Mabbett®

# FINAL
# SITE INSPECTION (SI)
## Castle Point Campus

## Castle Point VA Hospital
## Wappingers Falls, NY
## VA Contract No. VA101F-12-D-0055

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## ACRONYMS

| | |
|---|---|
| AEHA | Adelaide Environmental Health Associates |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 |
| CLP | Contact Laboratory Participant |
| EPA | U.S. Environmental Protection Agency |
| FEMA | Federal Emergency Management Association |
| FIRM | Flood Insurance Rate Map |
| FOIA/FOIL | Freedom of Information Act/Law |
| GEMS | Green Environmental Management System |
| GIS | Geographical Information System |
| HRS | Hazard Ranking System |
| LQG | Large Quantity Generator |
| MCL | Maximum Contaminant Level |
| mg/kg | milligrams per kilogram |
| mg/L | milligrams per liter |
| NPDES | US National Pollutant Discharge Elimination system |
| NPL | National Priorities List |
| NYSDEC | New York State Department of Environmental Conservation |
| NYS DOH | New York State Department of Health |
| PA | Preliminary Assessment |
| PCBs | Polychlorinated Biphenyls |
| PPE | Probable Point of Entry |
| RCRA | Resource Conservation and Recovery Act |
| RCRIS | Resource Conservation and Recovery Information System |
| SARA | Superfund Amendments and Reauthorization Act of 1986 |
| SI | Site Inspection |
| SPDES | State Pollutant Discharge Elimination System |
| SVOCs | Semi-volatile Organic Compounds |
| ug/kg | micrograms per kilogram |
| ug/L | micrograms per liter |
| VA | U.S. Department of Veterans Affairs |
| VAMC-CP | VA Hudson Valley Health Care System, Castle Point Campus |
| VOCs | Volatile Organic Compounds |

## ACKNOWLEDGMENT

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## EXECUTIVE SUMMARY

The Department of Veteran Affairs Medical Center, Castle Point (VAMC-CP) contracted Mabbett and Associates, Inc. (Mabbett®) to perform a supplemental investigation in the form of an U. S. Environmental Protection Agency (EPA) Site Inspection (SI) at the VAMC-CP facility. Initial investigations into historic waste disposal and site activities were performed in the 1990s at the request of EPA due to the presence of a former incinerator and boiler plant, multiple areas of landfilling, and the use of drinking water wells adjacent to landfilled areas.

Accordingly, the VA developed an SI scope of work to include a review of existing data, a sampling event to collect additional environmental media selected by the VA, and use of the EPA Hazard Ranking System (HRS) to assess the relative threat associated with actual or potential releases of hazardous substances at the facility. This report details the findings of the SI, which are summarized below.

**Historic Waste Disposal Activities**

Six (6) historic landfills were identified during site inspection activities performed in the 1990s. These landfills were all located on the western, undeveloped portion of the site. Items disposed of ranged from hazardous substances to construction debris and trash. The location and approximate size of these landfills was determined using visual and historically available information. All of the landfills are considered inaccessible; they have been reportedly covered with gravel and top soil, and are not generally accessible.

**Potable Water Wells**

Four potable water wells are located on the western portion of the site, two of which are in regular use. These wells are located within 200-feet of a former landfill area.

**Historic Site Investigations**

Historic investigations identified hazardous waste sources and EPA defined observed contamination and releases at the VAMC-CP. This investigation documented impacts from these waste sources to the potable water wells, surface water, and surface soil at the facility.

**Current Site Investigation**

Subsurface soil samples from the former landfill areas were collected and analyzed to characterize the nature of hazardous substances historically deposited at the facility, and to document the types of hazardous substances present in source areas and available to the groundwater, surface water, and air migration pathways. Environmental samples were collected from monitoring wells and on-site potable drinking water wells and analyzed to determine observed releases to groundwater and target populations and environments potentially at risk from the source areas. Environmental samples were also collected from sediment and analyzed to determine whether source area hazardous substances had migrated to surface water targets.

**Conclusions**

Elevated concentrations of contaminants were found in subsurface soils and groundwater near the former landfill areas, indicating that hazardous substances likely related to the source are wastes have migrated to the groundwater table. Elevated concentrations of contaminants were also found in sediment samples collected around the Boggy Pond, just north of one of the landfill areas.

It is recommended that additional surficial soil sampling be conducted to assess whether observed contamination is present near on-site and off-site residential areas. Surface water samples should be collected to assess whether observed releases of hazardous substances in sediment via overland surface water run-off have entered the Hudson River. Additional groundwater samples should be collected and filtered prior to

analysis to assess whether the groundwater samples obtained during this SI were biased by suspended solids containing metals.

Finally, an assessment program should be implemented to put the facility on the path of compliance under NYSDEC regulations (6 NYCRR Part 375). This program should include evaluation of the data collected to date and the investigation proposed above in context with current land use to identify the soil and groundwater cleanup objectives that are appropriate to the facility. Remedial options may include implementation of institutional or engineering controls. Options for formally closing the identified landfills at the facility will be dictated by NYSDEC land disposal regulations. Ultimately, a closure plan will be filed for approval by NYSDEC.

## 1. INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), the U.S. Department of Veterans Affairs (VA) Office of Construction and Facilities Management (OCFM) tasked Mabbett & Associates, Inc. (Mabbett®) to conduct a Site Inspection (SI) of the VA Hudson Valley Health Care System, Castle Point Campus (VAMC-CP; herein "facility"), in Wappingers Falls, Dutchess County, New York.

The SI was conducted in response to a request from the VA to complete supplemental investigations in the form of an SI at the facility. The original investigations into the facility were performed during the early 1990s at the request of the U.S. Environmental Protection Agency (EPA) due to the presence of the following:

- The existence of multiple areas of landfilling,
- The use of a former waste incinerator, and
- The use of drinking water wells that are adjacent to formerly used, unlined landfill areas.

Accordingly, the VA developed an SI scope of work to include a review of existing data, a sampling event to collect additional environmental media selected by the VA, and using the EPA Hazard Ranking System (HRS) to assess the relative threat associated with actual or potential releases of hazardous substances at the facility.

On July 26, 2013, the VA provided Mabbett with a scope of work for a site inspection at the facility, outlining the number and location of groundwater, sediment, and subsurface soil samples to be collected. Mabbett completed the field work in December 2013 and January 2014. The data was collected in order to provide analytical information that could be used to prepare an updated HRS scoring package. The data was also used to evaluate whether other applicable New York State Department of Environmental Conservation (NYSDEC) and Federal criteria have been exceeded. Accordingly, this SI report includes a summary of the investigation findings, results of the HRS scoring package, and recommendations for further actions.

## 2. SITE DESCRIPTION AND REGULATORY HISTORY

This section provides an overview of the type of facility, whether it is active or inactive, years of operation, and a general description of physical settings at and around the facility. A brief summary of previous investigations conducted at the facility is also provided. Finally, a discussion is provided on past land uses, any citizen complaints, and regulatory activities (RCRA status, permits, and permit violations) including local, State and Federal inspections.

### 2.1 Facility Information

#### 2.1.1 Location

The VAMC-CP address is 41 Castle Point Road, Wappingers Falls, Dutchess County, New York (Ref. 12). The facility is located on an approximately 244-acre parcel (Ref. 12). The location of the facility is shown in Figure L-1.

Portions of the facility are located in both Wappingers Falls and Castle Point, New York (Ref. 12). The facility is located along a portion of the east bank of the Hudson River approximately 45 miles north of New York City (Ref. 12). The approximate geographical coordinates for the facility entrance are 41° 32' 29.76" north latitude and 73° 57' 47.88" west longitude (Ref. 12).

Local land uses surrounding the facility are for mixed residential and industrial/commercial (Ref. 12). The VAMC-CP is bordered to the north by Castle Point Park and undeveloped land; to the south by residences; to the east by Route 9D and residences; and to the west by railroad tracks and the east bank of the Hudson River (Ref. 12).

The topography at the facility is generally flat with a minimal west-facing slope (<5%) toward the Hudson River (Ref. 8, 12). The topography in the general vicinity of the facility is also generally flat, with a minimal west-facing slope (<5%) toward the Hudson River (Ref. 8, 12).

The climate of Dutchess County is humid continental, and is characterized by strong seasonal contrasts and highly variable weather. Major storm systems, which move through the continental United States or up the nearby Atlantic Coast, have a significant impact on the weather in the region, especially during the fall, winter, and spring. These systems provide ample precipitation for the region, supplemented by tropical, maritime air masses during parts of the summer. Polar air masses from Canada move southeast into the area and strongly influence the winters. The annual mean temperature for the meteorological winter is 27.3 degrees Fahrenheit, and the annual mean temperature for the meteorological summer is 69.5 degrees Fahrenheit (Ref. 26).

#### 2.1.2 Ownership History

VA is the current facility owner (Ref. 12), VA purchased the property in 1924, as a conglomeration of several parcels, to form a 244-acre property leading from Route 9D to the Hudson River (Ref. 12). Prior to VA's purchase of these parcels and development as a VA hospital, the property was a farm homestead (Ref. 1, 12). This homestead contained large open fields, as well as several homes and various farm buildings (Ref. 1).

There is no information available indicating whether operation of the property as a farm (prior to VA's ownership) resulted in the release of hazardous substances. This SI and HRS score assume that VA's operation of the property as a medical center is the sole contributor of wastes potentially present at the facility. Accordingly, the following operational history includes a discussion of only VA's activities.

### 2.1.3 Description

The facility description was developed through a review of historical background documents and site reconnaissance. On September 12, 2013, Ms. Kiran Sears and Mr. James Greacen with Mabbett performed an initial facility reconnaissance. From December 2 to 6, 2013, Mabbett performed additional reconnaissance of the areas surrounding the facility according to EPA requirements.

The VA has operated the facility as the VAMC-CP from 1924 to the present (Ref. 1, 12). The VAMC-CP campus is comprised of approximately 30 buildings and structures, with the majority of buildings located on the eastern portion of the facility (Ref. 12). A layout of buildings at the facility is provided in Figure L-2. The buildings and structures include a medical treatment facility, office buildings, day care, maintenance and storage areas, a boiler plant, drinking water treatment and sewage treatment facilities (Ref. 12). A fence surrounds the facility (Ref. 12). Environmental aspects of the facility include:

- An operating wastewater treatment plant that discharges to the Hudson River under a NYSDEC State Pollution Discharge Elimination System (SPDES) permit;
- A natural gas boiler plant operating under a NYSDEC air emissions permit with #2 fuel oil as a backup fuel source;
- 12 emergency diesel generators;
- 25 aboveground fuel oil storage tanks;
- Stormwater managed under a NYSDEC MS4 Stormwater permit;
- Six landfills (Landfills A-F) that may contain paints, solvents, mercury, waste oils, ash, and other materials;
- A former boiler plant/incinerator; and
- Closed underground storage tanks (USTs) previously used for petroleum storage.

Since it began operating in 1924, there have been various changes to the facility: buildings have been erected, some demolished, and some improved; roads and parking areas have been built or improved; a water intake system, reservoir, and treatment facility for Hudson River water have been installed; steam water and air lines were placed below ground in tunnels, and their use discontinued; refuse, construction debris, waste, excavation dirt and fill have been deposited; and a railroad spur was added, used, and then removed (Ref. 1, 12). A former boiler plant/incinerator located on the western portion of the facility was demolished in 2010 (Ref. 12).

The facility has supplied its own drinking water since 1924 (Ref. 1, 12). Initially, seven groundwater wells were drilled (Ref. 1). These wells have since been abandoned, and an additional four wells were drilled (Ref. 1). Of these four wells, two are currently in use and two remain off-line due to human health contamination concerns (Ref. 12). The facility also maintains a surface water intake on the Hudson River, upstream of portions of the facility's runoff (Ref. 12). The facility does not currently utilize the surface water intake for drinking water; as such, there is no blending of groundwater and surface water for potable use at the facility. The facility is in the process of investigating the option of supplementing the potable well water with water from the surface water intake in the future (Ref. 12).

The groundwater extracted for potable use is treated at the facility and tested regularly by Severn Trent Services. The water from the wells is pumped to holding tanks, and then transferred to the water treatment plant where chlorine is added, then the water is allowed to equilibrate in one of two 100,000 gallon clear wells prior to use (Ref. 9, 12).

Figure L-1 is a USGS 7.5-minute topographic map and Figure L-2 is an aerial photograph, together these figures depict the following information:

- Site and 1-mile radius ring
- Nearest well
- Nearest residence
- Nearest wetlands

Other pertinent information is depicted on subsequent figures. The surface water drainage is depicted on Figure L-4. All potable wells located within four-miles of the Site are shown on Figure L-5. Additional wetland locations, drinking water intakes, public recreation areas, farmland, and other sensitive environments are depicted on Figure L-6.

## 2.2 Previous Investigations and Past Regulatory Activities

This section provides a brief summary of the dates and scope of previous investigations and regulatory activities relevant to the scope of this Site Inspection report.

***VA. October 2, 1987. Identification of Facility Waste Disposal Site. (Ref. 25)***

This VA letter informed EPA that the VAMC-CP used a landfill "for a period of years prior to 1978" and that the contents were unknown, but could include asbestos. Attached to the letter was a "Federal Facilities Update Report –CERCLA" indicating the Federal Facility ID (NY8360007282); the presence of a landfill containing solid waste and possibly asbestos; that "on-site landfill operation at this facility ceased operation as of June 1, 1978"; and the "potential contamination of groundwater and surface water." The attachment indicated the only record for the site was "October 1980 - Potential Hazardous Waste Site Identification and Preliminary Assessment."

***Adelaide Environmental Health Associates. July 23, 1991. Trip Report – Onsite Soil and Groundwater Sampling, Screening Site Inspection, Veterans Administration Medical Center – Castle Point (VAMC-CP). (Ref. 2)***

This report indicates that VA contracted Adelaide Environmental Health Associates (AEHA) to conduct a Screening Site Inspection (SSI) at the facility. The purpose of the SSI was to be an assessment for potential groundwater and soil contaminants due to historical facility operations, including disposing of waste at the facility in five landfills identified as Landfills A, B, C, D, and E. On July 9-11, 1991, AEHA collected four shallow soil samples (0-2 feet below ground), six surface water samples, and four groundwater drinking well samples. The collected samples were submitted to the EPA Contract Laboratory Participant (CLP) Compuchem Laboratory in North Carolina for the following analyses:

- Organics: VOCs, SVOCs, Pesticides, PCBs
- Inorganics: TAL Metals

A description of the collected samples and results is provided in the following discussion, and a figure showing the location of these sample locations is provided as Figure L-7:

Four (4) Soil Samples (CP-7, CP-8, CP-10, CP-14)
Three shallow soil samples (0-2 feet below ground) were collected to assess the facility for possible sources/indicators of contamination. Of these, two samples (CP-7, CP-8) were collected from Landfill A and Landfill B, and the third sample (CP-14) was collected near the railroad spur adjacent to the former boiler plant. To represent "background" conditions, a fourth soil sample (CP-10) was collected from a grassy field located approximately 500 feet east from Landfill F; the field was described as a "non-developed portion of the property."

Soil samples collected from the landfill areas and the former boiler plant contained organic and inorganic contaminants at significantly (3x) elevated concentrations compared with the background soil sample (Ref. 2). The area formed by triangulating the three waste area soil samples (CP-7, CP-8, CP-14) is approximately 68,715 square feet.

Six (6) Surface Water Samples (CP-1, CP-4, CP-5, CP-9, CP-13, CP-15)
Surface water samples were collected from three upstream and three downstream locations.

The upstream locations were collected from Boggy Pond (CP-9), an upstream location in the on-facility drainage ditch (CP-1), and an upstream location in the Hudson River (CP-15).

The downstream locations were collected from the drainage swale just prior to discharging into the Hudson River (CP-4), a low spot in one of the landfills (CP-5), and from a pond area downslope of this same landfill (CP-13). It is noted that the downstream surface water samples were not filtered, and selected surface water samples (CP-4, CP-5) contained visible sediment (Ref. 1).

The majority of the detected concentrations came from the low spot in the landfill. It was reported that the remaining two downstream samples contained copper and zinc only (Ref. 2).

Four (4) Potable Groundwater Well Samples (CP-2, CP-3, CP-11, CP-16)
The four on-facility potable water wells were also sampled. All four of the wells are located downgradient of the landfill areas and the former boiler plant. An upgradient or background groundwater sample was not collected for comparison.

It was reported that very low concentrations of metals only were detected in the potable water samples.

The data were reported to the VA on July 23, 1991 (Ref. 1). The report concluded that based on site interviews, reconnaissance (and presumably the data) that "some of the areas previously thought to be clean, non-landfill areas may in fact be landfill areas, and the background samples may not represent a true background/baseline level" (Ref. 1). AEHA subsequently evaluated these data in a Screening Site Inspection Report, which is discussed in the following section. A summary of the concentrations detected during the AHEA 1991 sampling event are presented in Table 2-1, below. Complete tables showing the samples collected and concentrations detected are provided in the subsequent sections. Surface soils are presented as Table 4-2, potable groundwater wells as Table 5-7, and historic surface water samples as Table 5-11.

The trip report made reference to a Preliminary Assessment completed by NUS Corporation dated December 15, 1989. However, a copy of the Preliminary Assessment report was not available in the file material.

**Table 2-1: Historic Detected Concentrations in Samples (Ref. 1)**

| Compound | Soil (ug/kg) | Surface Water (ug/L) | Drinking Water (ug/L) |
|---|---|---|---|
| Arsenic | 15,700 to 28,100 | 7.5 | ND |
| Barium | 307,000 | 330 | 32.5 to 33.4 |
| Beryllium | ND | 1.9 | ND |
| Chromium | ND | 50.5 | 24.3 |
| Cobalt | ND | 21.7 | ND |
| Copper | 85,700 | 40.7 to 523 | 7.8 to 9.4 |
| Lead | 75,800 to 161,000 | 643 | 2.3 to 5.9 |
| Manganese | ND | 81.8 | 50.9 to 153 |
| Vanadium | 75,400 | 128 | ND |
| Zinc | 205,000 | 72 to 2,680 | 17.6 to 26.4 |
| Mercury | ND | 0.97 | ND |
| Naphthalene | 82 to 130 | ND | ND |
| 2-Methylnaphthalene | 140 to 1,100 | ND | ND |
| Phenanthrene | 92 to 1,100 | ND | ND |
| Fluoranthene | 130 to 15,000 | ND | ND |
| di-n-Butylphthalate | 620 | ND | ND |
| Pyrene | 85 to 1,600 | ND | ND |
| Butylbenzylphthalate | 70 | ND | ND |
| Benzo(a)anthracene | 47 to 720 | ND | ND |
| Chrysene | 54 to 1,300 | ND | ND |
| Benzo(a)pyrene | 870 | ND | ND |

Notes:
The range of reported concentrations represents multiple samples collected from the given media.
ug/kg – micrograms per kilogram; ug/L – micrograms per liter; ND – not detected.

***Adelaide Environmental Health Associates. August 27, 1991. Final Report, Screening Site Inspection Report, Veterans Administration Medical Center – Castle Point, Castle Point, NY. (Ref. 1).***

Based on the AEHA 1991 Site Screening Inspection sampling event and site reconnaissance information, AEHA concluded that a "full-scale site investigation" was warranted (Ref. 1). AEHA completed an HRS scoring package, concluding with a site score of 74 (Ref. 1). The report indicated a threat from the landfills to nearby drinking water wells and to soil exposure.

Subsequently, EPA reviewed the report and on July 13, 1993 issued its own evaluation (Ref. 3), which is discussed in further detail in the following section.

***EPA. July 13, 1993. EPA Review of Site Inspection for VA Medical Center, Castle Point, NY. (Prepared by Ebasco Services, Inc.). (Ref. 3)***

EPA issued this letter to inform the VA that in June 1993 EPA reviewed the "Site Inspection" report for the facility and concluded that the site would be further evaluated for potential listing on the National Priorities

List (NPL). The EPA indicated that the VA did not need to do additional sampling at the time because "...the submitted data appears adequate for NPL evaluation of the site." EPA added that VA would be notified if additional data was needed.

As part of EPA's review, EPA contracted Ebasco Services, Inc. (Ebasco) to complete a Federal PA/SI Review for the VAMC-CP, including a data gap report and an HRS scoring package. (Note: it appears that EPA did not include Ebasco's review in the letter to VA.) Ebasco concluded that the existing information and environmental sampling data had numerous data gaps related to inaccurate or incomplete receptor and pathway information, but that Ebasco was able to fill these data gaps via desktop research. Therefore, Ebasco concluded that the updated information was sufficient to recommend that an Expanded Site Inspection was not required. However, Ebasco recommended "High Priority for Further Action" at the site.

The Ebasco HRS scoring package or final score was not located in the file material available for review. However, it appears that subsequently EPA completed another HRS scoring package using the updated information presented in Ebasco's Federal PA/SI Review (Ref. 9); a discussion of this EPA HRS scoring package is presented in the following section.

***EPA. June 23, 1995. Hazardous Ranking System (HRS) Screening on the VA Medical Center, Castle Point, New York. (Ref. 9).***

This document includes a letter from EPA to the VA stating that EPA used the updated information presented in Ebasco's Federal PA/SI Review to complete another HRS scoring package for the facility. It is unclear whether EPA included the HRS scoring package in its letter to the VA. The HRS scoring package was prepared for EPA by Malcolm Pirnie, Inc. on October 31, 1994. The HRS scoring package document was marked "Confidential, Not for Public Release."

This HRS indicated an overall score of 11.92 for the VAMC-CP, which was below the prior score of 74 and below the score of 28.5 needed for listing on the NPL.

In this letter, EPA informed the VA that EPA assigned the facility a "No Further Remedial Action Planned (NFRAP) status, meaning that, based on current information, the site does not qualify for inclusion on the National Priorities List (NPL)." EPA cautioned that NFRAP did not mean there was no hazard associated with the site, only that that the site would not be on the NPL. EPA concluded that the VA should review the screening letter and take appropriate actions to eliminate the possible spread of contamination.

No additional investigations involving the collection and/or sampling of media from the facility appear to have been performed since the 1991 Site Screening Inspection.

## 2.3 Regulatory Permits and Inspections

This section describes Federal and State operating permits and inspections at the facility.

### 2.3.1 U.S. Environmental Protection Agency

The facility is listed in the following EPA databases:

- Resource Conservation and Recovery Information System (RCRIS) database as a Resource Conservation and Recovery Act (RCRA) Large Quantity Generator (LQG) of hazardous waste under the EPA ID No. NY8360007282 for biennial reporting purposes (Ref. 22).
- EPA Air Facility System database under ID No. 3602700037 for the use of steam generators and diesel engines (Ref. 22).
- EPA Toxic Release Inventory System under ID No. 12511VHDSNRTE9D for the use of ethylene oxide (Ref. 22).

EPA performed a RCRA Compliance Evaluation Inspection of the facility on April 6, 2011, and on December 4, 2013 (Ref. 22). No violations or compliance issues were identified in the file material (Ref. 22).

### 2.3.2 State of New York

The facility is listed in the New York Facility Information System database under ID No. 3-1330-00050 for the following activities (Ref. 22):

- water quality certification (00003 and 020001);
- air facility registration (02000);
- SPDES (NY00200087);
- excavation and fill in navigable waters (00002, 00007, and 020002);
- process, exhaust and ventilation systems construction (00008) and operation (020003 and 00005);
- incinerator construction (00006) and operation (00007); and
- surface water discharge (00009).

The facility operates under a NY State Safe Drinking Water Act permit, ID No. NY1319255, for the use of Hudson River water and on-facility groundwater pumping wells for potable use, and for operating an on-facility potable water pumping and treatment system (Ref. 22).

The facility also operates under a National Priorities Discharge Elimination System (NPDES) permit, ID No. NYU300094, for operating the on-facility wastewater treatment system (Ref. 22).

No other permits, substantive violations or enforcement actions were noted in public records researched by Mabbett during preparation of this SI report.

# 3. OPERATIONAL HISTORY AND WASTE DISPOSAL PRACTICES

This section describes the operational history of the site, as well as a description of the wastes generated, waste disposal practices, waste areas (including containment and quantities) based on historical information.

## 3.1 Operational History

This section describes the VA's operational history that led to the generation of wastes at the facility. This information was obtained from background documents and site reconnaissance.

### 3.1.1 Waste-Generating Operations and Disposal Practices

Since 1924, the VAMC-CP generated wastes from the following activities:

- Operating a medical facility that generated regulated hazardous wastes requiring disposal (Ref. 1, 12)
- Operating a boiler/incinerator plant that generated boiler and incinerator ash (Ref. 1, 12).

The VA disposed of these wastes in six unauthorized and non-permitted landfills at the facility until approximately 1978 (Ref. 1, 3). None of the landfills contained a liner, run-off controls, or leachate collection systems (Ref. 1, 3). Additionally, the bottoms of the landfills were located at or below the groundwater table (Ref. 1, 3). All of the landfills were reportedly covered with "dirt from the construction of the new powerhouse, new chiller house, and new water treatment plant" (Ref. 1, 3). However, no information was available in the file material or from facility contacts confirming the actual thickness or chemical composition of the cover material.

In addition, coal and boiler/incinerator ash may have been improperly disposed of around the area of the former boiler plant (Ref. 1, 3).

A detailed description of each disposal area is provided in the following section and summarized in Table 3-1. Figure L-3 depicts the location of these disposal areas at the facility.

No other waste disposal areas are known to exist at the facility, and no new waste disposal areas have been created (Ref. 12).

### 3.1.2 Landfill A (Ref. 1, 3, 12)

Landfill A has a gravel "cover" blanketed with topsoil. This was placed on top of the fill in this landfill in the late 1970s/early 1980s. There is no liner, run-off controls, or leachate collection system in place. The approximate volume of materials placed inside this landfill is estimated to be 130,000 cubic feet. The exact location or extent of the potentially hazardous materials within this landfill area is not known. This landfill reportedly contained paints, oils, solvents, mercury, asbestos, medical and surgical infectious waste, batteries (lead acid), laboratory chemicals, pharmaceuticals, incinerator ash, building components, discarded mechanical equipment, and paper products. There have been several historic fires in this landfill, one lasting a week. This area is fenced (Ref. 12).

Within and at the southern end of Landfill A is a "Waste Pile" (Ref. 1). This area was used by VA to dispose of larger discarded equipment and containers, such as medical equipment, drums, batteries, cylinders, and waste oil containers (Ref. 1).

### 3.1.3 Landfill B (Ref. 1, 3, 12)

Landfill B adjoins Landfill A on the west and was part of an original "refuse dump" which now belongs to the Town of Wappinger. All land north of the property line has been redeveloped as the Castle Point Park. There is no liner, run-off controls, or leachate collection system in place. A gravel cover blanketed with topsoil was placed on top of the fill in this area. The total volume of this area was estimated at approximately 9,000 cubic feet, but the exact location and extent of hazardous materials reportedly disposed of in this area is unknown. The fill reportedly contained construction debris, solvents, and household trash, with tires and disposed drums present on top of the fill.

### 3.1.4 Landfill C (Ref. 1, 3, 12)

Landfill C, also called the "fire training facility", adjoined Landfill B on the west and the Town of Wappinger property on the north. A "fire pit" was present in the center of the area, approximately 100 by 200 feet and 10-feet below the surrounding land. There is no liner, run-off controls, or leachate collection system in place. A gravel cover blanketed with topsoil was placed on top of the fill in this area. Reportedly, the majority of the fill in this area consisted of construction debris and fill dirt. Field observations made as part of historic facility investigations reported maintenance chemicals, oils, mechanical parts, electrical devices, and paper products at the surface or partially buried.

### 3.1.5 Landfill D (Ref. 1, 3, 12)

Landfill D is located south of Boggy Pond, surrounding the pond's southern tip, and extends to the main campus road. There is no liner, run-off controls, or leachate collection system in place. A gravel cover blanketed with topsoil was placed on top of the fill in this area. The total volume of this area was estimated at approximately 30,000 cubic feet, but the exact location and extent of the hazardous material within this area is unknown. The area reportedly contained construction debris, fill dirt from excavations for buildings, pipe tunnels and an old grave yard.

Landfill D is adjacent to the southern end of Boggy Pond, a shallow surface water body at the facility (Ref. 12).

### 3.1.6 Landfill E (Ref. 1, 3, 12)

Landfill E is located south of the former boiler plant, adjoining the facility's southwestern border. There is no liner, run-off controls, or leachate collection system in place. A gravel cover blanketed with topsoil was placed on top of the fill in this area. The total volume of this area was estimated at approximately 5,000 cubic feet, but the exact location and extent of the hazardous material within this area is unknown. Construction debris and debris from before VA purchased the property were reportedly dumped here, as well as other trash. In addition, the adjacent property to the south was vacant and reportedly used for illegal dumping for years; there have been observations of dumping refrigerators, cars, bottles, etc. on the adjacent property. Prior to construction of the facility fence, some of the materials dumped on the adjacent property may also have been dumped on the VAMC-CP property.

Landfill E is reportedly where a former pond existed (Ref. 3). In 1991, the surface water stream of rainfall runoff as well as the treated wastewater of the main campus passed through Landfill E (Ref. 3). Landfill E is also within the Hudson River flood zone (Ref. 3).

### 3.1.7 Landfill F (Ref. 1, 3, 12)

Landfill F is located along the road from the water plant to the wastewater plant. There is no liner, run-off controls, or leachate collection system in place. The total volume of the area was estimated at approximately 12,000 cubic feet, but the exact location and extent of the hazardous material within this area is unknown. The area reportedly contains construction waste, excess fill from excavations on the property, paints, solvents, mercury, syringes, and grass cuttings.

### 3.1.8 Former Boiler Plant

The Former Boiler Plant area contained a former incinerator, boiler plant, and steam generator. The area had numerous tanks containing fuel oil for use in the boilers (Ref. 1). The buildings and transmission lines in this area stopped being used in the early 1980's, and were demolished in 2010 (Ref. 12). This area is located north of Landfill E (Ref. 12). As previously described, boiler and incinerator ash generated by the VA has been identified in the landfills (Ref. 1, 3). However, coal and generated ash may have been disposed of in the area around the building, such that the soil in this area may be potential waste source.

**Table 3-1: Waste Disposal Areas (Ref. 1, 3, 12)**

| Disposal Area Name | Reported Length (ft) | Reported Width (ft) | Reported Depth (ft) | Area (square feet) | Approximate Volume (cubic yards) | Reported Contents | Accessibility |
|---|---|---|---|---|---|---|---|
| Landfill A | 300 | 600 | 20 | 180,000 | 130,000 | Paints, oils, solvents, mercury ("baby jars"), asbestos, medical and surgical infectious waste, batteries, laboratory chemicals, and incinerator ash<br><br>Waste Pile included discarded medical equipment, drums, batteries, cylinders, and waste oil containers | Covered with gravel and topsoil. Currently forested.<br><br>Enclosed by locked fence |
| Landfill B | 100 | 50 | 16 | 5,000 | 9,000 | Solvents, construction debris, tires, empty drums, and household trash | Covered with gravel and topsoil. Vegetated (grass).<br><br>No enclosure |
| Landfill C | 500 | 300 | 20-30 | 150,000 | Unknown | Construction debris and fill, possibly car maintenance chemicals and oils | Covered with gravel and topsoil. Currently forested.<br><br>No enclosure |
| Landfill D | 500 | 200 | 8 | 100,000 | 30,000 | Construction debris and fill | Covered with gravel and topsoil. Vegetated (grass and trees).<br><br>No enclosure |
| Landfill E | 100 | 350 | 4 | 35,000 | 5,000 | Construction debris and household trash | Covered with gravel and topsoil. Currently forested.<br><br>No enclosure |

| Disposal Area Name | Reported Length (ft) | Reported Width (ft) | Reported Depth (ft) | Area (square feet) | Approximate Volume (cubic yards) | Reported Contents | Accessibility |
|---|---|---|---|---|---|---|---|
| Landfill F | 100 | 550 | 6 | 55,000 | 12,000 | Construction waste, fill, paints, solvents, mercury, syringes, and grass cuttings | Covered with gravel and topsoil. Currently forested.<br><br>No enclosure |
| Former Boiler Plant | 100 | 280 | 9 | 28,000 (estimated: scored as unknown area) | 4,000 | Coal, boiler/incinerator ash | Covered with gravel and topsoil. Vegetated (grass). A 2,400 square foot building covers the northern portion where coal and ash may have been released.<br><br>No enclosure<br><br>Would be considered Contaminated Soil source type |

## 4. WASTE/SOURCE SAMPLING

This section describes the 2013 SI sampling that was performed by Mabbett to assess the nature and extent of chemicals associated with each waste disposal area described above, and to assess whether the waste disposal areas met the HRS definition of a *source*.

### 4.1 Soil Samples

As prescribed by the VA, only subsurface soil samples (greater than 2 feet below ground) was included in the SI scope of work. No surface soil (0-2 feet below ground) samples were collected.

#### 4.1.1 Subsurface Soil Samples

During the 2013 SI, subsurface soil samples were collected from borings located around the approximate perimeter of each landfill and around the former boiler plant, as specified by the VA in the scope of work. The location of the borings is presented in Figure L-3.

From December 2-6, 2013, Mabbett subcontracted a drilling contractor to advance five soil borings around the perimeter of each landfill and the former boiler plant area to depths of approximately 15 to 20 feet below ground surface. Boring Logs for these installations are included in Appendix B.

From each boring, Mabbett collected one subsurface soil sample from approximately 1-foot above the apparent water table (approximately 4-5 feet below grade), and a second subsurface soil sample from a depth interval that appeared to have the highest level of potential contamination based on field observations including odor, staining, and elevated photoionization detector (PID) readings according to NYSDEC DER-10 Guidance.

Collected subsurface soil samples were submitted under chain-of-custody procedures to Mabbett's subcontracted laboratory Alpha Analytical Laboratory (Alpha) in Westford, Massachusetts. Alpha is a NYSDEC and New York State Department of Health (NYS DOH) certified laboratory. Samples were submitted for the following analyses:

- Volatile Organic Compounds (VOCs),
- Semi-Volatile Organic Compounds (SVOCs),
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Pesticides,
- Polychlorinated Biphenyls (PCBs),
- Metals,
- Cyanide,
- Total Petroleum Hydrocarbons (TPH), and
- Total Organic Carbon (TOC).

### 4.2 Analytical Results

The laboratory-reported analytical data were independently validated by Mabbett's subcontractor Environmental Data Services, Inc. in Williamsburg, Virginia in accordance with NYSDEC guidance. Validated

laboratory reports are provided in Appendix D – Laboratory Analytical Reports and Data Usability Summary Report. A table summarizing the soil data is provided in the Tables tab of this report as Table 4-1.

The subsurface soil data indicated that subsurface soil samples associated with each landfill and the former boiler plant area contained hazardous substances at elevated concentrations. Hazardous substances included one or more of organic compounds including organochlorine pesticides, PCBs, SVOCs and VOCs, and inorganic compounds including heavy metals.

## 4.3 Conclusions

The VA disposed of wastes at six landfills until at least 1978 (Ref. 3). There are no records of a liner or leachate collection system at any of the landfills. While the landfills were reportedly covered with "dirt," there is no record of formal capping with at least two feet of clean fill. At the former boiler plant area, the data indicate that wastes have contaminated subsurface soils. There is no cover over the soil in the former boiler plant area.

The 2013 SI subsurface soil sample data indicated that all of the landfills and the former boiler plant area subsurface soils contained hazardous substances. Accordingly, each landfill and the former boiler plant area met the HRS definition of a source. The hazardous substances detected in the subsurface soils are considered available to migrate to the groundwater, surface water, and air pathways.

Although no surficial soil (0-2 feet below ground) was collected during the 2013 SI, historical sampling during the 1991 Screening Site Inspection identified an area of observed contamination in surficial soil located between the former boiler plant area and two of the landfills (Ref. 1). Concentrations of hazardous chemicals detected in this area were equal to or greater than three times the concentrations detected in background samples. Therefore, this contaminated surficial soil meets the definition of a source for the soil exposure pathway. Table 4-2 is provided in the Tables tab of this report presents the data collected in 1991 for surface soils, and Table 4-3 compares the 1991 soil data versus the 2013 data.

## 5. GROUNDWATER AND SURFACE WATER MIGRATION PATHWAYS

The following sections evaluate the SI data and the potential for chemicals to be released to each pathway.

### 5.1 Groundwater Pathway

#### 5.1.1 Hydrogeology

The VAMC-CP is underlain by a Pleistocene-origin overburden consisting of lacustrine silt and clay deposits in the northwestern portion of the facility and glacial outwash sand and gravel deposits in the southeast (Ref. 3). In general, the glacial outwash deposits are considered to be unstratified drift consisting of a heterogeneous mixture of rock fragments including clay, cobbles, and boulders. The thickness of this unit is approximately 200 feet (Ref. 9). Beneath these overburden deposits is Paleozic-age bedrock of the Hudson River Formation, which is comprised primarily of slate and shale, with some chert and sandstone, limestone, and conglomerate beds. Slaty cleavage in this unit has produced numerous small, closely spaced subparallel joints and fractures (Ref. 3). The thickness of this formation ranges from between a few feet to several thousand feet; however, the thickness in the vicinity of the facility is unknown (Ref. 9).

Two aquifers underlie the VAMC-CP facility: the glacial outwash sand and gravel unit and the underlying Hudson River Formation bedrock (Ref. 3). The sand and gravel unit has an estimated permeability of greater than $10^{-3}$ cm/sec. Most groundwater storage and movement in the Hudson River Formation occurs in the joints and fractures, and permeability in this unit is presumed to be westerly, towards the Hudson River. The Hudson River Formation has an estimated permeability of greater than $10^{-6}$ cm/sec.

The facility is located in the HUC 12 Wicopee Creek-Fishkill Creek watershed (ID No. 020200080306), which is located within the larger HUC 8 Hudson-Wappinger watershed (ID No. 02020008) (Ref. 22). Historically available information indicates that the site is not located within a wellhead protection area (Ref. 1, 3). In order to confirm this, a verbal request was made to the NYS DOH, Dutchess County. During this discussion, the NYS DOH could not confirm whether or not the site is located within a wellhead protection area. According to the East Fishkill Master Plan, the site is not located inside any lands managed to protect public (or private) drinking water supplies (Ref. 30). The NYS DEC lists the Fishkill Aquifer as the closest Primary Aquifer to the Site, located approximately 1 mile to the east (Ref. 15, 28). The DEC also considers all Primary Aquifers to also be sole source aquifers, as defined by EPA (Ref. 15, 28).

Precipitation is the primary type of recharge to the sand and gravel unit and the underlying Hudson River Formation (Ref. 3). Discharge is by wells, natural seepage, and evapotranspiration (Ref. 3). Water flow in the sand and gravel unit is anticipated to move by gravity from high to low elevations (Ref. 3). Based on groundwater wells installed during the 2013 SI, the depth to ground water at each source area is approximately 5 feet below ground surface (Ref. 12).

The western border of the facility is adjacent to the Hudson River (Ref. 12). Based on the site topography and geology and available hydrogeologic information, groundwater at the site is anticipated to flow from east to west, and discharge into the Hudson River. The Hudson River is considered to be a groundwater divide due to its magnitude (Ref. 9, 12, 15). Therefore, the Hudson River effectively prevents the groundwater migration pathway from extending beyond the western

bank of the Hudson River. While groundwater and resources on the western side of the Hudson River are depicted in the attached figures, groundwater migration pathway targets west of the Hudson River were not evaluated as part of this pathway.

### 5.1.2 Groundwater Migration Pathway Targets

Four drinking water wells are located at the facility and within 0.25 miles of the source areas (Ref. 12). The four wells are owned and operated by the VAMC-CP for use only by the VAMC-CP (Ref. 12). The VA groundwater system supplies approximately 70,000 gallons of potable water per day to the VAMC-CP population of approximately 1,500 patients and workers (Ref. 12). The information available to date for each well is provided in the following list (Ref. 12):

**Table 5-1: On-Site Potable Water Wells**

| Well ID | Well Diameter (inches) | Screened Location | Total Depth (feet) | Date Installed | Status |
|---|---|---|---|---|---|
| PW-B | 6" | Gravel overburden | 36 | installed 11/6/75 | In use |
| PW-C | 6" | Gravel overburden | 36 | installed 11/6/75 | In use |
| PW-D | 8" | Gravel overburden | 29.5 | installed 11/6/75 | Not in use; bacteriological contamination |
| PW-E | 6" | Gravel overburden | 36 | installed 9/22/75 | Not in use; bacteriological contamination |

No additional information about well construction or screen intervals was available from the file material or the VA. According to the VA representative, only wells PW-B and PW-C are currently in use (Ref. 12). Wells PW-D and PW-E are considered by the VA to be contaminated with bacteriological contaminants; the VA has no current plan for extracting groundwater from these wells for any use (Ref. 12).

Currently, water from wells PW-B and PW-C are not blended with any other groundwater or surface source (Ref. 12). Until six to seven years ago, the VA blended 30% of the groundwater with 70% of surface water obtained from a VA-owned intake located on the Hudson River approximately one mile north of the facility (Ref. 9, 12). Currently, the VA does not use the intake and relies solely on groundwater for its drinking water; however, the VA is also considering the potential future use of the surface water intake for potable water (Ref. 12).

Potable water within a four-mile radius of the facility is obtained from private wells, and from municipal supplies obtained from groundwater wells, surface water reservoirs, and the Hudson River (Ref. 3). Potable water is used for private drinking water, public community water systems, industrial processes, and irrigation (Ref. 3). Not including the VAMC-CP population, over 60,000 people obtain drinking water from private or municipal groundwater or surface water sources located within 4-miles of the facility (Ref. 12, 17). The locations of these water sources are provided in Figure L-5.

The population numbers and figures presented are complete for all persons located within 4 miles of the Site; however the Hudson River is considered to be a groundwater divide. Therefore persons and utilities located west of the Hudson River were not accounted for in the HRS scoring.

**Table 5-2: Approximate Population Within 4 Miles (Ref. 17, 29):**

| Distance | Onsite | Number of Residents within the 4-mile target distance limit |
|---|---|---|
| 0.00 to 0.25 miles | 1,500 | 180 |
| 0.25 to 0.50 miles | -- | 490 |
| 0.50 to 1.0 miles | -- | 2,976 |
| 1.0 to 2.0 miles | -- | 10,509 |
| 2.0 to 3.0 miles | -- | 18,893 |
| 3.0 to 4.0 miles | -- | 27,357 |

A Freedom of Information Act (FOIA) request was submitted to NYS DOH requesting locational and well construction information of all registered potable wells located within approximately four miles of the facility. Table 5-3, provided in the Tables tab of this report, was provided by NYS DOH in response to this request. The table summarizes the names and state ID numbers of each of the potable water wells, but does not provide exact locational information, solely the names of the towns in which the wells are located. The wells mapped on Figure L-5 were obtained from the New York State Geographical Information System (GIS) website (Ref. 31).

### 5.1.3 Sample Locations

The four on-site potable drinking water wells PW-B, PW-C, PW-D, and PW-E were sampled during the 2013 SI. Samples were collected prior to the facility treatment system. Additionally, the VA provided laboratory analytical data for groundwater samples collected by VA following the on-site treatment system but prior to distribution for on-site potable use; samples were collected on July 24, 2013 and September 11, 2013. None of the collected groundwater samples were filtered prior to laboratory analysis. All four potable wells are considered to be hydrologically down gradient from the source areas based on topography (Ref. Site visit). These four wells were regarded as primary targets to assess potential population exposure to possible contaminants in the groundwater. Figure L-3 shows sample locations.

In addition, seven temporary, one-inch groundwater monitoring wells were installed down gradient from each potential source area (e.g. Landfills A through F [MW-A through MW-F], and Former Boiler Plant [MW-BP and MW-I]). Due to logistical constraints, there was not an opportunity to develop the temporary wells prior to sampling; however, wells were purged using EPA Low Stress methodology (e.g. low flow peristaltic pumping) for a minimum of 30 minutes prior to sampling and groundwater quality parameters (pH, temperature, dissolved oxygen, redox potential, turbidity) were continuously measured and allowed to stabilize prior to collecting samples. None of the collected groundwater samples were filtered prior to laboratory analysis, and some of them stabilized above 5 NTUs which qualify as still being turbid. Details regarding the sampling and turbidity can be found on the groundwater quality parameter field data forms presented in Appendix C. The collected groundwater samples were submitted under chain-of-custody procedures to Alpha Analytical Laboratory for

laboratory analysis for VOCs, SVOCs, Pesticides and PCBS, and total metals. The laboratory analytical data were validated by Environmental Data Services, Inc. The validated analytical data for samples collected from these wells were used to assess whether an observed release of hazardous substances from the source areas had occurred to groundwater. All seven groundwater monitoring wells ranged in depth 15 to 25 feet and were screened in the overburden sand and gravel aquifer (the same aquifer as the on-site potable wells). The groundwater monitoring well MW-F was the most upgradient well and served as the well best representing "background" conditions. Figure L-3 shows sample locations, and Table 5-4 under the Tables tab of this report presents the groundwater sampling data.

No samples were collected from other off-site groundwater or potable drinking water wells located within the 4-mile target distance limit. The rationale was that groundwater collected from the on-site potable wells would best represent the contaminants potentially migrating from the source to groundwater used for drinking water.

### 5.1.4 Analytical Results

The seven groundwater wells located down gradient from Landfills A through E (MW-A through E) and the former boiler plant (MW-BP and MW-I) and from the four on-site potable groundwater wells (PW-B, PW-C, PW-D, PW-E) were compared to the upgradient background groundwater monitoring well MW-F to assess whether an observed release to groundwater from the source areas occurred.

Based on chemical analysis, Level I concentrations meeting EPA's definition of an observed release (3x above background) and actual contamination at or above the January 2014 Superfund Chemical Data Matrix (SCDM) benchmark (e.g. EPA MCLs, non-zero MCLs) were not detected in any on-site potable drinking water wells.

Based on chemical analysis, Level II concentrations for the following hazardous substances meeting the definition of an observed release (3x above background) but below the SCDM benchmark (e.g. EPA MCLs, non-zero MCLs) were detected in the following on-site potable drinking water wells:

- Chromium – PW-D
- Copper – PW-B, PW-D, PW-E
- Cyanide – PW-B
- Lead – PW-D, PW-E
- Nickel – PW-B, PW-D, PW-E
- Potassium – PW-B
- Zinc – PW-D, PW-E

All of these Level II hazardous substances (chromium, copper, cyanide, lead, nickel, potassium, and zinc) were detected in one or more of the subsurface soil samples associated with the source areas.

All four drinking water wells can be considered to be subject to potential contamination, where concentration is above the detection limit, but less than 3x background and below the SCDM benchmarks (e.g. EPA MCLs, non-zero MCLs). Table 5-4 presents all of the groundwater data, and concentrations detected.

It should be noted that all of the analytical results for the collected on-site potable drinking water well samples were below Federal primary drinking water Maximum Contaminant Levels (MCLs).

Furthermore, the potable water well samples were collected prior to undergoing on-site treatment; potable water is treated with chlorine and suspended solids are allowed to settle prior to distribution for on-site consumption. Post treatment data for the substances identified above are summarized in Table 5-5. The analytical data for post-treatment groundwater samples was also below MCLs.

### 5.1.5 Groundwater Migration Pathway Conclusions

Due to the lack of any groundwater containment system at the landfills, an observed release has occurred from the source areas to groundwater, documented by chemical analysis of hazardous contaminants. The on-site potable drinking water wells located within 0.25 miles from the source areas contained detectable concentrations of certain hazardous chemicals potentially attributable to the source area wastes above background concentrations. These concentrations were measured in potable well samples collected upstream of the potable water treatment system. Post treatment potable water is below all applicable MCLs. The concentrations met the criteria for Level II contamination for inorganic compounds (cyanide, chromium, copper, lead, nickel, and zinc). These on-site drinking water wells are used by approximately 1,500 people at the VAMC-CP. However, the samples collected from groundwater monitoring wells and potable wells were not filtered prior to analysis. Additionally, the groundwater monitoring wells were not developed prior to sampling. A number of the wells, including the potable water wells, were turbid (greater than 5 NTU), while the background well was not turbid. Lack of development and lack of filtration of turbid wells may have resulted in elevated concentrations of metals and other contaminants due to the adhesion of these contaminants to the suspended solids in the water samples. This adhesion can increase the detected concentrations of chemicals in water samples, thereby biasing sample concentrations high. Should the filtered data indicate that none of the potable groundwater well samples contain concentrations of metals three times higher than similarly filtered background groundwater wells samples, this would have the effect of eliminating Level II targets and thereby decreasing the groundwater pathway score and overall site score.

The Level II nearest well factor value is 45, and the population factor value is 1,500 (1,500 users x 1).

The potential contamination factor value is 346. Table 5-6 presents a summary of the populations evaluated.

**Table 5-5: Post-Treatment Potable Water Data**

| | | Benchmarks | | Post Treatment Drinking Water Sample | |
|---|---|---|---|---|---|
| **Hazardous Substance** | **Units** | **EPA MCL** | **EPA Tap Water Screening Level** | **7/24/2012** | **9/11/2012** |
| Cyanide, Total | ug/l | 200 | 1.4 | ND (10) | ND (10) |
| Aluminum, Total | ug/l | 50[a] | 16000 | - | - |
| Antimony, Total | ug/l | 6 | 6 | ND (3.0) | ND (3.0) |
| Arsenic, Total | ug/l | 10 | 0.045 | ND (1.0) | ND (1.0) |
| Barium, Total | ug/l | 2000 | 2900 | 44 | 47 |
| Beryllium, Total | ug/l | 4 | 16 | ND (0.30) | ND (0.30) |
| Cadmium, Total | ug/l | 5 | 6.9 | ND (1.0) | ND (1.0) |
| Calcium, Total | ug/l | NONE | NONE | 84700 | - |
| Chromium, Total | ug/l | 100 | 16000 | ND (1.0) | ND (1.0) |
| Cobalt, Total | ug/l | NONE | 4.7 | - | - |
| Copper, Total | ug/l | 1300 | 620 | 27 | - |
| Iron, Total | ug/l | 300[a] | 11000 | ND (5.0) | ND (5.0) |
| Lead, Total | ug/l | 15 | NONE | ND (1.0) | - |
| Magnesium, Total | ug/l | NONE | NONE | 19600 | - |
| Manganese, Total | ug/l | 50[a] | 320 | ND (2.0) | ND (2.0) |
| Mercury, Total | ug/l | 2 | 0.63 | ND (0.20) | ND (0.20) |
| Nickel, Total | ug/l | NONE | 300 | ND (2.0) | ND (2.0) |
| Selenium, Total | ug/l | 50 | 78 | ND (2.0) | ND (2.0) |
| Silver, Total | ug/l | 100[a] | 71 | ND (2.0) | ND (2.0) |
| Sodium, Total | ug/l | NONE | NONE | 86000 | 75200 |
| Thallium, Total | ug/l | 2 | 0.16 | ND (1.0) | ND (1.0) |
| Vanadium, Total | ug/l | NONE | 63 | - | - |
| Zinc, Total | ug/l | 5000[a] | 4700 | 13 | 16 |

Notes:
ND = not detected at or above the laboratory reported method detection limit provided in parentheses
a = EPA MCL secondary standard
- = not analyzed
NONE = no standard exists

**Table 5-6. Groundwater Population for the Overburden Sand and Gravel Aquifer**

| **Level I Concentrations** | | | |
|---|---|---|---|
| Level I Wells | Population (individuals) | | Reference |
| none | none | | (Ref. 12) |
| Level I Concentration Factor Value: 10 x none = 0 | | | |
| **Level II Concentrations** | | | |
| Level II Wells | Population (individuals) | | Reference |
| PW-B, PW-D, PW-E | 1,500 | | (Ref. 12) |
| Level II Concentration Factor Value: 1 x 1,500 = 1,500 | | | |
| **Potential Contamination** | | | |
| Distance Category (miles) | Population (individuals) | Distance-weighted Population Value (non-karst) (HRS Table 3-12) | Reference |
| 0.00 to 0.25 miles | 0 (excludes Level I and II population) | 0 | Ref. 12 |
| 0.25 to 0.50 miles | 490 | 11 | Ref. 17, 29 |
| 0.50 to 1.0 miles | 2,976 | 523 | Ref. 17, 29 |
| 1.0 to 2.0 miles | 10,509 | 939 | Ref. 17, 29 |
| 2.0 to 3.0 miles | 18,893 | 678 | Ref. 17, 29 |
| 3.0 to 4.0 miles | 27,857 | 1,306 | Ref. 17, 29 |
| Potential Contamination Factor Value: 0.1 x [11 + 523 + 939 + 678 + 1,306] = 346 | | | |
| **Total Population Factor Value: 1,500 + 346 = 1,846** | | | |

Based on these data, the HRS score for the groundwater migration pathway is 100, with an uncapped score of 408. Based on the groundwater pathway score alone, the overall site score is above 28.5 due to the maximum groundwater migration pathway score. For completeness, the remaining pathways are described below and included in the scoring package.

Historic potable water data is presented on Table 5-7, in the Tables tab of this report. This data was used for comparison purposes and was not included in the calculation of the HRS score for the site.

## 5.2 Surface Water Pathway

### 5.2.1 Hydrogeologic Setting

The source areas are bordered to the south by an intermittent drainage swale (Ref. 12) (see Figure L-4). The drainage swale is approximately 3 feet wide and 6-inches deep, and is approximately 0.7 miles long (approximately 11,000 square feet) (Ref. 12). The drainage swale originates in a residential area located to the east of the facility, then enters the facility on the eastern border where it travels through a subsurface culvert, then is exposed just south of Administration Circle (Ref. 12). The drainage swale then flows west, passing to the south of Landfills D, F, then exits the facility through a subsurface pipe, reenters the facility south of Landfills A and E and the former boiler plant area, enters an underground culvert passing beneath the railroad, then discharges into the Hudson River (Ref. 12). There are no wetlands located along this intermittent drainage swale. Because the drainage swale is intermittent, it is not an in-water surface water pathway to the Hudson River. Based on overland flow, the outfall at the Hudson River is considered the Probable Point of Entry.

Boggy Pond is an on-site surface water body, located directly adjacent to and down gradient from Landfill D along the northern property boundary (Ref. 12). Boggy Pond is oblong and is approximately 110 feet long by 50 feet wide (approximately 5,200 square feet) and approximately 6 inches deep (Ref. 12). Overland run-off from Landfill D may enter the southern end of Boggy Pond (Ref. 12). Boggy Pond drains north through off-site wetlands into the western branch of the "Hudson River Tributary 6D," which has a flow rate of 0.02 cfs (Ref. 1, 3). This tributary flows through a primarily residential area northeast of the facility and discharges into the Hudson River, approximately one-mile north of the facility (Ref. 12).

The Hudson River is located adjacent to the western boundary of the facility (Ref. 12). The Hudson River has a flow rate of approximately 17,000 cfs (Ref. 3). The Hudson River, from the Albany area down through New York City to the Lower Hudson Bay, is considered to be tidally influenced (Ref. 9).

Portions of the facility, including the former boiler plant and Landfill E are located within the 100-year floodplain (Ref. 3). Boggy Pond and portions of Landfill D are located within the 500-year floodplain (Ref. 3, 4).

The two-year 24-hour rainfall is 2.64 inches (Ref. 3, 32).

### 5.2.2 Surface Water Migration Pathway Targets

The surface water migration pathway was evaluated based on overland flow of surface water to Boggy Pond, and from the intermittent drainage swale into the Hudson River. Because the drainage swale is intermittent, there is no in-water segment for evaluation. The probable point of entry for Boggy Pond is adjacent to Landfill D. Third probable point of entry is located where the Boggy Pond tributary stream discharges into the Hudson River approximately 1 mile north of the facility.

Although specific hydrogeological information was not obtained to confirm a groundwater to surface water pathway, this pathway was also evaluated because groundwater in the shallow overburden sand and gravel aquifer is likely to discharge into the Hudson River.

### 5.2.3 Drinking Water Threat

The VAMC-CP maintains a surface water intake in the Hudson River, slightly upstream of the drainage ditch discharge (Ref. 12). However, the VAMC-CP currently does not use this surface water intake for potable water. The VA is currently investigating the possibility of using the surface water intake but as of the submittal of this report, surface water is not used for potable water (Ref. 12). The surface water intake is not used for drinking water supply at least once per year; as such, the surface water intake does not meet the HRS definition of the nearest intake (see HRS Guidance 8.10, page 281). Since the VAMC-CP does not currently use this intake, the HRS score did not evaluate this intake when scoring the surface water pathway. If the intake does come into use, this could change the HRS scoring for the surface water pathway.

Additional drinking water intakes on the Hudson River within the 15-mile downstream target distance limit of the probable point of entry (PPE) of the facility include New York City (1.2 miles from the facility), the Town of Highland (11.3 miles from the facility), and the City of Poughkeepsie (11.5 miles from the facility) (Ref. 3).

**Table 5-8: Hudson River Drinking Water Intakes in Surface Waters (Ref. 3, 29, 33)**

| Intake | Distance | Population | Approx. Flow (cfs) |
|---|---|---|---|
| Highland Falls | 11.3 mi | 4,500 | 17,700 |
| Poughkeepsie area | 11.5 mi | 75,000 | 17,700 |

### 5.2.4 Human Food Chain Threat

Boggy Pond and the other surface water bodies at the facility are not known to be used for fishing or other sources of food for human consumption (Ref. 12).

The Hudson River is considered to be a fishery, and contains many edible species of fish, including American shad and herring (Ref. 3, 17). Locations of known fisheries within the 15-mile target distance limit are shown on Figure L-6. In the area of the facility, the Hudson River is a NYSDEC classified Class A waterbody (Ref. 3, 9, 14, 15). The Hudson River is known to contain PCB contamination (Ref. 33).

### 5.2.5 Environmental Threat

Boggy Pond drains through approximately 30 acres of wetlands along Hudson River Tributary No. 6D before the tributary discharges into the Hudson River (Ref. 3). Other than the wetlands, there are no known sensitive environmental receptors along the tributary. These wetlands are isolated and disconnected from the Hudson River.

There are wetlands located north and south of the facility along the Hudson River. Approximately 470 acres of wetlands border the Hudson River within 15-miles of the Site (Ref. 3, 4, 9).

Based on available historical information (Ref. 3), numerous sensitive environments exist along the Hudson River within 15-miles down gradient of the facility, including State endangered/threatened species habitats (estuary beggar ticks, osprey, heartland plantain); critical habitats for federally designated endangered species (shortnose sturgeon); and habitat used by Federally designated endangered species (bald eagle) (Ref. 3). Table 5-9 discusses the downstream sensitive environments within 15-miles down gradient of the facility in more detail.

**Table 5-9 Sensitive Environments Within 15 Miles of Facility (Ref. 3).**

| Sensitive Environment | Environment Type | Water Body Type | Flow (cfs) | Distance |
|---|---|---|---|---|
| Hudson River Tributary 6D | SDA- PAL | Stream | 0.02 | 0 feet |
| Hudson River | SDA- PAL | Large River | 17,700 | 130 feet |
| Wappingers Creek (mouth) | Unique biotic community | Large River | 17,700 | 2.8 miles |
| | SE/TS (estuary beggar ticks) | | | |
| | Spawning area | | | |
| Fishkill Creek (mouth) | Spawning area | Large River | 17,700 | 4.3 miles |
| | Migratory pathway for anadromous fish | | | |
| | S-AF (waterfowl concentration area) | | | |
| | SE/TS (osprey) | | | |
| | SE/TS (estuary beggar ticks) | | | |
| | SE/TS (heartland plantain) | | | |
| | Unique biotic community | | | |
| Poughkeepsie Deepwater Habitat | CH-FES (shortnose sturgeon) | Large River | 17,700 | 4.5 miles |
| | Spawning area | | | |
| Sloop Hill | Unique biotic community | Large River | 17,700 | 5.7 miles |
| Moodna Creek (mouth) | Spawning area | Large River | 17,700 | 6.3 miles |
| | Migratory pathway for anadromous fish | | | |
| | S-AF (waterfowl concentration area) | | | |
| | SE/TS (osprey) | | | |
| | Species under review (estuary hatpins) | | | |
| | Unique biotic community | | | |
| Hudson River (mile 44 to 56) | CH-FES (shortnose sturgeon) | Large River | 17,700 | 7.5 miles |
| | HU-FES (bald eagle) | | | |
| | Migratory pathway for anadromous fish | | | |
| | Spawning area | | | |
| Storm King | Unique biotic community | Large River | 17,700 | 7.5 miles |
| Foundary Cove | Migratory pathway for anadromous fish | Large River | 17,700 | 10 miles |
| | S-AF (waterfowl concentration area) | | | |
| Constitution Marsh | Spawning area | Large River | 17,700 | 11 miles |
| | Migratory pathway for anadromous fish | | | |
| | S-AF (waterfowl concentration area) | | | |
| | SE/TS (osprey) | | | |
| | SE/TS (pigmyweed) | | | |
| | Unique biotic community | | | |
| Con Hook | SE/TS (small bulrush) | Large River | 17,700 | 15 miles |
| | Unique biotic community | | | |

SDA- PAL: State-designated area for the protection of aquatic life
SE/TS: State endangered/threatened species
S-AF: Semi-aquatic foragers
HU-FES: Habitat used by Federally designated endangered species
CH-FES: Critical habitat for Federally designated endangered species

### 5.2.6 Sample Locations

During the 2013 SI, eleven (11) sediment samples were collected to evaluate the overland surface water pathway, including one (1) background sample. The sample locations were selected based on field observations in accordance with NYSDER-10 Section 3.8.2(2)(3), which calls for the collection of sediment samples at point source and groundwater discharge areas, depositional areas, and wetlands adjacent to disposal areas. Sediment samples were collected from 0-6 inches below grade. A brief description of the sediment samples is provided below. Sediment sample locations are presented in Figure L-3. Data from the sediment sampling is presented in Table 5-10, attached under the Tables tab of this report.

- Sediment samples SED-1 through SED-5 were collected from the perimeter of Boggy Pond, approximately 1-2 feet above the water line, to test the hypothesis of an observed release to surface water from the adjacent Landfill D.

- Sediment sample SED-6 was collected from a muddy/boggy area located east of the facility boundary. Overland surface water run-off from upgradient residential areas appears to drain into this muddy/boggy area. The surface water accumulated in this muddy/boggy area then flows into a subsurface culvert as it enters the eastern border of the facility, and then into the facility drainage swale. Because the physical nature of the sediment in this area was different from the on-site sediment samples, and because chemicals from off-site alternative upgradient locations may accumulate in this muddy/boggy area, this off-site sediment sample was not used to represent background conditions at the facility.

- Sediment samples SED-7 through SED-11 were collected along the drainage swale stream bed to assess whether hazardous substances from the other source areas are migrating toward the Hudson River. Based on chemical analysis data, sediment sample SED-8 appeared to best represent background sediment conditions for chemicals entering the drainage swale and attributable to the facility source areas.

### 5.2.7 Analytical Results

Boggy Pond sediment samples contained the hazardous substances 4,4'-DDE, trans-chlordane, PCB Aroclors 1248 and 1254, phenol, aluminum, arsenic, copper, lead, mercury, vanadium, and 2-butanone at concentrations meeting the EPA definition for an observed release of hazardous substances due to concentrations in excess of three times the background sediment sample SED-8. Subsurface soil samples (4-5 feet below grade) collected from Landfill D contained elevated levels of most of these hazardous substances, with the exception of trans-chlordane, PCB Aroclors 1248 and 1254, phenol, benzaldehyde, and 2-butanone. However, these hazardous substances were detected in subsurface soil samples (4-5 feet below grade) collected from the other source areas at the facility during this SI.

These data indicate that Boggy Pond sediments contain hazardous substances attributable to overland surface water run-off from Landfill D. Groundwater associated with Landfill D (groundwater sample MW-D) contained several of the inorganic hazardous substances, suggesting that these inorganic hazardous substances may have also migrated from groundwater to Boggy Pond sediment. No additional down stream sediment samples were collected to evaluate the surface water pathway along the tributary stream between Boggy Pond and the Hudson River.

Based on the elevated flow rate of the Hudson River (17,700 cfs) it is unlikely the observed release of hazardous substances would impact receptors along the Hudson River. However, as a conservative approach, the HRS score assumed that these observed releases of these hazardous substances have entered the Hudson River.

Sediment samples SED-9, SED-10, and SED-11 were collected along the drainage swale and down stream from both the background sample (SED-8) and the source areas. Sediment samples SED-10 and/or SED-11 contained concentrations of fluoranthene, pyrene, copper, lead, mercury, silver and zinc meeting the EPA HRS definition of an observed release by chemical analysis. These hazardous substances were also detected in subsurface soil samples (4-5 feet below grade) collected from the source areas at the facility during this SI. Additionally, groundwater samples collected from the source areas during this SI also contained these hazardous substances. Therefore, it is possible these hazardous substances may have migrated through both the overland surface water migration pathway and the groundwater to surface water migration pathway. However, the intermittent nature of the drainage swale lessens the likelihood that groundwater daylights within the drainage swale, and that groundwater migrating to surface water would be the pathway for the hazardous substances detected in the drainage swale sediment.

Based on the elevated flow rate of the Hudson River (17,700 cfs) it is unlikely the observed release of hazardous substances would impact receptors along the Hudson River. However, as a conservative approach, the HRS score assumed that these observed releases of these hazardous substances have entered the Hudson River.

### 5.2.8 Surface Water Migration Pathway Conclusions

The 2013 SI included the collection of sediment samples, but not surface water samples needed to evaluate the in-water segment of the surface water migration pathway. As specified in the HRS Guidance (Highlight 8-27), sediment data cannot be used to establish Level I concentrations for any of the three threats (drinking water, human food chain, environmental). Although the overland segment of the surface water pathway indicates that the sediment samples around Boggy Pond and the drainage swale were subject to observed releases of hazardous substances, neither feature are targets because they have no receptors, and therefore Level II concentrations were not evaluated for these areas. However, based on observed contamination in the overland segment, the HRS score evaluated potential contamination for receptors within the 15-mile target distance limit in the Hudson River.

An observed release of hazardous substances by chemical analysis has been documented in sediment samples collected from Boggy Pond and along the intermittent drainage swale. The analytical data suggest that these hazardous substances are migrating in overland surface water run-off from the source areas into Boggy Pond and the intermittent drainage swale. Although these hazardous substances are not likely to cause an adverse effect on receptors along the Hudson River due to flow rate of the Hudson River (17,000 cfs), sediment samples and/or surface water samples should be collected at the probable point of entries along the Hudson River to assess whether hazardous substances attributable to the facility source areas are present at elevated concentrations (e.g. Level I or Level II) within the Hudson River.

## 6. SOIL EXPOSURE PATHWAY

No surface soil samples were collected during this to evaluate the threat to individuals and sensitive environment of exposure to surficial contamination.

However, based on HRS guidance, the shallow sediment samples collected from the intermittent drainage swale during this SI may be used to represent a surface soil source area for evaluating potential surface soil exposure. Accordingly, these data were evaluated as part of the HRS score in this SI. Sediment samples from this SI were collected at (but above) the water line, from 0 to 1 feet below ground surface, in an area that was saturated and under the maximum water line for the area.

Additionally, it is noted that a surface soil exposure pathway was documented and scored during the 1991 Screening Site Inspection and follow-up HRS score completed by EPA in 1993 and 1995 (Ref. 9). The historical surface soil information is re-evaluated here for completeness.

### 6.1 Physical Conditions

The majority of the open areas on the facility are landscaped. Wooded areas exist near Landfill F, the Boggy Pond, the northern portions of Landfill B and C, the western and southern portions of Landfill A, and around Landfill E on the western portion of the facility. The entirety of the facility is accessible via walking / driving paths (Ref. 12). Within the facility, fenced and padlocked areas include Landfill A; and the western portion of the facility containing the potable water wells, Landfill E, the former boiler plant, and the water pumping house.

#### 6.1.1 Drainage Swale

A description of the drainage swale was previously provided in Section 5.2.1. The portion of the drainage swale with observed contamination extends between sediment samples SED-8 and SED-11, approximately 3,700 feet long (0.7 miles) and covering approximately 11,000 square foot area (3,700 feet long by 3 feet wide) (Ref. 12). This area is a conservative approximation and includes short inaccessible segments of the drainage swale enclosed in subsurface culverts. Although a fence surrounds the facility, the drainage swale is otherwise accessible within the facility grounds (Ref. 12).

The drainage swale has no liner or barrier beneath it (Ref. 12).

#### 6.1.2 Landfills and Former Boiler Plant Area

A description of the current physical condition of the landfills and former boiler plant area was previously provided in Section 3.1.1 and Table 3-1. In summary, the landfills are covered with vegetation and soil, but the thickness and chemical composition of the soil cover has not been verified or confirmed in the available file material or by VA representatives (Ref. 1, 3, 12). Additionally, there is no information in the file material suggesting that the former boiler plant area was covered or capped following demolition of the former boiler plant in 2010 (Ref. 12).

Although areas of observed contamination for sources other than contaminated soil can be based on any sample taken from the source, the observed contamination is related to surficial soil (0-2 feet below grade) (see HRS Guidance, pages 343-344). Accordingly, the subsurface soil samples collected at

each of the six landfills and former boiler plant area during this SI cannot be used to document observed contamination in surficial soil for the soil exposure pathway.

Based on the 1991 Screening Site Inspection, an area of observed contamination in surficial soil was documented based on three surficial soil samples (and one background sample) collected in 1991 (Ref. 1). A figure showing the location of this sampling is provided in Appendix E. A table showing the results of this sampling is provided previously as Table 4-1. Two of the surficial soil samples (CP-7, CP-8) were collected at Landfill A and Landfill B, respectively, and the third (CP-14) was collected near the railroad spur adjacent to the former boiler plant area. These three surficial soil samples form a triangular area of observed contamination for a contaminated soil source covering approximately 68,715 square feet (Ref. 1). However, the area of observed contamination may be larger, based on HRS guidance indicating that if any sample taken from a source area (other than contaminated soil) indicates observed contamination, the entire source area can be included in the area of observed contamination (see HRS Guidance, page 343). Although the triangulated area described herein is for a contaminated soil source, the boundaries of the area were expanded to include the entirety of Landfills A and B, and the area lying between Landfills A and B and the former boiler plant soil sample location. Based on this conservative scenario, the expanded area of observed contamination for the contaminated soil source increases to approximately 265,000 square feet (approximately 6 acres). This expanded triangulated area was the basis for evaluating targets in the following soil exposure pathway.

Although surficial soil at the other landfills (Landfills C, D, E and F) may contain observed contamination similar to Landfills A and B, there is no chemical analysis data to document observed contamination in surficial soil (0-2 feet bgs) at these other landfills. Additional surficial soil sampling to document observed contamination at the other landfills, as well as at residential properties located south of the facility and near Landfills A and F, is recommended.

## 6.2 Targets

The target evaluation is based on both the drainage swale surface soil source area, and the expanded surface soil source area triangulated by the area between Landfills A and B and the former boiler plant surficial soil sample location.

### 6.2.1 Resident Individuals and Workers

There are approximately 130 residents and approximately 42 day care students at the facility, but the residences and day care are not located on or within 200-feet of areas of observed contamination (Ref. 12). The portion of the drainage swale source that exits the facility after sediment sample location SED-9 is enclosed in a subsurface culvert until sediment sample location SED-10, and this portion of the drainage swale source area is not accessible to targets in the soil exposure pathway. Therefore, there are no resident individual targets.

There is a potable water pump house located adjacent to the former boiler plant area; it is less than 200-feet from the triangulated contaminated soil area (Ref. 12). According to the VA representative, a single worker checks on the pump house, but the pump house is not the work place. However, this work place receives brief but regular use (Ref. 12). Accordingly, the worker meets the definition of a target for the soil exposure pathway. The area is accessible to other VAMC-CP workers, including facility employees who work in waste collection and at the waste water treatment plant, workers

doing roadway maintenance (ie engineering, facilities, police, and fire department employees) and workers walking along the roadway. However, since use is intermittent, none of these workers meet the definition for regular use of the area.

As specified in the HRS Guidance (see page 362), workers are not differentiated by Level I and Level II concentrations. Additionally, workers are not counted in the resident individual or resident population factors (see HRS Guidance, page 364).

### 6.2.2 Resources and Terrestrial Sensitive Environments

No resources or terrestrial sensitive environments (commercial agriculture, silviculture, or livestock grazing/production) are present on an area of observed contamination.

### 6.2.3 Nearby Population

The nearby population is provided in the following table (Ref. 3, 18, 29).

**Table 6-1: Nearby Population**

| Approximate Area of Observed Contamination | Distance | Total Population | Distance-weighted Population Value (HRS Table 5-10) |
|---|---|---|---|
| 265,000 square feet | 0.00 to 0.25 miles | 180 | 4 |
| | 0.25 to 0.50 miles | 490 | 7 |
| | 0.50 to 1.0 miles | 2,976 | 10 |

## 6.3 Soil Exposure Pathway Conclusions

Areas of observed surficial soil contamination have been documented at the facility. However, surficial soil sampling should be performed to better define the areas of observed contamination associated with all of the source areas at the facility. Additionally, surficial soil samples should be collected near the on-site residences and the on-site daycare, as well as at nearby residential properties. These data should be compared to newly collected background surficial soil samples to assess whether there is observed contamination in those areas, and whether there are targets potentially exposed to contaminated surficial soil. These data may also be used to assess whether the facility needs to take a remedial action to remove or reduce exposure to potentially contaminated soils.

# 7. AIR PATHWAY

## 7.1 Physical Characteristics

Volatile organic compound hazardous substances were detected in shallow (0-2 feet) sediment samples collected around Boggy Pond during the 2013 SI (Ref. 12).

Metals and semi-volatile organic compounds that could be entrained as particulates were detected at elevated concentrations in the shallow sediment samples collected around Boggy Pond and within the intermittent drainage swale during the 2013 SI (Ref. 12).

As specified by the VA, no fixed air samples were included in the scope of work for this SI. However, subsurface soil borings screening with a field-calibrated PID did not show evidence of elevated volatile organic compounds (Ref. 12). Neither an observed release by direct observation nor chemical analysis was observed during this SI. Accordingly, only the potential to release was accounted for in the current HRS score for the air migration pathway.

Based on historical data from the 1991 Screening Site Inspection, volatile organic compounds were detected in surficial soil samples associated with the triangulated contaminated soil source area (Ref. 1). Additionally, during the 1991 Screening Site Inspection, odors were noted in the area of Landfill A, and open rusting drums (contents not specified) were observed (Ref. 1). The odors reported were limited to the immediate vicinity of Landfill A, therefore no people were expected to reside within the area of the air contamination from the release (Ref. 1, 3), and no sensitive environments were considered to be located within the area of air contamination from the release (Ref. 1, 3). No air sampling was performed to quantify these observations (Ref. 1, 3). Importantly, interviews conducted during the 1991 Screening Site Inspection indicated active fires within Landfill A (Ref. 1). These fires lasted for several days and required large amounts of water to extinguish (Ref. 1). Based on this historical information, a historical release to the atmosphere can be inferred. However, this historical release was not accounted for in the current HRS score as the landfill areas have been reportedly covered and no surficial evidence of contamination was present during this SI.

## 7.2 Targets

### 7.2.1 Population

The population within the 4-mile target limit distance is summarized in the following table (Ref. 3, 12, 17).

**Table 7-1: Population Within 4-Miles**

| Distance Category (miles) | Population (individuals) | Distance-Weighted Population Values |
|---|---|---|
| On a source | 0 | 0 |
| Greater than 0 to 0.25 miles | 1,500 | 408 |
| 0.25 to 0.50 miles | 490 | 9 |
| 0.50 to 1.0 miles | 2,976 | 26 |
| 1.0 to 2.0 miles | 10,509 | 27 |
| 2.0 to 3.0 miles | 18,893 | 12 |
| 3.0 to 4.0 miles | 27,857 | 23 |
| | | Total = 505 |

### 7.2.2 Resources

Within 0.5 mile of the source areas at the facility, there are no known commercial agriculture or commercial silviculture resources (Ref. 3). Major recreation areas within 0.5 mile of the facility include the Hudson River to the west of the facility, and the Castle Point Park directly adjacent to the northern border of the facility (Ref. 3).

### 7.2.3 Sensitive Environments

Sensitive environments within the 4-mile target distance limit based on historically available data are listed in the following table (Ref. 3). Additionally, approximately 40 acres of wetlands are located within the 4-mile target distance limit (Ref. 3, 18). These sensitive environments and wetlands are subject only to potential contamination because observed contamination to the air migration pathway was not observed during the 2013 SI.

**Table 7-2: Sensitive Environments and Wetlands Within 4 Miles of Site (Ref. 3, 26).**

| Sensitive Environment | Environment Type | Water Body Type | Distance from source areas | Rating Value (HRS Table 4-23) |
|---|---|---|---|---|
| Hudson River Tributary 6D | State-designated area for the protection of aquatic life | Stream | 0 feet | 5 |
| Hudson River | State-designated area for the protection of aquatic life | Large River | 130 feet | 5 |
| Wappingers Creek (mouth) | Unique biotic community<br>State endangered/threatened (estuary beggar ticks)<br>Spawning area | Large River | 2.8 miles | 75 |
| | | | | Total = [5+5+75] = 85 |
| | | | | |
| Wetlands | Area | Assigned value (HRS Table 6-18) | Associated distance weight (HRS Table 6-15) | Value |
| Greater than 0 to 0.25 miles | 10.5 acres | 25 | 0.25 | 6.25 |
| 0.25 to 0.5 miles | 30 acres | 25 | 0.054 | 1.35 |
| 2 to 3 miles | 1 to 50 acres | 25 | 0.0023 | 0.0575 |
| | | | | Total = [6.25 +1.35 + 0.0575] = 7.6 |

### 7.3 Air Migration Pathway Conclusions

There was no indication of an observed release to the air pathway during this SI. Historical documents suggest that active fires occurred at Landfill A and may have resulted in the historical release of contaminants. The potential contamination from the source areas is unlikely to warrant chemical analysis for an observed release.

## 8. SUMMARY AND CONCLUSIONS

The VAMC-CP was originally investigated during a Screening Site Inspection in 1991. The Screening Site Inspection identified hazardous waste sources and observed releases and observed contamination at the facility. The investigation documented impacts from the sources to drinking water wells, surface water, sediments, and surface soil at the facility. The Screening Site Inspection included an HRS scoring package, which indicated a site score of 74. Subsequent rescoring of the Screening Site Inspection data by EPA resulted in an HRS score of 11.92. EPA concluded that that No Further Remedial Action Planned status was appropriate, no further data collection was necessary, and that the facility was not eligible for placement on the NPL.

Based on this historic information, the VA decided to perform additional sampling at the facility in support of an SI. Accordingly, the VA developed a SI scope of work, which Mabbett implemented in December 2013 and January 2014. The SI gathered available data to evaluate the site as a candidate for the NPL. Subsurface soil samples from the potential waste disposal areas were collected and analyzed to characterize the nature of hazardous substances historically deposited at the facility, and to document the types of hazardous substances present in source areas and available to the groundwater, surface water, and air migration pathways. Environmental samples were collected from temporary groundwater monitoring wells, including one background monitoring well and on-site potable drinking water wells and analyzed to determine observed releases to groundwater and target populations and environments potentially at risk from the source areas. Environmental samples were also collected from sediment and analyzed to determine whether source area hazardous substances had migrated to surface water targets. Additionally, sediment samples and historical surficial soil samples were also evaluated to determine contaminated surface soil sources under the soil exposure pathway.

The VAMC-CP disposed unknown quantities of hazardous industrial and construction wastes in six landfills, each without liners or other engineered forms of containment. Landfilling reportedly ceased in 1978. The landfills were reportedly covered with fill, but the thickness and chemical composition of the fill has not been confirmed. Vegetation currently covers each landfill. An area of contaminated soil was created around the former boiler plant area reportedly due to improper handling of coal and boiler ash.

Analytical data collected during this SI indicated contamination from the landfills and the former boiler plant area entered groundwater. Analytical results indicated that hazardous substances related from the source area wastes were detected in several of the nearest on-site potable groundwater wells, which are used to supply drinking water (following on-site treatment) to the VAMCP-CP population. The detections occurred in samples collected upstream of the treatment system. There were no hazardous substances detected at Level I concentrations in on-site potable water wells. Level II concentrations detected in potable wells were metals, including, chromium, copper, cyanide, lead, nickel, potassium and zinc. All of these hazardous substances were present in and attributed to the source areas. It should be noted, however, that detected concentrations of all these substances was below Federal primary drinking water Maximum Contaminant Levels (MCLs). Based on the evidence of contamination to the groundwater pathway, the groundwater migration pathway score was a maximum of 100, resulting in a total site score of over 28.5. However, the groundwater and potable water samples were not filtered prior to analysis. Additionally, the groundwater monitoring wells were not developed prior to sampling. Finally, background conditions were determined based on only one groundwater monitoring well. Lack of development and lack of filtration of highly turbid (greater than 5 NTU) wells may have resulted in elevated concentrations of metals and other contaminants due to the adhesion of these contaminants to the suspended solids in the water sample. This adhesion may increase the detected concentrations of chemicals in water samples, thereby potentially biasing the sample results high. HRS Scoresheets from this assessment are provided as Appendix A.

Observed releases from the source areas were also documented in surface water sediment samples collected around Boggy Pond and along an intermittent drainage swale. Observed contamination included 4,4-DDE, PCBs, and metals including arsenic, copper, lead, mercury, vanadium and zinc. The hazardous substances in sediment samples were also detected at elevated concentrations in subsurface soil samples collected from the source area landfills and contaminated soil at the former boiler plant area.

Observed contamination documented using historical data from the 1991 Site Screening Inspection was reevaluated based on an updated area of observed contamination and target information (Ref. 1). However, the conclusions reported in the 1991 SSI that surface soil contamination exists and that additional sampling was required remains accurate.

It is recommended that additional surficial soil sampling be conducted to assess whether observed contamination is present near on-site and off-site residential areas. Surface water samples should be collected to assess whether observed releases of hazardous substances in sediment via intermittent overland surface water run-off have entered the Hudson River, and to determine if the groundwater to surface water pathway is impacting this as well. Most importantly, additional groundwater samples should be collected and filtered prior to analysis to assess whether the groundwater samples obtained during this SI were biased high by potentially suspended solids containing metals. Should the filtered data indicate that none of the potable groundwater well samples contain concentrations of metals 3 times higher than similarly filtered background groundwater wells samples, this would have the effect of eliminating Level II targets and thereby decreasing the groundwater pathway score and overall site score.

Finally, an assessment program should be implemented to put the facility on the path of compliance under NYSDEC regulations (6 NYCRR Part 375). This program should include evaluation of the data collected to date and the investigation proposed above in context with current land use to identify the soil and groundwater cleanup objectives that are appropriate to the facility. Remedial options may include implementation of institutional or engineering controls. Options for formally closing the identified landfills at the facility will be dictated by NYSDEC land disposal regulations. Ultimately, a closure plan must be filed with and approved by NYSDEC.

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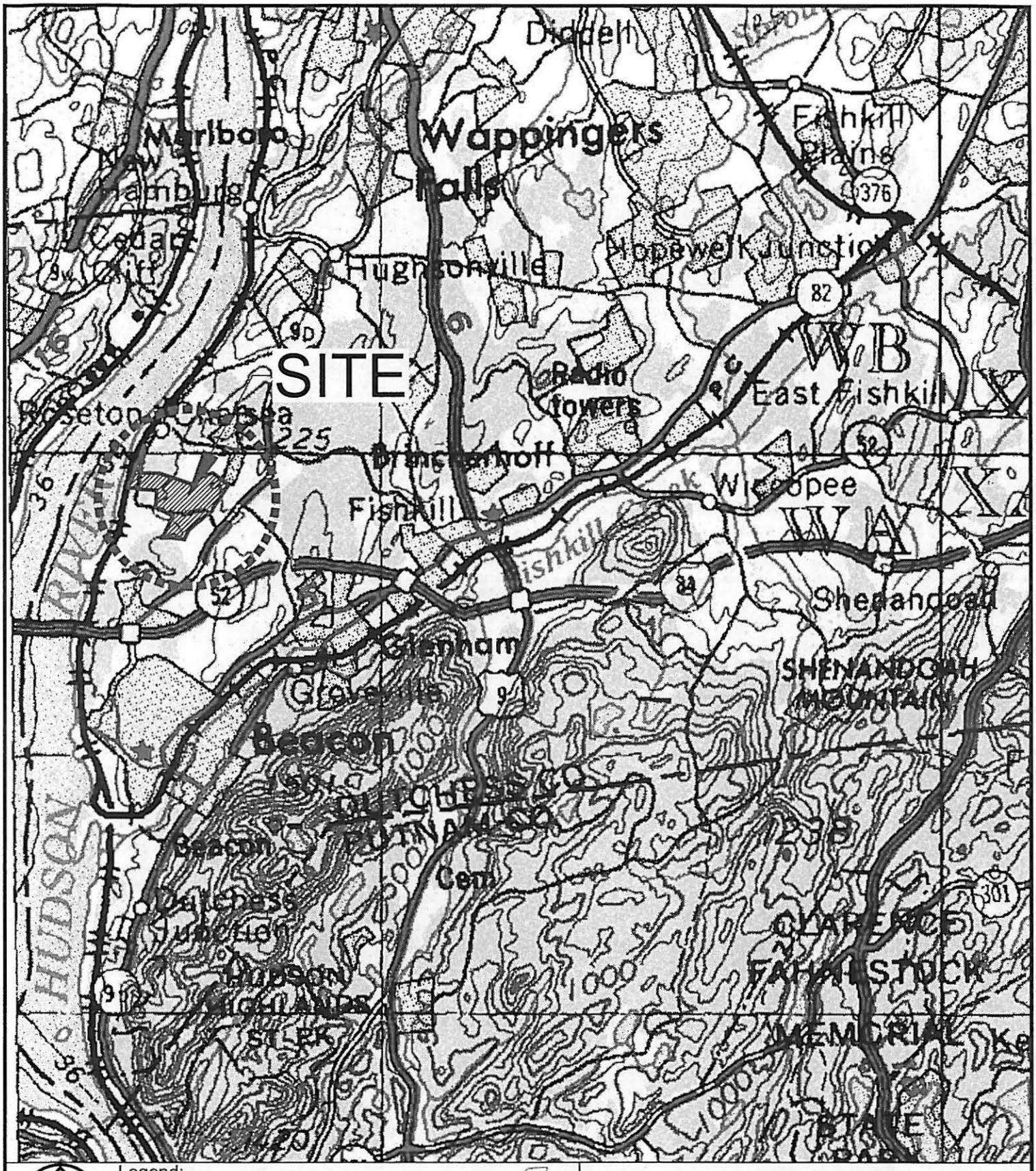
    *http://www.nws.noaa.gov/oh/hdsc/PF_documents/TechnicalPaper_No40.pdf*
33. NY State Department of Health Hudson River Public Water System 2008 Baseline Monitoring Program Summary
    *http://www.health.ny.gov/environmental/water/drinking/hudson_river_baseline_monitoring_program_summary_2008.htm*

# FIGURES




Legend:

1 MILE SITE RADIUS

N

GRAPHIC SCALE

5000 0 2500 5000 10,000

( IN FEET )
1 INCH = 5000 FEET

SITE LOCATION

VA - CASTLE POINT
41 CASTLE POINT ROAD, WAPPINGERS FALLS, NY.

Mabbett™
Mabbett & Associates, Inc.
6 Alfred Circle Bedford, MA 01730-2318
T. 781-275-6050 - 800-877-6050
www.mabbett.com

SITE LOCUS MAP
VA101F-13-J-0196

DWG. NO. L-1

| DRAWN DJA | APPROVED KBS | SCALE 1"=5000' | PROJ. NO. 2013025.002.003 |
|---|---|---|---|

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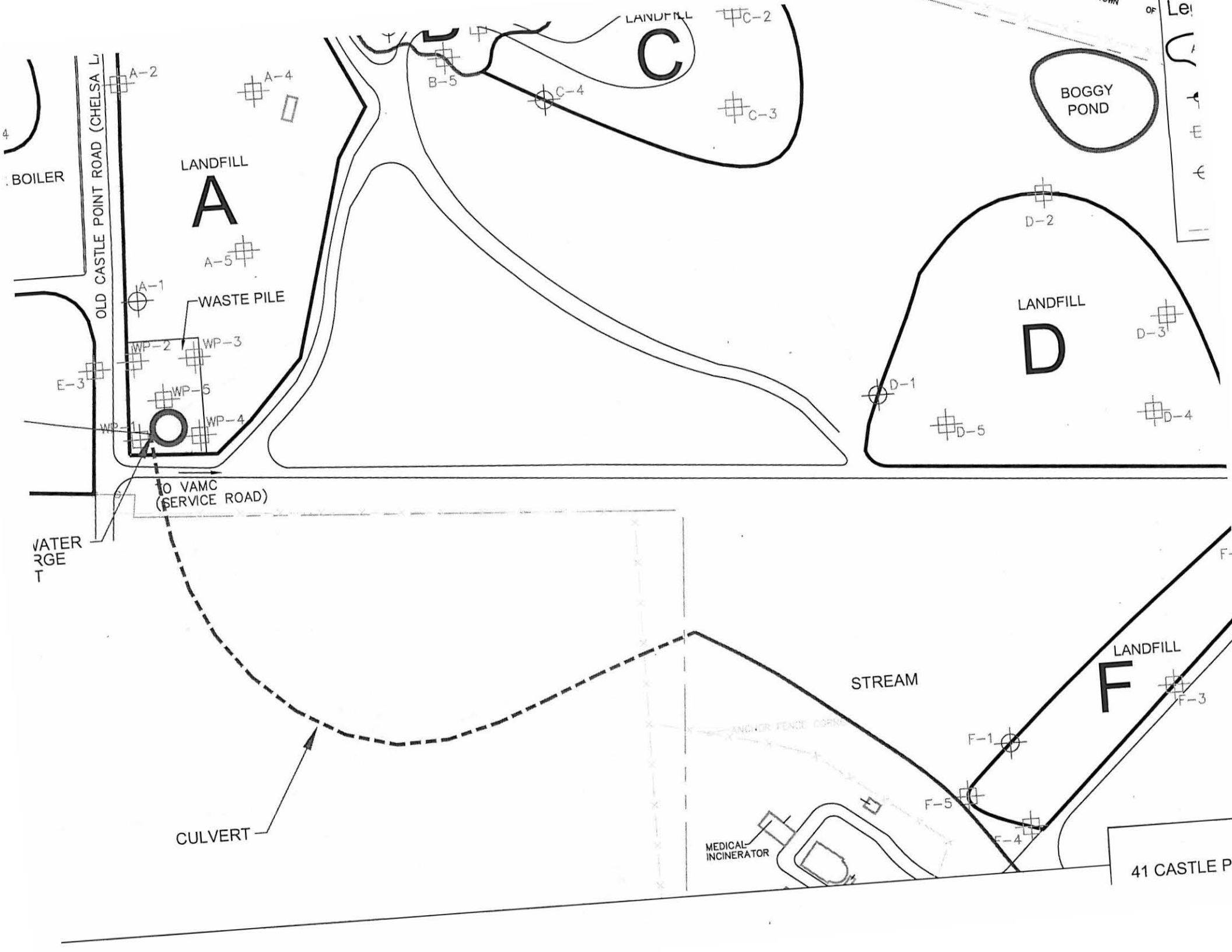
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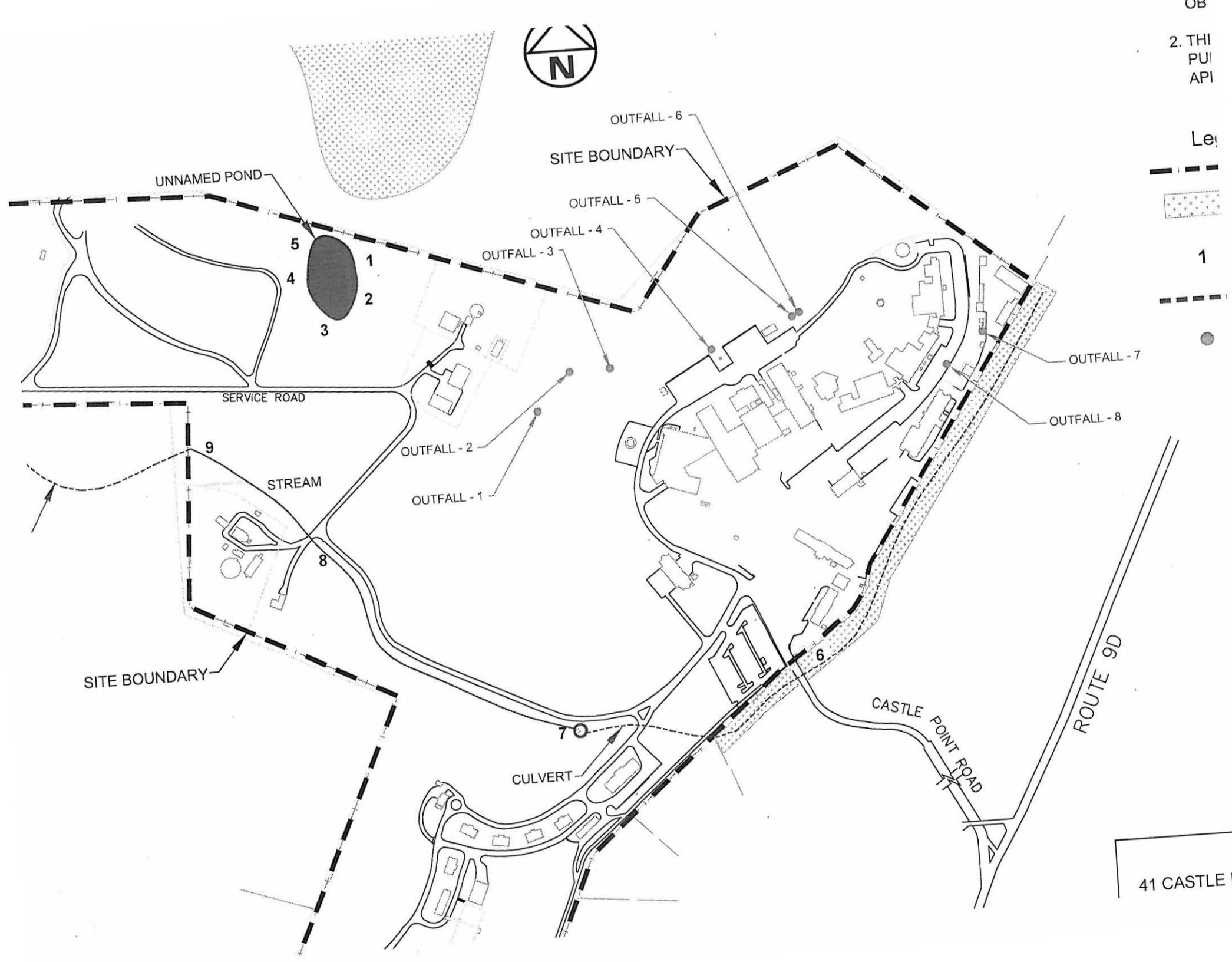
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SERVICE ROAD
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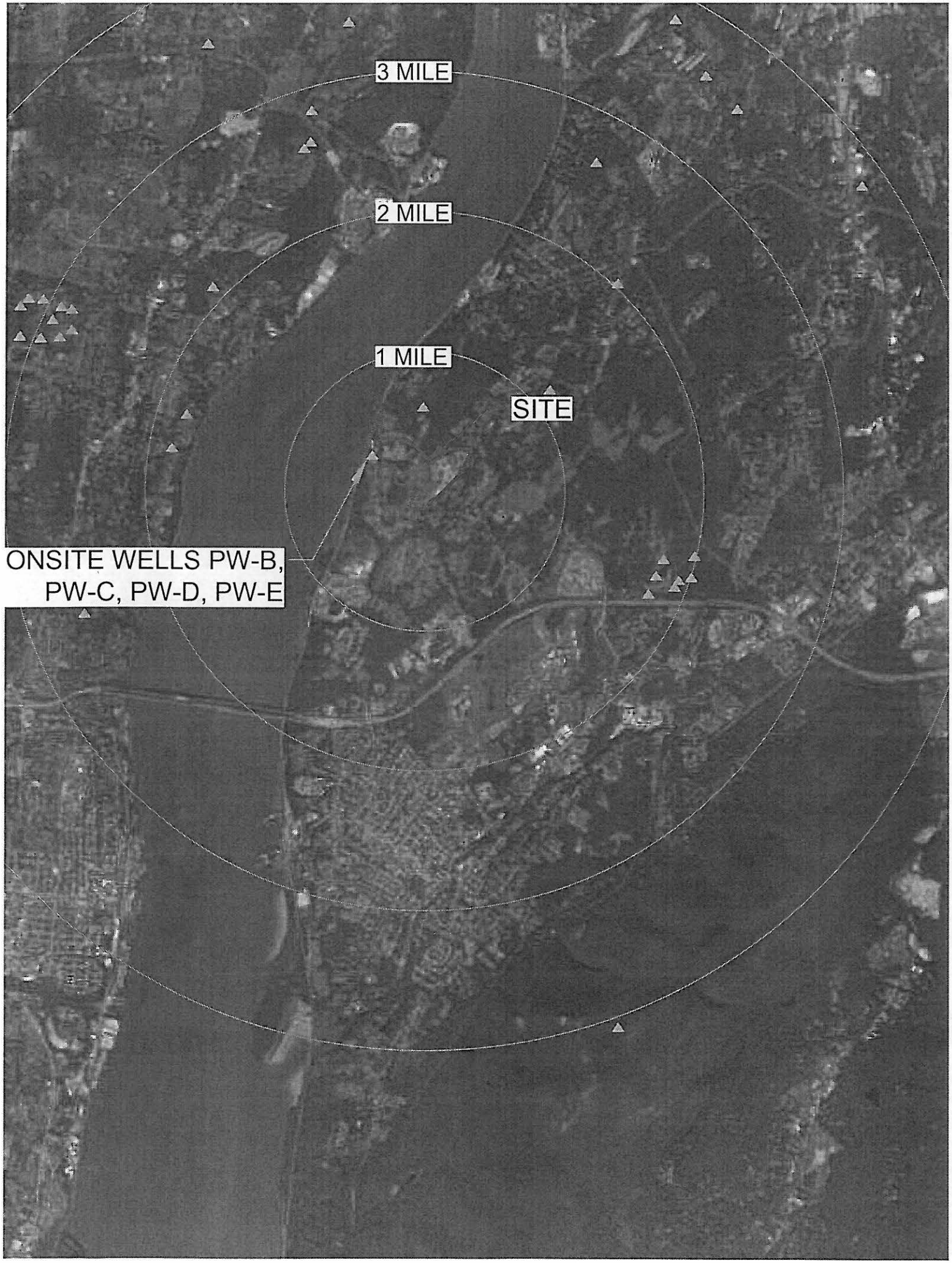
7
CASTLE POINT ROAD
ROUTE 9D
CULVERT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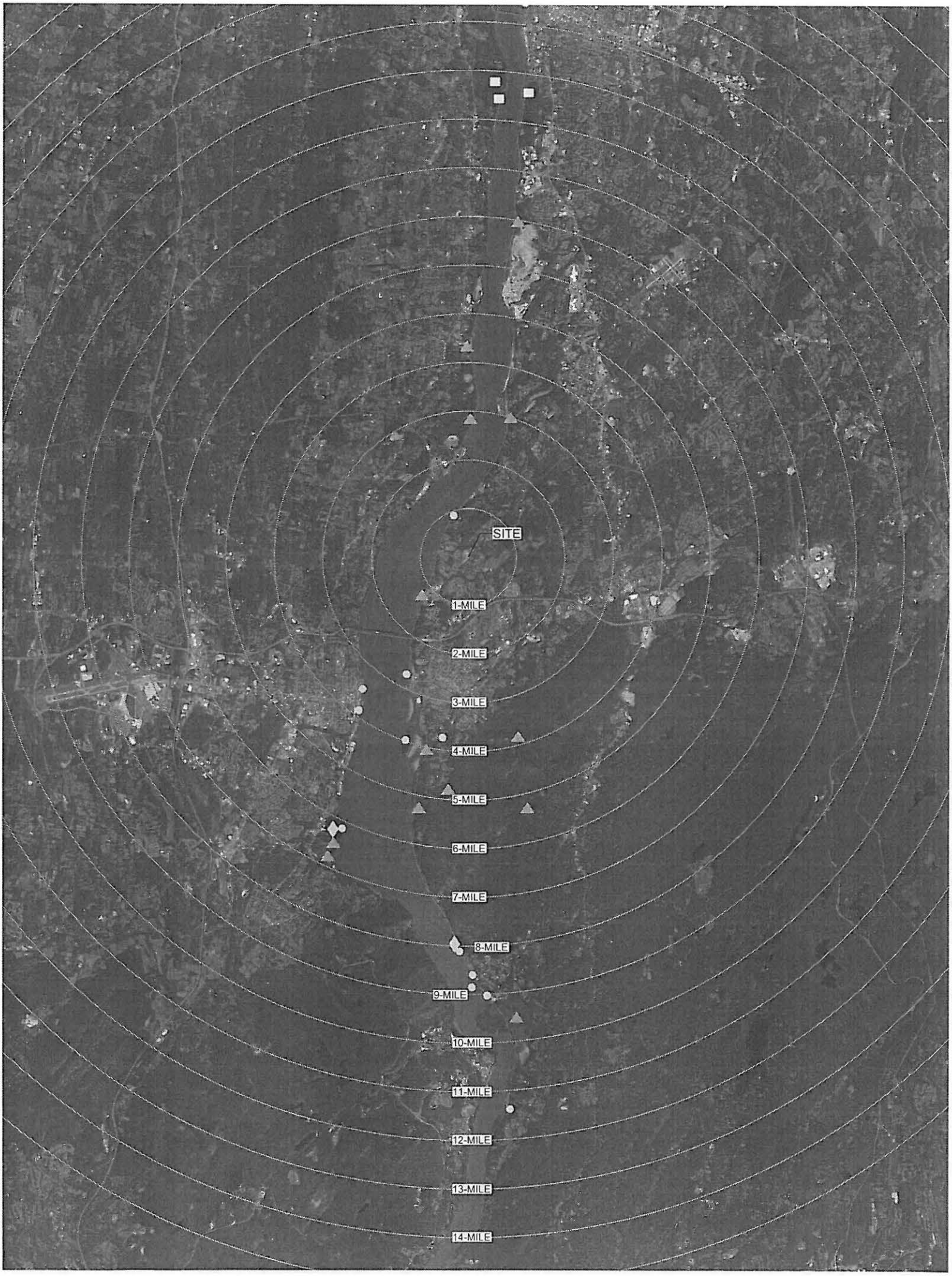
PW-C, PW-D, PW-E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# TABLES

**Table 4-1: Subsurface Soil Samples, 2013**

| Hazardous Substances | NY-UNRES | SCDM Values | Units | Location | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Landfill A | Landfill B | Landfill C | Landfill D | Landfill E | Landfill F | Former Boiler Plant |
| **Organochlorine Pesticides by GC** | | | | | | | | | | |
| 4,4'-DDE | 0.0033 | | mg/kg | 0.0154 | 0.0164 | 0.00459 | 0.00189 | 0.00163 | 0.03 | 0.0101 |
| 4,4'-DDD | 0.0033 | | mg/kg | 0.00504 | 0.00199 | 0.00176 | ND | 0.00163 | 0.00188 | 0.0042 |
| 4,4'-DDT | 0.0033 | | mg/kg | 0.0117 | 0.00676 | 0.00352 | 0.00238 J | 0.00453 | 0.128 | 0.00682 |
| **Semivolatile Organics by GC/MS** | | | | | | | | | | |
| Benzo(a)anthracene | 1 | 0.2 | mg/kg | 0.04 | 0.22 | 0.1 | 0.055 J | 4.3 | 18 | 0.81 |
| Benzo(a)pyrene | 1 | 0.02 | mg/kg | 0.15 | 0.3 | 0.14 | 0.048 J | 4.3 | 16 | 0.54 |
| Benzo(b)fluoranthene | 1 | | mg/kg | 0.045 | 0.22 | 0.14 | 0.064 J | 5.8 | 22 | 0.68 |
| Benzo(k)fluoranthene | 0.8 | 2 | mg/kg | 0.11 | 0.22 | 0.11 | ND | 2.6 | 5.6 | 0.36 |
| Chrysene | 1 | 20 | mg/kg | 0.059 | 0.22 | 0.42 | 0.06 J | 4.4 | 19 | 0.74 |
| Dibenzo(a,h)anthracene | 0.33 | 0.02 | mg/kg | 0.11 | 0.22 | 0.11 | ND | 0.73 | 2.3 | 0.22 |
| Indeno(1,2,3-cd)pyrene | 0.5 | 0.2 | mg/kg | 0.15 | 0.3 | 0.15 | ND | 2.8 | 12 | 0.3 |
| **Total Metals** | | | | | | | | | | |
| Barium, Total | 350 | 10000 | mg/kg | 110 | 94 | 410 | 60 | 55 | 68 | 86 |
| Cadmium, Total | 2.5 | 30 | mg/kg | 0.55 | 0.64 | 4 | 0.16 J | 0.68 | 0.19 | 0.66 |
| Copper, Total | 50 | 3000 | mg/kg | 17 | 23 | 270 | 36 | 27 | 23 | 26 |
| Lead, Total | 63 | 75 | mg/kg | 31 | 45 | 650 | 42 | 210 | 65 | 55 |
| Manganese, Total | 1600 | 10000 | mg/kg | 1600 | 510 | 1700 | 770 | 600 | 580 | 890 |
| Mercury, Total | 0.18 | 20 | mg/kg | 0.18 | 0.13 | 0.45 | 0.08 | 0.26 | 0.08 | 0.32 |
| Silver, Total | 2 | 300 | mg/kg | 0.26 | 0.89 | 4.3 | ND | 0.88 | 0.92 | 0.94 |
| Zinc, Total | 109 | 20000 | mg/kg | 57 | 200 | 1200 | 72 | 64 | 250 | 400 |
| **Volatile Organics by 8260/5035** | | | | | | | | | | |
| Acetone | 0.05 | 70000 | mg/kg | 0.95 | 0.91 | 0.022 | 0.015 | 0.0051 | 0.54 | 0.59 |
| 2-Butanone | 0.12 | 40000 | mg/kg | 0.35 | 0.22 | 0.022 | ND | 0.011 | 0.54 | 0.5 |

ND - Not detected above laboratory detection limit

J - estimated value

Values shown are maximums detected in sub surface soils at each of the landfill

**Table 4-2: Historic Surface Soil Samples, 1991**

| | | | Location | | |
|---|---|---|---|---|---|
| **Hazardous Substance** | **Units** | **Background** | **Landfill A** | **Landfill C** | **Boiler Plant** |
| Aluminum | mg/kg | 13,300 | 5,520 | 14,500 | 2,740 |
| Arsenic | mg/kg | 5 | 15.7 | 7.3 | 28.1 |
| Barium | mg/kg | 60.9 | 307 | 163 | 67.3 |
| Beryllium | mg/kg | 0.46 | 0.66 | 0.57 | 0.7 |
| Calcium | mg/kg | 1,680 | 4,730 | 17,800 | 4,960 |
| Chromium | mg/kg | 14 | 5.9 | 31.3 | 16.9 |
| Cobalt | mg/kg | 7.9 | 3.2 | 10.4 | 5.8 |
| Copper | mg/kg | 17.1 | 12.8 | 42.4 | 85.7 |
| Iron | mg/kg | 21,200 | 16,100 | 32,100 | 72,000 |
| Lead | mg/kg | 23.2 | 22.2 | 161 | 75.8 |
| Magnesium | mg/kg | 3,740 | 727 | 8,530 | 1,970 |
| Manganese | mg/kg | 389 | 123 | 744 | 354 |
| Nickel | mg/kg | 19.2 | 13.7 | 30.9 | 28.8 |
| Potassium | mg/kg | 874 | 560 | 1,470 | 521 |
| Sodium | mg/kg | 107 | 260 | 555 | 181 |
| Vanadium | mg/kg | 22.5 | 14.2 | 30.6 | 75.4 |
| Zinc | mg/kg | 61.8 | 35.7 | 205 | 63.5 |
| Mercury | mg/kg | ND | ND | ND | ND |
| Naphthalene | mg/kg | ND | ND | ND | ND |
| 2-Methylnaphthene | ug/kg | ND | ND | ND | ND |
| Phenanthrene | ug/kg | ND | ND | ND | ND |
| Fluoranthene | ug/kg | ND | ND | ND | ND |
| di-n-Butylphthalate | ug/kg | ND | ND | ND | ND |
| Pyrene | ug/kg | ND | ND | ND | ND |
| Butylbenzylphthalate | ug/kg | ND | ND | ND | ND |
| Benzo(a)anthracene | ug/kg | ND | ND | ND | ND |
| Chrysene | ug/kg | ND | ND | ND | ND |
| Benzo(a)pyrene | ug/kg | ND | ND | ND | ND |

ND = not detected above laboratory detection limits

A value 3 times greater than the backgound sample is defined as an observed release and highlighted in **GREEN**

Table 4-3: Comparison of 1991 and 2013 Soil Data

| 1991 Background | Hazardous Substance | Landfill A | | Landfill B | | Landfill C | |
|---|---|---|---|---|---|---|---|
| | | 1991 | 2013 | 1991 | 2013 | 1991 | 2013 |
| 60.9 | Barium | 307 | 110 | 163 | 410 | 67.3 | 86 |
| 17.1 | Copper | 12.8 | 17 | 42.4 | 270 | 85.7 | 26 |
| 23.2 | Lead | 22.2 | 31 | 161 | 650 | 75.8 | 55 |
| 389 | Manganese | 123 | 1600 | 744 | 1700 | 354 | 890 |
| 61.8 | Zinc | 35.7 | 57 | 205 | 1200 | 63.5 | 400 |
| ND | Mercury | ND | 0.18 | ND | 0.45 | ND | 0.32 |

Table 5-3: Groundwater Wells within 4 miles FOIA Response

| County | Water System Name | Water System ID | Source Name | Facility ID | Water System Type | PRINCIPAL CITY SERVED NAME |
|---|---|---|---|---|---|---|
| DUTCHESS | 182 OLD ROUTE 9 | NY1330012 | WELL #3 SOUTH SIDE OF BUILDING | 2617293 | NC | WAPPINGER (T) |
| DUTCHESS | 7-11 CONVENIENT FOOD STORE | NY1322594 | WELL | 2553633 | NC | WAPPINGER (T) |
| DUTCHESS | ALPINE SHOPPING CENTER | NY1330005 | WELL 1 BJS PARKING LOT | 2553710 | NTNC | WAPPINGER (T) |
| DUTCHESS | ALPINE SHOPPING CENTER | NY1330005 | WELL 2 STOP N SHOP | 2553711 | NTNC | WAPPINGER (T) |
| DUTCHESS | ANMOL FUELING INC. | NY1330515 | WELL | 2600383 | NC | WAPPINGER (T) |
| DUTCHESS | AROMA OSTERIA | NY1330284 | WELL | 2553997 | NC | WAPPINGER (T) |
| DUTCHESS | ASSOCIATED AIRCRAFT GROUP | NY1322627 | WELL | 2553638 | NTNC | WAPPINGER (T) |
| DUTCHESS | AVALON ASSISTED LIVING | NY1313000 | WELL 1 (REAR OF BUILDING) | 2553171 | C | WAPPINGER (T) |
| DUTCHESS | AVALON ASSISTED LIVING | NY1313000 | WELL 2 (FRONT UNDER MANHOLE) | 2583169 | C | WAPPINGER (T) |
| DUTCHESS | AVOCADO'S RESTAURANT | NY1316255 | WELL | 2553275 | NC | FISHKILL (T) |
| DUTCHESS | BEACON CITY | NY1302760 | WELL 1 | 2552841 | C | BEACON (C) |
| DUTCHESS | BEACON CITY | NY1302760 | WELL 2 | 2552842 | C | BEACON (C) |
| DUTCHESS | BEACON CITY | NY1302760 | WELL 8 | 2598903 | C | BEACON (C) |
| DUTCHESS | BETTER TAN | NY1330386 | WELL | 2576312 | NC | WAPPINGER (T) |
| DUTCHESS | BIRCHWOOD MOBILE HOME PARK | NY1310668 | WELL #1 | 2553079 | C | WAPPINGER (T) |
| DUTCHESS | BIRCHWOOD MOBILE HOME PARK | NY1310668 | WELL #2 | 2553080 | C | WAPPINGER (T) |
| DUTCHESS | BMB REAL ESTATE | NY1316250 | WELL#1 | 2553271 | NC | WAPPINGER (T) |
| DUTCHESS | BRINKERHOFF OFFICE BUILDINGS | NY1330487 | WELL 1 | 2589179 | NC | FISHKILL (T) |
| DUTCHESS | BRINKERHOFF OFFICE BUILDINGS | NY1330487 | WELL 2 | 2589180 | NC | FISHKILL (T) |
| DUTCHESS | BRINKERHOFF WATER DISTRICT | NY1302766 | WELL 1 | 2552859 | C | FISHKILL (T) |
| DUTCHESS | BRINKERHOFF WATER DISTRICT | NY1302766 | WELL 2 | 2552860 | C | FISHKILL (T) |
| DUTCHESS | BRINKERHOFF WATER DISTRICT | NY1302766 | WELL 3 | 2552861 | C | FISHKILL (T) |
| DUTCHESS | CABLEVISION - FORMERLY MEDIA ONE | NY1323016 | WELL 1,305 FT (LOG#W-1686) | 2553695 | NTNC | WAPPINGER (T) |
| DUTCHESS | CASTLE POINT MEDICAL CENTER | NY1319255 | WELL B | 2553424 | C | FISHKILL (T) |
| DUTCHESS | CASTLE POINT MEDICAL CENTER | NY1319255 | WELL C | 2553425 | C | FISHKILL (T) |
| DUTCHESS | CHENG APARTMENTS | NY1330609 | NORTH WELL | 2611326 | NP | WAPPINGER (T) |
| DUTCHESS | COOPER ROAD TRAILER PARK | NY1302125 | WELL 1 | 2552784 | C | WAPPINGER (T) |
| DUTCHESS | COOPER ROAD TRAILER PARK | NY1302125 | WELL 2 | 2552785 | C | WAPPINGER (T) |
| DUTCHESS | CREEKSIDE PLAZA | NY1325005 | WELL | 2553703 | NC | WAPPINGER (T) |
| DUTCHESS | CROSS COURT | NY1330211 | WELL #1 | 2553924 | NC | WAPPINGER (T) |
| DUTCHESS | DUTCHESS COUNTY AIRPORT TERMINAL | NY1330100 | WELL 1: TERMINAL | 2553815 | NC | WAPPINGER (T) |
| DUTCHESS | DUTCHESS COUNTY AIRPORT TERMINAL | NY1330100 | WELL 2: AERO | 2627402 | NC | WAPPINGER (T) |
| DUTCHESS | DUTCHESS COUNTY AIRPORT TERMINAL | NY1330100 | WELL 3: ANGLES | 2627404 | NC | WAPPINGER (T) |
| DUTCHESS | DUTCHESS COUNTY AIRPORT TERMINAL | NY1330100 | WELL 4: DC OPERATIONS BUILDING | 2627406 | NC | WAPPINGER (T) |
| DUTCHESS | DUTCHESS COUNTY AIRPORT TERMINAL | NY1330100 | WELL 7: TOWER | 2627410 | NC | WAPPINGER (T) |
| DUTCHESS | DUTCHESS MANOR REST | NY1316251 | WELL #1 | 2553272 | NC | FISHKILL (T) |
| DUTCHESS | DUTCHESS MOBILE HOME PARK | NY1305069 | WELL #1 | 2553046 | NP | WAPPINGER (T) |
| DUTCHESS | EAST FISHKILL PROVISIONS | NY1330161 | WELL #1 | 2553879 | NC | EAST FISHKILL (T) |
| DUTCHESS | EAST HOOK SPORTSMENS ASSOC | NY1317403 | WELL | 2553396 | NP | FISHKILL (T) |
| DUTCHESS | ELIO & MARIAS DELI INC | NY1330382 | WELL | 2576302 | NC | WAPPINGER (T) |
| DUTCHESS | EXECUTIVE PARK OFFICE BUILDING | NY1330519 | WELL #1 | 2600811 | NTNC | WAPPINGER (T) |
| DUTCHESS | EXECUTIVE SQUARE | NY1325000 | WELL #1 | 2553696 | NTNC | WAPPINGER (T) |
| DUTCHESS | EXECUTIVE SQUARE | NY1325000 | WELL #2 | 2553697 | NTNC | WAPPINGER (T) |
| DUTCHESS | FISHKILL BAPTIST CH (NURSERY) | NY1330015 | WELL | 2553723 | NC | FISHKILL (T) |
| DUTCHESS | FISHKILL FINANCIAL CENTER | NY1322584 | WELL 1 | 2553632 | NC | FISHKILL (T) |
| DUTCHESS | FISHKILL GAS AND MART- CITGO | NY1330331 | WELL 1 | 2554045 | NC | FISHKILL (T) |
| DUTCHESS | FISHKILL VILLAGE | NY1302765 | WELL #1, SAND+GRAVEL, 90FT | 2552858 | C | FISHKILL (V) |
| DUTCHESS | FISHKILL VILLAGE | NY1302765 | WELL #2, SAND+GRAVEL, 90FT | 2552853 | C | FISHKILL (V) |
| DUTCHESS | FISHKILL VILLAGE | NY1302765 | WELL #3, SAND+GRAVEL, 90FT | 2552854 | C | FISHKILL (V) |
| DUTCHESS | FISHKILL VILLAGE | NY1302765 | WELL #4, SAND+GRAVEL, 90FT | 2552855 | C | FISHKILL (V) |
| DUTCHESS | FISHKILL VILLAGE | NY1302765 | WELL #5A, SAND+GRAVEL (WSA9151) | 2552857 | C | FISHKILL (V) |
| DUTCHESS | FISHKILL VILLAGE | NY1302765 | WELL #6, SAND+GRAVEL, 120FT | 2552856 | C | FISHKILL (V) |
| DUTCHESS | FISHKILL VILLAGE | NY1302765 | WELL #8, SAND+GRAVEL 200FT (BEACON WELL) | 2552852 | C | FISHKILL (V) |
| DUTCHESS | GALLAHER'S CAFE | NY1330067 | HOUSE & APARTMENT WELL | 2629655 | NC | WAPPINGER (T) |
| DUTCHESS | GALLAHER'S CAFE | NY1330067 | WELL | 2553781 | NC | WAPPINGER (T) |
| DUTCHESS | GASLAND 376 | NY1330446 | WELL | 2576340 | NC | WAPPINGER (T) |
| DUTCHESS | HAMPTON BUSINESS CENTER | NY1322550 | WELL 001 | 2553624 | NTNC | WAPPINGER (T) |
| DUTCHESS | HANDSHAKES | NY1330133 | WELL #1 | 2553853 | NC | WAPPINGER (T) |
| DUTCHESS | HUDSON VALLEY KARATE | NY1316611 | WELL #1 | 2553325 | NC | WAPPINGER (T) |
| DUTCHESS | HUDSON VALLEY VOLKSWAGEN/VOLVO | NY1330514 | WELL #1 VW | 2600358 | NTNC | WAPPINGER (T) |
| DUTCHESS | HUDSON VALLEY VOLKSWAGEN/VOLVO | NY1330514 | WELL #2 VOLVO | 2600359 | NTNC | WAPPINGER (T) |
| DUTCHESS | HUDSONS RIBS AND FISH | NY1330122 | WELL #1 | 2553842 | NC | WAPPINGER (T) |
| DUTCHESS | HUGHSONVILLE MART | NY1330376 | WELL | 2576294 | NC | WAPPINGER (T) |
| DUTCHESS | JOE WILLYS FISH SHACK | NY1330123 | WELL #1 | 2553843 | NC | FISHKILL (T) |
| DUTCHESS | JP MORGAN CHASE BANK | NY1330688 | WELL 001 | 2623722 | NC | WAPPINGER (T) |
| DUTCHESS | KNIGHTS OF COLUMBUS - WAPPINGER | NY1330261 | WELL # 1 | 2553978 | NC | WAPPINGER (T) |
| DUTCHESS | LAWRENCE FARMS MALL | NY1330203 | WELL #1 | 2553918 | NTNC | WAPPINGER (T) |
| DUTCHESS | LAZY ACRES | NY1330469 | WELL | 2587321 | NC | WAPPINGER (T) |
| DUTCHESS | LITTLE ITALY DELI & CATERING | NY1330431 | WELL | 2576323 | NC | WAPPINGER (T) |
| DUTCHESS | LUKOIL GAS STATION & MART #169 | NY1322901 | WELL | 2553693 | NC | WAPPINGER (T) |
| DUTCHESS | M & T REGIONAL HEADQUARTERS | NY1330008 | WELL 1 | 2553715 | NTNC | FISHKILL (T) |
| DUTCHESS | MALOUFS MOUNTAIN | NY1330615 | WELL #1 | 2611943 | NC | FISHKILL (T) |
| DUTCHESS | MARKS PLAZA | NY1330508 | WELL #1 | 2598998 | NC | FISHKILL (T) |
| DUTCHESS | MARKS PLAZA | NY1330508 | WELL #2 | 2598999 | NC | FISHKILL (T) |
| DUTCHESS | MERRITT PARK WD, FISHKILL TOWN | NY1330656 | WELL 1 ( T-1) | 2623025 | C | FISHKILL (T) |
| DUTCHESS | MID-HUDSON ISLAMIC ASSOC MOSQUE | NY1330453 | WELL (605 FT DEEP/6 INCH CASING) | 2576706 | NC | WAPPINGER (T) |
| DUTCHESS | MOBIL MART 17LA6 | NY1330419 | WELL | 2576308 | NC | WAPPINGER (T) |
| DUTCHESS | MOBIL ON THE RUN WAPPINGERS | NY1330467 | WELL | 2587335 | NC | WAPPINGER (T) |
| DUTCHESS | MONTCLAIR CONDOMINIUMS | NY1303225 | WELL #2 | 2553019 | C | WAPPINGER (T) |
| DUTCHESS | MONTCLAIR CONDOMINIUMS | NY1303225 | WELL #3 | 2553018 | C | WAPPINGER (T) |
| DUTCHESS | MONTCLAIR CONDOMINIUMS | NY1303225 | WELL #4 | 2553017 | C | WAPPINGER (T) |
| DUTCHESS | MONTCLAIR CONDOMINIUMS | NY1303225 | WELL #5 | 2553016 | C | WAPPINGER (T) |
| DUTCHESS | MONTCLAIR CONDOMINIUMS | NY1303225 | WELL #6 | 2553015 | C | WAPPINGER (T) |
| DUTCHESS | MONTCLAIR CONDOMINIUMS | NY1303225 | WELL #7 | 2553014 | C | WAPPINGER (T) |
| DUTCHESS | MORNING SIDE MANOR | NY1330127 | WELL #1 | 2553847 | NP | WAPPINGER (T) |

Table 5-3: Groundwater Wells within 4 miles FOIA Response

| County | Water System Name | Water System ID | Source Name | Facility ID | Water System Type | PRINCIPAL CITY SERVED NAME |
|---|---|---|---|---|---|---|
| DUTCHESS | NATHAN'S RESTAURANT | NY1330129 | WELL 1 | 2553849 | NC | WAPPINGER (T) |
| DUTCHESS | NEMMI'S (FORMERLY LILY LOGANS) | NY1330187 | WELL #1 | 2553903 | NC | WAPPINGER (T) |
| DUTCHESS | NEW HACKENSACK NURSERY SCHOOL | NY1322377 | WELL | 2553597 | NC | WAPPINGER (T) |
| DUTCHESS | NEW HACKENSACK PLAZA | NY1322781 | WELL | 2553677 | NC | WAPPINGER (T) |
| DUTCHESS | POUGHKEEPSIE NISSAN INC | NY1330202 | WELL | 2553916 | NTNC | WAPPINGER (T) |
| DUTCHESS | RANDOLPH SCHOOL | NY1321645 | WELL 2 155 FT DRILLED 9/86 ROCK @ 15' | 2553538 | NTNC | WAPPINGER (T) |
| DUTCHESS | ROUTE 376 BUSINESS PARK, LOT 3 | NY1330642 | WELL | 2616514 | NC | EAST FISHKILL (T) |
| DUTCHESS | ROUTE 9D MOBIL STATION | NY1330546 | WELL ONE | 2607650 | NC | FISHKILL (T) |
| DUTCHESS | SCHNEIDER'S FISHKILL BOWL | NY1316252 | WELL | 2553273 | NC | FISHKILL (T) |
| DUTCHESS | SCORIN (AKA THE FIELD) | NY1330705 | W001 | 2627520 | NC | WAPPINGER (T) |
| DUTCHESS | SHADOWBROOK | NY1330096 | WELL #1 | 2553811 | NC | WAPPINGER (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL A: MAIN OFFICE | 2553895 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL C: CAMP ABC | 2594814 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL D: CAMP ABC | 2594815 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL E: CAMP ABC | 2594817 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL F: CAMP MARIAH | 2594818 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL G: HAYDEN-MARKS CRAZY HORSE | 2594819 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL H: CAMP HAYDEN-MARKS | 2594820 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL J: CAMP HAYDEN-MARKS | 2594822 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL K: CAMP HAYDEN-MARKS | 2594823 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL M: HIDDEN VALLEY | 2594827 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL N: STAFF LOUNGE | 2594825 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL O: CAMP TOMMY | 2594829 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL P: CAMP TOMMY | 2594830 | NC | FISHKILL (T) |
| DUTCHESS | SHARPE RESERVATION | NY1330178 | WELL Q: CAMP MARIAH | 2594831 | NC | FISHKILL (T) |
| DUTCHESS | SKYVIEW APARTMENTS | NY1310385 | WELL #1 | 2553060 | C | WAPPINGER (T) |
| DUTCHESS | SKYVIEW APARTMENTS | NY1310385 | WELL #2 | 2553059 | C | WAPPINGER (T) |
| DUTCHESS | SOUTHEAST CONTAINER | NY1322637 | WELL 001 (6IN) | 2553640 | NTNC | WAPPINGER (T) |
| DUTCHESS | SPLASH DOWN PARK/ADVENTURE ISLAND | NY1330101 | WELL | 2553816 | NC | FISHKILL (T) |
| DUTCHESS | STEWARTS RT 9D (STORE #325) | NY1330126 | WELL | 2553846 | NC | WAPPINGER (T) |
| DUTCHESS | STOETZEL MOBILE HOME PARK | NY1302138 | WELL | 2552809 | NP | WAPPINGER (T) |
| DUTCHESS | STONE GATE MOTEL/EFFICIENCIES | NY1302111 | WELL #1 LOWER WELL | 2552750 | NC | WAPPINGER (T) |
| DUTCHESS | STONE GATE MOTEL/EFFICIENCIES | NY1302111 | WELL #2 UPPER WELL | 2552751 | NC | WAPPINGER (T) |
| DUTCHESS | STONYKILL ENVIRONMENTAL CENTER | NY1330215 | WELL 4 (NEAR GREEN HOUSE)BARN/CLASSROOM | 2553927 | NC | WAPPINGER (T) |
| DUTCHESS | STONYKILL ENVIRONMENTAL CENTER | NY1330215 | WELL3 WASHINGTON HOUSE, SOUTHWEST CORNER | 2553928 | NC | WAPPINGER (T) |
| DUTCHESS | SUMLAND OFFICE BUILDINGS | NY1330485 | WELL #1 | 2589144 | NTNC | FISHKILL (T) |
| DUTCHESS | SUNSET FARMS MOBILE HOME PARK | NY1302112 | WELL #3 | 2552754 | C | WAPPINGER (T) |
| DUTCHESS | SUNSET FARMS MOBILE HOME PARK | NY1302112 | WELL #4 | 2552755 | C | WAPPINGER (T) |
| DUTCHESS | SUNSET FARMS MOBILE HOME PARK | NY1302112 | WELL #5 | 2614552 | C | WAPPINGER (T) |
| DUTCHESS | SUNSET FARMS MOBILE HOME PARK | NY1302112 | WELL #6 | 2601442 | C | WAPPINGER (T) |
| DUTCHESS | TALL TREES WATER DISTRICT | NY1302809 | WELL #1 | 2552968 | C | WAPPINGER (T) |
| DUTCHESS | TALL TREES WATER DISTRICT | NY1302809 | WELL #2 | 2552969 | C | WAPPINGER (T) |
| DUTCHESS | TASSONE REALTY PROPERTY | NY1330536 | WELL #1 (OFFICE AND BLDG. 2) | 2603001 | NP | WAPPINGER (T) |
| DUTCHESS | TASSONE REALTY PROPERTY | NY1330536 | WELL #2 (BLDG. 3 + 4) | 2603002 | NP | WAPPINGER (T) |
| DUTCHESS | TOWNE INN | NY1312463 | WELL | 2553138 | NC | FISHKILL (T) |
| DUTCHESS | UNITED WAPPINGER WATER IMPROVEMENT DIST. | NY1330660 | MEADOWWOOD 1 | 2620644 | C | WAPPINGER (T) |
| DUTCHESS | UNITED WAPPINGER WATER IMPROVEMENT DIST. | NY1330660 | PW02-5 ATLAS | 2619412 | C | WAPPINGER (T) |
| DUTCHESS | UNITED WAPPINGER WATER IMPROVEMENT DIST. | NY1330660 | PW02-6 ATLAS | 2619413 | C | WAPPINGER (T) |
| DUTCHESS | UNITED WAPPINGER WATER IMPROVEMENT DIST. | NY1330660 | PW-2 MEADOWWOOD | 2620646 | C | WAPPINGER (T) |
| DUTCHESS | UNITED WAPPINGER WATER IMPROVEMENT DIST. | NY1330660 | PW99-3 ATLAS | 2619409 | C | WAPPINGER (T) |
| DUTCHESS | UNITED WAPPINGER WATER IMPROVEMENT DIST. | NY1330660 | W001A (PW-99-1 ATLAS) | 2619408 | C | WAPPINGER (T) |
| DUTCHESS | UNITED WAPPINGER WATER IMPROVEMENT DIST. | NY1330660 | W001H C.W.W.I.A HILLTOP | 2619430 | C | WAPPINGER (T) |
| DUTCHESS | UNITED WAPPINGER WATER IMPROVEMENT DIST. | NY1330660 | W002H C.W.W.I.A HILLTOP | 2619436 | C | WAPPINGER (T) |
| DUTCHESS | UNITED WAPPINGER WATER IMPROVEMENT DIST. | NY1330660 | W005H C.W.W.I.A. (HILL TOP) 32FT. | 2619444 | C | WAPPINGER (T) |
| DUTCHESS | UNITED WAPPINGER WATER IMPROVEMENT DIST. | NY1330660 | W006 (PW02-7 ATLAS) | 2619414 | C | WAPPINGER (T) |
| DUTCHESS | UNITED WAPPINGER WATER IMPROVEMENT DIST. | NY1330660 | WELL 3 HILLTOP | 2619441 | C | WAPPINGER (T) |
| DUTCHESS | VILLA BORGHESE | NY1316246 | WELL | 2553267 | NC | WAPPINGER (T) |
| DUTCHESS | VILLAGE CREST APARTMENTS | NY1303232 | WELL #11 | 2599152 | C | WAPPINGER (T) |
| DUTCHESS | VILLAGE CREST APARTMENTS | NY1303232 | WELL #9 | 2553041 | C | WAPPINGER (T) |
| DUTCHESS | VILLAGE CREST APARTMENTS | NY1303232 | WELL L | 2553043 | C | WAPPINGER (T) |
| DUTCHESS | VISCOUNT LIQUORS DEMO KITCHEN | NY1330466 | WELL | 2587311 | NC | WAPPINGER (T) |
| DUTCHESS | WAPPINGER ROBINSON LANE RECREA | NY1330219 | WELL #1 | 2553935 | NC | WAPPINGER (T) |
| DUTCHESS | WAPPINGER ROBINSON LANE RECREA | NY1330219 | WELL #2 | 2553934 | NC | WAPPINGER (T) |
| DUTCHESS | WAPPINGER TOWN HALL | NY1330026 | WELL #1 | 2553737 | NC | WAPPINGER (T) |
| DUTCHESS | WAPPINGERS EMERGENCY SERVICES BLDG | NY1330192 | WELL 1 6"DIA. 220FT. | 2553908 | NC | WAPPINGER (T) |
| DUTCHESS | WAPPINGERS FALLS ELKS CLUB | NY1325004 | WELL 1 320FT | 2553702 | NC | WAPPINGER (T) |
| DUTCHESS | WAPPINGERS FALLS MOBILE HOME P | NY1302108 | WELL #1 (UPPER) | 2552743 | C | WAPPINGER (T) |
| DUTCHESS | WAPPINGERS FALLS MOBILE HOME P | NY1302108 | WELL #2 (LOWER) | 2552744 | C | WAPPINGER (T) |
| DUTCHESS | WAPPINGERS FALLS MOBILE HOME P | NY1302108 | WELL #3 (UPPER) | 2552745 | C | WAPPINGER (T) |
| DUTCHESS | WAPPINGERS FALLS VILLAGE | NY1302783 | WELL #3 | 2552911 | C | WAPPINGER FALLS |
| DUTCHESS | WAPPINGERS FALLS VILLAGE | NY1302783 | WELL #7 | 2627844 | C | WAPPINGER FALLS |
| DUTCHESS | WAPPINGERS FALLS VILLAGE | NY1302783 | WELL #7A | 2627845 | C | WAPPINGER FALLS |
| DUTCHESS | WOODHILL GREEN | NY1303230 | WELL #1 (NEAR NEW HACKENSACK RD, SOUTH) | 2553027 | C | WAPPINGER (T) |
| DUTCHESS | WOODHILL GREEN | NY1303230 | WELL #2 (NEAR NEW HACKENSACK RD, NORTH) | 2553028 | C | WAPPINGER (T) |
| DUTCHESS | WOODHILL GREEN | NY1303230 | WELL #4 (IN BLDG. NEAR TENNIS COURT,EAST | 2553029 | C | WAPPINGER (T) |
| DUTCHESS | ZHANG APARTMENTS | NY1330621 | WELL 1 | 2612991 | NP | POUGHKEEPSIE (T) |
| PUTNAM | GLASSBURY COURT AT COLD SPRING | NY3909004 | WELL 1 | 2624805 | C | PHILIPSTOWN (T) |
| PUTNAM | GLASSBURY COURT AT COLD SPRING | NY3909004 | WELL 2 | 2624806 | C | PHILIPSTOWN (T) |

**TABLE 5-4: Groundwater and Potable Water Well Sampling Data, 2013**

| | Hazardous Substance | Units | Benchmarks | | Background Sample | Down Gradient Samples | | | | | | Potable Drinking Water Wells | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EPA-MCL | SCDM Values | MW-F | MW-A | MW-C | MW-D | MW-E | MW-BP | MW-I | PW-B | PW-C | PW-D | PW-E |
| **General Chemistry - Lab** | | | | | | | | | | | | | | | |
| | Cyanide, Total | ug/l | 200 | 9 | 5 U | 3 J | 2 J | ND | 2 J | ND | 11 | 7 | ND | ND | 4 J |
| **Semivolatile Organics by GC/MS - Lab** | | | | | | | | | | | | | | | |
| | Phenol | ug/l | NONE | 4000 | 5 U | ND | ND | ND | ND | 9.6 | ND | ND | ND | ND | ND |
| **Semivolatile Organics by GC/MS-SIM - Lab** | | | | | | | | | | | | | | | |
| | Acenaphthene | ug/l | NONE | 900 | 0.2 U | ND | ND | ND | ND | 0.31 | ND | ND | ND | ND | ND |
| | Fluoranthene | ug/l | NONE | NONE | 0.2 U | ND | ND | ND | ND | 0.12 J | ND | ND | ND | ND | ND |
| | Hexachlorobutadiene | ug/l | NONE | 0.86 | 0.5 U | ND | ND | ND | ND | ND | ND | 0.12 J | ND | ND | ND |
| | Naphthalene | ug/l | NONE | 300 | 0.2 U | ND | ND | ND | ND | 0.17 J | ND | ND | ND | ND | ND |
| | Anthracene | ug/l | NONE | 4000 | 0.2 U | ND | ND | ND | ND | 0.07 J | ND | ND | ND | ND | ND |
| | Fluorene | ug/l | NONE | 600 | 0.2 U | ND | ND | ND | ND | 0.12 J | ND | ND | ND | ND | ND |
| | Phenanthrene | ug/l | NONE | NONE | 0.2 U | ND | ND | ND | ND | 0.41 | ND | ND | ND | ND | ND |
| | Pyrene | ug/l | NONE | 400 | 0.2 U | ND | ND | ND | ND | 0.08 J | ND | ND | ND | ND | ND |
| | 2-Methylnaphthalene | ug/l | NONE | 60 | 0.2 U | ND | ND | ND | ND | 0.15 J | ND | ND | ND | ND | ND |
| | Hexachloroethane | ug/l | NONE | NONE | 0.8 U | ND | ND | ND | ND | ND | ND | 0.09 J | ND | ND | ND |
| **Total Metals - Lab** | | | | | | | | | | | | | | | |
| | Aluminum, Total | ug/l | 50[a] | 10000 | 946 | 19200 | 95.2 | 19400 | 12500 | 768 | 4550 | 2.41 J | 2.15 J | 109 | ND |
| | Antimony, Total | ug/l | 6 | 6 | 0.22 J | 0.53 J | 0.25 J | 0.56 J | 0.54 J | 0.42 J | 0.37 J | 0.20 J | 0.11 J | 0.54 J | 0.32 J |
| | Arsenic, Total | ug/l | 10 | 4.4E-08 | 0.61 | 6.96 | 0.62 | 8.23 | 8.64 | 1.48 | 9.92 | 0.53 | 0.25 J | 1.29 | 0.29 J |
| | Barium, Total | ug/l | 2000 | 3000 | 68.59 | 358.4 | 50.19 | 309 | 180.7 | 113.8 | 118.4 | 35.45 | 46.81 | 52.14 | 58.58 |
| | Beryllium, Total | ug/l | 4 | 30 | 0.5 U | 1.72 | ND | 1.4 | 1.11 | ND | 0.2 J | ND | ND | ND | ND |
| | Cadmium, Total | ug/l | 5 | 7 | 0.06 J | 0.77 | ND | 0.51 | 0.65 | ND | 0.08 J | ND | ND | 0.07 J | ND |
| | Calcium, Total | ug/l | NONE | NONE | 155000 | 175000 | 132000 | 178000 | 172000 | 170000 | 152000 | 97400 | 102000 | 107000 | 119000 |
| | Chromium, Total | ug/l | 100 | 40 | 1.94 U | 33.8 | ND | 48.16 | 27.36 | ND | 5.73 | ND | ND | 2.07 | ND |
| | Cobalt, Total | ug/l | NONE | 4 | 0.72 | 22.88 | 0.77 | 22.94 | 31.88 | 0.28 J | 4.06 | 0.13 J | 0.13 J | 0.27 J | 0.26 J |
| | Copper, Total | ug/l | 1300 | 600 | 1.98 | 84.48 | 1.71 | 61.74 | 60.98 | ND | 11.5 | 10.21 | 4.16 | 34.68 | 16.74 |
| | Iron, Total | ug/l | 300[a] | 10000 | 1800 J | 41000 J | 511 J | 44400 J | 34700 J | 556 J | 9250 J | 303 J | 300 J | 3280 J | 627 J |
| | Lead, Total | ug/l | 15 | 7.9 | 1.07 | 70.5 | 0.31 J | 32.4 | 33.28 | 0.36 J | 6.96 | 2.02 | 0.70 J | 5.28 | 4.41 |
| | Magnesium, Total | ug/l | NONE | NONE | 19900 | 37400 | 26500 | 39700 | 39400 | 143 J | 18800 | 22200 J | 21300 J | 22800 J | 24700 J |
| | Manganese, Total | ug/l | 50[a] | 2100 | 82.54 | 7980 | 43.09 | 2924 | 3752 | ND | 2247 | 5.14 | 0.29 J | 18.63 | 2.91 |
| | Mercury, Total | ug/l | 2 | 4 | 0.2 U | 0.08 J | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| | Nickel, Total | ug/l | NONE | 300 | 2.64 | 43.94 | 1.75 | 46.22 | 37.86 | 8.4 | 10.36 | 25.69 | 5.84 | 11.64 | 43.95 |
| | Potassium, Total | ug/l | NONE | NONE | 827 J | 4250 J | 2260 J | 6330 J | 4250 J | 23900 J | 11000 J | 2610 | 1660 | 1710 | 1880 |
| | Selenium, Total | ug/l | 50 | 70 | 2.34 J | 3.54 J | 0.98 J | 2.87 J | 1.72 J | 1.32 J | 1.22 J | 0.97 J | 0.51 J | 1.16 J | 1.23 J |
| | Silver, Total | ug/l | 100[a] | 70 | 0.4 U | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| | Sodium, Total | ug/l | NONE | NONE | 132000 | 134000 | 175000 | 84300 | 142000 | 78000 J | 58000 | 68200 | 81000 | 74800 | 71100 |
| | Thallium, Total | ug/l | 2 | 0.1 | 0.5 U | 0.16 J | ND | 0.2 J | 0.15 J | ND | ND | ND | ND | ND | ND |
| | Vanadium, Total | ug/l | NONE | 100 | 1.01 J | 23.94 | 0.13 J | 22.84 | 16.22 | 1.51 J | 5.38 | ND | ND | 0.76 J | ND |
| | Zinc, Total | ug/l | 5000[a] | 4000 | 9.25 J | 171.3 | 4.89 J | 189.9 | 161.5 | 4.91 J | 30.3 | 12.6 | 20.3 | 96.96 J | 1989 J |
| **Volatile Organics by GC/MS - Lab** | | | | | | | | | | | | | | | |
| | Acetone | ug/l | ND | 10000 | R | 39 J | R | R | R | R | R | R | R | ND | ND |

**Notes:**

A value 3 times greater than the backgound sample (MW-F) is defined as an observed release

A qualifier of U (undetected) and a value greater than the background sample is defined as an observed release

ND not detected

J estimated

R rejected (during validation)

(a) EPA-MCL secondary standard

Observed Release

value exceeds SCDM benchmark

value is an observed release and exceeds SCDM benchmark

**Table 5-7: Historic Potable Water Well Sampling Data, 1991**

| | | Location | | | |
|---|---|---|---|---|---|
| **Hazardous Substance** | **Units** | **Wellhead C** | **Wellhead D** | **Wellhead B** | **Wellhead A** |
| Aluminum | ug/kg | 79.3 | 85.6 | 147 | 109 |
| Arsenic | ug/kg | ND | ND | ND | ND |
| Barium | ug/kg | 32.7 | 33.4 | 32.5 | 36.4 |
| Beryllium | ug/kg | ND | ND | ND | ND |
| Cadmium | ug/kg | ND | ND | ND | ND |
| Calcium | ug/kg | 83000 | 81100 | 86300 | 85400 |
| Chromium | ug/kg | 4 | ND | 24.3 | ND |
| Cobalt | ug/kg | ND | ND | ND | ND |
| Copper | ug/kg | ND | 7.8 | 9.4 | ND |
| Iron | ug/kg | 98.8 | 175 | 518 | 188 |
| Lead | ug/kg | ND | 5.9 | 2.4 | 2.3 |
| Magnesium | ug/kg | 20200 | 19900 | 20300 | 21400 |
| Manganese | ug/kg | 50.9 | 65.7 | 132 | 153 |
| Nickel | ug/kg | ND | ND | ND | ND |
| Potassium | ug/kg | 1980 | 1890 | 2450 | 1690 |
| Sodium | ug/kg | 19700 | 18400 | 23700 | 19400 |
| Vanadium | ug/kg | ND | ND | ND | ND |
| Zinc | ug/kg | 22.2 | 24.3 | 26.4 | 17.6 |
| Mercury | ug/kg | ND | ND | ND | ND |
| Naphthalene | ug/kg | ND | ND | ND | ND |
| 2-Methylnaphthene | ug/kg | ND | ND | ND | ND |
| Phenanthrene | ug/kg | ND | ND | ND | ND |
| Fluoranthene | ug/kg | ND | ND | ND | ND |
| di-n-Butylphthalate | ug/kg | ND | ND | ND | ND |
| Pyrene | ug/kg | ND | ND | ND | ND |
| Butylbenzylphthalate | ug/kg | ND | ND | ND | ND |
| Benzo(a)anthracene | ug/kg | ND | ND | ND | ND |
| Chrysene | ug/kg | ND | ND | ND | ND |
| Benzo(a)pyrene | ug/kg | ND | ND | ND | ND |

**Table 5-10: Sediment Samples, 2013**

| Hazardous Substance | Units | Background Sample | Drainage Swale Sediment Samples | | | Boggy Pond Sediment Samples (Max Value for SED-1 to SED-5) |
|---|---|---|---|---|---|---|
| | | SED-8 | SED-9 | SED-10 | SED-11 | |
| **Organochlorine Pesticides by GC - Lab** | | | | | | |
| 4,4'-DDE | ug/kg | 2.15 U | ND | ND | ND | 10 |
| trans-Chlordane | ug/kg | 2.68 U | ND | ND | ND | 4.98 |
| **Polychlorinated Biphenyls by GC - Lab** | | | | | | |
| Aroclor 1248 | ug/kg | 42.8 U | ND | ND | ND | 103 |
| Aroclor 1254 | ug/kg | 42.8 U | ND | ND | ND | 125 |
| **Semivolatile Organics by GC/MS - Lab** | | | | | | |
| Fluoranthene | ug/kg | 130 U | ND | 130 J | 190 | ND |
| Pyrene | ug/kg | 130 U | ND | 120 J | 180 | ND |
| Phenol | ug/kg | 220 U | ND | ND | ND | 640 |
| Benzaldehyde | ug/kg | 300 U | ND | ND | ND | 1000 |
| **Total Metals - Lab** | | | | | | |
| Aluminum, Total | ug/kg | 11,000,000 | 9,200,000 | 10,000,000 | 8,800,000 | 140,000,000 |
| Arsenic, Total | ug/kg | 3,200 | 1,800 | 5,200 | 3,800 | 12,000 |
| Calcium, Total | ug/kg | 2,300,000 | 1,400,000 | 11,000,000 | 9,000,000 | 8,400,000 |
| Copper, Total | ug/kg | 11,000 | 5,100 | 88,000 | 49,000 | 59,000 |
| Lead, Total | ug/kg | 9,900 | 5,300 | 43,000 | 28,000 | 43,000 |
| Mercury, Total | ug/kg | 30 J | ND | 350 | 170 | 110 |
| Silver, Total | ug/kg | 1000 U | ND | 1,700 J | 1,100 J | ND |
| Vanadium, Total | ug/kg | 12,000 | 11,000 | 18,000 | 14,000 | 52,000 |
| Zinc, Total | ug/kg | 49,000 | 44,000 | 260,000 | 220,000 | 140,000 |
| **Volatile Organics by 8260/5035 - Lab** | | | | | | |
| Acetone | ug/kg | 19 | 20 | ND | ND | 340 |
| 2-Butanone | ug/kg | 11 U | ND | ND | ND | 24 |

**Note:**

A value 3 times greater than the background sample (SED-8), is defined as an observed release. Observed releases are highlighted **GREEN.**

A qualifier of U (undetected) and a value greater than the background sample is defined as an observed release.

Boggy Pond Sediment Samples - These 5 sediment samples represent conditions for Boggy Pond and are not separately reported here.

ND = Not detected above laboratory detection limit

**Table 5-11: Historic Surface Water Samples, 1991**

| Hazardous Substance | Units | Background | Location | | | | |
|---|---|---|---|---|---|---|---|
| | | | Downstream Hudson River | Landfill A | Boggy Pond | Pond/Marsh Downsteam of Landfill | Hudson River |
| Aluminum | ug/kg | 298 | 323 | 24,100 | 6,440 | 400 | 388 |
| Arsenic | ug/kg | ND | ND | 7.5 | ND | ND | ND |
| Barium | ug/kg | 45 | 36.7 | 300 | 34.3 | 54.2 | 33 |
| Beryllium | ug/kg | ND | ND | 1.9 | ND | ND | ND |
| Cadmium | ug/kg | ND | ND | 18.2 | ND | ND | ND |
| Calcium | ug/kg | 79,700 | 62,300 | 99,500 | 31,300 | 56,900 | 32,400 |
| Chromium | ug/kg | ND | ND | 50.5 | ND | ND | ND |
| Cobalt | ug/kg | ND | ND | 21.7 | ND | ND | ND |
| Copper | ug/kg | ND | 40.7 | 523 | ND | 42.5 | ND |
| Iron | ug/kg | 492 | 514 | 68,700 | 782 | 419 | 577 |
| Lead | ug/kg | 2.6 | 2.4 | 643 | 3.3 | 2.4 | 3.6 |
| Magnesium | ug/kg | 16,500 | 25,500 | 24,200 | 12,100 | 25,500 | 2,900 |
| Manganese | ug/kg | 251 | 141 | 3630 | 127 | 24.3 | 56.2 |
| Nickel | ug/kg | ND | ND | 81.8 | ND | ND | ND |
| Potassium | ug/kg | 1,610 | 12,100 | 6,390 | 4,250 | 13,500 | 8,940 |
| Sodium | ug/kg | 38,900 | 165,000 | 11,700 | 77,700 | 182,000 | 218,000 |
| Vanadium | ug/kg | ND | ND | 128 | ND | ND | ND |
| Zinc | ug/kg | 21.6 | 72 | 2,680 | 22.5 | 52.5 | 14.2 |
| Mercury | ug/kg | ND | ND | 0.97 | ND | ND | ND |
| Naphthalene | ug/kg | ND | ND | ND | ND | ND | ND |
| 2-Methylnaphthene | ug/kg | ND | ND | ND | ND | ND | ND |
| Phenanthrene | ug/kg | ND | ND | ND | ND | ND | ND |
| Fluoranthene | ug/kg | ND | ND | ND | ND | ND | ND |
| di-n-Butylphthalate | ug/kg | ND | ND | ND | ND | ND | ND |
| Pyrene | ug/kg | ND | ND | ND | ND | ND | ND |
| Butylbenzylphthalate | ug/kg | ND | ND | ND | ND | ND | ND |
| Benzo(a)anthracene | ug/kg | ND | ND | ND | ND | ND | ND |
| Chrysene | ug/kg | ND | ND | ND | ND | ND | ND |
| Benzo(a)pyrene | ug/kg | ND | ND | ND | ND | ND | ND |

ND = not detected above laboratory detection limits

A value 3 times greater than the backgound sample is defined as an observed release

# APPENDIX A

# HRS SCORESHEETS

****** CONFIDENTIAL ******
******PRE-DECISIONAL DOCUMENT ******
****** SUMMARY SCORESHEET ******
****** FOR COMPUTING PROJECTED HRS SCORE ******

****** Do Not Cite or Quote ******

Site Name: VA Castle Point Region: Region 2

Scenario Name: SI

City, County, State: Castle Point, New York Evaluator:

EPA ID#: NY8360007282 Date:

Lat/Long: 41:032:29.76,-73:57:47.88

Congressional District:

This Scoresheet is for: SI

Scenario Name: SI

Description: 2013 sampling of soil, groundwater, and sediments

| | S pathway | $S^2$ pathway |
|---|---|---|
| Ground Water Migration Pathway Score ($S_{gw}$) | 100.0 | 10000.0 |
| Surface Water Migration Pathway Score ($S_{sw}$) | 26.82 | 719.31 |
| Soil Exposure Pathway Score ($S_s$) | 0.6 | 0.36 |
| Air Migration Score ($S_a$) | 1.13 | 1.28 |
| $S^2_{gw} + S^2_{sw} + S^2_s + S^2_a$ | | 10720.95 |
| $(S^2_{gw} + S^2_{sw} + S^2_s + S^2_a)/4$ | | 2680.24 |
| $\sqrt{(S^2_{gw} + S^2_{sw} + S^2_s + S^2_a)/4}$ | | 51.77 |

Pathways not assigned a score (explain):

**TABLE 3-1 --GROUND WATER MIGRATION PATHWAY SCORESHEET**

| Factor categories and factors | Maximum Value | Value Assigned | |
|---|---|---|---|
| Aquifer Evaluated: Shallow GW aquifer | | | |
| **Likelihood of Release to an Aquifer:** | | | |
| 1. Observed Release | 550 | 550.0 | |
| 2. Potential to Release: | | | |
| 2a. Containment | 10 | 10.0 | |
| 2b. Net Precipitation | 10 | 10.0 | |
| 2c. Depth to Aquifer | 5 | 5.0 | |
| 2d. Travel Time | 35 | 35.0 | |
| 2e. Potential to Release [lines 2a(2b + 2c + 2d)] | 500 | 500.0 | |
| 3. Likelihood of Release (higher of lines 1 and 2e) | 550 | | 550.0 |
| **Waste Characteristics:** | | | |
| 4. Toxicity/Mobility | (a) | 10000.0 | |
| 5. Hazardous Waste Quantity | (a) | 100.0 | |
| 6. Waste Characteristics | 100 | | 32.0 |
| **Targets:** | | | |
| 7. Nearest Well | (b) | 45.0 | |
| 8. Population: | | | |
| 8a. Level I Concentrations | (b) | 0.0 | |
| 8b. Level II Concentrations | (b) | 1500.0 | |
| 8c. Potential Contamination | (b) | 346.0 | |
| 8d. Population (lines 8a + 8b + 8c) | (b) | 1846.0 | |
| 9. Resources | 5 | 5.0 | |
| 10. Wellhead Protection Area | 20 | 20.0 | |
| 11. Targets (lines 7 + 8d + 9 + 10) | (b) | | 1916.0 |
| **Ground Water Migration Score for an Aquifer:** | | | |
| 12. Aquifer Score [(lines 3 x 6 x 11)/82,5000][c] | 100 | | 100.0 |
| **Ground Water Migration Pathway Score:** | | | |
| 13. Pathway Score ($S_{gw}$), (highest value from line 12 for all aquifers evaluated)[c] | 100 | | 100.0 |

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] Do not round to nearest integer

**TABLE 4-1 --SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET**

| Factor categories and factors | Maximum Value | Value Assigned | |
|---|---|---|---|
| Watershed Evaluated: Shallow GW aquifer | | | |
| **Drinking Water Threat** | | | |
| **Likelihood of Release:** | | | |
| 1. Observed Release | 550 | 550.0 | |
| 2. Potential to Release by Overland Flow: | | | |
| 2a. Containment | 10 | 10.0 | |
| 2b. Runoff | 10 | 1.0 | |
| 2c. Distance to Surface Water | 5 | 25.0 | |
| 2d. Potential to Release by Overland Flow [lines 2a(2b + 2c)] | 35 | 260.0 | |
| 3.Potential to Release by Flood: | | | |
| 3a. Containment (Flood) | 10 | 10.0 | |
| 3b. Flood Frequency | 50 | 25.0 | |
| 3c. Potential to Release by Flood (lines 3a x 3b) | 500 | 250.0 | |
| 4. Potential to Release (lines 2d + 3c, subject to a maximum of 500) | 500 | 500.0 | |
| 5. Likelihood of Release (higher of lines 1 and 4) | 550 | | 550.0 |
| **Waste Characteristics:** | | | |
| 6. Toxicity/Persistence | (a) | 10000.0 | |
| 7. Hazardous Waste Quantity | (a) | 100.0 | |
| 8. Waste Characteristics | 100 | | 32.0 |
| **Targets:** | | | |
| 9. Nearest Intake | 50 | 0.0 | |
| 10. Population: | | | |
| 10a. Level I Concentrations | (b) | 0.0 | |
| 10b. Level II Concentrations | (b) | 0.0 | |
| 10c. Potential Contamination | (b) | 5.75 | |
| 10d. Population (lines 10a + 10b + 10c) | (b) | 5.75 | |
| 11. Resources | 5 | 5.0 | |
| 12. Targets (lines 9 + 10d + 11) | (b) | | 10.75 |
| **Drinking Water Threat Score:** | | | |
| 13. Drinking Water Threat Score [(lines 5x8x12)/82,500, subject to a max of 100] | 100 | | 2.29 |
| **Human Food Chain Threat** | | | |
| **Likelihood of Release:** | | | |
| 14. Likelihood of Release (same value as line 5) | 550 | | 550.0 |
| **Waste Characteristics:** | | | |
| 15. Toxicity/Persistence/Bioaccumulation | (a) | 5.0E7 | |
| 16. Hazardous Waste Quantity | (a) | 100.0 | |
| 17. Waste Characteristics | 1000 | | 180.0 |
| **Targets:** | | | |
| 18. Food Chain Individual | 50 | 20.0 | |
| 19. Population | | | |
| 19a. Level I Concentration | (b) | 0.0 | |
| 19b. Level II Concentration | (b) | 0.0 | |
| 19c. Potential Human Food Chain Contamination | (b) | 0.0 | |
| 19d. Population (lines 19a + 19b + 19c) | (b) | 0.0 | |
| 20. Targets (lines 18 + 19d) | (b) | | 20.0 |
| **Human Food Chain Threat Score:** | | | |
| 21. Human Food Chain Threat Score [(lines 14x17x20)/82500, subject to max of 100] | 100 | | 24.0 |

| | | | |
|---|---|---|---|
| **Environmental Threat** | | | |
| **Likelihood of Release:** | | | |
| 22. Likelihood of Release (same value as line 5) | 550 | | 550.0 |
| **Waste Characteristics:** | | | |
| 23. Ecosystem Toxicity/Persistence/Bioaccumulation | (a) | 50000.0 | |
| 24. Hazardous Waste Quantity | (a) | 100.0 | |
| 25. Waste Characteristics | 1000 | | 32.0 |
| **Targets:** | | | |
| 26. Sensitive Environments | | | |
| 26a. Level I Concentrations | (b) | 0.0 | |
| 26b. Level II Concentrations | (b) | 0.0 | |
| 26c. Potential Contamination | (b) | 2.5 | |
| 26d. Sensitive Environments (lines 26a + 26b + 26c) | (b) | 2.5 | |
| 27. Targets (value from line 26d) | (b) | | 2.5 |
| **Environmental Threat Score:** | | | |
| 28. Environmental Threat Score [(lines 22x25x27)/82,500 subject to a max of 60] | 60 | | 0.53 |
| **Surface Water Overland/Flood Migration Component Score for a Watershed** | | | |
| 29. Watershed Score[c] (lines 13+21+28, subject to a max of 100} | 100 | | 26.82 |
| **Surface Water Overland/Flood Migration Component Score** | | | |
| 30. Component Score ($S_{sw}$)[c] (highest score from line 29 for all watersheds evaluated) | 100 | | 26.82 |

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] Do not round to nearest integer

**TABLE 4-25 --GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET**

| Factor categories and factors | Maximum Value | Value Assigned | |
|---|---|---|---|
| Watershed Evaluated: Shallow GW aquifer | | | |
| **Drinking Water Threat** | | | |
| **Likelihood of Release to an Aquifer:** | | | |
| 1. Observed Release | 550 | 0.0 | |
| 2. Potential to Release: | | | |
| 2a. Containment | 10 | 10.0 | |
| 2b. Net Precipitation | 10 | 6.0 | |
| 2c. Depth to Aquifer | 5 | 5.0 | |
| 2d. Travel Time | 35 | 35.0 | |
| 2e. Potential to Release [lines 2a(2b + 2c + 2d)] | 500 | 460.0 | |
| 3. Likelihood of Release (higher of lines 1 and 2e) | 550 | | 460.0 |
| **Waste Characteristics:** | | | |
| 4. Toxicity/Mobility | (a) | 100.0 | |
| 5. Hazardous Waste Quantity | (a) | 100.0 | |
| 6. Waste Characteristics | 100 | | 10.0 |
| **Targets:** | | | |
| 7. Nearest Well | (b) | 20.0 | |
| 8. Population: | | | |
| 8a. Level I Concentrations | (b) | 0.0 | |
| 8b. Level II Concentrations | (b) | 0.0 | |
| 8c. Potential Contamination | (b) | 0.05 | |
| 8d. Population (lines 8a + 8b + 8c) | (b) | 0.05 | |
| 9. Resources | 5 | 0.0 | |
| 10. Targets (lines 7 + 8d + 9) | (b) | | 20.05 |
| **Drinking Water Threat Score:** | | | |
| 11. Drinking Water Threat Score ([lines 3 x 6 x 10]/82,500, subject to max of 100) | 100 | | 1.12 |
| **Human Food Chain Threat** | | | |
| **Likelihood of Release:** | | | |
| 12. Likelihood of Release (same value as line 3) | 550 | 460.0 | |
| **Waste Characteristics:** | | | |
| 13. Toxicity/Mobility/Persistence/Bioaccumulation | (a) | 50000.0 | |
| 14. Hazardous Waste Quantity | (a) | 100.0 | |
| 15. Waste Characteristics | 1000 | | 32.0 |
| **Targets:** | | | |
| 16. Food Chain Individual | 50 | 0.0 | |
| 17. Population | | | |
| 17a. Level I Concentration | (b) | 0.0 | |
| 17b. Level II Concentration | (b) | 0.0 | |
| 17c. Potential Human Food Chain Contamination | (b) | 0.0 | |
| 17d. Population (lines 17a + 17b + 17c) | (b) | 0.0 | |
| 18. Targets (lines 16 + 17d) | (b) | | 0.0 |
| **Human Food Chain Threat Score:** | | | |
| 19. Human Food Chain Threat Score [(lines 12x15x18)/82,500,suject to max of 100] | 100 | | 0.0 |
| **Environmental Threat** | | | |
| **Likelihood of Release:** | | | |
| 20. Likelihood of Release (same value as line 3) | 550 | | 460.0 |

| | | | |
|---|---|---|---|
| **Waste Characteristics:** | | | |
| 21. Ecosystem Toxicity/Persistence/Bioaccumulation | (a) | 0.0 | |
| 22. Hazardous Waste Quantity | (a) | 100.0 | |
| 23. Waste Characteristics | 1000 | | 0.0 |
| **Targets:** | | | |
| 24. Sensitive Environments | | | |
| 24a. Level I Concentrations | (b) | 0.0 | |
| 24b. Level II Concentrations | (b) | 0.0 | |
| 24c. Potential Contamination | (b) | 0.0 | |
| 24d. Sensitive Environments (lines 24a + 24b + 24c) | (b) | 0.0 | |
| 25. Targets (value from line 24d) | (b) | | 0.0 |
| **Environmental Threat Score:** | | | |
| 26. Environmental Threat Score [(lines 20x23x25)/82,500 subject to a max of 60] | 60 | | 0.0 |
| **Ground Water to Surface Water Migration Component Score for a Watershed** | | | |
| 27. Watershed Score[c] (lines 11 + 19 + 28, subject to a max of 100) | 100 | | 1.12 |
| 28. Component Score ($S_{gs}$)[c] (highest score from line 27 for all watersheds evaluated, subject to a max of 100) | 100 | | 1.12 |

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] Do not round to nearest integer

TABLE 5-1 --SOIL EXPOSURE PATHWAY SCORESHEET

| Factor categories and factors | Maximum Value | Value Assigned | |
|---|---|---|---|
| **Likelihood of Exposure:** | | | |
| 1. Likelihood of Exposure | 550 | | 550.0 |
| **Waste Characteristics:** | | | |
| 2. Toxicity | (a) | 10000.0 | |
| 3. Hazardous Waste Quantity | (a) | 10.0 | |
| 4. Waste Characteristics | 100 | | 18.0 |
| **Targets:** | | | |
| 5. Resident Individual | 50 | | |
| 6. Resident Population: | | | |
| 6a. Level I Concentrations | (b) | 0 | |
| 6b. Level II Concentrations | (b) | | |
| 6c. Population (lines 6a + 6b) | (b) | | |
| 7. Workers | 15 | 5.0 | |
| 8. Resources | 5 | | |
| 9. Terrestrial Sensitive Environments | (c) | 0.0 | |
| 10. Targets (lines 5 + 6c + 7 + 8 + 9) | (b) | | 5.0 |
| **Resident Population Threat Score** | | | |
| 11. Resident Population Threat Score (lines 1 x 4 x 10) | (b) | | 49500.0 |
| **Nearby Population Threat** | | | |
| **Likelihood of Exposure:** | | | |
| 12. Attractiveness/Accessibility | 100 | 0.0 | |
| 13. Area of Contamination | 100 | 60.0 | |
| 14. Likelihood of Exposure | 500 | | 0.0 |
| **Waste Characteristics:** | | | |
| 15. Toxicity | (a) | 10000.0 | |
| 16. Hazardous Waste Quantity | (a) | 10.0 | |
| 17. Waste Characteristics | 100 | | 18.0 |
| **Targets:** | | | |
| 18. Nearby Individual | 1 | 1.0 | |
| 19. Population Within 1 Mile | (b) | 2.1 | |
| 20. Targets (lines 18 + 19) | (b) | | 3.1 |
| **Nearby Population Threat Score** | | | |
| 21. Nearby Population Threat (lines 14 x 17 x 20) | (b) | | 0.0 |
| **Soil Exposure Pathway Score:** | | | |
| 22. Pathway Score[d] ($S_s$), [lines (11+21)/82,500, subject to max of 100] | 100 | | 0.6 |

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] No specific maximum value applies to factor. However, pathway score based solely on terrestrial sensitive environments is limited to a maximum of 60
[d] Do not round to nearest integer

**TABLE 6-1 --AIR MIGRATION PATHWAY SCORESHEET**

| Factor categories and factors | Maximum Value | Value Assigned | |
|---|---|---|---|
| **Likelihood of Release:** | | | |
| 1. Observed Release | 550 | 0.0 | |
| 2. Potential to Release: | | | |
| 2a. Gas Potential to Release | 500 | 110.0 | |
| 2b. Particulate Potential to Release | 500 | 84.0 | |
| 2c. Potential to Release (higher of lines 2a and 2b) | 500 | 110.0 | |
| 3. Likelihood of Release (higher of lines 1 and 2c) | 550 | | 110.0 |
| **Waste Characteristics:** | | | |
| 4. Toxicity/Mobility | (a) | 200.0 | |
| 5. Hazardous Waste Quantity | (a) | 100.0 | |
| 6. Waste Characteristics | 100 | | 10.0 |
| **Targets:** | | | |
| 7. Nearest Individual | 50 | 20.0 | |
| 8. Population: | | | |
| 8a. Level I Concentrations | (b) | 0.0 | |
| 8b. Level II Concentrations | (b) | 0.0 | |
| 8c. Potential Contamination | (c) | 50.5 | |
| 8d. Population (lines 8a + 8b + 8c) | (b) | 50.5 | |
| 9. Resources | 5 | 5.0 | |
| 10. Sensitive Environments: | | | |
| 10a. Actual Contamination | (c) | 0.0 | |
| 10b. Potential Contamination | (c) | 9.26 | |
| 10c. Sensitive Environments (lines 10a + 10b) | (c) | 9.26 | |
| 11. Targets (lines 7 + 8d + 9 + 10c) | (b) | | 84.76 |
| **Air Migration Pathway Score:** | | | |
| 12. Pathway Score ($S_a$) [(lines 3 x 6 x 11)/82,500][d] | 100 | | 1.13 |

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] No specific maximum value applies to factor. However, pathway score based solely on sensitive environments is limited to a maximum of 60.
[d] Do not round to nearest integer

## SCRATCH PAD NOTES:

### PATHWAY/SOURCES: AIR

Scoresheet Line#: 9
Notes: Castle Point Park abuts the site to the north, behind Landfill areas A, B, and C
Documentation: sitevisit

Scoresheet Line#: 10
Notes: 10.5 acres of wetlands on Hudson River, 350 feet west of site (25); 30 acres of wetlands on Tributary 6D (25), wetlands located 3.5 miles south of the Site (25). Si values taken from Table 5-2 in report (0-1/4 = 25; 1/4-1/2=25; 2-3 = 55)
Documentation: EBASCO pp. 24 to 26, 27; FWS

Scoresheet Line#: 2a
Notes: Landfill A had evidence of a gas release in 1991 (odors noted in the area). No other odors have been noted at the Site. to calculate value:A - has been a fire in the landfill - 10B - no evidence of biogas release - 11C - contaminants in air are unknown - 0
Documentation: Adelaide91 p. 7

Scoresheet Line#: 2b
Notes: gravel and soil cover exists; nothing on field PID until 4 feet (3)no evidence of biogas (22)from figure 6-2 (6)
Documentation: sitevisit

Scoresheet Line#: 10b
Notes: 5 state designated protection of aquitic life + 5 state designated protection of aquitic life + 75 for spawning area and state T&E species = 85. For wetlands, 10.5 acres within 0.25 miles, 30 acres within 0.25-0.5 miles, and ~50 acres within 2-3 miles and then account for weighted distance factors = 7.6575. Total is 85 + 7.6 = 92.6.
Documentation: Ebasco

### PATHWAY/SOURCES: AREA OF CONTAMINATION (AOC) INFORMATION

Scoresheet Line#: AOC B
Notes: SCDM compounds based on pbserved contamination for drainage swale sediment. Did not include Boggy Pond chemicals.
Documentation: 2013 SI data

### PATHWAY/SOURCES: GROUND WATER

Scoresheet Line#:
Notes:
Documentation:

Scoresheet Line#: 2
Notes: Landfilled areas have no liners
Documentation: Adelaide91 pp. 7-12

Scoresheet Line#: 2b
Notes: net rainfall in dutchess county is 48" per year
Documentation: USA

Scoresheet Line#: 2c
Notes: Depth to shallow aquifer is less than 20 feet, based on visual observations during SI sampling and historic information
Documentation: SiteVisit

Scoresheet Line#: 2d
Notes: Permability of upper layer has been estimated to be approxiately 10^-3 cm/sec
Documentation: EBASCO p. 21, Document2 pp. 4 to 5

Scoresheet Line#: 4
Notes: All chemicals detected in soil samples during SI were entered
Documentation: SiteVisit, Appendix B

Scoresheet Line#: 8
Notes: drinking water samples do not have evidence of contamination. Also no background information for comparison
Documentation: Appendix A, B

Scoresheet Line#:
Notes:
Documentation:

Scoresheet Line#: 4
Notes: Arsenic was detected at elevated concentrations above EPA Tap qater criteria in groundwater wells in the shallow aquifer sampled during the 2103 SI.
Documentation: 2013 SI data

Scoresheet Line#: 8d
Notes: Based on population data assumed to be served by wells that are in the shallow aquifer, based on data that is 20 years old for population.
Documentation: Ebasco, Section 1, page 23.

Scoresheet Line#: 2d
Notes: The thickness of the shallow aquifer is approximately 200 feet thick.
Documentation: Document 2, page 5.

Scoresheet Line#: 10
Notes: The site is located within 4 miles of a NYSDEC designated wellhead protection area.
Documentation: Document 2, page 5.

Scoresheet Line#: 1
Notes: An observed release based on "direct observation" has NOT occurred. Historical interviews with site workers indicated the material that was likely added to the landfills and dumped at the boiler plant. BUT there is no documented evidence that hazardous ubstances were seen being released directly into groundwater.
Documentation: Ebasco, SEction 4, interviews from SSI 1991

Scoresheet Line#: 2a
Notes: note that evidence of migration from a source does not have to meet the criteria for observed release. In this case, there is evidence of hazardous substance migration from the source (ex. landfill a) to the groundwater at landfill a.
Documentation: 2013 SI groundwater data

Scoresheet Line#: 8a
Notes: actual contamination cannot be determined because there are no background monitoring wells with which to compare the drinking water wells.
Documentation: SSI 1991, 2013 SI

000
Scoresheet Line#: 8b
Notes: actual contamination cannot be determined because there are no background monitoring wells with which to compare the drinking water wells. There are no level II concentrations either.
Documentation: SSI 1991. SI 2013

Scoresheet Line#: 9
Notes: in the aquifer being evaluated is usable for drinking water purposes.
Documentation: 2013 SI

Scoresheet Line#: 1
Notes: Monitoring well MW-F (near landfill F) represented background conditions compared to other monitoring wells MW-A, B, C, D, E< BP, and I. MW-F contained the lowest concentrations of detected chemicals compared to these other wells. MW-F is also hydrologucally upgradient from the opther wells.
Documentation: 2013 SI analytical data

Scoresheet Line#: 7
Notes: The nearest well is within 0.25 miles of the source area and has Level I concentrations documented by chemical analysis.
Documentation: 2013 SI data

**PATHWAY/SOURCES: GROUND WATER TO SURFACE WATER – DRINKING WATER**

**PATHWAY/SOURCES: GROUND WATER TO SURFACE WATER – ENVIRONMENTAL**

**PATHWAY/SOURCES: GROUND WATER TO SURFACE WATER – HUMAN FOOD CHAIN**

**PATHWAY/SOURCES: SOIL EXPOSURE – RESIDENTIOAL POPULATION THREAT**

Scoresheet Line#: 1
Notes: sediments are readily accessible to on-site workers and patients
Documentation: sitevisit

Scoresheet Line#: 5
Notes: there are no residences, day cares, or schools located within 200 feet of any area of contamination. there are work places located within this area though
Documentation: SiteVisit

Scoresheet Line#: 8
Notes: there are no areas of aggriculture present at the site
Documentation: sitevisit

Scoresheet Line#: 9
Notes: there are state designated areas for the protection of aquatic life (boggy pond area)
Documentation: EBASCO pp. 24 to 26

Scoresheet Line#: 6
Notes: No residents live within the areas of contamination
Documentation: sitevisit

Scoresheet Line#:
Notes:
Documentation:

Scoresheet Line#:
Notes:
Documentation:

Scoresheet Line#: 1
Notes: There was observed contamination in surface soil samples in 1991. There are workers within 200 feet of the observed contamination areas (landfills).
Documentation: Adelaide 1991

## PATHWAY/SOURCES: SOIL EXPOSURE – NEARBY POPULATION THREAT

Scoresheet Line#: 12
Notes: the site is surrounded by a fence, however, the area could be accissible to the public and to on site workers
Documentation: sitevisit

Scoresheet Line#: 18
Notes: nearest individual resident is less than 1/4 mile offsite. Residences are located adjacent to the fenced in area surrounding Landfill E.
Documentation: sitevisit

Scoresheet Line#: 7
Notes: There is 1 worker who meets the definition of worker who may spend part of the day within 200 feet of the area of observed contamiantion for the soil source.
Documentation: Site Visit

Scoresheet Line#: 13
Notes: There is approximately 11,000 square feet of potentially impacted sediments in the drainage swales
Documentation: Site visit

Scoresheet Line#: 19
Notes: 0-0.25 = 1800.25-0.5 = 4900.5 - 1.0 = 2,976
Documentation: Ref. 3, 18

## PATHWAY/SOURCES: SITE SCENARIO INFORMATION

## PATHWAY/SOURCES: SOURCES

Scoresheet Line#: 2-5
Notes: Landfill A = 130,000 plus another 20,000 for the "Holding Area" next to it.
Documentation: Ebasco, section 1, page 20

Scoresheet Line#: source 8
Notes: added the surface soil as a source area with an unknown area because it is based on 3 surface soil samples with locations that cant be pinpointed from the 1991 SSI figure or descriptions. These chemicals are evaluated in the soil exposure pathway because there are background data available to document observed contamination.
Documentation: Ebasco, Section 1, AHEA SSI 1991

Scoresheet Line#: 2-5 (b)
Notes: used tied D because it is the most accurate information we have. we don't know for certain the depth of the sources, so volume was not used.
Documentation: All reference material, especially Ebsaco and SSI 1991

## PATHWAY/SOURCES: SURFACE WATER OVERLAND - DRINKING WATER

Scoresheet Line#: 9
Notes: The nearest intake is on the Hudson River. Flow rate is 17,000 cfs. The HRS Table 4-13 is 0.0001 x 20 = 0.002. The HRS software gives a value of 0 for large water body.
Documentation: Ebasco, SEction 1, page 7

Scoresheet Line#: 11
Notes: The Hudson River is used for the listed resources.
Documentation: Ebasc and Document 2

Scoresheet Line#: 10c
Notes: The nearest intake currently in use is NYC located 1.2 miles from the site, Highland at 11.3, and Poughkeepsie at 11.5 miles. The VAMC-CP intake is no longer in use. Hudson River flow rate is 17,700 cfs.

Based on population at each intake and HRS table 4-14, assigned value of 57.5.
Documentation: Ref 3, 12

### PATHWAY/SOURCES: SURFACE WATER OVERLAND – ENVIRONMENTAL

Scoresheet Line#: 23a
Notes: Used arsenic
Documentation: Ebasco

Scoresheet Line#: 26c
Notes: 4-23: assigned 100 for critical habitat. 4-13: assigned 0.0001 for large river flow rate at 17,000 cfs. 4-24: assigned 25 for 0.8 miles of wetland frontage along hudson river at probable point of entry. total equal 25.
Documentation: ebasoc section1

### PATHWAY/SOURCES: SURFACE WATER OVERLAND - HUMAN FOOD CHAIN

Scoresheet Line#: 18
Notes: Observed release of DDE for potential contamination of Hudson River fishery
Documentation: site visit

Scoresheet Line#: 19c
Notes: potential contamination is based on a guestimate of 0-100 pounds consumed per year. Assigned value fomr Tabl 4-18 of 0.03.
Documentation: None

# APPENDIX B

# BORING LOGS

A-1

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists, Inc. — Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-4-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~6'
LOGGED BY: SW CHECKED BY:
METHOD: Geoprobe DATE:
CASING: PVC riser
DIAMETER: 1"

| | |
|---|---|
| BORING NO. | A-1 |
| WELL NO. | A-1 |
| PG. 1 OF | 1 |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 16 | 2.6 | 45 | BLACK TOPSOIL, MOIST, NO ODOR<br>GRAYISH BROWN F-C SAND, 20% F-C GRAVEL, 20% SILT, MOIST, NO ODOR | | |
| 5-10 | — | — | — | 12 | 0.4 | | DARK GRAY SILT, 10% F-C SAND, 10% F-C GRAVEL, WET @ 6', NO ODOR | | |
| 10-15 | — | — | — | 0 | 0.3 | | COBBLE IN TIP OF SAMPLER | | |
| 15 | | | | | | | BOH @ 15', NO REFUSAL | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | WELL CONSTRUCTION DETAILS |
|---|---|
| silt & clay | asphalt |
| concrete | concrete |
| gravel | native fill |
| sand | bentonite |
| silt | casing |
| clay | screen |
| sand & gravel | grout |
| bedrock | bedrock |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

**Boring Log/Well Construction Diagram**

Mabbett
Scientists Engineers Program Managers
Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-4-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: N/A
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | A-2 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 48 | 2.4 | 4-5 | DARK GRAYISH-BROWN SILT, 10% F-C SAND, 10% F-C GRAVEL, DRY, NO ODOR<br>DARK GRAY SILT, 20% FC SAND, 10% F-C GRAVEL, DRY, NO ODOR<br>2ND ~~5~~ 5', REFUSAL ON PRESUMED BOULDER (2 ATTEMPTS) | | |
| 5-10 | — | | | | | | | | |
| 10-15 | | | | | | | | | |
| 15-20 | | | | | | | | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

A-3

**Boring Log/Well Construction Diagram**

Mabbett™
Defendants Liaison – Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-4-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~8'
LOGGED BY: SLS CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | A-3 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 24 / 14.5 | 3.1 | 0.5 / 4-5 | DARK BROWN TOPSOIL; BROWNISH-GRAY F-C SAND, 20% F-C GRAVEL, 20% SILT, MOIST, NO ODOR | | |
| 5-10 | — | — | — | 48 | 2.6 | 7-8 | GRAYISH-BROWN SILT, MOIST (V MOIST @ 8-10'), NO ODOR | | |
| 10-15 | — | — | — | 60 | 1.1 | 12' | SAA, V. MOIST, NO ODOR; DARK GRAY SILT, 10% F-C SAND, 10% F-C GRAVEL, DRY, NO ODOR, TIGHT | | |
| 15-20 | — | — | — | 56 | 1.1 | | SAA, DRY, NO ODOR | | |

BOR @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes: FD-3 → 7-8'

A-4

**Boring Log/Well Construction Diagram**

Mabbett™

Five Alfred Circle, Bedford, Massachusetts 01730
Phone (781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-4-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~14'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | A-4 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 24 | 4.2 | 4-5 | BROWNISH-GRAY F-C SAND, 20% F-C GRAVEL, 20% SILT, DRY, NO ODOR | | |
| 5-10 | — | — | — | 40 | 0.4 | | DARK GRAYISH-BROWN FINE SAND, TRACE SILT, NO ODOR | | |
| | | | | | | 9' | SAA 0-5', MOIST, NO ODOR | | |
| 10-15 | — | — | — | 32 | 2.2 | 13-14 | SAA 9-10', WET @ 14', NO ODOR | | |
| 15-20 | — | — | — | 24 | 1.0 | | SAA, WET NO ODOR | | |
| | | | | | | | DARK GRAY SILT, 10% F-C SAND, 10% F-C GRAVEL, WET NO ODOR | | |

BOH @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

A-5

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists | Engineers | Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-4-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~15'
LOGGED BY: SKO CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | A-5 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 20 | 3.0 | 4-5 | GRAYISH-BROWN F-C SAND, 20% F-C GRAVEL, 20% SILT, M-W-SI, COBBLE @ 4', NO ODOR | | |
| 5-10 | — | — | — | 0 | — | | COBBLE IN TIP OF SAMPLER | | |
| 10-15 | — | — | — | 30 | 2.7 | 14-15 | SAA 0-5', DRY NO ODOR, WET @ TIP OF SAMPLER | | |
| 15-20 | — | — | — | 30 | 0.4 | | SAA, WET, NO ODOR | | |
| | | | | | | 19' | SILTY DARK GRAY FINE SAND, WET, NO ODOR | | |

BOH @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

Notes:

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

B-1

**Boring Log/Well Construction Diagram**

Mabbett™
Solutions for Environmental Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-2 -13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc FOREMAN:
GROUNDWATER DEPTH: ~21'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING: PVC RISER
DIAMETER: 1"

| BORING NO. | B-1 |
|---|---|
| WELL NO. | B-1 |
| PG. 1 OF 2 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 30 | 2.1 | 4-5 | DARK GRAYISH BROWN F-C SAND, 20% F-C GRAVEL, 20% SILT, BRICK FRAG DRY; NO ODOR | | |
| 5-10 | — | — | — | 20 | 0.7 | | SAA. DRY NO ODOR | | |
| 10-15 | — | — | — | 30 | 1.1 | 11 | SAA. DRY. NO ODOR<br>DARK BROWNISH GRAY FINE SAND, 10% SILT, 10% F-C GRAVEL, DRY, NO ODOR | | |
| 15-20 | — | — | — | 30 | 1.2 | | SAA, MOIST, NO ODOR<br>GRAYISH BROWN F-C SAND, 20% F-C GRAVEL, 20% SILT, | | MOIST, NO ODOR |

10'

Bottom @ 25', ~~NO REFUSAL~~

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

B-1

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists & Engineers ... Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-4-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ± 21'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | |
|---|---|
| WELL NO. | B-1 |
| PG. 2 OF 2 | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | | | | |
| 20-25 | — | — | — | 52 | 6.0 | 20-21 | SAA, MOIST, NO ODOR<br>GRAYISH BROWN GRADING TO DARK GRAY SILT, WET, NO ODOR | | |
| 25 | | | | | | | BOH @ 25', NO REFUSAL | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

B-2

**Boring Log/Well Construction Diagram**

Mabbett
Scientists [illegible] Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-4-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~18'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | B-2 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 24 | 4.4 | 4-5' | DARK GRAYISH BROWN F-C SAND, 25% F-C GRAVEL, 20% SILT, BRICK FRAG, DRY NO ODOR | | |
| 5-10 | — | — | — | 24 | 1.2 | | SAA. W/BRICK FRAG, DRY NO ODOR | | |
| 10-15 | — | — | — | 30 | 1.2 | | SAA, NO BRICK, MOIST, NO ODOR | | |
| 15-20 | — | — | — | 34 | 2.2 | 17-18' | SAA, NO BRICK, VERY MOIST, NO ODOR | | |
| | | | | | | 18' | GRAYISH BROWN TO DARK GRAY SILT, WET, NO ODOR | | |

BOH @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

**Boring Log/Well Construction Diagram**

Mabbett™
Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH:
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: N/A
LOGGED BY: S.L.N CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | B-3 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 28 | 1.7 | 4-5 | GRAY/BR-BROWN F-C SAND, 20% F-C GRAVEL, 20% SILT, BRICK FRAG, CONCRETE FRAG, DRY, NO ODOR | | |
| 5-10 | — | — | — | 28 | 0.4 | | SAA, W/BRICK FRAG, DRY, NO ODOR | | |
| 10-15 | — | — | — | 12 | 0.4 | | SAA, NO BRICK FRAG, DRY, NO ODOR | | |
| 15-20 | — | — | — | 26 | 1.8 | 19-20 | SAA, NO BRICK FRAG, DRY, NO ODOR | | |

BOH @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

B-4

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists & Engineers – Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-4-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~9'
LOGGED BY: SW CHECKED BY:
METHOD: Geoprobe DATE:
CASING:
DIAMETER:

| BORING NO. | B-4 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 30 | 2.6 | 4-5 | GRAYISH-BROWN FINE SAND, 20% FINE GRAVEL, 20% SILT, BRICK, FRAG, DRY, NO ODOR | | |
| 5-10 | — | — | — | 32 | 2.5 | 8-9 | SAA, NO BRICK, DRY, NO ODOR<br>DARK BROWNISH-GRAY FINE SAND, 20% SILT, WET @ 9', NO ODOR | | |
| 10-15 | — | — | — | 24 | 2.4 | | SAA, WET, NO ODOR | | |
| 15-20 | ~ | ~ | ~ | | | | TOR @ 15', NO RECOVERY | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | WELL CONSTRUCTION DETAILS |
|---|---|
| silt & clay | asphalt |
| concrete | concrete |
| gravel | native fill |
| sand | bentonite |
| silt | casing |
| clay | screen |
| sand & gravel | grout |
| bedrock | bedrock |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

**Boring Log/Well Construction Diagram**

Mabbett™

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-3-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~15'
LOGGED BY: SLW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | B-5 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 19 | 1.1 | 4-5' | DARK BROWNISH GRAY SILT, 20% F-C SAND, 20% F-C GRAVEL, MOIST, NO ODOR | BRICK FRAG. | |
| 5-10 | — | — | — | 30 | 0.4 | | SAA, BRICK FRAG @ 9', DRY, NO ODOR | | |
| 10-15 | — | — | — | 24 | 0.4 | 14-15' | SAA, DRY, NO ODOR | | |
| 15-20 | — | — | — | 6 | 2.1 | | SAA, WET, NO ODOR | | |

BOH @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

C-1

**Boring Log/Well Construction Diagram**

**Mabbett**™
Scientists Engineers Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-4-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~17'
LOGGED BY: SW CHECKED BY:
METHOD: GeoProbe DATE:
CASING:
DIAMETER:

| BORING NO. | C-1 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 0-5 | — | — | — | 24 | 1.0 | 4-5 | 0.5 DARK BROWN TOPSOIL<br>DARK GRAYISH-BROWN F-C SAND, 20% GRAVEL, 20% SILT, DRY, NO ODOR, CONCRETE/BRICK CONSTRUC. | | |
| 5 | | | | | | | | | |
| 5-10 | — | — | — | 8 12 8 | 0.7 | | SAA W/ CLASS + CONCRETE DRY NO ODOR | | |
| 10 | | | | | | | | | |
| 10-15 | — | — | — | 28 | 1.1 | | SAA, NO CONCRETE/GLASS. DRY NO ODOR | | |
| 15 | | | | | | | | | |
| 15-20 | — | — | — | 60 | 0.9 | 16-17' | @17' SAA. WET, NO ODOR | | |
| 20 | | | | | | 19' | DARK GRAY SILT, WET, NO ODOR | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

C-2

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists • Engineers • Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone (781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-4-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~15'
LOGGED BY: SJD CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | C-2 |
|---|---|
| WELL NO. | |
| PG. 1 OF | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 20 | 3.2 | 0-5 | DARK BROWN-GRAY, F-C SAND, 20% f-c GRAVEL, 20% SILT, MOIST, NO ODOR | BRICK | |
| 5-10 | — | — | — | 22 | 3.0 | | (NO BRICK) SAA, MOIST, NO ODOR | | |
| 10 15 | — | — | — | 20 | 4.6 ↓ | 14-15 | (NO BRICK) SAA, WET @ 15', NO ODOR | | |
| 15-20 | — | — | — | 24 | 4.1 | 19 | (NO BRICK) SAA, WET, NO ODOR DARK GRAY SILT, WET, NO ODOR | | |

BOH @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

C-3

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists • Engineers • Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-3-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~13'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | C-3 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 24 | 4.1 ↓ | 4-5 | DARK BROWN TOPSOIL - MOIST, NO ODOR<br>GRAY/BROWN SILT, F-C SAND, 20% F-C GRAVEL, 20% SILT, DRY, NO ODOR | | |
| 5-10 | — | — | — | 22 | 3.9 | | SAA, DRY, NO ODOR | | |
| 10-15 | — | — | — | 34 | 4.3 | 12-13 | SAA, WET @ 13', NO ODOR | | |
| 15-20 | — | — | — | 36 | 4.4 | 18 | SAA, WET, NO ODOR<br>DARK GRAY SILT, WET, NO ODOR, GRAVEL IN TIP OF SAMPLER | | |

EOH @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

C-4

**Boring Log/Well Construction Diagram**

Mabbett™

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-3-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~13'
LOGGED BY: SW CHECKED BY:
METHOD: GeoProbe DATE:
CASING: PVC riser
DIAMETER: 1"

| | |
|---|---|
| BORING NO. | GP4 |
| WELL NO. | C-4 |
| PG. 1 OF | 1 |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 27 | 2.8 | 4-5 | DARK BROWNISH GRAY F-C SAND, 20% F-C GRAVEL, 20% SILT, DRY, NO ODOR | | |
| 5-10 | — | — | — | 20 | 2.9 | | SAA, MOIST, NO ODOR | | |
| 10-15 | — | — | — | 28 | SS 5.5 | 12-13 | SAA, WET @ 13', NO ODOR<br>DARK GRAY SILT, 10% F-C SAND, 5% F-C GRAVEL, WET, NO ODOR | | |
| 15-20 | — | — | — | 21 | 4.9 | | SAA, WET, NO ODOR | | |

BOH @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | WELL CONSTRUCTION DETAILS |
|---|---|
| silt & clay | asphalt |
| concrete | concrete |
| gravel | native fill |
| sand | bentonite |
| silt | casing |
| clay | screen |
| sand & gravel | grout |
| bedrock | bedrock |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

D-1

**Boring Log/Well Construction Diagram**

Mabbett
Consultants | Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-3-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~9'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING: PVC riser
DIAMETER: 1"

| | |
|---|---|
| BORING NO. | DW1 |
| WELL NO. | D-1 |
| PG. | 1 OF 1 |

| DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 0 5 | — | — | — | 50 | 4.8 | 4-5 | GRAYISH-BROWN SILT, 10% F-C SAND, 10% F-C GRAVEL, MOIST NO ODOR |
| 5 10 | — | — | — | 20 | 4.7 | 8-9 | SAA. WET @ 9', NO ODOR |
| 10 15 | — | — | — | 51 | 5.1 | 10.5 | SAA, WET, NO ODOR DARK GRAY SILT, 10% F-C SAND, 10% F-C GRAVEL, DRY, NO ODOR TIGHT |
| 15 20 | — | — | — | 24 | 4.5 | | SAA, DRY, NO ODOR |

SOIL LOG

WELL LOG: 5' 9'

BOH @ 20', NO REF.

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

D-2

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists | Engineers | Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone (781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-3-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~9'
LOGGED BY: SMO CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | D-2 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 35 | 6.3 | 4-5 | DARK GRAYISH BROWN SILT, 15% F-C SAND, <5% F-C GRAVEL, DRY, NO ODOR | | |
| 5-10 | — | — | — | 52 | 6.6 | @9' | GRAYISH BROWN SILT, MOIST, WET @9', NO ODOR | | |
| 10-15 | — | — | — | 42 | 7.2 | | SIA, WET, NO ODOR | | |
| 15-20 | — | — | — | 45 | 7.5 | 14.5' | DARK GRAY SILT, WET, NO ODOR SIA, WET, NO ODOR | | |
| | | | | | | 19.5' | DARK GRAY SILT, 20% F-C SAND, 20% F-C GRAVEL, WET, NO ODOR | | |

EOH @ 20', NO REF,

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

**Boring Log/Well Construction Diagram**

Mabbett™
Defenders of the Environment - Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-3-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~12'
LOGGED BY: SJO CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | D-3 |
|---|---|
| WELL NO. | |
| PG. / OF / | |

DARK BROWN TOPSOIL, BRICK FRAG, CONCRETE FRAG, DRY, NO ODOR

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 29 | 36 | 0.5<br>4-5' | GRAYISH BROWN SILT, 10% F-C SAND, 10% F-C GRAVEL, DRY NO ODOR | | |
| 5-10 | — | — | — | 47 | 2.8 | | GRAYISH BROWN SILT, DRY, MOIST @ 9', NO ODOR | | |
| 10-15 | — | — | — | 52 | 4.9 | 11-12 | SAA, NO ODOR WET @ 12' | | |
| 15-20 | — | — | — | 60 | 8.6 | | DARK GRAY SILT, WET, NO ODOR | | |

BOH @ 20', NO REF.

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

D-4

**Boring Log/Well Construction Diagram**

Mabbett™
Program Manager

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-3-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~10'
LOGGED BY: SEW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | D-4 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 32 | 5.6 | 4-5 | GRAY/BROWN SILT, 10% F-C SAND, 10% F-C GRAVEL, COBBLE @ 4', MOIST, NO ODOR | | |
| 5-10 | — | — | — | 30 | 7.1 | 9-10 | SAA, ~3" LAYER OF SILTY F-M SAND @ 4', DRY NO ODOR; GRAY/BROWN SILT [illegible], MOIST, NO ODOR | | |
| 10-15 | — | — | — | 50 | 6.9 | | SAA, WET, NO ODOR | | |
| 15-20 | — | — | — | 60 | 6.0 | 19.5 | SAA, WET, NO ODOR; DARK GRAY SILT, 30% F-C SAND, 10% F-C GRAVEL, WET, NO ODOR | | |

EOB @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

**Boring Log/Well Construction Diagram**

Mabbett™
Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-3-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~14
LOGGED BY: SWJ CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | D-5 |
|---|---|
| WELL NO. | |
| PG. 1 OF | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 20 | 4.7 | 4-5 | GRAYISH BROWN SILT, 10% F-C SAND, 10% F-C GRAVEL, MOIST, NO ODOR | | |
| 5-10 | — | — | — | 14 | 4.2 | | SAA, MOIST, NO ODOR | | |
| 10-15 | — | — | — | 15 | 6.1 | 13-14 | SAA, MOIST, NO ODOR<br>DARK GRAYISH BROWN FINE SILTY SAND, WET, NO ODOR | | |
| 15-20 | — | — | — | 24 | 7.7 | | DARK GRAYISH BROWN F-C SAND, 10% F-C GRAVEL, 10% SILT, WET, NO ODOR | | |

EOB @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

A-1

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists and Engineers - Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~~4~~ ~4'
LOGGED BY: SLJ CHECKED BY:
METHOD: GEOPROBE DATE:
CASING: PVC riser
DIAMETER: 1"

| BORING NO. | B-1 |
|---|---|
| WELL NO. | B-1 |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | -- | -- | -- | 32 | 2.9 | 3-4' | BLACK TARSOIL, TRACE BRICK FRAG, MOIST, NO ODOR. GRAYISH-BROWN SILT, 10% F-C GRAVEL, MOIST, WET @ 4', NO ODOR | | |
| 5-10 | -- | -- | -- | 28 | 2.2 | | GRAYISH-BROWN SILT, 10% F-C SAND, 10% F-C GRAVEL, WET, NO ODOR | | |
| 10-15 | -- | -- | -- | 24 | 5.5 | | SAA, WET, NO ODOR | | |
| 15 | | | | | | | BOH @ 15', NO REFUSAL | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | WELL CONSTRUCTION DETAILS |
|---|---|
| silt & clay | asphalt |
| concrete | concrete |
| gravel | native fill |
| sand | bentonite |
| silt | casing |
| clay | screen |
| sand & gravel | grout |
| bedrock | bedrock |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

E-2

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists & Engineers Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~8
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | E-2 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 0-5 | — | — | — | 30 | 5.8 | 4-5' | 0.5 BLACK TOPSOIL, MOIST, NO ODOR<br>GRAYISH BROWN SILT, 10% F-C GRAVEL GRADING TO NO GRAVEL, MOIST, NO ODOR | | |
| 5 | | | | | | | | | |
| 5-10 | — | — | — | 40 | 6.1 | 7.8 | GRAYISH-BROWN SILT, MOIST, NO ODOR<br>GRAY SILT, WET, NO ODOR | | |
| 10 | | | | | | | | | |
| 10-15 | — | — | — | 60 | 7.2 | | SAA, WET, NO ODOR<br>13 DARK GRAY GRADING TO GRAYISH BROWN SILT, SOME F-C SAND, TRACE F-C GRAVEL, WET, NO ODOR<br>BOH @ 15', NO REFUSAL | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

Notes:
MS/MSD @ 4-5'

E-5

**Boring Log/Well Construction Diagram**

Mabbett
Scientists Co. Inc. Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.:
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~4'
LOGGED BY: SLW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | E-3 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 24 | 6.2 | 3.4' | DARK GRAY FC SAND, 20% F-C GRAVEL, 20% SILT, MOIST, WET @ 4', NO ODOR | | |
| 5-10 | — | — | — | 6 | 6.1 | | SAA, WET, NO ODOR | | |
| 10-15 | — | — | — | 28 | 5.8 | 14' | GRAYISH BROWN SILT, WET, NO ODOR; DARK GRAY SLT, 20% F-C SAND, 20% F-C GRAVEL, WET, NO ODOR; BOTT @ 15', NO REFUSAL | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

E-7

**Boring Log/Well Construction Diagram**

Mabbett™

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~4'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | E-4 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 48 | 5.5 | 3-4' | BROWNISH-GRAY SILT, 45% F-C SAND, 45% FC GRAVEL, BRICK FRAG @ 0.5', MOIST, NO ODOR | | |
| | | | | | | | GRAY SILTY, FINE SAND, WET, NO ODOR | | |
| 5-10 | — | — | — | 40 | 6.6 | | SAA, WET, NO ODOR | | |
| | | | | | | 9 | GRAVEL: BROWN SILT, 20% F-C SAND, 20% FC GRAVEL, WET, NO ODOR | | |
| 10-15 | — | — | — | 16 | 7.1 | | SAA, WET, NO ODOR | | |
| | | | | | | | BOH @ 15', NO REFUSAL | | |
| 15-20 | | | | | | | | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes: FROM
FD-4 → 3-4'

E-5

**Boring Log/Well Construction Diagram**

**Mabbett**™
Scientists for Industry, Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~15'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | E-5 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 36 | 4.0 | 4-5 | 1 BROWNISH GRAY SILT, 10% F-C GRAVEL, BRICK FRAG, MOIST, NO ODOR<br>GRAYISH BROWN SILT MOIST, NO ODOR | | |
| 5-10 | — | — | — | 32 | 4.1 | | SAA, MOIST, NO ODOR<br>8 GRAY SILT, 70% F-C SAND, 20% F-C GRAVEL, DRY, NO ODOR | | |
| 10-15 | — | — | — | 51 | 5.2 | 14-15 | SAA, DRY, NO ODOR<br>11 DARK BROWNISH GRAY SILTY F-M SAND, DRY, NO ODOR<br>13 DARK GRAY SILT, 20% F-C SAND, 25% F-C GRAVEL, DRY, NO ODOR | | |
| 15-20 | — | — | — | 18 | 5.9 | | GRAYISH BROWN SILT, 20% FC SAND, 25% FC GRAVEL, WET, NO ODOR | | |

BOH @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

F-1

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists • Engineers • Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-2-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH:
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | MW F-1 (R) |
|---|---|
| WELL NO. | F-1 |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 28 | B.3<br>9.0 | 4-5' | DARK GRAY/BROWN SILT, 10% F-C SAND 10% F-C GRAVEL, COBBLE @ 4.5-5', DRY, NO ODOR | | |
| 5-10 | — | — | — | 60 | 2.3 | | SAME, GRADING TO GRAY/LT. BROWN SILT, 20% F-C SAND 10% F-C GRAVEL, COBBLE @ 6-6.5' DRY, NO ODOR | | |
| | | | | | | | BIT @ 10', REFUSAL ON PRESUMED BOULDER (4 ATTEMPTS) | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

F-2

**Boring Log/Well Construction Diagram**

Mabbett

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-2-20
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~12'
LOGGED BY: SLJ CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | F-2 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 30 | 0.3 | 4-5' | DARK GRAYISH-BROWN SILT, <5% F-C SAND, <5% F-C GRAVEL, TRACE COAL FRAGMENTS, MOIST NO ODOR | | |
| 5-10 | — | — | — | 41 | 2.3 | | GRAYISH-BROWN SILT, MOIST, NO ODOR | | |
| 10-15 | — | — | — | 44 | 1.3 NA | 10-12' | SAA, COBBLE FRAG @ 12.5' AND 14.5', WET @ 12', NO ODOR | | |
| 15-20 | — | — | — | 60 | 0.3 | | SAA, WET, NO ODOR — — — — — GRAY SILT, 20% F-C SAND, 10% F-C GRAVEL, COBBLE IN TIP OF SPOON | | |

Bott @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | WELL CONSTRUCTION DETAILS |
|---|---|
| silt & clay | asphalt |
| concrete | concrete |
| gravel | native fill |
| sand | bentonite |
| silt | casing |
| clay | screen |
| sand & gravel | grout |
| bedrock | bedrock |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

F-3

**Boring Log/Well Construction Diagram**

Mabbett

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-2-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: N/A
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | F-3 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 0-5 | — | — | — | 29 | 0.3 | 0.3 | GRAYISH BROWN SILT, 25% F-C SAND, MOIST, NO ODOR | | |
| | | | | | 3.8 | 4 | DARK GRAY SILT, 10% F-C SAND, TRACE F-C GRAVEL, TRACE CINDERS, MOIST, NO ODOR | | |
| 5 | | | | | | 4-5 | | | |
| 5-10 | — | — | — | 40 | 2.4 0.4 | 0.4 | LIGHT BROWN SILT, 20% F-C SAND, 10% F-C GRAVEL, MOIST. NO ODOR | | |
| 10 | | | | | | | | | |
| 10-15 | — | — | — | 36 | 0.3 | 12-13 | SAA, MOIST, NO ODOR | | |
| | | | | | | | BOH @ 15', REFUSAL ON PRESUMED COBBLE/BOULDER | | |
| 15 | | | | | | | | | |
| 15-20 | | | | | | | | | |
| 20 | | | | | | | | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

E-7

**Boring Log/Well Construction Diagram**

Mabbett™
Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax. (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-7-15
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: N/A
LOGGED BY: SLJ CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | B-4 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 38 | 0.2 | 4-5 | GRAYISH BROWN SILT, 10% F-C SAND, 10% F-C GRAVEL, MOIST, NO ODOR | | |
| 5-10 | — | — | — | 25 | 0.3 | | SAA, V. MOIST, NO ODOR | | |
| 10-15 | — | — | — | 42 | 1.1 | | SAA, MOIST, NO ODOR | | |
| 15-20 | — | — | — | 60 | 0.9 | 19-20 | DARK GRAY SILT, 20% F-C SAND, 10% F-C GRAVEL, DRY, NO ODOR TIGHT<br>SAA, MOIST, NO ODOR TIGHT | | |

BOH @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

F-5

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists & Engineers | Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-2-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~10'
LOGGED BY: SWJ CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | F-5 |
|---|---|
| WELL NO. | |
| PG. / OF | 1 |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 32 | 4.1 ↓ | 4-5 | BLACK TOPSOIL<br>GRAYISH BROWN SILT, 10% F-C SAND, 25% F-C GRAVEL, COBBLE FRAG @ 1.0', DRY, NO ODOR | | |
| 5-10 | — | — | — | 28 | 4.0 | 7'<br>9-10 | DARK BROWN SILT w/ ORGANICS<br>GRAYISH BROWN SILT, 20% F-C SAND, 10% F-C GRAVEL, V. MOIST @ 9', DRY 9-10', NO ODOR | | |
| 10-11 | — | — | — | 12 | 4.0 | 11' | SAA 7-10', M.D., NO ODOR, ALTHAT BOH @ 11', REF ON PRESUMED BEDROCK | | |
| | | | | | | | DARK GRAY F-C SAND, 10% SILT, WET, NO ODOR | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists & Engineers · Program Managers
Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~ 8'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | |
|---|---|
| WELL NO. | E-1 |
| PG. 1 OF | 1 |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 31 | 3.8 | 4-5 | DARK GRAY F-C SAND, 20% F-C GRAVEL, 20% SILT, BRICK FRAG + CINDERS @ 4.5-5.0', MOIST, NO ODOR | | |
| 5.10 | — | — | — | 36 | 5.6 | 7-8 | SAA, W/ CONCRETE FRAG, CINDERS, MOIST WET @ 8', NO ODOR | | |
| 10-15 | — | — | — | 21 | 5.0 | 11<br>13 | SAA, WET, NO ODOR<br>GRAY F-C SAND, 20% F-C GRAVEL, TRACE SILT, WET, NO ODOR<br>DARK GRAY SILT, 10% F-C SAND, 10% F-C GRAVEL, WET, NO ODOR | | |
| 15-20 | | | | | | | BOH @ 15', NO REFUSAL | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists & Engineers Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~9'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | I-2 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 25 | 1.2 | 4-5' | DARK GRAY SILT, 20% F-C SAND, 20% F-C GRAVEL, TRACE BRICK FRAG @4', MOIST, NO ODOR | | |
| 5-10 | — | — | — | 24 | 3.8 | 8-9' | DARK GRAY F-C SAND, 20% F-C GRAVEL, 20% SILT, DAMP, TRACE BRICK FRAG, CINDERS, MOIST, WET @ 9' NO ODOR | | |
| 10-15 | — | — | — | 12 | 4.1 | | GRAY F-C SAND, 20% F-C GRAVEL, TRACE SILT, WET, NO ODOR | | |
| 15-20 | — | — | — | 28 | 4.3 | | GRAY SILT, 12% F-C SAND, 10% F-C GRAVEL, WET, NO ODOR | | |

BOH @ 20', NO REFUSAL

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

**Boring Log/Well Construction Diagram**

Mabbett™

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12- -13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~5'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | I-3 |
|---|---|
| WELL NO. | |
| PG. | 1 OF 1 |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 28 | 4.4 | 4-5 | DARK GRAY F-C SAND, 20% F-C GRAVEL, 20% SILT BRICK FRAG, CONCRETE FRAG, CINDERS @ 4.0-5.0', MOIST, NO ODOR | | |
| 5-10 | — | — | — | 24 | — | | GRAY F-C SAND, 20% F-C GRAVEL, TRACE SILT, CINDERS, WET, NO ODOR | | |
| 10-15 | — | — | — | 16 | — | | DARK GRAY SILT, 20% F-C SAND, 20% F-C GRAVEL, WET, NO ODOR | | |
| | | | | | | | BOH @ 15', NO REFUSAL | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | WELL CONSTRUCTION DETAILS |
|---|---|
| silt & clay | asphalt |
| concrete | concrete |
| gravel | native fill |
| sand | bentonite |
| silt | casing |
| clay | screen |
| sand & gravel | grout |
| bedrock | bedrock |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes: MS/MSD @ 4-5'

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists, Engineers, Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~9'
LOGGED BY: SCW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | I-4 |
|---|---|
| WELL NO. | |
| PG. 1 OF | 1 |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 36 | 2.8 | 4-5 | VERY DARK GRAY SILT, 10% F-C SAND, 10% F-C GRAVEL, CONCRETE FRAG., MOIST, NO ODOR | | |
| 5-10 | — | — | — | 35 | 6.8 | 8-9 | BROWNISH-GRAY F-C SAND, 20% F-C GRAVEL, 20% SILT, CINDERS, MOIST, WET @9', NO ODOR | | |
| 10-15 | — | — | — | 12 | 7.2 | | DARK GRAY SILT, 20% F-C SAND, 20% F-C GRAVEL, WET, NO ODOR | | |
| | | | | | | | BOH @15', NO REFUSAL | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

BP-1

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists | Engineers | Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~9'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | |
|---|---|
| WELL NO. | BP-1 |
| PG. 1 OF 1 | |

| DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 27 | 6.1 | 4-5 | DARK BROWNISH GRAY SILT, 10% F-C SAND, 10% F-C GRAVEL, BRICK FRAG @ 2.0', MOIST, NO ODOR | | |
| 5-10 | — | — | — | 23 | 7.7 | 8-9 | SAA, NO BRICK, MOIST, WET @ 9', NO ODOR | | |
| 10-15 | — | — | — | 24 | 8.0 | | GRAYISH BROWN CRUMBLING TO DARK GRAY SILT, 20% F-C SAND, 20% F-C GRAVEL, WET, NO ODOR | | |
| | | | | | | | BOH @ 15', NO REFUSAL | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | WELL CONSTRUCTION DETAILS |
|---|---|
| silt & clay | asphalt |
| concrete | concrete |
| gravel | native fill |
| sand | bentonite |
| silt | casing |
| clay | screen |
| sand & gravel | grout |
| bedrock | bedrock |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

BP-2

**Boring Log/Well Construction Diagram**

Mabbett™

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~9'
LOGGED BY: SJW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | BP-2 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 35 | 3.3 | 4-5 | BLACK TO DARK GRAY SILT, 20% F-C SAND. 20% F-C GRAVEL, CINDERS @ 4.5-5', MOIST, NO ODOR | | |
| 5-10 | — | — | — | 25 | 3.3 | 8-9 | GRAY F-C SAND, 20% F-C GRAVEL, 20% SILT, CINDERS, MOIST, WET @ 9', NO ODOR | | |
| 10-15 | — | — | — | | | | BOH @ 10', REFUSAL ON PRESUMED BOULDER (2 ATTEMPTS) | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

BP-3

**Boring Log/Well Construction Diagram**

Mabbett™

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~5'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | BP-3 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | TYPE & NO. | PEN (IN) | BLOWS (per 6-in) | REC (in) | HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 30 | 4.2 | 4-5 | BLACK TO DARK GRAY SILT, 20% F-C GRAVEL, 20% F-C SAND, BRICK FRAG, CINDERS @ 4.5-5.0', MOIST, NO ODOR | | |
| 5-10 | — | — | — | 24 | 5.1 | | GRAY F-C SAND, 20% F-C GRAVEL, TRACE SILT, CINDERS, WET, NO ODOR | | |
| 10-11 | — | — | — | | | | GA SAA, WET, NO ODOR. EOH @ 11', REFUSAL ON PRESUMED BOULDER | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

Notes:

BP-4

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists & Engineers ... Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~5'
LOGGED BY: SJO CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | BP-4 |
|---|---|
| WELL NO. | |
| PG. | OF |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 24 | 5.9 | 4-5 | DARK GRAY SILT, 20% F-C SAND, 20% F-C GRAVEL, BRICK FRAG, CONCRETE FRAG, CINDERS @ 4.5-5.0', MOIST, NO ODOR | | |
| 5-10 | — | — | — | 18 | 6.1 | | GRAYISH BROWN F-C SAND, 20% F-C GRAVEL, TRACE SILT, CINDERS, CONCRETE FRAG, WET, NO ODOR | | |
| 10-15 | — | — | — | 26 | 6.2 | | SAA, WET, NO ODOR<br>GRAYISH BROWN GRADING TO DARK GRAY SILT, 20% F-C SAND, 20% F-C GRAVEL, WET, NO ODOR | | |
| | | | | | | | BOH @ 15', NO REFUSAL | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN /LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

BP-5

**Boring Log/Well Construction Diagram**

Mabbett™
Defenders [illegible] Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: ~5'
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | BP-5 |
|---|---|
| WELL NO. | |
| PG. 1 OF 1 | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 36 | 3.3 | 4-5 | DARK GRAY F-C SAND, 20% F-C GRAVEL, 20% SILT, BINDERS @ 4.5-5.0', MOIST (WET IN TIP) NO ODOR | | |
| 5-10 | — | — | — | 20 | 5.8 | | GRAYISH BROWN F-C SAND, 20% F-C GRAVEL, TRACE SILT, BRICK FRAG. CINDERS, WET, NO ODOR | | |
| 10-15 | — | — | — | 38 | 6.5 | 14' | GRAYISH BROWN SILT, 20% F-C SAND, 20% F-C GRAVEL, WET, NO ODOR<br>SAA, WET, NO ODOR<br>DARK GRAY SILT, 20% F-C SAND, 20% F-C GRAVEL, WET, NO ODOR<br>BOR @ 15', NO REFUSAL | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists | Engineers | Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax. (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: N/A
LOGGED BY: SLJ CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | WP-1 |
|---|---|
| WELL NO. | |
| PG. | OF |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | - | - | - | 26 | 25 | 0.5 0.2 | BLACK TOP SOIL, MOIST, NO ODOR<br>DARK GRAYISH BROWN SILT, 10% F-C SAND, 10% F-C GRAVEL, DRY NO ODOR | | |
| | | | | | | BOHC 4' REFUSAL ON PRESUMED BOULDER (3 ATTEMPTS) | | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | WELL CONSTRUCTION DETAILS |
|---|---|
| silt & clay | asphalt |
| concrete | concrete |
| gravel | native fill |
| sand | bentonite |
| silt | casing |
| clay | screen |
| sand & gravel | grout |
| bedrock | bedrock |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft. | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

WP - 2

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists | Engineers | Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone (781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: N/A
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | WP-2 |
|---|---|
| WELL NO. | |
| PG. OF | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 0-5 | - | - | - | 36 | 32 | 0.1 | OLIVE BROWN F-C SAND, 25% F-C GRAVEL 25% F-C SILT, DRY NO ODOR | | |
| 5 | | | | | | | BOH @ 3.5' REFUSAL ON PRESUMED BOULDER (3 ATTEMPTS) | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes

WP-3

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists · Engineers · Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax: (781)275-5651

LOCATION: Castle Point VA PROJ. NO.:
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: N/A
LOGGED BY: SLN CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | WP-3 |
|---|---|
| WELL NO. | |
| PG. | OF |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 30 | 2.9 | 0.5 | DARK BROWN TOPSOIL<br>BROWNISH GRAY F-C SAND, 20% F-C GRAVEL 20% F-C SILT, DRY, NO ODOR<br>BOH @ 4' REFUSAL ON PRESUMED BOULDER (2 ATTEMPTS) | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

WP-4

**Boring Log/Well Construction Diagram**

Mabbett™

Five Alfred Circle, Bedford, Massachusetts 01730
Phone (781) 275-6050 Fax: (781)275-5851

LOCATION: Castle Point VA PROJ. NO
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc. FOREMAN:
GROUNDWATER DEPTH: N/A
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | WP-4 |
|---|---|
| WELL NO. | |
| PG. OF | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 0-5 | - | - | - | 32 | 3.1 | 0.2 | 0.5' BLACK TOP SOIL, MOIST, NO ODOR<br>DARK GRAYISH BROWN F-C SAND, 20% FC GRAVEL, 20% SILT, MOIST, NO ODOR | | |
| 5' | | | | | | | BOH @ 4.5' REFUSAL ON PRESUMED BOULDER (2 ATTEMPTS) | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes:

WP-5

**Boring Log/Well Construction Diagram**

Mabbett™
Scientists [illegible] Program Managers

Five Alfred Circle, Bedford, Massachusetts 01730
Phone:(781) 275-6050 Fax (781)275-5651

LOCATION: Castle Point VA PROJ. NO.
BORING LOCATION: Castle Point, NY
DATE START/FINISH: 12-5-13
GROUND ELEVATION (NGVD): NS
CONTRACTOR: Mabbett & Associates, Inc FOREMAN:
GROUNDWATER DEPTH: N/A
LOGGED BY: SW CHECKED BY:
METHOD: GEOPROBE DATE:
CASING:
DIAMETER:

| BORING NO. | WP-5 |
|---|---|
| WELL NO. | |
| PG. OF | |

| SAMPLE DEPTH (FT) | SAMPLE TYPE & NO. | SAMPLE PEN (IN) | SAMPLE BLOWS (per 6-in) | SAMPLE REC (in) | SAMPLE HEADSPACE (ppmv) | REMARKS | SOIL DESCRIPTION | SOIL LOG | WELL LOG |
|---|---|---|---|---|---|---|---|---|---|
| 0-5 | — | — | — | 22 | 3.1 | 0.2 | GRAYISH BROWN F-C SAND, 20% F-C SILT 20% FC GRAVEL, DRY, NO ODOR<br><br>BOH @ 4' REFUSAL ON PRESUMED BOULDER (2 ATTEMPTS) | | |

UNC=UNCERTAIN
PEN=PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC=LENGTH OF SAMPLE RECOVERED
SS=SPLIT SPOON SAMPLE
S=SAMPLE TAKEN OFF AUGER
HEADSPACE=RESULT OF FIELD SCREENING WITH MiniRae 2000, PID EQUIPPED WITH A 11.7 eV LAMP.
RQD=LENGTH OF SOUND CORES > IN./LENGTH CORED %
DEPTH=DEPTH BELOW GROUND SURFACE
(GRAPHICAL COLUMN SHOWS LOCATION OF SAMPLE)

| SOIL TYPES | | WELL CONSTRUCTION DETAILS | |
|---|---|---|---|
| silt & clay | | asphalt | |
| concrete | | concrete | |
| gravel | | native fill | |
| sand | | bentonite | |
| silt | | casing | |
| clay | | screen | |
| sand & gravel | | grout | |
| bedrock | | bedrock | |

| GRANULAR SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| BLOWS/ft. | DENSITY | BLOWS/ft | CONSISTENCY |
| 0-4 | very LOOSE | <2 | very SOFT |
| 4-10 | LOOSE | 2-4 | SOFT |
| 10-30 | medium DENSE | 4-8 | medium STIFF |
| 30-50 | DENSE | 8-15 | STIFF |
| >50 | very DENSE | 15-30 | very STIFF |
| | | >30 | HARD |

Notes: