limit. This approach is similar to the Hubaux-Vos method but using a non-centrality parameter of distribution in calculating the LOD.

Method Detection Limit Study – (USEPA, Glaser etal, 1981)
This approach establishes a procedure for estimation of the MDL at a single concentration using a minimum of seven successive determinations of samples or spikes containing the analyte to be determined.

Weighted Least Squares Approach (Gibbons etal, 1997)
This approach for estimating the LOD utilizes spiked samples at a series of concentrations and applies a weighted least squares regression analysis to the resulting data.

4.3.5.3 Study Design in Estimation of Sensitivity

Two components of study design are crucial to ensuring an accurate estimation of sensitivity. First, when the signal of an analyte is used to estimate the Limit of Detection (LOD), it must be based on data for which qualitative identification criteria have been met. For example, qualitative mass spectral identification criteria must be met prior to using a specific ion in a mass spectrum to generate meaningful values for estimation of LOD based on spiked samples. Proper resolution of

analytes must be taken into account in determining whether a LOD can be reasonably estimated.

The second important component of study design is to build appropriate and representative variability into the study. Many methods for estimation of the LOD require the measurement of variance. The study design must take into account all factors that influence the variability of a measurement system in the routine operation with which it is to be performed. This would include utilizing different analysts, different lots of reagents, different days (taking into account minor temperature and humidity variations), and utilizing all instruments that are to be used in routine operations, to generate the data that will be used in estimating the LOD.

4.3.5.4 Relationship of Limit of Detection (LOD) to the Quantitation Limit (QL)

ETL has a procedure to relate the QL to the LOD (or MDL if appropriate). An important characteristic of expression of sensitivity is the difference in the LOD and the QL. The LOD is the minimum level at which the presence of an analyte can be reliably concluded. The QL is the minimum level at which both the presence of an analyte and its concentration can be reliably determined. For most instrumental measurement systems, there is a region where semi-quantitative data is generated around the LOD (both above and below the estimated MDL or LOD) and below the QL. In this region, detection of an analyte may be confirmed but quantification of the analyte is unreliable within the accuracy and precision guidelines of the measurement system. When an analyte is detected below the QL, and the presence of the analyte is confirmed by meeting the qualitative identification criteria for the analyte, the analyte can be reliably reported, but the amount of the analyte can only be estimated. If data is to be reported in this region, it must be done so with a qualification that denotes the semi-quantitative nature of the result.

4.3.5.5 Determination of Interferences

A determination that the method is free from interferences in a blank matrix is performed.

4.3.5.6 Determination of Range

Where appropriate, a determination of the applicable range of the method is performed. In most cases, range is determined and demonstrated by comparison of the response of an analyte in a curve to established or targeted criteria. The curve is used to establish the range of quantitation and the lower and upper values of the curve represent upper and lower quantitation limits. Curves are not limited to linear relationships.

4.3.5.7 Initial Demonstration of Capability

IDCs are performed prior to method performance.

4.3.5.8 Documentation of Method

The method is formally documented in an SOP. If the method is a minor modification of a standard laboratory method that is already documented in an SOP, an SOP Appendix describing the specific differences in the new method is acceptable in place of a separate SOP.

4.3.5.9 Continued Demonstration of Method Performance

Continued demonstration of Method Performance is addressed in the SOP. Continued demonstration of method performance is generally accomplished by batch specific QC samples such as Laboratory Control Samples and Method Blanks.

4.3.6 Data Review

All data, regardless of regulatory program level of reporting shall be subject to a thorough review, which involves a primary, secondary, and completeness review process. All levels of review must be documented.

4.3.6.1 Primary Review

The primary review is often referred to as a "bench-level" review. In most cases, the analyst who generates the data (i.e. logs in, prepares and/or runs the samples) is the primary reviewer. In some cases, an analyst may be reducing data for samples run by an auto-sampler set up by a different analyst. In this case, the identity of both the analyst and the primary reviewer is identified in the raw data.

One of the most important aspects of primary review is to make sure that the test instructions are clear, and that all project specific requirements have been understood and followed. If directions to the analyst are not clear, the analyst must go to the Supervisor, QA Manager, or Customer Service Representative, who must clarify the instructions.

Once an analysis is complete, the primary reviewer must ensure that:

- Sample preparation information is complete, accurate, and documented.
- Calculations have been performed correctly.
- Quantitation has been performed accurately.
- Qualitative identifications are accurate.
- Client specific requirements have been followed.
- Method and process SOPs have been followed.
- Method QC criteria have been met.
- QC samples are within established limits.
- Dilution factors are correctly recorded and applied.
- Non-conformances and/or anomalous data have been properly documented and appropriately communicated.
- Internal COC procedures have been followed.
- Primary review is documented by date and initials/signature of primary analyst.

Any anomalous results and/or non-conformances noted during the Primary Review are communicated to the Supervisor and the QA Manager for resolution. Resolution can require sample reanalysis, or it may require that data be reported with a qualification.

4.3.6.2 Secondary Review

The secondary review shall be a technical review of a data set and must be completed by the section supervisor. The secondary review is documented and the secondary reviewer is identified. The following items are reviewed:

- Qualitative Identification
- Quantitative Accuracy
- Calibration
- QC Samples
- Method QC Criteria

- Adherence to method and process SOPs
- Completeness
- Special Requirements/Instructions
- Manual Integrations-Minimal requirement is to spot check raw data files for manual integration, as verified by date and initials or signature of secondary data reviewer.

If problems are found during the secondary review, the reviewer must work with the appropriate personnel to resolve them and notify the QA Manager.

4.3.6.3 Completeness Review

The completeness review is performed by personnel from the QA/QC/Customer Service Department. The completeness review includes a comprehensive data validation of the entire data set. The completeness review includes the generation of a project narrative and/or cover letter, which outlines anomalous data and non-compliances. The completeness review addresses the following items:

- Verification of primary and secondary reviews
- Accuracy of Final Client Reporting Forms
- Manual Integrations – 100% as verified by signature of primary data reviewer
- Completeness
- Special Requirements/Instructions Fulfilled
- Is the project report complete?
- Correct assembly of the final report.
- Does the data meet with the client's expectations?
- Were the data quality objectives of the project met?
- Have QC outages and/or non-conformances been noted and explained in the case narrative.

If problems are found during the completeness review, the reviewer must work with the appropriate personnel to resolve them. If changes are made to the data, such as alternate qualitative identifications, identifications of additional target analytes, re-quantitation, or re-integration, the completeness reviewer must contact the laboratory analyst and/or primary reviewer of the data so that the primary analyst and/or reviewer is aware of the appropriate reporting procedures. This is accomplished by submitting a corrective action form to the appropriate personnel.

4.4 Equipment

4.4.1 Equipment Operation

ETL is committed to routinely updating and automating instrumentation. All equipment is subject to rigorous checks upon receipt, upgrade or modification to establish that the equipment meets the selectivity, accuracy and precision required by the test method for which it is used. All manufactures operations and maintenance manuals are kept up to date and accessible for the use of the equipment operator. Documentation of equipment usage is maintained using analytical run and maintenance logbooks.

4.4.2 Instrument Maintenance Activities

All routine maintenance is performed as recommended by the manufacturer and may be performed by an analyst. Maintenance logbooks are kept on all major pieces of equipment in which both routine and non-routine maintenance is recorded. Notation of the date and maintenance activity is recorded each time service procedures are performed. The return to analytical control following instrument repair is documented. Maintenance logbooks are retained as QA records.

Instrument preventative maintenance and careful calibration help to assure accurate measurements from laboratory instruments. Where applicable, all laboratory instrumentation is on a service contract with the instrument manufacturer or licensed service organization. The service contracts include regular preventative maintenance service calls on a scheduled basis.

Preventative maintenance procedures such as lubrication, source cleaning, detector cleaning and the frequency of such maintenance are performed according to the procedures delineated in the manufacturer's instrument manual or when deemed necessary by the analyst.

Instrument logbooks are in the laboratory at all times. They contain records of usage, calibration, maintenance and repairs. Adequate supplies of spare parts such as GC columns, syringes, septa, injection port liners, and electronic parts are maintained in the laboratory so that they are available when needed.

A complete listing of instrumentation may be found in **Table 9.**

4.4.3 Equipment Verification and Calibration

All equipment shall be tested upon receipt to establish its ability to meet the QC guidelines contained in the test method for which the instrumentation is to be used. This testing shall be documented. Once an instrument is placed in routine service, ongoing instrument calibration is demonstrated at the appropriate frequency as defined in the test method. Any instrument that is deemed to be malfunctioning is clearly marked and taken out of service. When the instrument is brought back into control, acceptable performance is documented.

4.5 Measurement Traceability

4.5.1 General

Traceability of measurements shall be assured using a system of documentation, calibration, and analysis of reference standards. Laboratory equipment that are peripheral to analysis and whose calibration is not necessarily documented in a test method analysis or by analysis of a reference standard shall be subject to ongoing certifications of accuracy.

At a minimum, these must include procedures for checking specifications for balances, thermometers, temperature, De-ionized (DI) and Reverse Osmosis (RO) water systems, automatic pipettes and other volumetric measuring devices. Wherever possible, subsidiary or peripheral equipment is checked against standard equipment or standards that are traceable to national or international standards.

An external certified service engineer services laboratory balances on an annual basis. This service is documented on each balance with a signed and dated certification sticker. Balances are calibrated on each day of use. All mercury thermometers are calibrated annually against a traceable reference thermometer. Temperature readings of ovens, refrigerators, and incubators are checked on each day of use.

Laboratory DI and RO water systems have documented preventative maintenance schedules and the conductivity of the water is recorded on each day of use.
Laboratory SOPs specify the required level of accuracy in volumetric glassware. In all cases, volumetric glassware meets the requirements specified in the published test method.

4.5.2 Reference Standards

The receipt of all reference standards must be documented. References standards are labeled with a unique Standard Identification Number, date received, and the expiration date. All documentation received with the reference standard is retained as a QC record and references the Standard Identification Number.

All standards should be purchased with an accompanying Certificate of Analysis that documents the standard purity. If a standard cannot be purchased from a vendor that supplies a Certificate of Analysis, the purity of the standard is documented by analysis. The documentation of standard purity is archived, and references the Standard Identification Number.

All efforts are made to purchase standards that are $\geq$ 97.0% purity. If this is not possible, the weight of the standard is corrected for the purity when performing calculations.

The accuracy of calibration standards is checked by comparison with a standard from a second source. In cases where a second standard manufacturer is not available, a different lot is acceptable for use as a second source. The appropriate Quality Control (QC) criteria for specific standards are defined in laboratory SOPs. In most cases, the analysis of an Initial Calibration Verification (ICV) or Laboratory Control Sample (LCS) is used as the second source confirmation.

4.5.3 Reagents

Reagents are, in general, required to be analytical reagent grade or higher purity unless otherwise specific in method SOPs. All reagents are labeled with the date received and date opened.

4.5.4 Laboratory Deionized Water

The quality of the laboratory deionized water is continuously monitored through the use of an in-line conductivity meter. The deionized water used at ETL is run through activated carbon, a cation resin, an anion resin, a mixed bed resin followed by a final mixed bed resin and is used only for inorganic analyses. The organic free water is carbon filtered and is used only for organic analyses. The deionized water and organic free water is verified daily by the analysis of the prep blank water for inorganics and by the analysis of the method blank for volatile organics. At the time of field blank preparation, a sample is taken of the deionized water and organic

free water and is either analyzed immediately or held by the laboratory to be analyzed if contamination of the field blank is determined.

4.6 Sample Handling, Transport and Storage

4.6.1 General

Chain of Custody (COC) can be established either when bottles are sent to the field or at the time of sampling. ETL can provide all the types of necessary coolers, reagent water, sample containers, preservatives, sample labels, custody seals, COC forms, ice, and packing materials required to properly preserve, pack and ship samples to the laboratory.

Samples are received at the laboratory by a sample custodian and a unique laboratory number is assigned. The following information is recorded for each sample shipment: Client/Project Name, Date and Time of Laboratory Receipt, Laboratory Number and Signature or initials of the personnel receiving the cooler.

Upon inspection of the cooler and custody seals, the sample custodian opens and inspects the contents of the cooler and records the cooler temp. If the cooler arrival temperature exceeds the required or method specified temperature range of 4 degree C $\pm$ 2 degree C (for samples with a temperature requirement of 4 degree C, a cooler temperature of just above the water freezing temperature to 6 degree C is acceptable). Samples that are hand delivered to the laboratory on the same day that they are collected may not meet these criteria. In these cases, the samples shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice. Sample receipt is considered "compromised" and procedure described in Section 3.7.1. All documents are immediately inspected to assure agreement between the test samples received and the COC.

Any non-conformance, irregularity or compromised sample receipt as described in section 3.7.1 must be documented and brought to the immediate attention of the client. The COC, shipping documents, documentation and any non-conformance, irregularity or compromised sample receipt, record of client contact and resulting instructions become part of the permanent record.

Samples that are being tested by an external subcontractor shall be appropriately packaged and sent out under COC.

Following sample labeling, the sample is placed in storage. Unless specified by method or state regulation, a tolerance range of 4 degree C ± 2 degree is used. Sample storage temperatures are monitored daily.

4.6.2 Sample Identification and Traceability

Each Sample Container shall be assigned a unique sample identification number that is cross referenced to the client ID number such that traceability of test samples is unambiguous and documented. Each sample container is affixed with a sample identification label.

4.6.3 Sample Disposal

Samples should be retained in storage facilities for a minimum of 30 days after the project report is sent, however provisions may be made for earlier disposal of samples once the holding time is exceeded. All samples requiring deliverable packages are retained for a six month period. Samples may be returned to the client per written request. Unused portions of samples found or suspected to be hazardous according to state or federal guidelines may be returned to the client upon completion of the analytical work.

4.7 Data Generation and Validation

4.7.1 Data Reduction

Analysis results will be reduced to the concentrations units specified in the analytical procedures using the equations provided in the analytical references listed in section 4.3.1. All calculations will be independently checked by senior laboratory staff.

4.7.2 Data Validation

Data validation is the process by which analytical data are evaluated and accepted or rejected based on a set of criteria. ETL personnel use the following criteria in the validation of laboratory data:

- use of published or approved analytical procedures
- use of properly operating and calibrated instrumentation
- precision and accuracy achieved comparable to that achieved in similar analytical programs

- precision, accuracy and blank contamination meeting the analysis specified criteria as and/or the criteria found in the applicable method.
- completeness of data set.

All data will be validated by laboratory supervisors and the QA/QC Department prior to being released for reporting purposes to the ETL Laboratory Director. The persons validating the data will have sufficient knowledge of the technical work to identify questionable values. All analyses requiring ETL protocols will be validated in accordance with the requirements of those protocols.

4.7.3 Data Reporting and Authorization Procedures

Key personnel who will handle data gathering and evaluation are shown in the ETL Organizational Chart. ETL uses a computerized sample tracking for routine tracking and reporting of analysis data.

4.8 Internal Quality Control

Quality control is the routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process. Quality Control checks are the application of ETL Quality Control program for laboratory analysis in order to ensure the generation of valid analytical results on project samples. These checks are performed by project participants throughout the program, under the guidance of the Quality Assurance Manager.

4.8.1 Proficiency Testing

Proficiency Test (PT) samples are analyzed as required for accreditation. As required by NELAC ETL participates in the PT program semi-annually for each PT Field of Testing (FoT) for which it is accredited, according to the NELAC PT FoT published guidelines. Under SDWA, the laboratory also analyzes a PT sample by each method once per year, if the laboratory uses more than one method for the analyte.

In addition to the PT program required for NELAC accreditation, ETL participates in a number of additional PT programs, as appropriate for the laboratory.

PT samples are handled and tested in the same manner (procedural, equipment, staff) as environmental samples. PT test sample data is

archived using the requirements for project and raw data record retention.

4.8.2 Quality Control Samples

4.8.2 1 Blank Samples

Blanks are used to assess contamination introduced in transit, storage or in the laboratory.

- Preparation Blanks – For inorganic analyses, these deionized water blanks are prepared using the same reagents and analytical procedures as the samples, in order to assess possible laboratory contamination.
- Laboratory Method Blanks – For organic analyses, theses blanks are "clean" samples, prepared in the laboratory to include surrogates, and analyzed according to a prescribed method in order to assess possible laboratory contamination.
- Laboratory Holding Blank – For organic analyses, these blanks are placed in cold storage with the volatile organic samples during the holding time to assess contamination which may be introduced in storage.
- Storage Blank – For organic analyses, these blanks are placed in the sample container storage area to assess contamination that may be introduced in storage.
- Calibration Blanks – For all analyses, these blanks are used in instrument calibration and contain all the reagents used in preparing instrument calibration standards except the parameters of interest.

4.8.2.2 Initial and Continuing Calibration Verification

Verification samples are analyzed during each analysis run to assure calibration accuracy for each analyte. For inorganic analysis, these are prepared from a source other than that used for calibration.

4.8.2.3 System Monitoring Compounds

For organic analyses, all samples are spiked with surrogate compounds prior to sample preparation in order to assess the behavior of actual components in individual samples during the entire preparative and analysis scheme. Surrogate standard compounds are chemically similar to compounds of interest (target compounds).

4.8.2.4 Matrix Spikes/Analytical Spikes

For all analyses at frequencies particular to each method, spiking solutions are added to samples in order to evaluate any matrix effects of the sample on the analytical method. Matrix spikes and analytical spikes are performed using actual elements of interest or target compounds.

4.8.2.5 Duplicate Samples

For all analyses, a second aliquot of a sample carried through all sample preparation procedures to verify the precision of the analytical method. At least one sample in each analysis batch of 20 or fewer samples is analyzed in duplicate.

4.8.2.6 Laboratory Control Samples

For inorganic analyses, at least one sample in each preparation batch of 20 or fewer samples is prepared and analyzed for each analyte of interest, in order to verify the preparation and analytical methods.

4.8.2.7 Blank Spikes

For organic analyses, reagent water is spiked with all the target analytes.

4.9 Detection Limits

4.9.1 Method Detection Limit

The Method Detection Limit (MDL) is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. A MDL utilizes all preparatory steps in the final detection.

To obtain an MDL:

1. Seven method blank samples are spiked at a concentration that is two to five times the estimated detection limit and no higher than the reporting limit needed.
2. As a general rule, the MDL can be analyzed at the reporting level of the method.

3. The MDL is calculated by multiplying the t-Test value by the standard deviation obtained for seven replicate analyses of a standard solution (each analyte in reagent water).

When a method requires that a method blank value is subtracted from the analyte response, the MDL calculations are made by subtraction the average of the individual method blank from each analyte response.

MDL's are determined annually, and when a new or changed instrument is utilized. The QA/QC Department maintains copies of MDL Forms for all tests performed at ETL.

4.10 Project Reports

4.10.1 General

All ETL Project reports that are generated under NELAC requirements must contain the content as described in Section 4.10.1.1. The criteria described in Section 4.10.1.2 and 4.10.4 apply to all Project Reports.

4.10.1.1 Project Report Content

- Title
- Laboratory name, address, telephone number, contact person
- Unique Laboratory Project Number
- Total Number of Pages (report must be paginated)
- Name and address of Client
- Client Project Name (if applicable)
- Laboratory Sample Identification
- Client Sample Identification
- Matrix and/or Description of Sample
- Dates: Sample Receipt, Collection, Preparation and/or Analysis Date
- Definition of Data Qualifiers
- Reporting Units
- Test Method

The following are required where applicable to the specific test method or matrix:

- Solid Samples: Indicate Dry or Wet Weight
- Whole Effluent Toxicity: Statistical package used

- If holding time ≤ 48 hours, Sample Collection, Preparation and/or Analysis Time
- Indication by flagging where results are reported below the quantitation limit.

4.10.1.2 Project Narrative

A Project Narrative and/or Cover Letter shall be included with each project report and at a minimum includes an explanation of any and all of the following occurrences:

- Non-conformances
- "Compromised" sample receipt Method Deviations
- QC criteria failures

Project Release

The Laboratory Director or his/her designee must authorize the release of the project report with a signature.

Where amendments to project reports are required after issue, these shall be in the form of a separate document and/or electronic data deliverable. The revised report is clearly identified as revised with the date of revision and the initials of the person making the revision. Specific pages of a project report may be revised using the above procedure with an accompanying cover letter indicating the page numbers of the project revised. The original version of the project report must be kept intact and the revisions and cover letter included in the project files.

4.10.1.3 Subcontractor Test Results

Project reports from external subcontract shall not be altered, and shall be included in original form in the final project report provided by ETL. Data from subcontractors' reports may be added to an ETL electronic deliverable.

Subcontracted data shall be clearly identified as such, and the name, address, and telephone number for the laboratory performing the test is included in the project report. If the report is being generated under NELAC requirements, all information outlined in Section 4.10.1.1 are required for both the originating laboratory and the subcontracting laboratory.

4.10.1.4 Electronic Data Deliverables

Electronic Data Deliverables (EDD) are routinely offered as part of ETL's services. ETL offers a variety of EDD formats including Environmental Restoration Information Management System (ERPIMS), New Agency Standard (NAS), Format A, Excel, Dbase, GISKEY, and Text Files.

EDD specifications are created in the client project set up in ETL-LIMS. EDD results are reviewed by the PM for contract review. The validation of the code is retained as a QC record.

EDDs shall be subject to a secondary review to ensure their accuracy and completeness.

4.10.1.5 Project Report Format

ETL offers a wide range of project reporting formats, including EDDs, short report formats, and complete data deliverable packages modeled on the Contract Laboratory Protocol (CLP) guidelines. More information on the range of project reports available can be obtained by contacting ETL. Regardless of the level of reporting, all projects must undergo the same levels of review.

5.0 Analytical Methodology

5.1 Calibration Procedures and Frequency

Instrument or method calibration is performed in accordance with the specific analytical methods and as outlined below. Quality control measures and frequency are summarized in Section 4.8

5.2 Volatile Organics- GC

5.2.1 Initial calibration for GC Volatiles consist of 5 calibration standards containing each target analyte plus surrogate compounds. Calibration standards must include concentrations at or below the reporting level, if these limits/levels are known. The validity of the initial calibration is verified by:

- % relative standard deviation (RSD) of the calibration factor (RRF) for target compound.

- Assessment of the relative retention time (RRT) shift for each compound between each standard run.
- Analysis of a standard obtained from a second source

5.2.2 Continuing calibration is performed when the initial calibration is not performed on the day of analysis. A continuing calibration check must be performed at the beginning and end of each analytical batch. The validity of the continuing calibration is verified by:

- assessment of % difference (%D) of the calibration factor versus the initial calibration average calibration factor for each compound
- RRT shift for each compound between successive calibration runs.
- The continuing calibration verification checks must include concentrations ~~at the lowest and highest~~ at or near the middle concentration of the initial calibration. MP 10/22/08

5.2.3 Standard Preparation Procedures

5.2.3.1 Calibration Standards

- Purchase commercially available certified stock solutions.
- Prepare working standards by dilution of the stock standards.
- Verify the working standards by analysis of a calibration check standard prepared independently from standards.

5.2.4 Sample Preparation Methods

- SW846 5030B
- SW846 5035

5.3 Metals - ICP

5.3.1 Initial calibration for ICP metals consists of a method blank and 1 calibration standard. The validity of the initial calibration is verified by:

- The analysis of an independently prepared standard immediately after calibration.
- Results must be within 90% to 110% of true value for each metal analyzed for analysis to begin.

5.3.2 Continuing calibration is performed by analysis of the Calibration Check Verification (CCV) standard at a frequency of 10% of sample volume, or every 2 hours, whichever is more frequent. The concentration

of the CCV is at or near the mid-range of the calibration curve for each metal. The CCV is also analyzed after the last analytical sample. The validity of the calibration and analysis of preceding samples is verified by CCV results between 90% of 110% of true value.

5.3.3 Standards Preparation Procedures

5.3.3.1 Calibration Standards

- Prepare calibration standards by dilution of the stock standard.
- The calibration standards are prepared in reagent grade water, with the same acid concentrations as the digested sample.

5.3.4 Sample Preparation Methods

SW846, 3005A, 3010A, 3020A, 3050

5.4 Metals - Mercury

5.4.1 Initial calibration for mercury consists of a blank and five standards. Calibration is performed each time the instrument (cold-vapor AA) is set up. Standards are prepared in reagent-grade water, with the same acid concentration as the digested samples and digested with the samples. The validity of the initial calibration is verified by analysis of ICV standards immediately after calibration; results must be within 85% to 125% of true value.

5.4.2 Continuing calibration is performed by analysis of the CCV standard at a frequency of 10% of sample volume, or every 2 hours, whichever is more frequent. The concentration of the CCV is at or near the midrange of the calibration curve. The CCV is also analyzed after the last analytical sample. The validity of the calibration and analysis of the preceding samples is verified by CCV results between 80% and 120% of true value.

5.4.3 Standards Preparation Procedures

5.4.3.1 Calibration Standards

- Prepare the calibration standards by dilution of the stock standard at the time of analysis. Calibrate the instrument using a blank and a minimum of five standards.

- Prepare the standards in the same manner as samples using the same combination of reagents at the same concentration as that which the sample will have after preparation.

5.5 Cyanide

5.5.1 Initial calibration for cyanide consists of a blank and six calibration standards (one of which is @ the CRDL for cyanide). Calibration is performed on a daily basis (or once every 24 hours), and each time the instrument is set up (every 6 months or when new stock standards/pyridine are made for manual cyanide). The validity of the initial calibration is verified by analysis of ICV standards immediately after calibration. The ICV must be distilled in the same manner as the samples; results must be within 85% to 115% of true values.

5.5.2 Continuing calibration is performed by analysis of the CCV standard (which must be distilled with the batch of samples to be analyzed), at a frequency of 10% of sample volume, or every two hours, whichever is more frequent. The validity of the calibration and preceding samples is verified by CCV results between 85% and 115% of true value.

5.6 pH Meter

5.6.1 Calibration Procedure

- Perform an initial operating check of the electrode and meter according to manufacturer's instructions.
- Calibrate the meter according to the operating instructions. Use the standards prepared below.
- Analyze a quality control standard to verify instrument calibration.
- Record all values for initial and subsequent calibration verifications.

5.6.2 Standards Preparation Procedures

5.6.2.1 Calibration Standards

- Use primary standard buffers purchased from an appropriate source. Prepare and use as directed in the accompanying instructions. A minimum of two buffers which bracket expected sample pH are required. One must be in the range of pH 6 to 8. Fresh buffers must be prepared monthly.
- Prepare an appropriate quality control sample from an EPA concentrate or other reference material.

5.7 Conventional Wet Chemistry

5.7.1 For manual colorimetric analytical procedure an initial five standard calibration curve must be generated every three months, with a reagent blank and a continuing calibration standard being run with every sample batch. If the concentration of the continuing calibration standard, as calculated from the initial calibration curve, exceeds ETL established control limit then that batch of samples must be rerun. If the rerun still exceeds established control limit, then the system should be considered out of control and a new initial calibration curve must be generated.

Table 8 Education and Experience

Douglas Tawse – MBA Business Administration, University of New Hampshire, Durham, NH; B.A. Business Administration, University of New Hampshire, Durham, NH
Responsibilities: President
Experience: Over 30 years in the Environmental and Business Field

Ronald Bayer – M.S., Environmental Sciences, Syracuse University, B.A., Chemistry, SUNY at Cortland
Responsibilities: VP Operations
Experience: Over 30 years in the Environmental and Business Field.

Renee M. Cusack – B.S., Biology, Mount Saint Mary College, NY
Responsibilities: Laboratory Director
Experience: Over 30 years in the Environmental Field

Kevin Jowell - B.S. Information Technology, University of Phoenix, Phoenix, AZ
Responsibilities: Systems Administrator, Data Management
Experience: 7 years I.T., 5 years analytical

Maria Pistole - B.S. Biology, Minor Chemistry, Marist College, Poughkeepsie, NY
Responsibilities: Quality Manager, Metals Supervisor
Experience: Over 25 years Environmental Field, 10 years EnviroTest

Meredith Ruthven – B.A. Biology, University of Vermont, Burlington, VT
Responsibilities: Wet Chemistry Supervisor, Quality Assurance Assistant
Experience: 10 years Environmental Field, 2 year Pharmaceutical, 6 years EnviroTest.

Debra R. Rohl – A.A.S. Management, State University of New York, Delhi, NY
Responsibility: Customer Service Manger
Experience: 21 years

Joyce M. Wilson-Esposito – Lab Experience
Responsibilities: Customer Service
Experience: 21 years

Lisa Savage – A.A.S. Environmental Control/ Hazardous Waste, Ulster County Community College, NY
Responsibilities: Health & Safety Manager, Metals, Wet Chemistry
Experience: 12 years Environmental Field, 10 years EnviroTest

Alicia Labare – B.S. Chemistry, State University of New York at Plattsburgh, Plattsburgh, NY
Responsibilities: Customer Service
Experience: 9 years analytical, 10 years EnviroTest

Laura Antash – Attended Dutchess Community College, Poughkeepsie, NY and Orange County Community College, Middletown, NY
Responsibilities: Sample Receipt Technician
Experience: 12 years Environmental Field, 8 years EnviroTest

Eric Andersen – M.A. Chemistry, State University of New York, New Paltz, NY; B.S. Chemistry, Southampton College of Long Island University, Southampton, NY
Responsibilities: Organics Manager
Experience: 25 years

Paul Pullar – B.A. Biology, Franklin Pierce College, Rindge, NH
Responsibilities: Organics
Experience: 18 years Environmental Field

Liam Ryan -High School Graduate
Responsibilities: Field Service Manager
Experience: 5 years EnviroTest

Mark Brignola - B.S.Community Health Education; B.S. Health Science, Minor Biology
Responsibilities: Field Services
Experience: 8 years EnviroTest

Kyle Miller - B.A. Environmental Science, Franklin Pierce College, New Hampshire
Responsibilities: Field Services
Experience: 3 years EnviroTest

Marc Breimer – Ph.D. Chemistry, State University of New York, Binghamton, NY, B.S. Chemistry, State University of New York, Binghamton, NY
Responsibilities: Organics
Experience: 6 years Environmental Field, 4 years EnviroTest

Tracy Gualtieri - High School Graduate
Responsibilities: Office Manager/Receptionist
Experience: 7 years, 8 months EnviroTest

Diana Algarin - 1 year Mount Saint Mary; 1 year Mercy College, New York
Responsibilities: Sample Management
Experience: 3 years

Crystal Washington- B.S. Forensic Chemistry, Buffalo State College, New York
Responsibilities: Metals Prep, Wet Chemistry
Experience: 3 years Environmental Field, 7 months EnviroTest

Colton Cascone - B.A. Environmental Studies, Green Mountain College, Vermont
Responsibilities: Wet Chemistry
Experience: 3 years EnviroTest

Kiarra Peterson - B.S. Chemistry, Mount Saint Mary College, New York
Responsibilities: Wet Chemistry
Experience: 2 years EnviroTest

Janine Rader – High School Graduate
Responsibilities: Administrative General Accounting
Experience: 1 year accounting, 10 years data entry

Table 9 Equipment

Instrument Type	Manufacturer	Model	Purchase Date	Autosampler	Method Performed
ICP	Perkin Elmer S/N 069N9012702	3300XL Optima Trace		Yes	6010B, 200.7
	Perkin Elmer S/N 069N70305	3000 Optima Trace	1998	Yes	6010B, 200.7
ICP/MS	Perkin Elmer Sciex S/N P1610402	ELAN 9000	2004	Yes	6020, 200.8
Mercury Analyzer	Leeman S/N 010-00073-1	Hydra AA	2002	Yes	7471A, 7470, 245.1
Ion Chromatograph	Dionex S/N 880721	DX-120	2001	Yes	300.0
TOC	OI Analytical S/N 1010	1010	2002	Yes	5310C
TKN Digestion System	LACHAT Instruments Block Digestor S/N 1800-763	BD-46	2003	No	LAC 10-107-062D
UV/VIS	Thermo Spectronic S/N 3SGD117031	Genesys 20	1996	No	HACH 8000, 375.4, 4500NO2B, 4500CN-E, 3500CR-D, 5540C, 4500PE, 365.3, 354.1, NYS89-9, 4500S-E
Flow Injection System	Lachat S/N A83000-1011	Quick Chem 8000	1998	Yes	LAC 10-107-06-2, LAC 10-210-00-1-A, LAC 10-204-00-1-A, lac-10-510-00-1
Autotitrator (pH, Alkalinity, turbidity, calcium hardness	Man-Tech (ATZ) S/N MS-OEI-582	PC– Titrate PC-1000	2003	Yes	4500HB, 150.1, 2320B, 130.2, 1, 2130B B,
pH Meter	Fisher S/N 5228013	Accumet Meter		No	4500HB, 9045C, 150.1
	Corning S/N 32723	pH Meter 340		No	4500HB, 9045C 150.1
Turbidimeter	HACH s/n 07120C023206	2100N	2008	No	2130B, 180.1
Turbidimeter	HACH S/N	2100A		No	2130B, 180.1
Conductivity Meter	Thermo Orion S/N 205922	Model 150		No	2510B
Automated Distillation Apparatus	Westco S/N	Easy Digest 40/20	2003	No	4500NH3, Phenol, LACHAT 10-210-001A

Instrument Type	Manufacturer	Model	Purchase Date	Autosampler	Method Performed
COD	HACH S/N 1159604	REACTOR	2006	No	410.2, 410.4, HACH 8000
COD	HACH S/N 5283	REACTOR	2005	No	410.2, 410.4, HACH 8000
Automated BOD Analyzer	Mandel Scientific Instruments S/N 164334	BOD Magic/YSI 5100	2003	No	405.1, 5210B
Ifrared	Perkin Elmer S/N 500504	1420	2003	No	418.1
Hot Block Digestor	Environmental Express		1998	No	3005A, 3010A, 3020A
	Environmental Express		1998	No	3005A, 3010A, 3020A
Utrasonic Processor	Misonic S/N 62771	XL-2020		No	95.3
Auto Shaker	Glas-Col S/N 279668	3D-Shaker		No	Extractions
GC/MS Volatiles	Hewlett-Packard MSD S/N 3022A29134	5970		Yes	524/624/8260
GC/MS Volatiles	Hewlett-Packard MS3 S/N US00006787	5972		Yes	524/624/8260
GC/MS Volatiles	Hewlett-Packard MS4 S/N CN10803090	5975	2008	Yes	524/624/8260
GC Semivolatiles	Hewlett-Packard (A) S/N 3033A32718	5890A Dual FID		Yes	8015 Alcohol 8015 DRO
	Hewlett-Packard (B) S/N 3018A21718	5890 FID		Yes	8015 Alcohol 8015 DRO
GC Volatiles	OI Analytical S/N US00003177 GC 5	6890 ELCD/PID		Yes	502.2/8021 601/602
	Hewlett Packard S/N 3022A28968 GC 6	5890 PID/FID		Yes	8015GRO 8021Stars/502.2 PID only
	Hewlett-Packard (J) S/N 3336A61811 GC 4	5890A PID/ELCD		Yes	8021/502.2/601/602
	OI Analytical S/N US10343086 GC 7	6890 ELCD/PID		Yes	502.2/8021 601/602
	OI Analytical S/N US10402016 GC 8	6890 ELCD/PID		Yes	502.2/8021 601/602

Figure 4

PROCEDURE TITLE: ETL Corrective Action Form

AREA OF APPLICABILITY: All Departments

PROCEDURE TITLE: Corrective Action Form

AREA OF APPLICABILITY:

PROCEDURE:

Date Initiated:	**Person(s) Responsible for Initiating Investigation:**
1.0 Identification of the Problem:	
2.0 The cause of the problem has been determined to be:	
3.0 The corrective action to eliminate the problem has been determined to be:	
4.0 Person(s) responsible for implementing the corrective action:	
5.0 Implementation completed (yes or no)(If no, explain why the implementation has not been completed):	
Effective Date:	
6.0 The effectiveness of the corrective action has been established (attach copy, if applicable) and /the corrective action has been implemented.	
Section Manager Signature:	Date:
Employee Signature:	Date:
Laboratory Director Signature:	Date:
QA Manager Signature:	Date:

Figure 5 Client Complaint Form

Client Complaint Form

General	
	Date
ETL Employee Receiving complaint	Time
Client Information	**Project Information (if applicable)**
Client	Project Name
Client Contact	Project Number
Telephone Number	SDG/Other Tracking number
Facsimile Number	

Complaint Category (Check as many as apply)					
	Lab Responsiveness		Incomplete Data Report		Unexpected Results
	Turnaround time		Recurrent Data Revision		Bottle Shipment/Login
	Technical Issue		EDD Problem		Other

Description of Complaint

Action Initiated

Resolution

Please route the completed complaint form to the QA Manager.

Saved as F/pmgroup/COMPLAIN

APPENDIX H

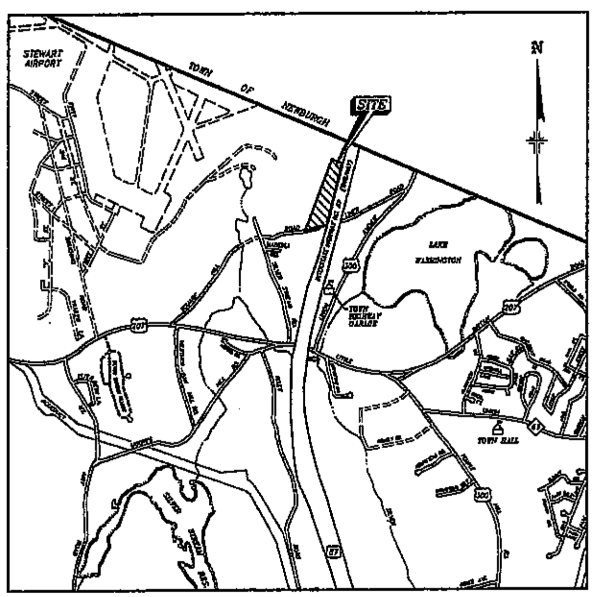
TOWN OF NEW WINDSOR

ORANGE COUNTY NEW YORK

CLOSURE PLAN

FOR

NEW WINDSOR LANDFILL



PROJECT AREA
SCALE : 1" = 1250'

TOWN OFFICIALS

SUPERVISOR	-	GEORGE A. GREEN
COUNCILPERSONS	-	ERNEST G. SPIGNARDO
	-	LINCOLN HEFT
	-	RACHEL FIEDLEHOLTZ
	-	JOHN T. FINNEGAN
TOWN CLERK	-	PAULINE G. TOWNSEND
HIGHWAY SUPERINTENDENT	-	FRED FAYO, JR.

PREPARED BY :

EA ENGINEERING P.C.
AN AFFILIATE of
EA ENGINEERING SCIENCE
AND TECHNOLOGY, INC.
The Maple Building
3 Washington Center
Newburgh, N.Y. 12550
Telephone: (914) 565-8100

McGOEY, HAUSER and EDSALL
CONSULTING ENGINEERS, P.C.
45 Quassaick Ave. (Rte. 9-W) New Windsor, New York 12553 (914)562-8640
400 Broad Street Milford, Pennsylvania 18337 (717)296-2765

DRAWING INDEX	
SHEET No.	DESCRIPTION
1	TITLE SHEET WITH VICINITY MAP
2	EXISTING CONDITION PLAN - SHEET 1
3	EXISTING CONDITION PLAN - SHEET 2
4	EXCAVATION PLAN
5	INTERIM GRADING PLAN
6	FINAL GRADING PLAN
7	CROSS SECTIONS
8	LEACHATE MANAGEMENT PLANS
9	DETAIL SHEET
10	DRAINAGE PLAN
11	END USE CONCEPT PLAN
2A	AS-BUILT PRE CONSTRUCTION SURVEY
4A	AS-BUILT POST EXCAVATION SURVEY
6A	AS-BUILT FINAL GRADING SURVEY

McGOEY, HAUSER and EDSALL
CONSULTING ENGINEERS, P.C.

REVISIONS			
NO.	DATE	BY	DESCRIPTION
1	11/93	DSS	REMOVED DRAWING REVISIONS

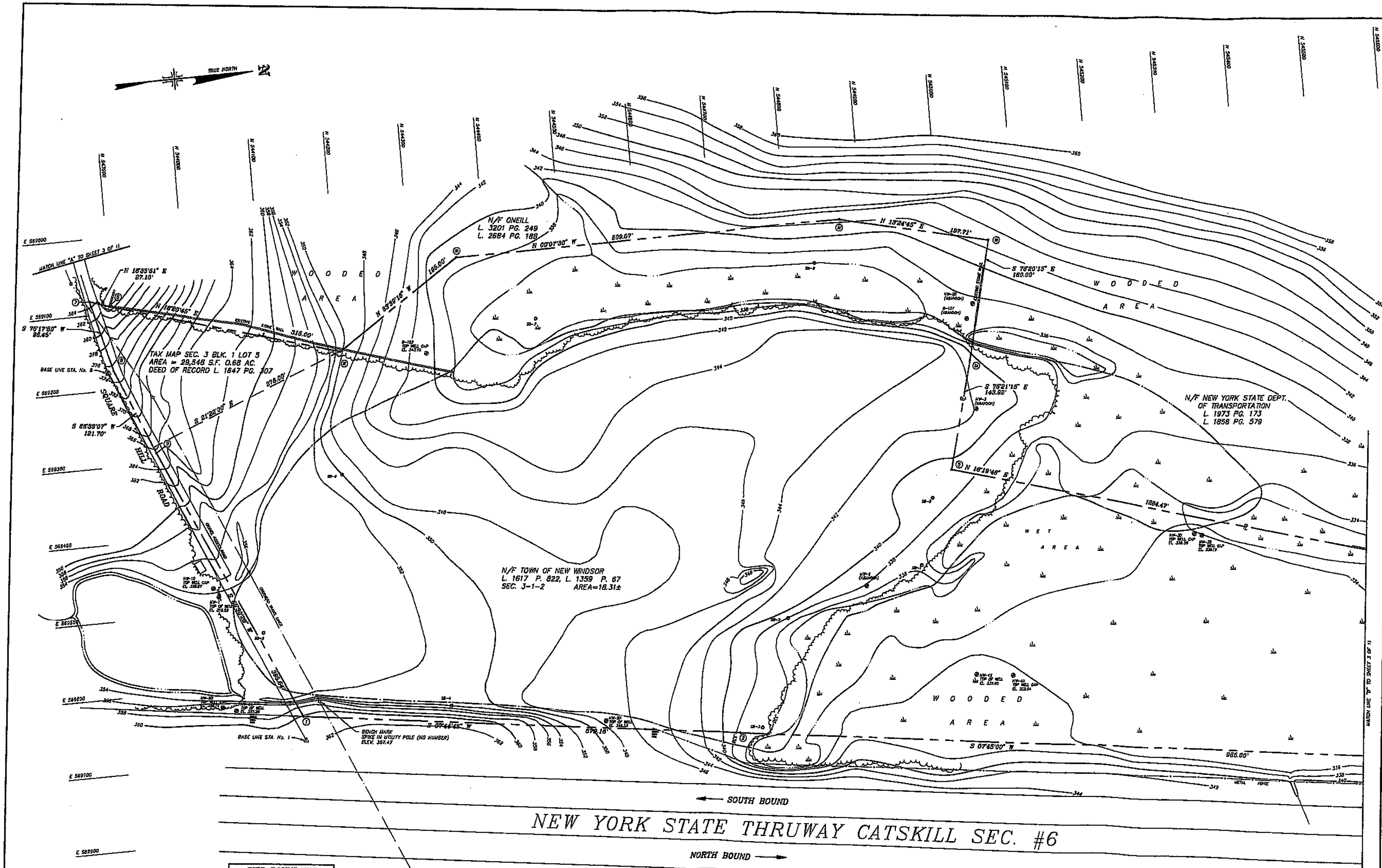
CLOSURE PLAN
FOR
NEW WINDSOR LANDFILL

TITLE SHEET

DESIGN	SUD
DRAWN	M.E.A.
CHECKED	MHS
PROJECT ENGINEER	DSS
DATE	6-5-92
SCALE	AS SHOWN
PROJECT NO.	11160.03
SHEET NO.	1 OF 11

EA ENGINEERING P.C.
AN AFFILIATE of
EA ENGINEERING SCIENCE
AND TECHNOLOGY

91-16.4

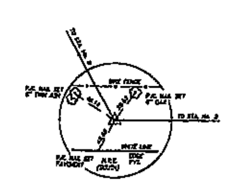


SITE BOUNDARY STATE PLANE COORD. VALUES		
#	Y ORDINATE	X ORDINATE
1	544108.8205	569646.7527
2	544582.7159	569724.8139
3	545656.7196	569857.6405
4	545721.5001	569824.9813
5	544989.3602	569410.4601
[illegible]	545025.7494	569271.2153
[illegible]	545063.5418	569115.7427
[illegible]	544871.2243	569069.8819
[illegible]	544362.1555	569070.8925
[illegible]	544129.8378	569179.0573
6	543897.5701	569090.4035
7	543871.8802	569081.7277
8	543836.3597	569175.0695
9	543944.7882	569288.7197

(#) DENOTES BOUNDARY CORNER NUMBER

LEGEND

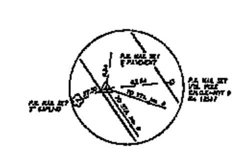
⊘	EXISTING MONITORING WELL	—S—	SILT FENCE
	WETLANDS	— — —	LIMITS OF CAP
	PROPERTY BOUNDARY	—FM—	PROPOSED FORCE MAIN
	STREAM		APPROXIMATE LIMITS OF WASTE
	EXISTING CONTOURS	○	GAS VENT
	PROPOSED CONTOURS	●	PROPOSED MANHOLE
	TRANSMISSION LINE POLE		DENOTES RIP-RAP
	CHAIN LINK FENCE		DENOTES JUTE MESH
	SOIL BORING LOCATIONS		EXISTING STONE WALL
	TREE LINE		



BASE LINE STATION No. 1

NOT TO SCALE

STATE PLANE COORD. VALUE
Y ORDINATE = 544109.9124
X ORDINATE = 569650.0565



BASE LINE STATION No. 9

NOT TO SCALE

STATE PLANE COORD. VALUE
Y ORDINATE = 543890.0063
X ORDINATE = 569177.4838

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

△ RECORD DRAWING NOTE.
THIS DRAWING REPRESENTS EXISTING CONDITIONS AT TIME OF CONTRACT DOCUMENT PREPARATION.
SEE SHT. 2A FOR ACTUAL PRECONSTRUCTION SURVEY

NOTES:

1. TOPOGRAPHY: 2' CONTOUR INTERVALS SUPPLIED BY FIELD METHODS.
2. SUBJECT TO EASEMENTS & R.O.W.S OF RECORD & UNDERGROUND UTILITIES, IF ANY.
3. USC & GS DATUM SECOND ORDER LEVELING 1955 B.M. C-75.

REVISIONS			
NO.	DATE	BY	DESCRIPTION
△	11/95	DSS	RECORD DRAWING REVISIONS

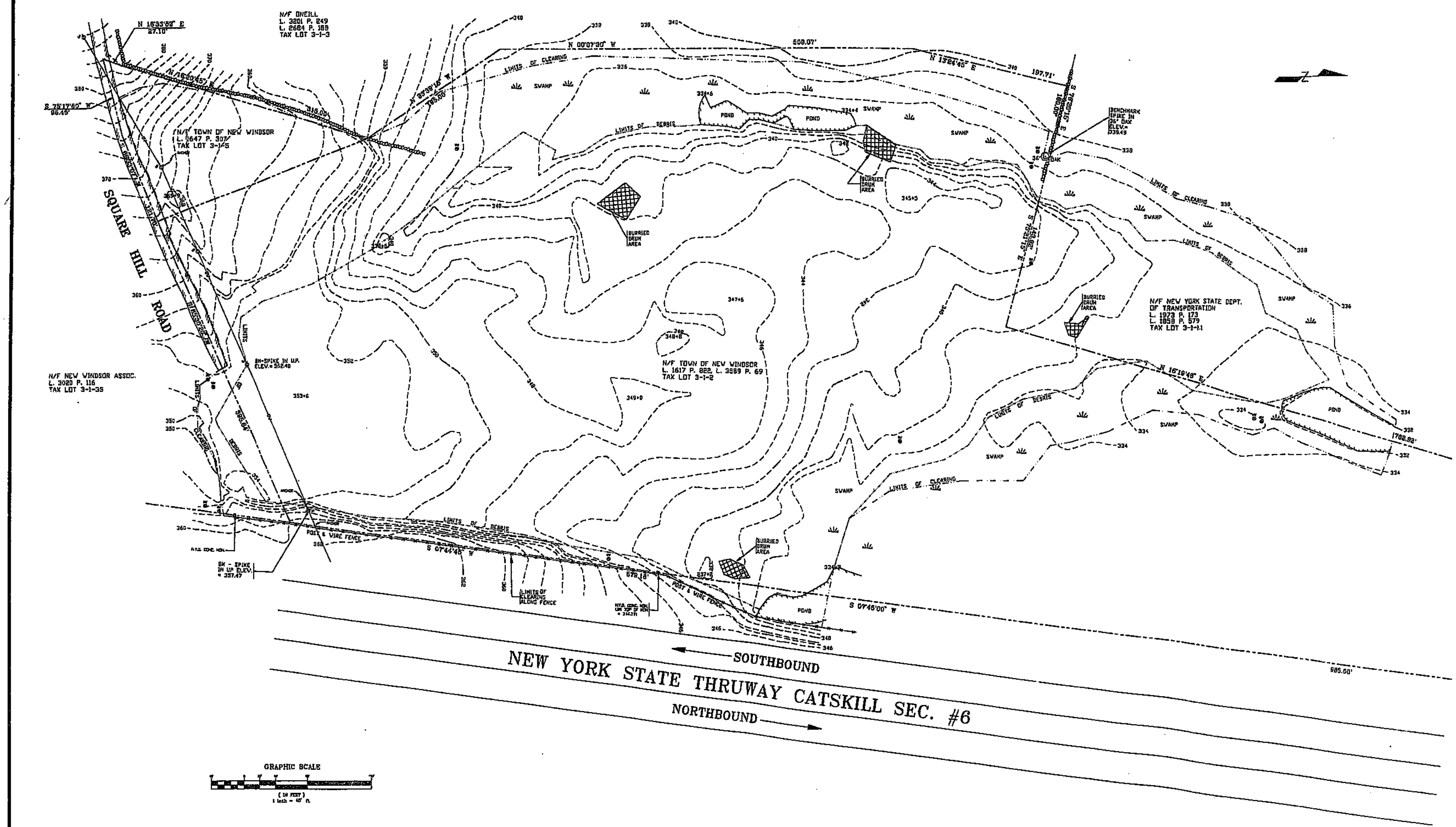
McGOEY, HAUSER and EDSALL
CONSULTING ENGINEERS, P.C.

CLOSURE PLAN FOR NEW WINDSOR LANDFILL

EXISTING CONDITION PLAN - SHEET 1

EA ENGINEERING P.C.
AN AFFILIATE of
EA ENGINEERING SCIENCE
AND TECHNOLOGY

DESIGN	SHD
DRAWN	M.E.A.
CHECKED	JHS
PROJECT ENGINEER	DSS
DATE	5-13-92
SCALE	1"=40'
PROJECT NO.	11160.03
SHEET NO.	2 OF 11



LEGEND			
	PROPERTY BOUNDARY		UTILITY POLE
	LIMITS OF CLEARING		GROUNDWATER MONITORING WELL
	LIMITS OF DEBRIS		CONCRETE MONUMENT
	EDGE OF POND		SWAMP
	10' CONTOURS		POST & WIRE FENCE
	CONTOURS		OVERHEAD WIRES
	EXISTING STONE WALL		EDGE OF PAVEMENT

NOTES:

1.) Topography from field survey completed on October 2, 1992.

2.) Contour interval: 2'

3.) Vertical datum from on site benchmark shown on contract drawings.

4.) Horizontal datum and boundary are from coordinates shown on contract drawings, and are not certified to.

5.) Unauthorized alteration or addition to a survey map bearing a licensed land surveyor's seal is a violation of section 7209, sub-division 2, of the New York State Education Law.

6.) Only copies from the original tracing marked with the land surveyor's seal shall be considered copies.

7.) Area of Limits of Clearing = 16.0 Acres.

I HEREBY CERTIFY TO THE PARTIES LISTED BELOW THAT THIS TOPOGRAPHIC MAP IS BASED ON ACTUAL FIELD SURVEY COMPLETED ON OCTOBER 2, 1992 AND CONFORMS TO THE MINIMUM STANDARDS FOR LAND SURVEYS ADOPTED BY THE DELAWARE-HUDSON LAND SURVEYORS ASSOCIATION ON DECEMBER 9, 1987 AND REVISED FEBRUARY 9, 1988.

- CHEMICAL WASTE MANAGEMENT, INC.
- TOWN OF NEW WINDSOR
- NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
- EA ENGINEERING, P.C.
- EA ENGINEERING, SCIENCE AND TECHNOLOGY INC.
- McGOEY, HAUSER AND EDSALL CONSULTING ENGINEERS, P.C.

DONALD R. STEDGE, L.S., N.Y.S. LIC. NO. 49769

REVISION			
NO.	DATE	BY	DESCRIPTION

NEW WINDSOR LANDFILL
PRECONSTRUCTION TOPOGRAPHY

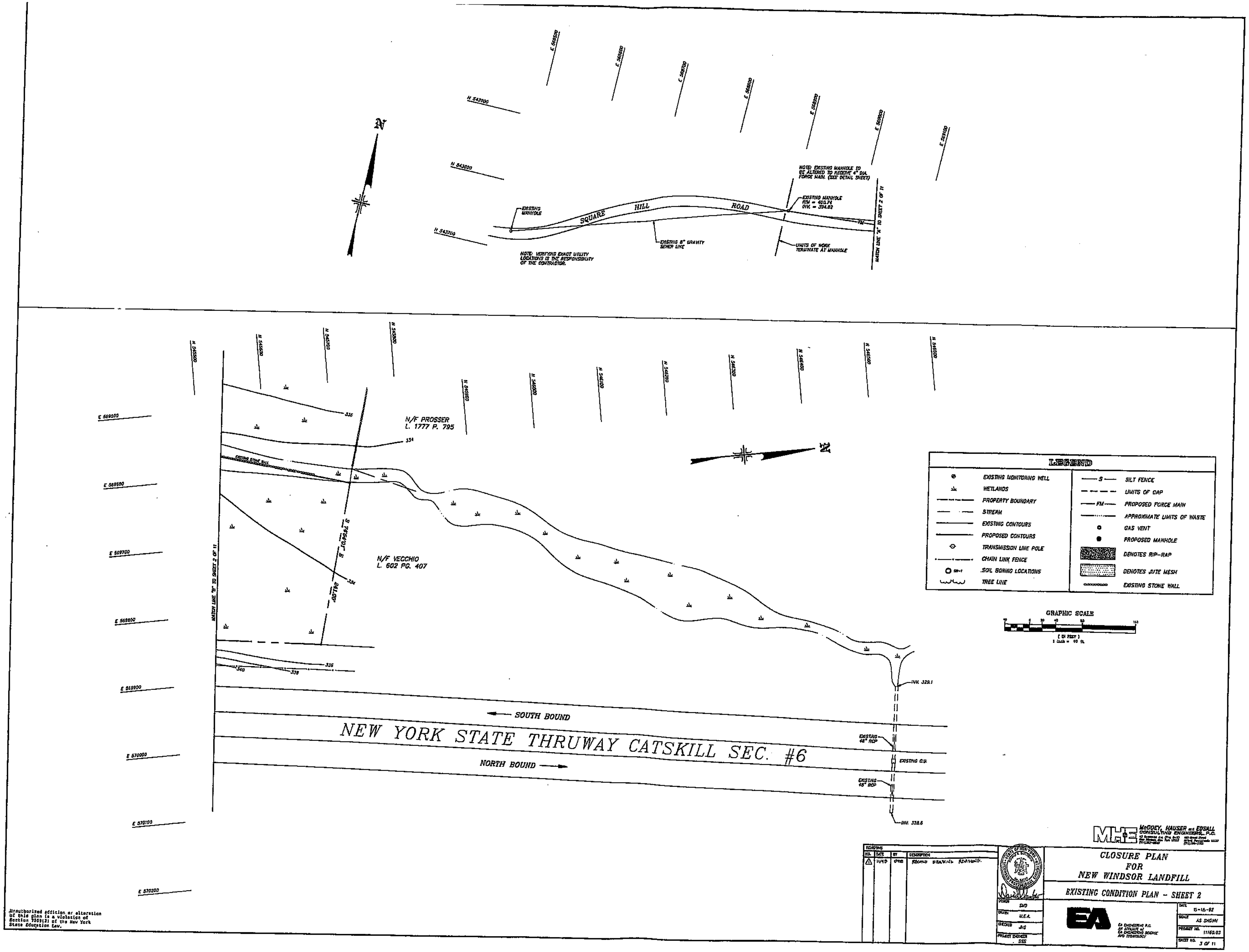
TOWN OF NEW WINDSOR

ORANGE COUNTY, NEW YORK

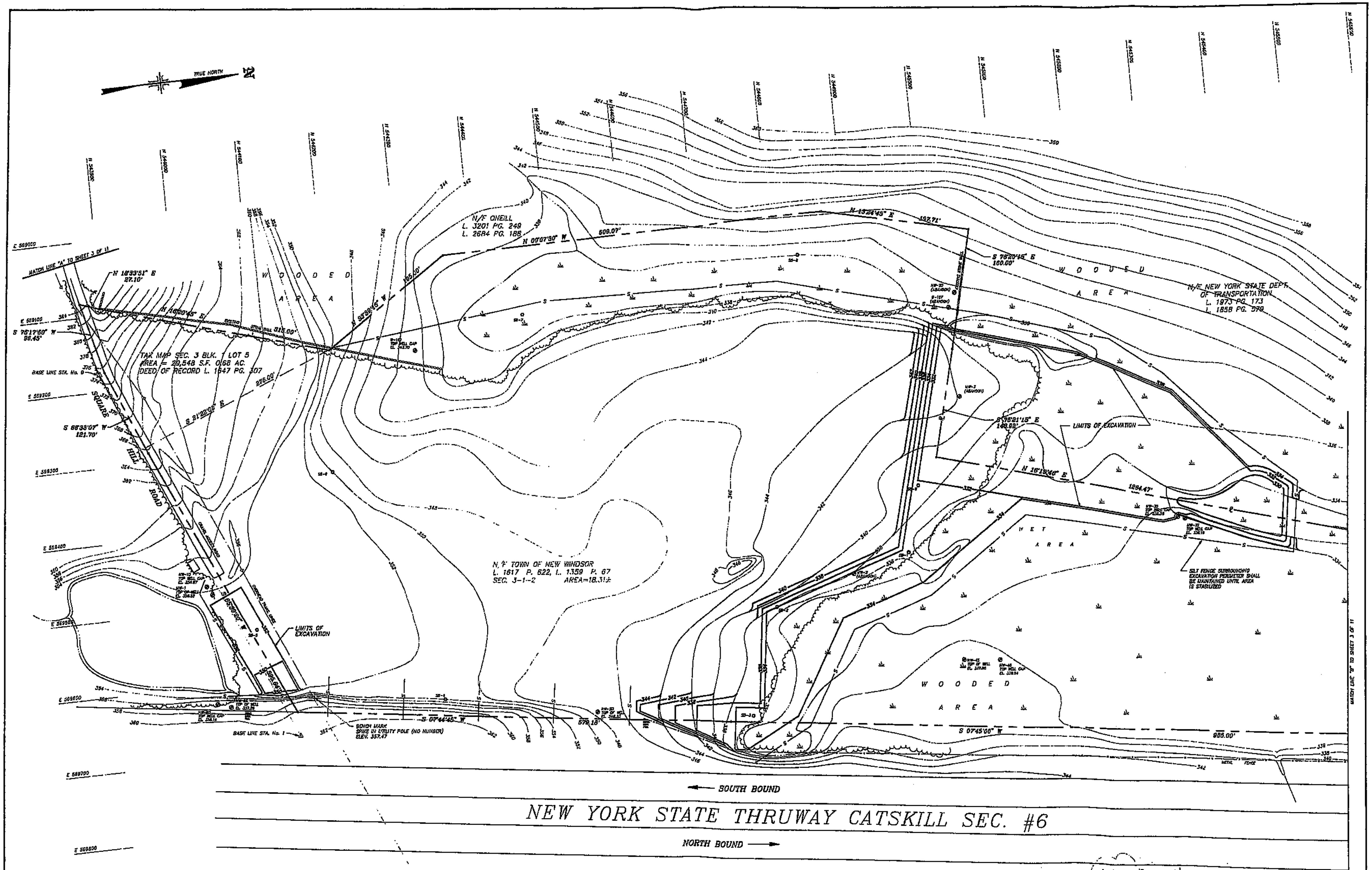
SCALE : 1" = 40'   OCTOBER 2, 1992

DONALD R. STEDGE, L.S., P.C.
49 EDGEWOOD DRIVE
CENTRAL VALLEY, NEW YORK 10917

JOB NO. 92014


SQUARE HILL ROAD
EXISTING MANHOLE
EXISTING 8" GRAVITY SEWER LINE
NOTE: EXISTING MANHOLE TO BE ALTERED TO RECEIVE 4" DIA. FORCE MAIN. (SEE DETAIL SHEET)
EXISTING MANHOLE RIM = 403.74 INV. = 394.82
UNITS OF WORK TERMINATE AT MANHOLE
NOTE: VERIFYING EXACT UTILITY LOCATIONS IS THE RESPONSIBILITY OF THE CONTRACTOR.
N/F PROSSER L. 1777 P. 795
N/F VECCHIO L. 602 PG. 407
EXISTING STONE WALL
SOUTH BOUND
NEW YORK STATE THRUWAY CATSKILL SEC. #6
NORTH BOUND
EXISTING 48" RCP
EXISTING C.B.
INV. 329.1
INV. 328.6
LEGEND
EXISTING MONITORING WELL
WETLANDS
PROPERTY BOUNDARY
STREAM
EXISTING CONTOURS
PROPOSED CONTOURS
TRANSMISSION LINE POLE
CHAIN LINK FENCE
SOIL BORING LOCATIONS
TREE LINE
SILT FENCE
LIMITS OF CAP
PROPOSED FORCE MAIN
APPROXIMATE LIMITS OF WASTE
GAS VENT
PROPOSED MANHOLE
DENOTES RIP-RAP
DENOTES JUTE MESH
EXISTING STONE WALL
GRAPHIC SCALE
(IN FEET)
MHE McGOEY, HAUSER and EDSALL CONSULTING ENGINEERS, P.C.
REVISIONS
NO. DATE BY DESCRIPTION
CLOSURE PLAN FOR NEW WINDSOR LANDFILL
EXISTING CONDITION PLAN - SHEET 2
DESIGN SMD
DRAWN M.E.A.
CHECKED JHS
PROJECT ENGINEER DSS
EA ENGINEERING P.C. AN AFFILIATE of EA ENGINEERING SCIENCE AND TECHNOLOGY
DATE 5-16-92
SCALE AS SHOWN
PROJECT NO. 11160.03
SHEET NO. 3 OF 11

Unauthorized addition or alteration of this plan is a violation of Section 7209(2) of the New York State Education Law.



Record Drawing Note
This drawing represents proposed excavation design.
For actual excavation limits and grading see sht. 4A.

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

NOTES:

1. EXCAVATED MATERIAL SHALL BE PLACED BACK ON LANDFILL TO BE USED AS INTERIM FILL.
2. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR THE WORK INCLUDING BUT NOT LIMITED TO:
   a) NEW YORK STATE THRUWAY WORK PERMIT
   b) NEW YORK STATE DEPARTMENT OF CONSERVATION, ARTICLE 15, STREAM DISTURBANCE PERMIT.

Unauthorized addition or alteration of this plan is a violation of Section 7209(2) of the New York State Education Law.

LEGEND

Symbol	Description	Symbol	Description
⊘	EXISTING MONITORING WELL	—S—	SILT FENCE
	WETLANDS	— — —	LIMITS OF CAP
	PROPERTY BOUNDARY	—FM—	PROPOSED FORCE MAIN
	STREAM		APPROXIMATE LIMITS OF WASTE
	EXISTING CONTOURS	○	GAS VENT
	PROPOSED CONTOURS	●	PROPOSED MANHOLE
	TRANSMISSION LINE POLE		DENOTES RIP-RAP
	CHAIN LINK FENCE		DENOTES JUTE MESH
○ SB-1	SOIL BORING LOCATIONS		EXISTING STONE WALL
	TREE LINE		

REVISIONS			
NO.	DATE	BY	DESCRIPTION
4	11/96	DDS	Record Drawing Revisions

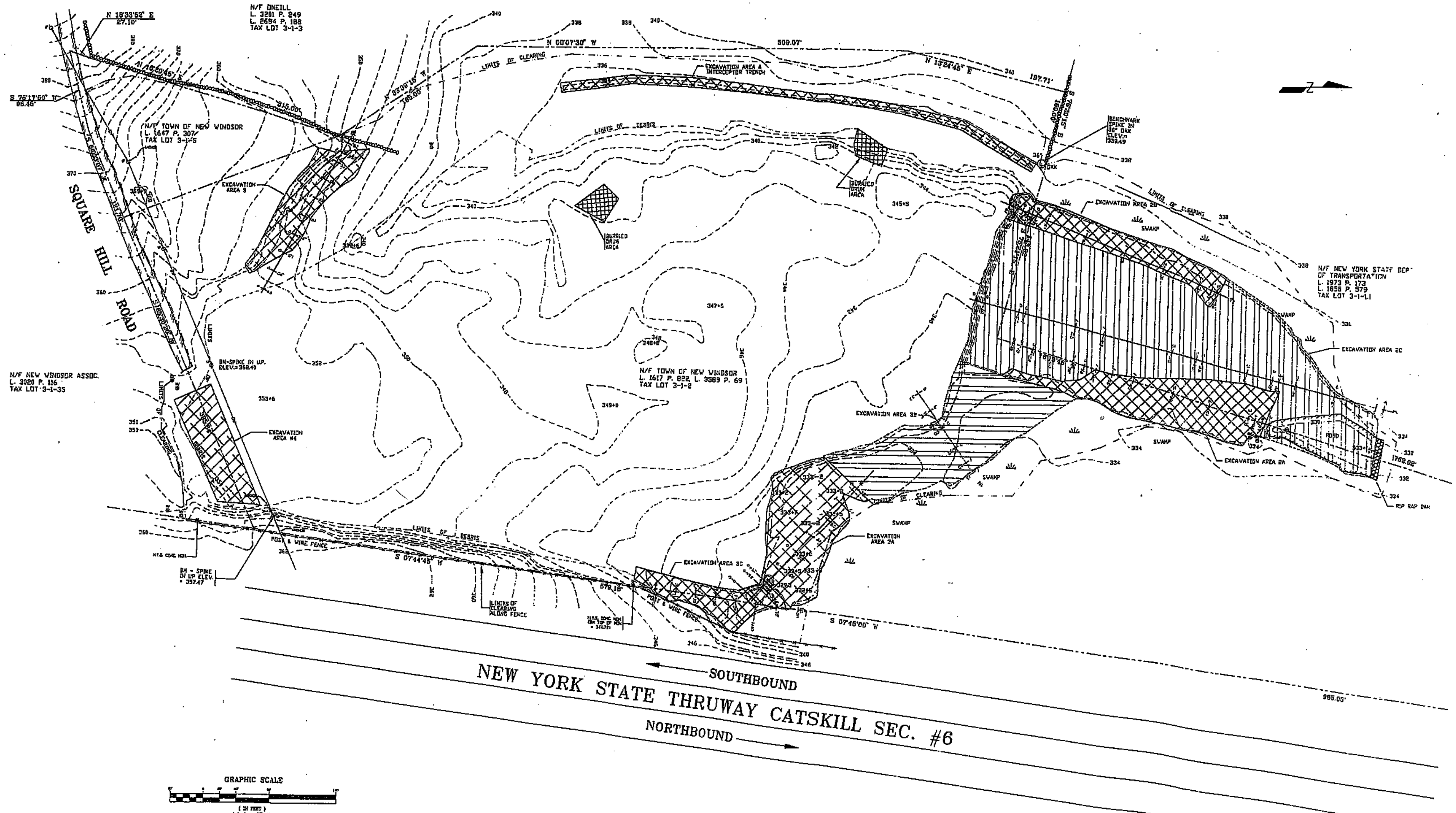
McGOEY, HAUSER and EDSALL CONSULTING ENGINEERS, P.C.

CLOSURE PLAN FOR NEW WINDSOR LANDFILL

EXCAVATION PLAN

EA ENGINEERING P.C.
AN AFFILIATE of EA ENGINEERING SCIENCE AND TECHNOLOGY

DESIGN	SND
DRAWN	M.E.A.
CHECKED	JHS
PROJECT ENGINEER	DSS
DATE	5-15-92
SCALE	1"=40'
PROJECT NO.	11160.03
SHEET NO.	4 OF 11



LEGEND			
- - - -	PROPERTY BOUNDARY		UTILITY POLE
— — —	LIMITS OF CLEARING		GROUNDWATER MONITORING WELL
- - - -	LIMITS OF DEBRIS		CONCRETE MONUMENT
	EDGE OF POND		SWAMP
	10' CONTOURS		POST & WIRE FENCE
	CONTOURS		OVERHEAD WIRES
	EXISTING STONE WALL		EDGE OF PAVEMENT

EXCAVATION VOLUMES:

AREA A = 337 c.y.* (SUB. OCT. 92)
AREA B = 777 c.y. (SUB. OCT. 92)
AREA #4 = 610 c.y.* (SUB. OCT. 92)

AREA #2A = 1,102 c.y. (SUB. NOV. 92) (REV. 12-17-92)
AREA #2B = 1,304 c.y. (SUB. NOV. 92)
AREA #2C = 9,434 c.y.

AREA #3A = 834 c.y. (SUB. OCT. 92)
AREA #3B = 1,019 c.y.
AREA #3C = 434 c.y. (SUB. NOV. 92)

*Excavation volumes calculated by CWM & EA Engineering and mutually agreed upon.

NOTES:

1.) Topography from field survey completed on October 8, 1992, and October 22, 1992.
2.) Contour interval: 2'
3.) Vertical datum from on site benchmark shown on contract drawings.
4.) Horizontal datum and boundary are from coordinates shown on contract drawings, and are not certified to.
5.) Unauthorized alteration or addition to a survey map bearing a licensed land surveyor's seal is a violation of section 7209, sub-division 2, of the New York State Education Law.
6.) Only copies from the original tracing marked with the land surveyor's seal shall be considered copies.
7.) Area of Limits of Clearing = 16.0 Acres.

I HEREBY CERTIFY TO THE PARTIES LISTED BELOW THAT THIS TOPOGRAPHIC MAP IS BASED ON ACTUAL FIELD SURVEY COMPLETED ON OCTOBER 2, 1992 AND CONFORMS TO THE MINIMUM STANDARDS FOR LAND SURVEYS ADOPTED BY THE DELAWARE-HUDSON LAND SURVEYORS ASSOCIATION ON DECEMBER 9, 1987 AND REVISED FEBRUARY 9, 1988.

- CHEMICAL WASTE MANAGEMENT, INC.
- TOWN OF NEW WINDSOR
- NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
- EA ENGINEERING, P.C.
- EA ENGINEERING, SCIENCE AND TECHNOLOGY INC.
- McGOEY, HAUSER AND EDSALL CONSULTING ENGINEERS, P.C.

DONALD R. STEDGE, L.S. N.Y.S. LIC. No. 49759

REVISION			
NO.	DATE	BY	DESCRIPTION
1	10/27/92	DRS	EXCAVATION AREAS B, 3-A, 4, A EXCAVATION VOLUMES
2	11/21/92	DRS	EXCAVATION AREAS 2A, 2B, 3C VOLUMES
3	12/28/92	DRS	EXCAVATION AREAS 2C, 3B VOLUMES
4	[illegible]	[illegible]	[illegible]

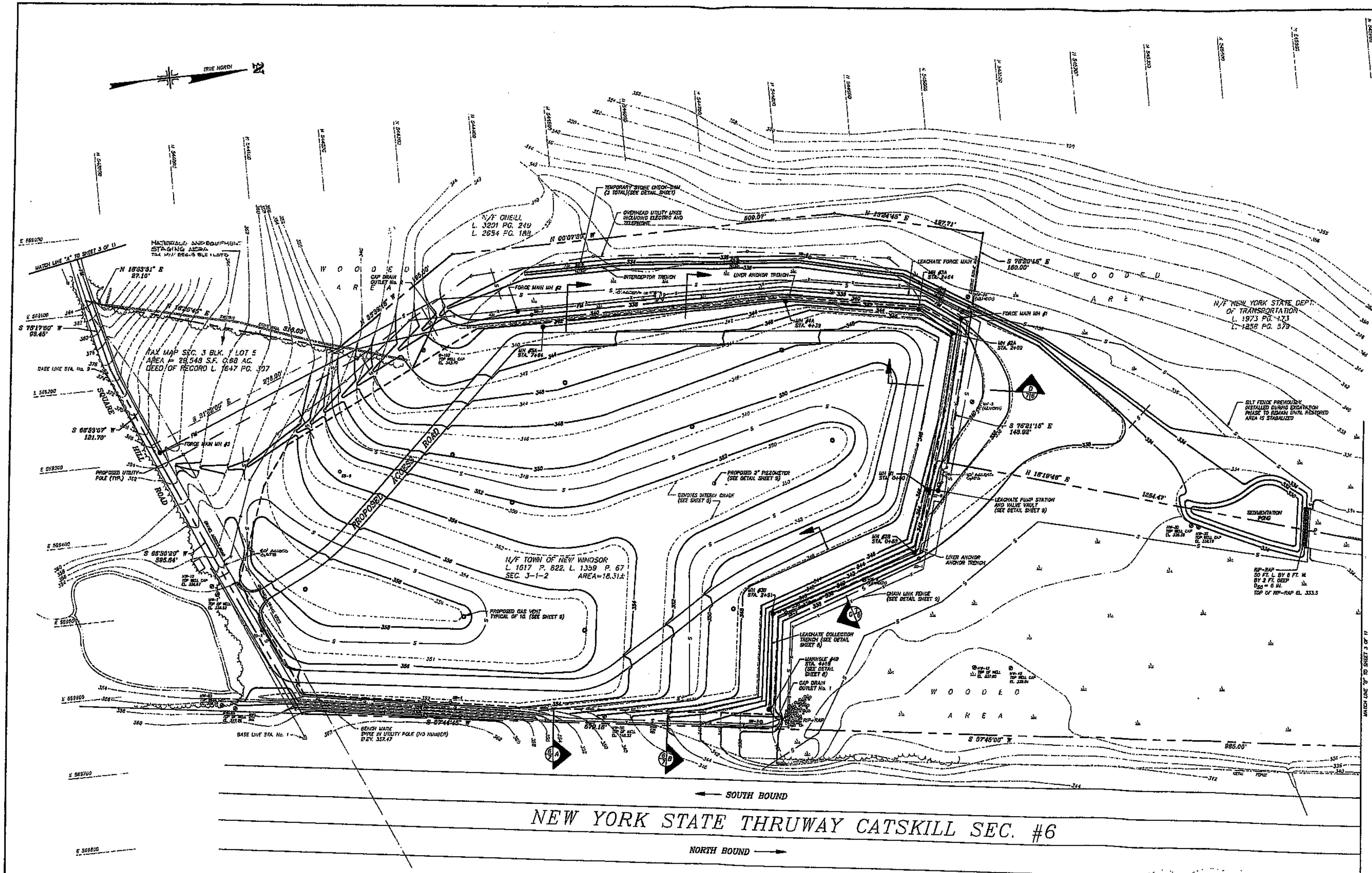
NEW WINDSOR LANDFILL
EXCAVATION PLAN

TOWN OF NEW WINDSOR
ORANGE COUNTY, NEW YORK
SCALE: 1" = 40'   OCTOBER 2, 1992

DONALD R. STEDGE, L.S., P.C.
10 EDGEWOOD DRIVE
CENTRAL VALLEY, NEW YORK [illegible]

JOB NO. 92014

4A of 11

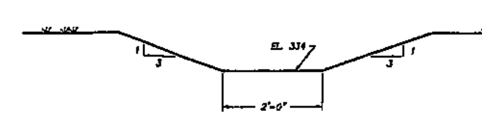


NOTE : PROPOSED OVERHEAD UTILITY LINES SHOWN APPROXIMATELY. EXACT LOCATIONS TO BE DETERMINED BY THE UTILITY COMPANY.

Unauthorized addition or alteration of this plan is a violation of Section 7209(2) of the New York State Education Law.

LEGEND

Symbol	Description	Symbol	Description
⊗	EXISTING MONITORING WELL	—— S ——	SILT FENCE
	WETLANDS	— — — —	LIMITS OF CAP
	PROPERTY BOUNDARY	—— FM ——	PROPOSED FORCE MAIN
	STREAM		APPROXIMATE LIMITS OF WASTE
	EXISTING CONTOURS	o	GAS VENT
	PROPOSED CONTOURS	●	PROPOSED MANHOLE
	TRANSMISSION LINE POLE		DENOTES RIP-RAP
	CHAIN LINK FENCE		DENOTES JUTE MESH
○ SB-1	SOIL BORING LOCATIONS		EXISTING STONE WALL
	TREE LINE		



INTERCEPTOR TRENCH DETAIL

SCALE : NONE

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

⚠ Record Drawing Note
THIS DRAWING REPRESENTS GRADING AND IMPROVEMENTS NOTED FROM THE DESIGN PLANS. FOR ACTUAL LOCATIONS AND IMPROVEMENTS REFER TO SHEET 8A.

McGOEY, HAUSER and EDSALL CONSULTING ENGINEERS, P.C.

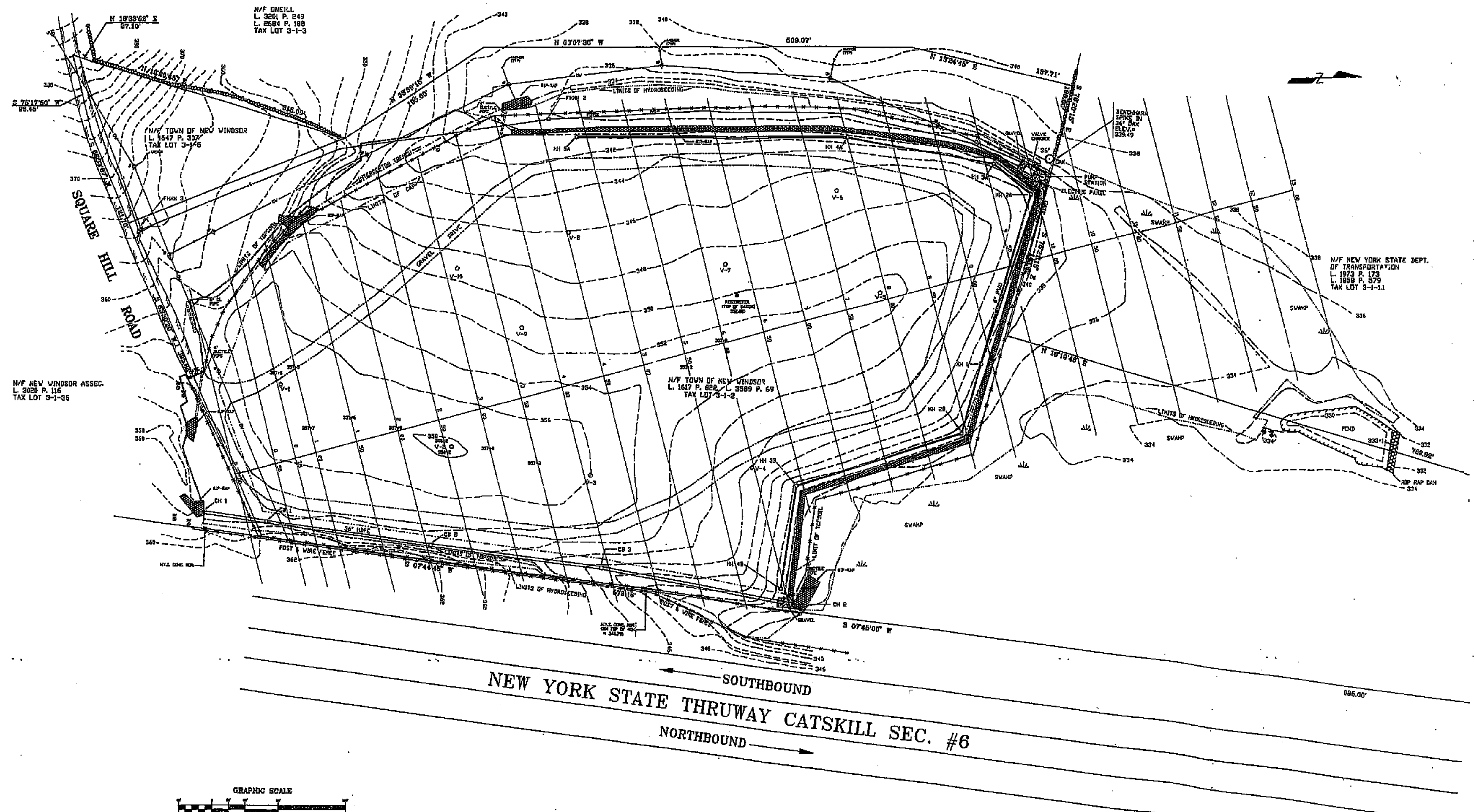
REVISIONS			
NO.	DATE	BY	DESCRIPTION
⚠	11/93	DSH	RECORD DRAWING REVISIONS

CLOSURE PLAN FOR NEW WINDSOR LANDFILL

FINAL GRADING PLAN

DESIGN	SHD
DRAWN	M.E.A.
CHECKED	JHS
PROJECT ENGINEER	DSS
DATE	5-15-92
SCALE	1"=40'
PROJECT NO.	11160.03
SHEET NO.	6 OF 11

EA ENGINEERING, P.C.
AN AFFILIATE of
EA ENGINEERING, SCIENCE AND TECHNOLOGY



LEGEND

	PROPERTY BOUNDARY		UTILITY POLE
	LIMITS OF CAP		GROUNDWATER MONITORING WELL
	OVERHEAD WIRES		CONCRETE MONUMENT
	FORCE MAIN		PIEZOMETER
	EDGE OF POND		VENTS
	10' CONTOURS		SWAMP
	CONTOURS		POST & WIRE FENCE
	LIMITS OF HYDROSEED		LIMITS OF TOPSOIL
	INTERCEPTOR TRENCH		EDGE OF PAVEMENT
	EXISTING STONE WALL		

LECHATE MANHOLE EL

OBJECT	RIM EL	INVERT IN	INVERT OUT
MH 1	342.33	331.76 W 331.77 E	331.63
MH 2A	344.84	332.61	332.42
MH 3A	341.80	333.00	332.94
MH 4A	341.88	333.03	333.14
MH 5A	341.61	-----	334.19
MH 2B	338.26	332.16	331.97
MH 3B	340.24	332.69	332.55
MH 4B	339.20*	-----	333.15

* Manhole burried at time of as-built. Elevation is top of concrete.

DRAINAGE ELEVATIONS

OBJECT	RIM EL	INVERT IN	INVERT OUT
CH 1	354.51	-----	350.24
CB 1	354.02	349.19	349.27
CB 2	354.07	348.09	348.12
CB 3	348.07	339.90	339.78
CH 2	342.50	-----	328.30

Rim elevations for CH 1 and CH 2 are for top of headwall.

FORCE MAIN EL

OBJECT	RIM EL
PUMP STATION	338.16
VALVE CHAMBER	337.91
FMH2	338.03
FMH3	364.03

NOTES:

1.) Topography from field survey completed on October 2, 1992, October 22, 1992, JUNE 10, 1993, AND JULY 16, 1993.

2.) Contour interval: 2'

3.) Vertical datum from on site benchmark shown on contract drawings.

4.) Horizontal datum and boundary are from coordinates shown on contract drawings, and are not certified to.

5.) Unauthorized alteration or addition to a survey map bearing a licensed land surveyor's seal is a violation of section 7209, sub-division 2, of the New York State Education Law.

6.) Only copies from the original tracing marked with the land surveyor's seal shall be considered copies.

7.) Area of HYDROSEEDING = 12.2 Acres.

8.) VOLUME OF TOPSOIL = 7,308 C.Y.

I HEREBY CERTIFY TO THE PARTIES LISTED BELOW THAT THIS TOPOGRAPHIC MAP IS BASED ON ACTUAL FIELD SURVEY COMPLETED ON JULY 16, 1993 AND CONFORMS TO THE MINIMUM STANDARDS FOR LAND SURVEYS ADOPTED BY THE DELAWARE-HUDSON LAND SURVEYORS ASSOCIATION ON DECEMBER 9, 1987 AND REVISED FEBRUARY 9, 1988.

- CHEMICAL WASTE MANAGEMENT, INC.
- TOWN OF NEW WINDSOR
- NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
- EA ENGINEERING, P.C.
- EA ENGINEERING, SCIENCE AND TECHNOLOGY INC.
- McGOEY, HAUSER AND EDSALL CONSULTING ENGINEERS, P.C.

DONALD R. SIEDGE, L.S., N.Y.S. LIC. NO. 49759

REVISION			
NO.	DATE	BY	DESCRIPTION

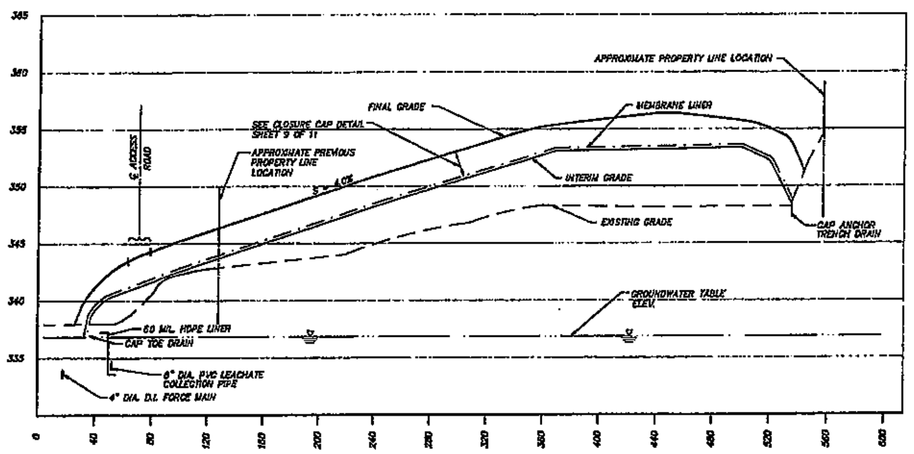
NEW WINDSOR LANDFILL
BORROW AS-BUILT TOPOGRAPHY

TOWN OF NEW WINDSOR
ORANGE COUNTY , NEW YORK
SCALE : 1"= 40'   JULY 16, 1993

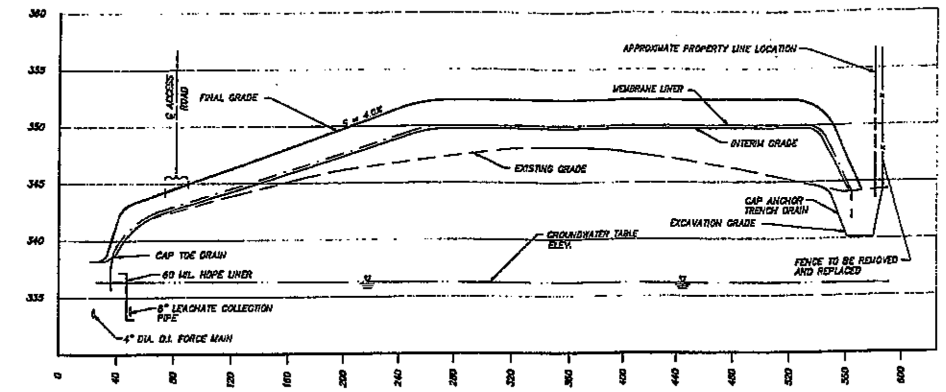
DONALD R. SIEDGE, L.S., P.C.
15 EDGEWOOD DRIVE
CENTRAL VALLEY, NEW YORK 10917

JOB NO. 9201

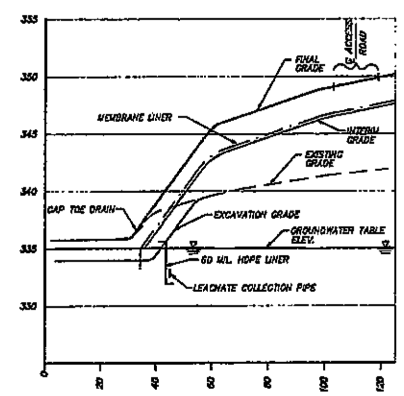
6A of 11



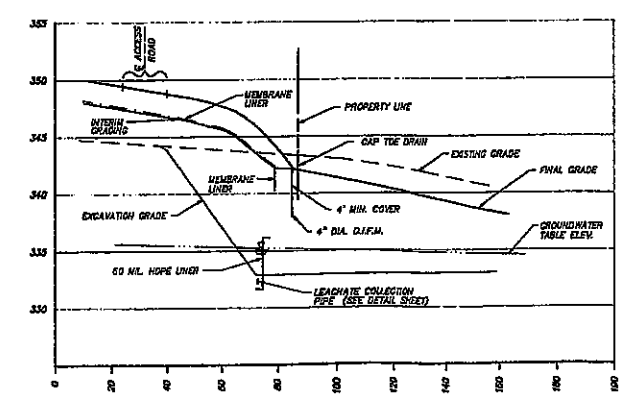
SECTION A
SCALE: HORZ. 1"= 40' VERT. 1"= 5'



SECTION B
SCALE: HORZ. 1"= 40' VERT. 1"= 5'



SECTION C
SCALE: HORZ. 1"= 20' VERT. 1"= 5'



SECTION D
SCALE: HORZ. 1"= 20' VERT. 1"= 5'

NOTE:
1. GROUND WATER LEVELS ON 3-22-90 (FT. MSL).

CROSS SECTIONS

McGOEY, HAUSER and EDSALL CONSULTING ENGINEERS, P.C.

REVISIONS			
NO.	DATE	BY	DESCRIPTION
△	11/98	DOS	RECORD DRAWING REVISIONS

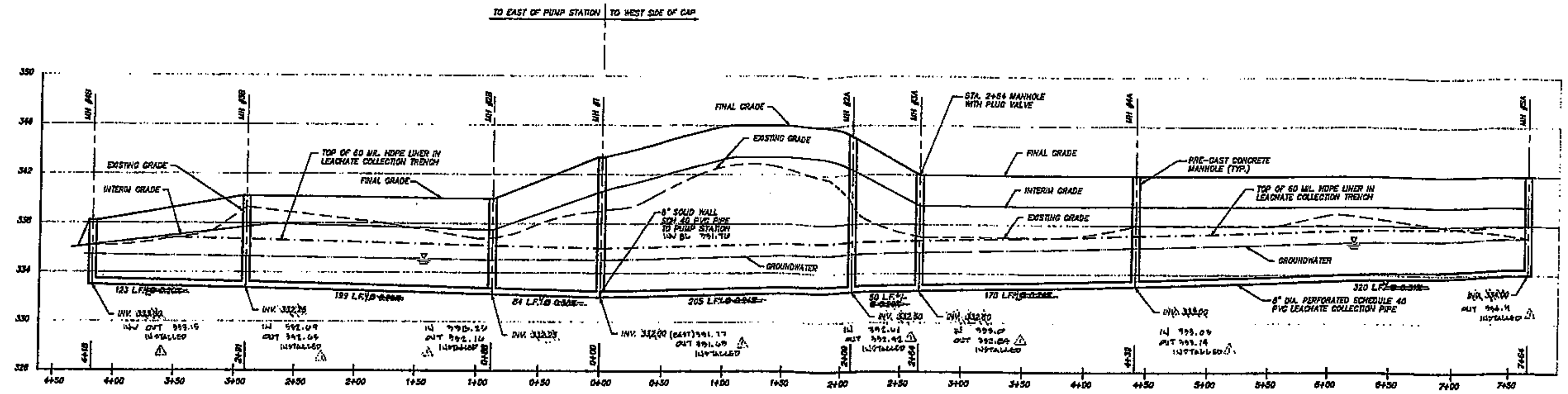
CLOSURE PLAN FOR NEW WINDSOR LANDFILL

CROSS SECTIONS

DESIGN	SUD
DRAWN	M.E.A.
CHECKED	JHS
PROJECT ENGINEER	DSS

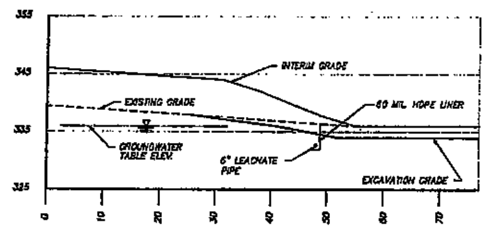
EA ENGINEERING P.C.
AN AFFILIATE of EA ENGINEERING SCIENCE AND TECHNOLOGY

DATE	5-19-92
SCALE	AS SHOWN
PROJECT NO.	11160.03
SHEET NO.	7 OF 11



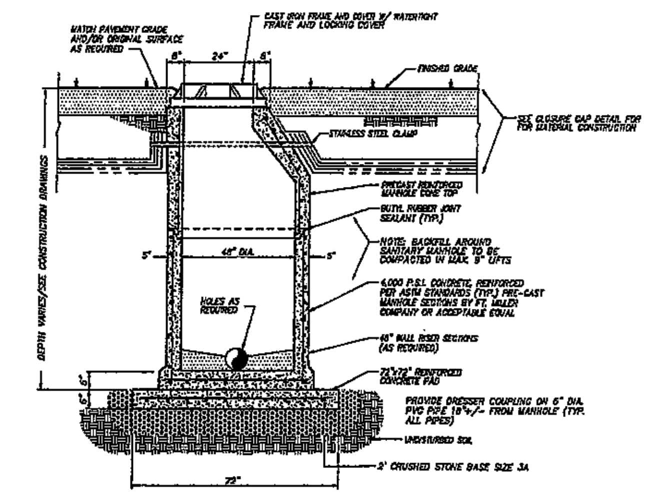
LEACHATE COLLECTION PIPING PROFILE

SCALE: HORZ. 1"= 40' VERT. 1"= 4'



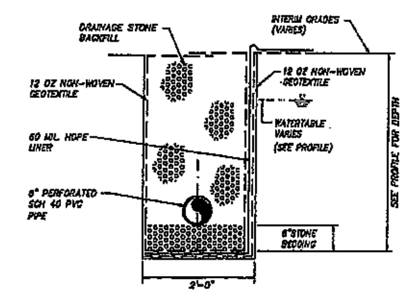
SECTION

SCALE: HORZ. 1"= 10' VERT. 1"= 10'



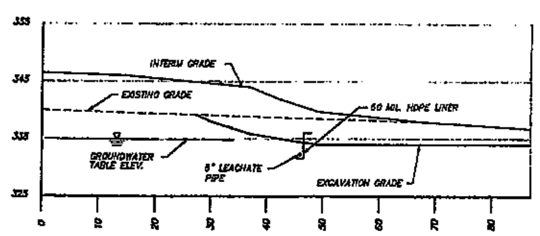
LEACHATE COLLECTION MANHOLE DETAIL

SCALE : NONE



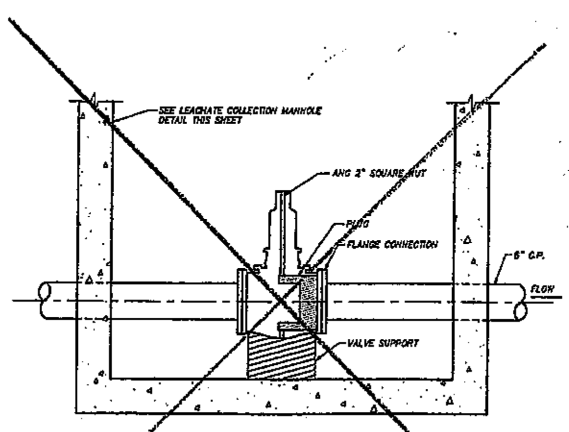
TYPICAL LEACHATE COLLECTION TRENCH

SCALE : NONE



SECTION

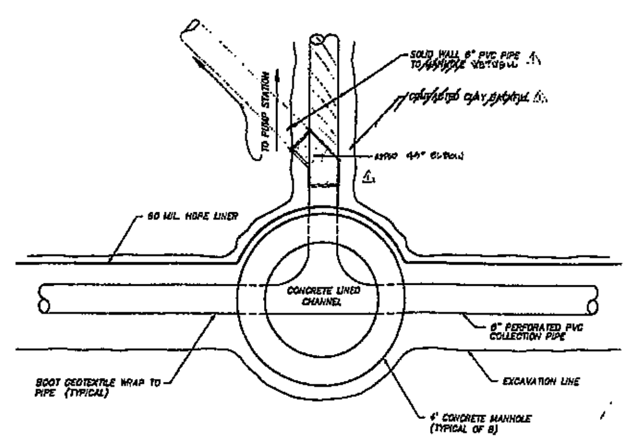
SCALE: HORZ. 1"= 10' VERT. 1"= 10'



MANHOLE STA. 2+64 6" LEVER ACTIVATED ECCENTRIC PLUG VALVE DETAIL

SCALE : NONE

NOT USED



PLAN VIEW AT MANHOLE STATION 0+00

SCALE : NONE

McGOEY, HAUSER and EDSALL CONSULTING ENGINEERS, P.C.

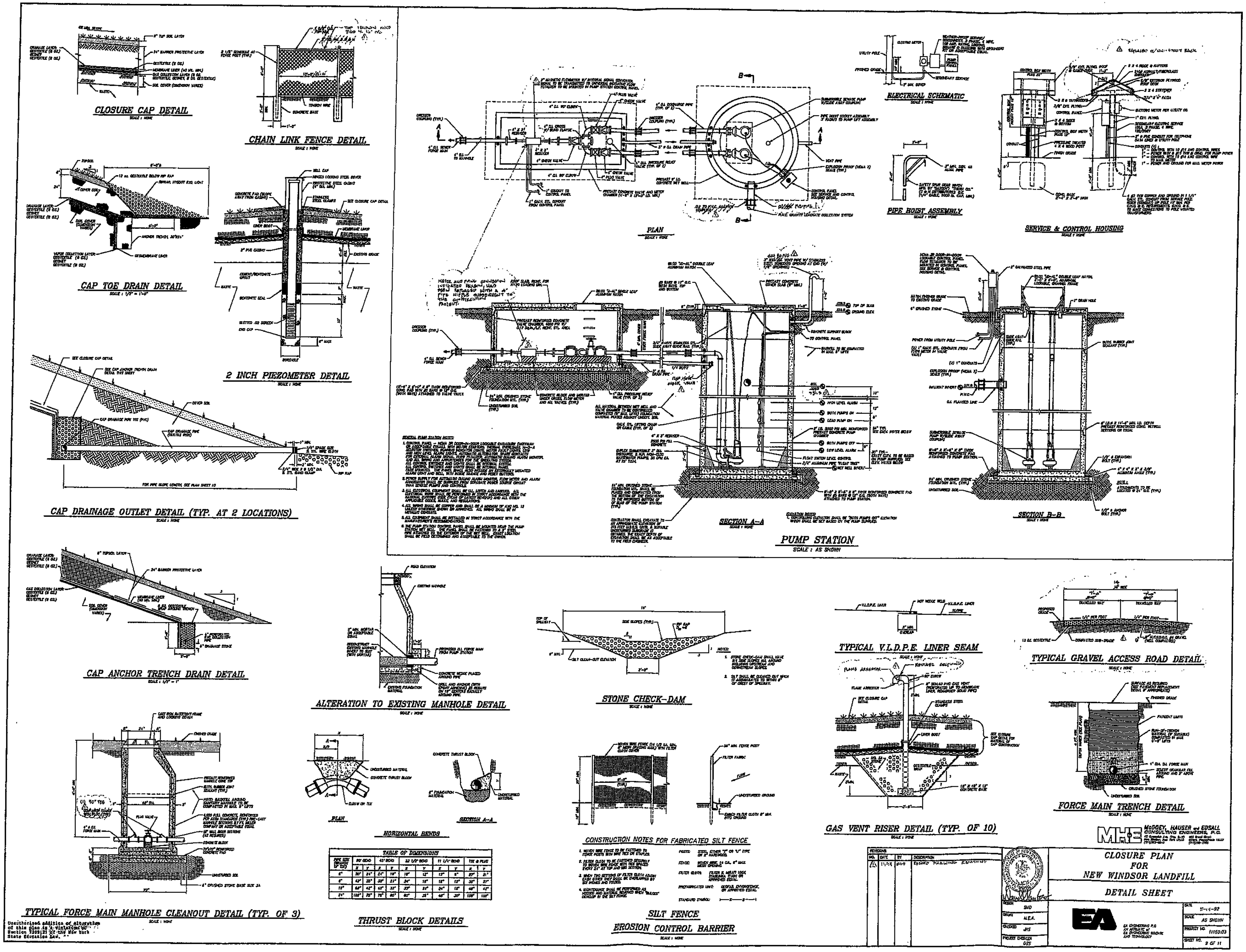
REVISIONS			
NO.	DATE	BY	DESCRIPTION
1	11/93	DSS	RECORD DRAWING REVISIONS

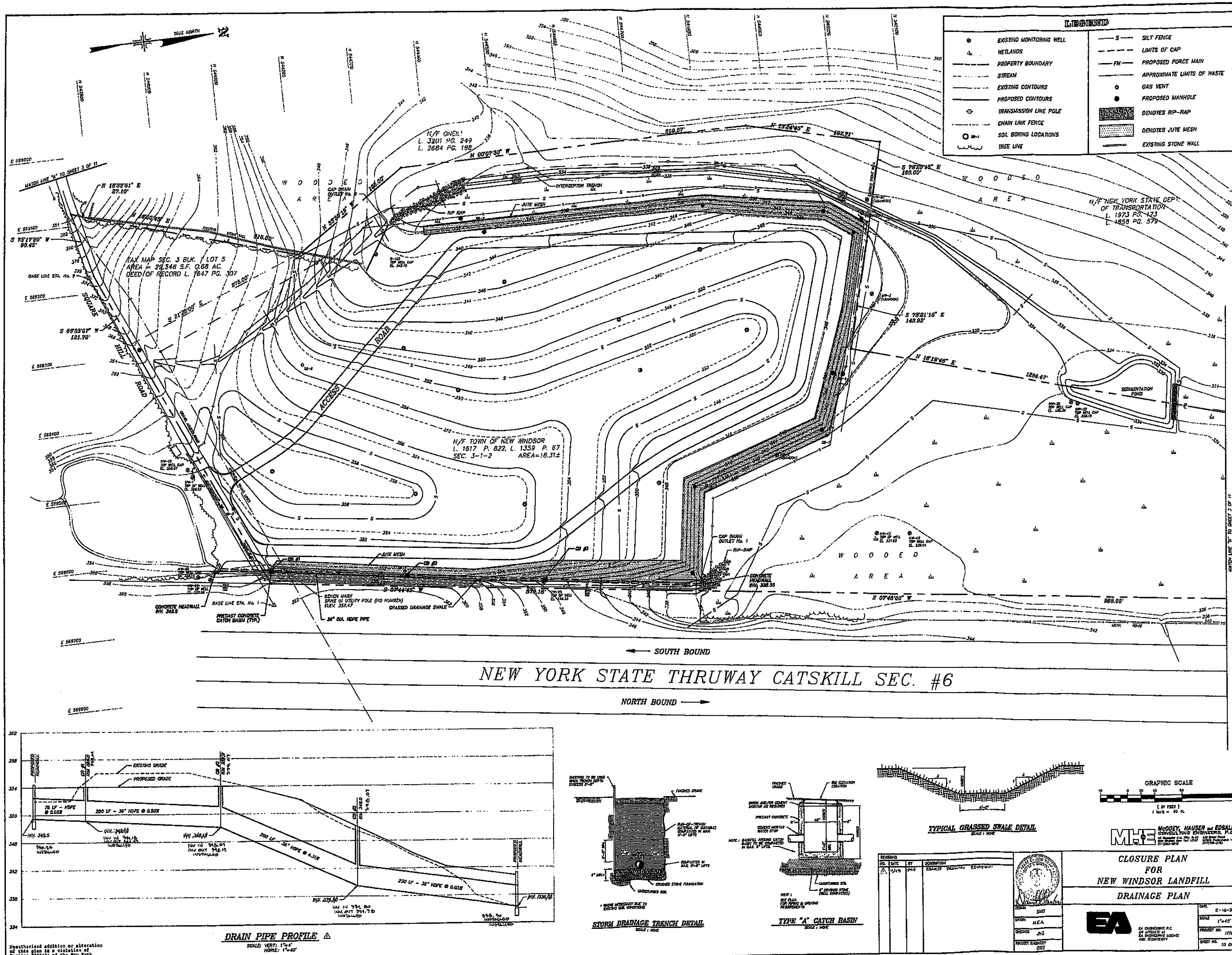
CLOSURE PLAN FOR NEW WINDSOR LANDFILL

LEACHATE MANAGEMENT PLANS

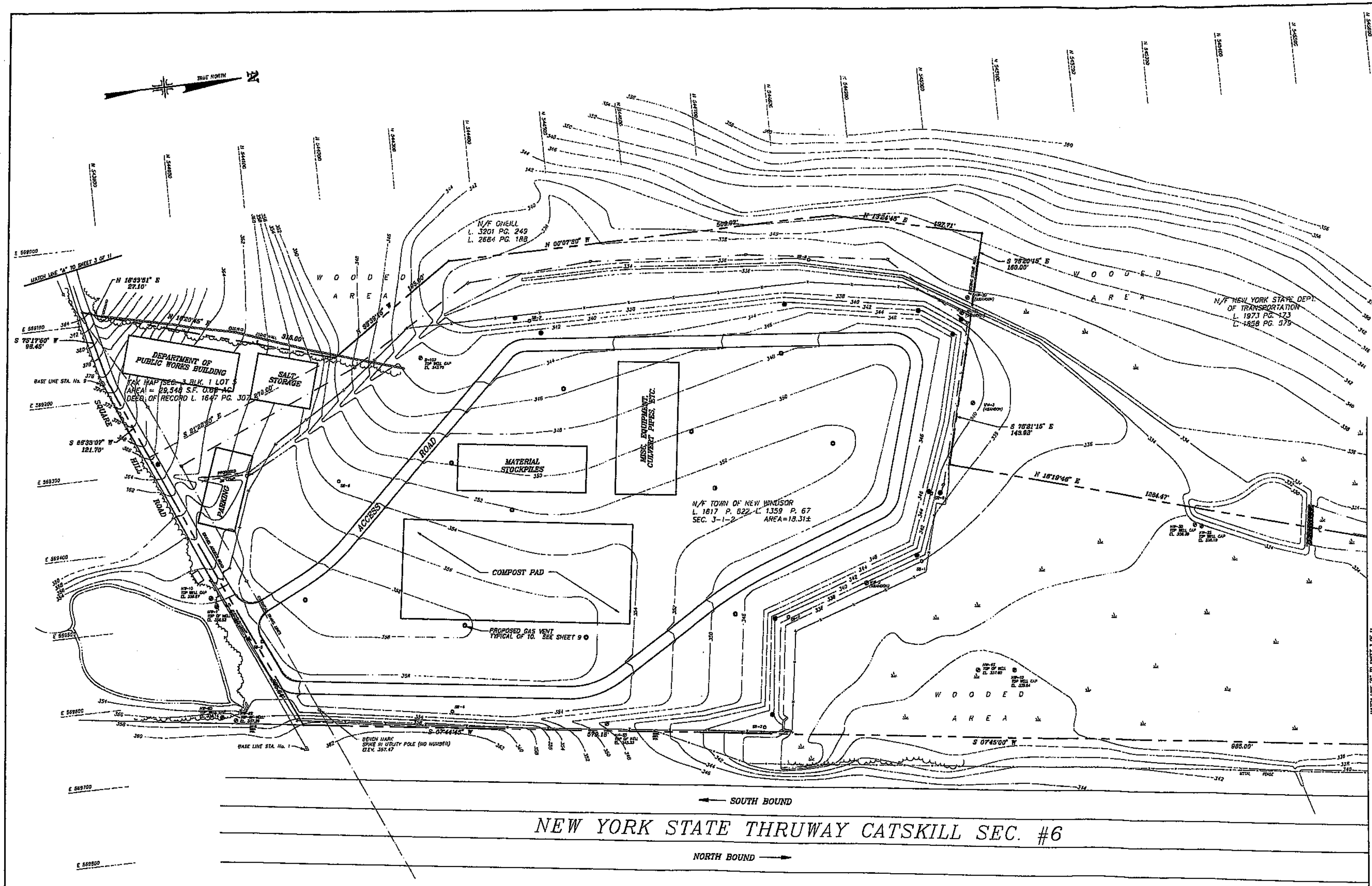
DESIGN	SMD
DRAWN	M.E.A.
CHECKED	JHS
PROJECT ENGINEER	DSS
DATE	5-16-92
SCALE	AS SHOWN
PROJECT NO.	11160.03
SHEET NO.	8 OF 11

EA ENGINEERING P.C. AN AFFILIATE of EA ENGINEERING SCIENCE AND TECHNOLOGY


CLOSURE CAP DETAIL
CHAIN LINK FENCE DETAIL
CAP TOE DRAIN DETAIL
2 INCH PIEZOMETER DETAIL
CAP DRAINAGE OUTLET DETAIL (TYP. AT 2 LOCATIONS)
PLAN
SECTION A-A
SECTION B-B
PUMP STATION
SCALE : AS SHOWN
ELECTRICAL SCHEMATIC
PIPE HOIST ASSEMBLY
SERVICE & CONTROL HOUSING
CAP ANCHOR TRENCH DRAIN DETAIL
ALTERATION TO EXISTING MANHOLE DETAIL
STONE CHECK-DAM
TYPICAL V.L.D.P.E. LINER SEAM
TYPICAL GRAVEL ACCESS ROAD DETAIL
GAS VENT RISER DETAIL (TYP. OF 10)
FORCE MAIN TRENCH DETAIL
TYPICAL FORCE MAIN MANHOLE CLEANOUT DETAIL (TYP. OF 3)
HORIZONTAL BENDS
THRUST BLOCK DETAILS
CONSTRUCTION NOTES FOR FABRICATED SILT FENCE
SILT FENCE
EROSION CONTROL BARRIER
McGOEY, HAUSER and EDSALL CONSULTING ENGINEERS, P.C.
CLOSURE PLAN
FOR
NEW WINDSOR LANDFILL
DETAIL SHEET
DESIGN SHD
DRAWN M.E.A.
CHECKED JHS
PROJECT ENGINEER DSS
DATE 5-11-92
SCALE AS SHOWN
PROJECT NO. 11160.03
SHEET NO. 9 OF 11
EA ENGINEERING P.C.
AN AFFILIATE of EA ENGINEERING SCIENCE AND TECHNOLOGY



TRUE NORTH
LEGEND
EXISTING MONITORING WELL
WETLANDS
PROPERTY BOUNDARY
STREAM
EXISTING CONTOURS
PROPOSED CONTOURS
TRANSMISSION LINE POLE
CHAIN LINK FENCE
SOIL BORING LOCATIONS
TREE LINE
SILT FENCE
LIMITS OF CAP
PROPOSED FORCE MAIN
APPROXIMATE LIMITS OF WASTE
GAS VENT
PROPOSED MANHOLE
DENOTES RIP-RAP
DENOTES JUTE MESH
EXISTING STONE WALL
N/F ONEIL
L. 3201 PG. 249
L. 2684 PG. 188
N/F NEW YORK STATE DEPT. OF TRANSPORTATION
L. 1973 PG. 173
L. 1859 PG. 579
TAX MAP SEC. 3 BLK. 1 LOT 5
AREA = 29,548 S.F. 0.68 AC.
DEED OF RECORD L. 1647 PG. 307
N/F TOWN OF NEW WINDSOR
L. 1617 P. 822, L. 1359 P. 67
SEC. 3-1-2 AREA=18.31±
W O O D E D AREA
SQUARE HILL ROAD
ACCESS ROAD
SEDIMENTATION POND
JUTE MESH
RIP RAP
INTERCEPTOR TRENCH
CAP DRAIN OUTLET No. 1
CONCRETE HEADWALL
PRECAST CONCRETE CATCH BASIN (TYP.)
36" DIA. HDPE PIPE
GRASSED DRAINAGE SWALE
SOUTH BOUND
NEW YORK STATE THRUWAY CATSKILL SEC. #6
NORTH BOUND
DRAIN PIPE PROFILE
EXISTING GRADE
PROPOSED GRADE
STORM DRAINAGE TRENCH DETAIL
TYPE "A" CATCH BASIN
TYPICAL GRASSED SWALE DETAIL
GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
McGOEY, HAUSER and EDSALL CONSULTING ENGINEERS, P.C.
REVISIONS
NO. DATE BY DESCRIPTION
CLOSURE PLAN FOR NEW WINDSOR LANDFILL
DRAINAGE PLAN
DESIGN SWD
DRAWN M.E.A.
CHECKED JHS
PROJECT ENGINEER DSS
EA ENGINEERING P.C.
AN AFFILIATE of EA ENGINEERING SCIENCE AND TECHNOLOGY
DATE 5-18-92
SCALE 1"=40'
PROJECT NO. 11160.03
SHEET NO. 10 OF 11



GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

LEGEND

●	EXISTING MONITORING WELL	—S—	SILT FENCE
⩪	WETLANDS	— — — —	LIMITS OF CAP
———	PROPERTY BOUNDARY	—FM—	PROPOSED FORCE MAIN
- - - -	STREAM	——·——	APPROXIMATE LIMITS OF WASTE
------	EXISTING CONTOURS	o	GAS VENT
———	PROPOSED CONTOURS	●	PROPOSED MANHOLE
-o-	TRANSMISSION LINE POLE		DENOTES RIP-RAP
---·---	CHAIN LINK FENCE		DENOTES JUTE MESH
O SB-1	SOIL BORING LOCATIONS	ooooooo	EXISTING STONE WALL
	TREE LINE		

NOTE : PROPOSED OVERHEAD UTILITY LINES SHOWN APPROXIMATELY. EXACT LOCATIONS TO BE DETERMINED BY THE UTILITY COMPANY.

Unauthorized addition or alteration of this plan is a violation of Section 7209(2) of the New York State Education Law.

McGOEY, HAUSER and EDSALL CONSULTING ENGINEERS, P.C.

REVISIONS			
NO.	DATE	BY	DESCRIPTION

CLOSURE PLAN FOR NEW WINDSOR LANDFILL

END USE CONCEPT PLAN

DESIGN SMD
DRAWN M.E.A.
CHECKED JHS
PROJECT ENGINEER DSS

EA ENGINEERING P.C. AN AFFILIATE OF EA ENGINEERING SCIENCE AND TECHNOLOGY

DATE 5-16-92
SCALE 1"=40'
PROJECT NO. 11160.03
SHEET NO. 11 OF 11