



Sterling Environmental Engineering, P.C.

**SITE MANAGEMENT PLAN**

**TOWN OF RAMAPO LANDFILL SITE  
250 TORNE VALLEY ROAD  
HILLBURN, ROCKLAND COUNTY, NEW YORK**

**NYSDEC SITE NUMBER #344004; USEPA CERCLIS ID NYD000511493**

***Prepared for:***

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and

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#### Table of Contents

	<u>Page #</u>
1.0 INTRODUCTION .....	1
1.1 Background Information .....	1
1.2 Current and Future Site Use .....	2
2.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN .....	2
2.1 Institutional Controls .....	2
2.2 Engineering Controls .....	3
2.2.1 Landfill Cover System .....	4
2.2.2 Leachate Collection System .....	4
2.2.3 Groundwater Extraction Wells .....	4
2.2.4 Drainage Swales .....	5
2.3 Certification of Institutional and Engineering Controls .....	5
3.0 SOIL MANAGEMENT PLAN .....	5
3.1 Notifications .....	5
3.2 Excavation of Soil .....	6
3.2.1 Excavation Requirements .....	6
3.2.2 Excavated Soil/Waste Storage .....	7
3.2.3 Excavated Soil/Waste Transportation and Disposal .....	7
3.2.4 Backfill Material .....	7
3.3 Groundwater Management .....	8
4.0 INSPECTION AND MONITORING PLAN .....	8
4.1 Annual Site Inspection .....	8
4.1.1 Landfill Cover System .....	9
4.1.1.1 Leachate Outbreaks .....	9
4.1.1.2 Gas Venting System .....	9
4.1.1.3 Soil Mass Movements (Sloughing) .....	10
4.1.1.4 Cracks .....	10
4.1.1.5 Settlement .....	10
4.1.1.6 Erosion and Deposition .....	10
4.1.1.7 Stressed Vegetation .....	10
4.1.1.8 Undesirable Vegetation .....	11
4.1.1.9 Animal Burrow Holes .....	11
4.1.1.10 Wildlife Resource Monitoring Survey .....	11

4.1.2	Surface Water Drainage and Erosion Control Features .....	11
4.1.3	Leachate Collection System.....	11
4.1.4	Groundwater Monitoring and Extraction Wells .....	12
4.1.5	Access Road.....	12
4.1.6	Fence.....	13
4.2	Performance Monitoring.....	13
4.2.1	Leachate Sampling.....	13
4.3	Effectiveness Monitoring.....	13
4.3.1	Groundwater Monitoring .....	14
4.3.2	Groundwater Level and Depth to Bottom Measurements .....	14
4.3.3	Monitoring Well Purging and Sampling.....	15
4.3.3.1	Revised Monitoring Program for Non-Operational Extraction Well Period .....	15
4.3.4	Air Quality Monitoring.....	16
5.0	OPERATION AND MAINTENANCE PLAN.....	16
5.1	Landfill Cover.....	16
5.1.1	Landfill Cover Mowing and Routine Maintenance .....	16
5.1.2	Mass Movements (Sloughing) .....	16
5.1.3	Cracks .....	17
5.1.4	Differential Subsidence (Settlement).....	17
5.1.5	Erosion and Deposition.....	17
5.1.6	Stressed Vegetation.....	17
5.1.7	Undesirable Vegetation.....	17
5.1.8	Geomembrane Liner Repair.....	18
5.2	Gas Odors .....	18
5.3	Access Roads .....	19
5.3.1	Snow Plowing.....	19
5.4	Gas Venting System.....	19
5.5	Leachate Collection System.....	19
5.5.1	Pump Maintenance .....	20
5.5.2	Leachate Collector Cleaning.....	20
5.6	Erosion Control Structures.....	20
5.7	Stone Drainage Aprons.....	21
5.8	Groundwater Monitoring Wells.....	21
5.9	Wetlands .....	21
5.10	Other Problems .....	22
6.0	REPORT PREPARATION.....	22
6.1	Annual Periodic Review Report .....	22
6.2	Groundwater Contamination Model .....	23
7.0	CONTINGENCY PLAN FOR AN ALTERNATE WATER SUPPLY .....	23
8.0	QUALITY ASSURANCE PROJECT PLAN (QAPP).....	25
9.0	HEALTH AND SAFETY PLAN .....	25

### Tables

Table 1	Analytical Methods/Quality Assurance Summary for Groundwater Samples
Table 2	Summary of Measuring Point Elevation and Total Depth Information

### Figures

Figure 1	Site Location
Figure 2	Property Features
Figure 3	Leachate Collection System - Extraction Wells and Lift Stations Locations
Figure 4	Surface Water Drainage and Erosion Control Features
Figure 5	Monitoring Well and Extraction Well Construction Details
Figure 6	Groundwater Monitoring Wells and Air Quality Monitoring Locations
Figure 7	Extraction Wells and Gravity Main Details
Figure 8	Historical Data - Reported Exceedances
Figure 9	Alternate Water Supply Plan

### Appendices

Appendix A	NYSDEC, USEPA, Town of Ramapo Contact Information
Appendix B	USEPA Superfund Record of Decision (ROD), Ramapo Landfill March 1992 and 1997 ESD (Provided on CD)
Appendix B-1	Covenant of Restrictions and Environmental Easements
Appendix C	Institutional and Engineering Control Evaluation Form
Appendix D	Post-Closure Annual Site Inspection Form
Appendix E	Leachate Collection System - Wiring Diagrams and Bill of Materials
Appendix F	Maintenance Checklist
Appendix G	Timber Rattlesnake Encounter Plan
Appendix H	NYSDEC EDD Manual (Provided on CD)
Appendix I	Health and Safety Plan
Appendix J	Extraction and Monitoring Well Construction Forms (Provided on CD)
Appendix K	Engineering Controls As-Built Drawings (Provided on CD)
Appendix L	Quality Assurance Project Plan (QAPP)
Appendix M	Town of Ramapo Police Department Shooting Range Details (August 2016)
Appendix N	As-Built for Yard Waste Composting Facility at Closed Ramapo Landfill (October 2007)

## 1.0 INTRODUCTION

The Town of Ramapo Landfill (Landfill), located at 250 Torne Valley Road in the Village of Hillburn, Town of Ramapo, Rockland County, New York (refer to Figure 1), is a National Priorities List (NPL) site and is regulated by the United States Environmental Protection Agency (USEPA), CERCLIS ID NYD000511493. The Landfill property is also registered as a New York State Class 2 Inactive Hazardous Waste Disposal Site, Registry No. 344004.

The USEPA outlined the requirement for a Site Management Plan (SMP) in the December 2009 5-Year Review Report for the Landfill. The SMP includes an updated long term monitoring plan, implemented Institutional Controls (ICs) and annual certification procedures to ensure the ICs are being followed. In addition, the SMP outlines a revised monitoring program in the event the groundwater extraction wells located downgradient of the Landfill are non-operational for more than 60 days.

The SMP also provides a scope of work to monitor the major components of the selected remedy for the Landfill as provided in the USEPA Superfund Record of Decision (ROD) dated March 31, 1992 (and modified December 1997) and outlined below:

- Landfill cap integrity;
- Groundwater extraction wells;
- Leachate collection system;
- Surface water drainage channels;
- Air monitoring;
- Property deed restrictions;
- Post-closure maintenance and monitoring; and
- Contingency plan to protect nearby residents (provide drinking water supply).

Contact information for the USEPA, New York State Department of Environmental Conservation (NYSDEC) and the Town of Ramapo representatives is provided in Appendix A. A copy of the 1992 ROD and December 1997 Explanation of Significant Difference (ESD) are provided in Appendix B.

### 1.1 Background Information

The Landfill is approximately 80 acres of waste-fill within a 96 acre parcel owned by the Town of Ramapo. The Landfill is located at the western base of the Ramapo Mountains on Torne Valley Road and consists of two major lobes commonly known as the north and south lobes. Landfill slopes range from three (3) to thirty-three (33) percent. Property features are presented in Figure 2.

Prior to landfilling operations in the 1950s and 1960s, portions of the property were excavated for gravel. In 1971, the Town was permitted by the Rockland County Department of Health (RCDOH) to operate a sanitary landfill. Under various operators, municipal solid waste (MSW) was accepted until 1984 and construction and demolition (C&D) debris was accepted until 1989. Substances reportedly disposed at the Landfill include industrial and sewer sludge, municipal refuse, asbestos, construction and demolition (C&D) debris, yard debris, paint sludge (presumably from an automotive plant) and liquid waste (reportedly from a paper company).

The Landfill was placed on the Superfund National Priorities List (NPL) in September 1983. Between 1980 and 1988, the NYSDEC and the Town of Ramapo entered into four (4) Orders on Consent phasing out Landfill operations, constructing a surface water and groundwater diversion system and a leachate

collection and transport system, and conducting a Remedial Investigation and Feasibility Study (RI/FS). The leachate collection system was constructed along the downgradient edge of the Landfill from 1984 to 1985. Initially, collected leachate was conveyed by pumps and lift stations to a wastewater treatment pond in the southwest corner of the Landfill property. After aeration and settling occurred, the water was discharged to the Ramapo River. Since 1996, leachate has been discharged to the Rockland County Sewer District (RCSD) No. 1 Publicly Owned Treatment Works (POTW).

In 1998, the Town of Ramapo subdivided the sections of the Landfill property that are used for the transfer facility, scale house, and leachate storage tank. The transfer facility and scale house properties were sold to the Rockland County Solid Waste Management Authority (RCSWMA) and the leachate storage tank property was sold to the RCSD.

## **1.2 Current and Future Site Use**

The ROD remedy includes deed restrictions for the Landfill property prohibiting installation of drinking water wells and activities that could affect the integrity of the cap. The remaining portion of the property is undeveloped and wooded. As described above, portions of the property were previously sold to RCSWMA and RCSD.

Currently, a composting facility and pistol shooting range operate at the Landfill property. The Site Plan, site profiles, proposed berm cross section, and timber retaining wall details for the Town of Ramapo Police Department Shooting Range, dated August 2016, are included as Appendix M. The Town will convey BMPs for operation of the pistol shooting range via separate transmittal once they are received from the Police Department's consultant. The October 2007 Yard Waste Composting Facility As-Built, prepared by William F. Cosulich Associates, P.C. for the RCSWMA, are included as Appendix N.

Management and maintenance of the shooting range and composting area are performed on a monthly basis. Inspection efforts are structured to assess whether these uses impact the Landfill cover system or offsite surface water discharges. The inspection and maintenance plan will also be provided under separate cover.

## **2.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN**

The Institutional and Engineering Control Plan details the steps necessary to manage and implement the institutional and engineering controls for the Landfill property and evaluate the controls for annual certification consistent with the requirements of the ROD and NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (DER-10).

The Institutional and Engineering Control Plan also identifies restrictions for the Landfill property that are binding for the present and future owners of the Landfill property.

### **2.1 Institutional Controls**

An Institutional Control (IC) is any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to the potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of the remedial program or with the effectiveness and/or integrity of operation, maintenance or monitoring activities at or pertaining to the Landfill property. Types of ICs include, but are not limited to: environmental easements, deed restrictions, discharge permits, site security (other than

fencing), local permits, Orders on Consent/decrees, zoning restrictions, hazardous waste site registry, deed notice, groundwater use restrictions, condemnation of property, and public health advisories.

The Covenant of Restrictions and Environmental Easements were filed with the Rockland County Clerk on August 28, 2012 and October 10, 2012 (Appendix B-1). The Environmental Easements stay with the property in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of the property at a level that is determined to be safe for a specific use, while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the potential restriction of future uses of the land that are consistent with the ROD.

The following restrictions apply to the Landfill property:

- There shall be no construction, use or occupancy that results in a disturbance or excavation that threatens the integrity of the engineering controls (ECs) described in Section 2.2, or which results in unacceptable human exposure to contaminated soils.
- The owner shall not disturb, remove or otherwise interfere with the installation, use, operation and maintenance of ECs described in Section 2.2 unless a written waiver is obtained from the USEPA and NYSDEC for each occasion.
- The owner shall prohibit land use from ever being used for purposes other than commercial/industrial use without the express written waiver by the USEPA and NYSDEC.
- The owner shall prohibit the use of underlying groundwater, without rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains permission to do so from the USEPA and NYSDEC.
- The owner shall provide an annual certification (see Section 2.3) prepared by a Professional Engineer or environmental professional acceptable to the USEPA and NYSDEC. The certification will document in-place ICs and ECs are unchanged from the previous certification, comply with this SMP and have not been impaired.
- The owner shall continue to implement and maintain the ICs and ECs identified in the SMP unless permission to discontinue such controls is granted from the USEPA and NYSDEC.
- All ICs and ECs shall be binding for present and all future owners. Any conveyance of the Landfill property or portions of the Landfill property are subject to the ICs and ECs.

## **2.2 Engineering Controls**

An Engineering Control (EC) is any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of the remedial program, or eliminate potential exposure pathways to contamination.

The ECs for the Ramapo Landfill control the source of contamination and the generation of contaminated leachate. The As-Built drawings for the ECs for the Ramapo Landfill are provided in Appendix K and include:

- A Landfill cover that includes layers of fill material, gas venting system, and an impermeable

membrane (see numerous cross-sections in Appendix K).

- Groundwater extraction wells to supplement the existing leachate collection system.
- Leachate collection system for offsite treatment.
- Drainage swales to collect and divert surface water runoff downgradient of sections of the impermeable membrane installed on the Landfill slopes.
- Site security fencing to control trespassers on the Landfill property.

### **2.2.1 Landfill Cover System**

Major components of the final cover system are a geomembrane barrier, secondary cushion geotextile, barrier protection soil layer, and a topsoil layer with vegetation.

The geomembrane barrier overlies the secondary cushion geotextile layer, which overlies the prepared existing subgrade, thereby covering the existing refuse mass and residual contaminated soil. The geomembrane barrier is overlain by another secondary cushion geotextile and a layer of 12 inches of low permeability barrier protection soil. The barrier protection soil layer is overlain by a 6-inch topsoil layer and seeded to minimize soil loss. The Landfill slopes are graded to provide proper drainage with a slope range of 3-33%.

### **2.2.2 Leachate Collection System**

All leachate collected from the slopes, drainage ditches and groundwater extraction wells flows by gravity to the leachate control building on the east side of Torne Valley Road, through a forcemain to the RCSD No. 1 POTW. The leachate collection/transfer system is designed and constructed to fully operate in an automatic mode. Extraction well and lift station locations are provided in Figure 3.

Individual pump controls are as follows:

1. Extraction Wells - Water Level Sensors
2. Lift Station and Pump Pit Pumps - Floaters with mercury switches sensing actual water levels (Inactive).

### **2.2.3 Groundwater Extraction Wells**

The groundwater extraction wells are pumped to contain the contaminant plume that migrates from the Landfill. The groundwater extraction wells are located on the western side of the Landfill along Torne Valley Road between monitoring well clusters MW-3 and MW-8. The layout of the extraction well system is approximately 700 feet in length. Three (3) extraction wells, W-5, W-6 and W-7, are approximately 20 feet deep and screened in dense sand and partially into bedrock (approximately 2.0 feet). The remaining extraction wells, W-1 through W-4, are deeper, ranging from 38 to 51 feet in depth and are screened in dense sand and partially into bedrock (up to 10 feet) (see Figure 3 for locations).

Each extraction point will be monitored with a separate flow meter. Monitoring will include pumping records for each extraction point. The Town hired a consultant, Roberge Electric (Roberge), to install a

flow meter on Extraction Well W-3 to serve as a prototype. Installation was completed at the end of May 2016. After evaluation, the flow meter performance was determined to be satisfactory and the Town contracted with Roberge to equip the remaining extraction wells with similar flow meters. Roberge completed installation of six (6) other flow meters at lift station A-7 and extraction wells W-1, W-2, W-4, W-7, and W-20 in mid-November 2016. Installation of flow meters at extraction wells W-5 and W-6 are scheduled to be completed in 2017. Once complete, each groundwater extraction point will be monitored and the records will include separate flow meter readings.

#### **2.2.4 Drainage Swales**

Drainage swales at the Landfill collect and divert surface water runoff. Two (2) swales are located on the north lobe and two (2) swales are located on the south lobe of the Landfill. These swales divert runoff into wetlands, a retention pond and Torne Brook as described in Section 4.1.2.

#### **2.3 Certification of Institutional and Engineering Controls**

The Landfill property will be inspected annually by a Professional Engineer or an environmental professional to certify Landfill property usage activities are consistent with SMP requirements. In addition, the inspection will be performed to determine the ongoing integrity, operability, and effectiveness of the institutional and engineering controls. A review of applicable standards, regulations and laws will be performed annually to determine whether any changes or new requirements are applicable to the Landfill property and the continuance of the Landfill property institutional and engineering controls. Results of the inspection will be documented in the Post-Closure Monitoring (PCM) Report that is submitted annually.

The Landfill property will be inspected annually to ensure that all controls are in place and effective and to identify conditions that could impair the ability of the ECs and ICs to protect the public health and environment. Appendix C contains an Institutional and Engineering Controls Evaluation Form. Appendix D contains the post-closure site inspection form.

### **3.0 SOIL MANAGEMENT PLAN**

Since Landfill waste remains at the Landfill property, ground intrusive activities that may result in the exposure of contamination must be handled in accordance with this Soil Management Plan.

#### **3.1 Notifications**

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 NYSDEC and USEPA. Appendix A contains contact information for the above notification. This information will be updated as necessary to provide accurate contact information. The notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site regrading, 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 to be encountered 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 Soil Management Plan;
- A statement that the work will be performed in compliance with this Soil Management Plan and 29CFR 1910.120;
- A copy of the contractor's Health and Safety Plan (HASP), in electronic format, if it differs from the HASP provided in this SMP;
- Identification of disposal facilities for potential waste streams; and,
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

### **3.2 Excavation of Soil**

Excavation of soil may be required as a part of future Landfill property maintenance or as a result of miscellaneous site activities. To the extent possible, excavation activities should be avoided within the Landfill waste mass. The NYSDEC and USEPA must be notified prior to any excavation activities within the Landfill waste mass as described in Section 3.1. Adequate personal protective equipment (PPE) must be used to prevent exposure to potentially contaminated soil during excavation, which must be identified by a qualified environmental consultant.

A work plan must be developed prior to initiating any excavation activities within the Landfill waste mass. The work plan, at a minimum, will be consistent with the requirements specified in the following sections. The work plan must identify the location and procedure for testing and certification of offsite backfill material.

#### **3.2.1 Excavation Requirements**

At a minimum, the following requirements apply to excavations within the Landfill waste mass:

1. All excavations must be advanced dry (i.e., free of saturated material).
2. Excavated materials will be transported to a designated staging area for subsequent offsite disposal or directly loaded into trucks used to transport soil offsite for disposal to a permitted facility.
3. Excavated materials must be staged on and covered with polyethylene sheeting to prevent contact with undisturbed soils and wind erosion.
4. Excavated soil must not be spread or permanently stored onsite.
5. Excavation must be performed in a manner that will prevent contaminated soil from being mixed with uncontaminated soil.

6. Excavation must be accomplished by methods that minimally disturb subsurface soils.

### **3.2.2 Excavated Soil/Waste Storage**

At a minimum, the following requirements apply to the storage of soil/waste excavated from within the Landfill waste mass:

1. Excavated soil/waste must be placed in temporary stockpiles or immediately taken offsite for disposal to a permitted facility.
2. Stockpiles must be constructed to isolate the excavated soil/waste from the environment.
3. Diversion measures must be employed to prevent stormwater run-on from entering the excavation.
4. Roll-off containers or equivalent units used to store excavated soil must be covered and water tight.

### **3.2.3 Excavated Soil/Waste Transportation and Disposal**

The following requirements apply to the transportation and disposal of excavated soil/waste from the Landfill property:

1. Sampling, classification, manifesting, labeling, transporting and disposing of soil/waste must be performed in accordance with all applicable Federal, State, and local laws and regulations.
2. Removed materials must be transported directly to a permitted disposal facility.
3. Sampling frequency, analysis methods, and analytical laboratory must be approved by the NYSDEC and USEPA prior to removal of any material.
4. Commitment letters must be obtained from permitted disposal facilities selected for the excavation project. The letters should state the disposal facility is permitted to accept contaminated soil/waste and has the available capacity to receive the waste volume that will be shipped.
5. Wheels and parts of vehicles that come in contact with contaminated soil/waste must be decontaminated prior to leaving the property.

### **3.2.4 Backfill Material**

The following requirements apply to the backfill material used to restore the Landfill property after excavation work is complete:

1. Backfill material used must be similar in physical properties to the material removed.
2. The backfill material must be of equal or less permeability than the native soil in or adjacent to the excavated area.

3. Backfill must be uncontaminated, pursuant to the applicable remediation standards.
4. The quality of the backfill must be documented that it is clean material from a commercial or noncommercial source.
5. If documentation of the backfill quality cannot be provided, the material will be analyzed for 6 NYCRR Part 375 parameters (full list) and reported concentrations must be less than Restricted Commercial Use Soil Cleanup Objectives.

### **3.3 Groundwater Management**

Development of new potable drinking water supplies via groundwater is prohibited at the Landfill property. However, groundwater may be encountered at the Landfill property as part of future excavation activities. To the extent possible, pumping of groundwater should be avoided within the Landfill waste mass. The NYSDEC and USEPA must be notified prior to any groundwater management activities as described in Section 3.1. Adequate PPE must be used to prevent exposure to potentially contaminated groundwater.

A work plan must be developed prior to initiating any groundwater management activities. At a minimum, the work plan must specify the manner in which the groundwater will be pumped, handled, stored, sampled, transported, and disposed.

## **4.0 INSPECTION AND MONITORING PLAN**

A Post-Closure Monitoring (PCM) Program is currently implemented at the Landfill property. The PCM includes the collection and analysis of groundwater samples and air quality monitoring. PCM has been conducted since 1993 and is required until 2023. Sampling analysis and quality assurance follow the protocol provided in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (DER-10). In addition, the monitoring program includes inspections of the Landfill to observe general conditions, oversee and inspect operation and maintenance activities, and to handle non-routine site issues, such as damage to the Landfill cover system.

### **4.1 Annual Site Inspection**

An annual site inspection will document the condition of the Landfill cover system, groundwater extraction system, leachate collection system, monitoring wells, and access roads. The Landfill property inspection will also include visual screening of the Landfill for leachate outbreaks (precipitates on the ground surface, intermittent seeps, or soft spots), gas odors, mass movements (sloughing), cracks (in soil or exposed geomembrane), and stressed or undesirable species of vegetation. The inspection will be performed annually during the post-closure monitoring event. If conditions are observed that require immediate action, the NYSDEC and USEPA will be notified (see Appendix A for contact information). The following sections describe the individual aspects of the annual Landfill property inspection and are included in the Post-Closure Annual Site Inspection Form (Appendix D).

#### **4.1.1 Landfill Cover System**

The Landfill final cover system consists of the following components, from surface downward:

- Vegetation and 6 inches of topsoil;
- 12 inches of barrier protection material;
- Cushion geotextile (geocomposite drainage layer; 12 oz./square yard);
- 60 mil. textured, linear polyethylene geomembrane barrier layer;
- Secondary cushion geotextile (gas venting layer); and,
- Six (6) inches of graded fill over Landfill waste material.

During the annual inspection, the Landfill cover will be observed by traversing the area on foot and recording conditions for inclusion in the Post-Closure Annual Site Inspection Form (refer to Appendix D). Adverse Landfill cover conditions will be handled in a manner consistent with the prescribed recommendations in the subsections below.

##### **4.1.1.1 Leachate Outbreaks**

If conditions indicative of leachate outbreaks, such as wet spots, surface sloughing or discoloration are observed during the inspection, further investigation is warranted to evaluate the condition and determine the appropriate corrective action. The condition will be reported to the NYSDEC and USEPA and an investigation plan will be developed to determine the cause and extent of the observed condition. The investigation plan may include, but is not necessarily limited to, test pit excavations or other appropriate subsurface investigation methods. A remedial action plan will then be developed to address the condition.

##### **4.1.1.2 Gas Venting System**

The following controls have been incorporated for the Landfill gas venting system to control gas migration from the Landfill:

- Gas Venting Layer - The gas venting layer is located above the grading fill over the subgrade surface and just below the geomembrane. A geosynthetic venting net (geonet) provides the equivalent function as a soil layer is used, as defined by 6 NYCRR Part 360-2.13(p). A geotextile filter fabric, bonded to the geonet is used above and beneath the geonet.
- Gas Venting Risers - Gas venting risers are installed for the purpose of venting Landfill gases to the atmosphere, and are spaced on an approximate 200-foot grid over the Landfill cover (i.e., just over one gas vent per acre of landfill cover). The vents extend through the Landfill cover at least 4 feet into the existing waste and project 3 feet above the top surface of the Landfill cover. The risers are constructed of 6-inch Schedule 80 diameter PVC pipe. The lower 4-foot portion of the risers (beneath the gas venting geonet) are slotted to allow migration of the gas into the gas risers. The geomembrane is attached to the gas venting riser using pre-fabricated boot seals to prevent channeling of surface water through the cap and gas emissions around the outside of the pipe. Gas vent openings will be inspected for obstructions. The vertical pipe condition will be observed. Gas vents and adjacent areas that require maintenance will be restored to the original design configuration.

Air quality is tested as described in Section 4.3.4 to determine if methane is a concern. Inspection and maintenance of the gas venting system is provided in Section 5.4.

#### **4.1.1.3 Soil Mass Movements (Sloughing)**

In the event of visual evidence of soil mass movements or sloughing, the nature and extent of the movement will be recorded and an investigation will be initiated to determine the cause. Repairs will be made as soon as possible and no later than 45 calendar days from the date sloughing is reported.

#### **4.1.1.4 Cracks**

Identified cracks in the Landfill cover or geomembrane will be recorded. Inspections for cracks are particularly important after extended dry periods, when drying processes are most prevalent. An attempt will be made to differentiate whether or not the cracking is related to mass movements rather than drying. Repairs will be made as soon as possible and no later than 45 calendar days from the date cracks are reported.

#### **4.1.1.5 Settlement**

Settlement locations and dimensions will be recorded on the Annual Site Inspection Form (refer to Appendix D). Repairs will be made as soon as possible and no later than 45 calendar days from when settling is reported.

#### **4.1.1.6 Erosion and Deposition**

Erosion features such as rills and gullies are a common problem on landfill cover systems. The Landfill cover is especially prone to erosion where vegetation is missing or where settlement has caused drainage to accumulate. When erosion of the Landfill cover material occurs, sediment transport and deposition in downstream drainage swales is expected. Erosion locations and deposition will be photographed and plotted, and the width, length, and depth will be recorded on the Annual Site Inspection form. Repairs will be made as soon as possible and no later than 45 calendar days from the date erosion and/or deposition features are reported.

#### **4.1.1.7 Stressed Vegetation**

Stressed vegetation usually exhibits browning, discoloration, wilting, or dead material. These conditions indicate the impacted vegetation is chronically weak and vulnerable due to one or more of the following possible conditions:

- Poor water-holding properties and/or drainage;
- Poor nutrient content;
- Accumulation of gases harmful to plant growth;
- Accumulation of salts harmful to plant growth; and/or,
- Exposure to Contaminants of Concern (COCs) in soil and groundwater.

Visual evidence of stressed vegetation on the Landfill cover will be noted in the Annual Site Inspection Form. Repairs will be made as soon as possible and no later than 45 calendar days from when stressed

vegetation is reported.

#### **4.1.1.8 Undesirable Vegetation**

Vegetation with a deep root structure (i.e., saplings; trees; bushes, etc.) is considered undesirable on the final Landfill cover system. If deep-rooted vegetation is observed on the Landfill cover during a site inspection, it will be photographed and its location noted on the Annual Site Inspection Form. Repairs will be made as soon as possible and no later than 45 calendar days from when undesirable vegetation is reported.

#### **4.1.1.9 Animal Burrow Holes**

Animal burrow holes located on the Landfill cover will be filled with soil, regraded and revegetated. If necessary, animal control will be implemented, in accordance with the NYSDEC and New York State Department of Health (NYSDOH) requirements.

#### **4.1.1.10 Wildlife Resource Monitoring Survey**

A Wildlife Resource Monitoring (WRM) survey at the Landfill will be conducted annually. The health of vegetative cover growing on the Landfill cover, the presence of undesired vegetation or invasive species, and the presence of terrestrial wildlife will be documented. If stressed or undesired vegetation, wildlife, or burrow holes are observed, the location(s) will be noted and corrective measures will be completed in accordance with Sections 5.1.6 and 5.1.7.

### **4.1.2 Surface Water Drainage and Erosion Control Features**

Surface water drainage at the Landfill consists of radial sheet flow from the Landfill slopes to two (2) swales located on the north lobe and two (2) drainage swales located on the south lobe of the Landfill, as shown on Figure 4. Downchute #1, located on the south side of the south lobe, and the south lobe's perimeter drainage system discharges into the wetlands and retention pond located south of the south lobe. A culvert carries overflow from the pond to Torne Brook. Downchute #2, located on the west side of the south lobe, and Downchutes #3 and #4 located on the north lobe, all discharge into the concrete gutter that runs inside the fence along the west side of the Landfill. At the southern end of the gutter, there is a culvert that discharges all the surface water into Torne Brook.

Channel cross-sections must be inspected to ensure that sideslopes are stable. Inspection will be made for scour, sediment deposition, breaches, rodent holes, and other damage. The riprap-lined downchute also will be checked for undermining and damage to geotextile. Any drainage will be noted on the Annual Site Inspection Form and repairs will be made no later than 45 calendar days from when drainage is reported.

### **4.1.3 Leachate Collection System**

The leachate collection system components include the manholes and leachate collection pipes, located on both sides of Torne Valley Road (see Figure 3). Manholes serve as cleanouts to all reaches of the network of collection piping. Inspection of each manhole will include, at a minimum, removing the covers and using artificial light if necessary, inspecting all characteristics and components in the manholes. Gravity mains will also be inspected for proper function. The condition of the manholes themselves will be noted, including any cracks, leaks, or misalignment. Pipe entrances and exits to manholes will be inspected for sediment build-up and tight seals. If necessary, inspectors with confined space entry certification will

enter the manholes for best viewpoint. Pipes will be inspected by qualified personnel with video camera equipment if deemed necessary.

Inspection of the leachate collection system includes lift station pumps, valve control panel and tank level controls. The Town maintains the manufacturer's maintenance and repair specifications for the leachate system components. Wiring diagrams and bill of materials are provided in Appendix E.

If visual evidence of damage to leachate collection system pipes, pumps or lift stations is observed, the nature and extent of the damage will be investigated to determine the cause. Repairs will be made as soon as possible and no later than 45 calendar days from the date damage is reported.

#### **4.1.4 Groundwater Monitoring and Extraction Wells**

Inspection of groundwater monitoring and extraction wells during site inspections and/or sampling events will focus on the following areas:

- Concrete surface seal;
- Protective outer casing and lid;
- Locks and locking well caps; and
- Excessive silt in the inner well casing.

Monitoring well and extraction well construction details are provided in Figure 5 and Appendix J. The integrity of the concrete surface seal will be visually assessed at each well location, and any observed cracks will be noted on the Annual Site Inspection Form for the monitoring wells and on the IC/EC inspection form for the extraction wells. Monitoring wells at the site have "stick-up" casings with a protective outer casing and lid. The protective outer casing and lid will be checked for damage at each well. Any pooling of water or evidence of pooling of water adjacent to the protective outer casing will be recorded. The wells will be checked to verify they lock properly and the integrity of the locking cap will be assessed. Any cracks in the locking caps or broken or missing locking caps will also be noted.

Silt collected in the bottom of a well may affect the ability to collect a representative groundwater sample. Each sampling event will include a depth to bottom measurement from the top of casing to evaluate the thickness of the silt. Measurements will be obtained prior to sampling.

Monitoring wells will be classified "excessively silted" if the silt layer equals or exceeds ten percent (10%) of the screen length. For example, a well that contains one (1) foot of silt and a well screen ten (10) feet in length would be calculated to have exactly 10% silt in the well and will require redevelopment.

Repairs will be made as soon as possible and no later than 45 calendar days from when damaged monitoring wells are reported.

#### **4.1.5 Access Road**

Vehicular traffic on the Landfill cover will be limited to the engineered access road. Vehicles are necessary to inspect and maintain the Landfill and perform necessary services.

The condition of the access road located on the Landfill will be included in the annual site inspection. Visual evidence of erosion, deposition, settling, potholes, or other adverse conditions that impede vehicular traffic will be noted on the Annual Site Inspection Form (Appendix D). A corrective measures

plan will be developed by the Town or its consultant to address the conditions. Repairs will be made as soon as possible and no later than 45 calendar days from when adverse road conditions are reported.

#### **4.1.6 Fence**

A chain link fence is located around the perimeter of the Landfill footprint. The fence will be inspected for signs of damage. Gates and locks will also be inspected and any damage will be noted on the Annual Site Inspection Form. Repairs will be made as soon as possible and no later than 45 calendar days from when damage is reported.

### **4.2 Performance Monitoring**

According to the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation (NYSDEC DER-10), performance monitoring is the regular assessment of physical and chemical parameters, to determine if the prescribed remedy for the Landfill is performing as designed. Performance monitoring activities applicable to the Landfill are as follows:

- Inspect Landfill cover (see Section 4.1.1);
- Inspect groundwater extraction wells and leachate collection system (see Sections 4.1.3 and 4.1.4);
- Inspect surface water runoff drainage swales (see Section 4.1.2);
- Analyze leachate samples on a biannual schedule (two (2) times per year) collected from the RCSD No. 1 POTW; and,
- Determine deed restrictions are implemented (see Section 2.1).

#### **4.2.1 Leachate Sampling**

Leachate samples will be collected twice a year from the RCSD No. 1 POTW by the RCSD and analyzed for USEPA Priority Pollutants, excluding Dioxin. Leachate sampling will alternate between Wet Well 1 (WW-1) and Wet Well 2 (WW-2). Results of the leachate analyses will be provided to the Town of Ramapo. Analytical data will also be used to track the performance of the Landfill cover and leachate collection system and to identify trends with regard to achieving remedial action objectives.

Since 2002, leachate recovery data indicate that a significantly greater volume of leachate has been recovered from the east wet well (WW-2) as opposed to the west wet well (WW-1). In addition, data indicate that leachate recovery volumes decrease during the fall months.

### **4.3 Effectiveness Monitoring**

Effectiveness monitoring is defined in NYSDEC DER-10 as the periodic chemical and physical analysis of media of concern to determine and/or confirm if the remedial action objectives are being achieved when compared to data obtained from the investigation, implementation and previous monitoring of the remedy. Effectiveness monitoring activities applicable to the Ramapo Landfill property include groundwater and air quality monitoring. Groundwater and air quality monitoring was selected based on potential Contaminants of Concern (COC) releases to each of these media and subsequent migration from

the Landfill source material to the surrounding environment.

#### **4.3.1 Groundwater Monitoring**

NYSDEC DER-10 states the network of shallow and deep monitoring wells at the Landfill property should be adequately designed to assess upgradient, onsite, and downgradient conditions and vertical profiling in the vicinity of the remedy. The network of wells must provide an adequate and effective representation for groundwater samples, so that all areas of concern at the site are included. Specifically, NYSDEC DER-10 states that groundwater monitoring wells should have coverage of the following areas:

- At least one (1) area-of-concern monitoring well located at the source area(s), to monitor conditions at the source area;
- At least one (1) monitoring well located downgradient of the source area, but within the contaminant plume;
- At least one (1) plume fringe monitoring well located at the limit of the plume, defined as an area where contaminant concentrations are below applicable standards, criteria and guidelines (SCGs);
- At least one (1) downgradient sentinel well located beyond the zone of groundwater exceeding applicable SCGs. The sentinel well should be located, to the extent practical, no closer than three (3) years travel time of groundwater to the nearest potential downgradient receptor and no further than five (5) years travel time from the delineated downgradient extent of the contaminant plume;
- At least one (1) monitoring well at the centerline of the contaminant plume;
- At least one (1) monitoring well upgradient of the source area(s); and,
- At least one (1) monitoring well cross-gradient of the source area(s).

The current monitoring program for the Town Landfill consists of sampling the eight (8) "OS" monitoring wells [UP-OS, 1-OS, 2-OS, 4-OS, 7-OS, 8-OS, 9-OS, and 10-OS], one OS/I monitoring well [3-OS/I], three (3) downgradient "I" monitoring wells [8-I, 9-I, and 10-I] and three (3) downgradient "R" monitoring wells [8-R, 9-R, and 10-R]), private residence water supply wells PW-1 and PW-2, and Suez-NA (formerly United Water New York) municipal water supply wells (SVWC-93, 94, 95, and 96) on an annual basis, every 5<sup>th</sup> quarter for 6 NYCRR Part 360 Baseline parameters and site related Volatile Organic Compounds (VOCs) - 1,1-Dichloroethane, benzene, chlorobenzene, and vinyl chloride (see Figure 6 for locations). Samples are analyzed for parameters listed in Table 1.

A new monitoring well cluster (UP-OS, UP-I, and UP-R) was installed in late 2016 on Town-owned land to determine the natural upgradient groundwater condition.

#### **4.3.2 Groundwater Level and Depth to Bottom Measurements**

Static elevations in monitoring wells will be measured to determine groundwater flow direction. Depth to water is measured for monitoring wells UP-OS, UP-I, UP-R, 1-OS/I, 1-R, 2-OS, 2-R, 3-OS/I, 3-R, 4-OS, 4-R, 5-OS, 5-R, 6-I, 6-R, 7-OS, 7-I, 7-R, 8-OS, 8-I, 8-R, 9-OS, 9-I, and 9-R. Monitoring well locations are shown on Figure 6 and monitoring well top of casing elevations and previously measured depth to well bottoms are provided in Table 2.

Depth to groundwater from top of casing is obtained prior to collecting samples for the post-closure monitoring event using an electronic water level indicator. The indicator probe is gradually lowered into the well until the point at which the indicator light or audible alarm indicates the probe is in contact with water. The water level will then be obtained by measuring the depth from this point to the top of the well's inner casing or surveyed reference mark. The water level measurement will be to the nearest 0.01 foot. Total depth of the well will then be measured from the top of the well's inner casing or surveyed reference mark to the bottom of the well. The total well depth measurements will be to the nearest 0.01 foot.

#### **4.3.3 Monitoring Well Purging and Sampling**

Well purging will be conducted manually using dedicated polyethylene tubing and foot valves or submersible pumps. Low-stress groundwater sampling methods will be used in accordance with approved protocols (USEPA, March 16, 1998). Field measurements including pH, conductivity, temperature, dissolved oxygen and turbidity will be measured immediately before sampling. Turbidity must be less than 50 nephelometric turbidity units (NTUs) prior to collection of a sample for metals analysis. Wells exhibiting turbidity greater than 50 NTUs will be allowed to settle for up to a 24-hour period so that turbidity values can decrease. Once turbidity is less than 50 NTUs, or the well has settled for a period of 24 hours, the metals sample will be collected.

Groundwater samples will be transferred directly to the appropriate laboratory supplied sample container(s). Sample containers will be properly labeled at the time of sample collection and proper chain of custody procedures will be followed. Groundwater samples will be analyzed for specific parameters from 6 NYCRR Part 360-2.11(c)(6) "Baseline Water Quality Analysis Table" (1988 Regulations) (see Table 1).

##### **4.3.3.1 Revised Monitoring Program for Non-Operational Extraction Well Period**

In the event the groundwater extraction wells identified in Section 2.2.3 are non-operational for more than sixty (60) days, a revised monitoring program will be implemented:

- The initial revised monitoring program sampling event must be conducted within two (2) weeks of the date that corresponds with the 60<sup>th</sup> day of non-operation for the extraction wells.
- Downgradient monitoring wells I-OS, I-R, 2-OS, 2-R, 3-OS/I, 3-R, 9-OS, 9-I and 9-R, well cluster 10, and private water supply wells PW-1 and PW-2 will be sampled and analyzed for parameters listed in Table 1.
- If initial results indicated PW-1 and PW-2 water quality has reported concentrations that exceed the Part 5 Maximum Contaminant Levels (MCLs), an alternate water supply for the associated residents must be provided by the Town of Ramapo. In addition, the next revised monitoring program event must include the Spring Valley Water Company (SVWC) municipal water supply wells.
- The revised monitoring program must be conducted on a quarterly basis until the groundwater extraction wells are operational. One (1) additional monitoring event should be conducted within sixty (60) days of the operation restart date.

#### **4.3.4 Air Quality Monitoring**

Air quality monitoring consists of measuring explosive gas (Lower Explosive Limit, or LEL), Hydrogen Sulfide (H<sub>2</sub>S) and volatile organic compounds (VOCs) of the headspace of each monitoring well, inside the baler building, leachate manhole A-5, lift stations A-10 and W-20, and breathing space of the Landfill perimeter at 100 foot intervals. Air quality monitoring locations are shown on Figure 6. Measurements are collected in the field with applicable monitoring equipment (e.g. Q-RAE and mini-RAE 3000 units).

### **5.0 OPERATION AND MAINTENANCE PLAN**

The maintenance checklist for Town personnel to record maintenance dates and descriptions for Landfill components is provided in Appendix F.

#### **5.1 Landfill Cover**

The following operational and maintenance activities will be conducted for the Landfill cover:

##### **5.1.1 Landfill Cover Mowing and Routine Maintenance**

The Town of Ramapo Department of Public Works or a contracted landscaping firm will perform the following required routine maintenance:

- Mowing the final cover and grass-lined ditches and swales three (3) times a year (late spring, mid-summer, and late autumn).
- Fertilizer and lime will be applied to re-seeded areas resulting from erosion, washouts, etc. The level of fertilization and liming will be selected for the grass species, soil type, and setting.
- Clear swales, ditches, and downchutes of accumulated debris, concurrently with mowing. Failure to remove debris from the drainage features could result in scouring or breaching of the channel.

The Landfill cover will be mowed at a minimum frequency to enhance the use of the Landfill by wildlife and migratory and nesting birds. However, mowing must be conducted at a frequency that also prevents growth of deep rooted vegetation which could damage the geomembrane layer of the cover system. The mowing plan will be implemented to avoid rattlesnake take and promote a habitable environment for rattlesnakes and birds.

A copy of the Timber Rattlesnake Encounter Plan for the Landfill is provided as Appendix G. The plan gives background information regarding this species, and specific steps to take if it is encountered. Encounters and inadvertent "take" from mowing will be documented on the Timber Rattlesnake Encounter Form and reported to the NYSDEC Region 3 Wildlife Office. The forms will be kept on file and included with the annual PRR for the Landfill. If encounters and "take" are occurring, modification of the mowing plan will be evaluated.

##### **5.1.2 Mass Movements (Sloughing)**

Areas with visual evidence of mass movements or sloughing of the topsoil or cover soil material will be repaired by properly reconstructing the cover cross-section to pre-existing conditions by placing cover soil and topsoil on the damaged areas.

### **5.1.3 Cracks**

Corrective measures for damaged areas will depend on the size and depth of the crack. Small-scale shallow cracks in the topsoil can be repaired by minor regrading and reseeding the area. Larger cracks exceeding 1-inch in width and 3-inches in depth will require filling with similar soil prior to repairing the topsoil and reseeding.

### **5.1.4 Differential Subsidence (Settlement)**

Corrective measures to subsidence-damaged areas will depend on the size and depth of the settlement. Small areas of subsidence (i.e., less than 0.5 foot deep) may be regraded using topsoil. Areas of concern that have settled greater than 0.5 foot should be filled with barrier protection layer soil after removing existing topsoil within the subsided area. Topsoil should then be replaced from 0.5 foot below ground surface (bgs) to a grade level matching surrounding topography. The topsoil should then be seeded to re-establish grass cover over the repaired area.

### **5.1.5 Erosion and Deposition**

Corrective measures to erosion-damaged areas should be repaired by backfilling with barrier protection layer soil to within 0.5 foot below ground surface (bgs) and then adding topsoil to grade level. The topsoil should be seeded to re-establish grass cover over the repaired area. If erosion persists after repairs have been made, then alternate repair methods will be required. Placement of coarse rip-rap stone or erosion control geosynthetics in persistent gullies are two viable alternatives to limit future erosion. An action plan detailing the corrective measures to be taken to rectify the erosion problem will be developed and submitted to the NYSDEC and USEPA for approval, prior to implementation of the remedy.

Corrective measures for areas with significant sediment deposition will depend on the size and thickness of the deposit. Since depositional events can be highly variable in extent and location, each depositional problem will be evaluated on a case-by-case basis. Reseeding or relining of the drainage channels may be necessary to keep the ditches functioning as required. An action plan detailing the corrective measures to be taken to rectify the deposition problem will be developed and submitted to the NYSDEC and USEPA for approval, prior to implementation of the remedy.

### **5.1.6 Stressed Vegetation**

Topsoil samples should be collected for analysis within the area identified with stressed vegetation in an effort to develop a suitable remedy. Topsoil samples should be analyzed for pH, organic content (total organic carbon), and nutrient content. The soil within the impacted area should be reconditioned as appropriate, mulched and seeded. If the reconditioning remedy does not result in establishment of a suitable cover, then further evaluation of the cause will be necessary via additional soil sampling and analysis of selected COCs in the stressed vegetation area. The extent of sampling and analysis will be developed on a case-by-case basis that is proportionate to the nature and aerial extent of the impacted area. Upon completion of the evaluation, an alternative remedy will be proposed and submitted to the NYSDEC and USEPA for approval.

### **5.1.7 Undesirable Vegetation**

Undesirable vegetation with associated deep root systems should be removed from the Landfill cover.

Void spaces produced during extraction of root balls should be repaired by backfilling with barrier protection layer soil to within 0.5 foot bgs and then adding topsoil to grade level. The topsoil should then be seeded to re-establish grass cover over the repaired area.

#### **5.1.8 Geomembrane Liner Repair**

Repair of the defective area(s) of the geomembrane liner will first involve exposure, brooming, and washing. A patch will be cut from remnant geomembrane liner material used during the final cover construction or from newly purchased material manufactured using the same or similar resins.

All seams used in the repairing procedures will be created in accordance with the manufacturer's directions and will be subjected to the same non-destructive test procedures specified in the technical specifications for the original geomembrane liner construction.

The detailed following tasks must be performed for proper repair of the geomembrane liner:

- Strip topsoil and barrier protective soil surrounding the damaged area;
- Remove geosynthetic drainage system (if necessary);
- Remove damaged geomembrane liner and inspect underlying gas venting layer (remove damaged gas venting layer, if necessary);
- Backfill, grade, and compact subgrade, as necessary to form a uniform surface for placement of new geosynthetics;
- Place and seam geosynthetics underlying geomembrane liner as necessary;
- Place and weld geomembrane liner;
- Place and seam geosynthetic drainage system (if necessary);
- Perform all required quality assurance/quality control (QA/QC) testing, as outlined in the Manufacturer's Specifications, to provide certification that the final cover has been repaired adequately; and,
- Replace barrier protection soil, topsoil, and restore vegetative cover.

Cross-sections of the Landfill final cover are provided in Appendix K for reference.

#### **5.2 Gas Odors**

The source of gas odors noted during a site inspection that are not attributable to open or malfunctioning valves will require further investigation using a landfill gas monitoring meter capable of detecting percentages of methane (Lower Explosive Limit), carbon dioxide, oxygen, and hydrogen sulfide. The source and cause of the odors should then be isolated and mitigated, as deemed appropriate on a case-by-case basis. An action plan detailing the corrective measures to be taken to rectify the gas odor problem will be developed and submitted to the NYSDEC and USEPA for approval, prior to implementation of the remedy.

### **5.3 Access Roads**

The access roads on the Landfill are constructed of stone and will require on-going regrading and maintenance to limit erosion, deposition, settling, pothole development, and other adverse conditions that impede vehicular traffic.

#### **5.3.1 Snow Plowing**

Snow plowing is coordinated by the Town of Ramapo. During the winter months, the access road leading to the pistol range, transfer facility and compositing facility will be plowed. The south lobe extraction wells require maintenance all year long; therefore, the Town of Ramapo plows the access road for the southern portion of the south lobe.

### **5.4 Gas Venting System**

The purpose of the Landfill gas venting system is to discharge Landfill gases passively in an environmentally-safe manner, using cost-effective design, and without damaging the effectiveness of the Landfill cover system. The passive gas venting system, consisting of a sub-surface gas venting layer and gas venting risers, was designed at the time of construction to comply with all applicable NYSDEC regulations. The gas venting risers require routine inspection and maintenance.

- Gas Venting Layer - The gas venting layer is located above the grading fill over the subgrade surface and just below the geomembrane. A geosynthetic venting net (geonet) provides the equivalent function as a soil layer is used, as defined by 6 NYCRR Part 360-2.13(p). A geotextile filter fabric, bonded to the geonet is used above and beneath the geonet.
- Gas Venting Risers - Gas venting risers are installed for the purpose of venting landfill gases to the atmosphere, and are spaced on an approximate 200-foot grid over the landfill cover (i.e., just over one gas vent per acre of landfill cover). The vents extend through the landfill cover at least 4 feet into the existing waste and project three (3) feet above the top surface of the landfill cover. The risers are constructed of 6-inch Schedule 80 diameter PVC pipe. The lower 4-foot portion of the risers (beneath the gas venting geonet) are slotted to allow migration of the gas into the gas risers. The geomembrane is attached to the gas venting riser using pre-fabricated boot seals to prevent channeling of surface water through the cap and gas emissions around the outside of the pipe.

Gas vents will be inspected for clogging of the opening by birds or insects. Also, verticality will be observed to determine if settlement has compromised the seal between the vent boot and the geomembrane, and if there is a seepage conduit formed around the vent for erosive sediment-carrying runoff. Gas vents and adjacent areas which require maintenance will be restored to the original design configuration, re-using the existing materials to the extent possible.

### **5.5 Leachate Collection System**

The leachate pumping system is no longer in service, but has not been removed. All leachate and groundwater collected by the groundwater extraction system flows via gravity to the RCSD #1 sewage pumping station on Torne Valley Road. The storage tank has been removed. A portion of the property was sold to RCSD #1 for the construction of the sewage pump station.

Maintenance and repairs will be performed when required so that proper function is not interrupted. Maintenance may include manual labor to remove sediment or possibly sewer snaking mechanical methods. Chronic problems such as large sediment accumulations may be indicative of a pipe breach, so video camera equipment may be deployed in such instance to verify. Necessary repairs including pipe replacement will be considered as applicable. Temporary portable pumps may also be considered. Gravity mains will be cleaned out when necessary and repaired/replaced if warranted. Details of the extraction well and lift station construction are provided in Figure 7.

#### **5.5.1 Pump Maintenance**

All routine pump maintenance will be performed in accordance with the requirements of the manufacturer's Operation and Maintenance (O&M) manuals maintained by the Town. The manufacturer's preventative maintenance recommendations will be followed for all routine equipment maintenance.

#### **5.5.2 Leachate Collector Cleaning**

The leachate collector components covered by this section include the manholes and leachate collection pipes, located on both sides of Torne Valley Road. Manholes serve as cleanouts to all reaches of the network of collection piping. Inspection of each manhole will include, at a minimum, removing the covers and using artificial light if necessary, inspecting all characteristics and components in the manholes. Gravity mains will also be inspected for proper function. The condition of the manholes themselves will be noted, including any cracks, leaks, or misalignment. Pipe entrances and exits to manholes will be inspected for sediment build-up and tight seals. If necessary, the inspectors with confined space entry certification will enter the manholes for best viewpoint. Pipes will be inspected with video camera equipment if deemed necessary.

Maintenance and repairs will be performed when required so that proper function is not interrupted. Maintenance may include manual labor to remove sediment or possibly sewer snaking mechanical methods. Chronic problems such as large sediment accumulations may be indicative of a pipe breach, so video camera equipment may be deployed in such instance to verify. Necessary repairs including pipe replacement will be considered as applicable. Temporary portable pumps may also be considered. Gravity mains will be cleaned out when necessary and repaired/replaced if warranted.

In the event of visual evidence of damage to the leachate collection system (e.g. piping, manholes or pumps) the nature and extent of the damage should be recorded to determine a cause. Areas of concern will be repaired by properly reconstructing the damaged section item in accordance with the Operation and Maintenance (O&M) Manual maintained by the Town. An action plan detailing the corrective measures to rectify the damage will be developed and submitted to the NYSDEC and USEPA for approval, prior to implementation of the remedy.

#### **5.6 Erosion Control Structures**

All erosion control structures, such as Landfill swales and downchutes, perimeter channels, plunge pools and outlets to both Torne Brook and to wetlands, are included in the maintenance work. The location of the erosion control structures are presented in Figure 4. Every linear foot of each structure will be visually inspected for irregularities such as displaced stones, eroded material, sediment build-up, and settlement which prevent effective drainage. Periodic removal of debris and sediment may be required. Sediment

build-up may require complete replacement of affected materials if a simple sediment removal process is too costly or impractical. Problems, particularly repeat events, will be investigated to determine if pre-emptive measures such as placement of larger stone or energy dissipation structures should be considered.

## **5.7 Stone Drainage Aprons**

The Landfill cover perimeter and drainage swales are constructed with stone-filled apron outlets which release any infiltration above the geomembrane to surface drainage structures. Proper maintenance of this outlet is critical to preventing infiltration from backing up into the cover system and creating seepage instability. The outlets will be kept free of debris and sediment. Evidence of improper drainage would be soft, saturated cover areas, potentially with shallow surficial sloughing of soil above the synthetics. Any such areas will be closely monitored and documented for widespread developments of similar conditions. A soft area may be indicative of clogging of drainage composites further down the slope, clogging of the apron stone, or just poor initial construction/compaction. A problem area may require replacement of the underlying drainage composite, the stone apron itself, or the geotextile material lining the upslope edge of the apron.

## **5.8 Groundwater Monitoring Wells**

If a monitoring well is excessively silted based on the criteria presented in Section 4.1.4, it will be redeveloped to remove as much silt as possible. Redevelopment of the well will be conducted after all required samples have been collected for the monitoring period. The monitoring wells will be developed by surging and pumping or other sufficient means. The monitoring wells will be developed until a turbidity of 50 nephelometric turbidity units (NTUs) is achieved or until field parameters, such as pH, specific conductance, turbidity and temperature are stabilized. Water removed during well development will be discharged to the ground surface in the well area.

If a monitoring well or piezometer has been damaged and deemed repairable, an action plan detailing the corrective measures to be taken to rectify the problem will be developed and submitted to the NYSDEC and USEPA for approval, prior to implementation of the remedy. Surface freeze and thaw cycles or impacts from vehicles may damage steel standpipes and associated concrete pads (wellheads) and these may require repair or replacement. Repairs/replacements will be limited to surficial features of the well, since subsurface damage to monitoring wells and piezometers (i.e., cracking of casing or screen) require well replacement.

Damaged wellheads will be replaced with similar materials consisting of an appropriately-sized standpipe set in a concrete seal formed 2 feet in diameter extending to a depth of approximately 1 feet bgs. The outer edge of the concrete pad will be flush with the ground. An internal grout collar will be placed in the annular space between the inner casing and the outer protective casing. Universal locks will be used to secure the outer lids of the protective casings of the monitoring wells.

## **5.9 Wetlands**

The primary method for wetlands inspection and maintenance is visual observation and subsequent plantings replacement when required.

The rip-rap ditch connecting the two wetlands, north and east of the leachate storage tank and the rip-rap outlet ditch at the southeast area of the south wetlands should be inspected, as required, and kept free of all debris and sediment.

## **5.10 Other Problems**

Significant problems other than those discussed in this section require an event-specific solution. A qualified civil/environmental engineer or his/her representative must:

- Determine the nature and extent of the problem;
- Identify the cause of the problem; and,
- Determine the required actions to repair the problem.

This process should begin immediately upon discovery of the problem. The NYSDEC and USEPA will be notified of the nature and extent of the problem.

## **6.0 REPORT PREPARATION**

### **6.1 Annual Periodic Review Report**

The Periodic Review Report (PRR) will provide a summary of groundwater and air quality monitoring results and will identify reported exceedances of standards and contaminant concentration trends that may be related to seasonal variations or performance of the engineering controls. The PRR report will also include groundwater elevations and flow direction figures for the overburden and bedrock aquifers underlying the Landfill based on depth to water measurements for each annual event. Groundwater sampling results will be submitted electronically to the NYSDEC EQuIS database (Appendix H).

Annual inspection results for the following Landfill components will also be included in the PRR:

- Leachate collection system condition and operation
- Leachate analytical results from bi-annual sampling events at RCSD No. 1 POTW
- Leachate flow rates from leachate collection system
- Groundwater extraction well flow rates and periods of operation
- Landfill cover system condition
- Condition of monitoring wells
- Institutional Controls (ICs) and Engineering Controls (ECs) evaluation form and certification statements in accordance with 6 NYCRR Part 375-1.8(h)(3).
- Condition of surface water drainage swales
- Condition of gas vents
- Wildlife resources monitoring survey

Certification of Institutional and Engineering Controls will be included in the PRR. Following the last

inspection of the reporting period, a Professional Engineer (PE) licensed to practice in New York State will prepare, and include in the PRR, the following certification as per the requirements of NYSDEC DER-10:

“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;
- Use of the site is compliant with the environmental easement;
- The engineering control systems are performing as designed and are effective;
- This report and all attachments were prepared under my direction, and have been reviewed by me;
- 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), P.E., of (business address), am certifying as (Owner/Remedial Party or Owner/Remedial Party’s Designated Site Representative)”.

## **6.2 Groundwater Contamination Model**

NYSDEC DER-10 requires trend monitoring be conducted at a site once there is a sufficient data to develop an understanding of the effectiveness of the remedy in addressing the exposures presented at the site and to identify trends with regard to achievement of remedial objectives.

Groundwater data is available from 1999 to present. Historical data for parameters with reported concentrations that exceed the applicable water quality standards are provided in each Periodic Review Report. A summary of well locations with parameters that have reported concentrations above the applicable groundwater standard are presented in Figure 8. Concentrations versus time for sample locations are plotted for the Annual PCM Report and include trend analysis.

## **7.0 CONTINGENCY PLAN FOR AN ALTERNATE WATER SUPPLY**

Water quality monitoring as prescribed in 6 NYCRR Part 360 is currently being performed at drinking water supply wells PW-1, PW-2, SVWC-93, SVWC-95 and SVWC-96 (SVWC-94 was out of service between 2009 and 2015).

Historical water quality data for water supply wells PW-1, PW-2, SVWC-93, SVWC-94, SVWC-95 and SVWC-96 indicate the following parameter concentrations are reported over time at concentrations that exceed the applicable groundwater standard:

Parameter	Location	Exceedance Date
Antimony	PW-2	3/2002, 4/2003
Antimony	SVWC-93	3/2002, 7/2002, 10/2002
Antimony	SVWC-94	3/2002, 10/2002
Thallium	PW-1	4/2003
Thallium	PW-2	9/2006
Thallium	SVWC-93	3/2002, 9/2006
Thallium	SVWC-96	6/1999
Iron	PW-1	7/2001
Iron	SVWC-93	10/2002
Iron	SVWC-96	5/2010
Sodium	All SVWC Wells	6/1999 - 5/2010

If groundwater monitoring data indicate that drinking water standards are consistently being contravened, then an alternate water supply may be deemed necessary.

If drinking water standards are significantly exceeded for site-related parameters in residential wells or in same-aquifer monitoring wells indicating that residential wells may be affected, and detected concentrations are confirmed by subsequent sampling, then residents will immediately be provided with bottled water and/or an acceptable point-of-use treatment system as an interim measure until an alternate water supply is constructed. This procedure is a contingency plan, developed for implementation of an alternate water supply. The plan includes the Preliminary Design Requirements as suggested by the NYSDEC in their Responsiveness Summary.

Two options are identified for extending existing municipal water lines to affected water users as discussed below:

1. An 8-inch diameter municipal water line from the Village of Hillburn terminates approximately 500 feet from Route 59 along Torne Valley Road. Water will be supplied to PW-1 and PW-2 by extending the municipal water line by approximately two (2) miles along Torne Brook Road.
2. The Pothat Water Co., currently owned by Suez-NA, provides water to individuals on Lake Street. The Pothat waterline could be extended to PW-1 and PW-2. The distance from the easternmost extent of the Pothat waterline to PW-1 and PW-2 is approximately 1,500 feet.

During the remediation of the Town of Ramapo Landfill, a 16-inch diameter ductile iron waterline was installed along the east side of Torne Valley Road, from Route 59 to the new Rockland County Recycling/Composting Facility located at the north end of Torne Valley Road and to the Baler Building,

located at the south end of Baler Boulevard, just northeast of the Landfill cap. The waterline was constructed by T&T Commonwealth, under separate contract by Rockland County, during January/February 1996.

A 16-inch x 16-inch x 6-inch diameter ductile iron tee was installed in the waterline east of Torne Valley Road at Torne Brook Road. A 6-inch diameter branch was installed beneath Torne Valley Road terminating at a 6-inch diameter gate valve installed in a precast concrete box on the west side of Torne Valley Road, north of Torne Brook Road.

In order to supply water to PW-1 at Torne Brook Farm and to PW-2, a 6-inch diameter waterline could be constructed as shown on Figure 9. The location of the waterline is selected to minimize construction in currently undisturbed areas, meaning that crossing through archaeologically sensitive areas will be minimized. From the connection point, the waterline could run along the north side of Torne Brook Road to Torne Valley Farm (PW-1), located on the south side of the road, and continue along the north side of Torne Brook Road to the residence served by PW-2.

The minimum depth of installation would be the frost depth of 42 inches to top of pipe, which is used by the Town of Ramapo for waterlines. Regulations pertaining to minimum separations between potable waterlines and sewer lines will be incorporated, as well. Strict avoidance of all archaeologically sensitive areas may not be possible so a Stage IB Cultural Resource Survey may be required. Final location and design of the alternate waterline would be dependent upon the results of that survey. Since construction of a waterline is a contingent item, dependent on future monitoring results, and since the feasibility of connecting to the Pothat Water Co. waterlines to the affected water users is not yet fully explored, it is proposed that the Stage IB Cultural Resource Survey be performed at the time it is evident that such a waterline is necessary. Bottled water and/or an acceptable point-of-use treatment system, which are readily implementable technologies, is suggested as an interim measure until a waterline could be investigated, designed and constructed.

## **8.0 QUALITY ASSURANCE PROJECT PLAN (QAPP)**

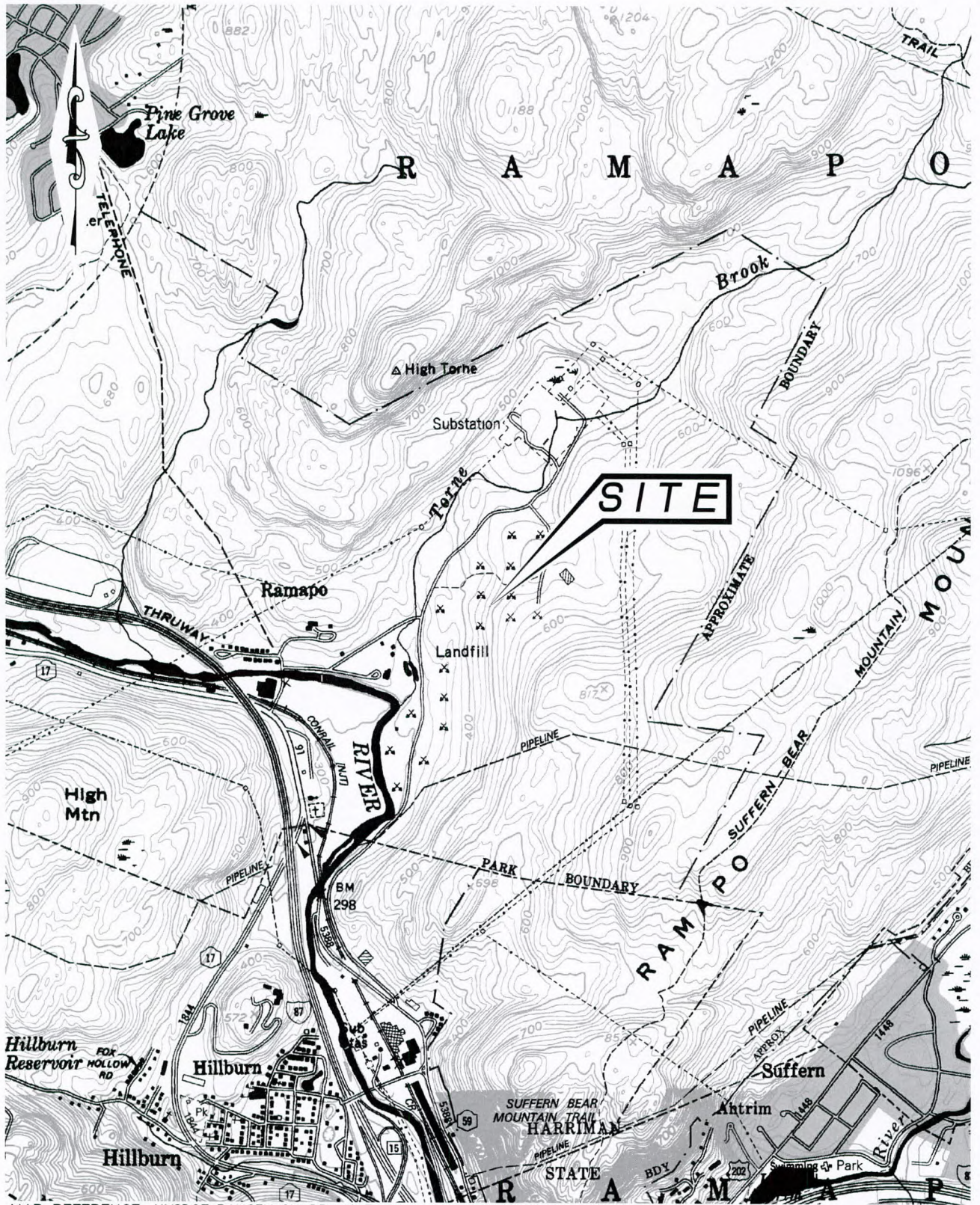
The purpose of the Quality Assurance Project Plan (QAPP) is to develop and describe detailed sample collection and analytical procedures that ensure high quality, valid data to evaluate the implemented remedies and whether the remedial action objectives for the site are being achieved. All data deliverables, the development of Data Usability Summary Reports (DUSRs), and electronic data deliverable (EDD) requirements will be performed according to guidance established in NYSDEC's EDD Manual, dated April 2013 (Appendix H). The QAPP for this site is included as Appendix L.

## **9.0 HEALTH AND SAFETY PLAN**

The Site Specific Health and Safety Plan (HASP) developed for the Town of Ramapo Landfill is provided in Appendix I.

S:\Sterling\Projects\2000 Projects\Town of Ramapo - 20010\Reports\SMP\_2017\Site Management Plan\_042817.docx

## FIGURES



# STERLING

Sterling Environmental Engineering, P.C.

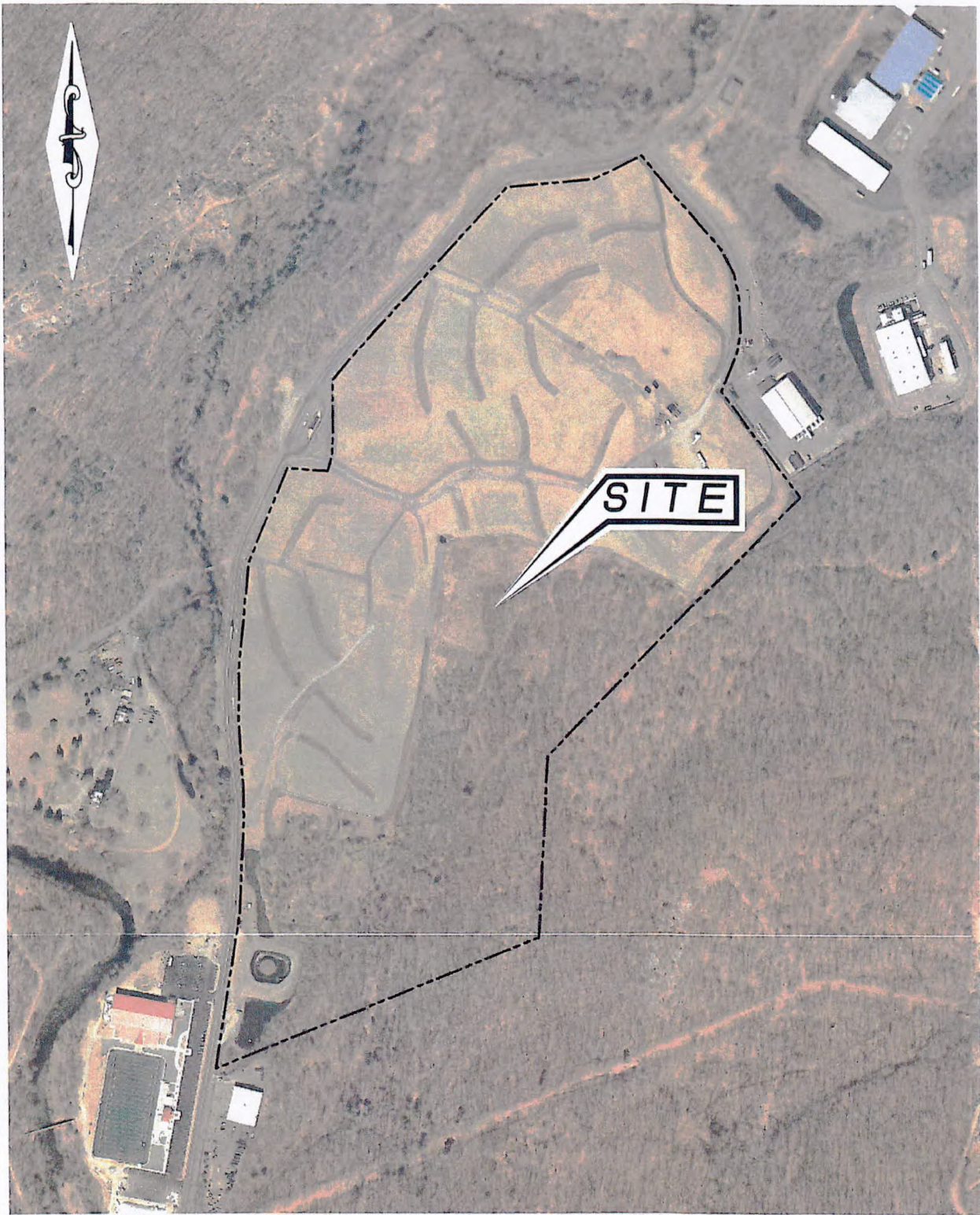
24 Wade Road • Latham, New York 12110

SITE LOCATION MAP  
TOWN OF RAMAPO  
LANDFILL

TOWN OF RAMAPO

ROCKLAND CO., N.Y.

PROJ. No.: 20010 | DATE: 6-14-11 | SCALE: 1" = 2000' | DWG. NO. 20010001 | FIGURE 1



MAP REFERENCE: NEW YORK STATEWIDE DIGITAL ORTHOIMAGERY PROGRAM, PHOTOGRAPHY CIRCA 2007.

# STERLING

Sterling Environmental Engineering, P.C.

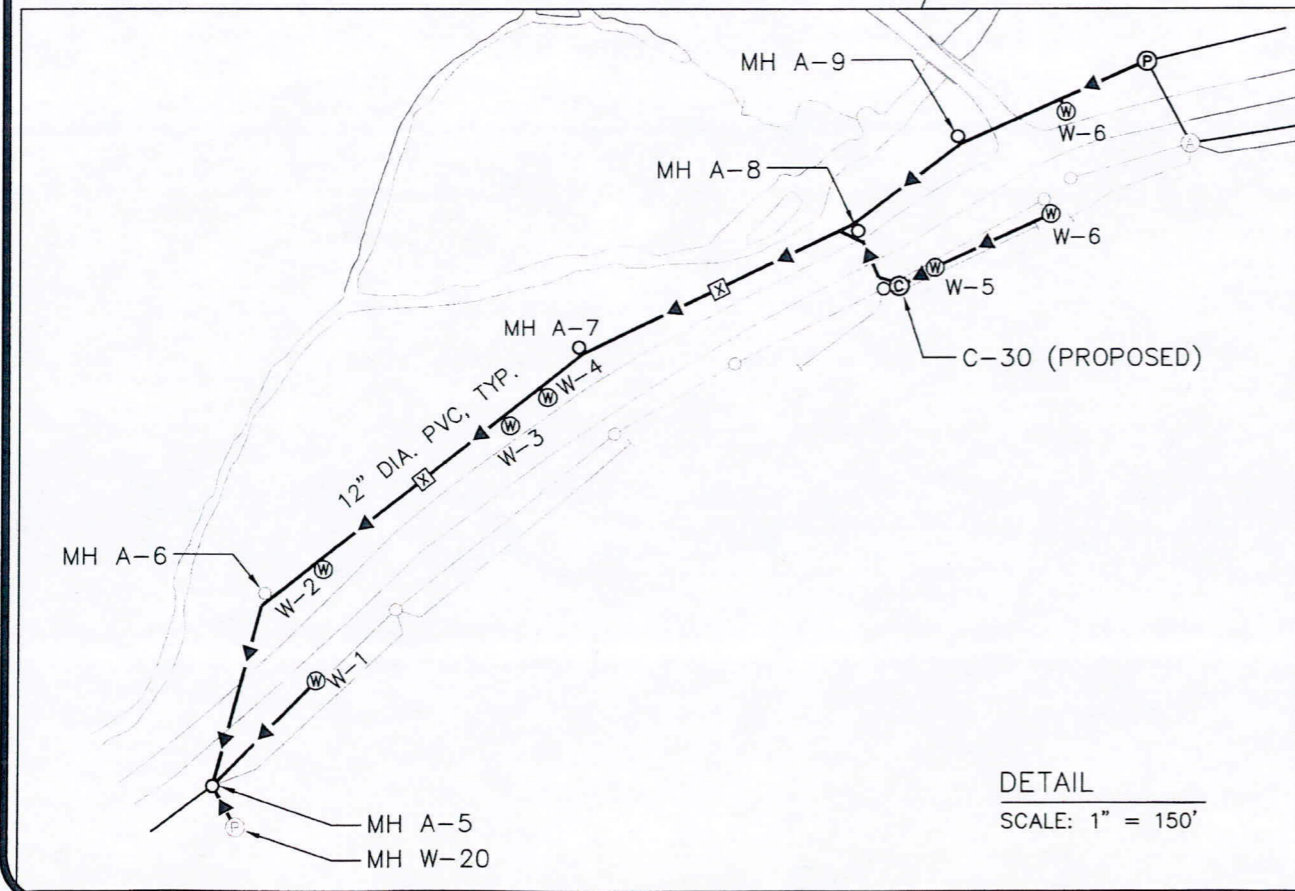
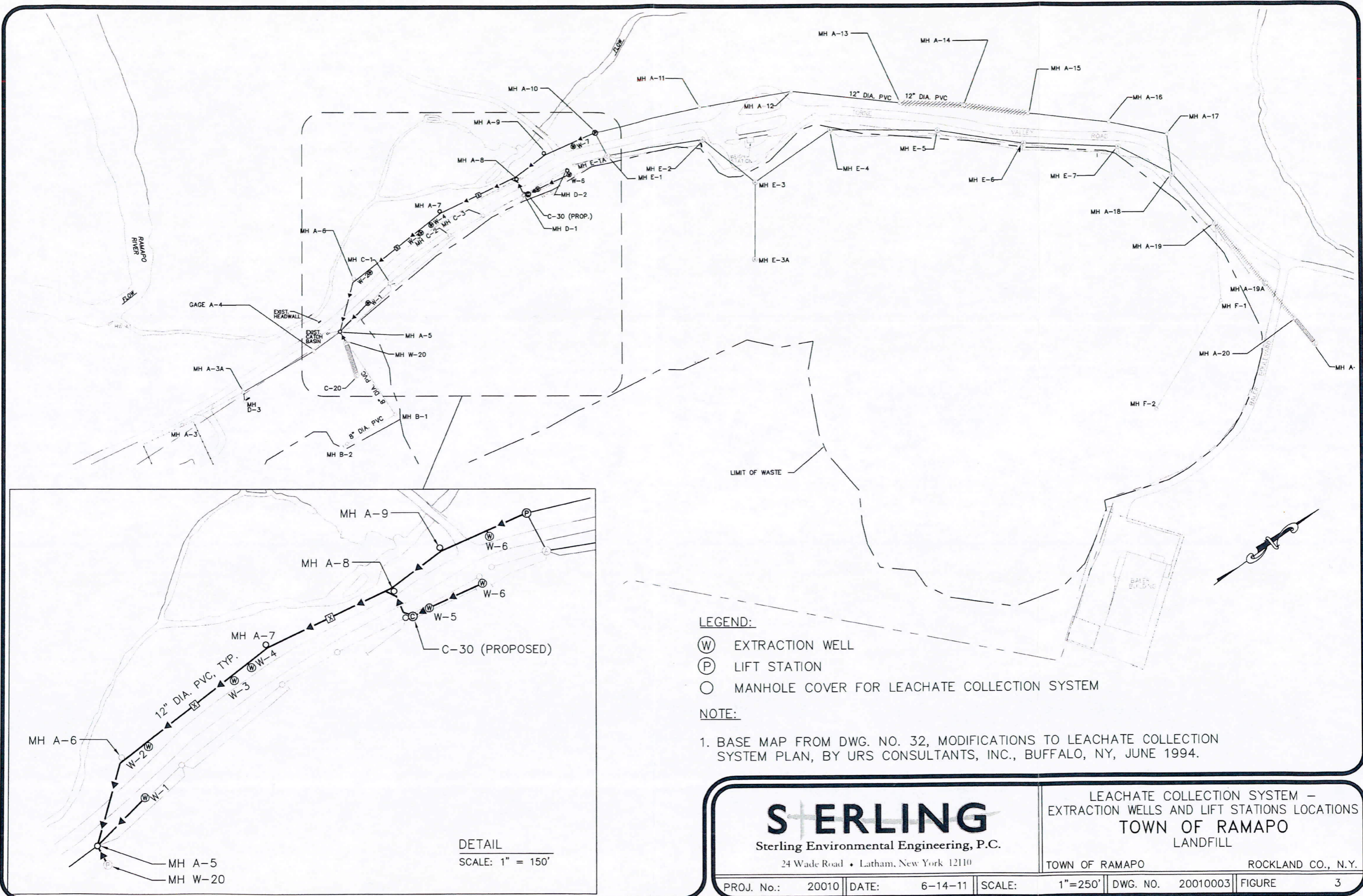
24 Wade Road • Latham, New York 12110

AERIAL PHOTOGRAPH  
TOWN OF RAMAPO  
LANDFILL

TOWN OF RAMAPO

ROCKLAND CO., N.Y.

PROJ. No.: 20010	DATE: 6-14-11	SCALE: 1" = 500'	DWG. NO. 20010002	FIGURE 2
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**LEGEND:**

- (W) EXTRACTION WELL
- (P) LIFT STATION
- (O) MANHOLE COVER FOR LEACHATE COLLECTION SYSTEM

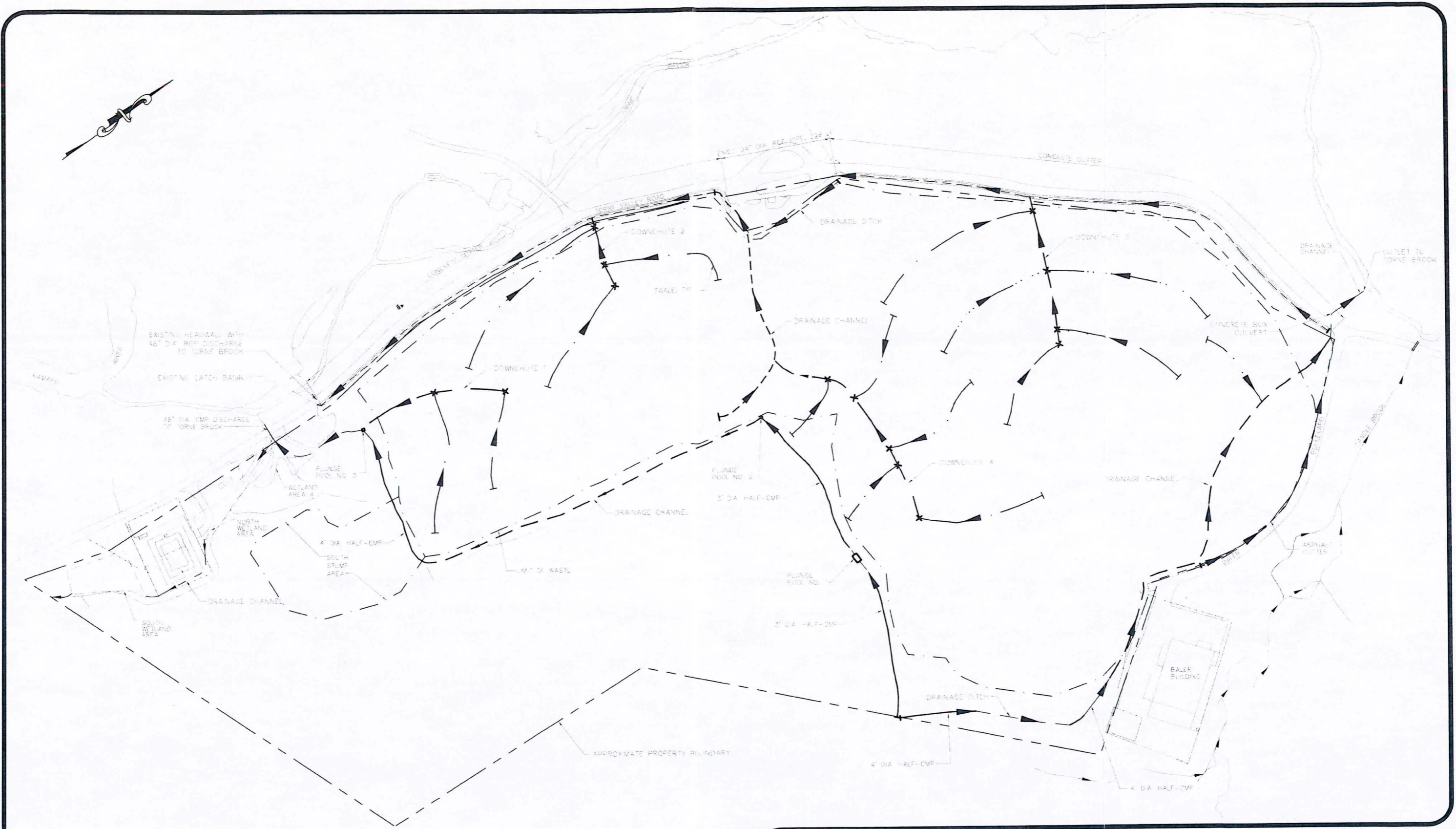
**NOTE:**

1. BASE MAP FROM DWG. NO. 32, MODIFICATIONS TO LEACHATE COLLECTION SYSTEM PLAN, BY URS CONSULTANTS, INC., BUFFALO, NY, JUNE 1994.

**STERLING**  
Sterling Environmental Engineering, P.C.  
24 Wade Road • Latham, New York 12110

LEACHATE COLLECTION SYSTEM –  
EXTRACTION WELLS AND LIFT STATIONS LOCATIONS  
**TOWN OF RAMAPO**  
LANDFILL

PROJ. No.: 20010	DATE: 6-14-11	SCALE: 1"=250'	DWG. NO. 20010003	FIGURE 3
TOWN OF RAMAPO			ROCKLAND CO., N.Y.	



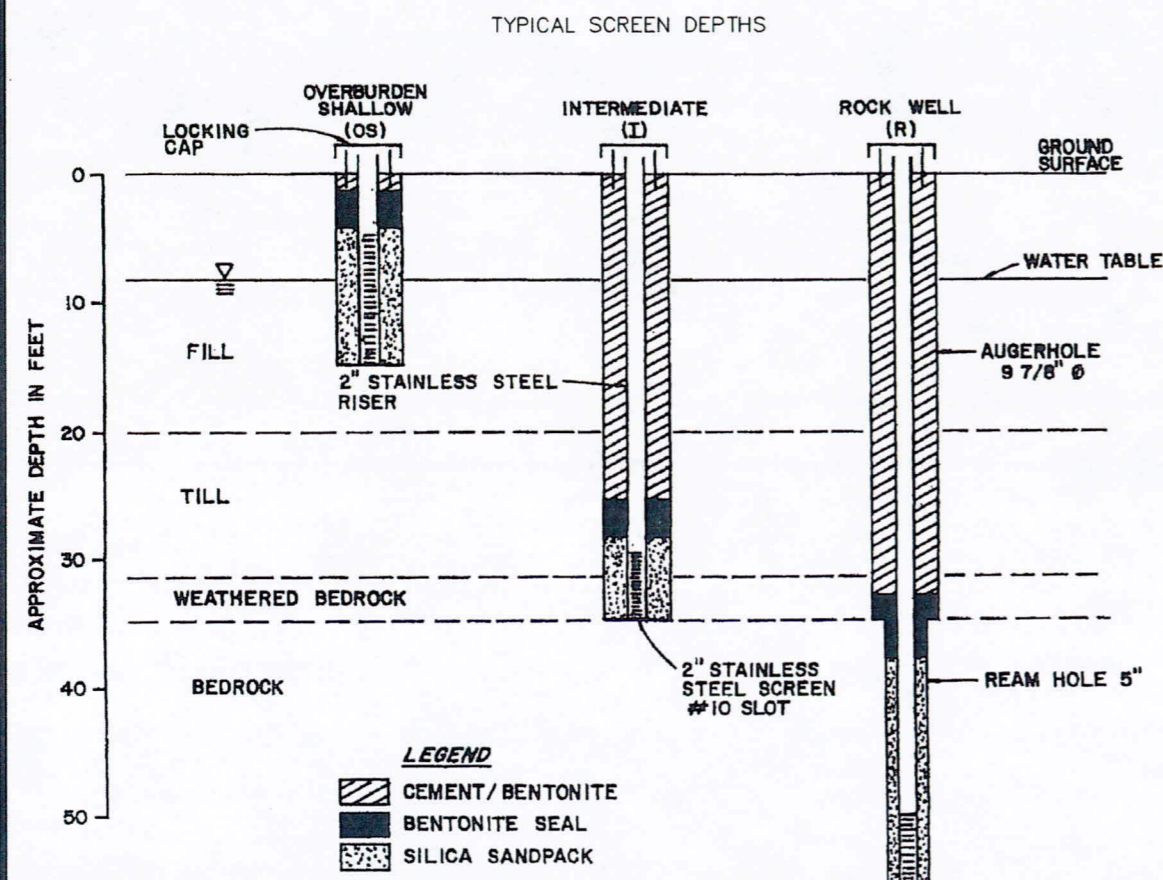
**NOTES:**

1. BASE MAP FROM DWG. NO. 31, SURFACE DRAINAGE PLAN, BY URS CONSULTANTS, INC., BUFFALO, NY, JUNE 1994.
2. INFORMATION SHOWN FOR EXISTING PIPE SIZES ARE AS PROVIDED B A.R. SPARACO, JR., P.L.S., POMONA, NEW YORK

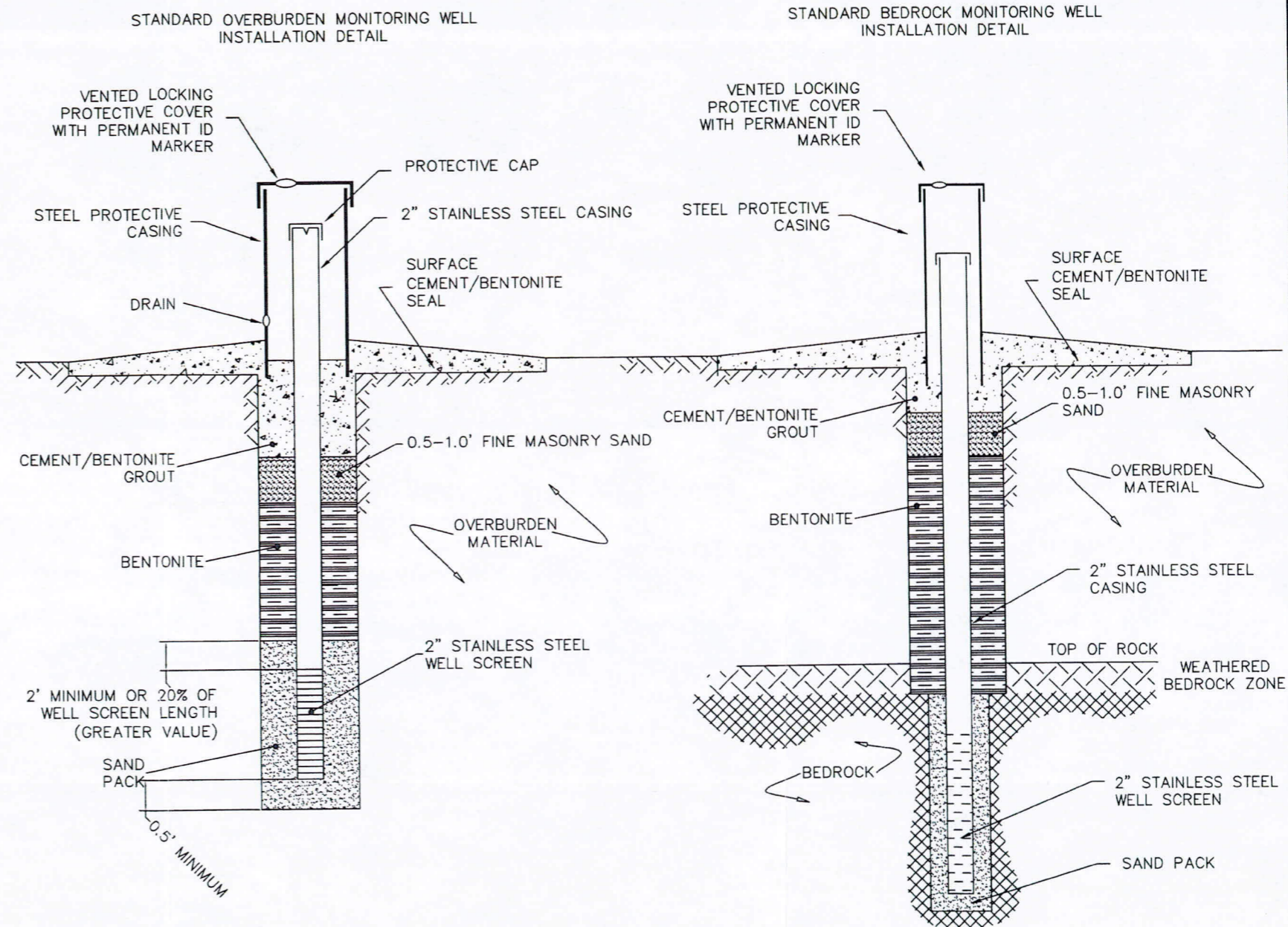
**S+ERLING**  
 Sterling Environmental Engineering, P.C.  
 24 Wade Road • Latham, New York 12110

**SURFACE WATER DRAINAGE AND  
 EROSION CONTROL FEATURES  
 TOWN OF RAMAPO  
 LANDFILL**

TOWN OF RAMAPO		ROCKLAND CO., N.Y.	
PROJ. No.:	20010	DATE:	6-14-11
SCALE:	1" = 250'	DWG. NO.	20010004
FIGURE		4	



DRAWING REFERENCE: FROM FIG. A2-3, TOWN OF RAMAPO LANDFILL RI/FS WORK PLAN, QUALITY ASSURANCE PROJECT PLAN AND FIELD SAMPLING PLAN BY URS CONSULTANTS, DATED AUGUST 1989.



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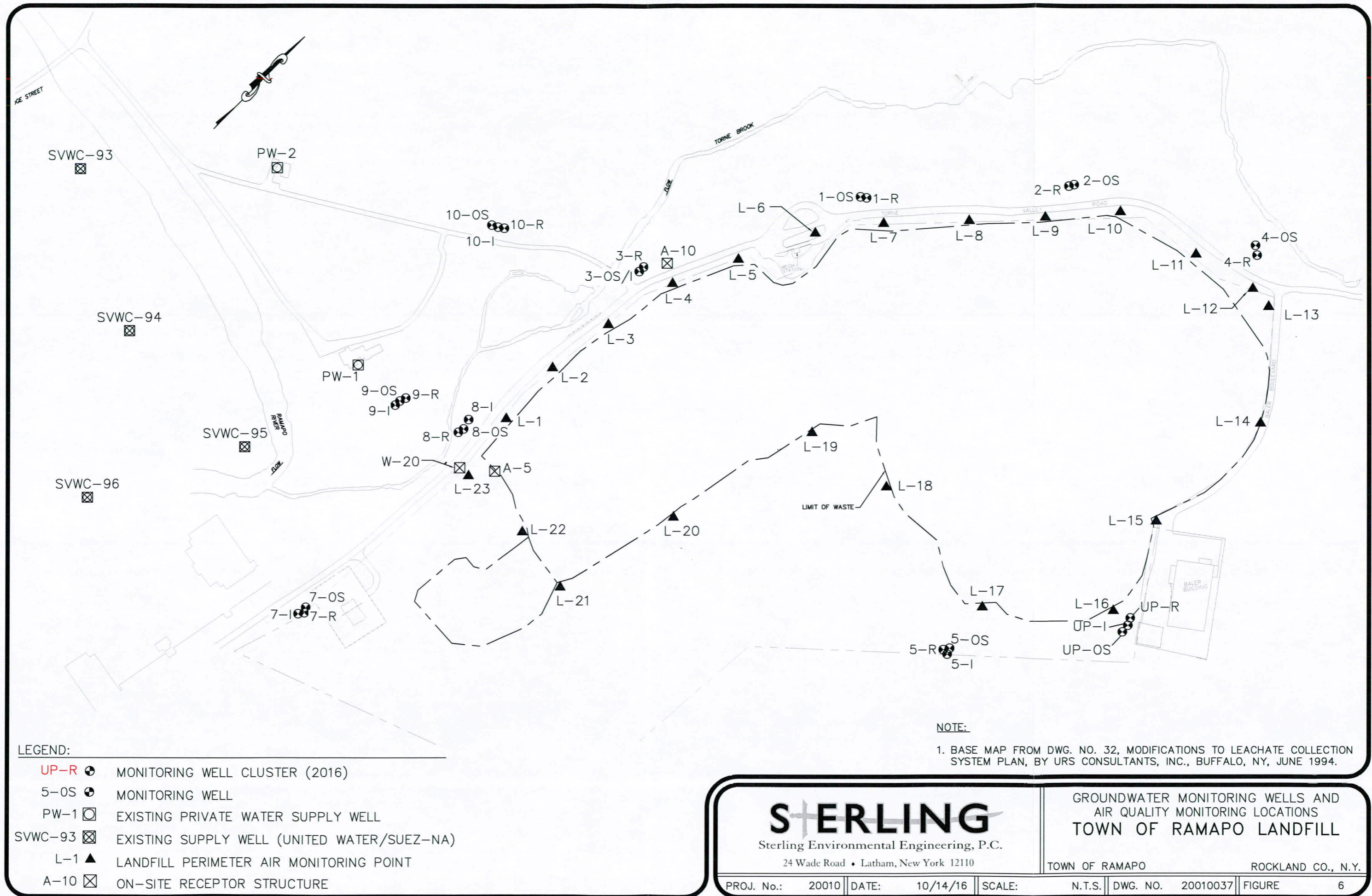
MONITORING WELL CONSTRUCTION DETAIL  
TOWN OF RAMAPO  
LANDFILL

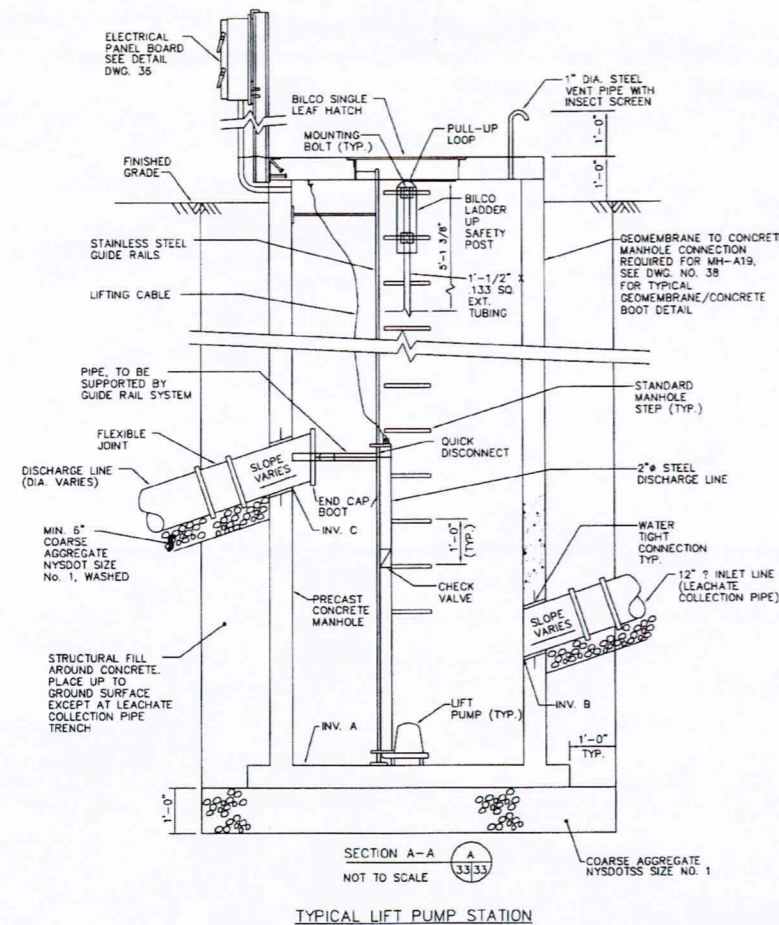
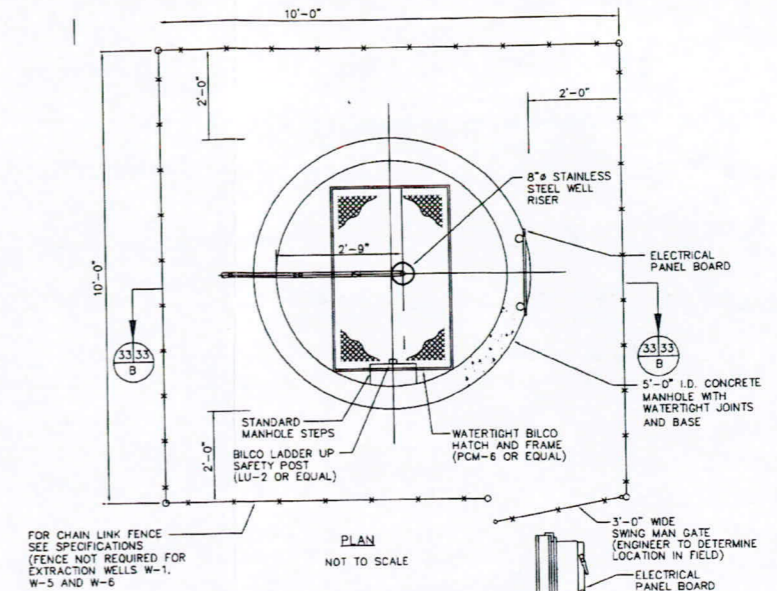
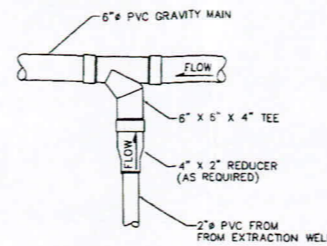
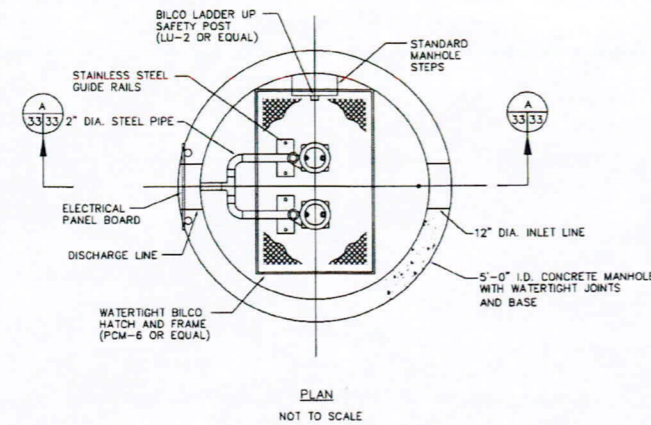
TOWN OF RAMAPO

ROCKLAND CO., N.Y.

PROJ. No.: 20010 | DATE: 6-14-11 | SCALE: N.T.S. | DWG. NO. 20010005 | FIGURE 5

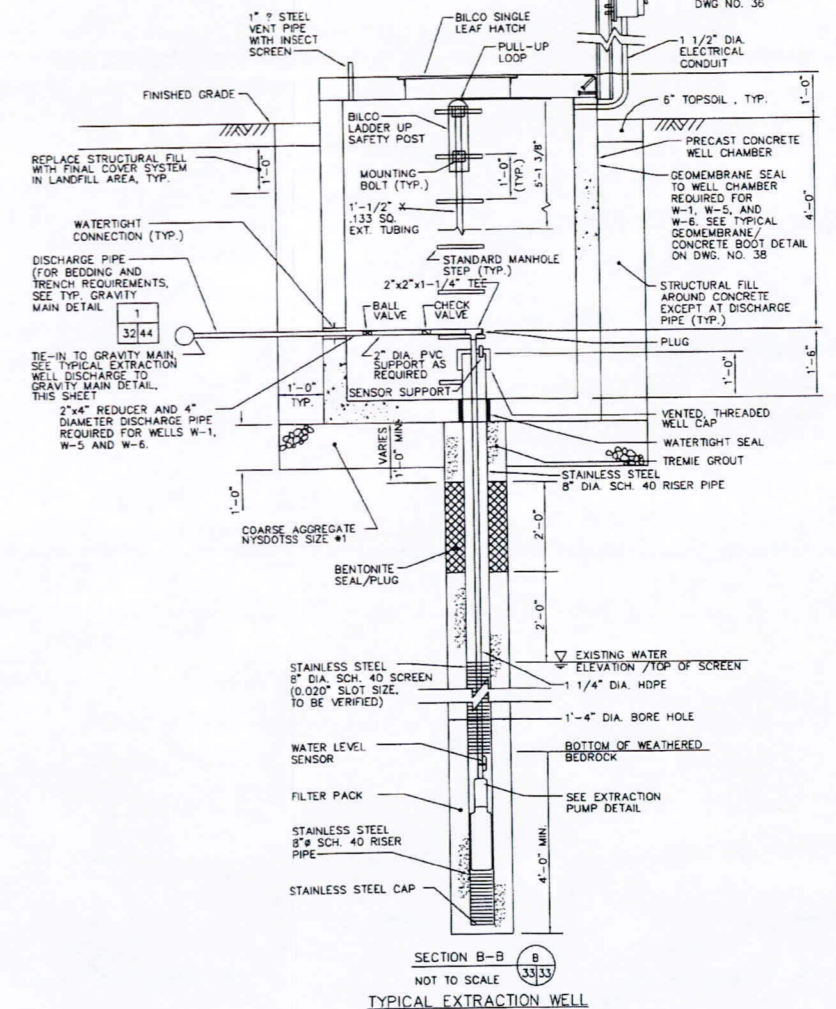
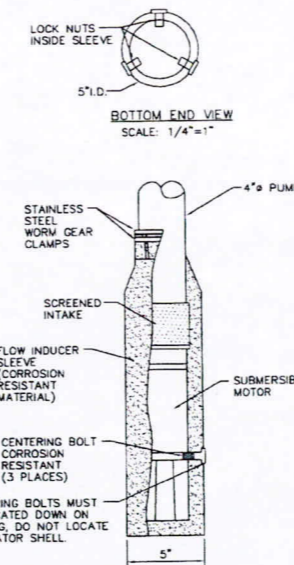
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EXTRACTION WELL SCHEDULE					
EXTRACTION WELL NO.	ELEVATION OF BOTTOM OF WELL (FEET)	LIFT PUMP DESIGNATION	PUMP OFF ELEVATION (FEET)	PUMP ON ELEVATION (FEET)	APPROX. WATER ELEVATION JAN. '93 (FEET)
W-1	274.5	P-1	293.0	298.0	306.0
W-2	270.2	P-2	293.0	298.0	309.0
W-3	285.5	P-3	293.5	298.5	315.0
W-4	291.0	P-4	299.0	304.0	317.0
W-5	328.5	P-5	332.5	334.5	336.5
W-6	330.0	P-6	334.0	336.0	338.0
W-7	324.5	P-7	328.5	330.5	333.0

LIFT PUMP STATION SCHEDULE			
PUMP STATION FEATURE	LIFT STATION MH-A19	LIFT STATION MH-A10	LIFT STATION W-20 (SOUTHERN EXT.)
INV. A	417.00	333.18	302.50
INV. B	418.50	334.68	304.00
INV. C	428.67	342.30	313.00
LIFT PUMPS	LP-41, 42	LP-31, 32	LP-20, 21
BOTH PUMPS OFF	417.50	333.68	303.00
LEAD PUMP ON	418.50	334.68	304.00
LAG PUMP ON	419.00	335.18	304.50
ALARM	419.50	335.68	305.00
APPROX. WATER ELEV. (JAN. '93)	443.00	336.00	314.00
FINISHED GRADE ELEV.	452.17	347.13	318.5



#### NOTES:

1. BASE MAP FROM DWG. NO. 33, LEACHATE/GROUNDWATER WITHDRAWAL WELL & GRAVITY MAIN DETAILS, BY URS CONSULTANTS, INC., BUFFALO, NY, JUNE 1994.

# STERLING

Sterling Environmental Engineering, P.C.

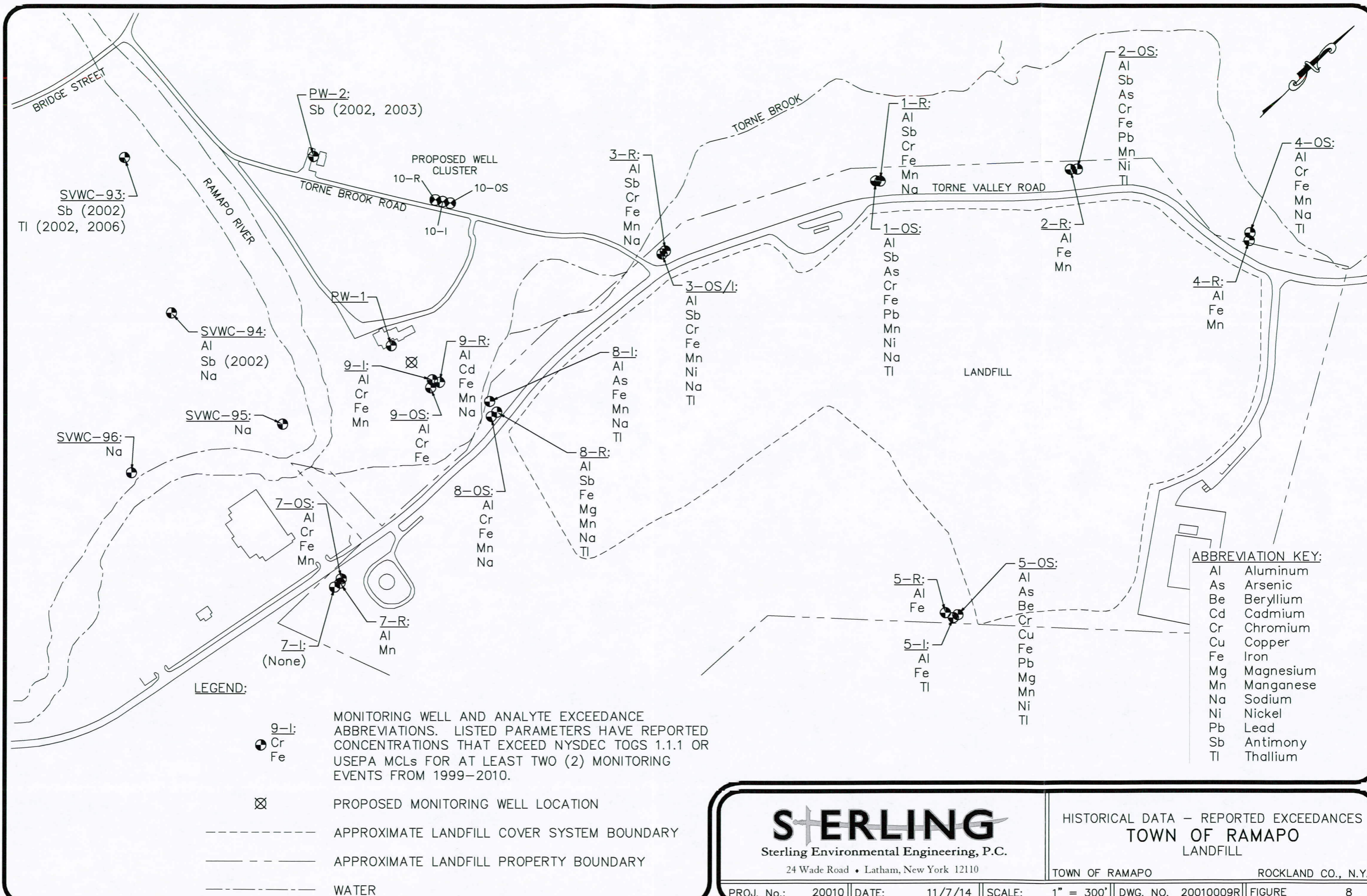
24 Wade Road • Latham, New York 12110

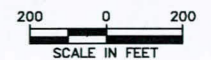
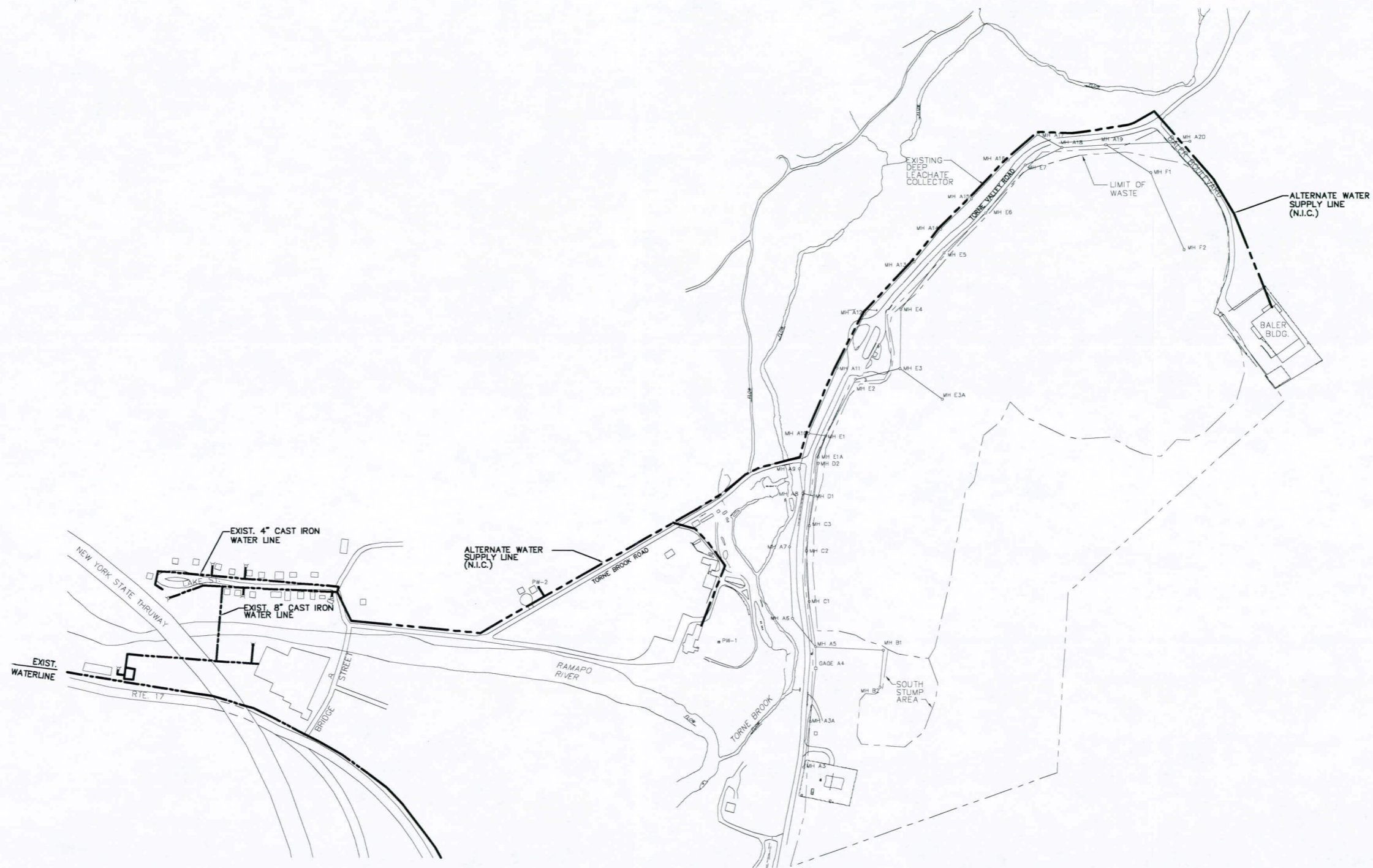
EXTRACTION WELLS  
AND GRAVITY MAIN DETAILS  
TOWN OF RAMAPO  
LANDFILL

TOWN OF RAMAPO

ROCKLAND CO., N.Y.

PROJ. No.: 20010 | DATE: 6-14-11 | SCALE: N.T.S. | DWG. NO. 20010007 | FIGURE 7





**NOTE:**

1. BASE MAP FROM DWG. NO. 12, ALTERNATE WATER SUPPLY PLAN, BY URS CONSULTANTS, INC., BUFFALO, NY, JUNE 1994.

**STERLING**

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ALTERNATE WATER SUPPLY PLAN  
TOWN OF RAMAPO  
LANDFILL

TOWN OF RAMAPO

ROCKLAND CO., N.Y.

PROJ. No.: 20010	DATE: 11/7/14	SCALE: 1" = 500'	DWG. NO. 20010010R	FIGURE 9
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## TABLES

**TABLE 1**  
**TOWN OF RAMAPO LANDFILL**  
**ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY**  
**FOR GROUNDWATER SAMPLES**

Groundwater Wells (1)		Method	Preservative	Sample Volume (ml)	Container Type	Minimum Reporting Limit (ug/L) (3)	Sample Holding Time
# of Samples	Parameter						
18	Specific Conductance	120.1	---	---	---	---	---
18	Temperature	170.1	---	---	---	---	---
27 (2)	Static Water Level	---	---	---	---	---	---
18	Floaters or Sinkers	---	---	---	---	---	---
18	pH	150.1	---	---	---	---	---
18	Eh	D1498	---	---	---	---	---
18	Field Observations	---	---	---	---	---	---
18	TKN	351.3	Sulfuric acid	250	Plastic	---	28 days
18	COD	410.1	Sulfuric acid	250	Plastic	---	28 days
18	Alkalinity	310.1	---	120	Plastic	---	14 days
18	1,1-Dichloroethane	601	HCL	3 x 40	Clear glass	5	14 days
18	Vinyl Chloride	601	HCL	3 x 40	Clear glass	2	14 days
18	Benzene	602	HCL	3 x 40	Clear glass	1	14 days
18	Chlorobenzene	602	HCL	3 x 40	Clear glass	5	14 days
18	Aluminum	200.7 or 200.8	Nitric acid	250	Plastic	50 to 200 (5)	None (Unfiltered)
18	Antimony	200.7 or 200.8	Nitric acid	250	Plastic	3	None (Unfiltered)
18	Arsenic	200.7 or 200.8	Nitric acid	250	Plastic	10	None (Unfiltered)
18	Barium	200.7 or 200.8	Nitric acid	250	Plastic	1,000	None (Unfiltered)
18	Beryllium	200.7 or 200.8	Nitric acid	250	Plastic	3	None (Unfiltered)
18	Cadmium	200.7 or 200.8	Nitric acid	250	Plastic	5	None (Unfiltered)
18	Calcium	200.7 or 200.8	Nitric acid	250	Plastic	---	None (Unfiltered)
18	Chromium (Total)	200.7 or 200.8	Nitric acid	250	Plastic	50	None (Unfiltered)
18	Chromium (Hexavalent)	200.7 or 200.8	---	250	Plastic	50	None (Unfiltered)
18	Cobalt	200.7 or 200.8	Nitric acid	250	Plastic	---	None (Unfiltered)
18	Copper	200.7 or 200.8	Nitric acid	250	Plastic	200	None (Unfiltered)
18	Iron	200.7 or 200.8	Nitric acid	250	Plastic	300 (5)	None (Unfiltered)
18	Lead	200.7 or 200.8	Nitric acid	250	Plastic	15 (6)	None (Unfiltered)
18	Manganese	200.7 or 200.8	Nitric acid	250	Plastic	35,000	None (Unfiltered)
18	Magnesium	200.7 or 200.8	Nitric acid	250	Plastic	50 (5)	None (Unfiltered)
18	Mercury	245.1 or 7472	Nitric acid	250	Plastic	0.7	None (Unfiltered)
18	Nickel	200.7 or 200.8	Nitric acid	250	Plastic	100	None (Unfiltered)
18	Potassium	200.7 or 200.8	Nitric acid	250	Plastic	---	None (Unfiltered)
18	Selenium	200.7 or 200.8	Nitric acid	250	Plastic	10	None (Unfiltered)
18	Silver	200.7 or 200.8	Nitric acid	250	Plastic	50	None (Unfiltered)
18	Sodium	200.7 or 200.8	Nitric acid	250	Plastic	20,000	None (Unfiltered)
18	Thallium	200.7 or 200.8	Nitric acid	250	Plastic	0.5	None (Unfiltered)
18	Vanadium	200.7 or 200.8	Nitric acid	250	Plastic	---	None (Unfiltered)
18	Zinc	200.7 or 200.8	Nitric acid	250	Plastic	2,000	None (Unfiltered)
18	Cyanide (Total)	200.7 or 200.8	NaOH	250	Plastic	200	None (Unfiltered)
18	Cyanide (Amenable)	200.7 or 200.8	NaOH	250	Plastic	---	None (Unfiltered)

--- Not Applicable

(1) Monitoring wells 1-OS/I, 2-OS, 3-OS/I, 4-OS, 5-OS, 7-OS, 8-OS, 8-I, 8-R, 9-OS, 9-I, 9-R, 10-OS, 10-I, 10-R, private water supply wells PW-1 and PW-2, and municipal water supply wells SVWC-93, SVWC-95 and SVWC-96 are sampled for the annual event.

(2) Includes depth to water measurements for monitoring wells 1-R, 2-R, 3-R, 4-R, 5-R, 6-I, 6-R, 7-I and 7-R.

(3) The required minimum reporting laboratory limit represents the lowest applicable groundwater standard from NYSDEC TOGS 1.1.1 Sanitary Code Subpart 5-1 or USEPA MCLs.

(4) One duplicate and one matrix spike/matrix spike duplicate is collected per sample event, at a randomly selected sample location.

(5) USEPA National Secondary Drinking Water Standard.

(6) USEPA Treatment Technique Action Level.

HCL = Hydrochloric Acid

**Table 2**

**Summary of Measuring Point Elevation and Total Depth Information  
Town of Ramapo Landfill, Ramapo, Rockland County, New York**

<b>Monitoring Well</b>	<b>Top of Casing Elevation<sup>(1)</sup> (feet)</b>	<b>Depth to Bottom of Well<sup>(2)</sup> (feet)</b>
1 - OS	379.23	24.00
1 - I	379.62	32.65
1 - R	379.32	54.00
2 - OS	422.76	22.59
2 - I	379.62	29.35
2 - R	422.02	53.93
3 - OS/I	345.89	16.22
3 - R	345.52	38.62
4 - OS	452.40	16.75
4 - I	453.25	25.79
4 - R	452.84	45.01
5 - OS	584.87	18.89
5 - I	584.62	41.96
5 - R	584.75	61.97
6 - I	464.00	31.76
6 - R	462.75	50.50
7 - OS	309.46	18.44
7 - I	309.40	48.73
7 - R	309.20	69.13
8 - OS	320.21	21.73
8 - I	320.52	51.72
8 - R	320.63	68.23
9 - OS	309.52	15.31
9 - I	309.42	41.31
9 - R	309.57	61.11
10 - OS	332.02	23.20
10 - I	331.39	32.55
10 - R	330.74	59.37

<sup>(1)</sup> Elevations provided by URS Company, Inc. "Water Level Elevations." Elevations are labeled "Top of Monitor Elevations," which is assumed to be top of stainless steel riser casing.

<sup>(2)</sup> Measured from top of stainless steel riser casing.

NA = Not Available

**APPENDIX A**

**NYSDEC, USEPA, TOWN OF RAMAPO CONTACT INFORMATION**

**TOWN OF RAMAPO LANDFILL  
250 TORNE VALLEY ROAD  
HILLBURN, NY 10931**

**CONTACT INFORMATION**

(As of April 2017)

<b>Contact</b>	<b>Address</b>	<b>Phone Number &amp; Email</b>
George Jacob, Project Manager United States EPA, Region 2	290 Broadway, 20 <sup>th</sup> Floor New York, New York 10007-1866	(212) 637-4266 <a href="mailto:jacob.george@epamail.epa.gov">jacob.george@epamail.epa.gov</a>
Carl Hoffman, P.E. NYSDEC	625 Broadway, 12 <sup>th</sup> Floor Albany, New York 12233-7017	(518) 402-9637 <a href="mailto:carl.hoffman@dec.ny.gov">carl.hoffman@dec.ny.gov</a>
Edward P. Dzurinko Town of Ramapo Department of Public Works	18 Pioneer Avenue Tallman, New York 10982-0446	(845) 357-0591 <a href="mailto:dzurinkoT@ramapo-ny.gov">dzurinkoT@ramapo-ny.gov</a>  Emergency number (845) 357-2400 (Ramapo Police Department)

**APPENDIX B**

**USEPA SUPERFUND RECORD OF DECISION (ROD)  
RAMAPO LANDFILL MARCH 1992 AND  
1997 ESD  
(PROVIDED ON CD)**

**USEPA SUPERFUND RECORD OF DECISION (ROD),  
RAMAPO LANDFILL MARCH 1992**

**EPA/ROD/R02-92/169  
1992**

**EPA Superfund  
Record of Decision:**

**RAMAPO LANDFILL  
EPA ID: NYD000511493  
OU 01  
RAMAPO, NY  
03/31/1992**

Text:

ROD FACT SHEET

SITE

Name: Ramapo Landfill

Location: Town of Ramapo

HRS Score: 44.73

ROD

Date Signed: March 31, 1992

Remedy: Landfill Cap/Leachate & GW  
Collection/Off-site Treatment

Capital Cost: \$18,390,000 - \$21,640,000

O & M Cost: \$319,800 - \$678,600

Present Worth Cost: \$21,410,000 - \$28,050,000

LEAD

NYSDEC

Primary Contact: Robert Nunes (212) 264-2723

Secondary Contact: Joel Singerman (212) 2641132

Main PRPs: Town of Ramapo

WASTE

Type: Volatiles, Semi-Volatiles,  
Inorganics

Medium: Soil, groundwater, surface water

Origin: Municipal and hazardous wastes

Est. Quantity: Municipal Landfill Size: 60 acres

RECORD OF DECISION

Ramapo Landfill Site  
Town of Ramapo  
Rockland County, New York

United States Environmental Protection Agency  
Region II  
New York, New York

DECLARATION FOR THE RECORD OF DECISION

#### Site Name and Location

Ramapo Landfill, Town of Ramapo, Rockland County, New York

#### Statement of Basis and Purpose

This decision document presents the selected remedial action for the Ramapo Landfill site (the "Site"), located in the Town of Ramapo, Rockland County, New York, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. SS9601-9675, as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300. This decision document explains the factual and legal basis for selecting the remedy for the Site. The information supporting this remedial action decision is contained in the administrative record for the Site. The administrative record index is attached (Appendix III).

The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy. (See Appendix IV.) NYSDEC will also concur with the contingent remedy, should the confirmatory studies determine that the contingent remedy is appropriate.

#### Assessment of the Site

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present a significant and substantial endangerment to public health, welfare, or the environment.

#### Description of the Selected Remedy

This operable unit represents the entire remedial action for the Site. It addresses the principal threats to human health and the environment at the Site by controlling the source of contamination and the generation of contaminated leachate, as well as by treating contaminated groundwater.

The major components of the selected remedy include:

REMEDY

- Installation of a cap on the tops of the landfill using a multi-media system, including layers of fill material, a gas-venting system and an impermeable membrane. The landfill side slopes will be capped using a multi-media system without an impermeable membrane, if confirmatory studies demonstrate that this approach meets remedial action objectives. Should the confirmatory studies indicate that the overall remedy's effectiveness would be significantly reduced by not including an impermeable barrier in the multi-media cap on the side slopes, then an impermeable barrier would be included in the cap on some or all of the side slopes of the landfill;
- Installation of groundwater extraction wells to supplement the existing leachate collection system;
- Collection and diversion of leachate seeps to the leachate collection system for off-site treatment;
- Installation of a perimeter drain around the sections of the cap containing the impermeable membrane to collect and divert surface water run-off;
- If groundwater pretreatment is needed (pursuant to the requirements of the off-site treatment facility), construction of a pretreatment facility which would be tied into the existing leachate collection and discharge system;
- Performance of air monitoring prior to, during, and following construction at the Site to ensure that air emissions resulting from the cap construction meet applicable or relevant and appropriate requirements. Perimeter air monitoring in the groundwater monitoring wells, piezometers, and additional gas monitoring wells to be installed between the landfill and the Baler Building will be performed. Landfill gas emissions will be controlled, if necessary;

- Imposition of property deed restrictions which will include measures to prevent the installation of drinking water wells at the site, and restrict activities which could affect the integrity of the cap;
- Performance of a maintenance and sampling program upon completion of closure activities. The monitoring program will provide data to evaluate the effectiveness of the remedial effort. Additional monitoring points will be established as needed to detect any future movement of site contaminants toward drinking water sources off-site;
- Development of a contingency plan for rapid implementation of additional measures to protect nearby residents and users of groundwater if those measures are determined to be necessary.

#### Declaration

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. In keeping with the statutory preference for treatment as a principal element of the remedy, the contaminated leachate and groundwater will be collected and treated. The landfill material, however, cannot be excavated and treated effectively, because of the size of the landfill and because there are no on-site "hot spots" that represent the major sources of contamination.

A review of the Site will be conducted no later than five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment, because this remedy will result in hazardous substances remaining on-site above health-based levels.

#### DECISION SUMMARY

RAMAPO LANDFILL SITE

TOWN OF RAMAPO

ROCKLAND COUNTY, NEW YORK

United States Environmental Protection Agency

Region II

New York, New York

March 1992

#### TABLE OF CONTENTS

SITE HISTORY AND ENFORCEMENT ACTIVITIES

HIGHLIGHTS OF COMMUNITY PARTICIPATION

SCOPE AND ROLE OF OPERABLE UNIT

SUMMARY OF SITE CHARACTERISTICS

SUMMARY OF SITE RISKS

DESCRIPTION OF REMEDIAL ALTERNATIVES

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

SELECTED REMEDY

STATUTORY DETERMINATIONS

DOCUMENTATION OF SIGNIFICANT CHANGES

## ATTACHMENTS

APPENDIX I. FIGURES

APPENDIX II. TABLES

APPENDIX III. ADMINISTRATIVE RECORD INDEX

APPENDIX IV. NYSDEC LETTER OF CONCURRENCE

APPENDIX V. RESPONSIVENESS SUMMARY

## SITE NAME, LOCATION AND DESCRIPTION

The Site is located on a 96-acre tract in the Town of Ramapo, Rockland County, New York, about 35 miles northwest of New York City, and 1 mile northeast of the Village of Hillburn, New York. The Site location is shown on Figure 1 and a Site plan is depicted in Figure 2. The Site is situated at the western base of the Ramapo Mountains off Torne Valley Road east of the New York State Thruway, Route 17, and Route 59. Utility corridors lie on three sides of the Site, high voltage power transmission lines to the east and west, and a highpressure gas line to the south. A power substation is located just north of the Site.

Approximately 50 acres of the Site are covered with fill material. The landfill portion of the Site is mounded into two major lobes (northern and southern), and slopes steeply toward the west with grades ranging from less than one percent to greater than 30 percent. Figure 3 depicts the location and depth of the landfill lobes. Both landfill lobes consist of mixed refuse. Substances reportedly disposed of in the landfill portion of the Site include industrial sludge and other wastes from a pharmaceutical company, sewage sludge, municipal refuse, asbestos, construction and demolition debris, yard debris, paint sludge, and liquid wastes from a paper company. Vegetative cover, although generally thick, varies from young trees to a mix of grasses and underbrush to bare ground. Areas along the Site boundaries consist of mature hardwood forest.

An on-site leachate collection system consists of 4 main conduits located along the northern and western boundaries of the Site as shown in Figure 4. Three conduits are located in the subsurface using perforated drain pipes. A 6-inch toe drain was installed just beneath the ground surface at the toe of the landfill, using 2,933 feet of perforated pipe. An 8-inch shallow under drain was installed at a depth 8 to 10 feet below grade using 4,023 linear feet of perforated pipe on the upslope side of Torne Valley Road. A 12-inch deep underdrain was installed between 10 and 25 feet deep using 4,259 linear feet of both perforated and nonperforated pipe. The fourth conduit consists of a concrete surface-water collector at the base of the landfill which enters a stormwater catch basin located in the southwestern part of the Site near MH-A-5. The catch basin was constructed and is maintained to prevent silt and other debris from entering the leachate-collection system. This conduit handles surface seeps from the landfill and surface runoff during storm events. The 4 collectors tie together near MH-A-5 (see Detail A on Figure 4). A 6-inch force main connects to the leachate holding pond, while a 48-inch pipe leads to Torne Brook (Former Outfall 002). This 48-inch pipe is designed to convey overflow during heavy-water runoff from the concrete collector.

The Site is currently being used as a compaction and transfer facility by the Town of Ramapo. Trash and debris are weighed at a weigh station/guard house along Torne Valley Road, compacted at a baler facility in the northeastern corner of the Site, and transferred to the Al Turi Landfill in Goshen, New York. A pistol range utilized by the Town of Ramapo Police Department is also located in the northeastern area of the Site.

The main surface waters in the vicinity of the Site are the Ramapo River, Torne Brook, and Candle Brook (see Figure 2). The Ramapo River, located approximately 300 feet from the southwest corner of the Site, is a NYSDEC Class "A" waters, which may be used as a source of water supply for drinking, culinary, or food-processing purposes. Torne Brook, which flows near the western boundary of the Site, and Candle Brook, a tributary of Torne Brook, are NYSDEC Class "B" waters, suitable for primary contact recreation and any other use, except as a source of water supply for drinking, culinary, or food-processing purposes. Figure 5 depicts the 100-year and 500-year floodplain boundary for Torne Brook.

There are no NYSDEC-regulated or federal jurisdictional wetlands preliminarily identified on-site. However, the United States Geological Survey (USGS) has identified an area of less than ten acres near the headwaters of Candle Brook and located east of the Baler Building as a wetland (see Figure 6). No

NYSDEC-regulated wetlands occur within 9 miles downstream of the Site, though several occur within a 2-mile radius, either upstream of the Site or on a different watershed. All wetlands on or adjacent to the Site will be definitively delineated as one of the remedial design activities for the Site.

Groundwater is withdrawn from the area south and west of the Site for residential use. Ten water supply wells, operated by the Spring Valley Water Supply Company and serving a population of over 200,000, are located along the Ramapo River both upstream and downstream of the Site. Four of these wells, SV-93, SV-94, SV-95, and SV-96 (see Figure 2), are located within 1,500 feet of the landfill. The closest of these wells lies approximately 500 feet west of the Site on the west bank of the Ramapo River. Torne Brook Estate, a residential apartment complex of 25 units, has a water well, PW-1, 450 feet from the landfill. A 2-unit apartment building maintains a water well, PW-2, about 1,200 feet from the landfill.

#### SITE HISTORY AND ENFORCEMENT ACTIVITIES

##### Site History

Prior to landfill operations in the 1950s and 1960s, portions of the Site were excavated as a source of gravel.

In 1971, the Rockland County Department of Health granted a permit to the Town of Ramapo for the operation of the sanitary landfill. At that time, the Site was owned by the Ramapo Land Company and the contract-operator was the Torne Mountain Sand and Gravel Co., Inc.

In 1976, a contract was awarded to Carmine Franco of Sorgine Construction Services of New York, Inc., for operation and maintenance of the landfill. The contract was terminated by the Town of Ramapo in 1979, when the Town began operating the landfill directly. Municipal waste was accepted in the landfill until 1984. The Town of Ramapo continued to accept construction and demolition debris at the Site until 1989.

In September 1983, the Ramapo Landfill site was placed on the Superfund National Priorities List.

The leachate collection and treatment system was constructed along the down gradient edge of the landfill in 1984 and 1985. Surface water and groundwater were conducted to a wastewater treatment pond in the Site's southwest corner. The pond's discharge was initially to the Ramapo River after aeration and settling in the pond.

From April 1989 through May 1990, the first phase (Phase I) of Remedial Investigation field work was carried out. From August to September 1990 the second phase (Phase II) of field work was conducted.

As of November 1, 1990, leachate is no longer treated at the Site and discharged to the Ramapo River. Leachate from the pond is being discharged to the Village of Suffern Wastewater Treatment Plant, approximately 1.8 miles south of the Site, via a sewer line of approximately 7,900 feet in length running along the shoulders of Torne Valley Road and Route 59. The present contract with the Village of Suffern anticipates an average daily flow of 80,000 gallons per day, for a maximum yearly flow of 29,200,000 gallons. The contract runs for 5 years, and is renewable for an additional 5 years.

##### Enforcement Activities

On June 4, 1980, the first of four Orders on Consent concerning the Ramapo Landfill was entered into between the Town of Ramapo and the NYSDEC. The first order required the Town of Ramapo, as Respondent, to: (a) determine the extent of leachate movement and the feasibility of leachate collection; (b) construct a surface-water and groundwater-diversion system; (c) construct a leachate-collection system; (d) construct a system capable of transporting or treating the collected leachate; (e) phase out operation of the landfill, and (f) meet other related requirements and schedule of compliance specified in the Order.

On May 20, 1983, a Modified Order on Consent was signed, requiring the Town of Ramapo to comply with a modified Schedule of Compliance, which required construction of a leachate-collection system, maintenance of an interim surface-water diversion system, construction of an Initial Treatment System with effluent

monitoring, a subsurface investigation program, the phaseout of the existing site for refuse disposal and submission of a closure plan.

On February 8, 1985, an Order on Consent was signed which required that the Initial Treatment System be completed by June 30, 1985 and construction of a Final Treatment System by October 31, 1986.

On February 1, 1988, the Town entered into its fourth and current (Title 3 1986 Environmental Quality Bond Act) Order on Consent (Index No. W30083-8707) with NYSDEC. This Order requires that a remedial investigation and feasibility study (RI/FS) and remedial program be developed and implemented for the Site, subject to approval from NYSDEC.

#### HIGHLIGHTS OF COMMUNITY PARTICIPATION

On September 20, 1989, the Town of Ramapo and NYSDEC conducted a public meeting at the Town of Ramapo Town Hall, Ramapo, New York, to inform local officials and interested citizens about the Superfund process, to review current and planned remedial activities at the Site, and to respond to any questions from area residents and other attendees.

The RI report, FS report, and the Proposed Plan for the Site were released to the public for comment on February 18, 1992. These documents were made available to the public in the administrative record file at the EPA Docket Room in Region II, New York and the information repositories at NYSDEC, Albany, New York, the Finkelstein Public Library, Spring Valley, New York, and the Suffern Free Public Library, Suffern, New York. The public comment period on these documents was held from February 19, 1992 to March 19, 1992.

During the public comment period, a public meeting was held in the Ramapo Town Hall, Ramapo, New York on March 3, 1992, to present the RI/FS reports and the Proposed Plan, answer questions, and accept both oral and written comments. At this meeting, representatives from the EPA, NYSDEC, and the New York State Department of Health (NYSDOH) answered questions about problems at the Site and the remedial alternatives under consideration. Responses to the comments received during the public comment period are included in the Responsiveness Summary (see Appendix V).

#### SCOPE AND ROLE OF OPERABLE UNIT

This response action applies a comprehensive approach and, therefore, only one operable unit is required to remediate the site.

Remedial action objectives are specific goals to protect human health and the environment; they specify the contaminant(s) of concern, the exposure route(s), receptor(s), and acceptable contaminant level(s) for each exposure route. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment.

The following remedial action objectives were established: 1) prevent inhalation of vapors from the landfill; 2) prevent human and animal contact with contaminated soil from the landfill surface; 3) prevent erosion of contaminated surface soil through surface-water runoff; 4) minimize the infiltration of rainfall or snow melt into the landfill, thus reducing the quantity of water percolating through the landfill materials and leaching out contaminants; and 5) reduce the movement and toxicity of the contaminated landfill leachate into groundwater, and subsequent down gradient migration of contaminants.

NYSDEC is the lead agency for this project; EPA is the support agency.

#### SUMMARY OF SITE CHARACTERISTICS

RI field work was carried out in two phases: Phase I from April 1989 through May 1990; Phase II from August to September 1990. Media sampled during the RI included surface and subsurface soil, waste samples, groundwater, surface water, sediments, and air. All RI Phase I and II sampling locations, excluding air monitoring points, are depicted in Figure 7.

Volatile compounds were detected in 3 waste sample locations, SPS3, SPS-4, and SPS-5, at concentrations ranging from 2 micrograms per kilogram (ug/kg) to 110 milligrams per kilogram (mg/kg) (total xylenes at SPS-5). No volatile compounds were detected in any of the surface soil samples including the background sample, SPS-9. Semi-volatile compounds, including polycyclic aromatic hydrocarbons (PAHs), were detected in waste samples and surface soil samples at concentrations ranging from 42 ug/kg to 16 mg/kg (naphthalene at SPS-5). No semi-volatile compounds were detected in the background sample. Antimony, barium, beryllium, cadmium, calcium, chromium, copper, lead, selenium, and zinc were detected in surface soil and waste samples at concentrations exceeding background by an order of magnitude. Acetone was detected in 4 subsurface soil samples, MW-1-SB, MW-2-SB, MW-3-SB, and MW-5-SB, at concentrations ranging from 13 to 28 ug/kg. Six semi-volatile compounds, acetone, and toluene were detected in one monitoring well boring (MW-3-SB).

All five waste samples, (waste samples include landfill material and one paint sludge sample), were analyzed for RCRA hazardous waste characteristics and extraction procedure (EP) toxicity parameters, for which there are regulatory levels. A comparison between the EP Toxicity Criteria and levels detected from the samples is presented in Table 1. No measurements exceeded the EP Toxicity Criteria. As part of RCRA testing, the samples were also analyzed for the characteristics of ignitability, corrosivity, and reactivity. Test results indicated that none of the waste samples were classified as a RCRA characteristic waste.

During the installation of monitoring well MW-10, a leachate seep was observed. LSMW-10 is a sample of the surface soil in this area. No volatiles were detected in this sample. Ten semi-volatiles were detected at concentrations up to 130 ug/kg (flouranthene). One pesticide, gamma-chlordane, was detected at 4.5 ug/kg. Four inorganic compounds, beryllium, cadmium, calcium, and mercury, were detected at concentrations greater than an order of magnitude above background.

NYSDEC Water Quality Standards and Guidelines and/or EPA Primary Drinking Water Standards are currently being contravened in groundwater monitoring wells installed in the overburden, intermediate layer, and bedrock aquifers. Standards were exceeded for arsenic, chromium, iron, lead, magnesium, manganese, mercury, sodium, benzene, chlorobenzene, di-n-octyl phthalate, and total organic carbon. Maximum groundwater concentrations of contaminants are compared with drinking water standards on Table 2. A summary of the number of data which exceeded state and federal drinking water standards is given in Table 3. No federal or state drinking water standards were exceeded in samples taken from the nearby public or private water supply wells.

Phase I and Phase II surface water samples were collected on Torne Brook, on the Ramapo River near the confluence of Torne Brook, a drainage swale on an adjacent property, and from 2 leachate seeps emanating from the landfill. New York State surface water standards were exceeded for vinyl chloride, antimony, arsenic, iron, manganese, mercury, nickel, zinc, ammonia, sulfide, copper, and lead. The highest frequency of the detections above the standards occurred at SW-1, near the confluence of Torne Brook and the Ramapo River, when leachate from the treatment pond was still being discharged to the Ramapo River. Maximum surface water concentrations of contaminants are compared with surface water standards on Table 4. Table 5 includes a summary of the number of data which exceeded state and federal surface water standards.

On July 12, 1991, NYSDEC sampled Torne Brook upgradient from the site, and at 3 locations on the Ramapo River. The 3 samples were collected roughly 150-feet upstream of the former Outfall 001, at the confluence with the former outfall, and roughly 150 feet downstream. The samples were analyzed for Target Analyte metals, cyanide, total organic carbon and ammonia. Analytical results indicated that no standards were exceeded for ammonia or any of the inorganic compounds previously noted as contravening standards.

No volatile or pesticide compounds were detected in any of the sediment samples collected in Torne Brook or the Ramapo River. Three semi-volatile compounds were detected in a sediment sample collected in Torne Brook, SS-3, at concentrations below NYSDEC sediment cleanup criteria. (See Table 6.) Inorganic compounds detected in sediments which exceeded background concentrations by at least an order of magnitude included manganese at SS-1, calcium and thallium at SS-3, antimony and manganese at SS-4, and calcium at SS-8.

An air monitoring study was conducted during the second phase of field activities to determine methane quality and Target Compound List (TCL) organic gas emissions. Air monitoring locations are depicted in Figure 8. The highest airborne concentration of a volatile organic compound (VOC) detected on-site was recorded at a piezometer, P-2, located in the northern lobe, west of the Baler Building. The results from

the sample collected indicated a total xylenes concentration of 7.7 milligrams per cubic meter, which exceeded the NYSDEC Ambient Guideline Concentration (AGC) for this compound. AGCs assume continuous exposure, however, and ordinarily are compared to annual averages of air sample results. TCL organic emissions and AGCs are presented in Table 7. No other air sampling data exceeded NYSDEC AGCs.

#### SUMMARY OF SITE RISKS

A Baseline Risk Assessment was conducted to evaluate the potential risks to human health and the environment associated with the Ramapo Landfill Site in its current state. The Baseline Risk Assessment focused on contaminants in the soil, groundwater, and air which are likely to pose significant risks to human health and the environment. A list of the contaminants of potential concern in groundwater, soil, and air is found in Table 8.

The Baseline Risk Assessment identified several potential exposure pathways by which the public may be exposed to contaminant releases at the Site under current and future land-use conditions. Five exposure scenarios were evaluated under current and future land-use conditions. These pathways included: ingestion of soil; dermal contact with soil; inhalation of vapors from the landfill; ingestion of groundwater; and inhalation of vapors during showering. These exposure pathways were evaluated separately for adults and children and are listed in Table 9. Under the current land-use scenario, five potential receptors were identified, namely, adult and child (ages 6-11) trespassers, adult and child residents living downgradient and off-site, and employees (workers) at the landfill. Under the future land-use scenario, three receptors were identified, namely adult and child (ages 0-6) residents living on-site, and workers. The reasonable maximum exposure scenario was evaluated.

Under current EPA guidelines, the likelihood of carcinogenic (cancer causing) and noncarcinogenic effects due to exposure to site chemicals are considered separately. It was assumed that the toxic effects of the site-related chemicals would be additive. Thus, carcinogenic and noncarcinogenic risks associated with exposures to individual compounds of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of mg/kg-day, are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) are compared with the RfD to derive the hazard quotient for the contaminant in the particular medium. The reference doses for the compounds of concern at the Ramapo Landfill site are presented in Table 10.

The hazard index is obtained by adding the hazard quotients for all compounds across all media. A hazard index greater than 1 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

Under current land-use conditions, the total site HI exceeded one for workers and child trespassers. Under future land-use conditions, the HIs exceeded 1 for all scenarios evaluated. Primary chemical contributors to noncarcinogenic health risks were xylenes (total) and chlorobenzene for inhalation of vapors from the landfill, and manganese and arsenic for ingestion of groundwater. A summary of the noncarcinogenic risks associated with the chemicals evaluated across various exposure pathways is found in Table 11.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of (mg/kg-day)<sup>-1</sup>, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term

"upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely. The SF for the compounds of concern are presented in Table 12.

For known or suspected carcinogens, EPA considers excess upper bound individual lifetime cancer risks of between  $10^{-4}$  to  $10^{-6}$  to be acceptable. This level indicates that an individual has not greater than a one in ten thousand to one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at the Site. Under current land-use conditions, the risk characterization showed that cancer risks for all receptors evaluated (i.e., adults, children, and workers) were less than or within the acceptable cancer risk range of  $10^{-4}$  to  $10^{-6}$ . Under future land-use conditions, cancer risks for children and workers were within the NCP acceptable range. However, the sum of future cancer risks for all exposure pathways assessed for adults ( $2 \times 10^{-4}$ ) were marginally outside the range. Arsenic and benzene were the chemicals responsible for the highest carcinogenic risks from groundwater ingestion and inhalation of vapors, respectively. A summary of the carcinogenic risks for the chemicals evaluated across various exposure pathways is found on Table 13.

The calculations were based on the contaminants detected in soils, on-site monitoring wells, and air. It was assumed that in the future, on-site monitoring wells would be used for residential purposes. Risk estimates were developed by taking into account various conservative assumptions about the likelihood of a person being exposed to the various contaminated media.

#### Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the Risk Assessment provides upper bound estimates of the risks to populations near the Landfill, and is highly unlikely to underestimate actual risks related to the Site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the RI Report.

#### Environmental Assessment

The environmental assessment evaluated exposure risks to aquatic life. Comparison of the results obtained from sediment samples with NYSDEC sediment cleanup criteria indicate that no contaminant concentrations found exceed the cleanup criteria. Therefore, sediments are not expected to pose a risk to aquatic life. In reviewing the surface water contaminant concentrations, aquatic surface water standards were exceeded for copper, iron, lead, mercury, sulfide, and zinc.

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**TOWN OF RAMAPO LANDFILL SITE  
SITE MANAGEMENT PLAN**  
250 Torne Valley Road, Hillburn County, New York  
April 28, 2017

The ecological studies also indicated that there are no federally listed threatened or endangered species identified at the Site. The landfill is in the historical range of a subspecies of the Eastern Woodrat, *Neotoma floridana magister*, listed by NYSDEC as endangered in New York State. However, because the species' habitat is within rock outcrops or boulder fields, it is unlikely to occur on or in the immediate vicinity of the landfill. No other NYSDEC rare, threatened, or endangered species or critical habitats are known to occur within a 2-mile radius of the landfill, or within 9 miles downstream of the landfill.

In summary, actual or threatened releases of hazardous substances from this Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health, welfare or the environment.

#### DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions, alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances. This Record of Decision evaluates in detail, 5 remedial alternatives for addressing the contamination associated with the Ramapo Landfill site. The time to implement reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate with the responsible parties, or procure contracts for design and construction. These alternatives are:

##### Alternative 1: No Further Action with Monitoring

Capital Cost: \$0  
Operation and Maintenance (O & M) Cost: \$345,700  
Present Worth Cost: \$3,260,000  
Time to Implement: 3 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. However, since leachate collection and off-site treatment of collected leachate and surface water are part of the ongoing operations at the Site, the requirement for a "no-action" alternative is not relevant for this Site. Therefore, a no further action alternative was considered.

The no further action alternative does not include any additional physical remedial measures that address contamination at the Site. However, this alternative does include maintaining the existing leachate collection system and continuing to send the collected groundwater and surface water to the Suffern Wastewater Treatment Plant at a rate of approximately 80 thousand gallons per day. It includes further long-term monitoring of on-site monitoring wells and nearby residential wells for target compound list (TCL) compounds, surface water in Torne Brook and the Ramapo River for TCL compounds, and air for VOCs and landfill gases.

In addition, the no further action alternative would include the development and implementation of a public awareness and education program to enhance the community's knowledge of the conditions existing at the Site. This alternative would require the involvement of local government, and several health departments and environmental agencies.

Because this alternative would result in contaminants remaining onsite above health-based levels, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

##### Alternative 2: Limited Action (with Option for Alternate Water Supply)

Capital Cost: \$190,000 - \$710,000  
O & M Cost: \$345,700  
Present Worth Cost: \$3,380,000 - \$3,970,000

Time to Implement: 6 months

To date, results obtained from sampling of nearby private wells indicate that the wells are not being adversely impacted by the landfill. Therefore, no provision for an alternate water supply is warranted at this time. However, should future groundwater monitoring data indicate that drinking water standards are being contravened in nearby wells, then an alternate water supply may be deemed necessary. This alternative includes the development, during the remedial design, of a contingency plan for the rapid implementation of an alternate water supply, if shown to be needed. The contingency plan would include the preliminary design for the alternate water supply. If drinking water standards are significantly exceeded for site-related parameters in residential wells, or in the same aquifer in the closest monitoring wells to the residential wells, and detected concentrations are confirmed by subsequent sampling, residents would immediately be provided with bottled water and/or an acceptable point-of-use treatment system, as an interim measure until an alternate water supply could be constructed.

Posting and fencing of the landfill would be included in order to reduce the frequency of trespassers on the landfill property. This alternative would also include deed restrictions with respect to the future use of the Site, and the prohibition of on-site groundwater extraction for potable use. The existing leachate collection system would be maintained, and the collected groundwater and surface water would continue to be sent to the Suffern Wastewater Treatment Plant. Similar to Alternative 1, this alternative would also include long-term monitoring of groundwater, surface water in Torne Brook and the Ramapo River, and air.

The higher end of the capital cost range (\$710,000) and presentworth cost range (\$3,970,000) for this alternative reflect the additional cost for the alternate water supply which is considered an optional item.

As in Alternative 1, this alternative would include a public awareness and education program.

Because this alternative would result in contaminants remaining onsite above health-based levels, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

#### Alternative 3: Installation of Groundwater Extraction Wells

Capital Cost: \$1,040,000 - \$3,300,000

O & M Cost: \$547,300 - \$1,156,000[1]

1 The O&M costs for Alternatives 3, 4, and 5 assume continued treatment of leachate and treatment of groundwater at the Suffern Wastewater Treatment plant. The Town of Ramapo, however, is pursuing arrangements for treatment of leachate and groundwater at the Rockland County Sewer District No. 1 publicly-owned treatment works.

Present Worth Cost: \$6,206,000 - \$14,210,000

Time to Implement: 6 months

Alternative 3 includes the installation of groundwater extraction wells to supplement the existing leachate collection system and restore contaminated groundwater aquifers. Groundwater extraction wells would be installed in areas where the groundwater table may be below the reach of the existing leachate collection system. Portions of the existing deep leachate collector would be plugged or grouted and new solid piping would be laid in areas where the withdrawal wells are to be added, to avoid leakage of the existing system. Collected leachate, groundwater and surface water would be sent to a publicly owned treatment works (POTW) for off-site treatment. The off-site treatment facility could be the Suffern Wastewater Treatment Plant, which is currently receiving wastewater discharged from the Site, or an alternate POTW. The selected POTW must be in compliance with all federal and state permit requirements. In addition, the wastewater discharged from the Site would have to meet all federal, state, local, and pretreatment requirements for the specific POTW.

If deemed necessary by future groundwater monitoring data, an alternate water supply would be provided for nearby users as discussed in Alternative 2. This alternative includes the development, during Remedial Design, of a contingency plan for rapid implementation of an alternate water supply, if shown to be needed.

The contingency plan would include the preliminary design for the alternate water supply, to the extent that public water could be provided to nearby users within one year of determination of its need based on monitoring results. As an interim measure, if drinking water standards are significantly exceeded for site-related parameters in residential wells, or in the same aquifer in the closest monitoring wells to the residents, and detected concentrations are confirmed by subsequent sampling, residents would immediately be provided with bottled water and/or an acceptable point-of-use treatment system.

It is estimated that the proposed improvements to the leachate collection system would increase the amount of groundwater collected and sent for treatment. Long-term monitoring of groundwater and surface water would be included under this alternative. Air monitoring for VOCs and landfill gases would be included, along with deed restrictions with respect to the future use of the Site, and the prohibition of on-site groundwater extraction for potable use. Posting and fencing of the landfill would be included in order to reduce the frequency of trespassers on the landfill property.

The higher end of the capital cost range (\$3,300,000) and presentworth cost range (\$14,210,000) for this alternative reflect the additional costs for the alternate water supply and groundwater pretreatment, which are optional items.

Because this alternative would result in contaminants remaining onsite above health-based levels, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

#### Alternative 4: Landfill Cap; Installation of Groundwater Extraction Wells

##### OPTION A:

Capital Cost: \$26,170,000 - \$29,310,000  
O & M Cost: \$319,600 - \$622,600  
Present Worth Cost: \$29,190,000 - \$35,760,000  
Time to Implement: 2 years

##### OPTION B:

Capital Cost: \$21,870,000 - \$25,010,000  
O & M Cost: \$319,600 - \$622,600  
Present Worth Cost: \$24,890,000 - \$30,880,000  
Time to Implement: 2 years

Alternative 4 would involve the installation of a multi-media cap complying with New York State Part 360 Solid Waste Regulations over the entire 60 acres of the landfill, improvements to the existing leachate collection system, a surface water drainage and diversion system, and relocating and/or raising of Torne Valley Road to allow for filling rather than excavating the landfill side slopes in order to achieve stable slopes. With a cap, there would be less infiltration into the landfill, and therefore, less potential for off-site migration of contaminated groundwater. Option A costs reflect estimated costs for a multi-media cap that meets all requirements of the New York State Part 360 Solid Waste Regulations. Option B costs reflect estimated costs for a multi-media cap which is identical to that in Option A, except that it would require a 12-inch thick fill layer above the impermeable barrier as opposed to a 30inch thick fill layer as required in Part 360. Both fill layers would be covered by a 6-inch thick layer of topsoil. The reduced fill layer in Option B would provide equivalent protection for the impermeable membrane, provided that the impermeable membrane not be damaged by frost or root action. The selection of the Option B cap would require approval from the NYSDEC for a variance of the Part 360 regulations.

The installation of groundwater extraction wells to supplement the existing leachate collection system would be implemented as described in Alternative 3. However, with the addition of a cap over the landfill, surface water would no longer have to be collected and sent for treatment. Collected leachate and groundwater would be sent to a POTW for off-site treatment. The off-site treatment facility could be the Suffern Wastewater Treatment Plant, which is currently receiving wastewater discharged from the Site, or

an alternate POTW. The selected POTW must be in compliance with all federal and state permit requirements. In addition, the wastewater discharged from the Site would have to meet all federal, state, local, and POTW-specific pretreatment requirements.

Long-term monitoring of groundwater and surface water would be included under this alternative. Air monitoring for VOCs and landfill gases would be included, and landfill gases would be vented to the atmosphere or controlled, as needed. This alternative also includes deed restrictions with respect to the future use of the Site, and the prohibition of on-site groundwater extraction for potable use. Posting and fencing of the landfill would be included in order to reduce the frequency of trespassers on the landfill property. Contaminated off-site soils resulting from leachate seeps would be removed and consolidated within the capped area.

If deemed necessary by future groundwater monitoring data, an alternate water supply would be provided for nearby users as discussed in Alternative 2. This alternative includes the development, during the remedial design, of a contingency plan for the rapid implementation of an alternate water supply, if shown to be needed. The contingency plan would include the preliminary design for the alternate water supply. If drinking water standards are significantly exceeded for site-related parameters in residential wells, or in the same aquifer in the closest monitoring wells to the residential wells, and detected concentrations are confirmed by subsequent sampling, residents would immediately be provided with bottled water and/or an acceptable point-of-use treatment system, as an interim measure until an alternate water supply could be constructed.

The higher end of the capital cost range (\$29,310,000 for Option A and \$25,010,000 for Option B) and present-worth cost range (\$35,760,000 for Option A and \$30,880,000 for Option B) reflect additional costs for the optional items which include an alternate water supply, groundwater pretreatment, and treatment of landfill gases.

Because this alternative would result in contaminants remaining onsite above health-based levels, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes. Alternative 5: Landfill Cap with Soil Cover on Side Slopes; Installation of Groundwater Extraction Wells

Capital Cost: \$18,390,000 - \$21,640,000  
O & M Cost: \$319,800 - \$678,600  
Present Worth Cost: \$21,410,000 - \$28,050,000  
Time to Implement: 2 years

Alternative 5 includes a landfill cap and improvements to the existing leachate collection system. The landfill cap would be similar to the cap described in Alternative 4, Option B, except for the absence of an impermeable membrane on the side slopes of the landfill. While, the exclusion of the impermeable membrane from the cap on the side slopes would result in an increase in the quantity of leachate generated, most of the leachate is expected to be collected by the existing leachate collection system and a proposed groundwater extraction well network. The side slopes, where the existing slopes are greater than 20 percent, are estimated to represent about 25 of the 60 acres. As New York State Part 360 Solid Waste Regulations require an impermeable membrane under the entire capped surface, this alternative would require approval from the NYSDEC for a variance from New York State Part 360 regulations. This approval would be contingent upon the ability of this alternative to collect leachate before it infiltrates into the groundwater aquifers or migrates off-site. As in Alternative 4, Option B, this alternative would also require a variance from New York State Part 360 regulations for the selection of a fill layer of less than 30 inches in thickness overlying the impermeable barrier. Also as in Alternative 4, contaminated off-site soils resulting from leachate seeps would be removed and consolidated within the capped area. Also, landfill gases would be vented to the atmosphere or controlled, as needed.

The installation of groundwater extraction wells to supplement the existing leachate collection system would be implemented as described in Alternative 3. However, with the addition of a cap over the landfill, surfacewater would no longer have to be collected and sent for treatment. Surface water runoff on the tops of the landfill lobes where the impermeable membrane is present would be collected by a perimeter drain and

diverted so as to prevent infiltration from these areas. Collected leachate and groundwater, and leachate seeps, if they occur, would be sent to a POTW for off-site treatment. The offsite treatment facility could be the Suffern Wastewater Treatment Plant, which is currently receiving wastewater discharged from the Site, or an alternate POTW. The selected POTW must be in compliance with all federal and state permit requirements. In addition, the wastewater discharged from the Site would have to meet all federal, state, local, and POTW-specific pretreatment requirements.

With a cap, there would be less infiltration into the landfill, and therefore, less potential for off-site migration of contaminated groundwater. Long-term monitoring of groundwater and surface water as discussed in Alternative 2 would be included, along with deed restrictions with respect to future use of the Site, and the prohibition of on-site groundwater extraction for potable use. Posting and fencing of the landfill would be included in order to reduce the frequency of trespassers on the landfill property.

If deemed necessary by future groundwater monitoring data, an alternate water supply would be provided for nearby users as discussed in Alternative 2. This alternative includes the development, during the remedial design, of a contingency plan for the rapid implementation of an alternate water supply, if shown to be needed. The contingency plan would include the preliminary design for the alternate water supply. If drinking water standards are significantly exceeded for site-related parameters in residential wells, or in the same aquifer in the closest monitoring wells to the residential wells, and detected concentrations are confirmed by subsequent sampling, residents would immediately be provided with bottled water and/or an acceptable point-of-use treatment system, as an interim measure until an alternate water supply could be constructed.

The higher end of the capital cost range (\$21,640,000) and presentworth cost range (\$28,050,000) for this alternative reflect additional costs for the optional items which include an alternate water supply, groundwater pretreatment, treatment of landfill gases.

Because this alternative would result in contaminants remaining onsite above health-based levels, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

#### SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative was assessed utilizing nine evaluation criteria as set forth in the NCP and OSWER Directive 9355.3-01. These criteria were developed to address the requirements of Section 121 of CERCLA to ensure all important considerations are factored into remedy selection decisions.

The following "threshold" criteria are the most important, and must be satisfied by any alternative in order to be eligible for selection:

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
2. Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes and requirements or provide grounds for invoking a waiver. The following "primary balancing" criteria are used to make comparisons and to identify the major trade-offs between alternatives:
3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
4. Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of a remedial

technology, with respect to these parameters, that a remedy may employ.

5. Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

6. Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. Cost includes estimated capital and operation and maintenance costs, and the present worth costs.

The following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete:

8. State acceptance indicates whether, based on its review of the RI/FS and the Proposed Plan, the State supports, opposes, and/or has identified any reservations with the preferred alternative.

9. Community acceptance refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Factors of community acceptance to be discussed include support, reservation, and opposition by the community. A comparative analysis of the remedial alternatives based upon the evaluation criteria noted above follows.

#### Overall Protection of Human Health and the Environment

The no further action alternative, Alternative 1, would be the least protective of human health and the environment. Although it does provide for leachate collection and off-site transport of collected leachate and surface water, it does not address any of the remedial action objectives established for the Site. Alternative 2 would be more effective than Alternative 1 in protecting human health and the environment, since fencing and posting implemented under Alternative 2 would limit access to the Site by trespassers and children and would provide for an alternate water supply to nearby users, if needed. Alternative 3 would be more effective than Alternatives 1 and 2, since it would include extraction and off-site treatment of contaminated groundwater. Alternatives 1, 2, and 3, however, do not include any provision for a landfill cap and therefore do not reduce the generation of leachate, prevent human and animal contact with contaminated soil from the landfill surface, prevent erosion of contaminated surface soil, nor provide a means of treating landfill gas emissions. Hence, Alternatives 1, 2, and 3 provide limited protection of human health and the environment.

Alternative 4 is most protective of human health and the environment. Ingestion of contaminated groundwater would be prevented by groundwater collection and off-site treatment. The combination of the leachate collection system, off-site groundwater extraction wells, and a multi-media cap would mitigate groundwater contamination. The multi-media cap would reduce the amount of infiltration into the landfill, as well as the water level within the landfill. This would lower the potential for downward migration of contaminants through the bedrock aquifer and for off-site migration of contaminated groundwater. A cap in compliance with New York State Part 360 Solid Waste Regulations would reduce infiltration to an overall 1.2 percent of precipitation. Alternative 4 Option B would be equally protective as Alternative 4 Option A, provided that the synthetic material selected for the impermeable membrane would not be damaged by frost or root action.

Alternative 5 is more protective than Alternatives 1, 2, and 3, and may provide a comparable degree of protection as Alternative 4. With the soil cap in Alternative 5, which would not include a cap with an impermeable barrier over 25 of the 60 acres, infiltration would be reduced to an overall 7 percent of precipitation. Although this infiltration rate is about 6 times greater than the infiltration rate associated with Alternative 4, most of the leachate generated by infiltration of precipitation would occur under the side slopes, and would likely be collected. This is because of the relative proximity of the side slopes to the existing leachate collection system and to the proposed groundwater extraction well network.

With a properly engineered soil cover, Alternative 5 should be as effective as Alternative 4 in controlling landfill gas emissions, since both cap designs include a gas venting system that can be retrofitted, if

necessary, with gas treatment. Potential difficulties with gas venting on the soil cap side slopes (e.g., from clogging) could be circumvented with a more frequent placement of vent standpipes.

Direct contact with the waste would be equally mitigated by the caps proposed in Alternatives 4 and 5.

#### Compliance with ARARs

A New York State Part 360 landfill cap is an action-specific ARAR for landfill closure[2].

<Footnote>2 Installing a cap will reduce infiltration of precipitation through the landfill, thereby reducing the generation of contaminated groundwater which might exceed ARARs.</footnote> Alternatives 1, 2, and 3 would not meet this ARAR, since they do not include any provisions for a landfill cap.

Alternative 4 Option A would meet this ARAR, since it includes a cap which would be constructed according to New York State Part 360 regulations. Alternative 4 Option B would meet this ARAR only with a variance for a reduced amount of fill material covering the impermeable layer. The concept of a variance is approvable, if an appropriate synthetic impermeable barrier were used and all other requirements of New York State Part 360 Solid Waste Regulations for landfill closure were met. Alternative 5 would only meet this ARAR with a variance for a reduced amount of fill material covering the impermeable layer, and for the elimination of the impermeable layer on the steep side slopes of the landfill.

Alternatives 4 would be the most effective in reducing groundwater contaminant concentrations below maximum contaminant levels (MCLs) because of the lower infiltration rate of precipitation associated with capping the entire landfill including the side slopes. Alternative 5 may be nearly as effective as Alternative 4 in reducing groundwater contaminant migration, if leachate and contaminated groundwater are effectively captured by the improved leachate collection system and the proposed groundwater extraction wells. Alternative 3 would provide for improvements to the leachate collection system and off-site treatment of leachate and extracted groundwater. However, Alternative 3 would not include a Site cap, and, therefore, would not be in compliance with the New York State landfill closure regulations. Alternatives 1 and 2 provide no measures for containing wastes in the landfill, nor for addressing contaminated groundwater.

Under all alternatives, collected leachate and groundwater would be sent to a POTW for off-site treatment. The selected POTW must be in compliance with all federal and state permit requirements. In addition, the collected leachate and groundwater would have to meet all federal, state, local, and pretreatment requirements for the specific POTW.

#### Long-Term Effectiveness and Permanence

Alternative 1 does not include any additional permanent measures for containing, controlling, or eliminating any of the on-site contamination, or reducing the potential of exposure to the contaminated landfill materials.

Alternatives 2 and 3 would provide limited protection including posting, fencing, deed restrictions, and, if needed, an alternate water supply for nearby users. Alternative 3 would also provide for improvements to the existing leachate collection system. However, these alternatives include no further measures to control or remediate Site contamination.

The closure caps proposed in Alternatives 4 and 5 represent a permanent measure that could be maintained at regular intervals to ensure their structural integrity and impermeability. Alternative 5 may require additional monitoring and maintenance to ensure integrity of the cap, and to prevent leachate seeps.

#### Reduction in Toxicity, Mobility, or Volume Through Treatment

None of the alternatives proposed reduce the toxicity or volume of waste present in the landfill.

All of the alternatives include off-site treatment of collected leachate and groundwater. The installation of extraction wells, included with Alternatives 3 through 5, to supplement the Site's existing leachate collection system would further reduce the toxicity, mobility, and volume of contaminated groundwater than would Alternatives 1 and 2. The addition of the proposed caps in Alternatives 4 and 5 would further reduce

the toxicity, mobility, and volume of contaminants by limiting or reducing infiltration of precipitation through the landfill. The soil cap in Alternative 5 would not be as effective as the cap in Alternative 4, designed in compliance with New York State Part 360 Solid Waste Regulations, in limiting generation of leachate.

#### Short-Term Effectiveness

Since no construction is required to implement Alternative 1, the no further action alternative, there would be no associated short-term impacts to the community, workers, or the environment. However, while no increases in risks result in the short-term, no protection against the principal Site threats would be achieved.

Alternative 2 would have the least short-term impact of the remaining alternatives, as it involves the smallest construction effort onsite in potentially contaminated areas. Alternative 3 would have the second lowest short-term impact, with limited construction activities in potentially contaminated areas. However, these alternatives would provide little protection against the principal Site threats.

Alternatives 4 and 5 contain multiple components, which increase the construction effort as well as the time required for implementation. Both alternatives include caps, which would involve clearing, grubbing, and re-grading of the landfill. Potential hazards to the surrounding community, and environment may include airborne dust and particulate emissions and an increase in noise levels. These impacts would be mitigated in part through the employment of proper construction techniques and operational procedures. Risks to on-site workers due to inhalation of contaminants adsorbed to fugitive dust would be minimized through the use of personal protection equipment. Once the surface soils are covered, the short-term impacts to the community, workers, and the environment would no longer be present.

#### Implementability

Alternative 1, the no further action alternative, would be the easiest of the alternatives to implement because it requires only additional monitoring of groundwater and surface water.

Alternative 2 is the second easiest alternative to implement. The construction of water supply lines and the installation of a fence would be easily implemented. Alternative 3 is the third easiest alternative to implement. The installation of extraction wells and the improvements to the leachate collection system, are not expected to be difficult to implement.

Alternatives 4 and 5 involve capping the landfill, as well as improvements to the leachate collection system. Construction methods for capping are well established, although some technical problems, particularly for large construction projects such as this, may be encountered. The potential for design and construction problems would be reduced under Alternative 5, since the soil cap would not require the installation of a synthetic impermeable barrier on steep side slopes. Stress situations such as bridging over subsidence and friction between the synthetic impermeable barrier and other cover components, especially on side slopes, may require special laboratory tests to ensure the design meets required performance standards. The synthetic liner specified in Alternatives 4 and 5 requires a special handling during installation to ensure integrity.

All of the alternatives would involve some degree of institutional management. Alternative 1 would require administrative coordination of the groundwater monitoring program and the 5-year Site status reviews, along with the development of the public education program. Alternative 2 would require a similar effort for those activities, and also for maintenance of the security fence and for installation of a water supply line to nearby residents.

In addition to the above activities, administrative requirements for Alternative 3 would include operation and maintenance of the improved leachate collection system and a pretreatment facility, if needed. Collected leachate and surface water discharged from the Site would have to be in compliance with the receiving POTW's pretreatment requirements.

Administrative requirements for Alternatives 4 and 5 include the management of the groundwater-monitoring

program, improved leachate collection system, and alternate water supply and pretreatment facility, if needed. In addition, the structural integrity and impermeability of the closure cap must be maintained through a program of periodic surveillance and necessary repairs. Because of the relatively large area of the landfill, this effort and its associated cost may be fairly substantial.

Most services and materials required for implementation of all of these potential remedial alternatives are readily available. Standard construction equipment and practices can be employed for the fence installation of Alternatives 2 through 5 and the extensive construction activities of Alternatives 4 and 5. Most of the materials and equipment required for these alternatives may be obtained locally.

Because the work would be taking place on a Superfund site, all onsite personnel must have approved health and safety training. Many companies are available to provide this training to contractors. The engineering and design services required for implementation of Alternatives 3 through 5 would be available from many vendors.

#### Cost

Present-worth cost estimates consider a 10% discount rate and a 30year operational period. The present-worth costs are as follows:

Alternative 1	\$3,260,000
Alternative 2	\$3,380,000 - \$3,970,000
Alternative 3	\$6,206,000 - \$14,210,000
Alternative 4, Option A	\$29,190,000 - \$35,760,000
Alternative 4, Option B	\$24,890,000 - \$30,880,000
Alternative 5	\$21,410,000 - \$28,050,000

The higher range for the present-worth cost in Alternative 2 reflects the additional costs for the alternate water supply which is considered an optional item. The higher range of capital costs and present-worth costs in Alternatives 3, 4, and 5 reflect additional costs for the optional items which include an alternate water supply, groundwater pretreatment, and treatment of landfill gases. Table 14 presents capital costs and annual O&M costs, as well as present-worth cost estimates for all the alternatives.

#### State Acceptance

NYSDEC concurs with the selected remedy. NYSDEC will also concur with the contingent remedy, should the confirmatory studies determine that the contingent remedy is appropriate. See Appendix IV.

#### Community Acceptance

The community's comments and concerns received during the public comment period are identified and addressed in the Responsiveness Summary which is attached as Appendix V to this document.

#### SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, both NYSDEC and EPA have determined that Alternative 5 is the appropriate remedy, with Alternative 4, Option B as a contingent remedy for the Site.

While, the exclusion of the impermeable membrane from the landfill cap on the side slopes, as discussed in Alternative 5, would result in an increase in the quantity of leachate generated, most of the leachate is expected to be collected by the existing leachate collection system and a proposed groundwater extraction well network. Therefore, the selection of Alternative 5 is contingent upon its ability to adequately collect leachate before it infiltrates into the groundwater aquifers or migrates off-site. Confirmatory studies will be performed during the remedial design phase to determine whether Alternative 5 will attain a standard of performance equivalent to Alternative 4, Option B in reducing migration of contaminated groundwater, preventing leachate outbreaks, and restoring contaminated aquifers. Should the confirmatory

studies indicate that Alternative 5 would not meet these objectives, then Alternative 4, Option B would be implemented at the Site, or in those Site areas where needed. Confirmatory studies may include additional groundwater flow modelling and pump tests to determine the hydraulic relationship between the upper and lower aquifers.

The selected alternative, Alternative 5, is expected to achieve substantial risk reduction through source control and a leachate and groundwater collection system.

The major components of the selected remedy are as follows:

- Installation of a cap on the tops of the landfill using a multi-media system, including layers of fill material, a gas-venting system and an impermeable membrane. The landfill side slopes will be capped using a multi-media system without an impermeable membrane, if confirmatory studies demonstrate that this approach meets remedial action objectives. Should the confirmatory studies indicate that the overall remedy's effectiveness would be significantly reduced by not including an impermeable barrier in the multi-media cap on the sideslopes, then an impermeable barrier would be included in the cap on some or all of the side slopes of the landfill;
- Regrading and compacting of the landfill mound to provide a stable foundation for the placement of the cap prior to its construction;
- Contaminated off-site soils resulting from leachate seeps would be removed and consolidated within the capped area.
- Installation of groundwater extraction wells to supplement the existing leachate collection system;
- Collection and diversion of leachate seeps to the leachate collection system for off-site treatment;
- Installation of a perimeter drain around the sections of the cap containing the impermeable membrane to collect and divert surface water runoff;
- If groundwater pretreatment is needed (pursuant to the requirements of the POTW), construction of a pretreatment facility which would be tied into the existing leachate collection and discharge system;
- Performance of air monitoring prior to, during, and following construction at the Site to ensure that air emissions resulting from the cap construction meet applicable or relevant and appropriate requirements. Perimeter air monitoring in the groundwater monitoring wells, piezometers, and additional gas monitoring wells to be installed between the landfill and the Baler Building will be performed. The gas monitoring wells will be monitored quarterly for explosive gas concentrations.
- Performance of air dispersion modeling to estimate ambient air concentrations of contaminants. Landfill gas emissions will be controlled, if necessary.
- Imposition of property deed restrictions by the appropriate State or local authorities. The deed restrictions will include measures to prevent the installation of drinking water wells at the site, and restrict activities which could affect the integrity of the cap.
- Performance of a maintenance and sampling program upon completion of closure activities. The monitoring program will fulfill the requirements of 6 NYCRR Part 360 for post-closure landfill monitoring in addition to monitoring parameters of concern found at the Site. Additional wells will be added where needed to detect any movement of site-related contaminants toward nearby private wells, including production wells of the Spring Valley Water Company.
- Development of a contingency plan for rapid implementation of measures to protect nearby residents and users of groundwater if those measures are determined to be necessary.
- Samples will be collected on a quarterly basis for site related parameters from nearby residential

wells and from new and selected existing monitoring wells. If increases are noted through this monitoring program at or immediately upgradient of the residences, the State and EPA will make a determination as to the need for appropriate action (i.e., extension of a public water line) to remedy the situation.

- Development and implementation of a dust control plan. The plan will contain all possible sources of fugitive dust emissions including intrusive field activities such as excavation or regrading of waste. Normal dust suppression techniques for handling of soils and road materials will be addressed in the plan. The plan should also include how each of these potential dust sources will be controlled by addressing the control methods that will be conducted.
- Spring Valley Water Company (SVWC) production well Nos. 93, 94, 95, and 96 will be monitored quarterly for the site parameter list, if site parameters are not already being monitored by SVWC. After one year, if the monitoring program does not show trends suggesting an impact from site-related contaminants, the monitoring schedule for these wells can be adjusted to conform with the minimum monitoring requirements specified under Chapter 10, Subpart 5-1 of the New York State Sanitary Code.
- Delineation and evaluation of any wetlands on or adjacent to the Site or impacted by the Site consistent with the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1989);
- Performance of a Stage 1A cultural resources survey, as early as possible during Remedial Design, on-site and in off-site areas where there is a potential impact to cultural resources.

The purpose of this response action is to reduce the present risk to human health and the environment due to contaminants leaching from the landfill mound. The capping of the landfill will minimize the infiltration of rainfall and snowmelt into the landfill, thereby reducing the potential for contaminants leaching from the landfill and negatively impacting the wetlands habitat and groundwater quality. Capping will prevent direct contact exposure to contaminated soils, and as such will result in risks which are less than EPA's target levels of 10<sup>-6</sup> and 1 for carcinogenic risks and the noncarcinogenic hazard index, respectively.

Pumping and treating the groundwater will contain the groundwater contamination within the Site boundary and will ensure that groundwater beyond the Site boundary meets applicable or relevant and appropriate state and federal standards for groundwater. The extracted leachate and groundwater will be discharged to a POTW for off-site treatment.

The response action also reduces the movement and toxicity of the contaminated landfill leachate into groundwater, and subsequent downgradient migration of contaminants.

#### STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibilities at Superfund sites is to undertake remedial actions that achieve protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes, as available. The following sections discuss how the selected remedy meets these statutory requirements. The contingent remedy will also meet these requirements.

#### Protection of Human Health and the Environment

Alternative 5 and Alternative 4, Option B are fully responsive to this criterion and to the identified remedial response objectives. Capping the landfill protects human health and the environment by reducing the mobility of contaminated materials, in that the leaching of contaminants into the aquifers will be

significantly reduced. In addition, capping the landfill will eliminate threats posed to adults, children, trespassers, and wildlife who come in contact with the Site. The extraction and treatment of contaminants in groundwater will prevent the off-site groundwater from being contaminated above drinking water standards, thereby ensuring that the community continues to have a potable supply of drinking water.

#### Compliance with ARARs

The selected remedy would require approval from the NYSDEC for a variance from New York State Part 360 Solid Waste Regulations for the elimination of the impermeable layer on the side slopes of the landfill. NYSDEC approval of this variance is contingent upon the results of the confirmatory studies to determine the effectiveness of Alternative 5.

Both cap designs in the selected and contingent remedies specify a 12-inch fill layer overlying the impermeable barrier. The selection of a 12-inch fill layer would require approval from NYSDEC for a variance from New York State Part 360 Solid Waste Regulations in order to meet frost protection requirements. NYSDEC considers this variance to be approvable at this site, providing that a synthetic membrane meeting appropriate performance standards is used as an impermeable barrier.

Attainment of chemical-specific ARARs for groundwater will be hastened due to reduced leaching following construction of the cap and the extraction and treatment of leachate and groundwater. The source of surface water contamination (leachate seeps) will be eliminated. Action- and location-specific ARARs will be complied with during implementation.

#### Action-specific ARARs:

- New York State Solid Waste Management Facilities 6 NYCRR Part 360
- National Emissions Standards for Hazardous Air Pollutants (NESHAPs)
- 6 NYCRR Part 257 Air Quality Standards
- 6 NYCRR Part 212 Air Emission Standards
- 6 NYCRR Part 373 Fugitive Dusts
- 40 CFR 50 Air Quality Standards
- SPDES - Discharge
- Resource Conservation and Recovery Act (RCRA)

#### Chemical-specific ARARs:

- SDWA MCLs
- 6 NYCRR Part 703.5 Groundwater Quality Regulations
- 6 NYCRR Part 702 Surface Water Standards
- 10 NYCRR Part 5 State Sanitary Code

#### Location-specific ARARs:

- Clean Water Act Section 404, 33 USC 1344
- Fish and Wildlife Coordination Act, 16 USC 661

- National Historic Preservation Act, 16 USC 470
- New York State Freshwater Wetlands Law ECL, Article 24, 71 in Title 23
- New York State Freshwater Wetlands Permit Requirements and Classification, 6 NYCRR 663 and 664
- New York State Endangered and Threatened Species of Fish and Wildlife Requirements, 6 NYCRR 182

Other Criteria, Advisories, or Guidance To Be Considered:

- Executive Order 11990 (Protection of Wetlands)
- Executive Order 11988 (Floodplain Management)
- EPA Statement of Policy on Floodplains and Wetlands Assessments for CERCLA Actions
- New York Guidelines for Soil Erosion and Sediment Control
- New York State Sediment Criteria, December 1989
- New York State Air Cleanup Criteria, January 1990
- SDWA Proposed Maximum Contaminant Levels (PMCLs) and Maximum Contaminant Level Goals (MCLGs)
- Sole Source Aquifer (SSA) Petition under review for the Ramapo River Watershed
- NYSDEC Technical and Operational Guidance Series 1.1.1, November 1991

Cost-Effectiveness

The selected remedy and the contingent remedy provide overall effectiveness proportional to their costs. The total capital and present worth cost ranges for the selected remedy are estimated to be \$18,960,000 - \$22,210,000, and \$19,890,000 - \$26,423,000, respectively. For the contingent remedy, the corresponding cost ranges are \$22,440,000 - \$25,580,000 and \$23,230,000 - \$29,230,000, respectively.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy and contingent remedy utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. The selected remedy and the contingent remedy represent the best balance of trade-offs among the alternatives with respect to the evaluation criteria.

The extraction and subsequent treatment of groundwater will permanently and significantly reduce the toxicity, mobility, and volume of contaminants in the groundwater. Confirmatory studies will be performed to demonstrate that the selected remedy meets all remedial action objectives. If the confirmatory studies indicate that the selected remedy is not effective in meeting remedial action objectives, then the contingency remedy will be implemented, where needed.

The selected remedy and contingent remedy will require construction of a landfill cap. No technological problems should arise since the technologies and materials needed for capping the landfill are readily available. With the construction of the landfill cap, the direct contact risk to the landfill surface will be eliminated.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element cannot be satisfied for the landfill itself, since treatment of the landfill material is not practicable. The size of the landfill and the fact that there are no identified on-site hot spots that represent the major sources of contamination

preclude a remedy in which contaminants could be excavated and treated effectively. However, the selected remedy and the contingent remedy call for the treatment of contaminated groundwater at the Site and, hence, satisfy the preference for treatment for this portion of the remedy.

#### DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred alternative presented in the Proposed Plan, other than a modification of the capital, O&M, and present worth costs associated with Alternatives 3 - 5.

In the Proposed Plan, the O&M costs associated with Alternatives 1 and 2 reflected continued treatment of the leachate from the landfill at the Suffern Wastewater Treatment plant, while Alternatives 3 - 5 reflected O&M costs associated with treatment of the leachate and groundwater at an alternative facility. The costs in ROD, however, reflect treatment of the leachate and groundwater for all of the alternatives at the Suffern Wastewater Treatment plant. The Town of Ramapo, however, is pursuing arrangements for treatment at the Rockland County Sewer District No. 1 POTW.

#### APPENDIX I

##### FIGURES

###### Figures

- Figure 1 - Site Location
- Figure 2 - Site Plan
- Figure 3 - Thickness of Fill
- Figure 4 - Leachate Collection System
- Figure 5 - Floodplain Boundary Map
- Figure 6 - Wetlands in Landfill Area
- Figure 7 - Environmental Sampling Locations
- Figure 8 - Air Monitoring Locations

#### APPENDIX II

##### TABLES

###### Tables

- Table 1 - Comparison Between Analytical Results for Wastes and EP Toxicity Limits
- Table 2 - Comparison of Maximum Groundwater Concentrations to ARARs
- Table 3 - Locations of Groundwater Data Exceeding ARARs
- Table 4 - Comparison of Maximum Surface Water Concentrations to ARARs
- Table 5 - Locations of Surface Water Data Exceeding ARARs
- Table 6 - Sediment Cleanup Criteria
- Table 7 - Phase II VOA Analytical Summary
- Table 8 - Chemicals of Potential Concern
- Table 9 - Potential Exposure Pathways
- Table 10 - Toxicity Values: Potential Noncarcinogenic Effects
- Table 11 - Summary of Noncancer Risks
- Table 12 - Toxicity Values: Potential Carcinogenic Effects
- Table 13 - Summary of Cancer Risks
- Table 14 - Summary of Costs for Remedial Alternatives

TABLE 3  
LOCATIONS OF GROUNDWATER DATA EXCEEDING ARARS

OVERBURDEN

Parameter	Location
Arsenic	GW-8
Chromium	GW-1, GW-2, GW-3, GW-4, GW-5
Iron	GW-1, GW-2, GW-3, GW-4, GW-5, GW-6, GW-7, GW-8, GW-9
split	
Lead	GW-2
Manganese	GW-1 through GW-8, GW-10
Sodium	GW-1, GW-3, GW-4, GW-6, GW-7, GW-8
TOC	GW-1 through GW-10, not analyzed in GW-5
Benzene	GW-5, GW-8, GW-4

INTERMEDIATE

Benzene	GW-1, GW-4, GW-6, GW-7, GW-8, GW-9
Chlorobenzene	GW-8
alpha-BHC	GW-5
delta-BHC	GW-4
Chromium	GW-1, GW-4, GW-5, GW-7, GW-8
Iron	GW-1 through GW-8
Magnesium	GW-4, GW-8
Manganese	GW-1, GW-4, GW-7, GW-8, GW-9
Mercury	GW-6
TOC	GW-1, GW-4, GW-5, GW-7, GW-8

BEDROCK

1,1-Dichloroethane	GW-4
Benzene	GW-4, GW-8, GW-9
Di-n-octyl phthalate	GW-8
gamma-BHC	GW-7
Iron	All wells
Magnesium	GW-8
Manganese	GW-3, GW-4, GW-8, GW-9, GW-9 split
Mercury	GW-8
Sodium	GW-3, GW-4, GW-7, GW-8, GW-9
TOC	GW-3, GW-4, GW-5, GW-8, GW-9, GW-10

TABLE 5

## LOCATIONS OF SURFACE WATER DATA EXCEEDING ARARS

Parameter	Location
Vinyl chloride	SW-5, SW-6
Antimony	SW-1
Arsenic	SW-1
Iron	SW-1, SW-8
Manganese	SW-1
Mercury	SW-1, SW-5, SW-6, SW-7, SW-8
Nickel	SW-1
Thallium	SW-2
Zinc	SW-2, SW-3, SW-4
Ammonia	SW-1
TOC	SW-1, SW-5, SW-6, SW-7, SW-8
NO2-N	SW-1
TDS	SW-1
Sulfide	SW-1, SW-2
Copper	SW-6
Lead	SW-5, SW-6, SW-7, SW-8
Cyanide	SW-1

Table 8

## GROUNDWATER CHEMICALS OF POTENTIAL CONCERN

Benzene	Propylbenzene	Pyrene
Tetrachloroethene	Chloromethane	Arsenic
Trichloroethene	Chlorobenzene	Cadmium
1,4-Dichlorobenzene	Styrene	Manganese
Isopropylbenzene	1,2-Dichlorobenzene	Cobalt
Total Xylene	1,3,5-Trimethylbenzene	Lead
Dichlorodifluoromethane	tert-Butylbenzene	Sodium
1,1-Dichloroethane	Naphthalene	Vanadium
1,2-Dichloroethane	Diethylphthalate	Mercury
p-Isopropyltoluene	Butylbenzylphthalate	Chromium (III)
cis-1,2-Dichloroethane	Bis(2-ethylhexyl)phthalate	Aluminum
1,2,4-Trimethylbenzene	Di-n-octylphthalate	Barium
Carbon Disulfide	delta-BHC	Calcium
Toluene	gamma-BHC	Copper
Acetone	4-Methyl-2-pentanone	Iron
Nickel	Potassium	Zinc

## SOIL/WASTE CHEMICALS OF POTENTIAL CONCERN

1,4-Dichlorobenzene	Benzo(g,h,i)perylene
1,2-Dichlorobenzene	2-Butanone
Benzoic acid	Benzene
Naphthalene	1,1,2,2-Tetrachloroethane
2-Methylenaphthalene	Chlorobenzene
Acenaphthene	Ethylbenzene
Fluorene	Total Xylenes
N-nicrosodiphenylamine	Dieldrin
Phenanthrene	Chlordane
Anthracene	Heptachlor Epoxide
Fluoranthene	Beryllium
Pyrene	Cadmium
Butylbenzylphthalate	Mercury
Benzo(a)anthracene	Total Phenols
Chrysene	
Bis(2-ethylhexyl)phthalate	
Di-n-octylphthalate	
Benzo(b)fluoranthene	
Benzo(k)fluoranthene	
Benzo(a)pyrene	
Indeno(1,2,3-cd)pyrene	
Dibenzofuran	

## AIR CHEMICALS OF POTENTIAL CONCERN

2-Butanone	Tetrachloroethene
1,1,1-Trichloroethane	Styrene
Carbon Tetrachloride	Toluene
Benzene	Total Xylenes
Chlorobenzene	Methylene Chloride
Ethylbenzene	Acetone

**1997 EXPLANATION OF SIGNIFICANT DIFFERENCES (ESD)**



## Explanation of Significant Differences

### RAMAPO LANDFILL SITE

Town of Ramapo  
Rockland County, New York

SDMS Document



110462

EPA  
Region 2

December 1997

#### INTRODUCTION

In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 117(c), and Section 300.435(c)(2)(i) of the National Oil and Hazardous Substances Contingency Plan, if after the Environmental Protection Agency (EPA) selects a remedial action, there is a significant change with respect to that action, an explanation of the significant differences and the reasons such changes were made must be published.

The March 31, 1992 Record of Decision (ROD) called for, among other things, the installation of a cap with an impermeable barrier only on the top (flat) portion of the Ramapo Landfill. In addition, the ROD indicated that the landfill's side slopes would not require an impermeable barrier, unless further study concluded that incorporating an impermeable barrier would result in a significantly more effective remedy.

As a result of the studies called for in the ROD, it was determined that a landfill cover which included an impermeable barrier on the side slopes of the landfill would be significantly more protective and cost-effective than a cover without an impermeable barrier on the side slopes. The engineering design of the remedy was completed in June 1994. The construction of the cover over the top and the side slopes of the landfill was completed in May 1997.

This Explanation of Significant Differences (ESD) will become part of the Administrative Record file for the site. The entire Administrative Record for the site, which includes the remedial investigation and feasibility study (RI/FS) report, ROD, and other relevant documents are available for public review at the following location:

Finkelstein Public Library  
24 Chestnut Street  
Spring Valley, New York

Hours: Mon.-Thur., 9:00 am - 9:00 pm  
Fri., 9:00 am - 6:00 pm  
Sat., 10:00 am - 5:00 pm  
Sun., 12:00 Noon - 5:00 pm

and

Suffern Free Public Library

Washington and Maple Avenues  
Suffern, New York

Hours: Mon.-Thur., 10:00 am - 9:00 pm  
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U.S. Environmental Protection Agency  
290 Broadway, 18<sup>th</sup> floor  
New York, New York 10007

Hours: 9:00 am - 5:00 pm (Monday - Friday)

The difference from the selected remedy is not considered by EPA or the New York State Department of Environmental Conservation (NYSDEC) to be a fundamental alteration of the remedy selected in the ROD. The remedy modification increases the protectiveness of the action with respect to human health and the environment, increases the cost-effectiveness of the action, and complies with federal and state requirements that were identified in the ROD.

#### SUMMARY OF SITE HISTORY, CONTAMINATION PROBLEMS, AND SELECTED REMEDY

The Ramapo Landfill site is located on a 96-acre tract in the Town of Ramapo, Rockland County, New York. Approximately 50 acres of the site are covered with fill material (the "landfill portion" of the site). The landfill portion of the site is mounded into two major lobes (northern and southern). Both landfill lobes consist of mixed refuse. Substances reportedly disposed of in the landfill portion of the site include industrial sludge and other wastes reportedly from a pharmaceutical company, sewage sludge, municipal refuse, asbestos, construction and demolition debris, yard debris, paint sludge, and liquid wastes reportedly from a paper company.

In 1971, the Rockland County Department of Health granted a permit to the Town of Ramapo for the operation of the sanitary landfill. Municipal waste was accepted in the landfill until 1984. The Town of Ramapo continued to accept construction and demolition debris at the site until 1989.

In September 1983, the Ramapo Landfill site was placed on the Superfund National Priorities List.

Based upon the results of the RI/FS, on March 31, 1992, a ROD was signed. The major components of the selected remedy are as follows:

- Installation of a cap on the top of the landfill;
- Excavation and consolidation of contaminated soils within the capped area;
- Installation of groundwater extraction wells to supplement the existing leachate collection system;
- Collection and diversion of leachate seeps to the leachate collection system;
- Conveyance of the collected leachate and groundwater to a publicly-owned treatment works for off-site treatment.
- Imposition of property deed restrictions to prevent the installation of drinking water wells at the site and restrict activities which could affect the integrity of the cap;
- Performance of operation, maintenance, and long-term monitoring activities; and
- Development of a contingency plan for rapid implementation of measures to protect nearby residents and users of groundwater if those measures are determined to be necessary.

The ROD also stated that an impermeable barrier would be placed on the landfill's side slopes if confirmatory studies indicated that the remedy's overall effectiveness would be significantly enhanced.

#### **DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE REASONS FOR THOSE DIFFERENCES**

The confirmatory studies called for in the ROD indicated that the exclusion of an impermeable barrier from the landfill cap on the side slopes would result in increased infiltration of rainfall through the cap. This would cause the generation of greater quantities of contaminated groundwater than a landfill cap with an impermeable barrier on the side slopes, which would result in greater operational costs to collect and treat a larger volume of contaminated groundwater and leachate.

In addition, it was determined that either a thicker soil cover or an impermeable barrier would be needed on the side slopes to provide adequate control of landfill gases. The impermeable barrier was found to be the less costly of the two options.

Therefore, based upon the results of the confirmatory studies, it was concluded that a cap with an impermeable barrier on the landfill's side slopes would be more protective and more cost-effective than a cap without an impermeable barrier on the side slopes.

#### **SUPPORT AGENCY COMMENTS**

NYSDEC supports the change to the remedy due to its environmental, public health, and technical advantages over the remedy selected in the ROD.

#### **AFFIRMATION OF STATUTORY DETERMINATIONS**

EPA and NYSDEC believe that the modified remedy increases the protectiveness of the action with respect to human health and the environment, increases the cost-effectiveness of the action, and complies with federal and state requirements that are applicable or relevant and appropriate to this remedial action. In addition, the remedy, continues to utilize permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

#### **PUBLIC PARTICIPATION ACTIVITIES**

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered. Towards this end, EPA invites comments or questions related to this ESD. Comments or questions should be directed to:

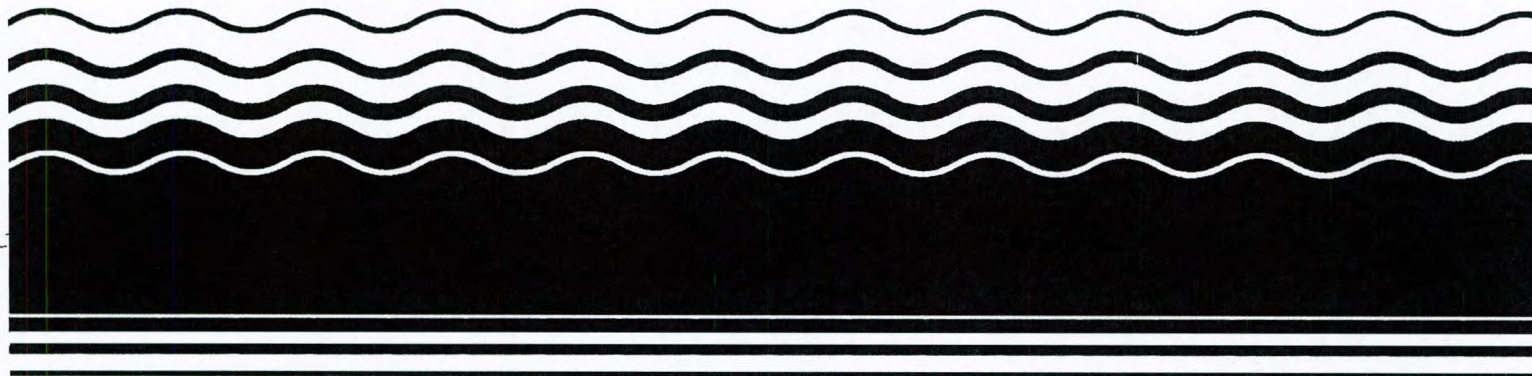
Robert Nunes  
Remedial Project Manager  
Central New York Remediation Section  
U.S. Environmental Protection Agency  
290 Broadway, 20<sup>th</sup> Floor  
New York, New York 10007-1866

Telephone: (212) 637-4254  
Telefax: (212) 637-3966  
Internet: nunes.robert@epamail.epa.gov

**PB98-963112  
EPA 541-R98-044  
September 1998**

**EPA    Superfund  
Explanation of Significant Difference  
for the Record of Decision:**

**Ramapo Landfill  
Ramapo, NY  
11/26/1997**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION II

DATE: NOV 25 1997

SUBJECT: Explanation of Significant Differences for the Ramapo Landfill Superfund Site

FROM: Richard L. Caspe, P.E., Director  
Emergency and Remedial Response Division

TO: Jeanne M. Fox  
Regional Administrator

Attached is an Explanation of Significant Differences (ESD) for the Ramapo Landfill Superfund site.

The March 31, 1992 Record of Decision (ROD) called for, among other things, the installation of a cap with an impermeable barrier only on the top (flat) portion of the Ramapo Landfill. In addition, the ROD indicated that the landfill's side slopes would not require an impermeable barrier, unless further study concluded that incorporating an impermeable barrier would result in a significantly more effective remedy.


As a result of the studies called for in the ROD, it was determined that a landfill cover which included an impermeable barrier on the side slopes of the landfill would be significantly more protective and cost-effective than a cover without an impermeable barrier on the side slopes. The attached ESD documents these findings.

Please indicate your approval of the ESD by signing below.

If you have any questions related to the ESD, please call me at extension 4390.

Attachment

Approved:

  
\_\_\_\_\_  
Jeanne M. Fox  
Regional Administrator

11/26/97

Date

# Explanation of Significant Differences

## RAMAPO LANDFILL SITE

Town of Ramapo  
Rockland County, New York

EPA  
Region 2

December 1997

### INTRODUCTION

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Suffern Free Public Library  
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- Collection and diversion of leachate seeps to the leachate collection system;
- Conveyance of the collected leachate and groundwater to a publicly-owned treatment works for off-site treatment.
- Imposition of property deed restrictions to prevent the installation of drinking water wells at the site and restrict activities which could affect the integrity of the cap;
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- Development of a contingency plan for rapid implementation of measures to protect nearby residents and users of groundwater if those measures are determined to be necessary.

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Robert Nunes  
Remedial Project Manager  
Central New York Remediation Section  
U.S. Environmental Protection Agency  
290 Broadway, 20<sup>th</sup> Floor  
New York, New York 10007-1866

Telephone: (212) 637-4254  
Telefax: (212) 637-3966  
Internet: nunes.robert@epamail.epa.gov

**APPENDIX B-1**

**COVENANT OF RESTRICTIONS AND ENVIRONMENTAL EASEMENTS**

Paul Piperato, County Clerk  
1 South Main St Ste 100  
New City, NY 10956  
(845) 638-5070

# Rockland County Clerk Recording Cover Sheet

Received From :  
JADE ABSTRACT  
151 SOUTH MAIN ST  
NEW CITY, NY 10956

Return To :  
JADE ABSTRACT  
151 SOUTH MAIN ST  
NEW CITY, NY 10956

Method Returned : FILE CABINET

## First GRANTOR

RAMAPO TOWN OF

## First GRANTEE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Index Type : Land Records

Instr Number : 2012-00030817

Book : Page :

Type of Instrument : Declaration

Type of Transaction : Ease, Rightway, A/Rent

Recording Fee : \$0.00

Recording Pages : 20

The Property affected by this instrument is situated in Ramapo, in the  
County of Rockland, New York

## Real Estate Transfer Tax

RETT # : 275

Deed Amount : \$0.00

RETT Amount : \$0.00

Total Fees : \$0.00

State of New York

County of Rockland

I hereby certify that the within and foregoing was  
recorded in the Clerk's office for Rockland County,  
New York

On (Recorded Date) : 08/28/2012

At (Recorded Time) : 11:35:00 AM



Doc ID - 025213070020

*Paul Piperato*

Paul Piperato, County Clerk



This sheet constitutes the Clerks endorsement required by Section 319 of Real Property Law of the State of New York

Entered By: COUNTER1 Printed On : 08/29/2012 At : 10:51:28AM

County: Rockland

Site No: 344004

Order No:

**DECLARATION OF COVENANTS, RESTRICTIONS  
AND ENVIRONMENTAL EASEMENT**

This Declaration of Covenants, Restrictions and Environmental Easement is made this 12<sup>th</sup> day of July, 2012, by and between The Town of Ramapo, a municipal corporation organized and existing under the laws of the State of NY, having its principal office at 237 Route 59, Suffern, New York 10901 ("Grantor"), and the People of the State of New York acting through their Commissioner of the New York State Department of Environmental Conservation with its Central Office, located at 625 Broadway, Albany, New York 12233 ("Grantee").

**WITNESSETH:**

WHEREAS, Grantor is the owner of a parcel of land located in the Town of Ramapo, County of Rockland, State of New York, which is the location of the Ramapo Landfill Superfund Site ("Ramapo Landfill Site"), a former sanitary landfill facility which accepted municipal waste for disposal, located on a tract of land containing more or less 86.068 acres, more particularly described on Exhibit A and depicted on Exhibit C, both attached hereto and made a part hereof, together with any buildings and improvements thereon and appurtenances thereto which the United States Environmental Protection Agency ("EPA"), pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9605, placed on the National Priorities List, as set forth in Appendix B of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300, by publication in the Federal Register on September 1, 1983; and

WHEREAS, the Site includes a tract of land containing more or less 54.813 acres, more particularly described on Exhibit B and depicted on Exhibit C, both attached hereto and made a part hereof, on which the Town of Ramapo constructed a landfill cover as part of the CERCLA remedial action selected for the Ramapo Landfill Site (the "Inactive Capped Landfill"); and

WHEREAS, in a Record of Decision dated March 31, 1992 ("ROD") as modified by an Explanation of Significant Difference dated November 25, 1997 ("ESD"), EPA selected, and the New York State Department of Environmental Conservation ("NYSDEC") concurred with, a remedial action for the Site pursuant to CERCLA, which provided for, among other things, the construction of a landfill cover with an impermeable barrier on the top (flat) portion as well as the side slopes of the landfill, covering approximately 54.813 acres, and also provided for institutional controls to prevent the installation of drinking water wells at the Ramapo Landfill Site, and to restrict activities which could affect the integrity of the landfill cover; and

WHEREAS, the construction activities associated with the remedial action have been completed at the Ramapo Landfill Site and long term monitoring activities are ongoing; and

WHEREAS, the parties hereto have agreed that Grantor shall grant to the Grantee a permanent Environmental Easement pursuant to Article 71, Title 36 of the NYS Environmental Conservation Law, covenant with respect to the restrictions on the use of the Landfill Site including the Inactive Capped Landfill, and provide a right of access to the Ramapo Landfill Site

R-18

County: Rockland

Site No: 344004

Order No:

in favor of Grantee and EPA, all of which shall run with the land, for purposes of implementing, facilitating and monitoring the CERCLA response action in order to protect human health and the environment; and

WHEREAS, Grantor wishes to cooperate fully with the Grantee in the implementation of all response actions at the Ramapo Landfill Site.

NOW, THEREFORE:

1. Grant: Grantor, on behalf of itself, its successors and assigns, for ten dollars and other good and valuable consideration, receipt whereof is hereby acknowledged, does hereby give, grant, covenant and declare in favor of the Grantee that the Ramapo Landfill Site shall be subject to this Declaration of Covenants, Restrictions and Environmental Easement, and Grantor does further give, grant and convey to the Grantee the perpetual right to enforce said restrictions, covenants, right of access and Declaration of Covenants, Restrictions and Environmental Easement, all of which shall be of the nature and character, and for the purposes hereinafter set forth, with respect to the Ramapo Landfill Site.
2. Purpose: It is the purpose of this instrument to convey to the Grantee real property rights, which will run with the land, facilitate the remediation of past environmental contamination and to impose use restrictions and covenants to protect human health and the environment by reducing the risk of exposure to contaminants.
3. Restrictions on Use; Maintenance of Engineering Controls; and Periodic Certifications of Compliance:
  - a) Institutional Controls. The following restrictions apply to the use of the Ramapo Landfill Site, as provided below, run with the land and are binding on the Grantor and its successors in title and assigns:
    - i. Activities that could affect the integrity of the landfill cover, including without limitation, excavation, digging, and construction activities, are prohibited on any portion of the Inactive Capped Landfill, unless Grantee and EPA have given their prior written consent to any such intrusive activity.
    - ii. Groundwater wells for drinking water shall not be installed or used on any portion of the Ramapo Landfill Site.
    - iii. The Ramapo Landfill Site shall not be used for "Residential use" and "Restricted-Residential use" as defined by New York State Department of Environmental Conservation (NYSDEC) Regulations - 6 NYCRR Part 375 - 1.8 (g) (2) (i) and (ii). Allowable Uses include "Commercial Use" and "Industrial use" as defined in NYSDEC Regulations - 6 NYCRR Part 375 - 1.8 (g) (2) (iii) and (iv).
  - b) Engineering Controls. Grantor, for itself and its successors and assigns, covenants and agrees to keep in good repair and maintain the following engineering controls ("Engineering Controls"):
    - i. Leachate Collection System;
    - ii. Landfill Cover and Gas Venting;

County: Rockland

Site No: 344004

Order No:

- iii. Fencing bordering the Inactive Capped Landfill;
  - iv. Groundwater Containment System (including extraction wells); and
  - v. Monitoring Well Network.
- c) Periodic Certification. Grantor, for itself and its successors and assigns, covenants and agrees that it shall, upon request by Grantee or EPA, certify to Grantee and to EPA that it is in compliance with the current Site Management Plan for the Ramapo Landfill Site (a copy of which is available from Grantee at the address provided in Section 15, below and electronically at the Grantee's website currently <http://www.dec.ny.gov/chemical/36045.html>); that the Institutional Controls for the Ramapo Landfill Site are in place and have not been violated since the date of the previous certification; that it is in compliance with its covenant to keep in good repair and maintain the Engineering Controls.
- 4. Modification or termination of restrictions and covenants: The restrictions, covenants and agreements specified in the preceding paragraph of this instrument may only be modified or terminated, in whole or in part, in writing, by the Grantee, provided, however, that any modification or termination of said restrictions shall not adversely affect the remedy selected by EPA and NYSDEC for the Ramapo Landfill Site. If requested by the Grantor, such writing will be executed by Grantee in recordable form. Any request by Grantor for a modification or termination of this instrument shall be made, not less than 30-days in advance of any modification or termination, in writing by Grantor to NYSDEC and to EPA in accordance with paragraph 15 of this instrument.
- 5. Right of access: Grantors hereby convey to Grantee and to EPA a right of access to the Ramapo Landfill Site at all reasonable times for the following purposes, which right of access shall run with the land and be binding on Grantor, its successors and/or assigns, and on any tenants or any other parties having an interest and/or rights to any portion of the Ramapo Landfill Site:
  - a) Implementing the response actions selected in the ROD as modified by the ESD.
  - b) Verifying any data or information relating to the Ramapo Landfill Site;
  - c) Verifying that no action is being taken at the Ramapo Landfill Site in violation of the terms of this instrument or of any federal or state environmental laws or regulations;
  - d) Conducting investigations under CERCLA relating to contamination on or near the Ramapo Landfill Site, including, without limitation, sampling of air, water, sediments, soils; and
  - e) Implementing additional or new response actions under CERCLA.
- 6. Reserved rights of Grantor: Grantor hereby reserves unto itself, its successors, and assigns, all rights and privileges in and to the use of the Ramapo Landfill Site which are not incompatible with the restrictions, rights, covenants and easements granted herein.
- 7. Federal authority: Nothing in this document shall limit or otherwise affect EPA's rights of entry and access or EPA's authority to take response actions under CERCLA, the NCP, or other federal law.

County: Rockland

Site No: 344004

Order No:

8. State authority: Nothing herein shall constitute a waiver of any rights the State may have pursuant to the Environmental Conservation Law, regulations and/or relevant provisions of statutory or common law.
9. No public access and use: No right of access or use by the general public to any portion of the Ramapo Landfill Site is conveyed by this instrument.
10. Public notice: Grantor, on behalf of itself, its successors and assigns, agrees to include in each instrument conveying any interest in any portion of the Ramapo Landfill Site, including but not limited to deeds, leases and mortgages, a notice which is in substantially the following form:

**NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO A DECLARATION OF COVENANTS, RESTRICTIONS AND ENVIRONMENTAL EASEMENT, DATED \_\_\_\_\_, 20\_\_, RECORDED IN THE ROCKLAND COUNTY CLERK'S OFFICE ON \_\_\_\_\_, 20\_\_, IN BOOK \_\_\_\_\_, PAGE \_\_\_\_\_, IN FAVOR OF, AND ENFORCEABLE BY, THE PEOPLE OF THE STATE OF NEW YORK AND BY THE UNITED STATES OF AMERICA AS THIRD-PARTY BENEFICIARY.**

Within thirty (30) days of the date any such instrument of conveyance is executed, Grantor agrees to provide Grantee and EPA with a certified true copy of said instrument and, if it has been recorded in the public land records, its recording reference.

11. Enforcement: The Grantee shall be entitled to enforce the terms of this instrument by resort to specific performance. All remedies available hereunder shall be in addition to any and all other remedies at law or in equity, including CERCLA. Any forbearance, delay or omission to exercise Grantee's rights under this instrument in the event of a breach of any term of this instrument shall not be deemed to be a waiver by the Grantee of such term or of any of the rights of the Grantee under this instrument.
12. Damages: Grantee shall also be entitled to recover damages for breach of any covenant or violation of the terms of this instrument including any impairment to the remedial action that increases the cost of the selected response action for the Ramapo Landfill Site as a result of such breach or violation.
13. Waiver of certain defenses: Grantor hereby waives any defense of laches, estoppel, or prescription.
14. Covenants: Grantor hereby covenants that the Grantor is lawfully seized in fee simple of the real property at the Ramapo Landfill Site, that the Grantor has a good and lawful right and power to sell and convey it or any interest therein and that the Ramapo Landfill Site is free and clear of encumbrances.
15. Notices: Any notice, demand, request, consent, approval, or communication under this instrument that either party desires or is required to give to the other shall be in writing and shall either be served personally or sent by first class mail, postage prepaid, addressed as follows:

County: Rockland

Site No: 344004

Order No:

To Grantor:

Supervisor, Town of Ramapo  
237 Route 59  
Suffern, NY 10901

To Grantee:

Office of General Counsel  
NYS Department of Environmental Conservation  
625 Broadway  
Albany, New York 12233-5500

Town Attorney  
Town of Ramapo  
237 Route 59  
Suffern, NY 10901

NYS Department of Environmental Conservation  
Division of Environmental Remediation  
Bureau of Site Control  
625 Broadway  
Albany, New York 12233

A copy of each such communication shall also be sent to EPA in the same manner as to Grantor or Grantee, and addressed to the following two addressees:

U.S. Environmental Protection Agency  
Emergency & Remedial Response Division  
New York Remediation Branch  
Attention: Ramapo Landfill Superfund Site Remedial Project Manager  
290 Broadway, 20<sup>th</sup> Floor,  
New York, New York 10007-1866

U.S. Environmental Protection Agency  
Office of Regional Counsel  
Attention: Ramapo Landfill Superfund Site Attorney  
290 Broadway, 17<sup>th</sup> Floor,  
New York, New York 10007-1866

16. General provisions:

a) Controlling law: The interpretation and performance of this instrument shall, with respect to the Declaration of Covenants, Restrictions and Environmental Easement, be governed by the laws of the State of New York, and with respect to other matters, shall be governed by the laws of the United States or, if there are no applicable federal laws, by the law of the State of New York.

b) Liberal construction: Any general rule of construction to the contrary notwithstanding, this instrument shall be liberally construed in favor of the grant to effect the purpose of this instrument and the policy and purpose of CERCLA. If any provision of this instrument is found to be ambiguous, an interpretation consistent with the purpose of this instrument that would render the provision valid shall be favored over any interpretation that would render it invalid.

c) Severability: If any provision of this instrument, or the application of it to any person or circumstance, is found to be invalid, the remainder of the provisions of this instrument, or the

County: Rockland

Site No: 344004

Order No:

application of such provisions to persons or circumstances other than those to which it is found to be invalid, as the case may be, shall not be affected thereby.

d) No forfeiture: Nothing contained herein will result in a forfeiture or reversion of Grantors' title in any respect.

e) Joint obligation: If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

f) Successors: The covenants, easements, terms, conditions, and restrictions of this instrument shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall continue as a servitude running in perpetuity with the real property at the Ramapo Landfill Site. The term "Grantor", wherever used herein, and any pronouns used in place thereof, shall include the persons and/or entities named at the beginning of this document, identified as "Grantor" and their personal representatives, heirs, successors, and assigns. The term "Grantee", wherever used herein, and any pronouns used in place thereof, shall mean the People of the State of New York acting through their Commissioner of NYSDEC or through any successor department or agency of the State of New York.

g) Captions: The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.

h) Counterparts: The parties may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by both parties; each counterpart shall be deemed an original instrument as against any party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling.

i) Third-Party Beneficiary: Grantor and Grantee hereby agree that the United States, through EPA, shall be, on behalf of the public, a third-party beneficiary of the benefits, rights and obligations conveyed to Grantee in this instrument; provided that nothing in this instrument shall be construed to create any obligations on the part of EPA.

TO HAVE AND TO HOLD unto the Grantee and its assigns forever.

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Executed this 20<sup>th</sup> day of June, 2012.

GRANTOR  
TOWN OF RAMAPO

By: 

Title: Supervisor

County: Rockland

Site No: 344004

Order No:

**Grantor's Acknowledgment**

STATE OF NEW YORK )  
COUNTY OF Rockland ) ss:

On the 28<sup>th</sup> day of June, in the year 2012, before me, the undersigned, personally appeared Christopher P. St. Lawrence, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity as Supervisor of the Town of Ramapo, and that by his/her signature on the instrument, the Grantor, upon behalf of which the individual acted, executed the instrument.

Judy L. Canetti  
Notary Public - State of New York

JUDY L. CANETTI  
Notary Public, State of New York  
No. 01CA0182715  
Qualified in Rockland County  
Commission Expires 3/19/2015

County: Rockland

Site No: 344004

Order No:

**THIS DECLARATION OF COVENANTS, RESTRICTIONS AND ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner.**

By: 

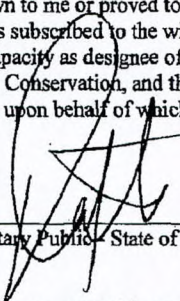
Robert W. Schick, Director  
Division of Environmental Remediation

Date: July 12, 2012

**Grantee's Acknowledgment**

(BC) STATE OF NEW YORK )  
COUNTY OF Albany ) ss:

On the 12 day of July, in the year 2012, before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity as designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his signature on the instrument, the People of the State of New York, upon behalf of which the individual acted, executed the instrument.

  
Notary Public - State of New York

David J. Chiusano  
Notary Public, State of New York  
No. 01CH5082146  
Qualified in Schenectady County,  
Commission Expires August 22, 2014

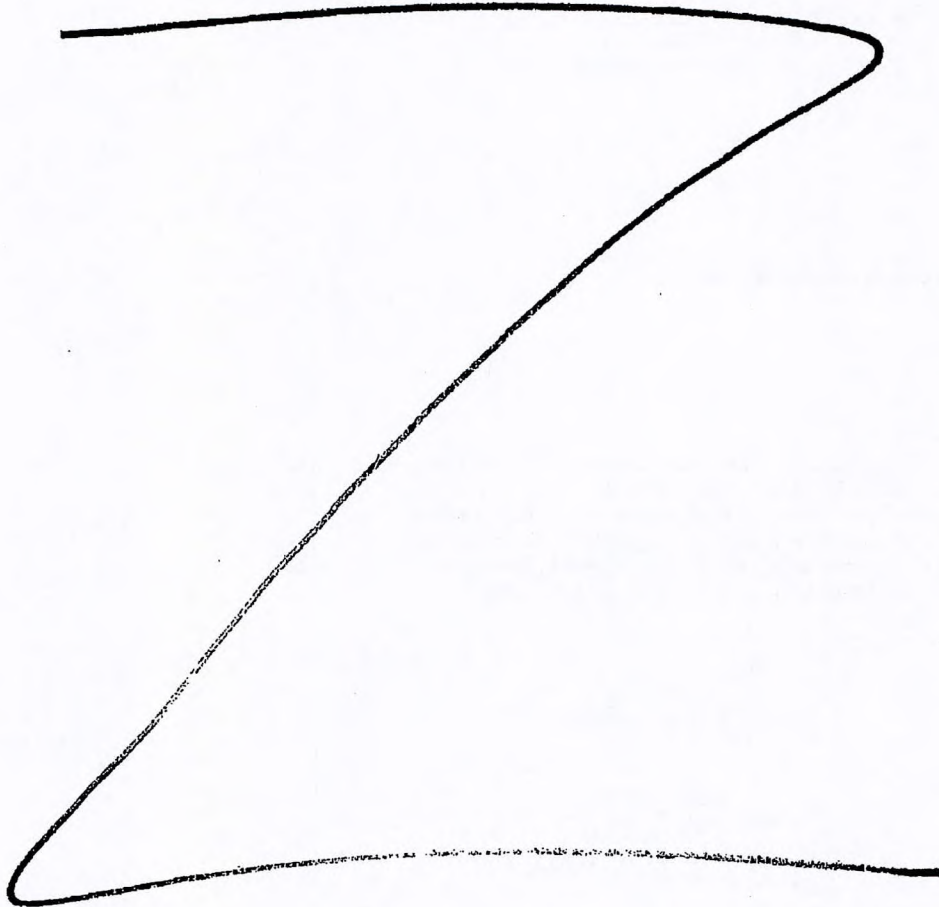
County: Rockland

Site No: 344004

Order No:

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**EXHIBIT A**  
**To**  
**Declaration of Covenants, Restrictions and Environmental Easement**  
**Ramapo Landfill Site Description**  
**Ramapo Landfill Superfund Site**





**SPARACO ENGINEERING & LAND SURVEYING, P.C.**  
CIVIL ENGINEERING \* LAND SURVEYING \* SITE PLANNING

P.O. Box 818, Harriman, NY 10926  
(845) 782-8543 Fax (845) 362-1987 sparacosteve@selsny.com

May 7, 2012  
Job # 2230

**DECLARATION OF COVENANTS AND RESTRICTIONS AND  
ENVIRONMENTAL EASEMENT AREA**

**TOWN OF RAMAPO  
PROPERTY DESCRIPTION  
"RAMAPO LANDFILL SITE"  
TAX LOT 39.19-1-3 DEED REF. BOOK 6 PAGE 132**

**TOWN OF RAMAPO \* ROCKLAND COUNTY \* NEW YORK**

BEING LOT No. 1 AS SHOWN ON A MAP ENTITLED "SUBDIVISION PLAT-  
TRANSFER STATION AND WEIGH STATION SUBDIVISION" WHICH MAP WAS FILED  
IN THE ROCKLAND COUNTY CLERK'S OFFICE ON AUGUST 31, 1998 AS MAP 7194 IN  
BK. 119 ON PG. 26. SAID LOT IS ALSO KNOWN AS TAX LOT 3 IN BLOCK 1 ON  
SECTION 39.19 OF THE TOWN OF RAMAPO TAX MAPS.

BEGINNING AT A POINT (P.O.B.) MARKED BY AN IRON PIPE, ALONG THE  
EASTERLY RIGHT OF WAY OF TORNE VALLEY RD. (VARIES IN WIDTH). SAID  
POINT MARKS THE INTERSECTION OF THE SOUTHWEST CORNER OF THE HEREIN  
DESCRIBED PARCEL AND THE NORTHWEST CORNER OF LANDS NOW OR  
FORMERLY OF M-LAND CORP. (TAX LOT 47.07-1-3) AND RUNNING THENCE,

1. N 17d03m56s E 237.06' ALONG THE EASTERLY RIGHT OF WAY OF  
TORNE VALLEY ROAD TO A POINT; THENCE,
2. N 02d15m54s E 83.13' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
3. S 80d04m46s E 149.12' ALONG THE COMMON BOUNDARY LINE OF  
THE HEREIN DESCRIBED PARCEL AND LANDS NOW OR FORMERLY  
OF ROCKLAND COUNTY SEWER DISTRICT No. 1 TO A POINT;  
THENCE,
4. N 09d46m40s E 168.95' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
5. N 77d12m37s W 53.82' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
6. N 81d10m05s W 64.26' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
7. N 57d16m19s W 22.03' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,

8. N 28d15m50s W 27.52' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
9. N 79d37m44s W 20.36' CONTINUING ALONG THE SAME TO A POINT  
ALONG THE EASTERLY RIGHT OF WAY OF TORNE VALLEY ROAD;  
THENCE,
10. N 02d15m54s E 448.40' CONTINUING ALONG THE EASTERLY RIGHT  
OF WAY OF TORNE VALLEY ROAD TO A POINT; THENCE,
11. N 07d44m05s W 323.46' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
12. N 04d57m55s E 524.69' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
13. N 21d42m12s E 370.88' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
14. N 28d13m55s E 34.63' CONTINUING ALONG THE SAME TO A POINT  
MARKED BY A P.K. NAIL AT THE SOUTHWEST CORNER OF LANDS  
NOW OR FORMERLY OF ROCKLAND COUNTY SOLID WASTE  
MANAGEMENT AUTHORITY LOT 2 (WEIGH STATION LOT-TAX LOT  
39.19-1-4) AS SHOWN ON THE AFOREMENTIONED FILED MAP;  
THENCE,
15. N 88d41m40s E 61.25' ALONG THE COMMON BOUNDARY LINE OF  
THE HEREIN DESCRIBED PARCEL AND LOT 2 ON THE  
AFOREMENTIONED FILED MAP TO A POINT; THENCE,
16. S 85d42m30s E 64.20' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
17. N 19d32m00s E 24.02' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
18. N 09d07m30s E 58.33' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
19. N 04d27m15s E 49.95' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
20. N 01d34m00s E 109.77' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
21. N 08d49m00s W 23.14' CONTINUING ALONG THE SAME TO A POINT  
MARKED BY A P.K. NAIL ALONG THE EASTERLY RIGHT OF WAY OF  
TORNE VALLEY ROAD; THENCE,
22. N 43d13m55s E 977.21' ALONG THE EASTERLY RIGHT OF WAY OF  
TORNE VALLEY ROAD TO A POINT; THENCE,
23. N 84d57m55s E 320.00' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
24. N 63d44m54s E 184.54' CONTINUING ALONG THE SAME TO A POINT  
WHICH MARKS THE INTERSECTION OF THE NORTHEAST CORNER  
OF THE HEREIN DESCRIBED PARCEL WITH THE NORTHWEST  
CORNER OF LANDS NOW OR FORMERLY OF ROCKLAND COUNTY  
SOLID WASTE MANAGEMENT AUTHORITY LOT 3 (TRANSFER  
STATION LOT-TAX LOT 39.19-1-5) ON THE AFOREMENTIONED FILED  
MAP; THENCE,
25. S 53d24m00s E 26.80' ALONG THE COMMON BOUNDARY LINE OF THE  
HEREIN DESCRIBED PARCEL AND LOT 3 ON THE  
AFOREMENTIONED FILED MAP TO A POINT; THENCE,
26. S 43d40m00s E 39.58' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,

27. S 39d52m00s E 65.74' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
28. S 42d10m00s E 133.70' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
29. S 39d01m00s E 77.76' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
30. SOUTHEASTERLY ALONG A CURVE TO THE RIGHT HAVING A  
RADIUS OF 375' AN ARC DISTANCE OF 239.98' CONTINUING ALONG  
THE SAME TO A POINT OF TANGENCY; THENCE,
31. S 02d21m00s E 53.82' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
32. SOUTHWESTERLY ALONG A CURVE TO THE RIGHT HAVING A  
RADIUS OF 425' AN ARC DISTANCE OF 168.50' CONTINUING ALONG  
THE SAME TO A POINT OF TANGENCY; THENCE,
33. S 20d22m00s W 69.05' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
34. S 21d32m00s W 42.08' CONTINUING ALONG THE SAME TO A POINT;  
THENCE,
35. S 36d31m30s E 494.86' CONTINUING ALONG THE SAME TO A POINT  
ALONG THE COMMON BOUNDARY LINE OF THE HEREIN  
DESCRIBED PARCEL AND LANDS NOW OR FORMERLY OF STONE  
INDUSTRIES TAX LOT 39.20-1-2; THENCE,
36. S 47d15m18s W 1,245.93' ALONG THE COMMON BOUNDARY LINE OF  
HEREIN DESCRIBED PARCEL AND LANDS NOW OR FORMERLY OF  
STONE INDUSTRIES INC., TO A POINT MARKED BY AN IRON PIPE;  
THENCE,
37. S 03d00m45s W 800.00' CONTINUING ALONG THE SAME TO A POINT  
MARKED BY AN IRON PIPE; THENCE,
38. S 69d49m58s W 1,215.00' CONTINUING ALONG THE SAME AND  
LANDS NOW OR FORMERLY OF M LAND CORP. TAX LOT 47.07-1-3  
TO THE POINT OR PLACE OF BEGINNING.

CONTAINING 86.068 ACRES OF LAND MORE OR LESS.

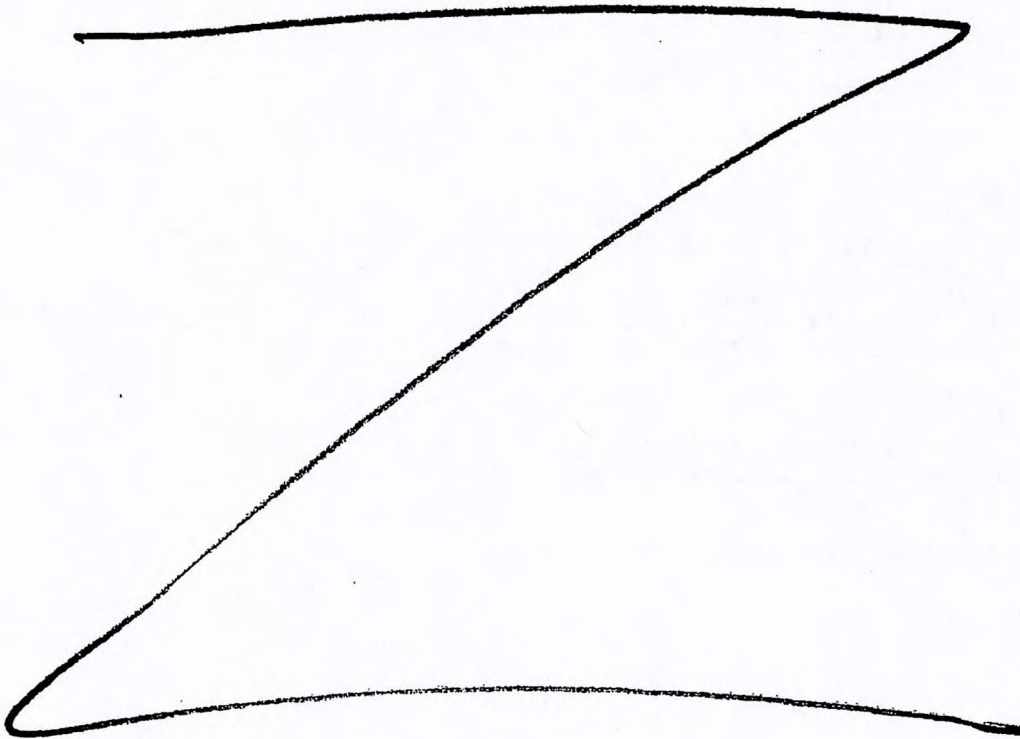
County: Rockland

Site No: 344004

Order No:

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**EXHIBIT B**  
**To**  
**Declaration of Covenants, Restrictions and Environmental Easement**  
**Inactive Capped Landfill Description**  
**Where Development or Use has been Restricted**  
**Ramapo Landfill Superfund Site**





**SPARACO ENGINEERING & LAND SURVEYING, P.C.**

CIVIL ENGINEERING \* LAND SURVEYING \* SITE PLANNING

P.O. Box 818, Harriman, NY 10926  
(845) 782-8543 Fax (845) 362-1987 sparaco.steve@selsny.com

May 7, 2012  
Job # 2230

**TOWN OF RAMAPO**

**PROPERTY DESCRIPTION**  
**"INACTIVE CAPPED LANDFILL"**  
**A PORTION OF TAX LOT 39.19-1-3**

**TOWN OF RAMAPO \* ROCKLAND COUNTY \* NEW YORK**

BEING A PORTION OF LOT 1 AS SHOWN ON A MAP ENTITLED "SUBDIVISION PLAT-TRANSFER STATION AND WEIGH STATION SUBDIVISION" WHICH MAP WAS FILED IN THE ROCKLAND COUNTY CLERK'S OFFICE ON AUGUST 31, 1998 AS MAP 7194 IN BK. 119 ON PG. 26.

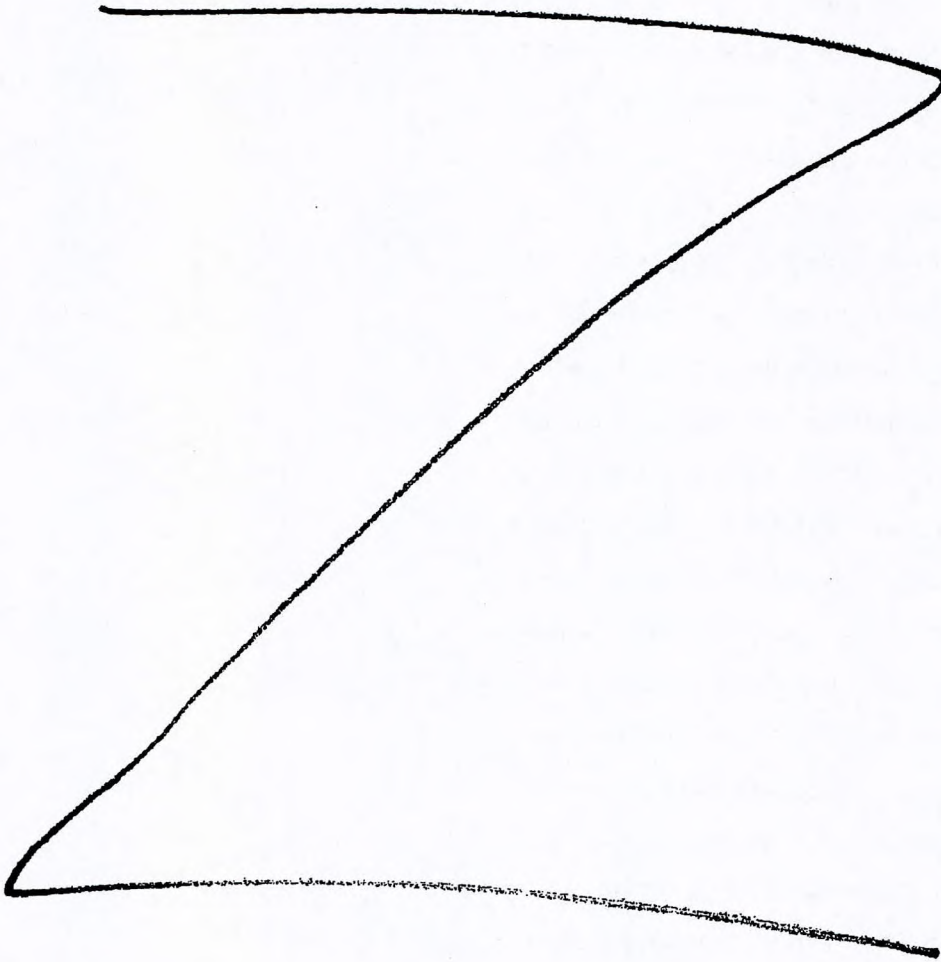
BEGINNING AT A POINT (P.O.B.) ALONG THE EASTERLY RIGHT OF WAY OF TORNE VALLEY ROAD (VARIES IN WIDTH) SAID POINT IS LOCATED N 17d03m56s E 237.06' AND N 02d15m54s E 702.05' FROM THE SOUTHWESTERLY CORNER OF LANDS NOW OR FORMERLY OF THE TOWN OF RAMAPO (TAX LOT 39.19-1-3) AND RUNNING THENCE;

1. N 02d15m54s E 32.05' CONTINUING ALONG THE EASTERLY RIGHT OF WAY OF TORNE VALLEY ROAD TO A POINT; THENCE,
2. N 07d44m05s W 323.46' CONTINUING ALONG THE SAME TO A POINT; THENCE,
3. N 04d57m55s E 524.69' CONTINUING ALONG THE SAME TO A POINT; THENCE,
4. N 21d42m12s E 370.88' CONTINUING ALONG THE SAME TO A POINT; THENCE,
5. N 28d13m55s E 34.63' CONTINUING ALONG THE SAME TO A POINT MARKED BY A P.K. NAIL AT THE SOUTHWEST CORNER OF LANDS NOW OR FORMERLY OF ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY LOT 2 (WEIGH STATION LOT-TAX LOT 39.19-1-4) AS SHOWN ON THE AFOREMENTIONED FILED MAP; THENCE,
6. N 88d41m40s E 61.25' ALONG THE COMMON BOUNDARY LINE OF THE HEREIN DESCRIBED PARCEL AND LOT 2 ON THE AFOREMENTIONED FILED MAP TO A POINT; THENCE,
7. S 85d42m30s E 64.20' CONTINUING ALONG THE SAME TO A POINT; THENCE,
8. N 19d32m00s E 24.02' CONTINUING ALONG THE SAME TO A POINT; THENCE,
9. N 09d07m30s E 58.33' CONTINUING ALONG THE SAME TO A POINT; THENCE,
10. N 04d27m15s E 49.95' CONTINUING ALONG THE SAME TO A POINT; THENCE,
11. N 01d34m00s E 109.77' CONTINUING ALONG THE SAME TO A POINT; THENCE,

12. N 08d49m00s W 23.14' CONTINUING ALONG THE SAME TO A POINT MARKED BY A P.K. NAIL ALONG THE EASTERLY RIGHT OF WAY OF TORNE VALLEY ROAD; THENCE,
13. N 43d13m55s E 977.21' ALONG THE EASTERLY RIGHT OF WAY OF TORNE VALLEY ROAD TO A POINT; THENCE,
14. N 84d57m55s E 320.00' CONTINUING ALONG THE SAME TO A POINT; THENCE,
15. N 63d44m54s E 184.54' CONTINUING ALONG THE SAME TO A POINT WHICH MARKS THE INTERSECTION OF THE NORTHEAST CORNER OF THE HEREIN DESCRIBED PARCEL WITH THE NORTHWESTERLY CORNER OF LANDS NOW OR FORMERLY OF ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY LOT 3 (TRANSFER STATION LOT-TAX LOT 39.19-1-5) ON THE AFOREMENTIONED FILED MAP; THENCE,
16. S 53d24m00s E 26.80' ALONG THE COMMON BOUNDARY LINE OF THE HEREIN DESCRIBED PARCEL AND LOT 3 ON THE AFOREMENTIONED FILED MAP TO A POINT; THENCE,
17. S 43d40m00s E 39.58' CONTINUING ALONG THE SAME TO A POINT; THENCE,
18. S 39d52m00s E 65.74' CONTINUING ALONG THE SAME TO A POINT; THENCE,
19. S 42d10m00s E 133.70' CONTINUING ALONG THE SAME TO A POINT; THENCE,
20. S 39d01m00s E 77.76' CONTINUING ALONG THE SAME TO A POINT; THENCE,
21. SOUTHEASTERLY ALONG A CURVE TO THE RIGHT HAVING A RADIUS OF 375' AN ARC DISTANCE OF 239.98' CONTINUING ALONG THE SAME TO A POINT OF TANGENCY; THENCE,
22. S 02d21m00s E 53.82' CONTINUING ALONG THE SAME TO A POINT; THENCE,
23. SOUTHWESTERLY ALONG A CURVE TO THE RIGHT HAVING A RADIUS OF 425' AN ARC DISTANCE OF 168.50' CONTINUING ALONG THE SAME TO A POINT OF TANGENCY; THENCE,
24. S 20d22m00s W 69.05' CONTINUING ALONG THE SAME TO A POINT; THENCE,
25. S 21d32m00s W 42.08' CONTINUING ALONG THE SAME TO A POINT; THENCE,
26. S 36d31m30s E 303.82' CONTINUING ALONG THE SAME TO A POINT; THENCE,
27. S 53d05m37s W 12.39' THROUGH LOT 1 (TAX LOT 39.19-1-3) ON THE AFOREMENTIONED FILED MAP TO A POINT; THENCE,
28. S 22d54m55s E 37.32' CONTINUING THROUGH THE SAME TO A POINT; THENCE,
29. S 17d35m21s E 27.16' CONTINUING THROUGH THE SAME TO A POINT; THENCE,
30. S 16d02m07s E 32.47' CONTINUING THROUGH THE SAME TO A POINT; THENCE,
31. S 11d38m20s E 9.95' CONTINUING THROUGH THE SAME TO A POINT; THENCE,
32. S 04d22m43s E 67.52' CONTINUING THROUGH THE SAME TO A POINT; THENCE,
33. S 45d13m42s W 323.07' CONTINUING THROUGH THE SAME TO A POINT; THENCE,
34. S 31d02m54s W 106.04' CONTINUING THROUGH THE SAME TO A POINT ON THE COMMON BOUNDARY LINE OF THE HEREIN DESCRIBED PARCEL AND LANDS NOW OR FORMERLY OF STONE INDUSTRIES INC. (TAX LOT 39.20-1-2); THENCE,
35. S 47d15m18s W 43.03' ALONG THE COMMON BOUNDARY LINE OF THE HEREIN DESCRIBED PARCEL AND LANDS NOW OR FORMERLY OF STONE INDUSTRIES INC. TO A POINT; THENCE,
36. N 57d45m10s W 74.88' THROUGH LOT 1 ON THE AFOREMENTIONED FILED MAP TO A POINT; THENCE,

37. N 63d32m00s W 258.60' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
38. N 85d06m00s W 85.10' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
39. S 13d54m54s W 16.28' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
40. S 66d10m28s W 29.44' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
41. N 81d52m47s W 28.37' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
42. N 43d59m16s W 29.07' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
43. N 78d10m47s W 78.82' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
44. N 72d47m10s W 104.67' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
45. S 85d28m45s W 205.37' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
46. S 47d38m15s W 67.33' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
47. S 07d09m00s W 185.40' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
48. S 08d28m48s W 200.00' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
49. S 09d23m00s W 133.14' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
50. S 12d54m09s W 70.17' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
51. S 17d09m23s W 139.27' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
52. S 12d17m39s W 139.77' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
53. S 18d09m00s W 60.60' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
54. S 30d19m44s W 37.39' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
55. S 68d19m00s W 30.48' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
56. N 80d53m23s W 30.16' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
57. N 73d32m10s W 327.78' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
58. S 65d55m36s W 29.74' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
59. S 20d59m45s W 58.65' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
60. N 81d03m00s W 63.30' CONTINUING THROUGH THE SAME TO A POINT;  
THENCE,
61. N 87d44m00s W 27.83' CONTINUING THROUGH THE SAME TO THE POINT OR  
PLACE OF BEGINNING.

CONTAINING 54.813 ACRES OF LAND MORE OR LESS.



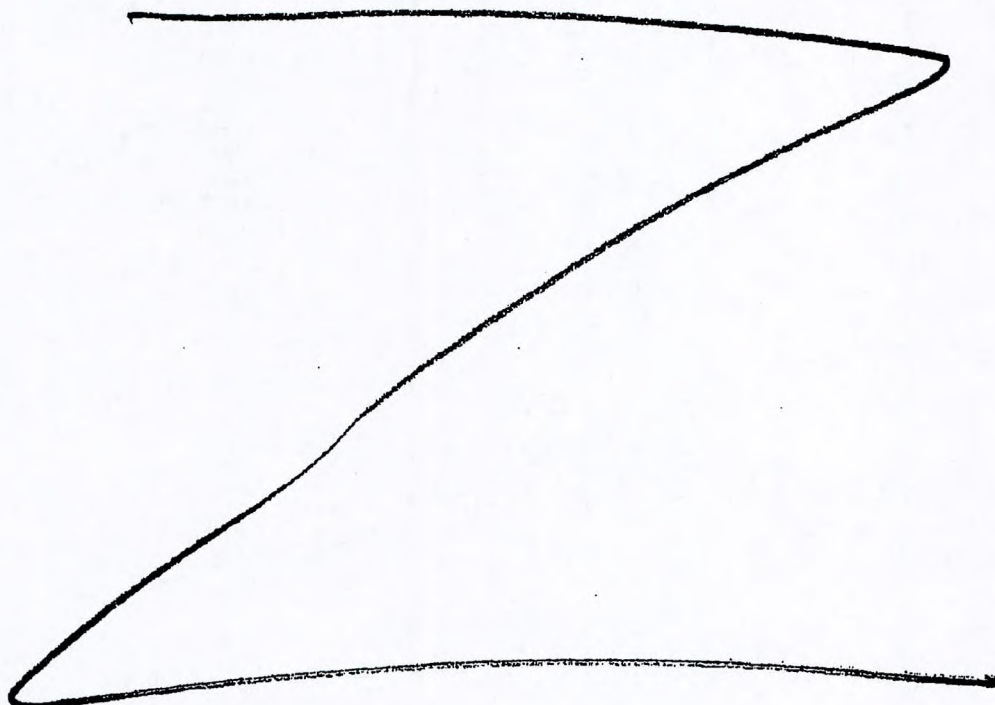
County: Rockland

Site No: 344004

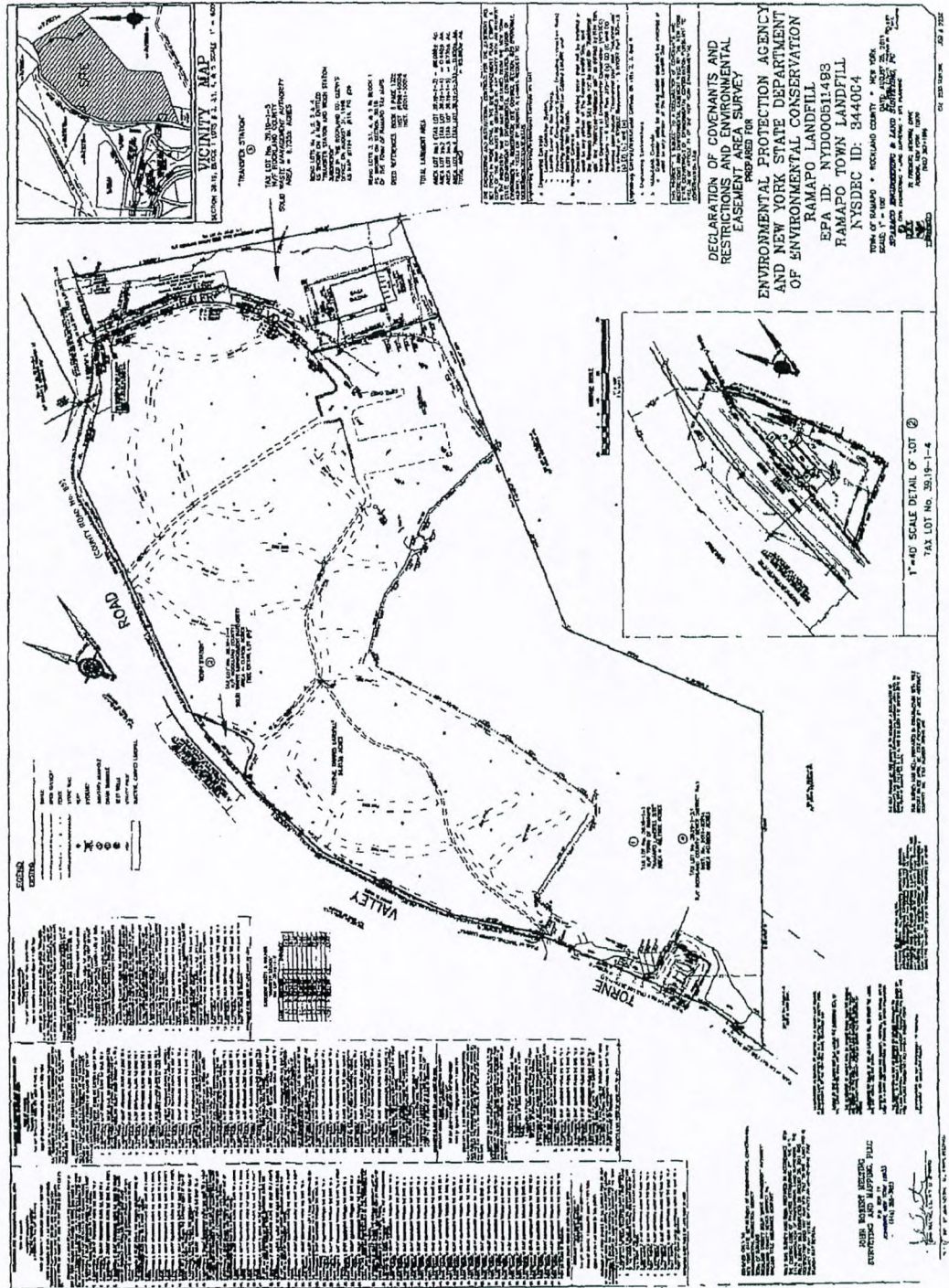
Order No:

**EXHIBIT C**  
**To**  
**Declaration of Covenants, Restrictions and Environmental Easement**

(See attached survey (Sparaco Engineering & Land Surveying, PC, August 25, 2011, revision date May 16, 2012) of Ramapo Landfill Site and Inactive Capped Landfill depicting Institutional Controls and Engineering Controls)







Paul Piperato, County Clerk  
1 South Main St, Ste. 100  
New City, NY 10956  
(845) 638-5070

## Rockland County Clerk Recording Cover Sheet

Received From :  
JADE ABSTRACT  
151 SOUTH MAIN ST  
NEW CITY, NY 10956

Return To :  
JADE ABSTRACT  
151 SOUTH MAIN ST  
NEW CITY, NY 10956

Method Returned : MAIL

**First GRANTOR**

ROCKLAND COUNTY SEWER DISTRICT NO 1

**First GRANTEE**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Index Type : Land Records

Instr Number : 2012-00036187

Book : Page :

Type of Instrument : Easement

Type of Transaction : Ease, R/Way, Asmt Rent/Lease

Recording Fee : \$0.00

Recording Pages : 11

The Property affected by this instrument is situated in Ramapo, in the  
County of Rockland, New York

**Real Estate Transfer Tax**

RETT # : 796

Deed Amount : \$0.00

RETT Amount : \$0.00

Total Fees : \$0.00

State of New York

County of Rockland

I hereby certify that the within and foregoing was  
recorded in the Clerk's office for Rockland County,  
New York

On (Recorded Date) : 10/10/2012

At (Recorded Time) : 3:34:00 PM



Doc ID - 025510290011

Paul Piperato, County Clerk



This sheet constitutes the Clerks endorsement required by Section 319 of Real Property Law of the State of New York

Entered By: COUNTER1 Printed On : 10/12/2012 At : 12:19:55PM

30045-1A0

County: Rockland

Site No: 344004

Order No:

**DECLARATION OF COVENANTS, RESTRICTIONS  
AND ENVIRONMENTAL EASEMENT**

This Declaration of Covenants, Restrictions and Environmental Easement is made this 12<sup>th</sup> day of September, 2012, by and between Rockland County Sewer District No. 1, a County Improvement District organized and existing pursuant to Article 5-A of the New York State County Law, having its principal office at 4 Route 340, Orangeburg, New York 10962 ("Grantor"), and the People of the State of New York (the "Grantee"), acting through their Commissioner of the New York State Department of Environmental Conservation with its Central Office, located at 625 Broadway, Albany, New York 12233 ("Grantee").

**WITNESSETH:**

WHEREAS, Grantor is the owner of a tract of land containing more or less 0.65 acres located in the Town of Ramapo, County of Rockland, State of New York, more particularly described on Exhibit A and shown on Exhibit B, both of which exhibits are attached hereto and made a part hereof, together with any buildings and improvements thereon and appurtenances thereto (the "Sewer District No. 1 Property"); and

WHEREAS, the Sewer District No. 1 Property is situated within the Ramapo Landfill Superfund site (the "Ramapo Landfill Site"), a former sanitary landfill facility which accepted municipal waste for disposal, which the United States Environmental Protection Agency ("EPA"), pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9605, placed on the National Priorities List, as set forth in Appendix B of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300, by publication in the Federal Register on September 1, 1983; and

WHEREAS, in a Record of Decision dated March 31, 1992 ("ROD") as modified by an Explanation of Significant Difference dated November 25, 1997 ("ESD"), EPA selected, and the New York State Department of Environmental Conservation ("NYSDEC") concurred with, a remedial action for the Ramapo Landfill Site, pursuant to CERCLA, which remedial action provided for, among other things, the construction of a landfill cover at a portion of the Ramapo Landfill Site not including the Sewer District No. 1 Property, and which remedial action also provided for institutional controls to prevent the installation of drinking water wells at the entire portion of the Ramapo Landfill Site, including the Sewer District No. 1 Property; and

WHEREAS, the construction activities associated with the remedial action have been completed at the Ramapo Landfill Site and long term monitoring activities are ongoing; and

WHEREAS, the deed ("Sewer District Deed") covering the Sewer District No. 1 Property from the Town of Ramapo to Grantor contains a restrictive covenant in favor of the Town of Ramapo that prohibits Grantor from installing or using groundwater wells for drinking water on the Sewer District No. 1 Property; and

WHEREAS, the parties hereto have agreed that in order to provide Grantee with the ability to enforce the foregoing restriction, Grantor shall grant to the Grantee a permanent Environmental

Easement pursuant to Article 71, Title 36 of the NYS Environmental Conservation Law, covenant with respect to the restrictions on the use of the Sewer District No. 1 Property, and provide a right of access to the Sewer District No. 1 Property in favor of Grantee and EPA, all of which shall run with the land, for purposes of implementing, facilitating and monitoring the CERCLA response action in order to protect human health and the environment; and

WHEREAS, Grantor wishes to cooperate fully with the Grantee in the implementation of all response actions at the Sewer District No. 1 Property.

NOW, THEREFORE:

1. Grant: Grantor, on behalf of itself, its successors and assigns, for ten dollars and other good and valuable consideration, receipt whereof is hereby acknowledged, does hereby give, grant, covenant and declare in favor of the Grantee that the Sewer District No. 1 Property shall be subject to this Declaration of Covenants, Restrictions and Environmental Easement, and Grantor does further give, grant and convey to the Grantee the perpetual right to enforce said restrictions, covenants, right of access and Environmental Easement, all of which shall be of the nature and character, and for the purposes hereinafter set forth, with respect to the Sewer District No. 1 Property.
2. Purpose: It is the purpose of this instrument to convey to the Grantee real property rights, which will run with the land, to impose use restrictions and covenants to protect human health and the environment by reducing the risk of exposure to contaminants.
3. Restrictions on Use: The following restrictions apply to the use of the Sewer District No. 1 Property, as provided below, run with the land and are binding on the Grantor and its successors in title and assigns: Groundwater wells for drinking water shall not be installed or used on any portion of the Sewer District No. 1 Property.
4. Modification or termination of restrictions and covenants: The restrictions specified in the preceding paragraph of this instrument may only be modified or terminated, in whole or in part, in writing, by the Grantee, provided, however, that any modification or termination of said restrictions shall not adversely affect the remedy selected by EPA and NYSDEC for the Ramapo Landfill Site. If requested by the Grantor, such writing will be executed by Grantee in recordable form. Any request by Grantor for a modification or termination of this instrument shall be made, not less than 30-days in advance of any modification or termination, in writing by Grantor to NYSDEC and to EPA in accordance with paragraph 15 of this instrument.
5. Right of access: Grantor hereby convey to Grantee and to EPA a right of access to the Sewer District No. 1 Property at all reasonable times for the following purposes, which right of access shall run with the land and be binding on Grantor, its successors and /or assigns, and on any tenants or any other parties having an interest and/or rights to any portion of the Sewer District No. 1 Property: to verify that no action is being taken at the Sewer District No. 1 Property in violation of the applicable terms of this instrument.

6. Reserved rights of Grantor: Grantor hereby reserves unto itself, its successors, and assigns, all rights and privileges in and to the use of the Sewer District No. 1 Property which are not incompatible with the restrictions, rights, covenants and easements granted herein, including, without limitation, the operation of a wastewater pump station.
7. Federal authority: Nothing in this document shall limit or otherwise affect any EPA rights of entry and access or EPA's authority to take response actions under CERCLA, the NCP, or other federal law.
8. State authority: Nothing herein shall constitute a waiver of any rights the State may have pursuant to the Environmental Conservation Law, regulations and/or relevant provisions of statutory or common law.
9. No public access and use: No right of access or use by the general public to any portion of the Sewer District No. 1 Property is conveyed by this instrument.
10. Public notice: Grantor, on behalf of itself, its successors and assigns, agrees to include in each instrument conveying any interest in any portion of the Sewer District No. 1 Property, including but not limited to deeds, leases and mortgages, a notice which is in substantially the following form:

**NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO A DECLARATION OF COVENANTS, RESTRICTIONS AND ENVIRONMENTAL EASEMENT, DATED \_\_\_\_\_, 20\_\_, RECORDED IN THE ROCKLAND COUNTY CLERK'S OFFICE ON \_\_\_\_\_, 20\_\_, IN BOOK \_\_\_\_\_, PAGE \_\_\_\_\_, IN FAVOR OF, AND ENFORCEABLE BY, THE PEOPLE OF THE STATE OF NEW YORK AND BY THE UNITED STATES OF AMERICA AS THIRD-PARTY BENEFICIARY.**

Within thirty (30) days of the date any such instrument of conveyance is executed, Grantor agrees to provide Grantee and EPA with a certified true copy of said instrument and, if it has been recorded in the public land records, its recording reference.

11. Enforcement: The Grantee shall be entitled to enforce the terms of this instrument by resort to specific performance. All remedies available hereunder shall be in addition to any and all other remedies at law or in equity, including CERCLA. Any forbearance, delay or omission to exercise Grantee's rights under this instrument in the event of a breach of any term of this instrument shall not be deemed to be a waiver by the Grantee of such term or of any of the rights of the Grantee under this instrument.
12. Damages: Grantee shall also be entitled to recover damages for breach of any covenant or violation of the terms of this instrument including any impairment to the remedial action that increases the cost of the selected response action for the Ramapo Landfill Site as a result of such breach or violation.
13. Waiver of certain defenses: Grantor hereby waives any defense of laches, estoppel, or prescription.

County: Rockland

Site No: 344004

Order No:

14. Covenants: Grantor hereby covenants that the Grantor is lawfully seized in fee simple of the Sewer District No. 1 Property, that the Grantor has a good and lawful right and power to sell and convey it or any interest therein and that the Sewer District No. 1 Property is free and clear of encumbrances, other than matters shown of record.
15. Notices: Any notice, demand, request, consent, approval, or communication under this instrument that either party desires or is required to give to the other shall be in writing and shall either be served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantor:

County of Rockland Sewer District No. 1  
4 Route 340  
Orangeburg, NY 10962  
Att: Dianne Philipps, Executive Director

To Grantee:

Office of General Counsel  
NYS Department of Environmental Conservation  
625 Broadway  
Albany, New York 12233-5500

NYS Department of Environmental Conservation  
Division of Environmental Remediation  
Bureau of Site Control  
625 Broadway  
Albany, New York 12233

A copy of each such communication shall also be sent to EPA in the same manner as to Grantor or Grantee, and addressed to the following two addressees:

U.S. Environmental Protection Agency  
Emergency & Remedial Response Division  
New York Remediation Branch  
Attention: Ramapo Landfill Superfund Site Remedial Project Manager  
290 Broadway, 20<sup>th</sup> Floor,  
New York, New York 10007-1866

U.S. Environmental Protection Agency  
Office of Regional Counsel  
Attention: Ramapo Landfill Superfund Site Attorney  
290 Broadway, 17<sup>th</sup> Floor,  
New York, New York 10007-1866

16. General provisions:

a) Controlling law: The interpretation and performance of this instrument shall, with respect to the Declaration of Covenants, Restrictions and Environmental Easement, be governed by the laws of the State of New York, and with respect to other matters, shall be governed by the laws of the United States or, if there are no applicable federal laws, by the law of the State of New York.

b) Liberal construction: Any general rule of construction to the contrary notwithstanding, this instrument shall be liberally construed in favor of the grant to effect the purpose of this instrument and the policy and purpose of CERCLA. If any provision of this instrument is found to be ambiguous, an interpretation consistent with the purpose of this instrument that would render the provision valid shall be favored over any interpretation that would render it invalid.

c) Severability: If any provision of this instrument, or the application of it to any person or circumstance, is found to be invalid, the remainder of the provisions of this instrument, or the application of such provisions to persons or circumstances other than those to which it is found to be invalid, as the case may be, shall not be affected thereby.

d) No forfeiture: Nothing contained herein will result in a forfeiture or reversion of Grantors' title in any respect.

e) Joint obligation: If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

f) Successors: The covenants, easements, terms, conditions, and restrictions of this instrument shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall continue as a servitude running in perpetuity with the Sewer District No. 1 Property. The term "Grantor", wherever used herein, and any pronouns used in place thereof, shall include the persons and/or entities named at the beginning of this document, identified as "Grantor" and their personal representatives, heirs, successors, and assigns. The term "Grantee", wherever used herein, and any pronouns used in place thereof, shall mean the People of the State of New York acting through their Commissioner of NYSDEC or through any successor department or agency of the State of New York.

g) Captions: The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.

h) Counterparts: The parties may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by both parties; each counterpart shall be deemed an original instrument as against any party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling.

i) Third-Party Beneficiary: Grantor and Grantee hereby agree that the United States, through EPA, shall be, on behalf of the public, a third-party beneficiary of the benefits, rights and obligations conveyed to Grantee in this instrument; provided that nothing in this instrument shall be construed to create any obligations on the part of EPA.

J) Nothing herein shall constitute a waiver by Grantor of any right it may have to indemnification by the Town of Ramapo, or otherwise, under the Sewer District Deed.

TO HAVE AND TO HOLD unto the Grantee and its assigns forever.

County: Rockland

Site No: 344004

Order No:

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Executed this 4<sup>TH</sup> day of SEPTEMBER, 2012.

GRANTOR

ROCKLAND COUNTY SEWER DISTRICT NO. 1

By: Dianne T. Phillips

Title: Executive Director

**Grantor's Acknowledgment**

STATE OF NEW YORK )

COUNTY OF Rockland )<sup>SS:</sup>

On the 4<sup>TH</sup> day of SEPTEMBER, in the year 2012, before me, the undersigned, personally appeared DIANNE T. PHILLIPS, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity as EXECUTIVE DIRECTOR of Rockland County Sewer District No. 1, and that by his/her signature on the instrument, the Grantor, upon behalf of which the individual acted, executed the instrument.



Notary Public - State of New York

PARISI ANNAMARIA

Notary Public, State of New York

Qualified in Rockland County

No. 01PA6103501

My Commission Expires 12-26-2015

County: Rockland

Site No: 344004

Order No:

**THIS DECLARATION OF COVENANTS, RESTRICTIONS AND ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner.**

By: 

Robert W. Schick, Director  
Division of Environmental Remediation

Date: 9/12/2012

**Grantee's Acknowledgment**

STATE OF NEW YORK     )  
  ) ss:  
COUNTY OF ALBANY     )

On the 12 day of September, in the year 2012, before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

  
Notary Public - State of New York

**David J. Chinsano**  
Notary Public, State of New York  
No. 01CH5082146  
Qualified in Schenectady County  
Commission Expires August 22, 2012

County: Rockland

Site No: 344004

Order No:

**EXHIBIT A**

**To**

**Declaration of Covenants, Restrictions and Environmental Easement  
Description of Sewer District No. 1 Property Subject to this Instrument**

May 7, 2012  
Job # 2230

**ROCKLAND COUNTY SEWER DISTRICT No. 1  
PROPERTY DESCRIPTION  
TAX LOT 39.19-1-3.1 DEED REF. INST.#2011-30014**

**TOWN OF RAMAPO \* ROCKLAND COUNTY \* NEW YORK**

**BEING LOT No.4 AS SHOWN ON THIS SURVEY**

BEGINNING AT A POINT (P.O.B.) ON THE EASTERLY RIGHT OF WAY OF TORNE VALLEY ROAD (VARIES IN WIDTH). SAID POINT IS LOCATED N 17d03m56s E 237.05' AND N 02d15m54s E 83.13' FROM THE SOUTHWESTERLY CORNER OF LANDS NOW OR FORMERLY OF THE TOWN OF RAMAPO (TAX LOT 39.19-1-3) AND RUNNING THENCE;

1. N 02d15m54s E 202.57' CONTINUING ALONG THE EASTERLY RIGHT OF WAY OF TORNE VALLEY ROAD TO A POINT; THENCE,
2. S 79d37m44s E 20.36' ALONG THE COMMON BOUNDARY LINE OF THE HEREIN DESCRIBED PARCEL AND LANDS NOW OR FORMERLY OF THE TOWN OF RAMAPO ( TAX LOT 39.19-1-3) TO A POINT; THENCE,
3. S 28d15m50s E 27.52' CONTINUING ALONG THE SAME TO A POINT; THENCE,
4. S 57d16m19s E 22.03' CONTINUING ALONG THE SAME TO A POINT; THENCE,
5. S 81d10m05s E 64.26' CONTINUING ALONG THE SAME TO A POINT; THENCE,
6. S 77d12m37s E 53.82' CONTINUING ALONG THE SAME TO A POINT; THENCE,
7. S 09d46m40s W 168.95' CONTINUING ALONG THE SAME TO A POINT; THENCE,
8. N 80d04m46s W 149.12' CONTINUING ALONG THE SAME TO A POINT OR PLACE OF BEGINNING.

CONTAINING 0.650 ACRES OF LAND MORE OR LESS.

County: Rockland

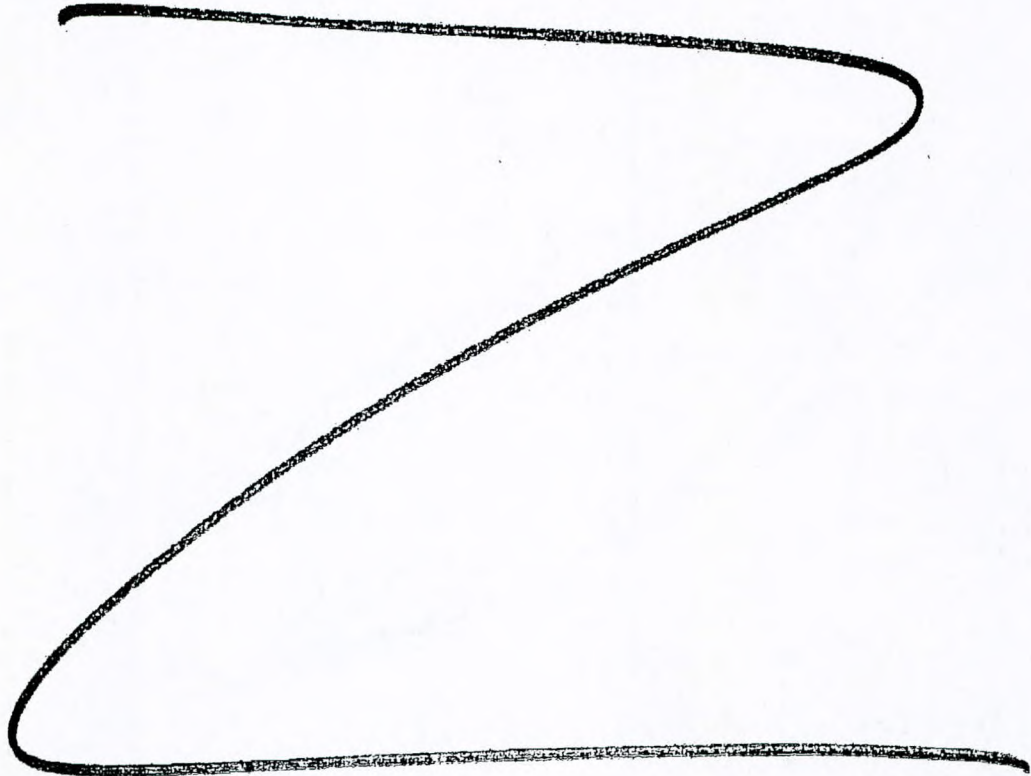
Site No: 344004

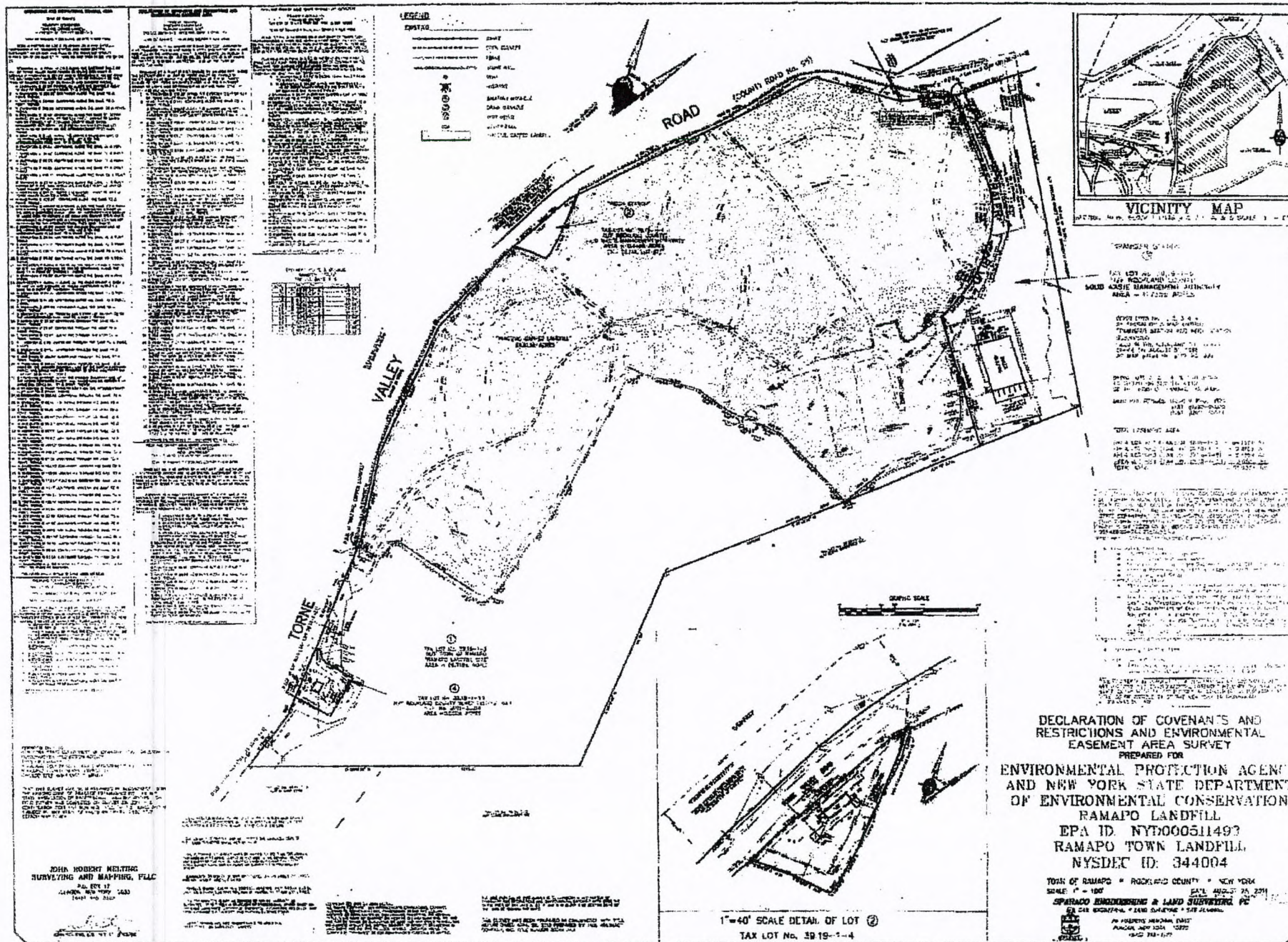
Order No:

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**EXHIBIT B**  
**To**  
**Declaration of Covenants, Restrictions and Environmental Easement**  
**Survey of Property**  
**Where Use has been Restricted**

(See attached survey (Sparaco Engineering & Land Surveying, PC, August 25, 2011, Revised May 16, 2012) of Ramapo Landfill Site and Sewer District No. 1 Property showing Institutional Control)





Paul Piperato, County Clerk  
1 South Main St., Ste. 100  
New City, NY 10956  
(845) 638-5070

## Rockland County Clerk Recording Cover Sheet

Received From :  
JADE ABSTRACT  
151 SOUTH MAIN ST  
NEW CITY, NY 10956

Return To :  
JADE ABSTRACT  
151 SOUTH MAIN ST  
NEW CITY, NY 10956

Method Returned : MAIL

**First GRANTOR**

ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY

**First GRANTEE**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Index Type : Land Records

Instr Number : 2012-00036186

Book : Page :

Type of Instrument : Easement

Type of Transaction : Ease, R/Way, Asmt Rent/Lease

Recording Fee : \$0.00

Recording Pages : 13

The Property affected by this instrument is situated in Ramapo, in the  
County of Rockland, New York

**Real Estate Transfer Tax**

RETT # : 795

Deed Amount : \$0.00

RETT Amount : \$0.00

Total Fees : \$0.00

State of New York

County of Rockland

I hereby certify that the within and foregoing was  
recorded in the Clerk's office for Rockland County,  
New York

On (Recorded Date) : 10/10/2012

At (Recorded Time) : 3:32:00 PM



Doc ID - 025510280013

Paul Piperato, County Clerk



This sheet constitutes the Clerks endorsement required by Section 319 of Real Property Law of the State of New York

Entered By: COUNTER1 Printed On : 10/10/2012 At : 3:35:21PM

30095 TAO

County: Rockland

Site No: 344004

Order No:

**DECLARATION OF COVENANTS, RESTRICTIONS  
AND ENVIRONMENTAL EASEMENT**

This Declaration of Covenants, Restrictions and Environmental Easement is made this 25<sup>th</sup> day of September, 2012, by and between The Rockland County Solid Waste Management Authority, a municipal corporation organized and existing under the laws of the State of NY, having its principal office at 420 Toms Valley Road, Hillburn, NY 10931 ("Grantor"), and the People of the State of New York (the "Grantee"), acting through their Commissioner of the New York State Department of Environmental Conservation with its Central Office, located at 625 Broadway, Albany, New York 12233 ("Grantee").

**WITNESSETH:**

WHEREAS, Grantor is the owner of two tracts of land, the Weigh Station Lot, Tax Map No. 39.19-1-4 containing respectively 0.44 acres, more or less and the Transfer Station Lot, Tax Map No. 39.19-1-5 containing 8.735 acres, more or less both lots being described in Deed Instrument No. 1998-60056, located in the Town of Ramapo, County of Rockland, State of New York, more particularly described on Exhibit A and shown on Exhibit B, both of which exhibits are attached hereto and made a part hereof, together with any buildings and improvements thereon and appurtenances thereto (the "SWMA Property"); and

WHEREAS, the SWMA Property is situated within the Ramapo Landfill Superfund site (the "Ramapo Landfill Site"), a former sanitary landfill facility which accepted municipal waste for disposal, which the United States Environmental Protection Agency ("EPA"), pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9605, placed on the National Priorities List, as set forth in Appendix B of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300, by publication in the Federal Register on September 1, 1983; and

WHEREAS, in a Record of Decision dated March 31, 1992 ("ROD") as modified by an Explanation of Significant Difference dated November 25, 1997 ("ESD"), EPA selected, and the New York State Department of Environmental Conservation ("NYSDEC") concurred with, a remedial action for the Ramapo Landfill Site, pursuant to CERCLA, which remedial action provided for, among other things, the construction of a landfill cover at a portion of the Ramapo Landfill Site not including the SWMA Property, and which remedial action also provided for institutional controls to prevent the installation of drinking water wells at the entire portion of the Ramapo Landfill Site, including the SWMA Property; and

WHEREAS, the construction activities associated with the remedial action have been completed at the Ramapo Landfill Site and long term monitoring activities are ongoing; and

WHEREAS, the parties hereto have agreed that Grantor shall grant to the Grantee a permanent Environmental Easement pursuant to Article 71, Title 36 of the NYS Environmental Conservation Law, covenant with respect to the restrictions on the use of the SWMA Property, and provide a right of access to the SWMA Property in favor of Grantee and EPA, all of which shall run with the land, for purposes of implementing, facilitating and monitoring the CERCLA response action in order to protect human health and the environment; and

R  
12

WHEREAS, Grantor wishes to cooperate fully with the Grantee in the implementation of all response actions at the SWMA Property.

NOW, THEREFORE:

1. Grant: Grantor, on behalf of itself, its successors and assigns, for ten dollars and other good and valuable consideration, receipt whereof is hereby acknowledged, does hereby give, grant, covenant and declare in favor of the Grantee that the SWMA Property shall be subject to this Declaration of Covenants, Restrictions and Environmental Easement, and Grantor does further give, grant and convey to the Grantee the perpetual right to enforce said restrictions, covenants, right of access and Environmental Easement, all of which shall be of the nature and character, and for the purposes hereinafter set forth, with respect to the SWMA Property.
2. Purpose: It is the purpose of this instrument to convey to the Grantee real property rights, which will run with the land, facilitate the remediation of past environmental contamination and to impose use restrictions and covenants to protect human health and the environment by reducing the risk of exposure to contaminants.
3. Restrictions on Use: The following restrictions apply to the use of the SWMA Property, as provided below, run with the land and are binding on the Grantor and its successors in title and assigns: Groundwater wells for drinking water shall not be installed or used on any portion of the SWMA Property.
4. Modification or termination of restrictions and covenants: The restrictions specified in the preceding paragraph of this instrument may only be modified or terminated, in whole or in part, in writing, by the Grantee, provided, however, that any modification or termination of said restrictions shall not adversely affect the remedy selected by EPA and NYSDEC for the Ramapo Landfill Site. If requested by the Grantor, such writing will be executed by Grantee in recordable form. Any request by Grantor for a modification or termination of this instrument shall be made not less than 30-days in advance of any modification or termination in writing by Grantor to NYSDEC and to EPA in accordance with paragraph 15 of this instrument.
5. Right of access: Grantor hereby conveys to Grantee and to EPA a right of access to the SWMA Property at all reasonable times for the following purposes, which right of access shall run with the land and be binding on Grantor, its successors and /or assigns, and on any tenants or any other parties having an interest and/or rights to any portion of the SWMA Property: to verify that no action is being taken at the SWMA Property in violation of the applicable terms of this instrument.
6. Reserved rights of Grantor: Grantor hereby reserves unto itself, its successors, and assigns, all rights and privileges in and to the use of the SWMA Property which are not incompatible with the restrictions, rights, covenants and easements granted herein.
7. Federal authority: Nothing in this document shall limit or otherwise affect EPA's rights of entry and access or EPA's authority to take response actions under CERCLA, the NCP, or other federal law.

County: Rockland

Site No: 344004

Order No:

8. State authority: Nothing herein shall constitute a waiver of any rights the State may have pursuant to the Environmental Conservation Law, regulations and/or relevant provisions of statutory or common law.
9. No public access and use: No right of access or use by the general public to any portion of the SWMA Property is conveyed by this instrument.
10. Public notice: Grantor, on behalf of itself, its successors and assigns, agrees to include in each instrument conveying any interest in any portion of the SWMA Property, including but not limited to deeds, leases and mortgages, a notice which is in substantially the following form:

**NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO A DECLARATION OF COVENANTS, RESTRICTIONS AND ENVIRONMENTAL EASEMENT, DATED \_\_\_\_\_, 20\_\_, RECORDED IN THE ROCKLAND COUNTY CLERK'S OFFICE ON \_\_\_\_\_, 20\_\_, IN BOOK \_\_\_\_\_, PAGE \_\_\_\_\_, IN FAVOR OF, AND ENFORCEABLE BY, THE PEOPLE OF THE STATE OF NEW YORK AND BY THE UNITED STATES OF AMERICA AS THIRD-PARTY BENEFICIARY.**

Within thirty (30) days of the date any such instrument of conveyance is executed, Grantor agrees to provide Grantee and EPA with a certified true copy of said instrument and, if it has been recorded in the public land records, its recording reference.

11. Enforcement: The Grantee shall be entitled to enforce the terms of this instrument by resort to specific performance. All remedies available hereunder shall be in addition to any and all other remedies at law or in equity, including CERCLA. Any forbearance, delay or omission to exercise Grantee's rights under this instrument in the event of a breach of any term of this instrument shall not be deemed to be a waiver by the Grantee of such term or of any of the rights of the Grantee under this instrument.
12. Damages: Grantee shall also be entitled to recover damages for breach of any covenant or violation of the terms of this instrument including any impairment to the remedial action that increases the cost of the selected response action for the Ramapo Landfill Site as a result of such breach or violation.
13. Waiver of certain defenses: Grantor hereby waives any defense of laches, estoppel, or prescription.
14. Covenants: Grantor hereby covenants that the Grantor is lawfully seized in fee simple of the SWMA Property, that the Grantor has a good and lawful right and power to sell and convey it or any interest therein and that the SWMA Property is free and clear of encumbrances.
15. Notices: Any notice, demand, request, consent, approval, or communication under this instrument that either party desires or is required to give to the other shall be in writing and shall either be served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantor:  
The Rockland County Solid Waste

To Grantee:  
Office of General Counsel

County: Rockland

Site No: 344004

Order No:

Management Authority  
420 Torne Valley Road  
Hillburn, NY 10931  
Attention: Executive Director

NYS Department of Environmental Conservation  
625 Broadway  
Albany, New York 12233-5500

Kimberlea Shaw Rea, Esq.  
General Counsel  
The Rockland County Solid Waste  
Management Authority  
420 Torne Valley Road  
Hillburn, NY 10931

NYS Department of Environmental Conservation  
Division of Environmental Remediation  
Bureau of Site Control  
625 Broadway  
Albany, New York 12233

A copy of each such communication shall also be sent to EPA in the same manner as to Grantor or Grantee, and addressed to the following two addressees:

U.S. Environmental Protection Agency  
Emergency & Remedial Response Division  
New York Remediation Branch  
Attention: Ramapo Landfill Superfund Site Remedial Project Manager  
290 Broadway, 20<sup>th</sup> Floor,  
New York, New York 10007-1866

U.S. Environmental Protection Agency  
Office of Regional Counsel  
Attention: Ramapo Landfill Superfund Site Attorney  
290 Broadway, 17<sup>th</sup> Floor,  
New York, New York 10007-1866

16. General provisions:

a) Controlling law: The interpretation and performance of this instrument shall, with respect to the Declaration of Covenants, Restrictions and Environmental Easement, be governed by the laws of the State of New York, and with respect to other matters, shall be governed by the laws of the United States or, if there are no applicable federal laws, by the law of the State of New York.

b) Liberal construction: Any general rule of construction to the contrary notwithstanding, this instrument shall be liberally construed in favor of the grant to effect the purpose of this instrument and the policy and purpose of CERCLA. If any provision of this instrument is found to be ambiguous, an interpretation consistent with the purpose of this instrument that would render the provision valid shall be favored over any interpretation that would render it invalid.

c) Severability: If any provision of this instrument, or the application of it to any person or circumstance, is found to be invalid, the remainder of the provisions of this instrument, or the application of such provisions to persons or circumstances other than those to which it is found to be invalid, as the case may be, shall not be affected thereby.

County: Rockland

Site No: 344004

Order No:

- d) **No forfeiture:** Nothing contained herein will result in a forfeiture or reversion of Grantors' title in any respect.
- e) **Joint obligation:** If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.
- f) **Successors:** The covenants, easements, terms, conditions, and restrictions of this instrument shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall continue as a servitude running in perpetuity with the SWMA Property. The term "Grantor", wherever used herein, and any pronouns used in place thereof, shall include the persons and/or entities named at the beginning of this document, identified as "Grantor" and their personal representatives, heirs, successors, and assigns. The term "Grantee", wherever used herein, and any pronouns used in place thereof, shall mean the People of the State of New York acting through their Commissioner of NYSDEC or through any successor department or agency of the State of New York.
- g) **Captions:** The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.
- h) **Counterparts:** The parties may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by both parties; each counterpart shall be deemed an original instrument as against any party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling.
- i) **Third-Party Beneficiary:** Grantor and Grantee hereby agree that the United States, through EPA, shall be, on behalf of the public, a third-party beneficiary of the benefits, rights and obligations conveyed to Grantee in this instrument; provided that nothing in this instrument shall be construed to create any obligations on the part of EPA.

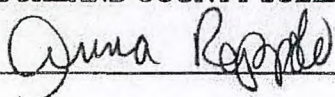
TO HAVE AND TO HOLD unto the Grantee and its assigns forever.

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Executed this 20<sup>th</sup> day of September, 2012.

GRANTOR

THE ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY

By: 

Title: Executive Director

County: Rockland

Site No: 344004

Order No:

**Grantor's Acknowledgment**

STATE OF NEW YORK )

COUNTY OF Rockland ) ss:

On the 20<sup>th</sup> day of Sept., in the year 2012, before me, the undersigned, personally appeared Ruth Rappolo, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Lawrence G. Stevenson

Notary Public - State of New York

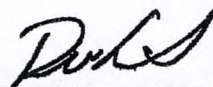
**LAWRENCE G. STEVENSON**  
Notary Public, State of New York  
No. 0186075290  
Qualified in Rockland County  
Commission Expires June 3, 2014

County: Rockland

Site No: 344004

Order No:

**THIS DECLARATION OF COVENANTS, RESTRICTIONS AND ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner.**

By:   
Robert W. Schick, Director  
Division of Environmental Remediation

Date: SEP 25 2012

**Grantee's Acknowledgment**

STATE OF NEW YORK )  
 ) ss:  
COUNTY OF Albany )

On the 25<sup>th</sup> day of September, in the year 2012, before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity as designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his signature on the instrument, the People of the State of New York, upon behalf of which the individual acted, executed the instrument.

  
Notary Public - State of New York

**David J. Chiusano**  
Notary Public, State of New York  
No. 01CH5082146  
Qualified in Schenectady County  
Commission Expires August 22, 2012

County: Rockland

Site No: 344004

Order No:

**EXHIBIT A**  
**To**  
**Declaration of Covenants, Restrictions and Environmental Easement**  
**Description of Property Subject to this Instrument**

May 7, 2012  
Job # 2230

**ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY**  
**PROPERTY DESCRIPTION**  
**"WEIGH STATION LOT"**  
**TAX LOT 39.19-1-4 DEED REF. INST.#1998-60056**

**TOWN OF RAMAPO \* ROCKLAND COUNTY \* NEW YORK**

BEING LOT No. 2 AS SHOWN ON A MAP ENTITLED "SUBDIVISION PLAT-TRANSFER STATION AND WEIGH STATION SUBDIVISION" WHICH MAP WAS FILED IN THE ROCKLAND COUNTY CLERK'S OFFICE ON AUGUST 31, 1998 AS MAP 7194 IN BK. 119 ON PG. 26. SAID LOT ALSO KNOWN AS TAX LOT 4 IN BLOCK 1 ON SECTION 39.19 OF THE TOWN OF RAMAPO TAX MAPS:

BEGINNING AS A POINT (P.O.B.) MARKED BY A P.K. NAIL IN THE EASTERLY LINE OF TORNE VALLEY ROAD. SAID POINT BEING FURTHER DESCRIBED BY THE FOLLOWING THREE COURSES AND DISTANCES FROM THE ORIGINAL SOUTHERLY CORNER OF LANDS NOW OR FORMERLY OF ORANGE AND ROCKLAND UTILITIES, INC. "SUB-STATION SITE" (TAX LOT 39.15-1-1);

- A. S 49d09m35s E 90.00' TO A POINT IN THE SOUTHEASTERLY LINE OF TORNE VALLEY ROAD; THENCE,
  - B. S 84d57m55s W 320.00' CONTINUING ALONG THE EASTERLY LINE OF TORNE VALLEY ROAD TO A POINT; THENCE,
  - C. S 43d13m55s W 977.21' CONTINUING ALONG THE EASTERLY LINE OF TORNE VALLEY ROAD TO THE POINT OR PLACE OF BEGINNING AND RUNNING THENCE;
1. S 08d49m00s E 23.14' ALONG THE COMMON BOUNDARY LINE OF THE HEREIN DESCRIBED PARCEL AND LANDS NOW OR FORMERLY OF THE TOWN OF RAMAPO LOT 1 (INACTIVE CAPPED LANDFILL SITE TAX LOT 39.19-1-3) AS SHOWN ON THE AFOREMENTIONED FILED MAP TO A POINT; THENCE,
  2. S 01d34m00s W 109.77' CONTINUING ALONG THE SAME TO A POINT; THENCE,
  3. S 04d27m15s W 49.95' CONTINUING ALONG THE SAME TO A POINT; THENCE,
  4. S 09d07m30s W 58.33' CONTINUING ALONG THE SAME TO A POINT; THENCE,
  5. S 19d32m00s W 24.02' CONTINUING ALONG THE SAME TO A POINT; THENCE,
  6. N 85d42m30s W 64.20' CONTINUING ALONG THE SAME TO A POINT; THENCE,
  7. S 88d41m40s W 61.25' CONTINUING ALONG THE SAME TO A POINT MARKED BY A P.K. NAIL IN THE EASTERLY LINE OF TORNE VALLEY ROAD; THENCE,
  8. N 28d13m55s E 275.37' ALONG THE EASTERLY LINE OF TORNE VALLEY ROAD TO A POINT; THENCE,
  9. N 43d13m55s E 22.79' CONTINUING ALONG THE SAME TO THE POINT OR PLACE OF BEGINNING.

CONTAINING 0.440 ACRES OF LAND MORE OR LESS.

County: Rockland

Site No: 344004

Order No:

**ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY.**

**PROPERTY DESCRIPTION**

**"TRANSFER STATION"**

**TAX LOT 39.19-1-5 DEED REF. INST. #1998-60056**

**TOWN OF RAMAPO \* ROCKLAND COUNTY \* NEW YORK**

BEING LOT No. 3 AS SHOWN ON A MAP ENTITLED "SUBDIVISION PLAT-TRANSFER STATION AND WEIGH STATION" WHICH MAP WAS FILED IN THE ROCKLAND COUNTY CLERK'S OFFICE ON AUGUST 31, 1998 AS MAP 7194 IN BK. 119 ON PG. 26. SAID LOT ALSO KNOWN AS TAX LOT 5 IN BLOCK 1 ON SECTION 39.19 OF THE TOWN OF RAMAPO TAX MAPS.

BEGINNING AT A POINT (P.O.B.) IN THE SOUTHEASTERLY LINE OF TORNE VALLEY ROAD. SAID POINT BEING FURTHER DESCRIBED BY THE FOLLOWING TWO COURSES AND DISTANCES FROM THE ORIGINAL SOUTHERLY CORNER OF THE ORANGE AND ROCKLAND UTILITIES, INC. "SUB-STATION SITE" TAX LOT 39.15-1-1;

- A. S 49d09m35s E 90.00' CROSSING TORNE VALLEY ROAD TO A POINT;  
THENCE,
  - B. N 63d44m54s E 184.54' ALONG THE SOUTHEASTERLY LINE OF TORNE VALLEY ROAD TO THE POINT OR PLACE OF BEGINNING AND RUNNING THENCE;
1. N 63d44m54s E 24.51' ALONG THE EASTERLY LINE OF TORNE VALLEY ROAD TO A POINT; THENCE,
  2. N 50d52m43s E 231.14' CONTINUING ALONG THE SAME TO A POINT MARKED BY AN IRON PIPE AT THE SOUTHEASTERLY LINE OF LANDS NOW OR FORMERLY OF ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY (TAX LOT 39.20-1-1); THENCE,
  3. S 30d05m52s E 1,256.47' ALONG THE COMMON BOUNDARY LINE OF THE HEREIN DESCRIBED PARCEL AND LANDS NOW OR FORMERLY OF ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY TO A POINT MARKED BY AN IRON PIPE IN THE NORTHWESTERLY LINE OF LANDS NOW OR FORMERLY OF STONE INDUSTRIES, INC. (TAX LOT 39.20-1-2); THENCE,
  4. S 47d15m18s W 391.26' ALONG THE COMMON BOUNDARY LINE OF THE HEREIN DESCRIBED PARCEL AND LANDS NOW OR FORMERLY OF STONE INDUSTRIES, INC. TO A POINT; THENCE,
  5. N 36d31m30s W 494.86' ALONG THE COMMON BOUNDARY LINE OF THE HEREIN DESCRIBED PARCEL AND LANDS NOW OR FORMERLY OF THE TOWN OF RAMAPO LOT 1 (INACTIVE CAPPED LANDFILL SITE TAX LOT 39.19-1-3) ON THE AFOREMENTIONED FILED MAP TO A POINT; THENCE,
  6. N 21d32m00s E 42.08' CONTINUING ALONG THE SAME TO A POINT; THENCE,
  7. N 20d22m00s E 69.05' CONTINUING ALONG THE SAME TO A POINT; THENCE,
  8. NORTHERLY ON A CURVE TO THE LEFT HAVING A RADIUS OF 425.00' AN ARC DISTANCE OF 168.50' CONTINUING ALONG THE SAME TO A POINT OF TANGENCY; THENCE,
  9. N 02d21m00s W 53.82' CONTINUING ALONG THE SAME TO A POINT OF CURVATURE; THENCE,
  10. NORTHWESTERLY ALONG A CURVE TO THE LEFT HAVING A RADIUS OF 375.00' AND ARC DISTANCE OF 239.98' CONTINUING ALONG THE SAME TO A POINT OF TANGENCY; THENCE,
  11. N 39d01m00s W 77.76' CONTINUING ALONG THE SAME TO A POINT; THENCE,
  12. N 42d10m00s W 133.70' CONTINUING ALONG THE SAME TO A POINT; THENCE,
  13. N 39d52m00s W 65.74' CONTINUING ALONG THE SAME TO A POINT; THENCE,
  14. N 43d40m00s W 39.58' CONTINUING ALONG THE SAME TO A POINT; THENCE,

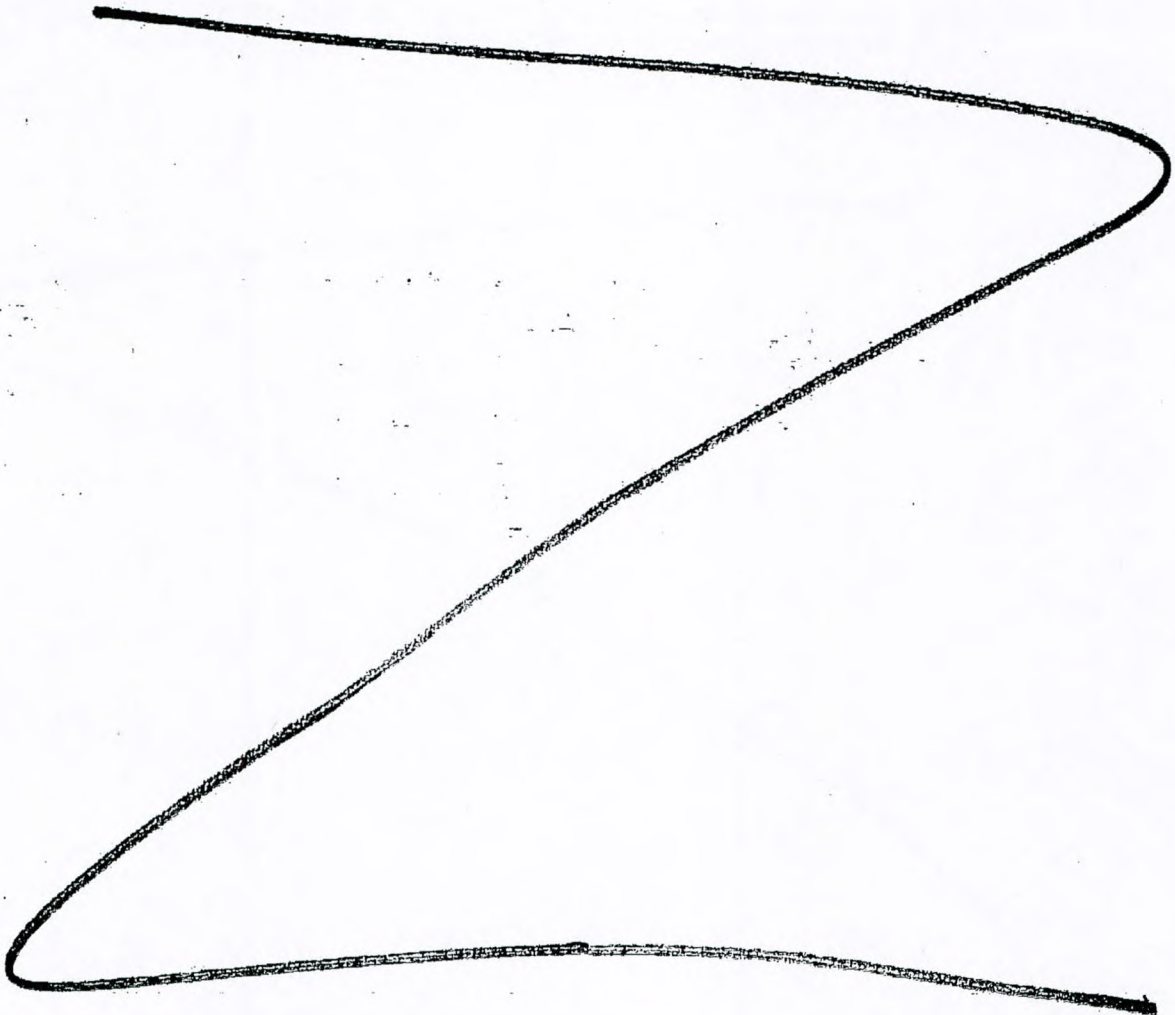
County: Rockland

Site No: 344004

Order No:

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15. N 53d24m00s W 26.80' CONTINUING ALOGN THE SAME TO THE POINT OR PLACE OF BEGINNING.

CONTAINING 8.735 ACRES OF LAND MORE OR LESS.



County: Rockland

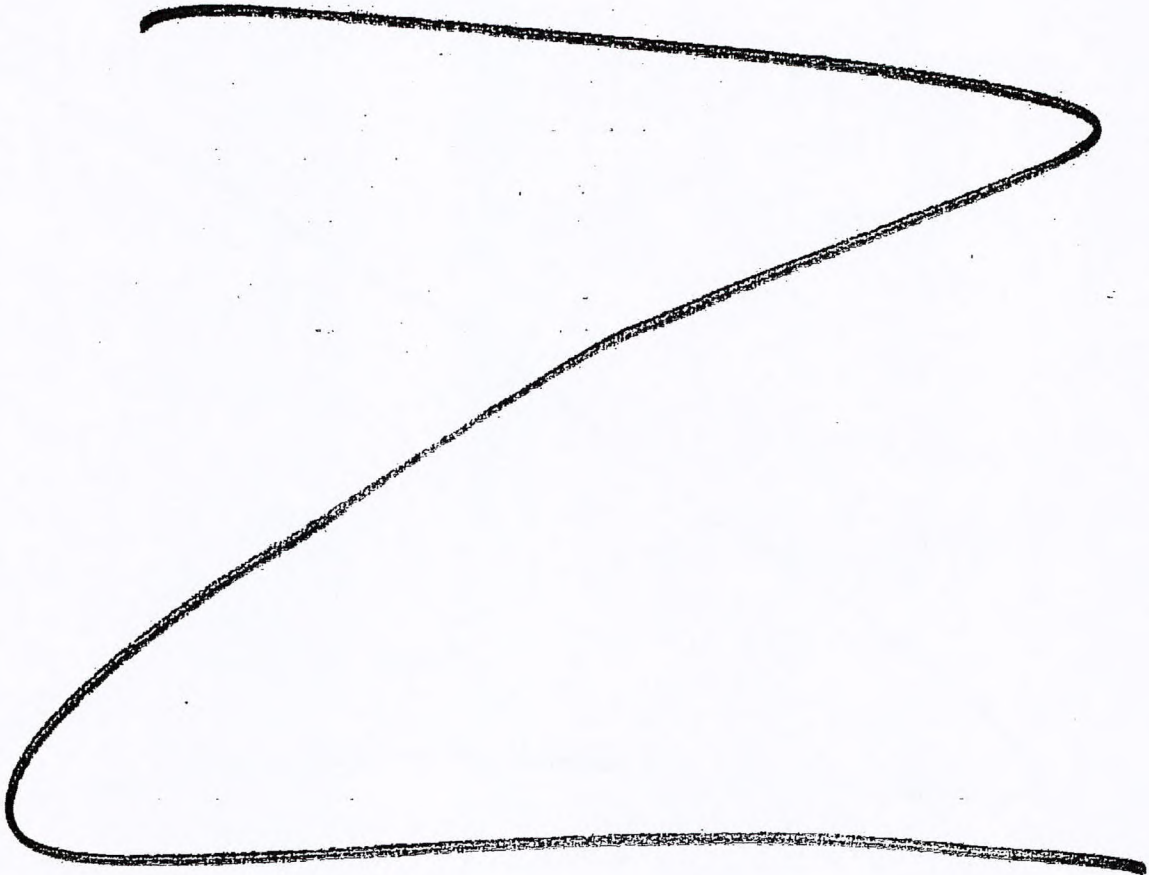
Site No: 344004

Order No:

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**EXHIBIT B**  
**To**  
**Declaration of Covenants, Restrictions and Environmental Easement**  
**Survey of Property**  
**Where Use has been Restricted**

(See attached survey (Sparaco Engineering & Land Surveying, PC, August 25, 2011, Revised May 16, 2012) of Ramapo Landfill Site and SWMA Property showing Institutional Control)



**APPENDIX C**

**INSTITUTIONAL AND ENGINEERING  
CONTROL EVALUATION FORM**

## INSTITUTIONAL AND ENGINEERING CONTROL EVALUATION FORM

### **I. Site Background Information**

#### **A. Site Name and Location:**

Site name as it appears on the Environmental Easement: \_\_\_\_\_

Name of the current property owner(s): \_\_\_\_\_

Site Street Address: \_\_\_\_\_

Municipality (-ies): \_\_\_\_\_ County (-ies): \_\_\_\_\_

Blocks: \_\_\_\_\_

Lots: \_\_\_\_\_

Source information obtained from: \_\_\_\_\_

#### **B. Person responsible for preparing Institutional and Engineering Control Evaluation Form:**

Person's Name: \_\_\_\_\_

Person's Title: \_\_\_\_\_

Company Name: \_\_\_\_\_

Relationship to the Site (check as appropriate): Owner \_\_\_\_\_ Operator \_\_\_\_\_

Lessee \_\_\_\_\_ Person Who Conducted the Cleanup \_\_\_\_\_

Other (describe) \_\_\_\_\_

Street Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_

Telephone Number: (\_\_\_\_) \_\_\_\_ - \_\_\_\_

Fax Number: (\_\_\_\_) \_\_\_\_ - \_\_\_\_

E-mail Address: \_\_\_\_\_

**C. Case Specific Information (Complete all that apply)**

- Site Name: \_\_\_\_\_
- Site Registry Number: \_\_\_\_\_
- Date of final Remediation Report and/or Certificate of Completion: \_\_\_\_\_
- Name and program of assigned Project Manager at issuance of Environmental Easement:  
\_\_\_\_\_

**D. Existing Site Conditions**

- Describe the physical characteristics of the site (features, topography, drainage, vegetation, access, etc.). If necessary, attach additional sheets.

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- Describe the current site operations/use. If necessary, attach additional sheets.

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- Describe visual integrity/condition engineering control. If necessary, attach additional sheets.

## II. Protectiveness Evaluation

**A. Environmental Easement and Engineering Control Information (Complete below)**

- Provide the following information for the recorded Environmental Easement:

Book Number: \_\_\_\_\_

Page Number: \_\_\_\_\_

Date the date the Environmental Easement was filed in the office of the county recording officer: \_\_\_\_\_

- Have any amendments and/or additional filings been recorded that may modify or supersede the Environmental Easement?

Yes \_\_\_\_ No \_\_\_\_

If "Yes", provide an explanation. If necessary, attach additional sheets.

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**B. Evaluation of Institutional and Engineering Controls**

**1. Zoning or Land Use Changes (Complete below)**

- a. Land use at the time the Environmental Easement was filed (check all that apply):

Non-Residential \_\_\_\_ Residential \_\_\_\_ Agricultural \_\_\_\_ Other \_\_\_\_

- b. Current land use (check all that apply):

Non-Residential \_\_\_\_ Residential \_\_\_\_ Agricultural \_\_\_\_ Other \_\_\_\_

- c. Has there been an actual or pending zoning or land-use change?

Yes \_\_\_\_ No \_\_\_\_

**2. Inspections (Complete below)**

Have periodic inspections of the site identified any excavation or other disturbance activities that have taken place within the restricted areas?

Yes \_\_\_\_ No \_\_\_\_

Date(s) of Disturbance: \_\_\_\_\_

Duration of Disturbance: Years \_\_\_\_ Months \_\_\_\_ Days \_\_\_\_

Date the NYSDEC was notified: \_\_\_\_\_

Date Work Plan Approved: \_\_\_\_\_

Description of the disturbance and methods to address the disturbance. If necessary, attach additional sheets.

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Name of Contact Person Relative to the Disturbance:

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Title: \_\_\_\_\_

Street Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

**3. Changes to Laws and Regulations (Complete below)**

- a. Are there any subsequently promulgated or modified environmental laws or regulations, which apply to the site?

Yes \_\_\_\_ No \_\_\_\_

- b. If "Yes", has the evaluation also determined that the Environmental Easement and engineering control, as applicable, meets the requirements of the new laws and regulations?

Yes \_\_\_\_ No \_\_\_\_

- c. The Environmental Easement and engineering control, as applicable that did not meet the requirements of the new laws and regulations has been addressed in the following manner to bring them into compliance. If necessary, attach additional sheets.

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**APPENDIX D**

**POST-CLOSURE ANNUAL SITE INSPECTION FORM**

## APPENDIX D

**RAMAPO LANDFILL  
NYSDEC SITE NO. 3-44-004  
POST-CLOSURE SITE INSPECTION FORM**

Date: \_\_\_\_\_  
Inspected By: \_\_\_\_\_

	Condition: (Check)				Remarks
	Acceptable	Not Acceptable	Present	Not Present	
1. Vegetative Cover					
2. Drainage Structures (Swales, Downchutes, Channels, Plunge Pools, Outfalls to Torne Brook).					
a. Sediment Build-Up					
b. Pooling or Ponding					
c. Slope Integrity					
d. Overall Adequacy					
e. Concrete Lining					
f. Gabion Lining					
g. Corrugated Metal Pipe (CMP) Lining					
3. Access Road					
4. Landfill Cover System					
a. Erosion Damage					
b. Leachate Seeps					
c. Settlement					
d. Stone Aprons					
5. Gabion Retaining Walls					
a. Structural					
b. Drainage Media Behind Wall					
6. Fence and Gates					
7. Slope Stability					
a. Landfill					
b. Mountain Side					
8. Gas Vents					

Other	Yes (Check)	No (Check)
Obtain Groundwater Extraction Well Operation Period Records and Maintenance Records for Current Year		

Miscellaneous Comments:

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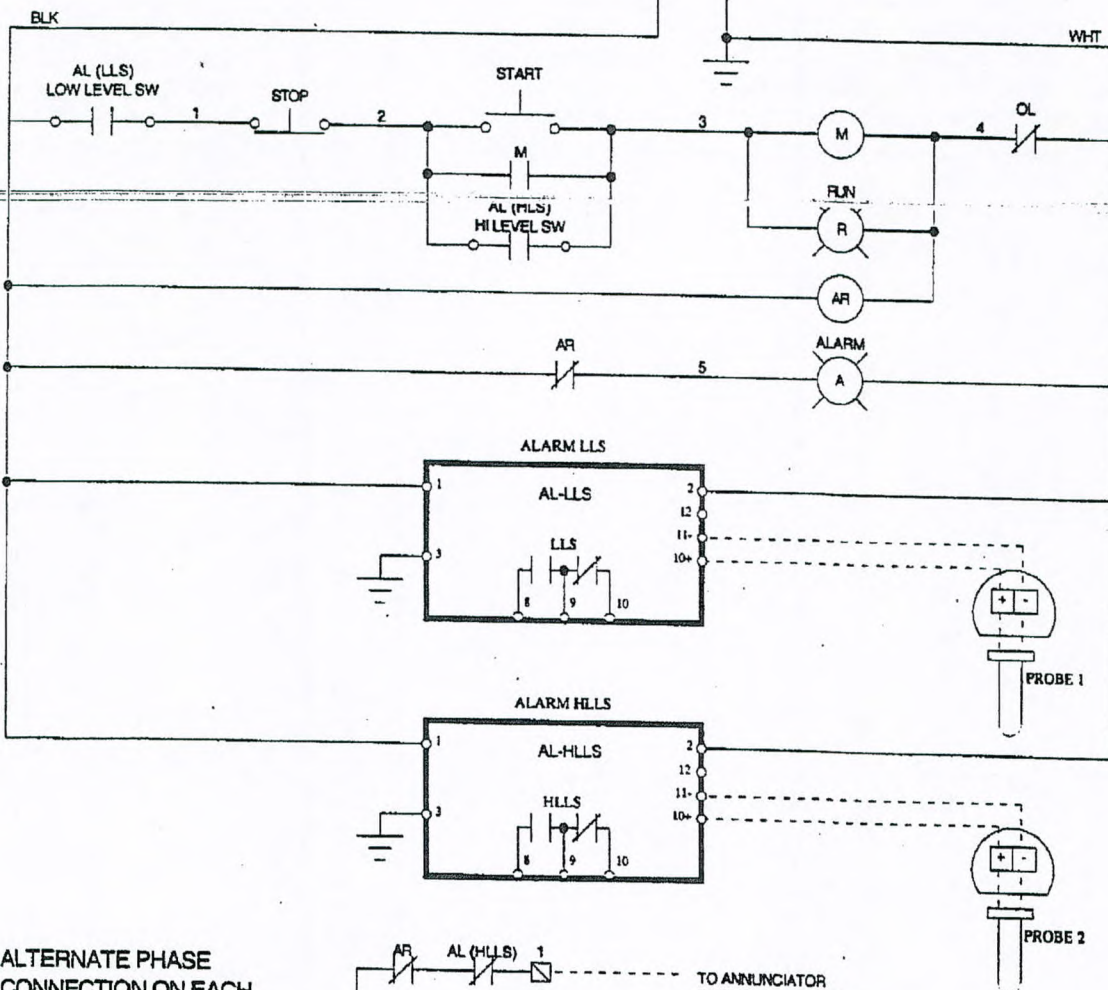
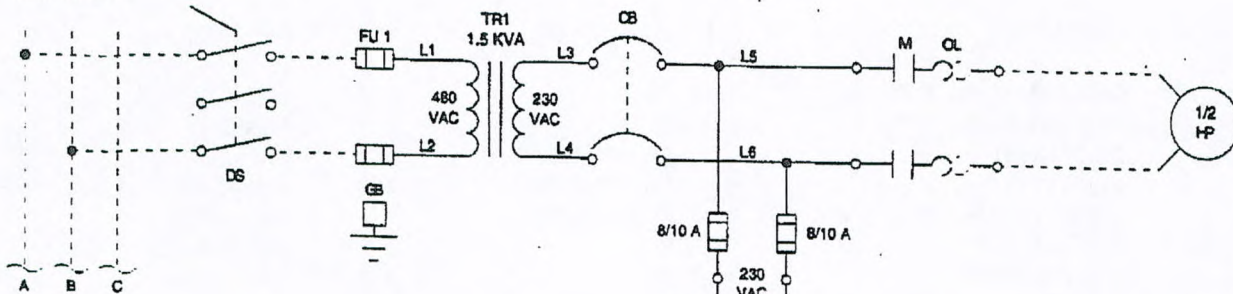


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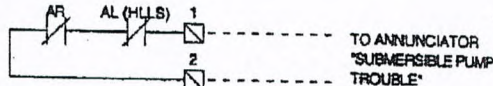
**APPENDIX E**

**LEACHATE COLLECTION SYSTEM - WIRING  
DIAGRAMS AND BILL OF MATERIALS**

480 VAC  
FROM  
JUNCTION BOX



NOTE: ALTERNATE PHASE  
CONNECTION ON EACH  
STATION (AB, BC, CA,.....)



**BENFELD**  
CONTROL SYSTEMS Inc.

WHITE PLAINS NY 914-948-3231

RAMAPO LANDFILL: EXTRACTION WELL PUMP  
WIRING DIAGRAM (TYP. OF 7)

GEO-CON  
VOORHEES NJ

DATE 12/30/97

REV.

DRAWING NO.

PS3385.B2

TAG	DESCRIPTION	MANUFACTURER	QTY	PART NO.
BNC	ENCLOSURE NEMA 3R	HOFFMAN	1	A-24R248HCR
	WINNER PANEL	HOFFMAN	1	A-24P24
PL1	PILOT LIGHT	ALLEN BRADLEY	1	800H-QR11R
PL2	PILOT LIGHT	ALLEN BRADLEY	1	800H-QR11A
SS1	3 POSITION SELECTOR SWITCH	ALLEN BRADLEY	1	800H-JR2A
AL-LLS,HLLS	ALARM BOARD	B&W	2	5200HF2-OC
TR1	TRANSFORMER	ACME	1	T-2-53011-S
FU1	FUSE BLOCK 2P 30 A	-----	1	-----
	W/PRIMARY FUSE	BUSSMAN	2	FNQ-R-3
CB	CIRCUIT BRAKER	ALLEN BRADLEY	1	1492-CB2G100
	W/N.C. AUXILIARY CONTACT	ALLEN BRADLEY	1	1492-ACBH2
TB2	TRANSFORMER	MICRON	1	B075MBT713RK
	W/PRIMARY FUSE	BUSSMAN	2	FNQ-R-8/10
	W/SECONDARY FUSE	BUSSMAN	1	FNM-1
AR	CONTROL RELAY	ALLEN BRADLEY	1	700-HF32A1
M	FULL VOLTAGE MOTOR STARTER	ALLEN BRADLEY	1	509-TOXD
	W/HEATER ELEMENT	ALLEN BRADLEY	2	<del>W43</del> W45
TB	TERMINAL BLOCK	ALLEN BRADLEY	5	1492-W4
GB	GROUND BAR	SIEMENS	1	GB5
DS	DISCONNECT SWITCH	SEVERE	1	WFR001
	(PROVIDED SEPARATE)			

**BENFELD**

CONTROL SYSTEMS Inc.

WHITE PLAINS NY

914-948-3231

RAMAPO LANDFILL: EXTRACTION WELL #1  
BILL OF MATERIALS (TYP. OF 2)

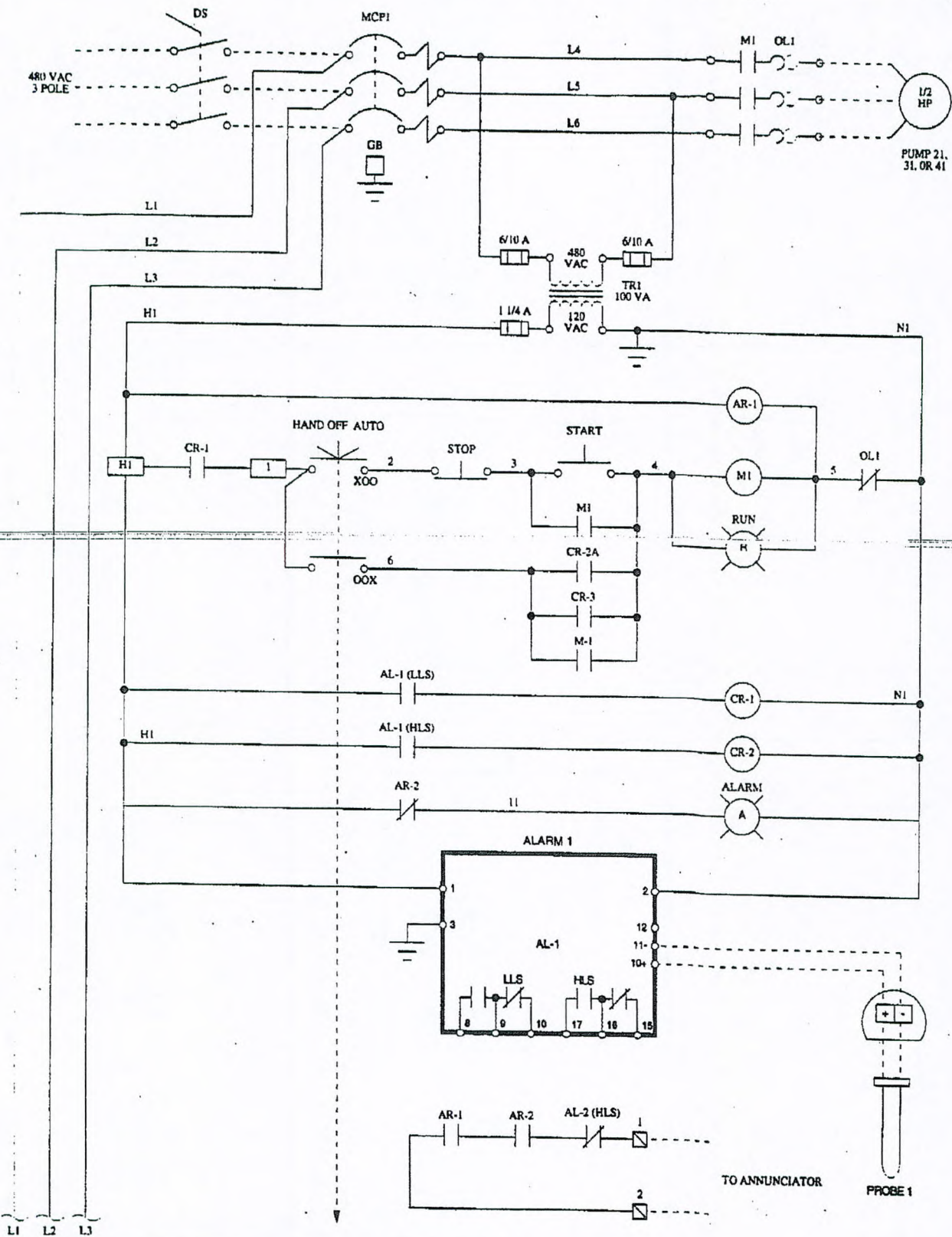
GEO-CON  
VOORHEES NJ

DATE 12/30/97

REV.

DRAWING NO.

PS3385.B3



**BENFELD**

CONTROL SYSTEMS Inc.

WHITE PLAINS NY

914-948-3231

RAMAPO LANDFILL: LIFT STATION PUMP  
WIRING DIAGRAM (TYP. OF 3)

GEO-CON  
VOORHEES NJ

DATE 12/30/97

REV.

DRAWING NO.

PS3385.A2



TAG	DESCRIPTION	MANUFACTURER	QTY	PART NO.
BNC	ENCLOSURE NEMA 3R	HOFFMAN	1	A-30R3012HCR
	WINNER PANEL	HOFFMAN	1	A-30P30
PL1	PILOT LIGHT	ALLEN BRADLEY	2	800H-QR11R
PL2	PILOT LIGHT	ALLEN BRADLEY	2	800H-QR11A
PB1	PUSH BUTTON	ALLEN BRADLEY	2	800H-AR1D1
PB2	PUSH BUTTON	ALLEN BRADLEY	2	800H-BR6D2
SS	3 POSITIN SELECTOR SWITCH	ALLEN BRADLEY	1	800H-JR2A
AL-1	FLOATS	B/W	2	7010-A-4-A-20
TR1,TR2	TRANSFORMER	MICRON	2	B100MBT713RK
	W/PRIMARY FUSE	BUSSMAN	4	FNQ-R-6/10
	W/SECONDARY FUSE	BUSSMAN	2	FNQ-R-6/10
CR1,2,3,AR1,AR2	CONTROL RELAY	ALLEN BRADLEY	5	700P-400A1
MCP1,MCP2	MOTOR CIRCUIT PROTECTOR	SIEMENS	2	ED63A010
	W/AUXILIARY CONTACT	SIEMENS	2	AO1ED62
M1	FULL VOLTAGE MOTOR STARTER	ALLEN BRADLEY	1	509-TOD
	W/HEATER ELEMENT	ALLEN BRADLEY	1	W27
	W/2 N.O. AUXILIARY CONTACT	ALLEN BRADLEY	1	195-FA20
M2	FULL VOLTAGE MOTOR STARTER	ALLEN BRADLEY	1	509-TOD
	W/HEATER ELEMENT	ALLEN BRADLEY	1	W27
	W/ N.O. N.C. AUXILIARY CONTACT	ALLEN BRADLEY	2	195-FA22
TB	TERMINAL BLOCK	ALLEN BRADLEY	4	1492-W4
GB	GROUND BLOCK	SIEMENS	1	GB5
DS	DISCONNECT SWITCH (PROVIDED SEPARATE)	SIEMENS	1	NFR351

**BENF ELD**

CONTROL SYSTEMS Inc.

WHITE PLAINS NY

914-848-3231

RAMAPO LANDFILL: LIFT STATION PUMP  
BILL OF MATERIALS (TYP. OF 5)

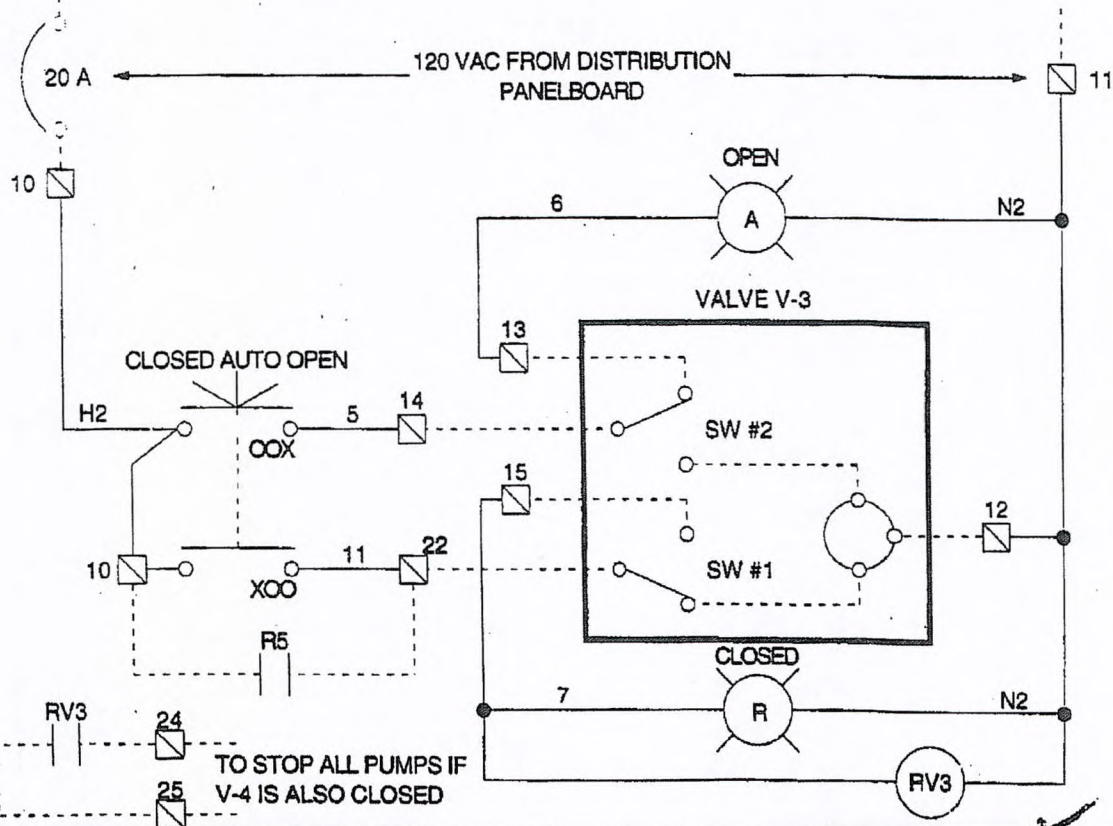
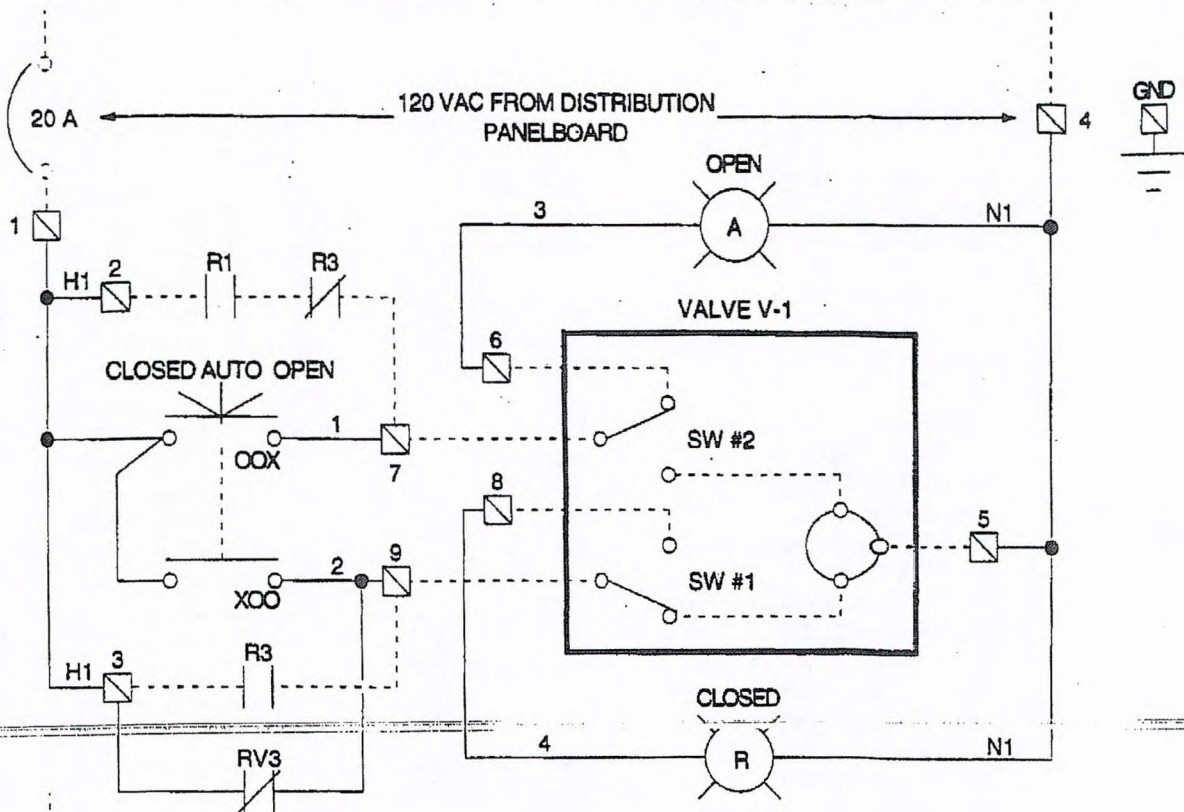
GEO-CON  
VOORHEES NJ

DATE 12/30/97

REV.

DRAWING NO.

PS3385.A4



**BENF ELD**

CONTROL SYSTEMS Inc.

WHITE PLAINS NY

914-948-3231

RAMAPO LANDFILL: VALVE CONTROL PANEL  
WIRING DIAGRAM

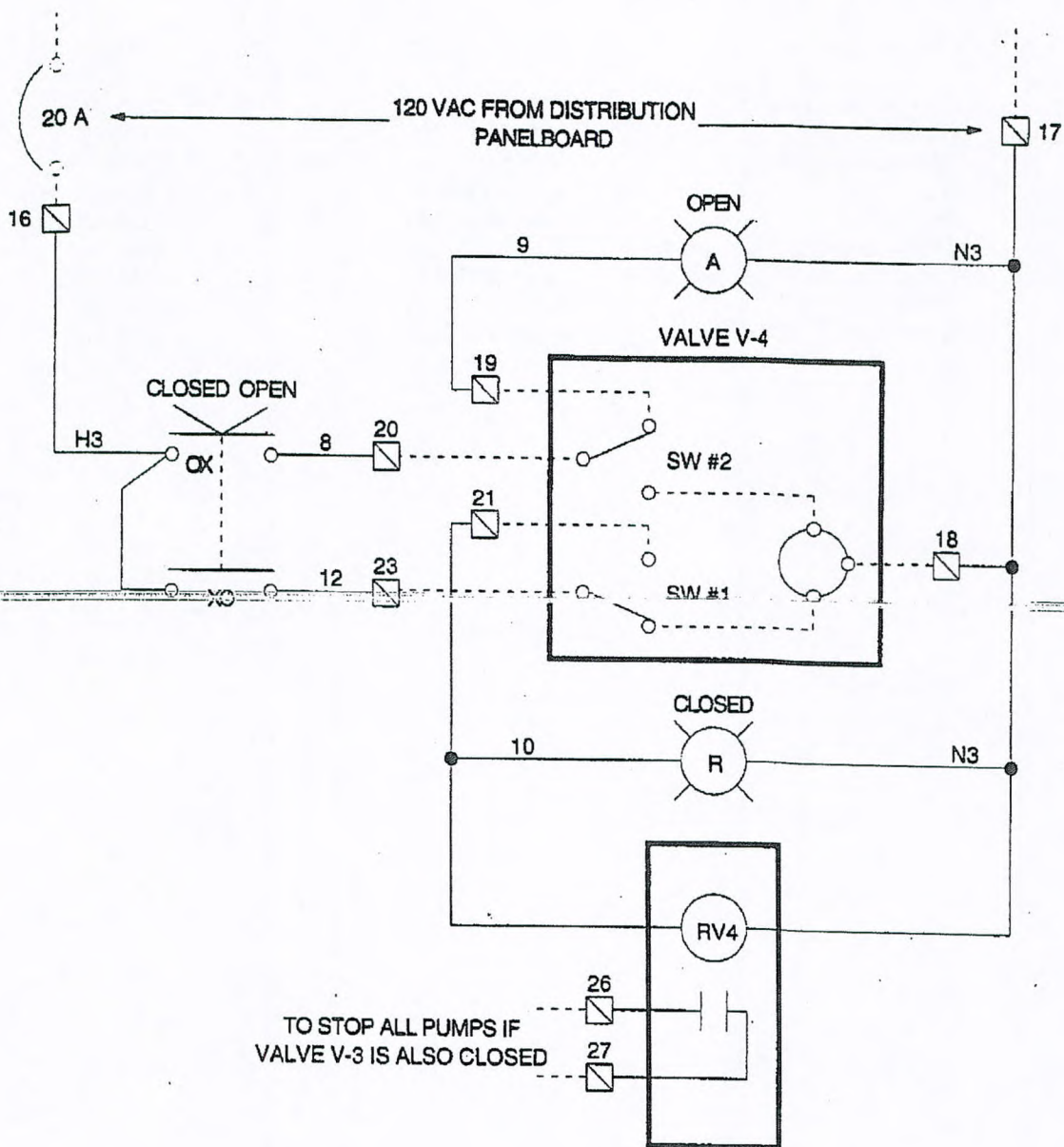
GEO-CON  
VOORHEES NJ

DATE 12/30/97

REV.

DRAWING NO.

PS3385.C2/C4



**BENF ELD**  
CONTROL SYSTEMS Inc.

WHITE PLAINS NY

914-948-3231

RAMAPO LANDFILL: VALVE CONTROL PANEL  
WIRING DIAGRAM

GEO-CON  
VOORHEES

DATE 12/30/97

REV.

DRAWING NO.

PS3385.C3

TAG	DESCRIPTION	MANUFACTURER	QTY	PART NO.
ENC	ENCLOSURE NEMA 12	HOFFMAN	1	C-SD12126
	WINNER PANEL	HOFFMAN	1	C-P1212
	W/KEYLOCK HANDLE	HOFFMAN	1	C-WHK
PL1	PILOT LIGHT	ALLEN BRADLEY	3	800H-QR11R
PL2	PILOT LIGHT	ALLEN BRADLEY	3	800H-QR11G
SS1	2 POSITION SELECTOR SWITCH	ALLEN BRADLEY	1	800H-HR2B
SS2	2 POSITION SELECTOR SWITCH	ALLEN BRADLEY	2	800H-HR2B
TB	TERMINAL BLOCK	ALLEN BRADLEY	23	1492-W4
	W/ GROUND BLOCK	ALLEN BRADLEY	1	1492-WG4

**BENF ELD**

CONTROL SYSTEMS Inc.

WHITE PLAINS NY

914-948-3231

RAMAPO LANDFILL: VALVE CONTROL PANEL  
BILL OF MATERIALS

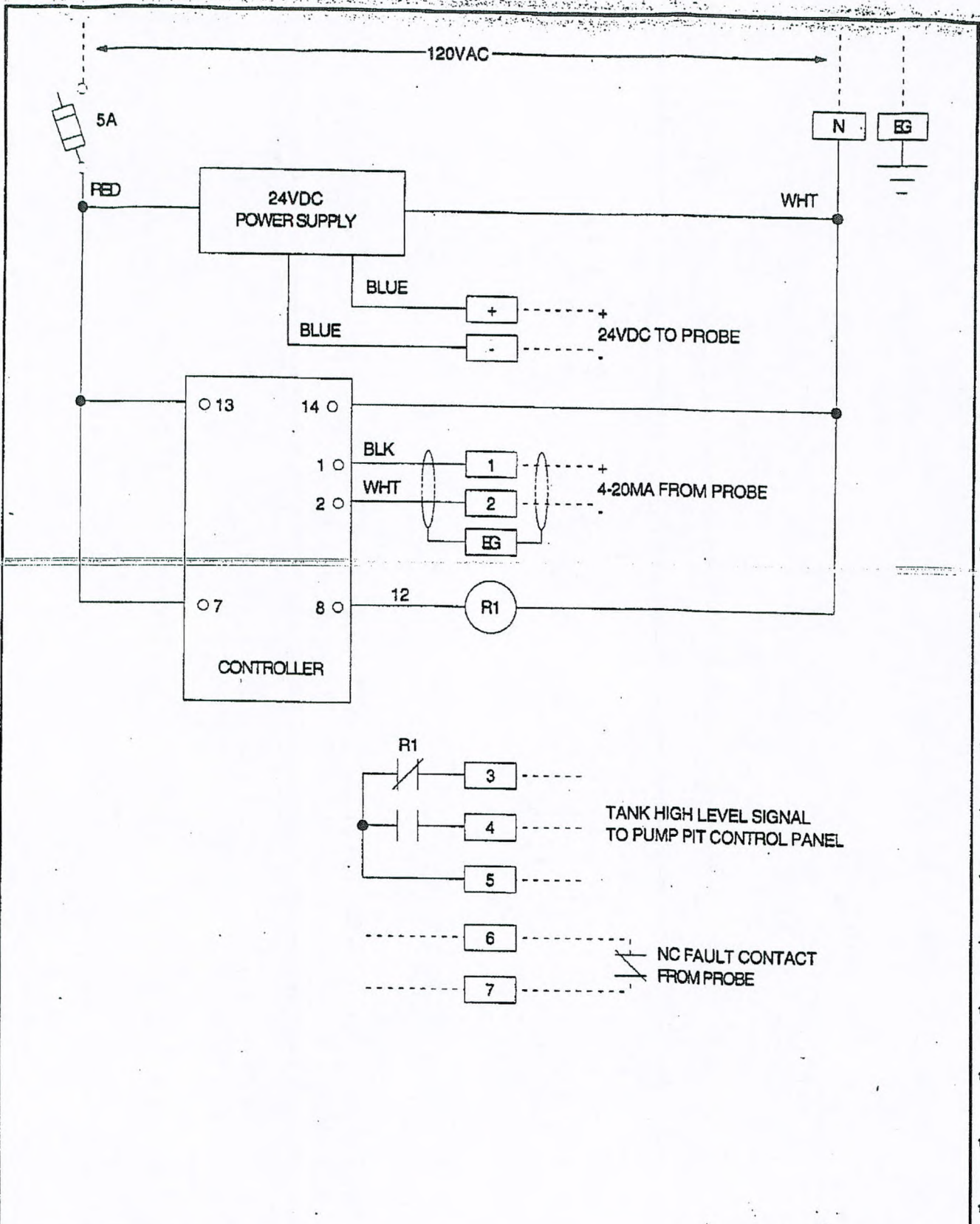
GEO-CON  
VOORHEES NJ

DATE 12/30/97

REV.

DRAWING NO.

PS3385.C4



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<b>BENF ELD</b> CONTROL SYSTEMS Inc. WHITE PLAINS NY 914-948-3231	RAMAPO LANDFILL TANK LEVEL CONTROL SYSTEM WIRING DIAGRAM	DATE 11/18/96
	GEO-CON HILLBURN NY	REV.
		DRAWING NO. PS3385

# Environmental Restoration Systems

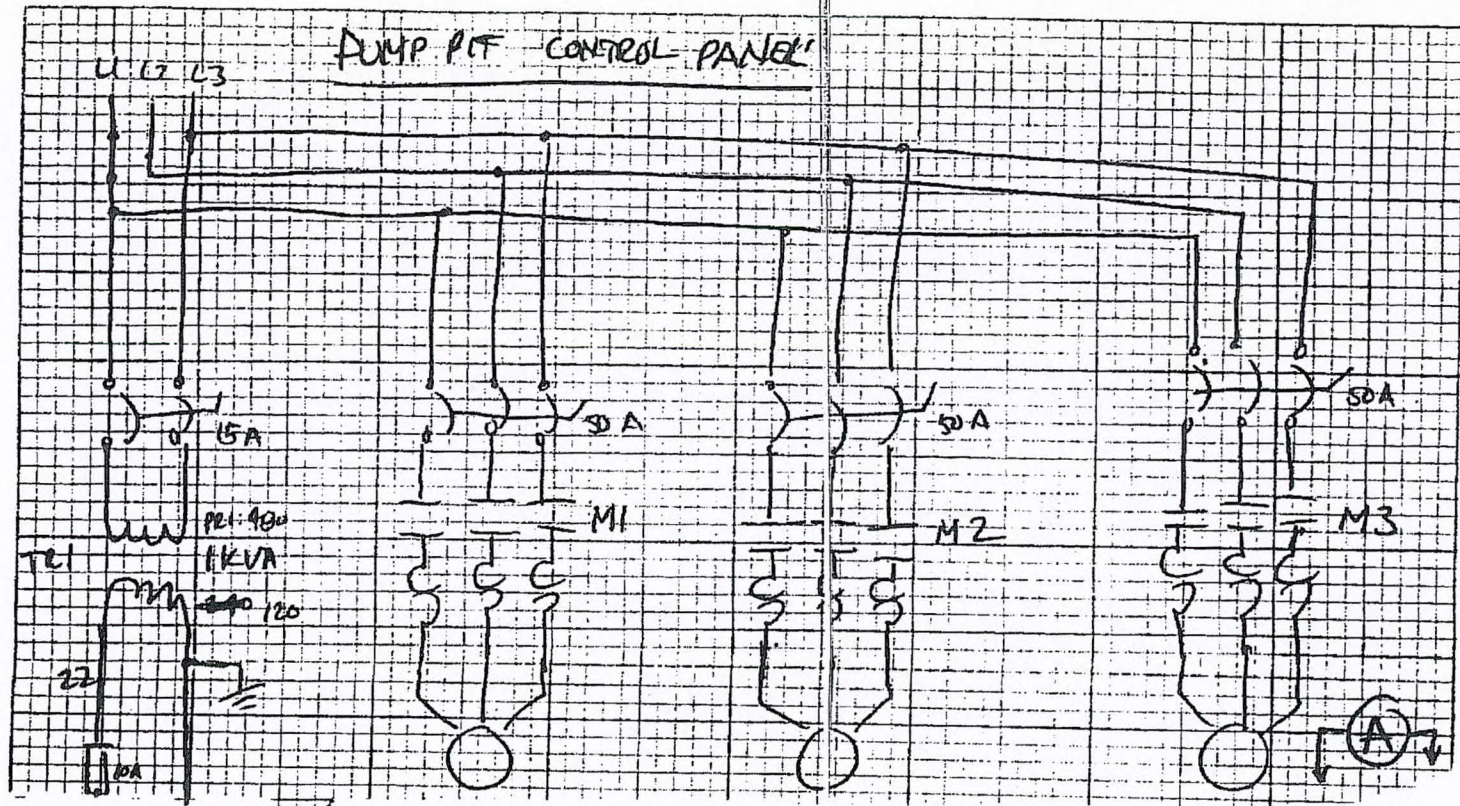
SUBJECT Ramapo Landfill

BY ROS DATE 8/20/97 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

PROJECT NUMBER \_\_\_\_\_

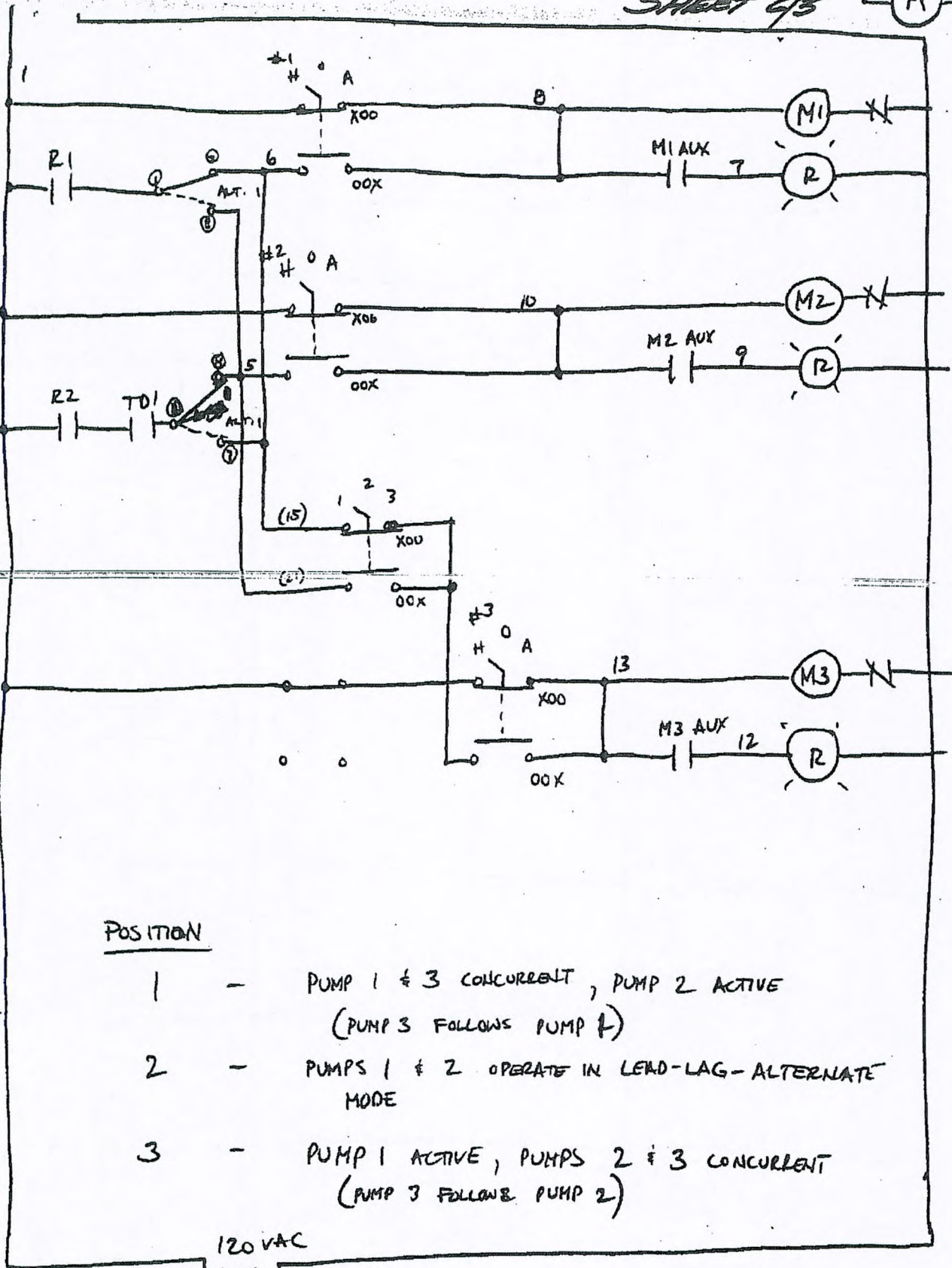
PHASE \_\_\_\_\_ TASK \_\_\_\_\_

SHEET NUMBER \_\_\_\_\_ OF \_\_\_\_\_



Brin H. Anderson

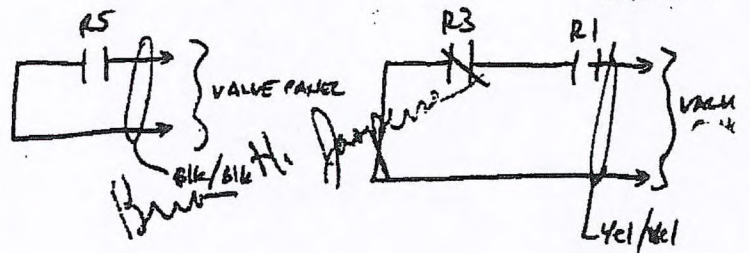
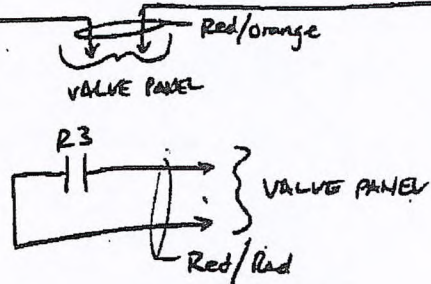
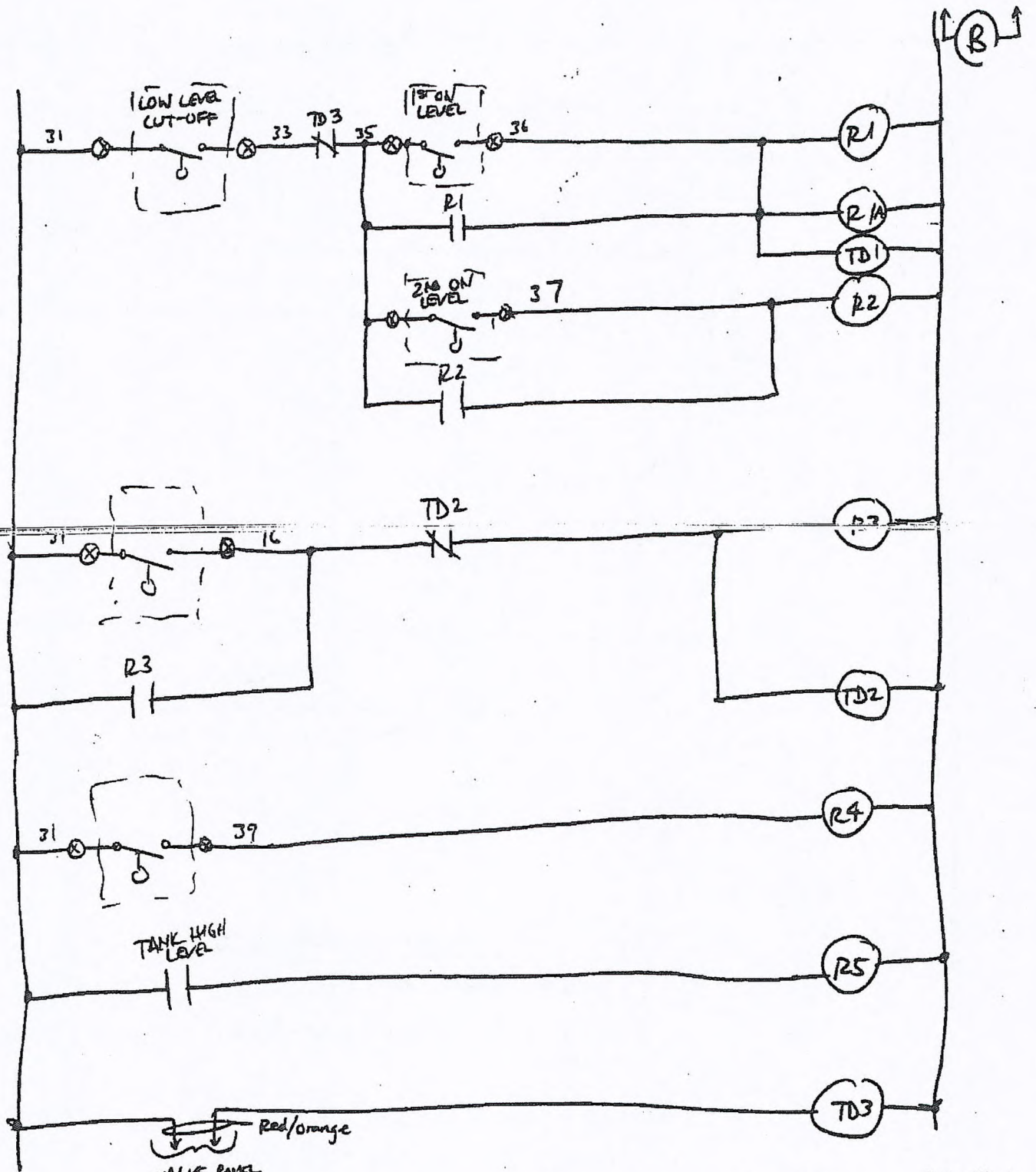
SHEET 1/5



POSITION

- 1 - PUMP 1 & 3 CONCURRENT, PUMP 2 ACTIVE  
(PUMP 3 FOLLOWS PUMP 1)
- 2 - PUMPS 1 & 2 OPERATE IN LEAD-LAG-ALTERNATE  
MODE
- 3 - PUMP 1 ACTIVE, PUMPS 2 & 3 CONCURRENT  
(PUMP 3 FOLLOWS PUMP 2)

Brian H. Jaspers



**APPENDIX F**  
**MAINTENANCE CHECKLIST**

**TOWN OF RAMAPO LANDFILL  
MAINTENANCE CHECKLIST**

Inspected By: \_\_\_\_\_

Landfill Property Item	Maintenance Date	Description of Maintenance
1. Vegetative Cover		
a. Seeding		
b. Fertilizing		
c. Topsoil Replaced		
d. Removal of Undesirable Vegetation		
2. Drainage Structures		
a. Excavation		
b. Fill		
c. Regrading		
d. Landfill Cap Replacement		
e. Vegetative Cover Placement		
f. Lining Replacement		
3. Access Road		
a. Excavation		
b. Fill		
c. Grading		
d. Stone Paving		
4. Extraction Wells and Lift Pump Stations		
a. Pumps		
b. Manholes		
c. Valve Control Panel		

5. Landfill Cap		
a. Excavation		
b. Cover Materials		
• Topsoil		
• Barrier Protection Layer		
• Drainage Composite		
• Geomembrane		
• Gas Vent Composite		
c. Testing		
d. Grading Fill		
e. Vegetative Cover		
6. Gabion Retaining Walls		
a. Replace Stone		
b. Replace Baskets		
c. Drainage Media Behind Wall		
• Clean		
• Replace		
7. Fence and Gates		
8. Gas Vents		
• Pipes		
• Bedding and Adjacent Media		
9. Other		

**APPENDIX G**

**TIMBER RATTLESNAKE ENCOUNTER PLAN**

## **TIMBER RATTLESNAKE ENCOUNTER PLAN**

### **Town of Ramapo Landfill**

### **Rockland County, NY**

Timber Rattlesnake (*Crotalus horridus*), a State threatened species, is known to exist on or near the Town of Ramapo Landfill Site.

**It is illegal to take (kill), import, transport, possess or sell an animal listed as Threatened without a license.**

The following fact sheets describing this species and its habitat are attached:

- Notification of the Potential to Encounter a Timber Rattlesnake;
- New York Natural Heritage Program online species profile for Timber Rattlesnake; and
- New York State Department of Environmental Conservation (NYSDEC) Timber Rattlesnake Fact Sheet.

If this species is encountered, please adhere to the following protocol:

1. Stop all work immediately;
2. Evacuate the area and contact the Engineer in charge;
3. Delay all work in the area until the snake has moved from the work area. Do not return to the area of the snake encounter for a minimum of two (2) hours;
4. Mowing and maintenance activities may be continued a minimum of 750 feet from the area of the snake encounter;
5. If the snakes do not move along on their own in the allotted timeframe, the Engineer in charge shall contact NYSDEC to find a local nuisance timber rattlesnake removal option. The phone number for the NYSDEC Region 3 Bureau of Wildlife is (845) 256 – 3098.
6. Fill out the attached “Timber Rattlesnake Encounter Form.” These forms should be kept on file and included with each Periodic Review Report for the Landfill.

**TIMBER RATTLESNAKE ENCOUNTER FORM**

**Town of Ramapo Landfill**

**Rockland County, NY**

Timber Rattlesnake (*Crotalus horridus*), a State threatened species, is known to exist on or near the Town of Ramapo Landfill Site.

If this species is encountered, please adhere to the protocol in the Timber Rattlesnake Encounter Plan. Fill out the following information to be kept on file. These forms will be submitted with the Town of Ramapo Landfill Periodic Review Report (PRR).

**TIMBER RATTLESNAKE SIGHTING**

Date and Time sighted: \_\_\_\_\_

Approximate Location: \_\_\_\_\_

Your Name: \_\_\_\_\_

Persons/Agencies Contacted and Phone #: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Actions Taken: \_\_\_\_\_

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## Notification of the Potential to Encounter a Timber Rattlesnake



*Light (or Yellow) Phase Timber Rattlesnake*



*Dark (or Black) Phase Timber Rattlesnake*

**The project site and nearby lands may include habitats used by the timber rattlesnake.**

- The timber rattlesnake is listed as “Threatened” on the New York State Endangered Species List.
  - As a listed species, the timber rattlesnake is protected under the New York State Environmental Conservation Law.
  - As provided by the law, it is illegal for any person to approach, touch, move, threaten, harass, disturb, injure, or kill a timber rattlesnake. It is also illegal to take import, transport, possess, or sell any timber rattlesnake, its skin, or other parts, except under a permit from the New York State Department of Environmental Conservation (DEC).
  - A violation of the Environmental Conservation Law is punishable by both criminal and civil penalties.
  - Due to its coloration, the timber rattlesnake in its natural habitat is seldom seen.
- The timber rattlesnake may be encountered along roads, near homes and yards, in construction sites, and in undeveloped areas. If encountered, move away and do not attempt to touch, disturb, injure, or kill the rattlesnake.
  - Timber rattlesnakes are not aggressive and are not likely to strike unless disturbed, harassed, cornered, stepped on, or picked up.



*If a timber rattlesnake is encountered, do not approach, touch, attempt to move or herd the rattlesnake away, threaten, harass, disturb, injure, or kill the rattlesnake. Unless a qualified snake monitor licensed in New York State to handle and relocate the snake has been retained who will promptly arrange for the snake to be removed, please contact the NYS Department of Environmental Conservation Region 3 Bureau of Wildlife at 845-256-3098 for information regarding removal of the snake in accordance with New York State Law.*

# Timber Rattlesnake



Timber Rattlesnake (Yellow Phase)



Photo credits: Jesse W. Jaycox

**Scientific Name** *Crotalus horridus*  
Linnaeus, 1758

**Family Name** Viperidae  
Vipers and Pit Vipers

## Did you know?

Newborn timber rattlesnakes, often born well away from the overwintering den, follow the scent trails of adult snakes back to the den for hibernation (Brown and MacLean 1983, Reinert and Zappalorti 1988).

## Summary

**Protection** Threatened in New York State, not listed federally.

This level of state protection means: A native species likely to become an endangered species within the foreseeable future in New York (includes any species listed as federally Threatened by the United States). It is illegal to take, import, transport, possess, or sell an animal listed as Th

**Rarity** G4, S3

A global rarity rank of G4 means: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

A state rarity rank of S3 means: Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.

## Conservation Status in New York

There are approximately 205 extant dens known in the state, but when interacting and potentially interacting populations are taken into consideration, the number of occurrences will be in the range of 35 to 60. Indiscriminate killing and unregulated collecting, including a past bounty system in some portions of the range, has resulted in many populations becoming extirpated or depleted in numbers in most areas where the species was once numerous. Bounties on timber rattlesnakes were outlawed in New York State in 1971, but even in areas without bounties, rattlesnakes were collected or severely persecuted by local residents in many areas. These factors, combined with a low reproductive potential, and current threats such as development, illegal collecting, and other disturbance factors will likely prevent or slow population recovery.

## Short-term Trends

Declines and extirpation of some timber rattlesnake populations have been documented within the past 25 years and will likely continue to some degree given current threats.

## Long-term Trends

Timber rattlesnakes have been subjected to substantial reduction due to specimen collection and persecution during the past century and it is believed that denning populations in New York have been reduced by 50% to 75% of their historical numbers (Brown 1984, 1988). Management efforts focused on habitat protection and public education have somewhat stabilized the remaining populations, but loss of habitat continues to be a threat to the species.

# Conservation and Management

## Threats

Loss of habitat, habitat fragmentation, mining, road mortality, illegal collecting, persecution, and pathogenic organisms are all considered threats to timber rattlesnake populations.

## Conservation Strategies and Management Practices

Nuisance response efforts aimed at moving rattlesnakes out of areas where they may be harmed are in effect in some areas and these efforts may be useful in other locations where homes are located within the summer foraging habitat. Timber rattlesnakes should be taken into consideration when determining trail placement on public lands. Mitigation measures to manage the adverse effects of habitat fragmentation should be developed and implemented.

## Research Needs

Standardized survey protocols need to be developed and implemented at all known and potentially suitable sites to document the character, quality, and extent of occupied habitat.

# Habitat

In the Northeast, this species inhabits mountainous or hilly deciduous or mixed deciduous-coniferous forests, often with rocky outcroppings, steep ledges, and rock slides (Petersen and Fritsch 1986, Brown 1993). Dens, or hibernacula, are located in rocky areas where underground crevices provide retreats for overwintering (Brown 1993). New York dens are often located in accumulations of talus below ledges or in fractures within or underneath ledges or rock outcrops. Rattlesnakes use open canopy, rocky areas for basking, shedding, gestating, and birthing. Foraging areas are generally located within forested habitat surrounding the den.

## Associated Ecological Communities

### Acidic Talus Slope Woodland

An open to closed canopy woodland that occurs on talus slopes (slopes of boulders and rocks, often at the base of cliffs) composed of non-calcareous rocks such as granite, quartzite, or schist.

**Appalachian Oak-hickory Forest**

A hardwood forest that occurs on well-drained sites, usually on ridgetops, upper slopes, or south- and west-facing slopes. The soils are usually loams or sandy loams. This is a broadly defined forest community with several regional and edaphic variants. The dominant trees include red oak, white oak, and/or black oak. Mixed with the oaks, usually at lower densities, are pignut, shagbark, and/or sweet pignut hickory.

**Appalachian Oak-pine Forest**

A mixed forest that occurs on sandy soils, sandy ravines in pine barrens, or on slopes with rocky soils that are well-drained. The canopy is dominated by a mixture of oaks and pines.

**Beech-maple Mesic Forest**

A hardwood forest with sugar maple and American beech codominant. This is a broadly defined community type with several variants. These forests occur on moist, well-drained, usually acid soils. Common associates are yellow birch, white ash, hop hornbeam, and red maple.

**Calcareous Cliff Community**

A community that occurs on vertical exposures of resistant, calcareous bedrock (such as limestone or dolomite) or consolidated material; these cliffs often include ledges and small areas of talus.

**Calcareous Talus Slope Woodland**

An open or closed canopy community that occurs on talus slopes composed of calcareous bedrock such as limestone or dolomite. The soils are usually moist and loamy; there may be numerous rock outcrops.

**Chestnut Oak Forest**

A hardwood forest that occurs on well-drained sites in glaciated portions of the Appalachians, and on the coastal plain. This forest is similar to the Allegheny oak forest; it is distinguished by fewer canopy dominants and a less diverse shrublayer and groundlayer flora. Dominant trees are typically chestnut oak and red oak.

**Cliff Community**

A community that occurs on vertical exposures of resistant, non-calcareous bedrock (such as quartzite, sandstone, or schist) or consolidated material; these cliffs often include ledges and small areas of talus.

**Floodplain Forest**

A hardwood forest that occurs on mineral soils on low terraces of river floodplains and river deltas. These sites are characterized by their flood regime; low areas are annually flooded in spring, and high areas are flooded irregularly.

**Hemlock-northern Hardwood Forest**

A mixed forest that typically occurs on middle to lower slopes of ravines, on cool, mid-elevation slopes, and on moist, well-drained sites at the margins of swamps. Eastern hemlock is present and is often the most abundant tree in the forest.

**Limestone Woodland**

A woodland that occurs on shallow soils over limestone bedrock in non-alvar settings, and

usually includes numerous rock outcrops. There are usually several codominant trees, although one species may become dominant in any one stand.

#### **Maple-basswood Rich Mesic Forest**

A species rich hardwood forest that typically occurs on well-drained, moist soils of circumneutral pH. Rich herbs are predominant in the ground layer and are usually correlated with calcareous bedrock, although bedrock does not have to be exposed. The dominant trees are sugar maple, basswood, and white ash.

#### **Oak-tulip Tree Forest**

A hardwood forest that occurs on moist, well-drained sites in southeastern New York. The dominant trees include a mixture of five or more of the following: red oak, tulip tree, American beech, black birch, red maple, scarlet oak, black oak, and white oak.

#### **Pitch Pine-oak-heath Rocky Summit**

A community that occurs on warm, dry, rocky ridgetops and summits where the bedrock is non-calcareous (such as quartzite, sandstone, or schist), and the soils are more or less acidic. This community is broadly defined and includes examples that may lack pines and are dominated by scrub oak and/or heath shrubs apparently related to fire regime.

#### **Red Cedar Rocky Summit**

A community that occurs on warm, dry, rocky ridgetops and summits where the bedrock is calcareous (such as limestone or dolomite, but also marble, amphibolite, and calcsilicate rock), and the soils are more or less calcareous. The vegetation may be sparse or patchy, with numerous lichen covered rock outcrops.

#### **Rocky Summit Grassland**

A grassland community that occurs on rocky summits and exposed rocky slopes of hills. Woody plants are sparse and may be scattered near the margin of the community. Small trees and shrubs may be present at low percent cover.

#### **Shale Cliff And Talus Community**

A community that occurs on nearly vertical exposures of shale bedrock and includes ledges and small areas of talus. Talus areas are composed of small fragments that are unstable and steeply sloping; the unstable nature of the shale results in uneven slopes and many rock crevices.

#### **Shallow Emergent Marsh**

A marsh meadow community that occurs on soils that are permanently saturated and seasonally flooded. This marsh is better drained than a deep emergent marsh; water depths may range from 6 in to 3.3 ft (15 cm to 1 m) during flood stages, but the water level usually drops by mid to late summer and the soil is exposed during an average year.

#### **Shrub Swamp**

An inland wetland dominated by tall shrubs that occurs along the shore of a lake or river, in a wet depression or valley not associated with lakes, or as a transition zone between a marsh, fen, or bog and a swamp or upland community. Shrub swamps are very common and quite variable.

## Associated Species

Copperhead (*Agkistrodon contortrix*)  
Racer (*Coluber constrictor*)  
Rat Snake (*Elaphe obsoleta*)  
Five-Lined Skink (*Eumeces fasciatus*)

## Identification Comments

### Identifying Characteristics

This is a heavy bodied snake of forested uplands. The young measure approximately 12 inches at birth and adults range from 36 to 60 inches in length (Conant and Collins 1998). The coloration and pattern is highly variable geographically (Conant and Collins 1991) with two main color variations, yellow or black, found in New York. The yellow variation has a yellow head and body with black or dark brown crossbands and the crossbands, which may be "V"-shaped, may break up anteriorly to form a row of dark spots down the back and along each side of the body (Conant and Collins 1998). The black variation has a black head and body with black crossbands and a reddish mid-dorsal stripe may be present. Some individuals that are considered to be the black variation have black heads, yellow bodies, and dark crossbands. In some locations, completely black specimens are not unusual (Conant and Collins 1998). The scales have longitudinal keels giving the snake a rough textured appearance. Timber rattlesnakes, like other pit-vipers, have a two heat-sensitive openings, or pits, situated below and between the eye and nostril. This sensory organ aids the snake in the detection of prey. As the name implies, rattlesnakes also have a rattle at the end of the tail that is made up of loosely attached segments. A new segment is added each time the snake sheds its skin, which is about 1.5 times per year. When disturbed, a rattlesnake will vibrate its tail, causing the loose segments to create a buzzing sound.

### Characteristics Most Useful for Identification

The presence of a rattle is the most useful diagnostic characteristic.

### Best Life Stage for Identifying This Species

Adults may be easier to identify than newborn rattlesnakes, but in general the coloration and pattern of adults and young are similar, although newborn timber rattlesnakes may be more gray in color. Newborn timber rattlesnakes have a single rattle segment called a button.

### Behavior

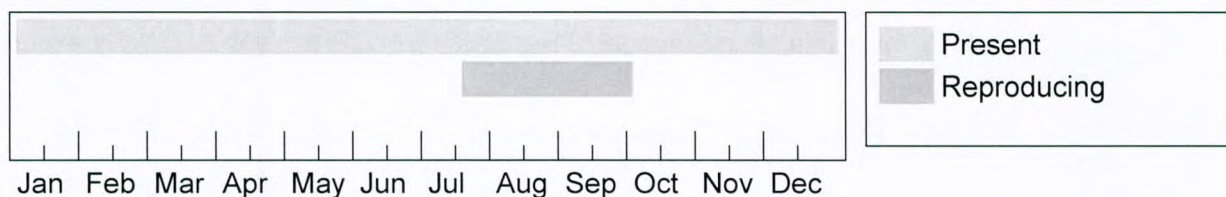
In New York, timber rattlesnakes hibernate in communal dens, often with copperheads (also venomous), and other species non-venomous snakes. Depending on the latitude and local weather conditions, hibernation generally begins from mid-September through late-October and continues through the winter until late-March through mid-May. During the active season, rattlesnakes will generally use forested habitats up to 2.5 miles (4 km) or greater from their overwintering dens for foraging and other activities. Mating takes place during late-July to early-August and the young are born in August or September of the subsequent year.

## Diet

Timber rattlesnakes mainly prey upon small rodents such as mice, chipmunks, and gray squirrels, but they will also take songbirds on occasion.

## The Best Time to See

In general, timber rattlesnakes are active from late April until mid-October. In some locations, rattlesnakes may start to enter dens in mid-September and may not emerge until late-May, especially at more northern locations.



The time of year you would expect to find Timber Rattlesnake in New York.

## Similar Species

**Massasauga(*Sistrurus catenatus*):** In New York, the massasauga is found in wetland habitat in the central and western part of the state and the range of the two species do not overlap. Otherwise, the two can be differentiated by the scalation on the head; the massasauga has nine plates on the crown of its head instead of the numerous small scales found on the timber rattlesnake (Conant and Collins 1998).

**Copperhead(*Agkistrodon contortrix*):** The northern copperhead often occurs with the timber rattlesnake in southeastern New York. Copperheads can be distinguished from timber rattlesnakes by their coppery-orange head, hourglass shaped crossbands, and lack of a rattle.

## Taxonomy

Kingdom Animalia

└ Phylum Craniata

└ Class Reptiles (Reptilia)

└ Order Lizards, Snakes and Amphisbaenians (Squamata)

└ Family Viperidae (Vipers and Pit Vipers)

## Additional Resources

## Links

### NatureServe Explorer

<http://natureserve.org/explorer/servlet/NatureServe?searchName=CROTALUS+HORRIDUS>

### Google Images

<http://images.google.com/images?q=CROTALUS+HORRIDUS>

### New York State Department of Environmental Conservation

<http://www.dec.ny.gov/animals/7147.html>

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## Timber Rattlesnake Fact Sheet

### Timber Rattlesnake

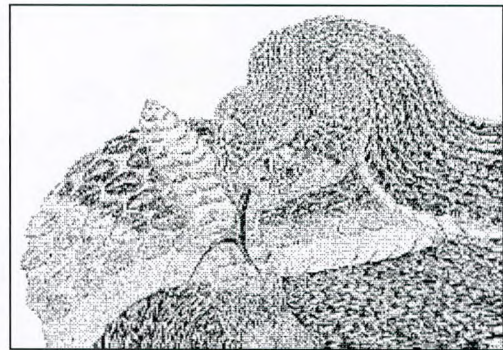
#### *Crotalus horridus*

New York Status: Threatened

Federal Status: Not Listed

### Description

Measuring from 3-4.5 feet (91-137 cm) or more in length, the timber rattlesnake is the largest venomous snake in New York. The record length is 74 ½ inches (189 cm). Timber rattlers impress one as being very stocky; they are large snakes. Despite their size, cryptic coloration allows them to be easily concealed. Two color patterns are commonly found: a yellow phase, which has black or dark brown crossbands on a lighter background color of yellow, brown or gray, and a black phase, which has dark crossbands on a dark background. Black or dark brown stippling also occurs



to varying degrees, to the extent that some individuals appear all black. Scales are ridged, giving this rattlesnake a rough-skinned appearance. The timber rattler has a broadly triangular head with many small scales on the crown of the head bordered by a few large scales, unlike the massasauga rattlesnake which has nine large scales on the top of the head.

Like other members of the pit-viper family, the timber rattlesnake has a temperature-sensitive opening, or pit, on either side of the face between and a little below the eye and nostril. This sensory organ is used to detect prey and potential predators. Another feature distinctive of rattlesnakes is the rattle itself. This structure is made of loosely attached horny segments. A new segment is added each time the snake sheds. When vibrated, the rattle makes a buzzing sound characteristic of a disturbed rattlesnake.

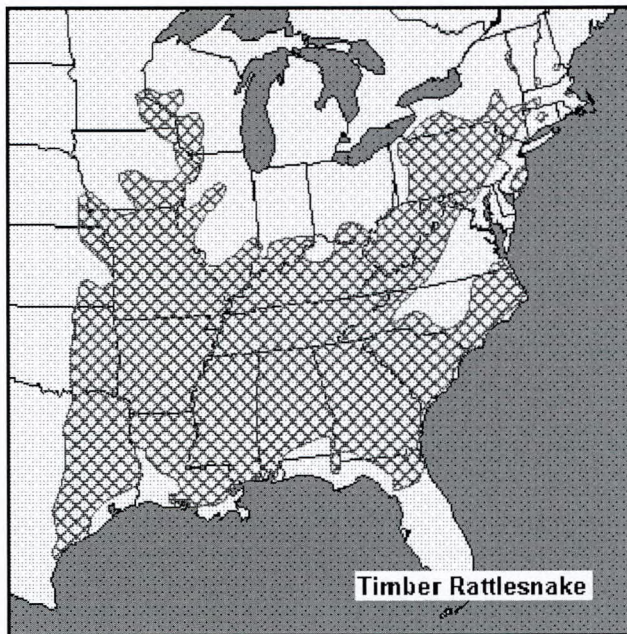
### Life History

Timber rattlesnakes are active from late April until mid-October, although in northern New York they may not emerge until mid-May. Upon emerging from the den, they are very lethargic. Little feeding occurs early in the spring. Mating occurs in the spring and fall. Males are especially active at this time, seeking out females by following the pheromone (sex attractant odor) they emit. The gestation period is 4-5 months. Females give birth to 4-14 (average 9) young every three to five years during late August to mid-September. The young are approximately 1 foot (30 cm) in length at birth and emerge singly from the female, encased in a transparent membrane which is shed in a few minutes. Each is equipped with venom, hollow fangs and a tiny rattle segment called a "button." Their skin has a velvety texture and the coloring is essentially the same as the adult's. They remain in the area for 1-2 weeks before shedding their skin and dispersing. The young follow the adult's scent trail back to the den. Males are sexually mature in 5 years, females in 7-11 years. Their average life span is 16-22 years, with a maximum age of about 30 years. During winter, dozens of timber rattlers may congregate together in a den to hibernate below the frost line in association with copperheads (*Agkistrodon contortrix*), other

snakes, and skinks (*Eumeces spp.*). Dens are generally on open, steep, south facing slopes with rock fissures or talus surrounded by hardwood forests.

Adults shed their skin every one or two years, with the average being every 1.4 years. A new rattle segment is added each time shedding occurs. Snakes with a complete set of rattles are rarely seen, however, since the rattles regularly break off. This rattler feeds primarily on small mammals, but occasionally takes small birds, amphibians and other snakes. The venom, which is used primarily to immobilize prey, can be fatal to humans if the bite is untreated. However, in New York there have been no records of human deaths attributable to rattlesnakes in the wild during the last several decades. Contrary to popular opinion, a rattlesnake will not pursue or attack a person unless threatened or provoked.

### Distribution and Habitat



The range of the timber rattler extends from southern New Hampshire south through the Appalachian Mountains to northern Georgia and west to southwestern Wisconsin and northeastern Texas. Populations were once found on Long Island and in most mountainous and hilly areas of New York State, except in the higher elevations of the Adirondacks, Catskills and Tug Hill region. They are now found in isolated populations in southeastern New York, the Southern Tier and in the peripheral eastern Adirondacks.

Timber rattlesnakes are generally found in deciduous forests in rugged terrain. In the summer, gravid (pregnant) females seem to prefer open, rocky ledges where temperatures are higher, while the males and non-gravid females seem to prefer cooler, thicker woods

where the forest canopy is more closed. Rattlers generally migrate from 1.3 to 2.5 miles (2 to 4 km) from their den each summer, with a maximum movement of 4.5 miles (7.2 km) observed.

### Status

Although still fairly common in some local areas, the timber rattlesnake has been extirpated or greatly reduced in numbers in most areas where it was once numerous due to unregulated collection and indiscriminate killing. A contributing factor was the bounty system under which a reward was paid for each timber rattler killed. Bounties were outlawed in New York State in 1971. Even in areas without bounties, the snake was severely persecuted by local residents or overcollected for the pet and curio trade. Timber rattlesnakes reproduce at a low rate, making for slow population growth. Factors such as development, illegal collecting, and the continual disturbance of forests by recreational users will likely prevent or hinder population recovery for many areas.

### Management and Research Needs

The New York State Department of Environmental Conservation coordinates a program to monitor and map, using a Geographic Information System, the remaining populations in New York State. Surveys are in progress to identify existing den sites and assess each population's size, reproductive success

and any threats to existing habitat. Protection of habitat is now a primary concern. Collecting rattlers from the wild is now prohibited, but poachers are still active in supplying the black market pet trade.

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Drawing by Jean Gawalt

Map adapted from Conant and Collins (1998) and Tyning (1992)

**APPENDIX H**

**NYSDEC EDD MANUAL  
(PROVIDED ON CD)**

**APPENDIX I**

**HEALTH AND SAFETY PLAN**



Sterling Environmental Engineering, P.C.

**HEALTH AND SAFETY PLAN**

**TOWN OF RAMAPO LANDFILL SITE  
250 TORNE VALLEY ROAD  
HILLBURN, ROCKLAND COUNTY, NEW YORK USEPA**

**NYSDEC SITE NUMBER #344004; USEPA CERCLIS ID NYD000511493**

*Prepared for:*

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July 7, 2011

**HEALTH AND SAFETY PLAN**  
**TOWN OF RAMAPO LANDFILL SITE**  
**ROCKLAND COUNTY, NEW YORK**  
**USEPA CERCLIS ID NYD 000511493**

**Table of Contents**

	<b><u>Page #</u></b>
1.0 GENERAL INFORMATION	1
2.0 DESIGNATION OF RESPONSIBILITIES	3
3.0 LANDFILL PROPERTY SPECIFIC HEALTH AND SAFETY CONCERNS	4
3.1 Airborne Exposure Limits	4
3.2 Explosive Gas	4
3.3 Personal Protective Equipment (PPE)	4
3.4 Suspected Safety Hazards	4
3.5 Excavator and Drill Rig Operations	5
3.6 Adverse Weather	6
3.7 Fire and Explosion	6
3.8 Requirement to Conduct Utility Mark Out	6
3.9 Confined Space Entry	6
3.10 Excavation and Sampling Work Zones	6
3.11 Natural Hazards	7
3.12 Heat and Cold Stress Hazards	8
3.13 Noise Hazards	10
3.14 Slip, Trip and Fall Hazards	10
3.15 Modifications to this Plan	11
4.0 MEDICAL SURVEILLANCE PROGRAM	11
4.1 General	11
4.2 Frequency of Medical Exams	11
5.0 EMERGENCY ACTION PLAN	11
5.1 Notification	12
5.2 Personal Injury	12
5.3 Fire/Explosion	13
5.4 Emergency Services	13
5.5 Equipment Failure	13
5.6 Record Keeping	13

	<u>Page #</u>
6.0 DECONTAMINATION METHODS	13
6.1 Contamination Prevention Methods	13
6.2 Equipment Decontamination Methods	14
6.2.1 Heavy Equipment Decontamination Procedures	14
6.2.2 Cleaning of Field Sampling Equipment	14
6.2.3 Personal Clothing Decontamination	14

### List of Tables

Table I-1	Published Airborne Exposure Limits and Odor Thresholds in Parts Per Million (PPM) in Air for Substances Known or Suspected to be Present in Groundwater
Table I-2	Air Monitoring Methods, Action Levels, and Protective Levels for Personnel

### Figures

Figure I-1	Map and Directions to Hospital
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## 1.0 GENERAL INFORMATION

The Health and Safety Plan (HASP) identifies hazardous substances and conditions known or suspected to be present on the Town of Ramapo Landfill Property (Landfill) and specific measures to be taken to ensure hazardous substances or conditions do not adversely impact the health and safety of personnel and the general community (public). The HASP is intended to identify potential hazards and appropriate precautions as defined by OSHA 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response).

All personnel working on this Landfill project must read this HASP, acknowledge understanding of this plan, and abide by its requirements.

In general, personnel are responsible for complying with all regulations and policies applicable to the work they are performing. The Project Manager or the Health and Safety Representative (HSR) are authorized to stop work if any personnel or subcontractor fails to adhere to the required health and safety procedures.

In addition to this HASP, each contractor must provide a project specific HASP that addresses minimum training requirements for activities specific to the project and identifies potential hazards specific to the project that are not discussed herein.

Additionally, the project specific HASP provided by the contractor must outline minimum training requirements for personnel, supervisors and trainers as specified in 29 CFR 1910.120(e)(3-9), which include:

### **Initial Training**

1. Personnel who engage in hazardous substance removal or other activities that expose or potentially expose personnel to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction, and a minimum of three (3) days of actual field experience under the direct supervision of a trained experienced supervisor.
2. Personnel who are on the Landfill property only occasionally for a specific limited task (such as, however not limited to, groundwater monitoring, land surveying, or geophysical surveying) and who are unlikely to be exposed to over permissible exposure limits and published exposure limits, shall receive a minimum of 24 hours of instruction, and a minimum of one (1) day actual field experience under the direct supervision of a trained, experienced supervisor.
3. Personnel who regularly work in areas that have been monitored and fully characterized indicating exposures are under permissible and published exposure limits, and where respirators are not necessary, and the characterization indicates that there are no health hazards or no possibility of an emergency developing, shall receive a minimum of 24 hours of instruction, and a minimum of one (1) day actual field experience under the direct supervision of a trained, experienced supervisor.
4. Personnel with 24 hours of training who are originally covered under Items 2 or 3 and who become general personnel as defined in Item 1, or who are required to wear respirators, shall have the additional 16 hours and two (2) days of training necessary to total the training specified in Item 1.

### **Management and Supervisor Training**

5. Managers and supervisors directly responsible for, or who supervise personnel engaged in hazardous waste operations, shall receive 40 hours initial training, and three (3) days of supervised field experience (the training may be reduced to 24 hours and one (1) day if the only area of their responsibility is supervising personnel covered by Items 2 and 3 and have had at least eight (8) additional hours of specialized training at the time of job assignment on such topics as, however not limited to, the contractor's project specific HASP (inclusive of employees training program), personal protective equipment program, spill containment program, and health hazard monitoring procedures and techniques.

### **Qualifications for Trainers**

6. Trainers shall be qualified to instruct personnel regarding the subject matter presented in training. Such trainers shall have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they shall have the academic credentials and instructional experience necessary for teaching the subjects. Instructors shall demonstrate competent instructional skills and knowledge of the applicable subject matter.

### **Training Certification**

7. Personnel and supervisors who have received and successfully completed the training and field experience shall be certified by their instructor or the head instructor and trained supervisor as having completed the necessary training. A written certificate shall be provided to each certified person. Any person who has not been certified or who does not meet the requirements of Item 10 shall be prohibited from engaging in hazardous waste operations.

### **Emergency Response**

8. Personnel who are engaged in responding to hazardous emergency situations that may expose them to hazardous substances shall be trained in how to respond to such expected emergencies.

### **Refresher Training**

9. Personnel, managers and supervisors shall receive eight (8) hours of refresher training annually on the items specified in 29 CFR 1910.120(e)(2) and/or (e)(4) and shall review incidents that occurred in the past year that can serve as training examples of related work, and other relevant topics.

### **Equivalent Training**

10. Personnel who can show by documentation or certification that their experience and/or training has resulted in training equivalent to that training required in 29 CFR 1910.120(e)(1-4) shall provide a copy of the certification or documentation upon request. However, certified personnel with equivalent training upon initial assignment to the Landfill property shall receive appropriate, specific training before entering restricted areas and shall have the appropriate number of supervised field days. Equivalent training includes any academic training or training that existing personnel might have already received from actual hazardous waste site experience.

Project specific logs of assigned Landfill personnel and their associated training/refreshers certifications will be kept for each activity where potential exposures to contaminants exist.

## **2.0 DESIGNATION OF RESPONSIBILITIES**

The responsibility for implementing this HASP is shared by the Project Manager and the HSR. The Project Manager and HSR will be designated for each Landfill project.

The Project Manager will recommend policy on all matters to the HSR and will provide the necessary resources to conduct the project safely.

The Project Manager is responsible for developing safety procedures and training programs, and is the final decision point for determination of health and safety policies and protocols for all projects. The Project Manager is responsible for establishing operating standards and coordinating all safety and technical activities.

The Project Manager is responsible for:

- Ensuring the availability, use, and proper maintenance of specified personal protective equipment (PPE), decontamination, and other health or safety equipment.
- Maintaining a high level of safety awareness among construction personnel/subcontractors and communicating pertinent matters promptly.
- Ensuring all field activities are performed in a manner consistent with this HASP.
- Monitoring for dangerous conditions during field activities.
- Ensuring proper decontamination of personnel and equipment.
- Coordinating with emergency response personnel and medical support facilities.
- Initiating immediate corrective actions in the event of an emergency or unsafe condition.
- Notifying the HSR of any emergency, unsafe condition, problem encountered, or exception to the requirements of this HASP.
- Recommending improved health and safety measures to the HSR.

The HSR has the authority to:

- Suspend field activities or otherwise limit exposures if the health or safety of any person appears to be endangered. This authority includes suspension of work due to adverse weather conditions, fire or other emergency.
- Inform the Project Manager or contractor personnel to alter work practices that are deemed not properly protective of human health or the environment.
- Suspend an individual from field activities for infraction of the requirements in this HASP.

The HSR must be present for all intrusive investigative activities on the Landfill property. However, the presence of the HSR shall in no way relieve any person or company of its obligations to comply with the requirements of the HASP and all applicable Federal, State and local laws and regulations.

All personnel involved in the project must be familiar with and conform to the safety protocols prescribed in this HASP, and communicate any relevant experience or observations to the HSR to help improve overall safety. Individual project members are the key elements in ensuring health and safety compliance. Every project member is considered responsible for implementing and following this HASP.

### **3.0 LANDFILL PROPERTY SPECIFIC HEALTH AND SAFETY CONCERNS**

#### **3.1 Airborne Exposure Limits**

Table I-1 lists the published airborne exposure limits for those substances that are known or suspected to be present at the Landfill property.

Unknown or unexpected materials of a hazardous nature may be encountered during ground intrusive activities. No work will be conducted if field measurements or observations indicate there is potential uncontrolled exposure to undefined hazards, or that exposures may exceed protection afforded by the requirements in this HASP.

#### **3.2 Explosive Gas**

Explosive gas, including methane and hydrogen sulfide ( $H_2S$ ), may be present in the subsurface pore spaces and therefore any major ground intrusive activity must be monitored with a gas unit that measures the Lower Explosive Limit (LEL) in percent and  $H_2S$  in parts per million (ppm). Action levels for explosive gas and  $H_2S$  are provided in Table I-2.

#### **3.3 Personal Protective Equipment (PPE)**

Table I-2 provides a summary of potential airborne hazards that may be encountered by personnel during ground intrusive and construction activities, action levels and corresponding required actions and the required PPE for levels C and D.

No work is anticipated requiring Level B or A PPE and very limited work in Level C is expected. If air monitoring results require PPE upgrades from Level D, then only medically qualified, trained personnel experienced in the use and limitations of air purifying or supplied air respirators will be used. Air purifying respirators with High-Efficiency Particulate Air (HEPA) filters, capable of removing particles of 0.3 micron or larger from air at 99.97% or greater efficiency, should be used when exposure to dust is a potential risk.

Unless the HSR directs otherwise, respirators used for organic vapors or particulates should have cartridges changed after eight (8) hours of use, or at the end of each shift, or when any indication of breakthrough or excessive resistance to breathing is detected. OSHA regulations require a Respiratory Protection Program for personnel who enter areas where respirators are required, and such Respiratory Protection Programs must address the requirements for replacement of cartridges.

#### **3.4 Suspected Safety Hazards**

Suspected safety hazards include those inherent with the operation of heavy equipment such as drill rigs

or excavators, and proximity to excavations. Inspections to ensure appropriate safety measures are in place and the use of lockout and tagout procedures during maintenance of this equipment will control these hazards. Personal protective equipment (PPE) including hard hats, safety shoes and eye protection will be worn to augment other safety precautions.

Drill rigs and excavators must not operate closer than thirty (30) feet to any overhead lines, measured directly between any part of the equipment and the lines themselves except where electrical distribution and transmission lines have been de-energized and visibly grounded at the point of work, or where insulating barriers have been erected to prevent physical contact with the lines. If drilling or excavating is required within thirty (30) feet of any overhead lines, a written work plan must be provided by the contractor or other equipment operator that includes special measures designed to mitigate the risks and is in accordance with 29 CFR 1926.550(a)(15). The work plan must be reviewed and approved by written signature by the Project Manager.

Care must be taken to ensure loose clothing does not get tangled in any moving equipment associated with drill rigs or excavators.

There may be slip or trip hazards associated with rough, slippery or elevated work surfaces.

There is also the possibility of organic vapors being encountered during ground intrusive activities due to the presence of volatile organic compounds (VOCs) in soil and groundwater. The HSR will use continuous monitoring instruments to measure total VOCs while each task is being conducted to determine ambient levels of contaminants. Procedures for monitoring VOCs and airborne particulates are provided in Table I-2.

All excavations will be maintained to prevent access by unauthorized persons and will be filled or fenced off by the end of the workday. Absolutely no one will be permitted in the excavations, except the operator of equipment where the operator is always located aboveground level. If equipment breaks down within the excavation, the equipment will have to be towed out of the excavation for repair. All subsurface samples will be obtained by operation of the excavating equipment and will be collected from the excavator bucket.

### **3.5 Excavator and Drill Rig Operations**

Excavations will be performed with a track-mounted excavator or backhoe. To conduct soil borings, a hollow-stem auger or direct push drill rig will be used. Working with or near this equipment poses potential hazards, including being struck by or pinched/caught by equipment, potentially resulting in serious physical bodily harm.

In particular, the following precautions will be used to reduce the potential for injuries and accidents:

- The inspection of excavator and drill rig brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, tires, horn, and other safety devices will be conducted prior to the initial mobilization and checked routinely throughout the project.
- Excavator and drill rig cabs will be kept free of all nonessential items and all loose items will be secured.
- Excavators and drill rigs will be provided with necessary safety equipment, including seat belts.

- Drill rig cables and auger flight connections will be inspected for evidence of wear. Frayed or broken cables or defective connections will be replaced immediately.
- Parking brakes will be set before shutting off any heavy equipment or vehicle.

All employees will be briefed on the potential hazards prior to the start of each excavation or drilling project.

### **3.6 Adverse Weather**

Drilling or excavating is dangerous during electrical storms. All field activity must terminate during thunderstorms. Extreme heat and cold, ice and heavy rain can produce unsafe conditions for drilling work. Such conditions, when present, will be evaluated on a case-by-case basis to determine if work shall terminate.

### **3.7 Fire and Explosion**

Use of gasoline or diesel powered equipment increases the risk of fire and explosion hazards. Contractors will be required to store diesel fuel and gasoline in metal cans with self-closing lids and flash arrestors.

### **3.8 Requirement to Conduct Utility Mark Out**

Prior to the start of any subsurface work, underground utilities and piping that may pose a potential hazard will be identified and located. DigSafely.NewYork or equivalent service will be contacted and underground utilities will be located and marked. Also, the location of privately owned utility lines will be determined.

In the event a pipe or line is struck, work will stop and the Emergency Action Plan (see Section 5.0) will be implemented.

### **3.9 Confined Space Entry**

Confined space entry is not anticipated for excavating and sampling activities. If a project requires confined space entry, a specific HASP will be implemented.

"Confined Space" is defined as a space that:

- 1) is large enough and so configured that an employee can bodily enter and perform assigned work;
- 2) has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
- 3) is not designed for continuous employee occupancy.

### **3.10 Excavation and Sampling Work Zones**

One of the basic elements of an effective HASP is the delineation of work zones for each ground intrusive location. The purpose of establishing work zones is to:

- Reduce the accidental spread of hazardous substances by personnel or equipment from the contaminated areas to the clean areas;

- Confine work activities to the appropriate areas, thereby minimizing the likelihood of accidental exposures;
- Facilitate the location and evacuation of personnel in case of an emergency; and
- Prevent unauthorized personnel from entering controlled areas.

Although a work site may be divided into as many zones as necessary to ensure minimal employee exposure to hazardous substances, this HASP uses the three (3) most frequently identified zones: the Exclusion Zone, Decontamination Zone, and Support Zone. Movement of personnel and equipment between these zones should be minimized and restricted to specific access control points to minimize the spreading of contamination.

- **Exclusion Zone**

During investigative work, the Exclusion Zone is the immediate excavation, test pit, borehole, or other area where contamination is either known or expected to occur and where the greatest potential for exposure exists. The following protective measures will be taken in the Exclusion Zone.

Unprotected onlookers will be restricted from the excavation location so that they are at least twenty-five (25) feet upwind or fifty (50) feet downwind of excavation or drilling activities.

Personnel conducting activities and sampling in the Exclusion Zone will wear the applicable PPE. The actions to be taken and PPE to be worn in the Exclusion Zone if VOCs are above background levels are described in Table I-2.

- **Decontamination Zone**

During investigative work, a Decontamination Zone will be established at the perimeter of the Exclusion Zone, and will include the personnel, equipment and supplies that are needed to decontaminate equipment. The size will be selected by the HSR to conduct the necessary decontamination activities. Personnel and equipment in the Exclusion Zone must pass through this zone before leaving or entering the Support Zone. The necessary decontamination must be completed in this zone and the requirements are described in Section 6.2. This zone should always be established and maintained upwind of the Exclusion Zone.

- **Support Zone**

During investigative work, the areas located beyond the Decontamination Zone will be considered the Support Zone. Break areas, operational direction and support facilities will be located in this area. Eating and drinking will be allowed only in the Support Zone.

### **3.11 Natural Hazards**

Work that takes place in the natural environment may be affected by plants and animals known to be hazardous to humans. Spiders, bees, wasps, hornets, ticks, timber rattlesnakes, poison oak and poison ivy are only some of the hazards that may be encountered. Individuals who may potentially be exposed to these hazards should be made aware of their existence and instructed in their identification. Emergencies resulting from contact with a natural hazard should be handled through the normal medical emergency channels. Individuals who are sensitive or allergic to these types of natural hazards should indicate their susceptibility to the HSR.

### 3.12 Heat and Cold Stress Hazards

If work is to be conducted during the winter, cold stress is a concern to the health and safety of personnel. Because disposal clothing such as Tyvek does not "breathe", perspiration does not evaporate and the suits can become wet. Wet clothes combined with cold temperatures can lead to hypothermia. If the air temperature is less than 40 degrees Fahrenheit (°F) and a worker's clothes become wet due to perspiration, the worker must change to dry clothes.

#### Signs and Symptoms of Cold Stress

- **Incipient frostbite:** is a mild form of cold stress characterized by sudden blanching or whitening of the skin.
- **Chilblain:** is an inflammation of the hands and feet caused by exposure to cold moisture. It is characterized by a reoccurring localized itching, swelling, and painful inflammation of the fingers, toes, or ears. Such a sequence produces severe spasms, accompanied by pain.
- **Second-degree frostbite** is manifested by skin which has a white, waxy appearance and is firm to the touch. Individuals with this condition are generally not aware of its seriousness, because the underlying nerves are frozen and unable to transmit signals to warm the body. Immediate first aid and medical treatment are required.
- **Third-degree frostbite** will appear as blue, blotchy skin. This tissue is cold, pale and solid. Immediate medical attention is required.
- **Hypothermia** develops when body temperature falls below a critical level. In extreme cases, cardiac failure and death may occur. Immediate medical attention is warranted when the following symptoms are observed:
  - Involuntary shivering;
  - Irrational behavior;
  - Slurred speech;
  - Sluggishness; and
  - Loss of consciousness.

#### Preventing Cold Related Illness/Injury

- Train personnel to identify the signs and symptoms of cold stress. Require field personnel to wear proper clothing for cold, wet and windy conditions, including layers that can be adjusted to changing weather conditions. It is important to keep hands and feet dry.
- Field personnel working in extremely cold conditions must take frequent short breaks in warm, dry shelters to allow their body temperature to increase. If possible, field work should be scheduled during the warmest part of the day. The buddy system should be used so that personnel can assist each other in recognizing signs of cold stress.
- Drink warm, sweet beverages and avoid drinks with caffeine and alcohol. Eat warm, high-calorie foods.

- Personnel with medical conditions such as diabetes, hypertension or cardiovascular disease or who take certain medications, may be at increased risk for cold stress.

### **Treatment of Cold Related Injuries**

If cold stress symptoms are evident, the affected person must move into a warm, dry sheltered area and all wet clothing should be removed and replaced with dry clothing. If frostbite is suspected, the affected person should be treated by trained medical personnel.

### **Signs and Symptoms of Heat Stress**

Wearing PPE also puts a worker at a considerable risk for developing heat stress. This can result in health effects ranging from heat fatigue to serious illness or death. Consequently, regular monitoring, remaining hydrated and other precautions are vital.

- **Heat Rash** may result from continuous exposure to heat and humid air.
- **Heat Cramps** are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:
  - Muscle spasms; and
  - Pain in the hands, feet and abdomen.
- **Heat Exhaustion** occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:
  - Pale, cool, and moist skin;
  - Heavy sweating; and
  - Dizziness, fainting, and nausea.
- **Heat Stroke** is the most serious form of heat stress. Temperature regulation fails, and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Competent medical help must be obtained. Signs and symptoms are:
  - Red, hot, and unusually dry skin;
  - Lack of or reduced perspiration;
  - Dizziness and confusion;
  - Strong, rapid pulse; and
  - Loss of consciousness.

### **Preventing Heat Related Illness/Injury**

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or heat exhaustion that person may be predisposed to additional heat injuries. To avoid heat stress, the following steps should be taken:

- Have personnel drink 16 oz. (0.5 liter) of fluid (preferably water or diluted drinks) before beginning work. Urge personnel to drink one to two (1 to 2) cups every fifteen (15) to twenty (20) minutes, or at each monitoring break. A total of 1 to 1.6 gallons (four (4) to six (6) liters) of fluid per day are recommended, however more may be necessary to maintain bodyweight.
- If possible, adjust work schedules to avoid the hottest parts of the day.
- Encourage personnel to maintain an optimal level of physical fitness.
- Shelter (air-conditioned, if possible) or shaded areas should be provided to protect personnel during rest periods.
- Train personnel to recognize, identify, and treat heat stress.

For personnel wearing standard work clothes, recommendations for monitoring and work/rest schedules are those approved by American Conference of Governmental Industrial Hygienists (ACGIH) and National Institute of Occupational Safety and Health (NIOSH). Personnel wearing semi-permeable PPE or impermeable PPE should be monitored when the temperature in the work area is above 70°F.

### **3.13 Noise Hazards**

Work that involves the use of heavy equipment such as a drill rig or excavator can expose personnel to noise during field activities that can result in noise-induced hearing loss. The HSR will monitor the noise exposure and will determine whether noise protection is warranted for each of the personnel. The HSR will ensure either ear muffs or disposable foam earplugs are available and are used by the personnel in the immediate vicinity of the field operation as required.

### **3.14 Slip, Trip and Fall Hazards**

Ground intrusive locations can contain a number of slip, trip and fall hazards for personnel, such as:

- Holes, pits, or ditches
- Excavation faces
- Slippery surfaces
- Steep grades
- Uneven grades
- Snow and ice
- Sharp objects

All personnel must be instructed to keep back three (3) feet from the top edge of excavation faces. Drill auger sections will be stored on the transport vehicle as long as possible to avoid creating a trip hazard.

Drill auger sections and other tools will be stored in neat arrangements convenient to the driller, however sufficiently distant from the immediate area around the drill rig to minimize trip hazards.

Personnel will be instructed to look for potential safety hazards and immediately inform the HSR regarding any new hazards. If the hazard cannot be immediately removed, actions must be taken to warn personnel.

### **3.15 Modifications to this Plan**

Requirements and guidelines in this HASP are subject to modification by the Project Manager or the HSR in response to additional information obtained during field work regarding the potential for exposure to hazards.

## **4.0 MEDICAL SURVEILLANCE PROGRAM**

### **4.1 General**

Personnel who participate in field activities that meet the following criteria will be included in the Medical Surveillance Program:

- All who may be exposed to hazardous substances or health hazards at or above permissible exposure limits, without regard to the use of respirators, for thirty (30) days or more per year, as required by 29 CFR 1926.65(f)(2)(i-iv).
- All who wear a respirator for thirty (30) days or more every year as required by 29 CFR 1926.62(f)(2)(i-iv).
- All who are injured because of overexposure from an incident involving hazardous substances or health hazards.

### **4.2 Frequency of Medical Exams**

Medical examinations and consultations will be provided on the following schedule to the personnel who meet qualifications outlined in Section 4.1:

- Prior to assignment to a work site, if any of the criteria noted in Section 4.1 are anticipated.
- At least once every twelve (12) months, unless the physician believes a longer interval (not greater than two (2) years) is appropriate.
- As soon as possible upon notification that a worker has developed signs or symptoms indicating possible overexposure to hazardous materials.

## **5.0 EMERGENCY ACTION PLAN**

Personnel will use the following standard emergency procedures. The HSR will be notified of any emergency and be responsible for ensuring that the appropriate procedures are followed and the Project Manager is notified. A first aid kit, an eye wash unit that can provide a minimum flow rate of 0.4 GPM

for fifteen (15) minutes, and a fire extinguisher rated 20A-B-C (or higher) will be readily available to personnel. All personnel will be trained in use of emergency supplies. Questions regarding procedures and practices described in the HASP should be directed to the Project Manager or HSR.

## 5.1 Notification

Any symptoms of adverse health, regardless of the suspected cause, are to be immediately reported to the HSR.

Upon the occurrence of an emergency, including an unplanned chemical release, fire or explosion, personnel will be alerted and the area evacuated immediately. The HSR will notify the ambulance service, fire department and/or police department, as required. Emergency contact telephone numbers are provided in Section 5.4. Re-entry to the work area will be limited to those required to assist injured personnel or for firefighting or spill control. Anyone entering the work area following an emergency incident must wear appropriate protective equipment.

The following alarm systems will be utilized to alert personnel to evacuate the restricted area:

- Direct Verbal Communication
- Radio Communication or Equivalent
- Portable or Fixed Telephone

The following standard hand signals will also be used as necessary:

Hand Signal	Message
Hand gripping throat	Can't breathe/out of air
Grip co-worker's wrist	Leave area immediately, no debate!
Hands on top of head	Need assistance
Thumbs up	Yes/O.K.
Thumbs down	No/Problem

Upon activation of an alarm, personnel will proceed to a designated assembly area. The designated assembly area will be determined on a daily basis by the HSR and updated as necessary depending upon work conditions, weather, air monitoring, etc. The location of the designated assembly area will be clearly marked and communicated to employees daily or upon relocation of the area. Personnel gathered in the designated assembly area will remain there until their presence has been noted. A tally of personnel on the daily restricted area access roster will be made as necessary to ensure all personnel have been properly evacuated and accounted for.

Personnel may return to the designated work area following authorization by the HSR.

## 5.2 Personal Injury

If anyone within a work area is injured and cannot leave the restricted area without assistance, emergency medical services will be notified (see Section 5.4) and appropriate first aid will be administered by certified Emergency Medical Technicians (EMTs).

### 5.3 Fire/Explosion

Upon the occurrence of a fire beyond the incipient stage (where Landfill property personnel could respond to extinguish), or an explosion anywhere on the Landfill property, the fire department will be alerted and all personnel moved to a safe distance from the involved area.

### 5.4 Emergency Services

Emergency Services	Telephone Number
Town of Ramapo – Public Works	845-357-0591
Fire Department (Sloatsburg)	911 or 845-753-5575
Police Department	911 or 845-357-2400
Ambulance	911 or 845-357-1788
Good Samaritan Hospital	845-368-5000
Poison Control Center	800-333-0542
NYSDEC Spills Emergency Response Program	800-457-7362

A map showing the route to the hospital with written directions is presented in Figure I-1.

### 5.5 Equipment Failure

If any equipment fails to operate properly, the Project Manager and/or HSR will determine the effect of this failure on continuing operations. If the failure affects the safety of personnel (e.g., failure of monitoring equipment) or prevents completion of the planned tasks, all personnel will leave the work area until appropriate corrective actions have been taken.

### 5.6 Record Keeping

The HSR will maintain records of reports concerning occupational injuries and illnesses in accordance with 29 CFR 1904.

## 6.0 DECONTAMINATION METHODS

### 6.1 Contamination Prevention Methods

The HSR will make all personnel aware of the potential for contamination. The following procedures will be established to minimize contact with waste:

- Personnel will not walk through areas obvious of contamination;
- Personnel will not directly touch potentially hazardous substances;
- Personnel will wear gloves when touching soil or waste;
- Personnel will wear disposable outer garments where appropriate; and
- Excavated soils will be placed on plastic sheeting and covered with plastic sheeting at the end of the workday.

## **6.2 Equipment Decontamination Methods**

Equipment, tools and materials used in the investigation and collection of soil and groundwater from the Landfill property must be properly prepared and cleaned/decontaminated for each sampling event. The degree of cleaning/decontamination depend upon property conditions and the nature and type of contamination, if present, the intent and goal(s) of the investigation, and data quality objectives, as well as other project-specific requirements.

### **6.2.1 Heavy Equipment Decontamination Procedures**

All equipment, tools and materials associated with sampling events must be decontaminated prior to use. Items such as drill rigs, auger flights, trackhoes, and backhoes all present potential sources of contamination to environmental samples. Therefore, all heavy equipment utilized at the property must undergo the following decontamination procedures:

- The sampling portion of the equipment will be high-pressure, hot washed or steam-cleaned with potable water; and,
- Prior to leaving the property, the wheels of all vehicles that come in contact with excavated soil will be washed by the above described method.

All decontamination fluids will be discharged to the ground on the Landfill property. The bucket of trackhoes may be cleaned over an excavation, allowing decontamination washwater to return to the excavation.

### **6.2.2 Cleaning of Field Sampling Equipment**

All equipment and tools used to collect samples for chemical analyses, including spatulas, spoons, scoops, trowels, split-spoons, augers, etc. will be decontaminated using the following procedures:

- Non-phosphate detergent wash;
- Potable water or distilled/deionized water rinse; and
- Air or oven-dry.

If the sampling equipment will be stored for future use, allow it to dry and then wrap in aluminum foil (shiny-side out) or seal in plastic bags.

Decontamination fluids will be discharged to the ground on the Landfill property.

### **6.2.3 Personal Clothing Decontamination**

All footwear worn in and around the contamination area will be dry-brushed or washed down using soap and water to remove soil or oily residue remnants. If disposable gloves, boots or suits (such as Tyvek<sup>®</sup> suits) are worn, these will be removed and disposed in a designated 55-gallon drum or garbage bag onsite for future disposal. Any other clothing that comes in contact with the potentially contaminated material should not be worn more than 24-hours and should be washed prior to wearing again.

## TABLES

**Table I-1**  
**Published Airborne Exposure Limits**  
**and Odor Thresholds in Parts Per Million (PPM) in Air**  
**for Substances Known or Suspected to be Present in Groundwater**

Substance	OSHA PEL/STEL/C	NIOSH REL/STEL	ACGIH TLV/STEL	IDLH	Cancer Causing	Odor Threshold *
<b>Metals</b>						
Antimony	0.5/-/-	0.5/-	0.5/-	50	Y	-
Arsenic	0.010/-/-	0.002/-	0.01/-	5	Y	-
Beryllium	0.002/0.025/0.005	0.005/-	0.002/0.01	4	Y	-
Cadmium	0.005/-/-	0.05/-	0.01/-	9	Y	-
Chromium	0.5/-/-	0.50/-	0.5/-	250	N	-
Copper	0.1/-/-	0.1/-	0.2/-	100	N	-
Cyanide	5/-/-	-/5	5/-	50	N	-
Lead	0.050/-/-	0.50/-	5/-	100	Y	-
Magnesium	15/-/-	-/-	10/-	750	N	-
Manganese	5/-/5	1/3	0.2/-	500	N	-
Mercury (Total)	0.1/-/-	0.1/-	0.025/-	10	N	-
Nickel	1/-/-	0.015/-	1.5/-	10	Y	-
Thallium	0.1/-/-	0.1/-	0.1/-	15	N	-
<b>VOCs</b>						
1,1 Dichloroethene	5/-/-	1/-	-/-	-	N	35.5
Vinyl Chloride	1/-/-	-/-	1/-	-	Y	
Benzene	1/5/25	0.1/1	0.5/2.5	500	N	1.5
Chlorobenzene	75/-/-	-/-	75/-	1000	N	-

**Notes:**

Airborne exposure limits for Iron and Sodium do not exist.

Definitions of PEL, REL, STEL, TLV, C and IDLH are discussed below:

PEL            The Occupational Safety and Health Administration's (OSHA) Permissible Exposure Limit for airborne contaminants as a time-weighted average for an eight (8) hour work shift, as listed in 29 CFR 1910.1000.

REL            The National Institute for Occupational Safety and Health's (NIOSH) Recommended Exposure Level for a work shift.

STEL	A Short Term Exposure Limit as a 15-minute time-weighted average (No more than four (4) exposures per shift).
TLV	The American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Value for airborne concentrations to which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effects.
C	Ceiling Concentration – The concentration that should not be exceeded during any part of the working exposure.
IDLH	The Immediately Dangerous to Life and Health maximum concentration from which one could escape within 30 minutes without experiencing any escape–impairing or irreversible health effects. (Note: Level C air-purifying respirators do not adequately protect an individual exposed to these concentrations.) These IDLH values were established by NIOSH and have not been peer reviewed. Caution is recommended with their application.

\* Reference: Ernest Orlando Lawrence, Berkeley National Laboratory Environmental Health and Safety Division – Chemical Hygiene and Safety Plan Odor Threshold Table for Chemicals.  
[http://www.lbl.gov/ehs/chsp/html/odor\\_threshold.shtml](http://www.lbl.gov/ehs/chsp/html/odor_threshold.shtml)

TABLE I-2

## AIR MONITORING METHODS, ACTION LEVELS, AND PROTECTIVE LEVELS FOR PERSONNEL

Hazard	Monitoring Unit	Action Level	Protective Levels/Action	Monitoring Schedule
Organic Vapors (2)	PID	1 to 2 ppm above background in the breathing zone	Level D-Continue Work	Continuous for ground intrusive activities. (3)
		2 to 6 ppm above background in the breathing zone	Level D and Test for Benzene with Dräger Tube (4)	
		Benzene 1-10 ppm with Dräger Tube	Level C - Continue Work	
		6 to 20 ppm above background in the breathing zone	Level C-Continue Work	
		20 to 60 ppm above background in breathing zone	Level C and Test for Benzene with Dräger Tube	
		Benzene >10 ppm with Dräger Tube	STOP WORK EVACUATE AREA (1)	
		> 60 ppm above background in the breathing zone	STOP WORK EVACUATE AREA (1)	
Oxygen-Deficient Atmosphere	Q-RAE 4-Gas Meter or Equivalent	19.5 to 23.5%	Level D-Continue Work	Continuous for ground intrusive activities.
		< 19.5%	Do not enter Confined Space. STOP WORK EVACUATE AREA (1)	
		> 23.5%	Fire explosion hazard; EVACUATE AREA (1)	
Explosive Gas (LEL)	Q-RAE 4-Gas Meter or Equivalent	< 10% LEL	Level D-Continue Work	Continuous for ground intrusive activities.
		10 to 20% LEL	If school building is occupied, stop work (1). If school building is unoccupied, issue warning.	
		> 20% LEL	EVACUATE AREA (1)	
Hydrogen Sulfide (H <sub>2</sub> S) (2)	Q-RAE 4-Gas Meter or Equivalent	< 5 ppm	Level D-Continue Work	Continuous for ground intrusive activities.
		5 to 10 ppm	If school building is occupied, stop work (1). If school building is unoccupied, issue warning.	
		> 10 ppm	STOP WORK EVACUATE AREA (1)	
Dust	Particulate Monitor Miniram or Equivalent	< 5 mg/m <sup>3</sup> above background in the breathing zone.	Level D-Continue Work	Continuous for ground intrusive activities.
		5 to 10 mg/m <sup>3</sup> above background in the breathing zone.	Level C-Continue Work	
		> 10 mg/m <sup>3</sup> above background in the breathing zone.	STOP WORK EVACUATE AREA (1)	

**Protection Levels:**

Level D - Required PPE: Safety goggles, hard hat, safety boots (steel toe/shank) and work clothes or coveralls.

Level C - Required Personal Protective Equipment (PPE): Full face, air purifying respirator or 1/2 face air purifying respirator with safety goggles, chemical resistant clothing, inner and outer chemical resistant gloves, safety boots (steel toe/shank with chemical resistant overboots), hard hat and hearing protection (if warranted).

**Notes:**

LEL - Lower Explosive Limit

ppm= parts per million

(1) For all circumstances where work is stopped, the Health and Safety Representative must be notified.

(2) Action levels provided for organic vapors and dust represent fifteen (15) minute average values.

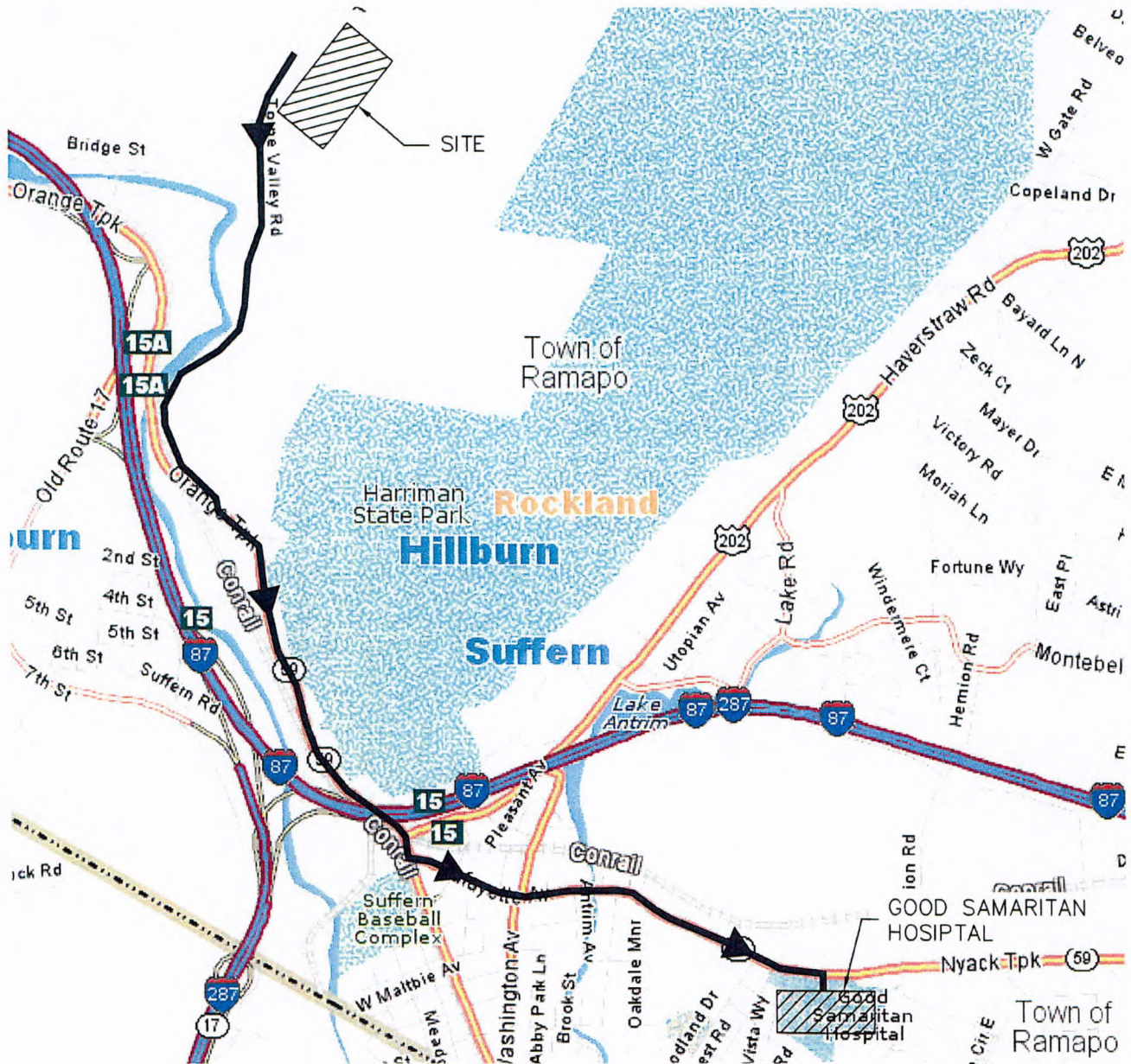
(3) Continuous indicates the monitoring unit will continuously collect readings from the workers' breathing space area over a fifteen (15) minute period, and the average for each period will be used to determine the action level.

(4) Test breathing space for Benzene with Dräger Tube, if concentration is one (1) ppm or greater, move to Level C PPE.

**FIGURE I-1**

**MAP AND DIRECTIONS TO HOSPITAL**

GOOD SAMARITAN HOSPITAL  
255 LAFAYETTE AVENUE  
SUFFERN, NY 10901  
(845)368-5000



DIRECTIONS:

1. HEAD SOUTH ON TORNE VALLEY ROAD
  2. TURN LEFT ONTO ORANGE TURNPIKE
  3. CONTINUE ONTO ORANGE AVE.
  4. TURN LEFT ONTO LAFAYETTE AVE.
  5. ARRIVE AT HOSPITAL ON RIGHT SIDE
- TOTAL DISTANCE = 3.5 MILES

**STERLING**

Sterling Environmental Engineering, P.C.

24 Wade Road • Latham, New York 12110

MAP AND DIRECTIONS TO HOSPITAL  
TOWN OF RAMAPO  
LANDFILL

TOWN OF RAMAPO

ROCKLAND CO., N.Y.

PROJ. No.: 20010 | DATE: 6-14-11 | SCALE: N.T.S. | DWG. NO. 20010011 | FIGURE 1-1

**APPENDIX J**

**EXTRACTION AND MONITORING WELL CONSTRUCTION FORMS  
(PROVIDED ON CD)**

**APPENDIX K**

**ENGINEERING CONTROLS AS-BUILT DRAWINGS  
(PROVIDED ON CD)**

**APPENDIX L**

**QUALITY ASSURANCE PROJECT PLAN (QAPP)**



Sterling Environmental Engineering, P.C.

**QUALITY ASSURANCE PROJECT PLAN**

**TOWN OF RAMAPO LANDFILL SITE  
ROCKLAND COUNTY, NEW YORK  
NYSDEC SITE #344004; USEPA CERCLIS ID NYD000511493**

*Prepared for:*

Town of Ramapo  
237 Route 59  
Suffern, New York 10901

and

Town of Ramapo Department of Public Works  
16 Pioneer Avenue  
P.O. Box 446  
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April 28, 2017

*"Serving our clients and the environment since 1993"*

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**QUALITY ASSURANCE PROJECT PLAN**  
**TOWN OF RAMAPO LANDFILL SITE**  
**ROCKLAND COUNTY, NEW YORK**  
**NYSDEC SITE #344004; USEPA CERCLIS ID NYD000511493**

**Table of Contents**

	<b><u>Page #</u></b>
TITLE AND APPROVAL PAGE .....	1
DISTRIBUTION LIST .....	2
PROJECT PERSONNEL SIGN-OFF SHEET .....	3
PROJECT ORGANIZATIONAL CHART .....	4
COMMUNICATION PATHWAYS.....	5
PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS .....	6
SPECIAL PERSONNEL TRAINING REQUIREMENTS .....	7
PROJECT SCOPING SESSION PARTICIPANTS SHEET .....	8
PROBLEM DEFINITION .....	9
PROJECT QUALITY OBJECTIVES /SYSTEMATIC PLANNING PROCESS STATEMENTS.....	11
MEASUREMENT PERFORMANCE CRITERIA TABLE .....	14
SECONDARY DATA CRITERIA AND LIMITATIONS TABLE.....	16
SUMMARY OF PROJECT TASKS .....	17
REFERENCE LIMITS AND EVALUATION TABLE - GROUNDWATER PARAMETERS .....	20
PROJECT TASKS AND SCHEDULE .....	22
SAMPLING DESIGN AND RATIONALE .....	22
SAMPLING LOCATIONS AND METHODS.....	22
ANALYTICAL SOP REQUIREMENTS.....	24
FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE.....	25
PROJECT SAMPLING SOPS.....	26
FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING AND INSPECTION SUMMARY .....	27
ANALYTICAL SOPS .....	29

ANALYTICAL INSTRUMENT CALIBRATION .....	29
ANALYTICAL INSTRUMENT MAINTENANCE, TESTING AND INSPECTION.....	30
SAMPLE HANDLING, CUSTODY AND DISPOSAL .....	31
ANALYTICAL QUALITY CONTROL AND CORRECTIVE ACTION.....	33
PROJECT DOCUMENTS AND RECORDS TABLE.....	34
ANALYTICAL SERVICES .....	35
ASSESSMENTS AND CORRECTIVE ACTION .....	36
DATA REVIEW .....	36
CONSIDERATIONS FOR USABILITY ASSESSMENT .....	37

### **Tables**

Table 1	Analytical Methods/Quality Assurance Summary
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### **Figures**

Figure 1	Site Location Map
Figure 2	Groundwater Monitoring Wells and Air Quality Monitoring Locations

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## TITLE AND APPROVAL PAGE

(Worksheets # 1 & 2)

**Site name/project name:** Town of Ramapo Landfill

**Site location/number:** Town of Ramapo, Rockland County, New York  
NYSDEC Site #344004;  
USEPA CERCLIS ID NYD000511493

**Lead Organization:** Town of Ramapo

**Project Manager:** Edward P. Dzurinko  
Director of Public Works

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**Federal Regulatory Agency:** George Jacob, Project Manager  
United States Environmental Protection Agency (USEPA)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**State Regulatory Agency:** New York State Department of Environmental Conservation  
  
Carl Hoffman, P.E.  
Environmental Engineer 2

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Other Stakeholders (as needed)

List plans and reports from previous investigations relevant to this project

1. "Operation and Maintenance Manual, Ramapo Landfill Remediation," URS GREINER, March 1999
2. "Work Plan, Quality Assurance Project Plan and Field Sampling Plan for the Remedial Investigation/Feasibility Study at the Ramapo Landfill," URS Consultants, August 1989
3. 2000-2015 Post-Closure Monitoring Reports, Sterling Environmental Engineering, P.C.
4. Draft Site Management Plan, Sterling Environmental Engineering, P.C., November 7, 2014
5. Revised Site Management Plan, Sterling Environmental Engineering, P.C., dated April 28, 2017
6. USEPA – Region 2, Fourth Five-Year Review Report, Ramapo Landfill Superfund Site, Rockland County, Town of Ramapo, New York, February 2015

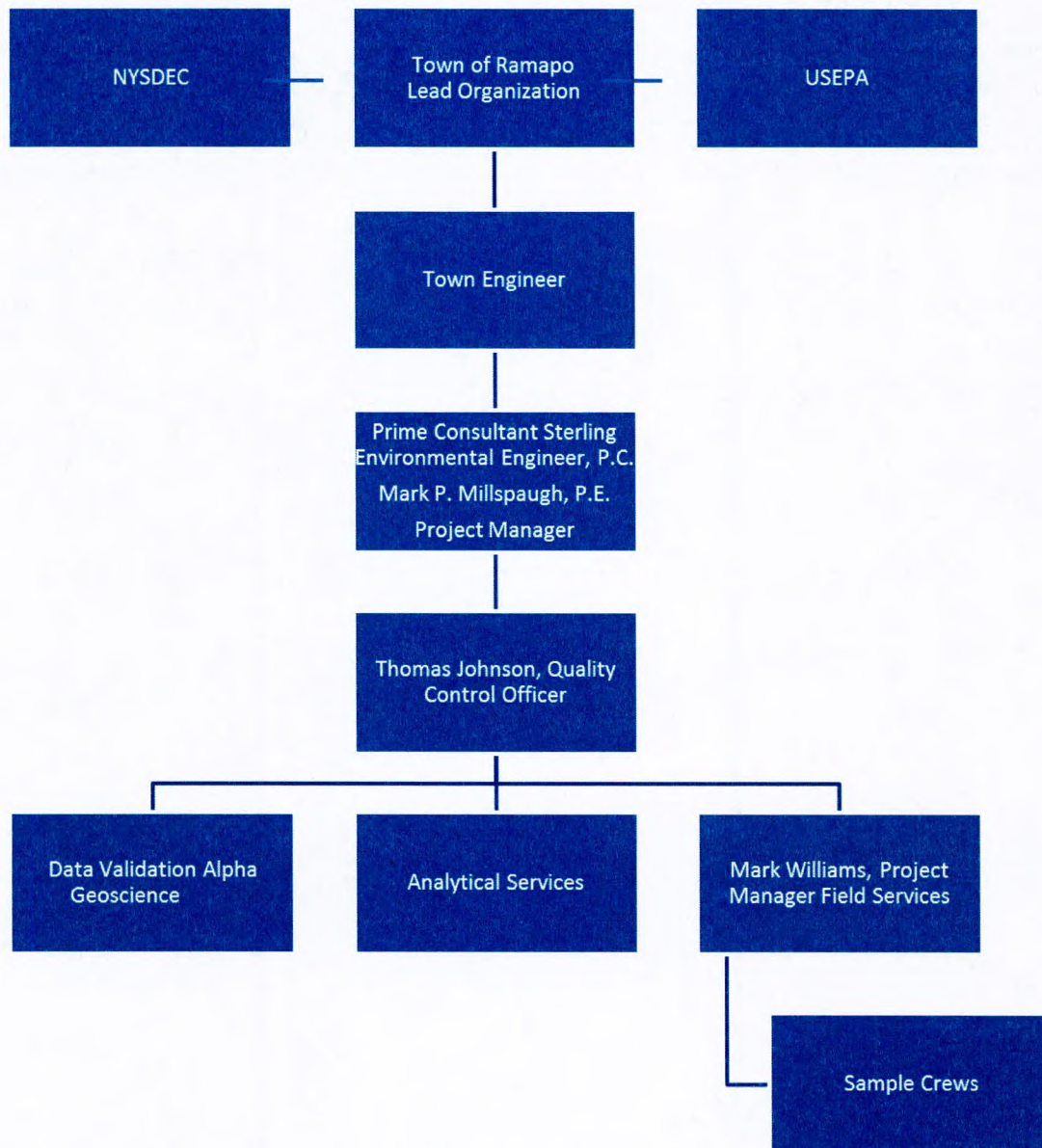
**DISTRIBUTION LIST**  
**(Worksheet #3)**

<b>QAPP Recipients</b>	<b>Title</b>	<b>Organization</b>	<b>Telephone #</b>	<b>Fax #</b>	<b>E-mail Address</b>
Edward P. Dzurinko	Director of Public Works	Town of Ramapo DPW	845-357-0591	845-357-0895	<a href="mailto:dzurinkot@ramapo-ny.gov">dzurinkot@ramapo-ny.gov</a>
Paul Gdanski, P.E.	Engineer	Town of Ramapo DPW	845-357-0591	845-357-0895	<a href="mailto:gdanski@ramapo-ny.gov">gdanski@ramapo-ny.gov</a>
Carl Hoffman, P.E.	Environmental Engineer 2	NYSDEC DER Remedial Section D Remedial Bureau E	518-402-9813	518-402-9819	<a href="mailto:carl.hoffman@dec.ny.gov">carl.hoffman@dec.ny.gov</a>
Susan Edwards, P.E.	Chief	NYSDEC Remedial Section D Remedial Bureau E	518-402-9814		<a href="mailto:susan.edwards@dec.ny.gov">susan.edwards@dec.ny.gov</a>
George Jacob	Project Manager	USEPA, Region 2 Emergency & Remedial Response Division	212-637-4266	212-637-3966	<a href="mailto:jacob.george@epamail.epa.gov">jacob.george@epamail.epa.gov</a>
Mark P. Millspaugh, P.E.	President	Sterling Environmental Engineering, P.C.	518-456-4900	518-456-3532	<a href="mailto:mark.millspaugh@sterlingenvironmental.com">mark.millspaugh@sterlingenvironmental.com</a>
Mark A. Williams, P.G.	Geologist	Sterling Environmental Engineering, P.C.	518-456-4900	518-456-3532	<a href="mailto:mark.williams@sterlingenvironmental.com">mark.williams@sterlingenvironmental.com</a>

**PROJECT PERSONNEL SIGN-OFF SHEET**  
**(Worksheet #4)**

<b>Project Personnel</b>	<b>Title</b>	<b>Organization</b>	<b>Telephone/E-mail</b>	<b>Signature</b>	<b>Date QAPP Read</b>
Edward P. Dzurinko	Director of Public Works	Town of Ramapo DPW	845-357-0591 <a href="mailto:dzurinkot@ramapo-ny.gov">dzurinkot@ramapo-ny.gov</a>		
Paul Gdanski, P.E.	Engineer	Town of Ramapo DPW	845-357-0591 <a href="mailto:gdanskip@ramapo-ny.gov">gdanskip@ramapo-ny.gov</a>		
Carl Hoffman, P.E.	Environmental Engineer 2	NYSDEC DER Remedial Section D Remedial Bureau E	518-402-9813 <a href="mailto:carl.hoffman@dec.ny.gov">carl.hoffman@dec.ny.gov</a>		
Susan Edwards, P.E.	Chief	NYSDEC Remedial Section D Remedial Bureau E	518-402-9814 <a href="mailto:susan.edwards@dec.ny.gov">susan.edwards@dec.ny.gov</a>		
George Jacob	Project Manager	USEPA, Region 2, Emergency & Remedial Response Division	212-637-4266 <a href="mailto:jacob.george@epamail.epa.gov">jacob.george@epamail.epa.gov</a>		

**PROJECT ORGANIZATIONAL CHART**  
**(Worksheet #5)**



**COMMUNICATION PATHWAYS**  
**(Worksheet #6)**

<b>Communication Driver</b>	<b>Responsible Entity</b>	<b>Name</b>	<b>Contact Information</b>	<b>Procedure (Timing, Pathways)</b>
Approval of QAPP Amendments / Modifications	NYSDEC and USEPA	Carl Hoffman, NYSDEC George Jacob, USEPA	See Worksheet #3	Written notification to Town
Delays or Changes to Field Work	Town of Ramapo and STERLING	Edward P. Dzurinko Mark Millspaugh, P.E.	See Worksheet #3	Verbal, electronic notification followed by written
Initiation of Correct Action	NYSDEC and USEPA	Carl Hoffman, NYSDEC George Jacob, USEPA	See Worksheet #3	Verbal, electronic notification followed by written
Reporting of Issues Related to Analytical Data Quality	STERLING and Laboratory	Mark Millspaugh, P.E. and Laboratory	See Worksheet #3	Verbal, electronic notification followed by written

**PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS**  
**(Worksheet #7)**

<b>Name</b>	<b>Title</b>	<b>Organizational Affiliation</b>	<b>Responsibilities</b>	<b>Educational and Experience Qualifications</b>
Edward P. Dzurinko	Director of Public Works	Town of Ramapo DPW	Oversee project and respond to NYSDEC/USEPA	
Paul Gdanski, P.E.	Engineer	Town of Ramapo DPW	Oversee project tasks and coordinate with Project Manager	Professional Engineer
Mark Millspaugh, P.E.	Project Manager	STERLING	Oversee project tasks and manage subcontractors	Professional Engineer
Thomas Johnson	QC Officer	STERLING	Oversee quality control tasks	
Mark Williams	Field Services Project Manager	STERLING	Oversee all field activities	
	Analytical Services Project Manager	TBD	Oversee analytical services	
	Data Validator	TBD	Perform all data validation	

**SPECIAL PERSONNEL TRAINING REQUIREMENTS**  
**(Worksheet #8)**

<b>Project Function</b>	<b>Specialized Training</b>	<b>Training Provider</b>	<b>Training Date</b>	<b>Personnel/Groups Receiving Training</b>	<b>Personnel Titles/Organizational Affiliation</b>	<b>Location of Training Records/Certificates</b>
Field Activities	40-Hour OSHA Training and Annual 8-Hour Refresher	Approved Training Vendor	Various	STERLING Field Services	STERLING	STERLING
Sample Analysis	EPA Analytical Methods	Lab onsite and Vendor Training	Various	Laboratory Personnel	Laboratory	Laboratory
Data Validation	Data Validator Training	Various	Various	Data Validator	Data Validator	Data Validator

**PROJECT SCOPING SESSION PARTICIPANTS SHEET**  
**(Worksheet #9)**

No Scoping Session has been held for this project. If one is held, the date, purpose, and participants will be listed, along with any decisions and action items.

## **PROBLEM DEFINITION**

### **(Worksheet #10)**

#### **Problem Summary**

Site management is the final phase of remediation at the Town of Ramapo Landfill site and will continue until the remedial action objectives (RAOs) for the project are met and the site is closed. The measures for monitoring and documenting the effectiveness of the remedial action in achieving site RAOs are described herein.

#### **Site Description**

The Town of Ramapo Landfill (Landfill), located in the Town of Ramapo, Rockland County, New York (refer to Figure 1), is a National Priorities List (NPL) site and is regulated by the United States Environmental Protection Agency (USEPA), CERCLIS ID NYD000511493. The Landfill property is also registered as a New York State Class 2 Inactive Hazardous Waste Disposal Site, Registry No. 344004.

The Landfill is approximately 60 acres of waste-fill within a 96 acre parcel owned by the Town of Ramapo.

#### **Site History**

Prior to landfilling operations in the 1950s and 1960s, portions of the property were excavated for gravel. In 1971, the Town was permitted by the Rockland County Department of Health (RCDOH) to operate a sanitary landfill. Under various operators, municipal solid waste (MSW) was accepted until 1984 and construction and demolition (C&D) debris was accepted until 1989. Substances reportedly disposed at the Landfill include industrial and sewer sludge, municipal refuse, asbestos, C&D debris, yard debris, paint sludge (presumably from an automotive plant) and liquid waste (reportedly from a paper company).

The Landfill was placed on the Superfund National Priorities List (NPL) in September 1983. Between 1980 and 1988, the NYSDEC and the Town of Ramapo entered into four (4) Orders on Consent phasing out Landfill operations, constructing a surface water and groundwater diversion system and a leachate collection and transport system, and conducting a Remedial Investigation and Feasibility Study (RI/FS). The leachate collection system was constructed along the downgradient edge of the Landfill from 1984 to 1985. Initially, collected leachate was conveyed by pumps and lift stations to a wastewater treatment pond in the southwest corner of the Landfill property. After aeration and settling occurred, the water was discharged to the Ramapo River. Since 1996, leachate has been discharged to the Rockland County Sewer District (RCSD) No. 1 Publicly Owned Treatment Works (POTW).

Chemical Waste Management, one of the potentially responsible parties (PRPs), undertook closure of the Landfill, which began in May 2000 and was completed in September 2001. Once the Landfill was properly closed, the Order on Consent released Chemical Waste Management from all physical and financial obligations.

## Project Description

Groundwater samples will be collected and analyzed in accordance with the NYSDEC July 2005 Analytical Services Protocol (ASP) or latest ASP revision. Groundwater samples will be analyzed for specific parameters selected from 6 NYCRR Part 360-2.11(c)(6) Baseline Water Quality Analysis Table (1988) and consists of field parameters pH, Oxidation Reduction Potential (ORP), Specific Conductivity and Temperature. Field observations, including floaters and sinkers will be noted. Parameters to be analyzed by a laboratory include Total Kjeldahl Nitrogen (TKN), Chemical Oxygen Demand (COD), Alkalinity, Hardness as CaCO<sub>2</sub>, and site related volatile organic compounds (VOCs): 1,1 Dichorethane, Vinyl Chloride, Benzene, Chlorobenzene and Target Analyte List (TAL) metals.

Leachate samples will be collected and analyzed for VOCs, semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), chloride, Biological Oxygen Demand (BOD), COD, Total Suspended Solids (TSS), metals, total and free cyanide, ammonia, TKN, T-Phosphorous and phenols.

Air quality will be monitored for explosive gas (Lower Explosive Limit, or LEL), Hydrogen Sulfide (H<sub>2</sub>S) and VOCs.

Table 1 presents a summary of the sample locations, sample matrix, required analyses, type and number of sample container, method of sample preservation, holding time and analytical method.

**PROJECT QUALITY OBJECTIVES /SYSTEMATIC PLANNING PROCESS STATEMENTS  
(Worksheet #11)**

Overall project objectives include:

The objectives of the sampling are to determine whether RAOs are being met.

Effectiveness monitoring is defined in NYSDEC DER-10 as the periodic chemical and physical analysis of media of concern to determine and/or confirm if the RAOs are being achieved when compared to data obtained from the investigation, implementation and previous monitoring of the remedy. Effectiveness monitoring activities applicable to the Ramapo Landfill property include groundwater and air quality monitoring. Groundwater and air quality monitoring was selected based on potential Contaminants of Concern (COC) releases to each of these media and subsequent migration from the Landfill source material to the surrounding environment.

**Who Will Use the Data?**

Data will be used by: USEPA and NYSDEC

**What Will the Data be Used For?**

The data will be used to determine if RAOs are being achieved when compared to data obtained from previous investigations and monitoring of the remedy.

**What Type of Data is Needed?**

Leachate samples will be collected twice a year from the RCSD No. 1 POTW by the RCSD and analyzed for USEPA Priority Pollutants, excluding Dioxin. Leachate sampling will alternate between Wet Well 1 (WW-1) and Wet Well 2 (WW-2). Results of the leachate analyses will be provided to the Town of Ramapo, NYSDEC and NYSDOH. Analytical data will also be used to track the performance of the Landfill cover and leachate collection system and to identify trends with regard to achieving RAOs.

Groundwater samples are currently sampled from seventeen (17) monitoring wells: 1-OS/I, 2-OS, 3-OS/I, 4-OS, 5-OS or 5-I, 8-OS, 8-I, 8-R, 9-OS, 9-I, 9-R, 10-OS, 10-I, and 10-R private water supply wells PW-1 and PW-2, and municipal water supply wells SVWC-93, SVWC-95 and SVWC-96 (SVWC-94 has been out of service since 2009) (see Figure 2 for locations). Samples are analyzed for parameters listed in Table 1.

Air quality monitoring consists of measuring explosive gas (Lower Explosive Limit, or LEL), Hydrogen Sulfide (H<sub>2</sub>S) and volatile organic compounds (VOCs) of the headspace of each monitoring well, inside the Baler Building, leachate manhole A-5, lift stations A-10 and W-20, and breathing space of the Landfill perimeter at 100 foot intervals. Air quality monitoring locations are shown on Figure 2. Measurements are collected in the field with applicable monitoring equipment (e.g. Q-RAE and mini-RAE 3000 units).

### **How "good" do the data need to be in order to support the environmental decision?**

The project-specific action limits and quantification limits for each sampled media are specified on Worksheet #15 for all contaminants of concern (COCs). The data will be used in order to monitor remedial progress. Data quality requirements and assessments are provided in the NYSDEC ASP, which includes the detection limit for each analyte and sample matrix. Note that the quantification limits, estimated accuracy, accuracy protocol, estimated precision and precision protocol are determined by the laboratory and will be in conformance with the requirements of the NYSDEC ASP (latest revision) and/or USEPA 5/99 SOW for organics and USEPA 1/00 SOW for inorganics, where applicable. Table 1 presents a summary of the data quality requirements.

### **Where, when, and how should the data be collected?**

Leachate samples will be collected twice a year from the RCSD No. 1 POTW by the RCSD and analyzed for USEPA Priority Pollutants, excluding Dioxin. Leachate sampling will alternate between Wet Well 1 (WW-1) and Wet Well 2 (WW-2). Results of the leachate analyses will be provided to the Town of Ramapo, NYSDEC and NYSDOH. Analytical data will also be used to track the performance of the Landfill cover and leachate collection system and to identify trends with regard to achieving RAOs.

Groundwater samples are currently sampled from seventeen (17) monitoring wells: 1-OS/I, 2-OS, 3-OS/I, 4-OS, 5-OS or 5-I, 8-OS, 8-I, 8-R, 9-OS, 9-I, 9-R, private water supply wells PW-1 and PW-2, and municipal water supply wells SVWC-93, SVWC-95 and SVWC-96 (SVWC-94 has been out of service since 2009) (see Figure 2 for locations). The USEPA seeks quarterly monitoring events for sentinel wells 9-OS, 9-I, 9-R, private water supply wells PW-1, PW-2, and municipal water supply wells SVWC-93, SVWC-95 and SVWC-96. Samples are analyzed for parameters listed in Table 1.

Air quality monitoring consists of measuring explosive gas (Lower Explosive Limit, or LEL), Hydrogen Sulfide (H<sub>2</sub>S) and volatile organic compounds (VOCs) of the headspace of each monitoring well, inside the Baler Building, leachate manhole A-5, lift stations A-10 and W-20, and breathing space of the Landfill perimeter at 100 foot intervals. Air quality monitoring locations are shown on Figure 2. Measurements are collected in the field with applicable monitoring equipment (e.g. Q-RAE and mini-RAE 3000 units).

### **Who will collect and generate the data?**

Sterling Environmental Engineering, P.C. (STERLING) will collect the samples. A NYSDOH ELAP and CLP certified laboratory meeting the requirements for sample custody procedures, including cleaning and handling sample containers and analytical equipment will be used to generate the data. The laboratory's standard operating procedures must be available upon request.

### **How will the data be reported?**

Post-closure groundwater monitoring samples for the Landfill require Category A data deliverables as defined in the NYSDEC ASP, July 2005.

Category B data deliverables will be required for the Remedial Process Closure when groundwater monitoring can be terminated for the Landfill. At this time, a Data Usability Summary Report (DUSR) will be generated by an independent third party for the Category B data deliverables.

A summary of documents required for Categories A and B data deliverables and a copy of the NYSDEC DER-10 Appendix 2B "Guidance for Data Deliverables and the Development of Data Usability Summary Reports" is presented in Appendix H of the project Site Management Plan (SMP).

#### **How will the data be archived?**

Data from subcontract laboratories will be received in electronic format specified in the contract and validated by subcontractor personnel.

Final CLP and subcontracted validated data will be submitted to the NYSDEC and USEPA in electronic format and hard copy consistent with CLP deliverables.

Electronic data will be input into the project's NYSDEC EQulS database.

Hard copies of field data including field logs will be archived in the project files.

**MEASUREMENT PERFORMANCE CRITERIA TABLE**  
**(Worksheet #12)**

**Matrix** Groundwater

**Analytical Groups** VOCs, Metals, other (TKN, COD, alkalinity)

<b>Sampling Procedure</b>	<b>Analytical Method/SOP</b>	<b>Data Quality Indicators (DQIs)</b>	<b>Measurement Performance Criteria</b>	<b>QC Sample and/or Activity Used to Assess Measurement Performance</b>	<b>QC Sample Assesses for Sampling (S), Analytical (A), or both (S&amp;A)</b>
Refer to Worksheets 18, 21	Refer to Worksheet 23 and Table 1	Precision, accuracy, completeness (described below).	See below.	Refer to Worksheet #20 for more detail  Field Duplicates Matrix Spike MS Duplicate Trip Blank (VOCs only)	  S&A A A S

**Precision**

Precision is a measurement of the degree to which two or more measurements are in agreement, which is quantitatively assessed based on the standard deviation. Precision in the laboratory is assessed through the calculation of relative percent difference (RPD) and relative calculation of relative standard deviations (RSD) for three or more replicate samples. Laboratory precision will be assessed through the analysis of matrix spike/matrix spike duplicate (MS/MSD) and field duplicate samples for organic parameters. For inorganic parameters, precision will be assessed through the analysis of matrix spike/duplicate/field duplicate pairs. Precision for field parameters, including pH, turbidity, specific conductance, and temperature will be determined through duplicate analysis of 1 in every 20 samples.

**Accuracy**

Accuracy is the degree of agreement between an observed value and an accepted reference of true value. Accuracy in the field is assessed through the use of field blanks and trip blanks and through the adherence to all sample handling, preservation and holding times. One trip blank will accompany each batch of water matrix sample containers shipped to the laboratory for volatile organic chemical analysis. Laboratory accuracy is assessed through the analysis of a MS/MSD (1 per 20 samples), standard reference materials (SRM), laboratory control samples (LCS), and surrogate compounds, and the determination of percent recoveries.

## Completeness

Data completeness is a measure of the amount of valid data obtained from a prescribed measurement system as compared with that expected and required to meet the project goals. Laboratory and field completeness will be addressed by applying data quality checks and assessments to ensure that the data collected are valid and significant.

The laboratory completeness objectives for the Supplemental Sediment Sampling Investigation will be 90 percent or greater. A third party Data Validator will assess the completeness and validity of laboratory data deliverables. The completeness of an analysis will be documented by including in the report sufficient information to allow the Data Validator to assess the quality of the results.

Raw data such as chromatograms, spectra, calibration data, laboratory worksheets and notes, etc. will not be produced with the analytical data reporting package however will be stored with the sample results in the laboratory and made available upon request, if necessary, to substantiate analytical results. The raw data will be archived for at least two (2) years by the laboratory. The laboratory will retain all analytical information; regardless of whether STERLING requests the substantiation of results.

### Matrix Leachate

**Analytical Groups** VOCs, SVOCs, Pesticides, PCBs, Metals, other (Chloride, BOD, COD, TSS, TKN, Phenols, Phosphorous)

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses for Sampling (S), Analytical (A), or both (S&A)
Refer to Worksheets 18, 21	Refer to Worksheet 23	Precision, accuracy, completeness (described above).	See above.	Refer to Worksheet #20 for more detail  Trip blank (VOCs only)	S

**SECONDARY DATA CRITERIA AND LIMITATIONS TABLE**  
(Worksheet #13)

<b>Secondary Data</b>	<b>Data Source (Originating Organization, Report Title, and Date)</b>	<b>Data Generator(s) (Originating Org., Data Types, Data Generation/Collection Dates)</b>	<b>How Data Will Be Used</b>	<b>Limitations on Data Use</b>
Annual groundwater sampling results	Post-Closure Monitoring (PCM) Reports 2000-2015	STERLING Groundwater Data; Air Quality Data; Leachate Data	For comparison to current data	NA

## **SUMMARY OF PROJECT TASKS (Worksheet #14)**

### **Project Tasks**

Collection of groundwater, leachate and air samples.

### **Sampling Tasks**

Collection of groundwater samples from 17 monitoring wells, as described in Worksheet #18.

Collection of leachate samples, as described in Worksheet #18.

Collection of air samples, as described in Worksheet #18.

### **Analysis Tasks**

Groundwater samples analyzed for parameters selected from 6 NYCRR 360-2.11(c)(6), Baseline Water Quality Analysis Table (1988) and consists of field parameters, TKN, COD, Alkalinity, Hardness, TAL metals, and site-related VOCs.

Leachate samples analyzed for VOCs, SVOCs, pesticides, PCBs, metals, leachate parameters.

Air samples analyzed for explosive gas, H<sub>2</sub>S, and VOCs.

### **Quality Control Tasks**

The laboratory supplies trip blank samples with sample containers when VOCs are analyzed. The purpose of trip blanks is to detect additional sources of VOCs that might potentially influence contaminant values reported in actual samples both quantitatively and qualitatively. The following are potential sources of contamination:

- Laboratory reagent water
- Sample containers
- Cross contamination in shipment
- Contact with analytical instrumentation during preparation of the sample containers and analysis of the samples at the laboratory
- Laboratory reagents used in analytical procedures

A trip blank consists of a set of 40 ml sample vials filled at the laboratory with laboratory demonstrated analyte free water. Trip blanks should be handled, transported and analyzed in the same manner as the samples acquired that day, except the trip blank samples are not opened in the field. Trip blanks must accompany samples at a rate of one (1) set per shipment. The temperature of the trip blanks must be

maintained at 4 degrees Celsius (4°C) while onsite and during shipment. Trip blanks must be returned to the laboratory with the same set of bottles they accompanied in the field.

Duplicate and matrix/matrix-spike duplicates are required at a frequency of one (1) per twenty (20) samples. The selected location for collecting these sample types may be randomly chosen.

Matrix spike samples are quality control procedures, consistent with NYSDEC ASP specifications, used by the laboratory as part of its internal Quality Assurance/Quality Control program. The matrix and matrix spike duplicates are aliquots of a designated sample (water or soil) which are spiked with known quantities of specified compounds. They are used to evaluate the matrix effect of the sample upon the analytical methodology as well as to determine the precision of the applicable analytical method.

### **Secondary Data**

Data from previous groundwater, leachate and air sampling events have been reviewed and evaluated for project use. Data deemed as valuable have been added to the project database.

### **Data Management Tasks**

Analytical data are placed in a database after validation, along with field measurements.

### **Documentation and Records**

All samples collected have locations documented, records of each sample collected in a notebook, and all field measurements documented in a field notebook. COCs and sample logs will be collected for each sample.

**PROJECT TASKS AND SCHEDULE**  
**(Worksheet #14 & 16)**

<b>Activity</b>	<b>Responsible Party</b>	<b>Planned Start Date</b>	<b>Planned Completion Date</b>	<b>Deliverable</b>	<b>Deliverable Due Date</b>
Sample Collection - Groundwater	STERLING	11/7/16	11/10/16	Field Notes/DFR	
Sample Collection - Leachate	STERLING			Field Notes/DFR	
Sample Collection - Air	STERLING	11/7/16	11/10/16	Field Notes/DFR	
Analysis	Laboratory Alpha Analytical, Inc.			Report of Analysis/Data Package	
Data Validation	Third Party Alpha Geoscience	11/23/16	11/28/16	DUSR	
Summarize Data	Laboratory/ STERLING	11/28/16	11/30/16	Monitoring Report	
Data Usability Assessment	Project Team	11/28/16	11/28/16	Summary Report	

**REFERENCE LIMITS AND EVALUATION TABLE - GROUNDWATER PARAMETERS**

(Worksheet #15)

Volatile Organic Compounds (All units: µg/L)	CAS Number	Project Action Limit		
		Federal	New York State	
		EPA National Primary Drinking Water Standards <sup>1</sup>	NYSDEC Standards and Guidance Values for Class GA Groundwater <sup>2</sup>	NYSDOH Drinking Water Quality Standards <sup>3</sup>
1,1-Dichloroethane	75-34-3	---	5.0	5.0
Benzene	71-43-2	5.0	1.0	5.0
Chlorobenzene	108-90-7	100	5.0	5.0
Vinyl Chloride	75-01-4	2.0	2.0	2.0

TAL Metals and Inorganic Parameters (All units: mg/L)	CAS Number	Project Action Limit		
		Federal	New York State	
		EPA National Primary Drinking Water Standards	NYSDEC Standards and Guidance Values for Class GA Groundwater	NYSDOH Drinking Water Quality Standards
<i>Cyanide</i>				
Total Cyanide	74-90-8	---	0.2	---
Amenable Cyanide	74-90-8	0.2	---	0.2
<i>TAL Metals</i>				
Aluminum	7429-90-5	---	---	---
Antimony	7440-36-0	0.006	0.003	0.006
Arsenic	7440-38-2	0.01	0.025	0.01
Barium	7440-39-3	2.0	1.0	2.0
Beryllium	7440-41-7	0.004	0.003	0.004
Cadmium	7440-43-9	0.005	0.005	0.005
Calcium	7440-70-2	---	---	---
Chromium (Total)	7440-47-3	0.1	0.05	0.1
Chromium (Hexavalent)	18540-29-9	---	0.05	---
Cobalt	7440-48-4	---	---	---
Copper	7440-50-8	1.3	0.2	---

Iron	7439-89-6	---	0.3 <sup>a</sup>	0.3 <sup>a</sup>
Lead	7439-92-1	0.015	0.025	---
Magnesium	7439-95-4	---	35	---
Manganese	7439-96-5	---	0.3 <sup>a</sup>	0.3 <sup>a</sup>
Mercury	7439-97-6	0.002	0.0007	0.002
Nickel	7440-02-0	---	0.1	---
Potassium	7440-09-7	---	---	---
Selenium	7782-49-2	0.05	0.01	0.05
Silver	7440-22-4	---	0.05	0.1
Sodium	7440-23-5	---	20	--- <sup>b</sup>
Thallium	7440-28-0	0.002	0.0005	0.002
Vanadium	7440-62-2	---	---	---
Zinc	7440-66-6	---	2.0	5.0

Notes:

<sup>1</sup> United States Environmental Protection Agency Primary Drinking Water Maximum Contaminant Levels.

<sup>2</sup> New York State Department of Environmental Conservation T.O.G.S. 1.1.1: Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations

<sup>3</sup> New York State Department of Health Part 5, Subpart 5-1 Public Water Systems

<sup>a</sup> If iron and manganese are present, the total concentration of both should not exceed 0.5 mg/L.

<sup>b</sup> Water containing more than 20 mg/L of sodium should not be used for drinking by people on severely restricted sodium diets. Water containing more than 270 mg/L of sodium should not be used for drinking by people on moderately restricted sodium diets.

## **PROJECT TASKS AND SCHEDULE (Worksheet #16)**

A Post-Closure Monitoring (PCM) Program is currently implemented at the Landfill property. The PCM includes the collection and analysis of groundwater samples and air quality monitoring. PCM has been conducted since 1993 and is required until 2023.

## **SAMPLING DESIGN AND RATIONALE (Worksheet #17)**

Sampling analysis and quality assurance follow the protocol provided in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (DER-10).

## **SAMPLING LOCATIONS AND METHODS (Worksheet #18)**

### **See Table 1**

Representative samples will be collected as follows:

- Groundwater samples will be obtained after the monitoring well has been purged of three (3) well casing volumes of water and field measurements (pH, conductivity, temperature, dissolved oxygen and turbidity field observations) have been collected. Samples will be collected using dedicated inertial footvalve and tubing bailers or submersible pumps.
- Air quality will be monitored in the headspace of each monitoring well, the Baler Building, leachate manhole A-5 and Lift Stations A-10 and W-20, and breathing space for the Landfill perimeter. Air quality monitoring will include Lower Explosive Limit (LEL), Hydrogen Sulfide (H<sub>2</sub>S) and VOCs with appropriate monitoring equipment.
- Field equipment will be calibrated daily before use according to the manufacturer's procedures.
- Sampling equipment will be decontaminated prior to use at each location according to the NYSDEC approved procedures described below.

### **Sample Identification**

Each sample container will have a durable label affixed to it that specifies the following sample information:

- Sample location;
- Sample type;
- Sample identification number (including well designation);
- Date and time of sample collection; and
- Laboratory analyte.

### **Sample Preservation, Handling and Shipment**

All analytical samples will be placed in the appropriate sample containers as specified in the NYSDEC ASP. The holding time criteria identified for the individual methods of the ASP will be followed, as specified in Table 1.

Prior to shipment to the laboratory, the sample containers will be checked for proper identification and compared to the field logbook for accuracy. The samples will then be wrapped with a cushioning material. Sample containers will be placed in a cooler with ice immediately after sample collection and maintained at 4 degrees Celsius (4°C) throughout the duration of the sampling event and subsequent shipment to and storage at the analytical laboratory until analysis.

Chain of Custody Forms will be placed in a sealed plastic bag and taped to the underside of the cooler lid. The cooler will be sealed with packaging tape and custody seals will be placed in such a manner that any opening of the cooler prior to arrival at the laboratory can be detected.

All samples will be shipped to ensure laboratory receipt within 48 hours of sample collection in accordance with NYSDEC requirements. The laboratory will be notified prior to the shipment of the samples.

All field sampling equipment should be sterile and dedicated to a particular sampling location. In situations where this is not possible, decontamination procedures will be used to reduce the risk of cross-contamination between sample locations. A decontamination station will be established that will be an area located away from the suspected source of contamination, however close enough to the sampling area to keep equipment handling to a minimum.

All non-disposable equipment will be decontaminated prior to initial use, prior to moving to a new sampling location and prior to leaving the site. Different decontamination procedures are used for various types of equipment as discussed below. When using field decontamination, it is advisable to start sampling in the area of the site with the lowest known contamination and proceed to the areas of highest suspected contamination.

Teflon, PVC, polyethylene, polystyrene and stainless steel sampling equipment decontamination procedures will be the following:

- Wash thoroughly with nonresidual nonionic anionic detergent (such as Alconox) and clean potable tap water using a brush to remove particulate matter or surface film.
- Rinse thoroughly with tap water.
- Rinse thoroughly with distilled water.
- Rinse in a well ventilated area with methanol (pesticide grade) and air dry.
- Rinse thoroughly with distilled water and air dry.
- Wrap completely in clean aluminum foil with dull side against the equipment.

**ANALYTICAL SOP REQUIREMENTS  
WORKSHEET #19**

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Containers (volume, numbers and bottle type)	Preservation Requirements	Preservation Holding Time	Analytical Holding Time
<b>Groundwater (Liquid)</b>	VOCs	EPA 8260C / 2108	Two 40-ml VOA vials w/ PTFE-faced silicone septum	1 - 4°C OR 1:1 HCL to a pH of <2.	14 days	14 days
	Metals, including Hg	EPA 6010C / 2144	Amber 250ml unpreserved	4 ± 2°C	N/A	180 days
		EPA 7470A / 2145	Plastic 500ml	4 ± 2°C OR HNO <sub>3</sub> to a pH of <2.	N/A	28 days
	TKN	SM 4500Norg-C, EPA 351.1 / 2207	1, plastic 500ml	4 ± 2°C, H <sub>2</sub> SO <sub>4</sub> preserved	N/A	28 days
	COD	SM 5220D, EPA 410.4 / 2208	1, 250mL Plastic	4 ± 2°C, 1:1 H <sub>2</sub> SO <sub>4</sub> to a pH of <2.	N/A	28 days
	Alkalinity	SM 2320B / 2213	1, Plastic 500ml	4 ± 2°C	N/A	14 days
<b>Leachate (Liquid)</b>	VOCs	EPA 8260C / 2108	Two 40-ml VOA vials w/ PTFE-faced silicone septum	1 - 4°C OR 1:1 HCL to a pH of <2.	14 days	14 days
	SVOCs	EPA 8270D / 2111	Two 1-liter amber glass jars	4 ± 2°C	7 days	40 days
	PCBs	EPA 8082A / 2129	Two 1-liter amber glass jars	4 ± 2°C	7 days	40 days
	Metals, including Hg and Cn	EPA 6010C / 2144	Amber 250ml unpreserved	4 ± 2°C	N/A	180 days
		EPA 7470A / 2145	Plastic 500ml	4 ± 2°C OR HNO <sub>3</sub> to a pH of <2.	N/A	28 days
		EPA 9010C, 9012B, 9014(M) / 2210	1, 250mL amber glass jar	4 ± 2°C	14 days	14 days
	Chloride	SM 4500Cl-E, EPA 9251 / 2216	1, Plastic 250ml	4 ± 2°C	N/A	28 days
	BOD	SM 5210B / 2205	1, 1-liter Plastic	4 ± 2°C	N/A	48 hours
	COD	SM 5220D, EPA 410.4 / 2208	1, 250mL Plastic	4 ± 2°C, 1:1 H <sub>2</sub> SO <sub>4</sub> to a pH of <2.	N/A	28 days
	Ammonia	SM4500NH <sub>3</sub> -BH, EPA 350.1 / 2206	1, plastic 500ml	4 ± 2°C, H <sub>2</sub> SO <sub>4</sub> preserved	N/A	28 days
	TKN	SM 4500Norg-C, EPA 351.1 / 2207	1, plastic 500ml	4 ± 2°C, H <sub>2</sub> SO <sub>4</sub> preserved	N/A	28 days
	Phenols, Total	EPA 510AC, EPA 420.1 / 2211	1, 1-liter amber glass jars	4 ± 2°C, H <sub>2</sub> SO <sub>4</sub> preserved, pH<4	N/A	28 days
	TSS	SM 2540D / 2220	1, Plastic 1-Liter	4 ± 2°C	N/A	7 days

**FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE**  
**(Worksheet #20)**

Matrix	Analytical Group	# of Sampling Locations	# of Field Duplicates	# of Matrix Spikes	# of Matrix Spike Duplicates	# of Trip Blanks	Other
<b>Groundwater</b>	Field Parameters <sup>1</sup>	17	1	1	1	1	
	VOCs	17	1	1	1	0	
	Metals	17	1	1	1	0	
	Additional Parameters <sup>2</sup>	17	1	1	1	0	
<b>Leachate</b>	VOCs	2	0	0	0	1	
	SVOCs	2	0	0	0	0	
	PCBs	2	0	0	0	0	
	Metals, including Total and Amenable Cyanide	2	0	0	0	0	
	Additional Parameters <sup>3</sup>	2	0	0	0	0	
<b>Air</b>	Explosive Gas, LEL	30	0	0	0	0	All parameters are monitored along the perimeter of the Ramapo Landfill, approximately every 100-ft, in the drainage swale.
	Hydrogen Sulfide	30	0	0	0	0	
	VOCs	30	0	0	0	0	

Notes:

<sup>1</sup> - Field parameters include Specific Conductivity, Temperature, Static Water Level, pH, Eh, Field Observations, Floaters or Sinkers.

<sup>2</sup> - Groundwater additional parameters include TKN, COD and Alkalinity.

<sup>3</sup> - Leachate additional parameters include Chloride, BOD, COD, TSS, Ammonia, TKN, Phenols, Phosphorous.

**PROJECT SAMPLING SOPS  
(Worksheet #21)**

<b>SOP or Reference #</b>	<b>Title, Revision Date and/or #</b>	<b>Originating Organization</b>	<b>Equipment Type</b>	<b>Modified for Project?</b>	<b>Comments</b>
	Groundwater Sampling SOP	Sterling Environmental Engineering, P.C.	See Worksheets #18 and #22	No	

**FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING AND INSPECTION SUMMARY**  
**(Worksheet #22)**

<b>Field Equipment</b>	<b>Activity</b>	<b>Frequency</b>	<b>Responsible Personnel</b>	<b>Acceptable Criteria</b>	<b>Corrective Action</b>	<b>Operation Reference</b>
<b>556 YSI Water Quality Meter</b>	Calibration of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit accepts system calibration range for each parameter.	Recalibrate meter until appropriate calibration criteria are met.	Operation's Manual
	Maintenance of Unit	As needed basis.	Equipment Technician	Manufacturer deems unit is in working condition after repair.	Rental or purchase of replacement unit.	Equipment Supplier
	Testing of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit is functioning properly with no observed deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual
	Physical Inspection of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit is in good condition with no observed physical deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual
<b>Solinst Water Level Meter</b>	Maintenance of Unit	As needed basis.	Equipment Technician	Manufacturer deems unit is in working condition after repair.	Rental or purchase of replacement unit.	Equipment Supplier
	Testing of Unit	Prior to each sampling location.	Field Team Leader	Unit is functioning properly with no observed deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual
	Physical Inspection of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit is in good condition with no observed physical deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual
<b>EXTech pH100 pH Meter</b>	Calibration of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Within one (1) pH of the calibration solution.	Recalibrate meter until appropriate calibration criteria are met.	Operation's Manual
	Maintenance of Unit	As needed basis.	Equipment Technician	Manufacturer deems unit is in working condition after repair.	Rental or purchase of replacement unit.	Equipment Supplier
	Testing of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit is functioning properly with no observed deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual
	Physical Inspection of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit is in good condition with no observed physical deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual

<b>MiniRae 3000 PID Meter</b>	Calibration of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit accepts system calibration range for each parameter.	Recalibrate meter until appropriate calibration criteria are met.	Operation's Manual
	Maintenance of Unit	As needed basis.	Equipment Technician	Manufacturer deems unit is in working condition after repair.	Rental or purchase of replacement unit.	Equipment Supplier
	Testing of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit is functioning properly with no observed deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual
	Physical Inspection of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit is in good condition with no observed physical deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual
<b>QRAE II Explosive Gas Meter</b>	Calibration of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit accepts system calibration range for each parameter.	Recalibrate meter until appropriate calibration criteria are met.	Operation's Manual
	Maintenance of Unit	As needed basis.	Equipment Technician	Manufacturer deems unit is in working condition after repair.	Rental or purchase of replacement unit.	Equipment Supplier
	Testing of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit is functioning properly with no observed deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual
	Physical Inspection of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit is in good condition with no observed physical deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual
<b>LaMotte 2020e Turbidity Meter</b>	Calibration of Unit	Before each individual turbidity reading.	Field Team Leader	Unit accepts the "zero" calibration criteria.	Recalibrate meter until appropriate calibration criteria are met.	Operation's Manual
	Maintenance of Unit	As needed basis.	Equipment Technician	Manufacturer deems unit is in working condition after repair.	Rental or purchase of replacement unit.	Equipment Supplier
	Testing of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit is functioning properly with no observed deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual
	Physical Inspection of Unit	Before and after activities each day, per sampling event.	Field Team Leader	Unit is in good condition with no observed physical deficiencies.	Unit must be sent to manufacturer for maintenance.	Operation's Manual

**ANALYTICAL SOPS  
 (Worksheet #23)**

<b>Title, Date, Reference #</b>	<b>Definitive or Screening Data</b>	<b>Matrix/Analytical Group</b>	<b>SOP Option or Equipment Type</b>	<b>Modified for Project? Y/N</b>
*See Worksheet #19				

**ANALYTICAL INSTRUMENT CALIBRATION  
 (Worksheet #24)**

<b>Instrument</b>	<b>Calibration Procedure</b>	<b>Frequency of Calibration</b>	<b>Acceptance Criteria</b>	<b>Corrective Action</b>	<b>Person Responsible</b>	<b>SOP Reference</b>

**ANALYTICAL INSTRUMENT MAINTENANCE, TESTING AND INSPECTION**  
**(Worksheet #25)**

The following information regarding equipment will be maintained for a project:

1. Equipment calibration and operating procedures will include provisions for documentation of frequency, conditions, standards and records reflecting the calibration procedures, methods of usage and repair history of the monitoring unit. Calibration of field equipment will be performed daily at the sampling site so background contamination can be taken into consideration and the instrument calibrated accordingly.
2. Critical spare parts, necessary tools and manuals will be available to facilitate equipment maintenance and repair.

**SAMPLE HANDLING, CUSTODY AND DISPOSAL**  
**(Worksheet #26 &27)**

Activity	Organization and title or position of person responsible for the activity	SOP Reference
Sample Labeling	STERLING	Groundwater Sampling
Chain-of-custody form completion	STERLING	Groundwater Sampling
Packaging	STERLING	Groundwater Sampling
Shipping Coordination	STERLING/Laboratory	Groundwater Sampling
Sample Receipt, Inspection and Log-In	Laboratory	Laboratory SOP
Sample Custody & Storage	Laboratory	Laboratory SOP
Sample Disposal	Laboratory	Laboratory SOP

All analytical samples will be placed in the appropriate sample containers as specified in the NYSDEC ASP. The holding time criteria identified for the individual methods of the ASP will be followed, as specified in Table 1.

Prior to shipment to the laboratory, the sample containers will be checked for proper identification and compared to the field logbook for accuracy. The samples will then be wrapped with a cushioning material. Sample containers will be placed in a cooler with ice immediately after sample collection and maintained at 4 degrees Celsius (4°C) throughout the duration of the sampling event and subsequent shipment to and storage at the analytical laboratory until analysis.

Chain of Custody Forms will be placed in a sealed plastic bag and taped to the underside of the cooler lid. The cooler will be sealed with packaging tape and custody seals will be placed in such a manner that any opening of the cooler prior to arrival at the laboratory can be detected.

All samples will be shipped to ensure laboratory receipt within 48 hours of sample collection in accordance with NYSDEC requirements. The laboratory will be notified prior to the shipment of the samples.

The Chain of Custody form is initiated at the laboratory with bottle preparation and is shipped with the bottles. The Chain of Custody remains with the sample(s) at all times and lists the name of the person assuming responsibility for the samples. This person is tasked with ensuring secure and appropriate handling of the bottles and samples. When the form is complete, it should indicate that there were no lapses in sample accountability.

A sample is considered to be in an individual's custody if any of the following conditions are met:

- It is in the individual's physical possession,

- It is in the individual's view after being in his or her physical possession,
- It is secured by the individual so that no one can tamper with it, or
- The individual puts it in a designated and identified secure area.

Chain of Custody Forms are provided by the laboratory contracted to perform the analytical services. At a minimum, the following information shall be provided on these forms:

- Project name and address
- Project number
- Sample identification number
- Date
- Time
- Sample location
- Sample type
- Analysis requested
- Number of containers and volume taken
- Remarks
- Type of waste
- Sampler(s) name(s) and signature(s)
- Spaces for relinquished by/received by signature and date/time.

The Chain of Custody Form is filled out and signed by the person performing the sampling. The original of the form travels with the sample and is signed and dated each time the sample is relinquished to another party, until it reaches the laboratory or analysis is complete. The field sampler keeps one copy and a copy is retained for the project file.

## **ANALYTICAL QUALITY CONTROL AND CORRECTIVE ACTION (Worksheet #28)**

### **Duplicates and Matrix Spikes**

Duplicate and matrix/matrix-spike duplicates are required at a frequency of one (1) per twenty (20) samples. The selected location for collecting these sample types may be randomly chosen.

Matrix spike samples are quality control procedures, consistent with NYSDEC ASP specifications, used by the laboratory as part of its internal Quality Assurance/Quality Control program. The matrix and matrix spike duplicates are aliquots of a designated sample (water or soil) which are spiked with known quantities of specified compounds. They are used to evaluate the matrix effect of the sample upon the analytical methodology as well as to determine the precision of the applicable analytical method.

### **Trip Blanks**

The laboratory supplies trip blank samples with sample containers when VOCs are analyzed. The purpose of trip blanks is to detect additional sources of VOCs that might potentially influence contaminant values reported in actual samples both quantitatively and qualitatively. The following are potential sources of contamination:

- Laboratory reagent water
- Sample containers
- Cross contamination in shipment
- Contact with analytical instrumentation during preparation of the sample containers and analysis of the samples at the laboratory
- Laboratory reagents used in analytical procedures

A trip blank consists of a set of 40 ml sample vials filled at the laboratory with laboratory demonstrated analyte free water. Trip blanks should be handled, transported and analyzed in the same manner as the samples acquired that day, except the trip blank samples are not opened in the field. Trip blanks must accompany samples at a rate of one (1) set per shipment. The temperature of the trip blanks must be maintained at 4 degrees Celsius (4°C) while onsite and during shipment. Trip blanks must be returned to the laboratory with the same set of bottles they accompanied in the field.

**PROJECT DOCUMENTS AND RECORDS TABLE**  
**(Worksheet #29)**

<b>Sample Collection Documents and Records</b>	<b>Analysis Documents and Records</b>	<b>Data Assessment Documents and Records</b>	<b>Other</b>
Field Log Books	COCs	Data Review Reports	
COCs	Tabulated data summary forms	DUSR	
Field Change Request Forms	Electronic Data Deliverables		
Sampling Instrument Calibration Records			
DFRs			

Proper management and documentation of field work is essential to ensure that all necessary work is conducted in accordance with the Site Management Plan (SMP) and Quality Assurance Project Plan (QAPP) in an efficient and qualified manner.

Field log books must be bound and should have consecutively numbered, water resistant pages. All pertinent information regarding the site and sampling procedures must be documented. Notations should be made in log book fashion, noting the time and date of all entries. Information recorded in this notebook should include, but not be limited to, the following:

- Project name and address
- Name, address and telephone number of field contact
- Site address
- Purpose of sampling
- Location of sampling point
- Number(s) and volume(s) of sample(s) taken
- Description of sampling point and sampling methodology
- Date and time of collection, arrival and departure
- Sample distribution and method of storage and transportation
- References, such as sketches of the sampling site or photographs of sample collection.
- Field observations, including results of field analyses (e.g., pH, temperature, specific

conductance), water levels, drilling logs, and organic vapor and air quality measurements.

- Signature of personnel responsible for completing log entries.

**ANALYTICAL SERVICES**  
**(Worksheet #30)**

<b>Matrix</b>	<b>Laboratory</b>	<b>Address, Contact Person</b>
Groundwater	Alpha Analytical, Westborough, MA	Mr. Patrick Filey 8 Walkup Drive Westborough, MA 01581
Leachate	RCSD No. 1 (Advanced Analytical Technologies, Inc.)	Mr. George Stancu 37 Ramland Road Orangeburg, NY 10962

### **ASSESSMENTS AND CORRECTIVE ACTION** **(Worksheets #31, 32, & 33)**

Internal and external assessments and oversight activities are continuously performed for the project to ensure that usable data are generated. Formal assessments are not considered necessary; however, management review of field sampling procedures, laboratory procedures and results, and reporting procedures will be performed on a regular basis. If necessary, appropriate corrective actions will be taken and reported. The annual Periodic Review Report (PRR) will contain a description of QA assessments and corrective actions taken, if any. This will include:

- A summary of project QA/QC programs and training conducted;
- Conformance of project activities to QAPP requirements and procedures;
- Status of project and schedule delays;
- Deviations from the approved QAPP and amendments to the QAPP;
- Results of data review activities;
- Required corrective actions and effectiveness of corrective action implementation;
- Data usability assessments; and
- Limitations on the use of measurement data generated.

### **DATA REVIEW** **(Worksheets #34, 35 & 36)**

**Data Verification** – Data verification is a check that all specified activities involved in collecting and analyzing samples have been completed and documented. Reports subject to verification include:

- Approved QAPP;
- Field and Laboratory SOPs;
- Field logbooks;
- Equipment calibration records;
- Chain-of-Custody Forms; and
- Analytical data package.

Field Logbooks, equipment calibration records, and COC forms will be reviewed internally and verified against the approved QAPP and SOPs. All analytical data packages will be verified by the laboratory for completeness.

**Data Validation** – Data validation is the evaluation of conformance to stated requirements.

Category B deliverables will be required for the Remedial Process Closure when groundwater monitoring can be terminated for the Landfill. At that time, a DUSR will be generated by an independent third party Data Validator.

**Data Usability Assessment** – A data usability assessment considers whether data meet project quality objectives. This is the final step of data review. The assessment will ensure that all necessary information was provided, including validation results. If there are deviations from stated procedures, the assessment will determine the impact on the data usability.

**CONSIDERATIONS FOR USABILITY ASSESSMENT  
(Worksheet #37)**

<b>Item</b>	<b>Assessment Activity</b>
<b>Data Deliverables and QAPP</b>	Ensure that all necessary information was provided, including but not limited to validation results.
<b>Deviations</b>	Determine the impact of deviations on the usability of data.
<b>Sampling Locations, Deviation</b>	Determine if alterations to sample locations continue to satisfy the project objectives.
<b>Chain-of-Custody, Deviation</b>	Establish that any problems with documentation or custody procedures do not prevent the data from being used for the intended purpose.
<b>Holding Times, Deviation</b>	Determine the acceptability of data where holding times were exceeded.
<b>Damaged Samples, Deviation</b>	Determine whether the data from damaged samples are usable. If the data cannot be used, determine whether resampling is necessary.
<b>PT Sample Results, Deviation</b>	Determine the implications of any unacceptable analytes (as identified by the PT sample results) on the usability of the analytical results. Describe any limitations on the data.
<b>SOPs and Methods, Deviation</b>	Evaluate the impact of deviations from SOPs and specified methods on data quality.

## TABLES

**TABLE 1**  
**TOWN OF RAMAPO LANDFILL**  
**ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY**  
**FOR GROUNDWATER SAMPLES**

Groundwater Wells (1)		Method	Preservative	Sample Volume (ml)	Container Type	Minimum Reporting Limit (ug/L) (3)	Sample Holding Time
# of Samples	Parameter						
18	Specific Conductance	120.1	---	---	---	---	---
18	Temperature	170.1	---	---	---	---	---
27 (2)	Static Water Level	---	---	---	---	---	---
18	Floaters or Sinkers	---	---	---	---	---	---
18	pH	150.1	---	---	---	---	---
18	Eh	D1498	---	---	---	---	---
18	Field Observations	---	---	---	---	---	---
18	TKN	351.3	Sulfuric acid	250	Plastic	---	28 days
18	COD	410.1	Sulfuric acid	250	Plastic	---	28 days
18	Alkalinity	310.1	---	120	Plastic	---	14 days
18	1,1-Dichloroethane	601	HCL	3 x 40	Clear glass	5	14 days
18	Vinyl Chloride	601	HCL	3 x 40	Clear glass	2	14 days
18	Benzene	602	HCL	3 x 40	Clear glass	1	14 days
18	Chlorobenzene	602	HCL	3 x 40	Clear glass	5	14 days
18	Aluminum	200.7 or 200.8	Nitric acid	250	Plastic	50 to 200 (5)	None (Unfiltered)
18	Antimony	200.7 or 200.8	Nitric acid	250	Plastic	3	None (Unfiltered)
18	Arsenic	200.7 or 200.8	Nitric acid	250	Plastic	10	None (Unfiltered)
18	Barium	200.7 or 200.8	Nitric acid	250	Plastic	1,000	None (Unfiltered)
18	Beryllium	200.7 or 200.8	Nitric acid	250	Plastic	3	None (Unfiltered)
18	Cadmium	200.7 or 200.8	Nitric acid	250	Plastic	5	None (Unfiltered)
18	Calcium	200.7 or 200.8	Nitric acid	250	Plastic	---	None (Unfiltered)
18	Chromium (Total)	200.7 or 200.8	Nitric acid	250	Plastic	50	None (Unfiltered)
18	Chromium (Hexavalent)	200.7 or 200.8	---	250	Plastic	50	None (Unfiltered)
18	Cobalt	200.7 or 200.8	Nitric acid	250	Plastic	---	None (Unfiltered)
18	Copper	200.7 or 200.8	Nitric acid	250	Plastic	200	None (Unfiltered)
18	Iron	200.7 or 200.8	Nitric acid	250	Plastic	300 (5)	None (Unfiltered)
18	Lead	200.7 or 200.8	Nitric acid	250	Plastic	15 (6)	None (Unfiltered)
18	Manganese	200.7 or 200.8	Nitric acid	250	Plastic	35,000	None (Unfiltered)
18	Magnesium	200.7 or 200.8	Nitric acid	250	Plastic	50 (5)	None (Unfiltered)
18	Mercury	245.1 or 7472	Nitric acid	250	Plastic	0.7	None (Unfiltered)
18	Nickel	200.7 or 200.8	Nitric acid	250	Plastic	100	None (Unfiltered)
18	Potassium	200.7 or 200.8	Nitric acid	250	Plastic	---	None (Unfiltered)
18	Selenium	200.7 or 200.8	Nitric acid	250	Plastic	10	None (Unfiltered)
18	Silver	200.7 or 200.8	Nitric acid	250	Plastic	50	None (Unfiltered)
18	Sodium	200.7 or 200.8	Nitric acid	250	Plastic	20,000	None (Unfiltered)
18	Thallium	200.7 or 200.8	Nitric acid	250	Plastic	0.5	None (Unfiltered)
18	Vanadium	200.7 or 200.8	Nitric acid	250	Plastic	---	None (Unfiltered)
18	Zinc	200.7 or 200.8	Nitric acid	250	Plastic	2,000	None (Unfiltered)
18	Cyanide (Total)	200.7 or 200.8	NaOH	250	Plastic	200	None (Unfiltered)
18	Cyanide (Amenable)	200.7 or 200.8	NaOH	250	Plastic	---	None (Unfiltered)

--- Not Applicable

(1) Monitoring wells 1-OS/I, 2-OS, 3-OS/I, 4-OS, 5-OS, 7-OS, 8-OS, 8-I, 8-R, 9-OS, 9-I, 9-R, 10-OS, 10-I, 10-R, private water supply wells PW-1 and PW-2, and municipal water supply wells SVWC-93, SVWC-95 and SVWC-96 are sampled for the annual event.

(2) Includes depth to water measurements for monitoring wells 1-R, 2-R, 3-R, 4-R, 5-R, 6-I, 6-R, 7-I and 7-R.

(3) The required minimum reporting laboratory limit represents the lowest applicable groundwater standard from NYSDEC TOGS 1.1.1 Sanitary Code Subpart 5-1 or USEPA MCLs.

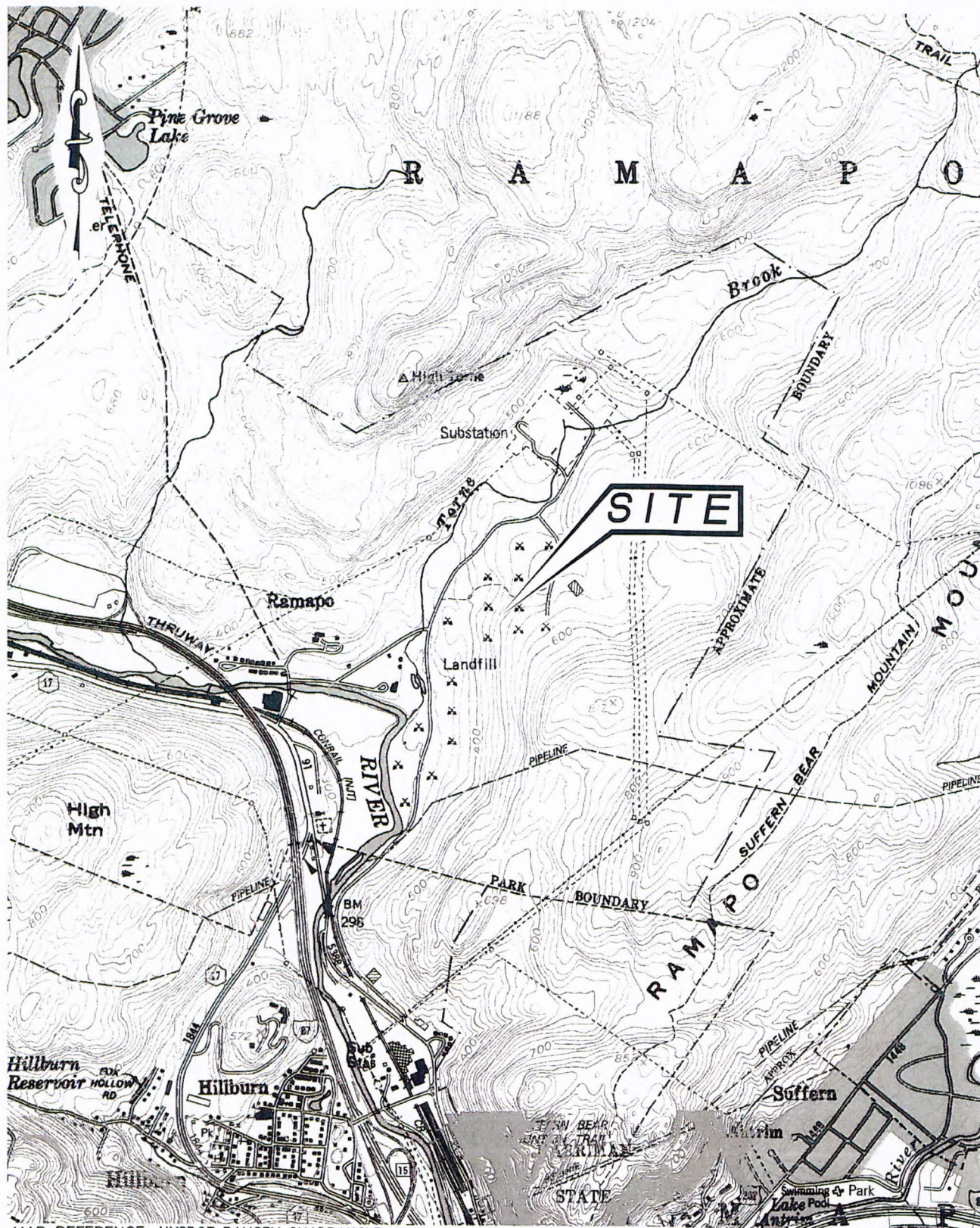
(4) One duplicate and one matrix spike/matrix spike duplicate is collected per sample event, at a randomly selected sample location.

(5) USEPA National Secondary Drinking Water Standard.

(6) USEPA Treatment Technique Action Level.

HCL = Hydrochloric Acid

## FIGURES



MAP REFERENCE: NYSDOT RAMSEY QUADRANGLE, 1990, SLOATSBURG QUADRANGLE, 1990

# STERLING

Sterling Environmental Engineering, P.C.

24 Wade Road • Latham, New York 12110

SITE LOCATION  
TOWN OF RAMAPO  
LANDFILL

TOWN OF RAMAPO

ROCKLAND CO., N.Y.

PROJ. No.: 20010 | DATE: 6-14-11 | SCALE: 1" = 2000' | DWG. NO. 20010001 | FIGURE 1

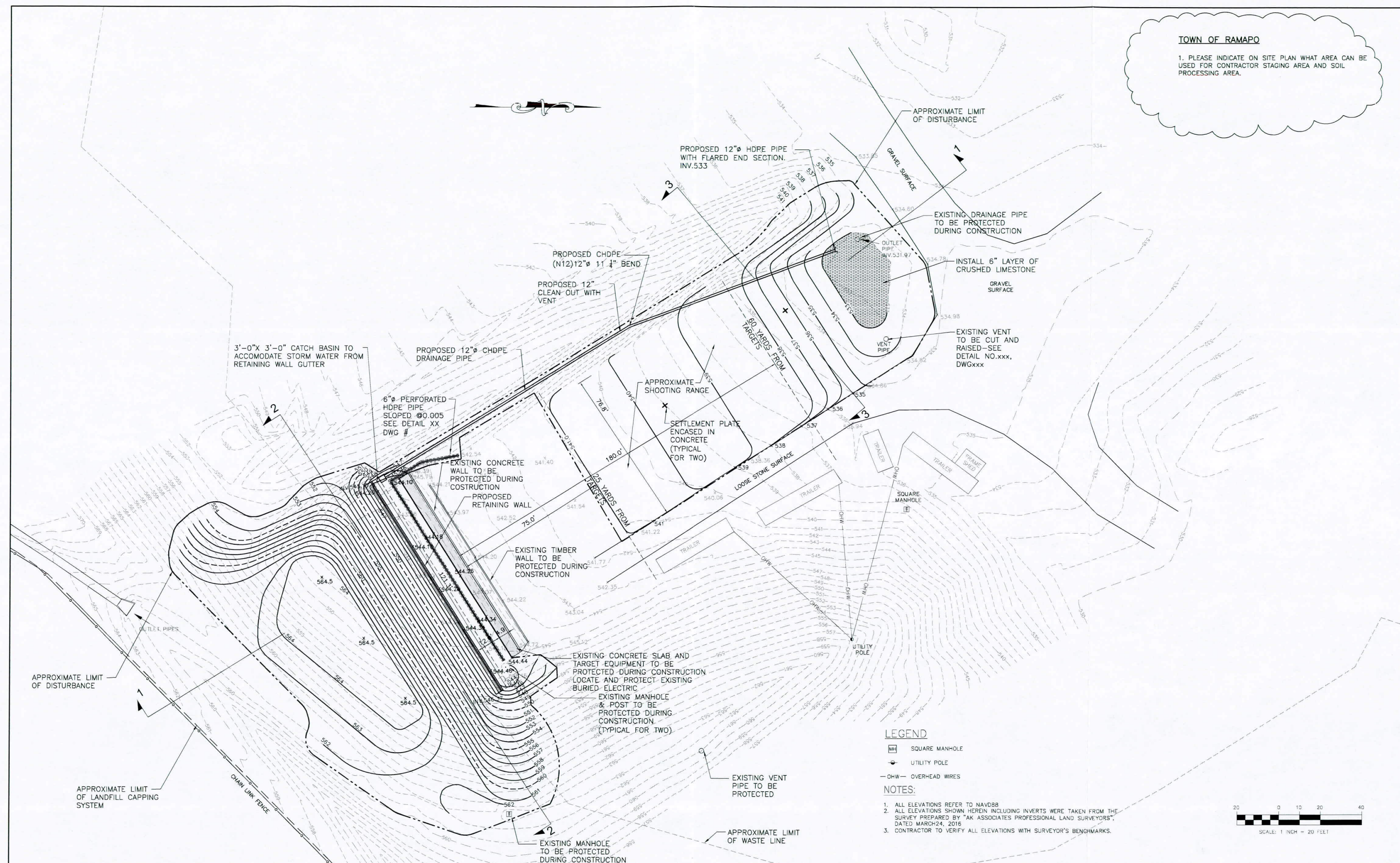


**APPENDIX M**

**TOWN OF RAMAPO POLICE DEPARTMENT SHOOTING RANGE  
DETAILS (AUGUST 2016)**

# TOWN OF RAMAPO

1. PLEASE INDICATE ON SITE PLAN WHAT AREA CAN BE USED FOR CONTRACTOR STAGING AREA AND SOIL PROCESSING AREA.



DRAFT

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW

PROJECT ENGINEER:	DESIGNED BY:
ER	ER
DRAWN BY:	CHECKED BY:
DS	WDM



D&B ENGINEERS AND ARCHITECTS, P.C.

TOWN OF RAMAPO  
POLICE DEPARTMENT

ROCKLAND COUNTY

NEW YORK

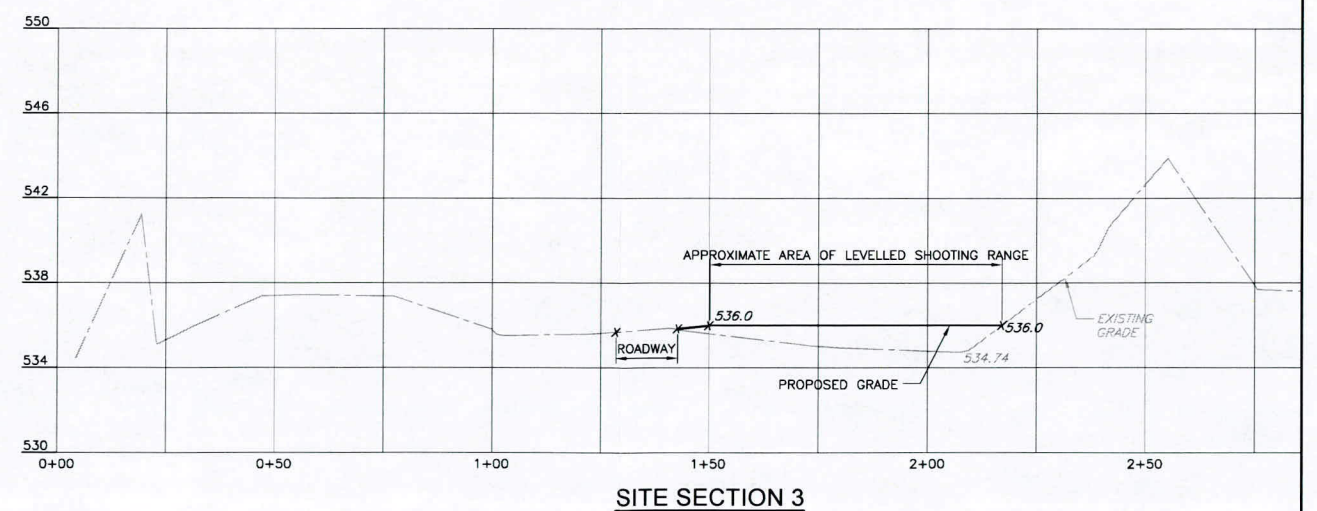
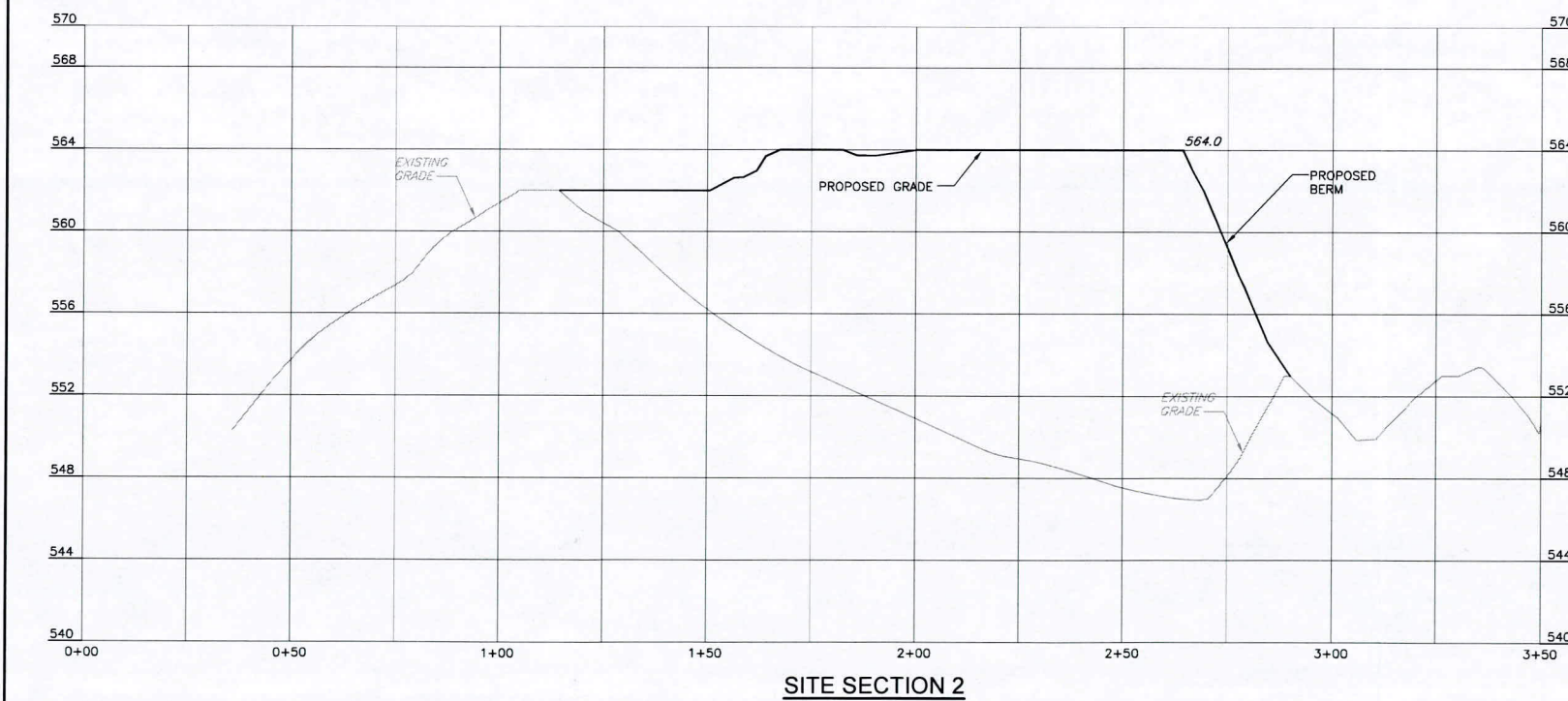
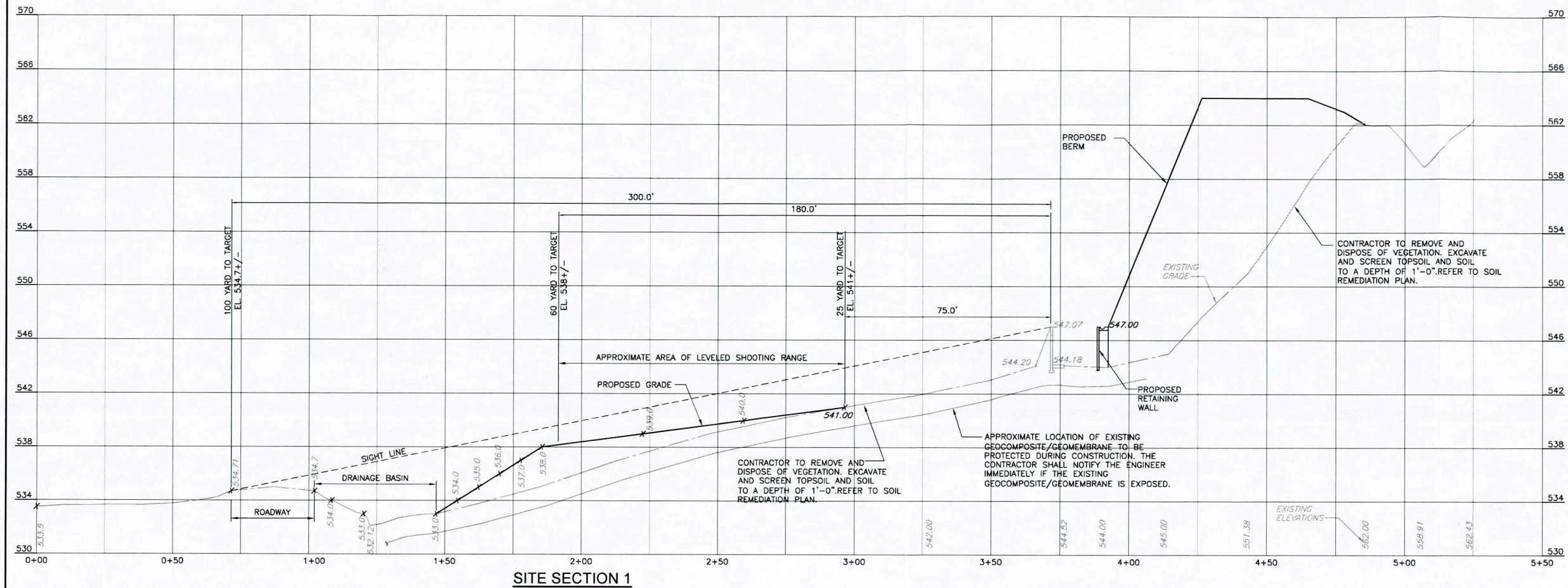
FIRING RANGE IMPROVEMENTS

SITE PLAN - PROPOSED

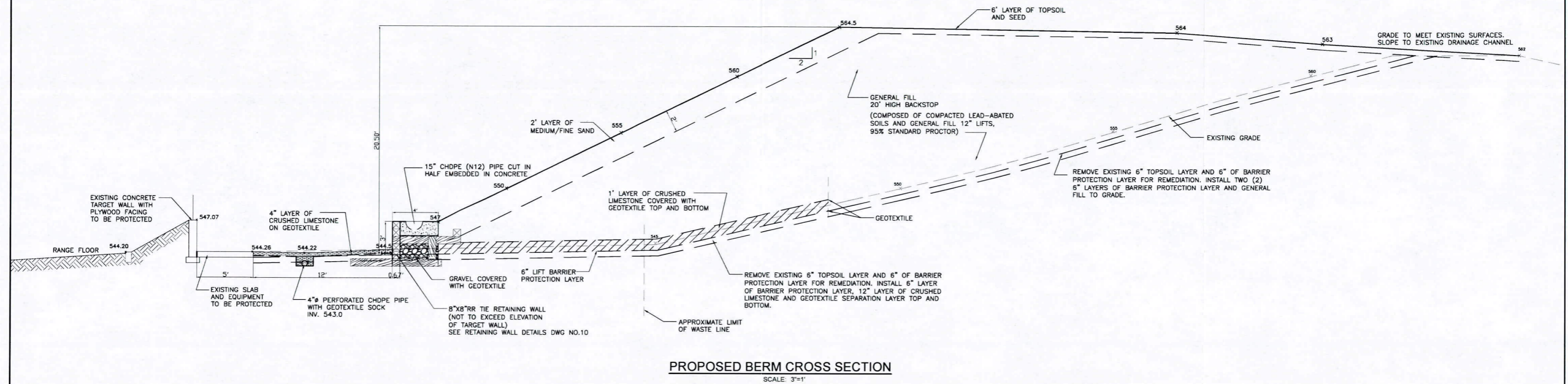
PROJECT NO.	3781
DATE:	AUGUST 2016
SCALE:	1" = 20'

DRAWING NO.

3



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NO.	DATE	REVISION	INT.

DRAFT

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PROJECT ENGINEER:	DRAWN BY:
ER	DS
DESIGNED BY:	CHECKED BY:
ER	WDM



TOWN OF RAMAPO POLICE DEPARTMENT	NEW YORK
ROCKLAND COUNTY	
FIRING RANGE IMPROVEMENTS	

PROPOSED BERM CROSS SECTION

PROJECT NO. 3781
DATE: AUGUST 2016
SCALE: 3"=1'

5



**APPENDIX N**

**AS-BUILTS FOR YARD WASTE COMPOSTING FACILITY AT CLOSED  
RAMAPO LANDFILL (OCTOBER 2007)**



# ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY

## YARD WASTE COMPOSTING FACILITY AT CLOSED RAMAPO LANDFILL

### RAMAPO, NEW YORK

GENERAL CONSTRUCTION - CONTRACT NO. 2007-102

**MARCH 2007**

#### AUTHORITY MEMBERS

Christopher P. St. Lawrence, Chairperson

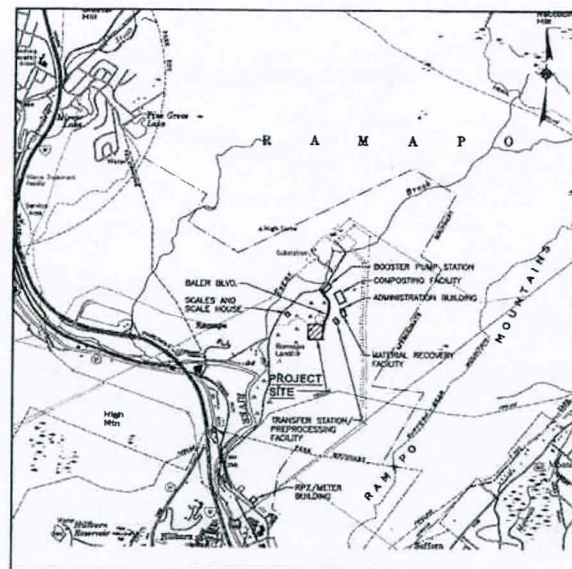
Howard Phillips, Vice Chairperson  
Patrick Moroney, Second Vice Chairperson  
Phil Soskin, Treasurer  
Ilan Schoenberger, Deputy Treasurer  
Sean Mathews, Secretary

Connie L. Coker  
Harriet D. Cornell  
Edward Devine  
Theodore R. Dusanenko  
Michael T. Grant

Alex Gromack  
Douglas Jobson, Jr.  
Thom Kleiner  
Phillip A. Marino  
Francis J. Wassmer, Jr.

Andrew T. Lehman  
Executive Director

MISSION STATEMENT: WE SHALL SERVE THE PEOPLE OF ROCKLAND COUNTY WELL BY PROVIDING  
NEEDED SOLID WASTE MANAGEMENT SERVICES IN ORDER TO PROTECT AND ENHANCE OUR  
ENVIRONMENT IN A HIGH QUALITY, ETHICAL, COURTEOUS, TIMELY AND COST EFFECTIVE MANNER.



VICINITY MAP

#### DRAWING NO.

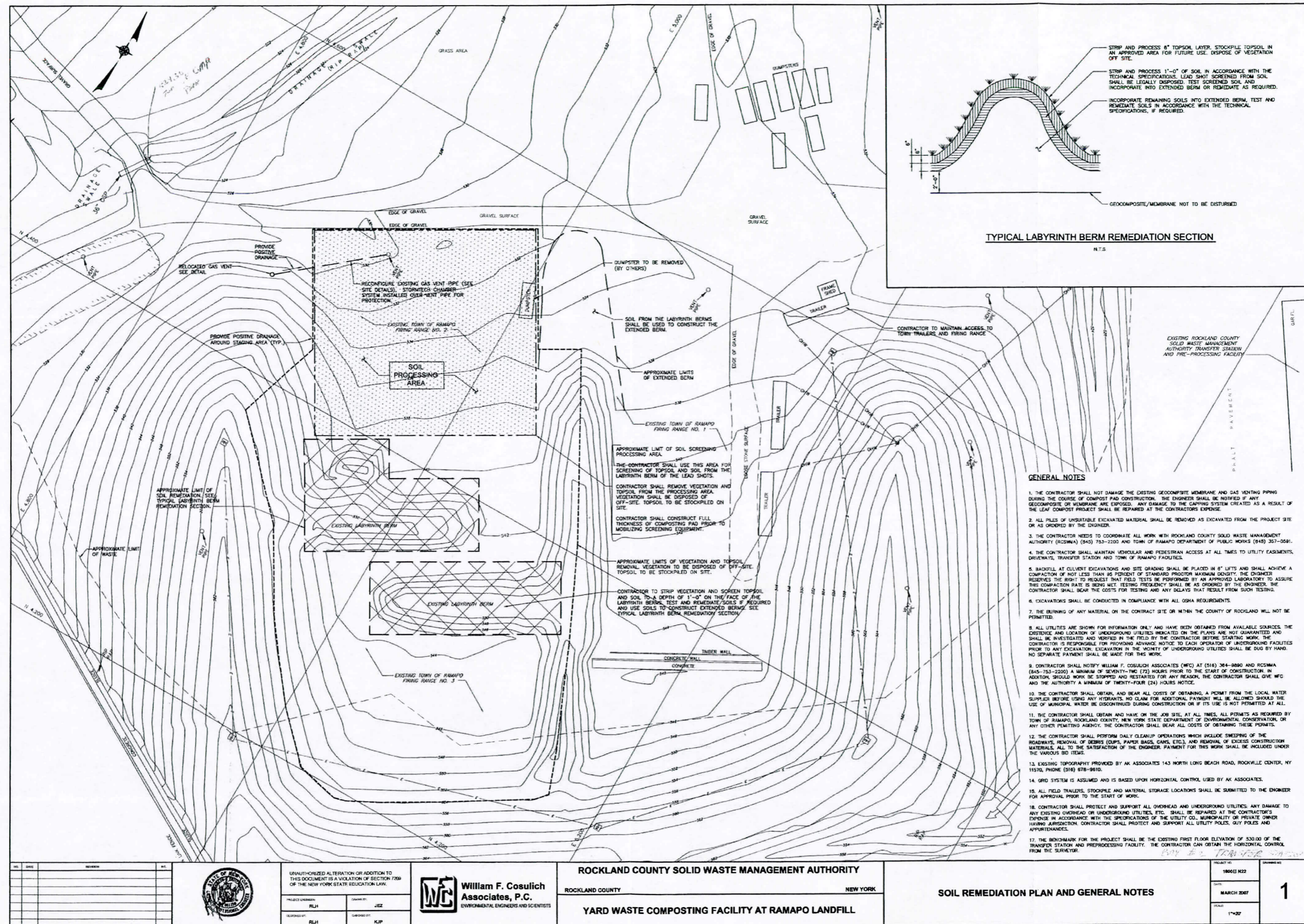
#### LIST OF DRAWINGS

-	COVER SHEET
1	SOIL REMEDIATION PLAN AND GENERAL NOTES
2	SITE PLAN
3	ROAD PROFILE
4	SITE SECTIONS
5	DRAINAGE PROFILES AND WATER QUALITY VEGETATED SWALE PLAN
6	SOIL EROSION AND SEDIMENT CONTROL PLAN
7	SOIL EROSION AND SEDIMENT CONTROL DETAILS
8	SITE DETAILS



William F. Cosulich  
Associates, P.C.  
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

As-Built's  
October 2007  
HCCI



GENERAL NOTES

1. THE CONTRACTOR SHALL NOT DAMAGE THE EXISTING GEOCOMPOSITE MEMBRANE AND GAS VENTING PIPING DURING THE COURSE OF COMPOST PAD CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IF ANY GEOCOMPOSITE OR MEMBRANE ARE EXPOSED. ANY DAMAGE TO THE CAPPING SYSTEM CREATED AS A RESULT OF THE LEAF COMPOST PROJECT SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
2. ALL PILES OF UNSUITABLE EXCAVATED MATERIAL SHALL BE REMOVED AS EXCAVATED FROM THE PROJECT SITE OR AS ORDERED BY THE ENGINEER.
3. THE CONTRACTOR NEEDS TO COORDINATE ALL WORK WITH ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY (RCSWMA) (845) 753-2200 AND TOWN OF RAMAPO DEPARTMENT OF PUBLIC WORKS (848) 357-0581.
4. THE CONTRACTOR SHALL MAINTAIN VEHICULAR AND PEDESTRIAN ACCESS AT ALL TIMES TO UTILITY EASMENTS, DRIVEWAYS, TRANSFER STATION AND TOWN OF RAMAPO FACILITIES.
5. BACKFILL AT CULVERT EXCAVATIONS AND SITE GRADING SHALL BE PLACED IN 6" LIFTS AND SHALL ACHIEVE A COMPACTION OF NOT LESS THAN 95 PERCENT OF STANDARD PROCTOR MAXIMUM DENSITY. THE ENGINEER RESERVES THE RIGHT TO REQUEST THAT FIELD TESTS BE PERFORMED BY AN APPROVED LABORATORY TO ASSURE THIS COMPACTION RATE IS BEING MET. TESTING FREQUENCY SHALL BE AS ORDERED BY THE ENGINEER. THE CONTRACTOR SHALL BEAR THE COSTS FOR TESTING AND ANY DELAYS THAT RESULT FROM SUCH TESTING.
6. EXCAVATIONS SHALL BE CONDUCTED IN COMPLIANCE WITH ALL OSHA REQUIREMENTS.
7. THE BURNING OF ANY MATERIAL ON THE CONTRACT SITE OR WITHIN THE COUNTY OF ROCKLAND WILL NOT BE PERMITTED.
8. ALL UTILITIES ARE SHOWN FOR INFORMATION ONLY AND HAVE BEEN OBTAINED FROM AVAILABLE SOURCES. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES INDICATED ON THE PLANS ARE NOT GUARANTEED AND SHALL BE INVESTIGATED AND VERIFIED IN THE FIELD BY THE CONTRACTOR BEFORE STARTING WORK. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ADVANCE NOTICE TO EACH OPERATOR OF UNDERGROUND FACILITIES PRIOR TO ANY EXCAVATION. EXCAVATION IN THE VICINITY OF UNDERGROUND UTILITIES SHALL BE DUG BY HAND. NO SEPARATE PAYMENT SHALL BE MADE FOR THIS WORK.
9. CONTRACTOR SHALL NOTIFY WILLIAM F. COSULICH ASSOCIATES (WFC) AT (516) 364-9880 AND RCSWMA (845-753-2200) A MINIMUM OF SEVENTY-TWO (72) HOURS PRIOR TO THE START OF CONSTRUCTION. IN ADDITION, SHOULD WORK BE STOPPED AND RESTARTED FOR ANY REASON, THE CONTRACTOR SHALL GIVE WFC AND THE AUTHORITY A MINIMUM OF TWENTY-FOUR (24) HOURS NOTICE.
10. THE CONTRACTOR SHALL OBTAIN AND BEAR ALL COSTS OF OBTAINING A PERMIT FROM THE LOCAL WATER SUPPLIER BEFORE USING ANY HYDRANTS. NO CLAIM FOR ADDITIONAL PAYMENT WILL BE ALLOWED SHOULD THE USE OF MUNICIPAL WATER BE DISCONTINUED DURING CONSTRUCTION OR IF ITS USE IS NOT PERMITTED AT ALL.
11. THE CONTRACTOR SHALL OBTAIN AND HAVE ON THE JOB SITE, AT ALL TIMES, ALL PERMITS AS REQUIRED BY TOWN OF RAMAPO, ROCKLAND COUNTY, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION OR ANY OTHER PERMITTING AGENCY. THE CONTRACTOR SHALL BEAR ALL COSTS OF OBTAINING THESE PERMITS.
12. THE CONTRACTOR SHALL PERFORM DAILY CLEANUP OPERATIONS WHICH INCLUDE SWEEPING OF THE ROADWAYS, REMOVAL OF DEBRIS (CUPS, PAPER BAGS, CANS, ETC.), AND REMOVAL OF EXCESS CONSTRUCTION MATERIALS. ALL TO THE SATISFACTION OF THE ENGINEER. PAYMENT FOR THIS WORK SHALL BE INCLUDED UNDER THE VARIOUS BID ITEMS.
13. EXISTING TOPOGRAPHY PROVIDED BY AK ASSOCIATES 143 NORTH LONG BEACH ROAD, ROCKVILLE CENTER, NY 11570, PHONE (516) 678-9810.
14. GRID SYSTEM IS ASSUMED AND IS BASED UPON HORIZONTAL CONTROL USED BY AK ASSOCIATES.
15. ALL FIELD TRAILERS, STOCKPILE AND MATERIAL STORAGE LOCATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO THE START OF WORK.
16. CONTRACTOR SHALL PROTECT AND SUPPORT ALL OVERHEAD AND UNDERGROUND UTILITIES. ANY DAMAGE TO ANY EXISTING OVERHEAD OR UNDERGROUND UTILITIES, ETC., SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE IN ACCORDANCE WITH THE SPECIFICATIONS OF THE UTILITY CO., MUNICIPALITY OR PRIVATE OWNER HAVING JURISDICTION. CONTRACTOR SHALL PROTECT AND SUPPORT ALL UTILITY POLES, GUY POLES AND APPURTENANCES.
17. THE BENCHMARK FOR THE PROJECT SHALL BE THE EXISTING FIRST FLOOR ELEVATION OF 530.00 OF THE TRANSFER STATION AND PREPROCESSING FACILITY. THE CONTRACTOR OBTAIN THE HORIZONTAL CONTROL FROM THE SURVEYOR.

NO.	DATE	REVISION



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PROJECT ENGINEER		CHECKED BY	
RLH		JEZ	
DESIGNED BY		CHECKED BY	
RLH		KJP	



William F. Cosulich  
Associates, P.C.  
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY

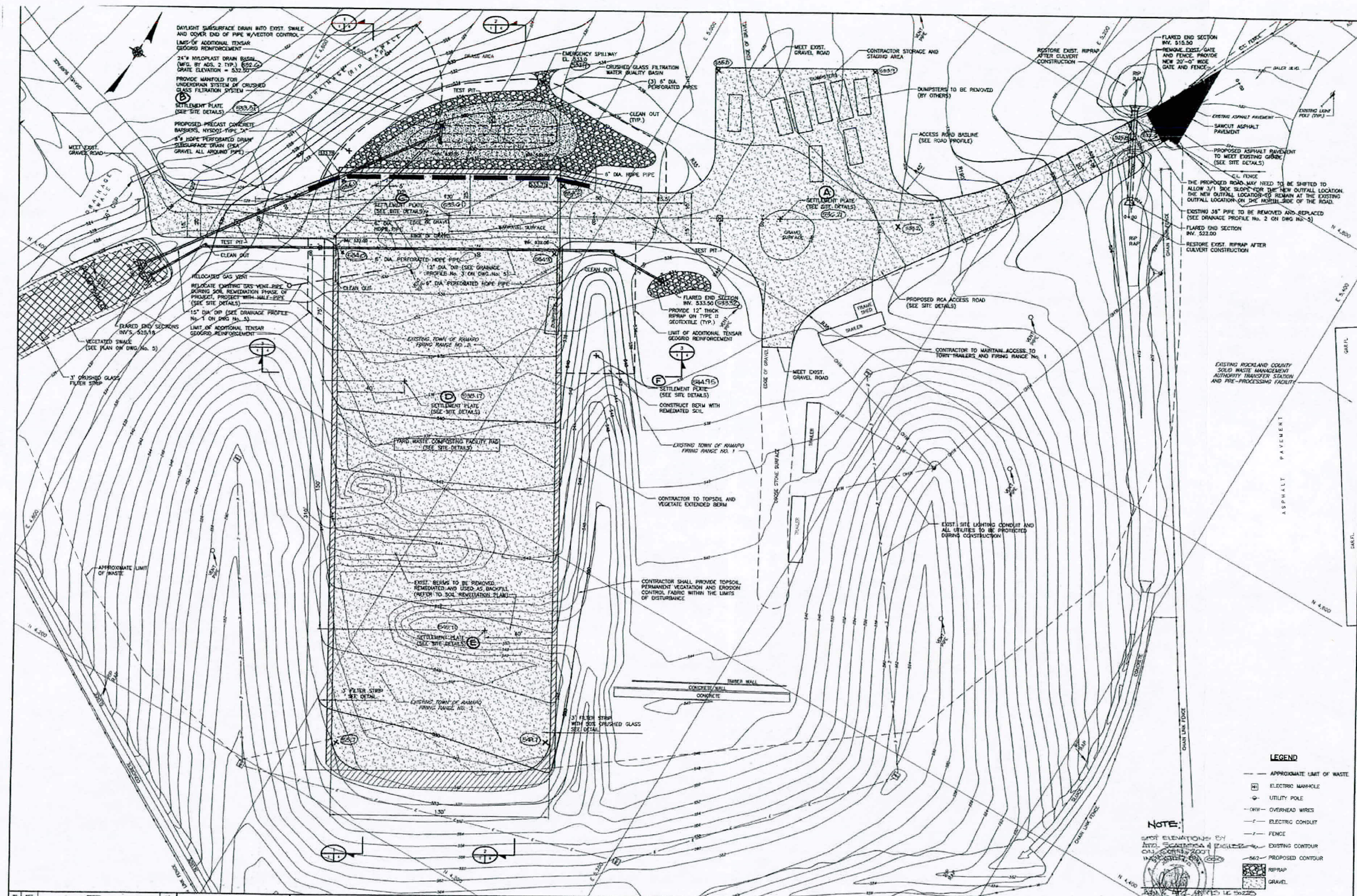
ROCKLAND COUNTY

NEW YORK

YARD WASTE COMPOSTING FACILITY AT RAMAPO LANDFILL

SOIL REMEDIATION PLAN AND GENERAL NOTES

PROJECT NO.	180011 N22	DATE	MARCH 2007
SCALE	1"=20'	SHEET NO.	1



NO.	DATE	REVISION
1	3/27/07	ISSUED FOR PERMIT
2	3/27/07	ISSUED FOR PERMIT
3	3/27/07	ISSUED FOR PERMIT
4	3/27/07	ISSUED FOR PERMIT
5	3/27/07	ISSUED FOR PERMIT
6	3/27/07	ISSUED FOR PERMIT
7	3/27/07	ISSUED FOR PERMIT
8	3/27/07	ISSUED FOR PERMIT
9	3/27/07	ISSUED FOR PERMIT
10	3/27/07	ISSUED FOR PERMIT



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PROJECT ENGINEER: RLH  
 CHECKED BY: JEZ  
 DATE: 3/27/07

**William F. Cosulich Associates, P.C.**  
 ENVIRONMENTAL ENGINEERS AND SCIENTISTS

**ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY**  
 ROCKLAND COUNTY  
 NEW YORK

**YARD WASTE COMPOSTING FACILITY AT RAMAPO LANDFILL**

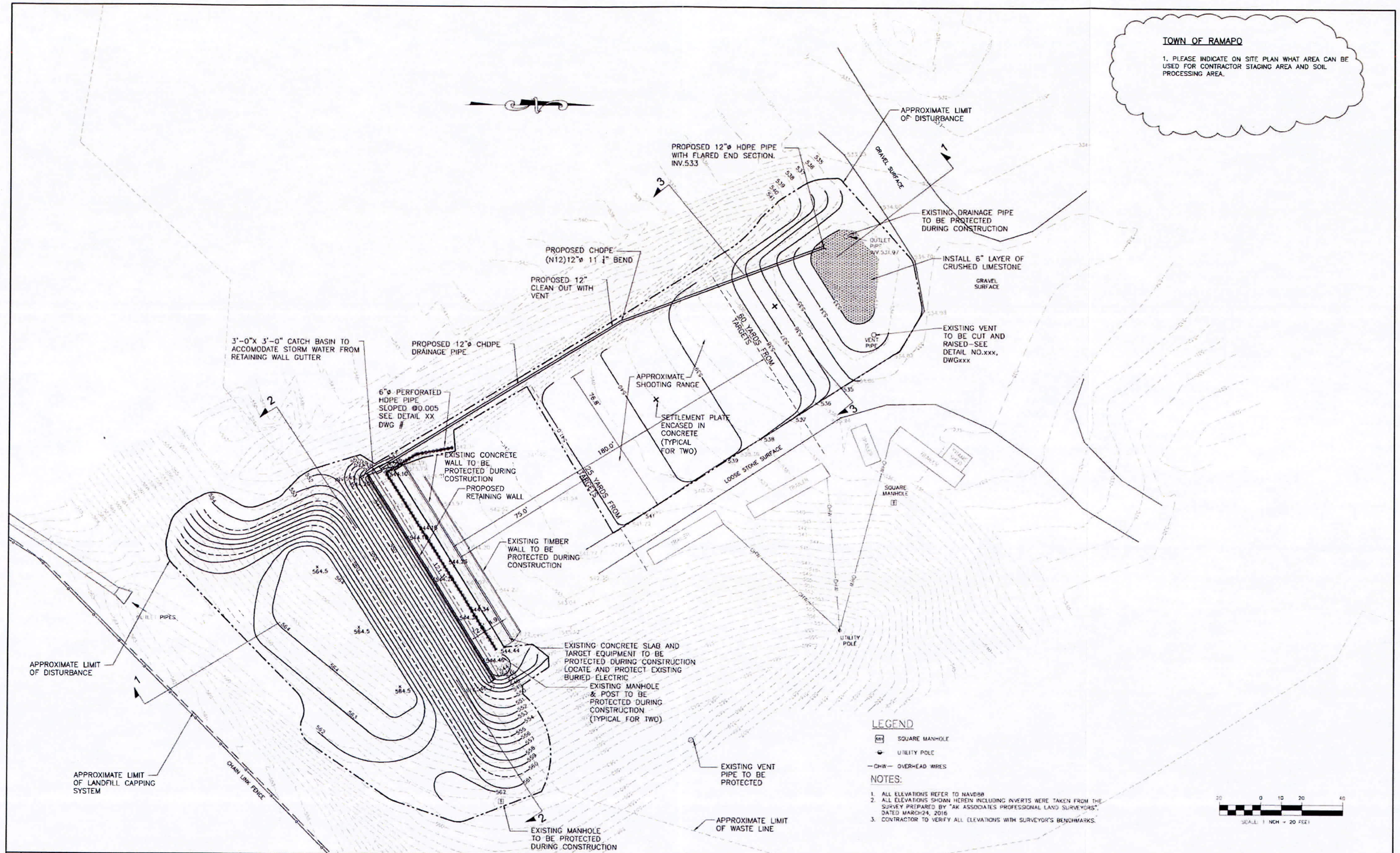
**SITE PLAN SURVEY**

PROJECT NO.	100611102
DATE	MARCH 2007
SCALE	1"=20'
SHEET NO.	2

3621

# TOWN OF RAMAPO

1. PLEASE INDICATE ON SITE PLAN WHAT AREA CAN BE USED FOR CONTRACTOR STAGING AREA AND SOIL PROCESSING AREA.



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PROJECT ENGINEER: ER  
DESIGNED BY: ER  
DRAWN BY: DS  
CHECKED BY: WDM

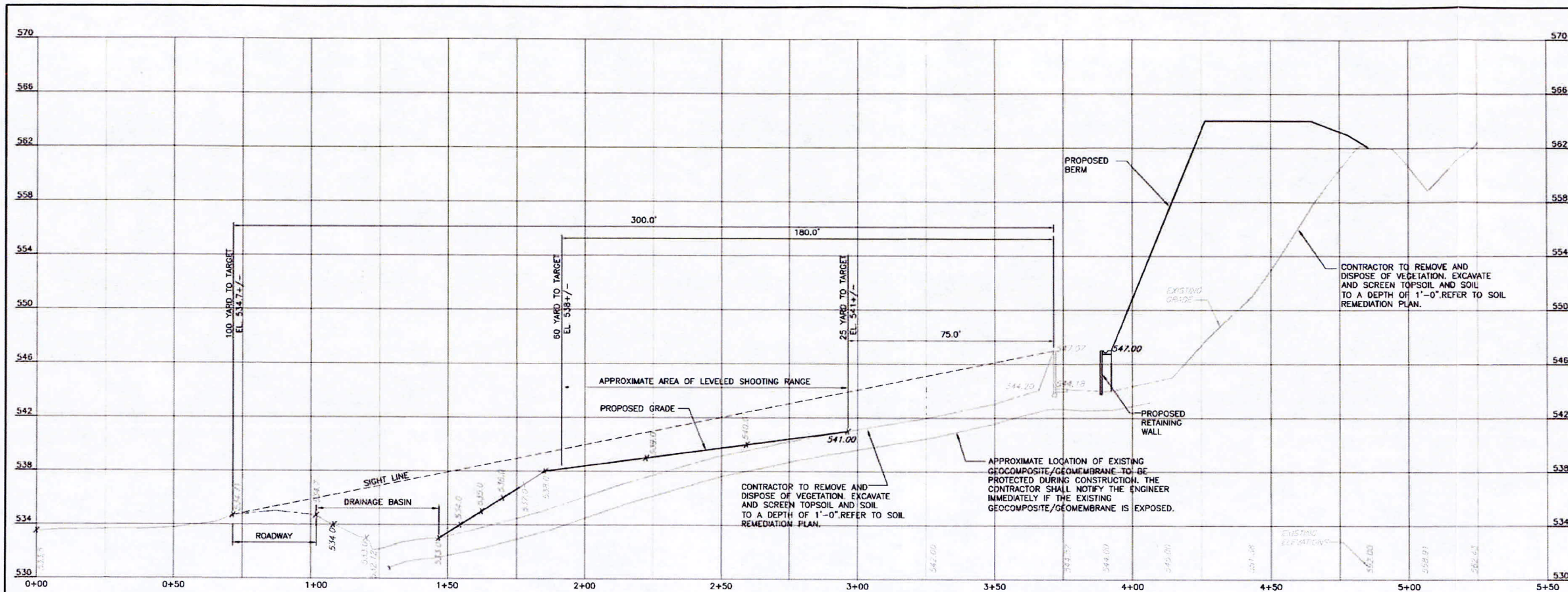
**D&B ENGINEERS AND ARCHITECTS, P.C.**

**TOWN OF RAMAPO POLICE DEPARTMENT**  
ROCKLAND COUNTY NEW YORK  
**FIRING RANGE IMPROVEMENTS**

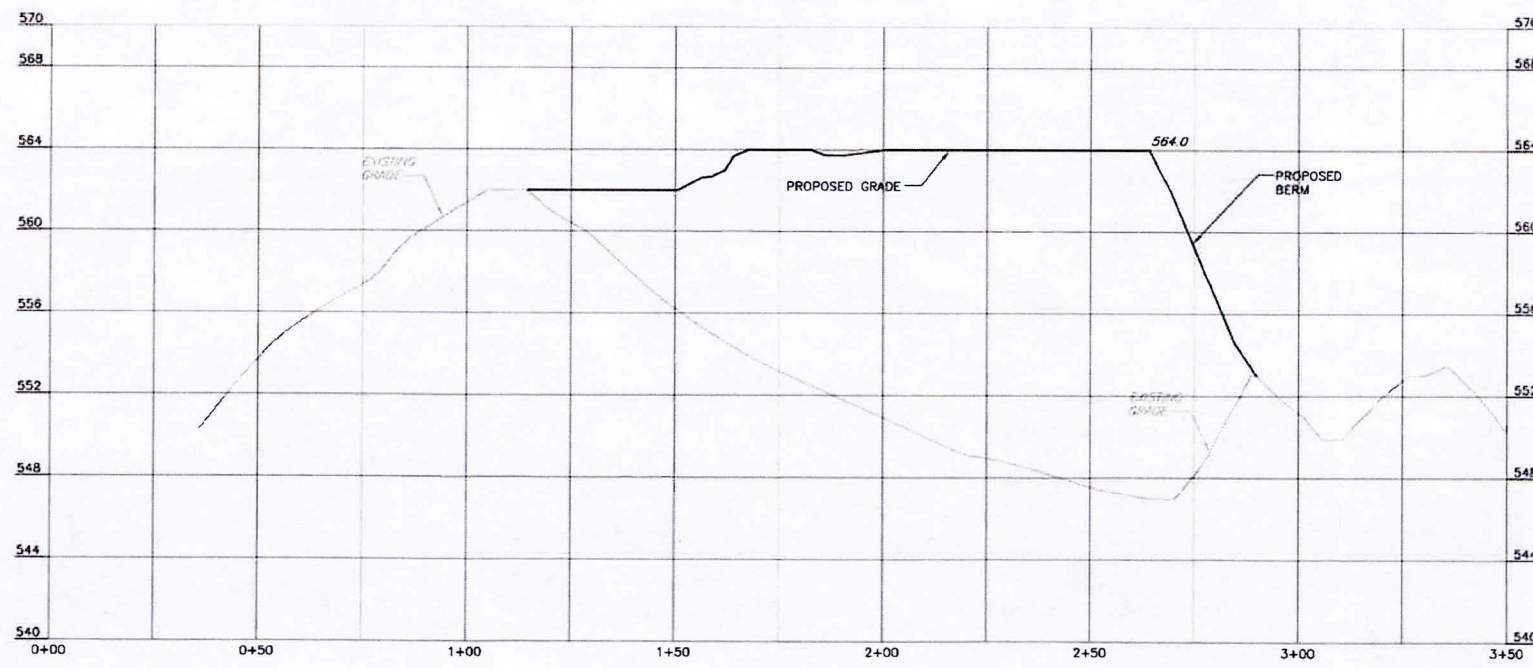
SITE PLAN - PROPOSED

PROJECT NO. 3781  
DATE: AUGUST 2018  
SCALE: 1"=20'

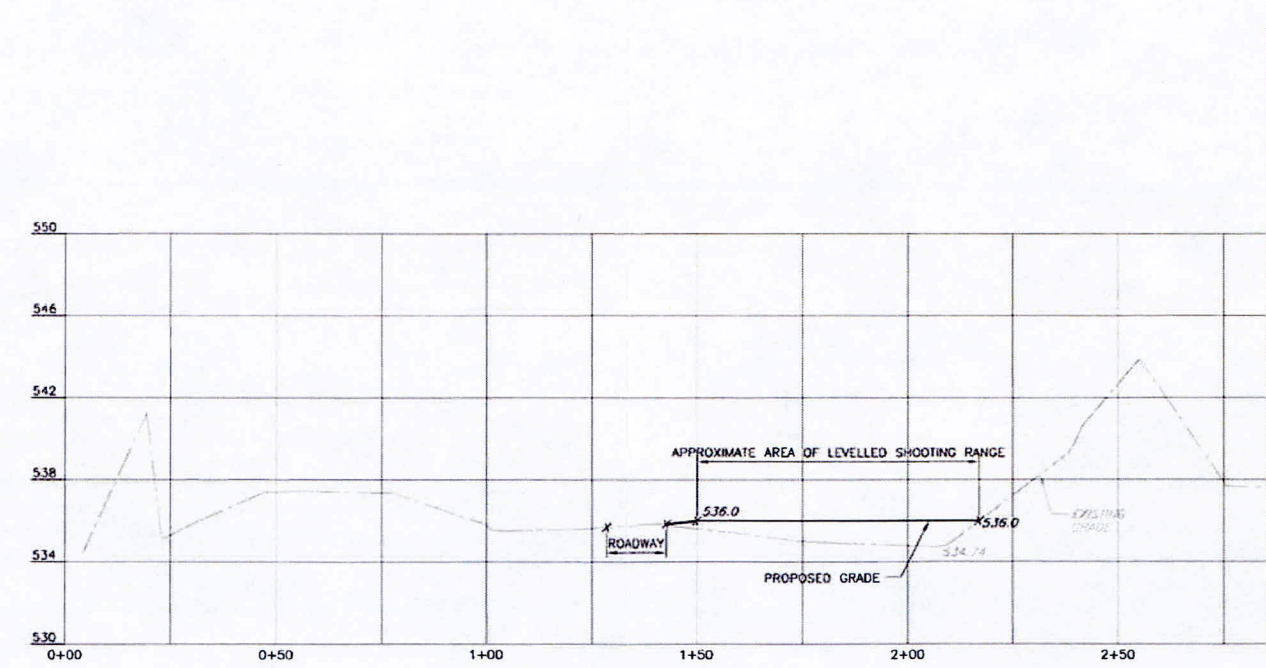
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**SITE SECTION 1**



**SITE SECTION 2**



**SITE SECTION 3**

NO.	DATE	REVISION	INT.

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PROJECT ENGINEER:	ER	DRAWN BY:	DS
DESIGNED BY:	ER	CHECKED BY:	WDM

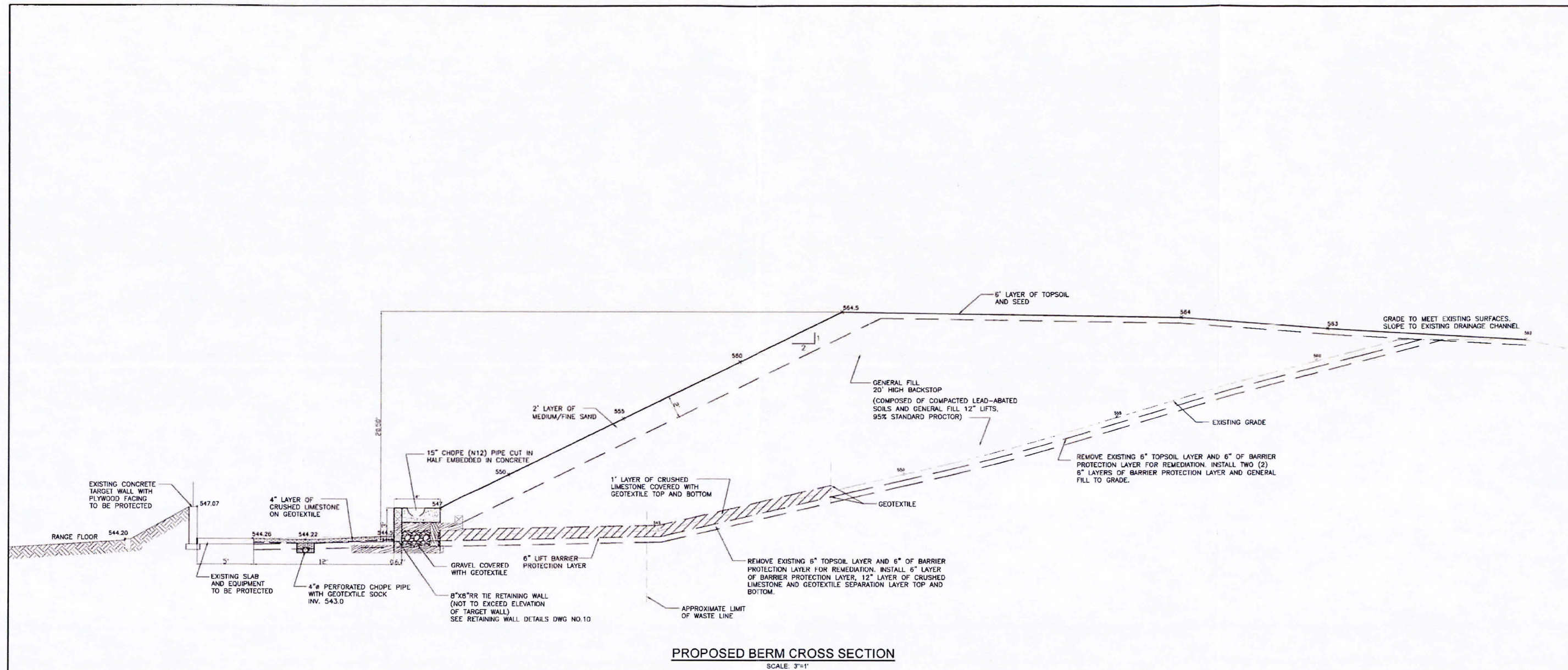

**D&B ENGINEERS AND ARCHITECTS, P.C.**

**TOWN OF RAMAPO POLICE DEPARTMENT**  
 ROCKLAND COUNTY NEW YORK  
**FIRING RANGE IMPROVEMENTS**

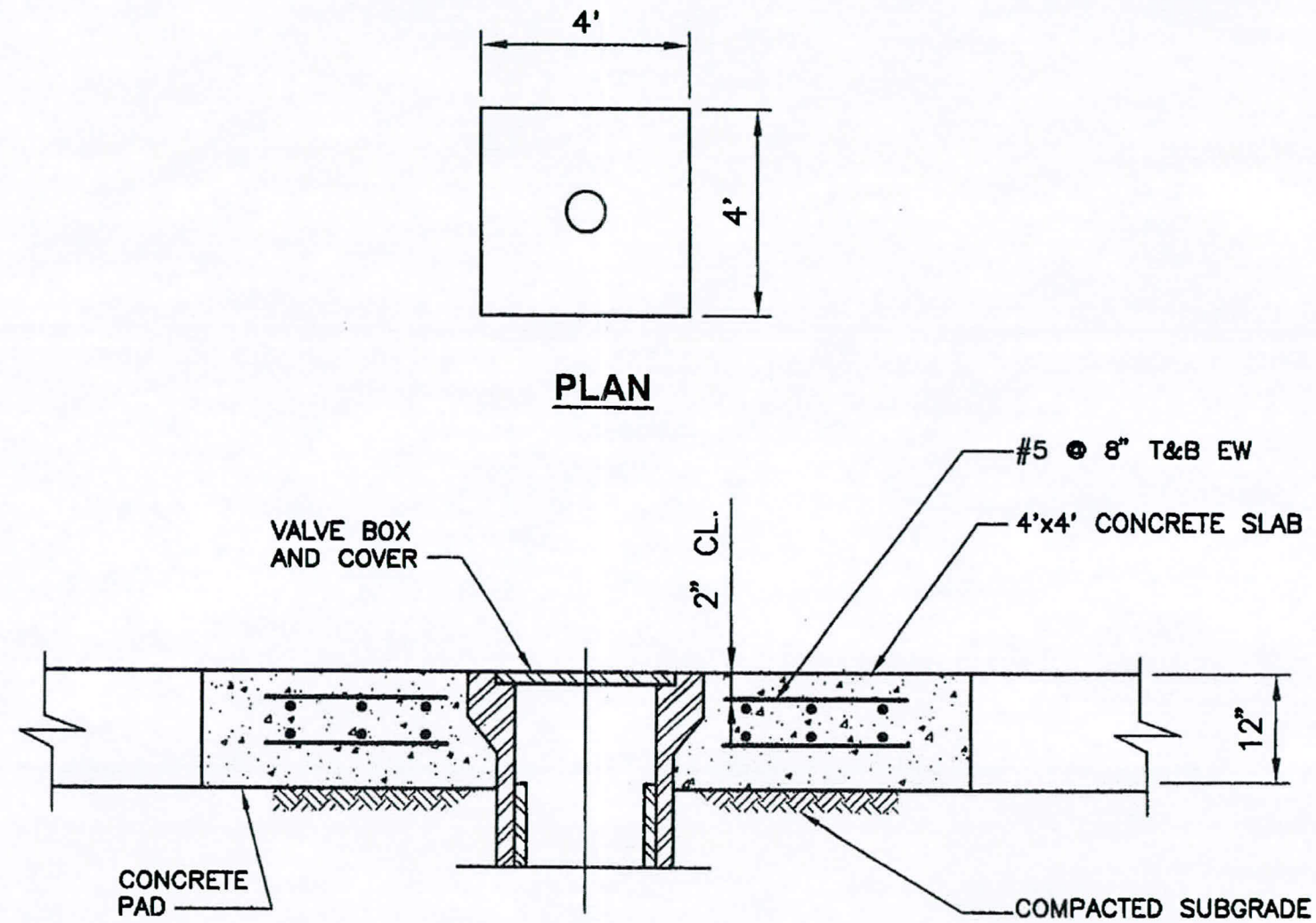
**SITE PROFILES**

PROJECT NO. 3781  
 DATE: AUGUST 2016  
 SCALE: HORIZONTAL: 1"=20' VERTICAL: 1"=4'  
**4**

P:\SITE\10460331\REVIEWS\OCTOBER 2016\31 SITE PROFILES REVIEWS\OCTOBER 2016.dwg 10/27/16 4:24 PM 2016/10/27



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DATE: 09/11/07



William F. Cosulich  
Associates, P.C.  
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

ROCKLAND COUNTY SOLID WASTE MANAGEMENT  
AUTHORITY

SETTLEMENT PLATE CONCRETE SLAB ENCASEMENT DETAIL

CHANGE #2



**WILLIAM F. COSULICH ASSOCIATES, P.C.**  
ENVIRONMENTAL ENGINEERS • SCIENTISTS • PLANNERS  
330 Crossways Park Drive, Woodbury, New York 11797 - 2015  
516-364-9880 • Fax: 516-364-8675

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WFC FAX NO: (516) 364-8675

DATE: 6/22/07

COMPANY NAME: HELMER - CROWN

ATTENTION: ANTHONY BRUNO

FAX NO.: 845-942-1165

FROM: JASON TONNE

SUBJECT: SETTLEMENT PLATE DETAIL JOB #: 1000 IN - N22

NO. OF PAGES: 2  
(including cover sheet)

MESSAGE:

ANTHONY-

ATTACHED PLEASE FIND REVESED SETTLEMENT PLATE DETAIL.  
PLEASE NOTE MINOR CHANGES FROM DETAIL ON CONTRACT  
DWGS. PLEASE REVIEW AND CALL ME WITH ANY QUESTIONS.

THANKS

THANK YOU:

Jason Tonne

**WILLIAM F. COSULICH ASSOCIATES, P.C.***Environmental Engineers • Scientists*330 Crossways Park Drive, Woodbury, New York 11797-2015  
516-364-9880 • Fax: 516-364-8675**PRIVILEGE AND CONFIDENTIALITY NOTICE**

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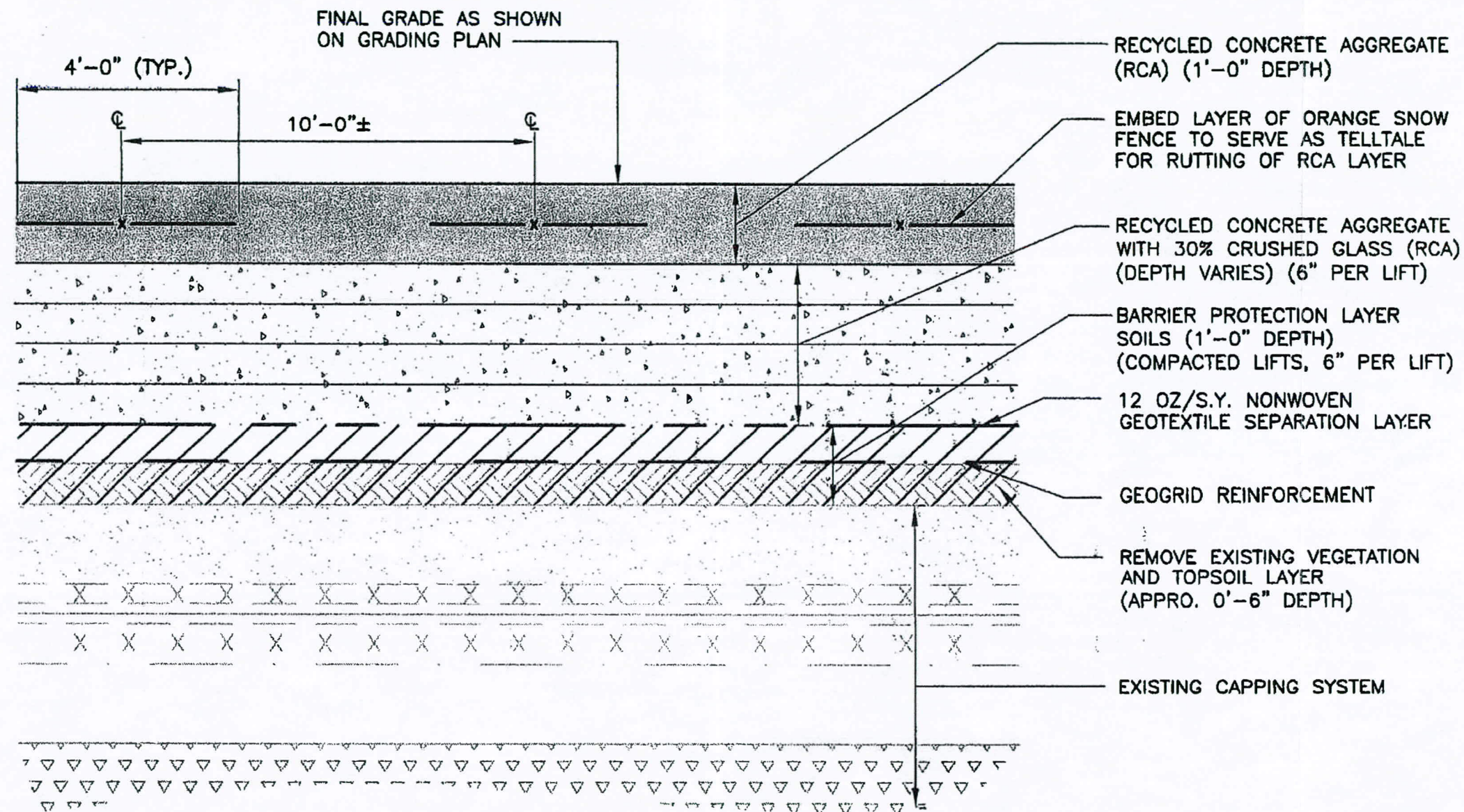
DATE: 9/17/07COMPANY NAME: RCSWMAATTENTION: DREW/DENIS/ANTHONY/RUDYFAX NO.: 845-753-2281FROM: JASON TONNESUBJECT: CULVERT/ROAD ALIGNMENT JOB #: 1000 II-N-N22NO. OF PAGES: 2  
(including cover sheet)

CHANGE #1

MESSAGE: \_\_\_\_\_

SEE SKETCHCALL TO DISCUSSTHANKSTHANK YOU: Jason Tonne

F:\1000II-N22\dwg\1000II-N22-ROAD.dwg, FIG 1, 08/08/07 08:45:16 AM, CMelford



SCALE: 1/2"=1'-0"



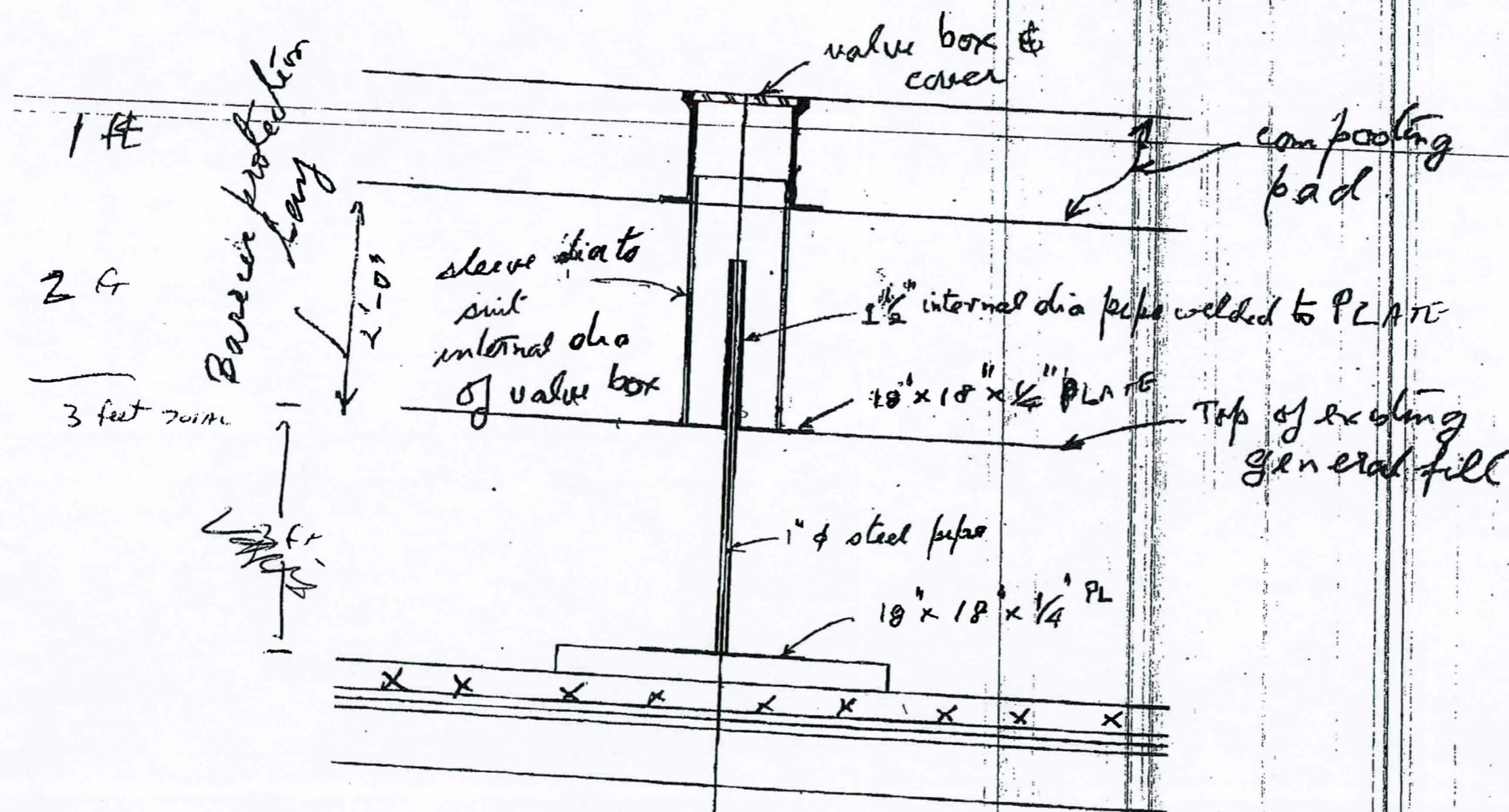
William F. Cosulich  
Associates, P.C.  
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY

REVISED COMPOSTING PAD AND ACCESS ROAD SECTION

FIGURE 1

# Sketch of suggested dual settlement gauge (or T-5)



CHANGE #1

May 4, 57 R. Pergande

D WASTE

COMPOST PAD  
(SEE DETAIL THIS DWG.)

TYPE II GEOTEXTILE  
COMPACTED SUBGRADE

SHED GLASS

12" RECYCLED AGGREGATE  
W/CRUSHED GLASS

VALVE BOX  
AND COVER

FOR PROPOSED COI  
AND ACCESS ROAD  
DETAIL THIS DRAWING

2" MIN. OF  
BARRIER  
PROTECTION  
LAYER

12 OZ/SY NON-WOVEN  
GEOTEXTILE TO BE  
WIRE TIED AROUND  
1"Ø STEEL PIPE

1"Ø STEEL PIPE

FOR EXIST. CAPPING  
SYSTEM, SEE DETAIL  
THIS DWG.

6"  
(TYP)

1/4  
18"x18"x1/4" PL  
SAND BASE

2'-0"  
GENERAL FILL

ORIGINAL

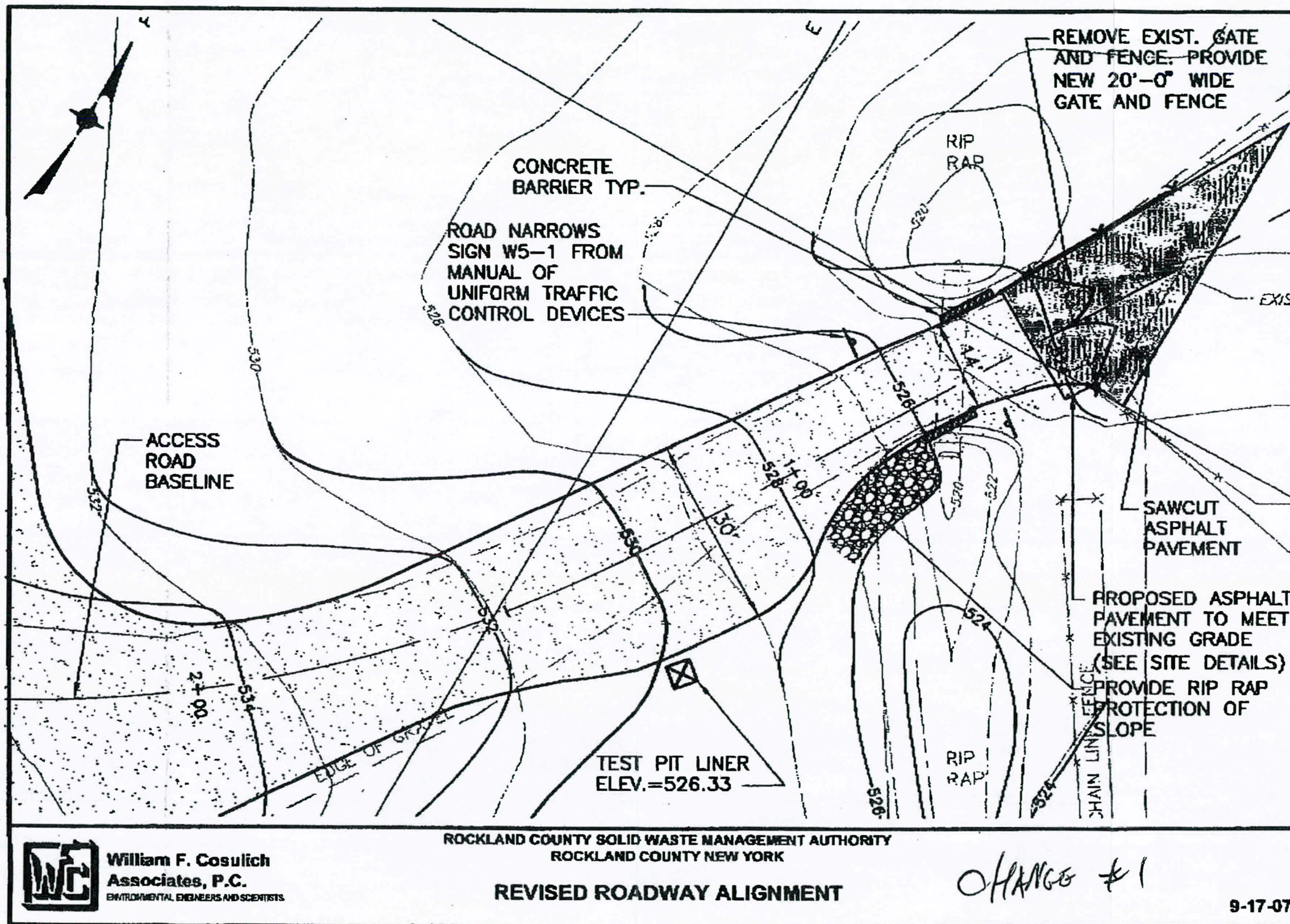
## SETTLEMENT PLATE DETAIL

N.T.S.

002/002

09/17/2007 11:25 FAX 516 364 9045

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William F. Cosulich  
Associates, P.C.  
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

ROCKLAND COUNTY SOLID WASTE MANAGEMENT AUTHORITY  
ROCKLAND COUNTY NEW YORK

REVISED ROADWAY ALIGNMENT

CHANGE #1

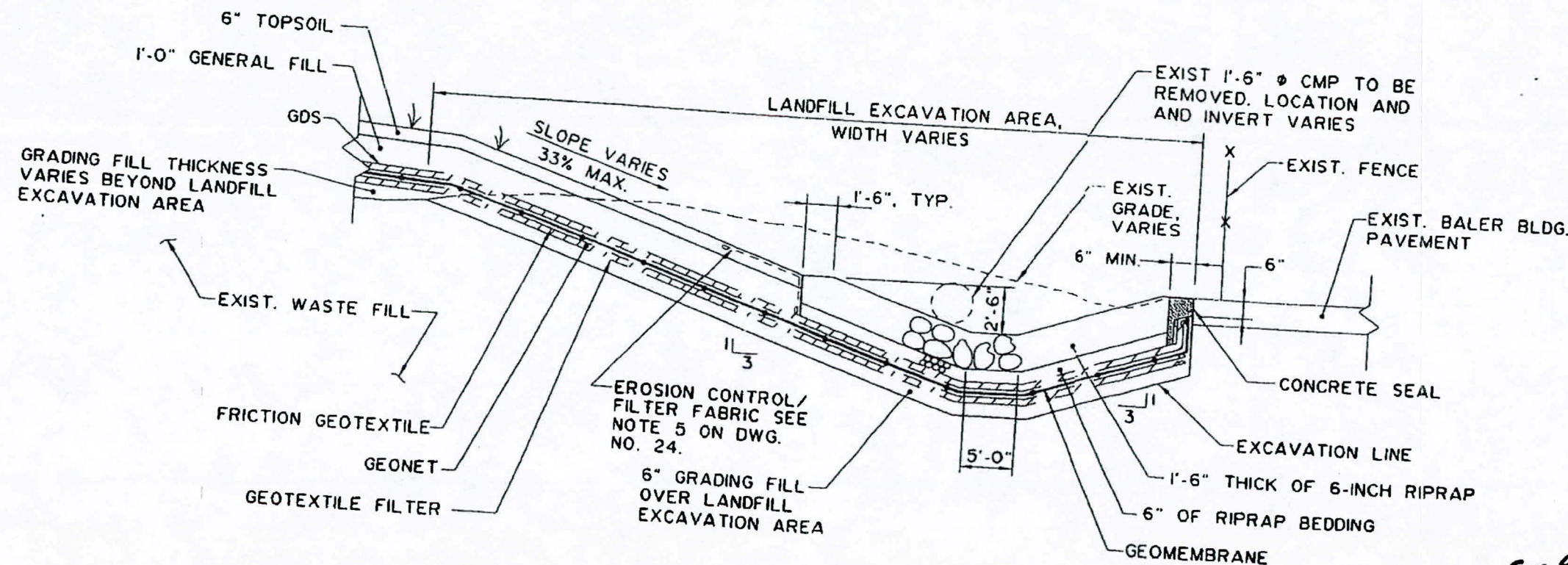
9-17-07

From  
TOD &  
Town of Ramapo  
files

#1

#2

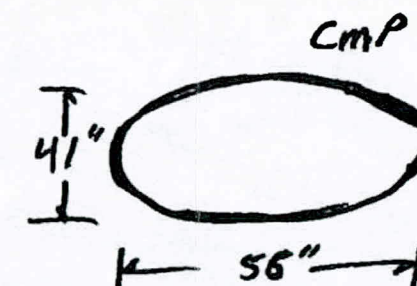
CHANGE #2



TYPICAL FINAL COVER TIE-IN  
AT BALER BUILDING PAVEMENT

NOT TO SCALE

4
22/25





**WILLIAM F. COSULICH ASSOCIATES, P.C.**  
**Environmental Engineers • Scientists**

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WFC FAX NO: (516) 364-8675

DATE: 9/12/07

COMPANY NAME: URS

ATTENTION: RANDY WEST

FAX NO.: 716-856-2545

FROM: JASON TENNE

SUBJECT: EA CULVERT ANTI-SEEP JOB #: 1000IN-N12

NO. OF PAGES: 3  
(including cover sheet)

MESSAGE: \_\_\_\_\_

RANDY

ATTACHED IS A SKETCH OF WHAT  
WE ARE TOLD EXISTS AT THE CULVERT

PLEASE CALL TO DISCUSS

Thanks

THANK YOU: Jason Tenne



**WILLIAM F. COSULICH ASSOCIATES, P.C.**  
Environmental Engineers Scientists Planners

Sheet No. \_\_\_\_\_ of \_\_\_\_\_

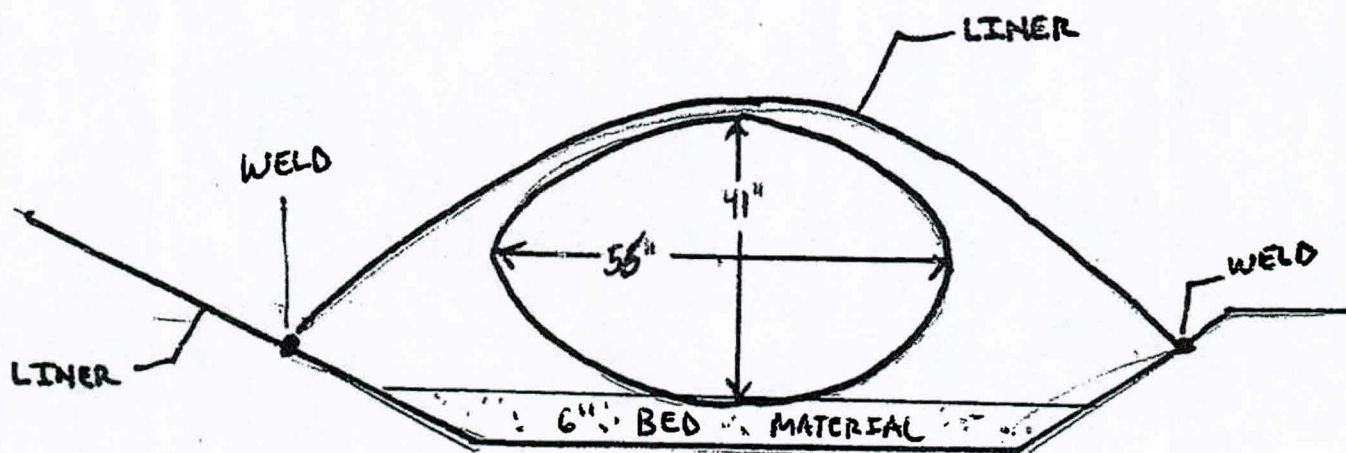
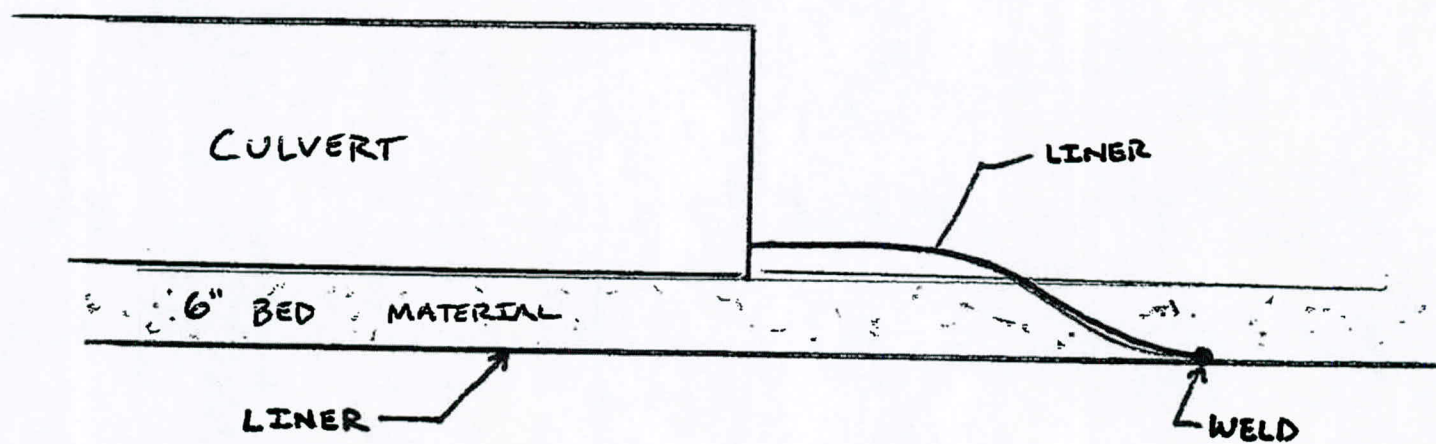
By J. TENNE Date 9/12/07

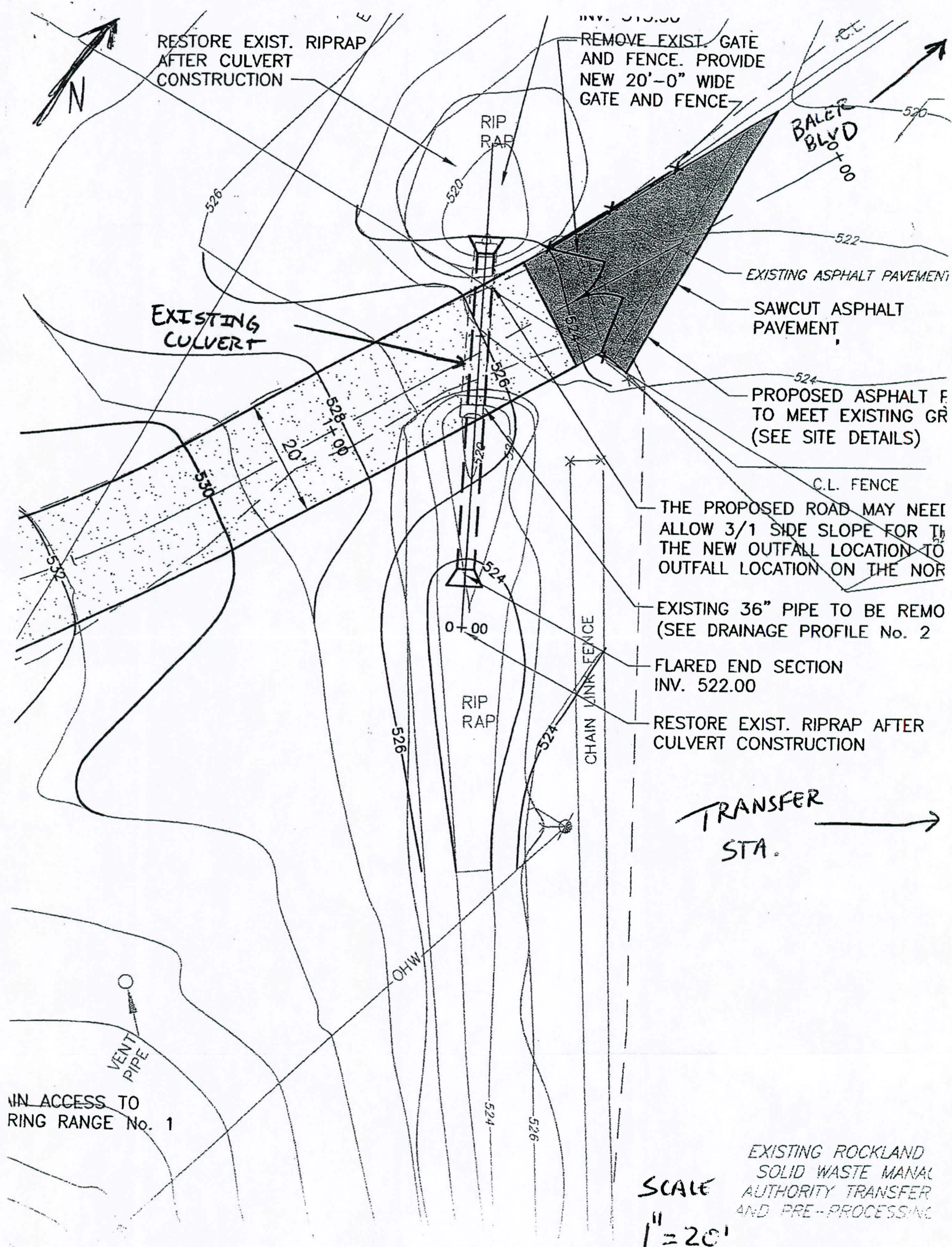
Chkd. by \_\_\_\_\_ Date \_\_\_\_\_

Project: RCSWMA - YARD WASTE

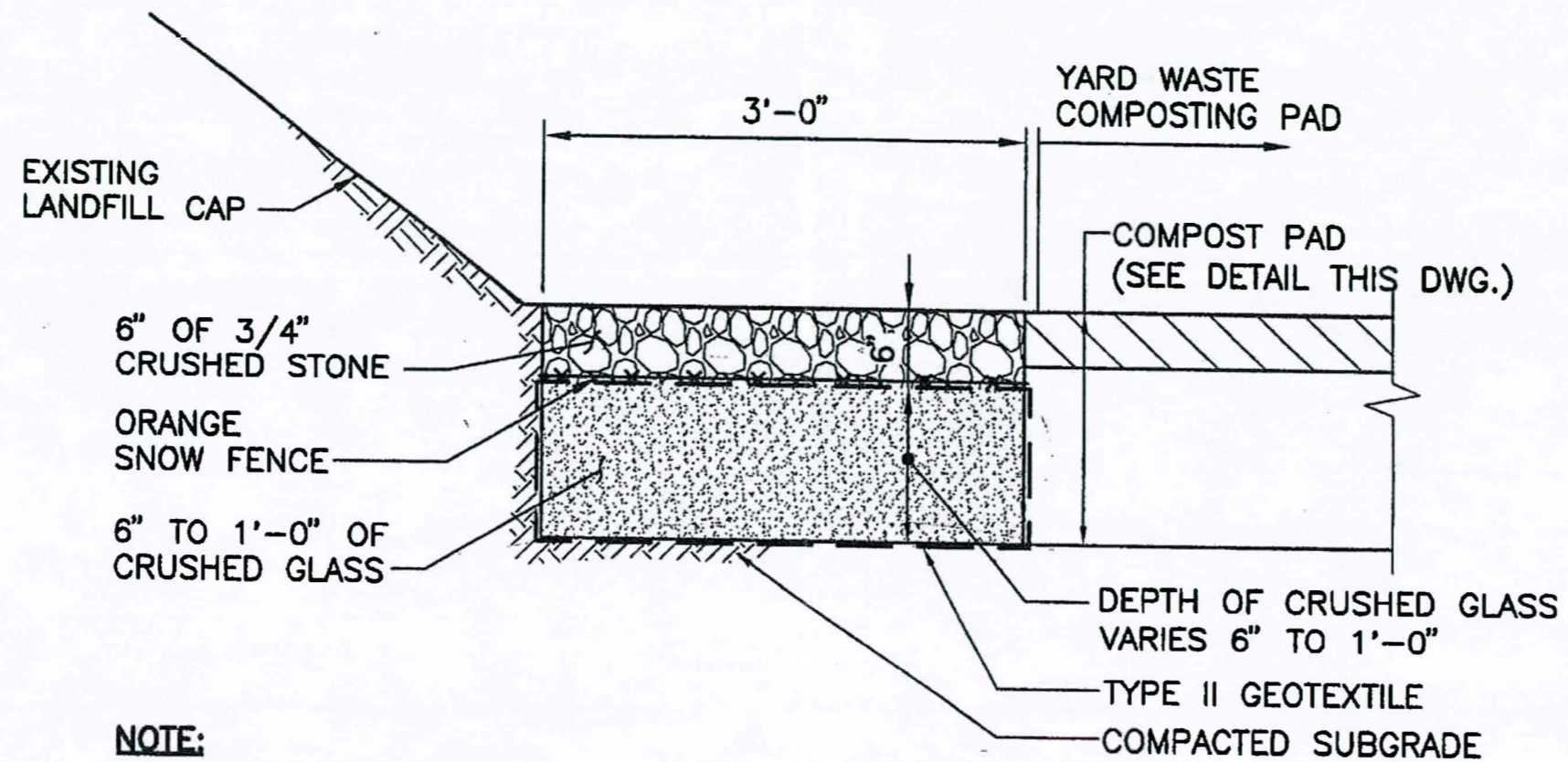
Job No. 100011 N-N22

Subject: CULVERT ANTI SEEP





\\100011-N22-RL\Fldwg\100011N22-C-DT02.dwg, 8X11, 8/29/2007 1:52:33 PM, LGlubiak



**NOTE:**

1. CRUSHED STONE SHALL BE 3/4"
2. AROUND NO MOW ZONE, FILTER STRIP TO BE ALL CRUSHED GLASS

DATE: 08/29/07



William F. Cosulich  
Associates, P.C.  
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

ROCKLAND COUNTY SOLID WASTE MANAGEMENT  
AUTHORITY

**FILTER STRIP DETAIL**



**WILLIAM F. COSULICH ASSOCIATES, P.C.**  
Environmental Engineers Scientists Planners

Sheet No. 1 of 1

By J. TONNE Date 8/13/07

Chkd. by            Date           

Project: RCSWMA COMPOSTING FACILITY Job No. 1000214-N22

Subject: 12"  $\phi$  DRAIN REALIGNMENT

