REMEDIAL SYSTEM OPTIMIZATION REPORT

CROSS-COUNTY SANITARY/KESSMAN LANDFILL
286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563
NYSDEC Site No. 340011
Work Assignment No. D009812-07

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233

Prepared by:
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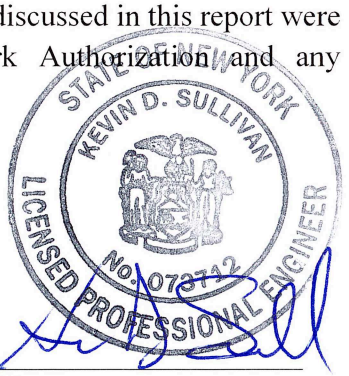
DECEMBER 2020

CERTIFICATION

I, Kevin D. Sullivan, certify that I am currently a NYS registered professional engineer and that this Remedial System Optimization (RSO) Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the New York State Department of Environmental Conservation, Department of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10), and that all activities discussed in this report were performed in full accordance with the Department-approved Work Authorization and any subsequently approved modifications.



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NYS Professional Engineer #	Date	Signature

TABLE OF CONTENTS

SECTION **PAGE**

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

This Remedial System Optimization (RSO) Report has been prepared for the Cross-County Sanitary – Kessman Landfill Site (the "Site"; Site No. 340011), located at 286 Cornwall Hill Road, Patterson, New York. A Site Location Map is presented in **Figure 1**, and the overall Site Layout is presented in **Figure 2**. This RSO Report has been completed in accordance with New York State Department of Environmental Conservation (NYSDEC or the "Department") Division of Environmental Remediation (DER) Work Assignment (WA) No. D009812-07, Title 6 of New York Code, Rules, and Regulations (6 NYCRR) Part 375, and NYSDEC Technical Guidance for Site Investigation and Remediation (DER-10).

The Site has been under investigation and/or remediation since it was repossessed in 1974, with the overall goals of remediating contaminated soil, surface water, and sediment at the Site. Initial site assessments and remedial investigations were completed in the 1980s, leading to the completion of a Feasibility Study (FS) Report in December of 1992. A Record of Decision was issued in November 1994. Subsequent to the ROD, the remedial design was prepared, and the remedial action was completed in September 1996.

Post-construction, Site related contamination was first detected in wetland sediment in 2003. This finding has been the focus of ongoing investigations, culminating in the investigation and delineation activities performed by TRC Engineers, Inc. (TRC) between 2017 and 2019. The TRC investigations included sediment sampling, groundwater sampling, geotechnical investigation, and geophysical investigation primarily to further delineate the limits of elevated polychlorinated biphenyl (PCB) concentrations in the wetland sediment adjacent to the closed landfill. Per- and polyfluoroalkyl substances (PFAS) were also detected in groundwater at concentrations greater than the screening levels indicated in "Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs". However, no source of PFAS impacts has been identified at the Site. Therefore, remediation of PFAS impacts to groundwater is not addressed in this RSO Report.

The concentrations of PCBs detected in surface water exceeded the NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) Class A surface water criteria; however, the source of this contamination is believed to be directly related to the contaminated sediment. Since the concentrations of PCBs detected in surface water are expected to attenuate following sediment remediation, this RSO does not include separate action specifically targeting PCB contamination in surface water.

Considering the above, the focus of this RSO Report is remediation of PCB impacts in sediment in the wetlands adjacent to the closed landfill. The RSO Report has been organized into (7) seven sections as follows:

- **Section 1 –** Description of the Remedial System Optimization background and report organization.
- **Section 2** – Description of the Site location, setting, and history, and development of the Remedial Action Objectives for this RSO.
- **Section 3** – Description of the investigations conducted to date, summary of findings from investigations, and identification of the nature and extent of contamination to be addressed.
- **Section 4** – Evaluation of viable process options and technologies.
- **Section 5** – Discussion of the potential sources of contamination and remaining uncertainties.
- **Section 6** – Recommendations for implementation of a remedy, including discussion of applicable regulations and guidance.
- **Section 7** – A listing of references used for preparation of this report.

2.0 SITE HISTORY AND REMEDIAL ACTION OBJECTIVES

2.1 Site Location and Setting

The Site is located on the east side of Cornwall Hill Road, in the Town of Patterson, approximately 1 mile south of the Village of Patterson, Putnam County, New York. Currently, the Site, which occupies two parcels (Tax Map Nos. 13-3-16 and 13-3-17) and a portion of a third parcel (Tax Map No. 13-3-14), is zoned as R4 – Residential according to the Putnam County eParcel GIS viewer. The Site is bordered by undeveloped land to the north, a commercial property to the south, residential properties and Cornwall Hill Road to the west, and the Metropolitan Transportation Authority (MTA) Metro-North Railroad and the Great Swamp, a protected wetland (NYSDEC Classification DP-22), to the east. The Site is approximately 10 acres in size consisting of approximately 7.2 acres of landfill and 2.8 acres of low-lying wetland area.

The wetland area includes a shallow pond (approximately 3 feet to 4 feet deep) connected to a red maple/ash swamp which extends northward off-Site. The shallow pond is bordered by the capped landfill (west) and the railroad track ballast (east). The intermittent/seasonal connection of the pond to the Great Swamp is to the north, adjacent to the railroad. The shallow pond is surrounded by a thick, inner ring of broadleaf cattail and a dense, outer ring of phragmites. The phragmites dominate the shallower portions of the pond, the surrounding wetland area, and extend far off-Site to the north as an understory in the red maple/ash swamp.

There are several single-family residences located northwest of the Site, along Cornwall Hill Road. The Patterson Municipal Landfill and the Patterson Town Garage are southwest of the Site, and there is a maintenance and repair facility for heavy excavation equipment south of the Site.

The surface elevation of the landfill is approximately 440 feet above mean sea level (AMSL), 10 to 12 feet above the surrounding ground and the original elevation of the Great Swamp. The landfill and the adjacent wetland area are relatively flat, in contrast to hills and ridges west and south of the Site, which rise to more than 550 feet AMSL.

2.2 Site History

The Site was operated as a municipal landfill by the Town of Patterson on the Kessman family property from approximately 1963 to 1972. In 1972, the landfill was sold to Cross County Sanitation, Inc. (CCS), a private carting company which operated at the Site from 1972 to 1974. Historic information collected by NYSDEC alleges that unknown types and quantities of industrial and hazardous wastes were disposed of at the landfill between 1972 and 1974. In 1974, NYSDEC forced the closure of the landfill and the property was repossessed by the Kessman family. Clean soil obtained from nearby locations was used to cover the refuse after landfill operations ceased. The Site had been inactive since placement of the cover.

In 1983, a Phase I Environmental Site Assessment (Phase I ESA) was performed by Camp, Dresser, and McKee, Inc. Based on the Phase I ESA findings, a Phase II Environmental Site Investigation (Phase II ESI) was performed by Wehran Engineering, P.C. in 1985. The Phase II ESI included a magnetometer survey; collection and analysis of surface water, groundwater, sediment, and leachate samples; excavation of test pits and collection of soil samples; and collection of a groundwater sample from a nearby domestic water well. Based on the results of the Phase II ESI, the Site was reclassified to Class 2. By May 1991, the NYSDEC, under the State Superfund Program, initiated a Remedial Investigation/Feasibility Study (RI/FS) to address the

contamination. The RI was conducted in two phases, by ABB Environmental Services (ABB), between December 1991 and October 1993.

Based on the findings of the RI, several interim remedial measures (IRMs) were conducted at the Site. In the fall of 1993, more than 115 drums were removed and surrounding contaminated soil was excavated from the northern toe of the landfill (adjacent to the wetland). However, when additional drums were identified, due to limited funding, further removal was suspended and scheduled to resume in the spring of 1994.

In April 1994, IRM work resumed, including continued removal of buried drums, excavation of impacted soil, and collection and analysis of surface water, soil, and leachate samples. Drum removal continued through May and June 1994. In total, 157 drums and 100 cubic yards of contaminated soil were reportedly removed/excavated. In December 1994 the disposal of all staged drums and soil were completed.

In parallel with the IRM work, NYSDEC completed the RI, and undertook and completed the FS by September 1994, to evaluate potential remedial strategies for the Site. Based on the FS Report, NYSDEC selected a remedy and published a Record of Decision (ROD) for the Site in November 1994. NYSDEC selected the alternatives described below as the remedy for the Site.

Alternative SD-4, Option A - Excavation and On-Site Disposal of Sediments

Alternative SD-4, Option A consisted of the excavation of approximately 2,600 cubic yards of contaminated sediments east of the landfill and west of the MTA Metro-North Railroad, restoration of the wetland, and environmental monitoring. This alternative included dewatering of sediments and disposal beneath the cap described in Alternative LF-3A.

Alternative LF-3A - Capping of Buried Wastes with Piping for Possible Future Leachate Collection System

Alternative LF-3A consisted of capping the wastes with a cover that complied with 6 NYCRR Part 360. Overall, this alternative included a cap approximately 7.2 acres in size, as well as continued environmental monitoring and institutional controls. Additionally, the alternative called for the installation of a leachate collection system with the ability to construct a leachate storage and transfer/leachate treatment facility if needed based on future remedy performance. It should be noted that Remedial Action "issued for bid" drawings specify construction of a leachate collection trench with "outlets" at 100-foot intervals, apparently intended to allow passive drainage of collected water into the wetland. The construction of the leachate collection system (i.e., apparent buried piping) has been field-verified, but the presence of "outlets" could not be confirmed as discussed below. A portion of the property was also fenced to limit access.

Remedial construction was performed by EPA, Inc. between August 1995 and September 1996.

2.3 Remedial Action Objectives

Remedial Action Objectives (RAOs) are developed in order to set objectives for protecting public health and the environment. RAOs developed in the ROD (identified above) indicate that at a minimum, the remedy selected should eliminate or mitigate all significant threats to public health and the environment presented by the hazardous waste disposed at the Site, through the proper application of scientific and engineering principles. The RAOs in the ROD and the RAOs which apply to the presence of contaminated sediments in the wetland,

which are the focus of this RSO, are listed below. Bold text indicates RAOs which apply to the remaining PCB-contaminated sediments.

1. Reduce, control, or eliminate the impact of the contamination present within the soils/waste on Site (generation of leachate within the fill mass) – this RAO has been addressed through consolidation and closure of the landfill (capping);
2. **Eliminate the threat to surface waters by eliminating any future contaminated surface run-off from the contaminated soils on site – this RAO has not been fully addressed since the risk has not been fully eliminated or mitigated;**
3. **Eliminate the potential for direct human or animal contact with the contaminated soils and sediments on site – the potential for direct human or animal contact has not been fully addressed, eliminated, or mitigated;**
4. Mitigate the impacts of contaminated groundwater to the environment – this RAO has been addressed through landfill capping and mitigating leachate generation, and continued monitoring through implementation of the site management plan;
5. Prevent, to the extent possible, migration of contaminants in the landfill to groundwater – this RAO has been addressed through landfill capping, mitigating leachate generation and migration, as well as through implementation of the site management plan; and
6. Provide for attainment of Standards, Criteria, and Guidance Values (SCGs) for groundwater quality at the limits of the area of concern (AOC) – continuing to be addressed through the site management program.

Several of the above RAOs have been addressed (as indicated) through the consolidation of contaminated soil and waste in the Site landfill and installation of a closure cap. Others are being addressed through implementation of the site management plan (SMP). Overall, the remedy appears to be effectively reducing the generation of leachate (RAO 1), mitigating impacts to groundwater (RAO 4), preventing migration of contaminants to groundwater (RAO 5), and providing for attainment of groundwater quality standards (RAO 6). In summary, the RAOs for this RSO were developed from those remaining in the list above, and in consideration of current known Site conditions, as follows:

- Eliminate or mitigate the potential for direct human or animal contact with contaminated soils and sediments; and,
- Eliminate the threat to surface waters by removing residual contaminated sediment or soil from outside of the closed landfill.

2.4 Standards, Criteria and Guidance Values

SCGs consist of a compilation of standards, criteria, and guidance values which control the selection and implementation of a remedial action. Standards and criteria consist of cleanup standards, standards of control, and other substantive environmental requirements or limitations promulgated under federal or state laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance. Guidance values are non-promulgated criteria, advisories and/or guidance that are not legal requirements and do not have the same status as standards and criteria; however, remedial approaches should consider guidance that, based on professional judgment, may be applicable to the project. There are two key SCGs for this RSO as discussed in the subsections below.

2.4.1 NYSDEC Sediment Guidance Values

The NYSDEC has developed guidance values for contamination in sediment which can be used for assessing risks to aquatic life as well as animals higher on the food chain (through bioaccumulation). When the concentration of total PCBs in sediment is less than 0.1 milligram per kilogram (mg/kg), ecological risk is generally considered acceptable. Conversely, a concentration of total PCBs in sediment exceeding 1 mg/kg is likely to be harmful to aquatic organisms or organisms exposed through the food chain (NYSDEC, 2014).

Table 5 of the NYSDEC document "Screening and Assessment of Contaminated Sediments, New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Bureau of Habitat" dated June 24, 2014, segregates freshwater sediments into three different classifications based on concentrations of total PCBs:

- Class A (total PCBs < 0.1 mg/kg) sediments are considered to be of low risk to aquatic life;
- Class B (total PCBs = 0.1 mg/kg up to 1 mg/kg) sediments are slightly to moderately contaminated and additional testing is required to evaluate the potential risks to aquatic life; and
- Class C (total PCBs > 1 mg/kg) sediments are considered to be highly contaminated and likely to pose a risk to aquatic life.

Based on NYSDEC guidance, the target guidance value for PCBs in sediment for this RSO is less than 0.1 mg/kg (Class A sediment). However, other remedial options involving residual PCB concentrations of up to 1.0 mg/kg (Class B sediment) may be considered, provided these options include a minimum of 2 feet of clean cover over the residual impacts.

2.4.2 USEPA Toxic Substance Control Act Criteria and Requirements

The Toxic Substance Control Act of 1976 (TSCA) provides USEPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. TSCA addresses the production, importation, use, and disposal of specific chemicals, including PCBs. Title 40 CFR 761 establishes prohibitions on and requirements for, the manufacture, processing, distribution in commerce, disposal, storage, and marking of PCBs and PCB items. Additionally, 40 CFR 761.61 provides several options for clean-up and disposal of PCB remediation wastes:

- 40 CFR 761.61(a) establishes requirements for self-implementing cleanups and disposal;
- 40 CFR 761.61(b) establishes requirements for performance-based disposal; and
- 40 CFR 761.61(c) establishes a procedure for applying for a risk-based cleanup or disposal approval where an entity is seeking to conduct PCB cleanup or disposal by a means other than prescribed in either 40 CFR 761.61(a) or (b).

Since PCB disposal at the Site occurred prior to 1978, soil and/or sediment containing PCBs at concentrations less than 50 mg/kg are not regulated under TSCA. Waste containing PCBs at concentrations equal to or greater than 50 mg/kg will be managed as TSCA-regulated waste under the performance-based disposal track, with no approval or notice required.

3.0 SUMMARY OF INVESTIGATIONS AND FINDINGS

3.1 Summary of Recent Investigations

The key investigations supporting the nature and extent of PCB contamination and volume of PCB-impacted media in the wetland area were performed during the four phased investigations/periods listed below, each summarized in the subsections that follow.

- Pre-2016 Investigations – These investigations, undertaken between February 2002 and January 2013 (prior to TRC involvement), identified elevated concentrations of PCBs in the wetland, and focused on assessment of potential transport of contamination between the leachate collection drain and the wetland (surface water) and included initial efforts to delineate the extent of contamination in the wetland sediments;
- October 2016 Sediment and Surface Water Investigations – These initial characterization and delineation investigations were performed by TRC, and focused on confirming and building on the findings from earlier investigations;
- November 2017 Supplemental Investigations – Supplemental investigation and delineation activity focused on delineation of hot spots and better defining horizontal extent of contamination (performed by TRC); and
- November 2018 Investigation and Delineation Activities – Final delineation activities performed by TRC in November 2018 were designed to address remaining data gaps and investigate the potential for contamination further off Site to the north and east via "far-field" samples.

3.1.1 Pre-2016 Investigations and Findings

Between February 2002 and November 2007, monitoring and investigation activities were completed by O'Brien & Gere Engineers, Inc. (OBG) and Iyer Environmental Group, PLLC (IEG). One of the key investigations completed during this time period was a dye tracer study, performed between May and August 2004, and summarized in a final letter report dated November 24, 2004. The objective of the dye tracer study was to:

- Examine the potential for connection between the wetland surface water and the leachate collection system installed at the toe of the landfill during the Remedial Action; and
- Identify any other potential migration pathways between the landfill and surface water or groundwater.

In general, the dye tracer study did show communication between the wetland surface water and the leachate collection system, potentially confirming the presence of the leachate collection pipe outlets to the wetland. Quantification of the connection could not be achieved due to the relatively low concentrations of tracer detected in the leachate collection system.

IEG continued to perform site management and investigation activities to evaluate Site related contamination through November 2007. Wetland sediment samples were collected during these activities, and analyses identified concentrations of PCBs between 2.2 and 23.2 mg/kg. Site monitoring and maintenance activities were conducted by various engineering firms through 2012.

Aztec Technologies, Inc. (Aztec) became involved in the Site management program beginning in 2012, and undertook a sediment contamination delineation program. The results of this effort are presented in the report titled, "PCB Sediment Delineation Report, Cross County/Kessman Landfill", dated January 29, 2013 (Aztec, 2013).

As part of the Aztec investigation, samples were collected on a 20-foot by 20-foot sampling grid, with the westernmost line of samples coincident with the edge of the landfill and wetland boundary. The locations sampled along this line (Line A) were referred to as A-1 through A-14. Subsequently, 4 additional lines, each successively further east at 20-foot spacings (Line B, Line C, Line D, and Line E), were sampled. Fourteen (14) samples were collected from 0-3 inches below the sediment surface (bss) along each line. Surface water samples were also collected at random locations throughout the ponded area. The samples were analyzed for PCBs. The 2012 sample locations are illustrated in **Figure 3** (colored dots with no outer ring). As shown in the figure legend, dark blue dots indicate concentrations of total PCBs between 0.1 mg/kg and 1.0 mg/kg, light blue dots indicate concentrations of total PCBs greater than 1.0 mg/kg up to 3.2 mg/kg (Protection of Groundwater Soil Cleanup Objective of 6 NYCRR 375-6.8 used during earlier investigations), and red dots indicate concentrations above 3.2 mg/kg. All 70 sediment samples exhibited concentrations greater than 0.1 mg/kg total PCBs, and in 44 of the 70 samples the concentrations of PCBs detected exceeded 1 mg/kg. The concentrations of PCBs in these samples ranged from 0.11 mg/kg to 130 mg/kg (adjacent to locations CCSK-SE-1 and CCSK-SE-21). As appropriate, these results were used in developing the scope of subsequent investigations discussed below.

3.1.2 October 2016 Investigation and Findings

In October 2016, TRC implemented an investigation focusing on the areas of impacted soil, sediment, and surface water identified in the Aztec report. The objectives of the sampling program were to collect additional data focused on the following:

- Further delineating the extent of impacted sediment both horizontally and vertically; and
- Evaluating potential sources of PCB contamination in the wetland including:
    - Seepage from the landfill leachate collection system; and/or
    - Residual material not removed during the original IRM and Remedial Action.

This investigation included collection and analysis of a leachate sample, surface water samples, sediment samples at two depths (0-0.5 feet 0.5-1.0 feet bss) in the wetland area east of the landfill, and surface soil/sediment samples near the estimated locations of each discharge point (outlet) of the leachate collection system (shown on the remedial design drawings for the landfill closure and also depicted in **Figure 2**).

The methods used during the TRC-led investigations were in accordance with the NYSDEC-approved generic Health and Safety Plan, Field Activities Plan, and Quality Assurance Project Plan (QAPP).

Sediment Sampling Summary

TRC collected two sediment samples (depth intervals indicated above) from each of eighteen (18) locations. The results of this investigation appeared to correlate well with the 2012 Aztec sampling event with the exception of sample location CCSK-SE-2 (sample collected from 0-0.5 feet bss [total PCBs at 23,000 mg/kg] and sample collected from 0.5-1.0 feet bss [total PCBs at 11,000 mg/kg]). The concentrations of PCBs detected

in samples from two (2) locations exceeded the Toxic Substance Control Act (TSCA) regulatory threshold for PCBs of 50 mg/kg (CCSK-SE-2 and CCSK-SE-8 [total PCBs at 81 mg/kg at 0.5 to 1.0 feet bss]).

In relation to CCSK-SE-21, elevated concentrations (> 1.0 mg/kg) of PCBs were also detected to the northeast at CCSK-SE-9, CCSK-SE-15, CCSK-SE-16 and CCSK-SE-17, to the east at CCSK-SE-6 and CCSK-SE-13, and to the southeast at CCSK-SE-1, CCSK-SE-7, and CCSK-SE-12. The primary Aroclor detected in Site sediments was Aroclor-1242. Aroclor-1232 and Aroclor-1254 were also detected at a much lower frequencies, and generally at lower concentrations than Aroclor-1242. The full results of these analyses are presented in **Table 1**. **Figure 3** illustrates the sample locations and total PCB results.

Overall, a review of the data collected by this investigation identified gaps in the delineation due to elevated levels of contaminants at outermost sampling locations (requiring further horizontal delineation) or deepest sampling intervals (requiring further vertical delineation). The data points were used to develop and scope the subsequent investigations discussed below.

Surface Water Sampling Summary

TRC collected thirty (30) surface water samples along two transect lines within the ponded area and one surface water sample north of the ponded area. The results from this sampling event were found to correlate well with the 2012 event (there appears to have been little change to the surface water quality since 2012). It should be noted that the Aztec report compares the surface water analytical results for PCBs to 0.09 milligrams per liter (mg/L). However, the TOGS 1.1.1 Class GA water quality standard for PCBs is 0.09 micrograms per liter (µg/L). Nineteen (19) of the surface water samples collected by TRC contained PCB concentrations above this value (ranging from 0.2 µg/L up to 1.5 µg/L). PCBs were not detected at twelve (12) sampling locations (including the additional location to the north), however, the detection limit for each of these samples exceeded 0.09 µg/L. All of the surface water PCB detections were Aroclor 1242.

Soil Sampling Summary

TRC collected ten surface soil samples (0-0.5 feet below ground surface [bgs]) from the low-lying area west of the wetland/ponded area. All of these samples were analyzed for PCBs. The PCB concentrations in these samples ranged from 0.50 mg/kg up to 3.1 mg/kg. Four of the ten soil samples, CCSK-SS-02, CCSK-SS-03, CCSK-SS-05, and CCSK-SS-10, exhibited concentrations of PCBs above the sediment guidance value of 1.0 mg/kg (Class C sediment). The PCB concentrations in the remaining samples were below 1.0 mg/kg, but greater than the Class A sediment guidance value of 0.1 mg/kg. All of the surface soil PCB detections were Aroclor 1242.

3.1.3 November 2017 Investigation and Findings

Based on the findings of the October 2016 investigations, TRC completed the first of two supplemental investigations in November 2017. The investigation consisted of collection and analysis of twenty-seven (27) sediment samples and one leachate sample, with analysis of all samples collected for PCBs. The objectives of this supplemental investigation were to:

- Provide a better understanding of whether the landfill is a potential source of the PCBs detected in sediment at and near previous sample location CCSK-SE-2, as well in the southern portion of the wetland area;

- Further delineate the horizontal and/or vertical extent of PCB contamination in sediment for use in estimating the volume of impacted media and to support the development of potential remedial options; and
- Locate one or more of the leachate collection system "outlets" and determine if a correlation exists between the outlet locations and observed elevated concentrations of PCBs in sediment.

The results of the investigation were summarized in a memorandum, dated January 5, 2018. A summary of the supplemental investigation activities and results is presented below.

Sediment Sampling Summary

A total of 27 sediment samples were collected from 12 locations in November 2017, and submitted for analysis of PCBs. The samples were collected from several locations previously investigated (CCSK-SE-1, CCSK-SE-2, CCSK-SE-7, CCSK-SE-8, and CCSK-SE-13) as well as new locations (CCSK-SE-19 through CCSK-SE-25). Sample locations were selected to horizontally and vertically delineate elevated concentrations of PCBs found at previous sample locations CCSK-SE-2 and CCSK-SE-7.

Samples were collected from three discrete depth intervals (0-0.5 feet bss, 0.5-1.0 feet bss, and 1.0-1.5 feet bss) at each new location. Samples at previous sampling locations (CCSK-SE-1, CCSK-SE-2, CCSK-SE-7, CCSK-SE-8, and CCSK-SE-13) were collected from the 1.0-1.5 feet bss depth interval. One additional sample was also collected at CCSK-SE-2, from a depth of 1.5-2.0 feet bss.

The results of this investigation are presented in **Table 1** and are illustrated in **Figure 3**. Notable findings are briefly summarized below:

- *CCSK-SE-2:*
  - Both samples collected at location CCSK-SE-2 contained elevated concentrations of PCBs (1.0-1.5 feet bss: 210 mg/kg; 1.5-2.0 feet bss: 200 mg/kg).
  - Elevated concentrations (above the Class C SGV of 1 mg/kg) of PCBs were detected in samples collected north (CCSK-SE-19) and east (CCSK-SE-20) of CCSK-SE-2. Detected concentrations of PCBs ranged from 1.4 mg/kg to 32 mg/kg in samples from these locations.
  - Elevated concentrations of PCBs were detected in each of the samples collected at location CCSK-SE-21 (south of CCSK-SE-2). The highest concentration was detected in the deepest sample (1.0-1.5 feet bss: 1,200 mg/kg PCBs).

- *CCSK-SE-7:*
  - The sample collected from 1.0-1.5 feet bss at location CCSK-SE-7 contained 41 mg/kg PCBs.
  - Samples collected at locations surrounding CCSK-SE-7 (CCSK-SE-22 to the west and CCSK-SE-23 to the south) each contained PCB concentrations above the screening value in two or more of the depth intervals sampled. Concentrations ranged from 3.2 mg/kg to 72 mg/kg in samples collected at these locations.
  - The concentration of PCBs in one sample from location CCSK-SE-25 (further south of CCSK-SE-7) was elevated (1.0-1.5 feet bss: 6.0 mg/kg).
  - Sample location CCSK-SE-24 was the only location in the vicinity (east) of CCSK-SE-7 where concentrations of PCBs did not exceed the screening value.

- *CCSK-SE-1, CCSK-SE-8, and CCSK-SE-13:*
  - One sample was collected from 1.0-1.5 feet bss at each location.
  - PCBs were detected above the screening value in each sample: CCSK-SE-1 (40 mg/kg), CCSK-SE-8 (3.1 mg/kg), and CCSK-SE-13 (23 mg/kg).

The primary analyte detected in Site sediments was Aroclor 1242. Aroclor 1232 and Aroclor 1254 were also detected at much lower frequencies, and generally at lower concentrations than Aroclor 1242.

Leachate Sampling Summary

One leachate sample was collected from leachate collection manhole CCSK-MHC-1 for chemical analysis during this investigation, in an attempt to identify the potential source(s) of the elevated PCB concentrations in the wetland area. PCBs were detected in this sample at a concentration of 0.63 µg/L, which exceeds the Class GA Groundwater Standard of 0.09 µg/L, but is consistent with the previous pond surface water sample analytical data. The PCB Aroclor that was detected in this sample was Aroclor 1242, consistent with most other PCB detections at this Site.

The January 5, 2018 memorandum concluded that the relatively low PCB concentration detected in the leachate collection manhole was not likely to be a contributing factor in the relatively high levels of PCBs detected in the wetland sediment. However, additional activities aimed at locating the leachate collection system discharge point(s) and assessing the potential for other seepage points from the landfill were also recommended and are discussed below.

Landfill Leachate System Discharge Point Investigation Summary

During the November 2017 investigation, attempts were made to locate the landfill leachate system discharge points to determine if a correlation exists between these locations and observed concentrations of PCBs in sediment. A combination of methods/techniques were used including visual inspection, GPS equipment, field measurements and limited ground intrusive activities. TRC was unable to locate any landfill leachate collection system discharge points. Additional exploration using pipeline video camera equipment was subsequently recommended and implemented as discussed in the subsection below.

3.1.4 November 2018 Delineation Investigation and Findings

Between September 2018 and November 2018, TRC performed supplemental sediment and groundwater sampling, a geotechnical investigation, and a geophysical investigation centered around the leachate collection system. The objectives of this investigation were to:

- Further delineate the horizontal and vertical limits of elevated concentrations of the PCBs in sediment within and around the wetland area to support the development of potential remedial options;
- Develop a better understanding of whether the landfill leachate collection system is a potential source of the PCBs detected in sediment; and
- Gather geotechnical data to be used for remedial design, if needed.

Detailed descriptions of the activities and findings were presented in a memorandum to NYSDEC dated February 20, 2019. Brief summaries of the activities and findings are presented below.

Field Activities Summary

Sediment Sampling

A total of 59 sediment samples were collected at various depths from 30 locations within the main wetland area between September 10 and 26, 2018 and analyzed for PCBs. These 30 locations, which included 11 previously sampled locations, were selected to further delineate PCB impacted sediment identified during previous sediment sampling at the Site.

Samples were collected from discrete 0.5-foot vertical intervals at each location. At new locations selected for horizontal delineation purposes, samples were collected from three, 0.5-foot intervals to a total depth of 1.5 feet bss. At previously sampled locations selected for vertical delineation purposes, samples were collected from two, 0.5-foot intervals beginning immediately below the deepest previously sampled interval. An attempt was also made to collect a sample of the mineral soil beneath the sediment at location CCSK-SE-21. Sediment samples were submitted to the laboratory for analysis of PCBs. As requested by the New York State Department of Health, samples collected at two locations, CCSK-SE-33 and CCSK-SE-42, were also analyzed for the following:

- Target Compound List (TCL) VOCs +10 by USEPA Method 8260;
- TCL Semi-volatile Organic Compounds (SVOCs) +20 by USEPA Method 8270;
- Target Analyte List (TAL) Metals and Cyanide by USEPA Methods 6010, 7470 and 9010;
- Pesticides by USEPA Method 8081; and,
- PFAS by USEPA Method 537 (current NYSDEC-approved list of 21 PFAS was reported).

Far-Field Sediment Sampling

Sediment samples were collected from six far-field locations, outside of the main wetland area. The six far-field sediment samples were collected to determine if PCB impacts extended beyond the wetland area. Far-field sediment samples were collected from three off-Site locations east of the MTA Metro-North Railroad tracks (CCSK-SE-26, CCSK-SE-27, and CCSK-SE-28), and three locations north of the main water body (CCSK-SE-29, CCSK-SE-30, and CCSK-SE-31). These far-field locations are believed to be representative of conditions downgradient of the main impacted area. Far-field sediment samples were submitted to the laboratory for analysis of PCBs.

Groundwater Sampling

Groundwater samples were collected from eight monitoring wells (MW-1A, MW-1B, MW-3A, MW-3B, MW-5A, MW-5B, MW-20A, and MW-20B). Sample collection was performed in accordance with standard procedures, including gauging (water level and total well depth), inspection for the presence of non-aqueous phase liquid (NAPL), and purging and sampling. Groundwater samples were submitted to the laboratory for the following analyses:

- TCL VOCs by USEPA Method 8260;
- TCL SVOCs by USEPA Method 8270;
- PCBs by USEPA Method 8082A;
- 1,4-Dioxane by USEPA Method 8270 with Selected Ion Monitoring (SIM); and
- PFAS by USEPA Method 537 (current NYSDEC-approved list of 21 PFAS).

Geotechnical Investigation

As part of the investigation activities, a geotechnical study was conducted for the purposes of collecting data for potential use during future remedial design (potential design of excavation shoring or sheet piling system). The geotechnical study consisted of a single boring (SB-001) which was drilled along the entrance driveway immediately west of the landfill perimeter fencing.

Continuous split spoon samples were collected for analysis of soil physical parameters at SB-001, which was terminated at 16 feet below the ground surface (feet bgs) due to refusal. In general, soil recovery in the split spoons was very poor, likely due to the presence of gravel and rock particles blocking the driving shoe. Additionally, attempts to collect undisturbed samples were not successful due to the dense granular nature of the subsurface soil. Shelby tube damage occurred during the two attempts at collecting undisturbed samples.

Geophysical Investigation

A geophysical investigation was performed to attempt to determine the locations of the leachate collection system main trunk and discharge laterals. The main objective of this investigation was to provide additional information related to the location of the leachate collection system and aid in determining if this system may be responsible for or contributing to the wetland sediment contamination. NAEVA Geophysics, Inc. (NAEVA) performed the geophysical survey activities utilizing ground penetrating radar (GPR), electromagnetic (EM) sensor, and utility survey equipment.

Data Summary

To be consistent with the original remediation conducted in 1995 – 1996, the sediment analytical results were compared to the NYSDEC Division of Fish, Wildlife and Marine Resources, Bureau of Habitat, Screening and Assessment of Contaminated Sediment Class C Freshwater Sediment Guidance Values (SGVs). It should be noted that all PCB detections exceeded the Class A sediment guidance value (0.1 mg/kg) and the lowest detection level achieved throughout the sediment sampling program was 0.11 mg/kg. Groundwater analytical results were compared to the NYSDEC Division of Water Technical and Operational Guidance Series (TOGS 1.1.1) Ambient Water Quality Standards and Guidance Values: Standards and Guidance Values for Class GA Water ("Class GA Values"). No SCG values were available for PFAS or 1,4-dioxane in sediment under the NYSDEC Inactive Hazardous Waste Disposal Site remedial program. The results of analysis of groundwater for the PFAS (PFOA – Perfluorooctanoic acid, and PFOS – Perfluorooctanesolfonic acid) were compared to the screening levels indicated in "Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Program" ("Screening Levels"). The results of analysis of groundwater for 1,4-dioxane were compared to the maximum contaminant levels in 10 NYCRR Chapter I, Subpart 5-1: Public Water Systems (1 µg/L). For the purposes of this RSO Report, 1 ug/L will be considered the SCG for 1,4-dioxane.

Sediment Data

A review of the results of the analyses of the sediment samples is presented below.

- *PCBs in Sediment Samples:*
  - PCBs were detected at concentrations above the SGV of 1 mg/kg in 26 of the 59 sediment samples submitted for analysis in 2018 from the main wetland area (not including far-field samples). PCB concentrations in these samples ranged from 1.2 mg/kg (CCSK-SE-42, 0.5-1.0 feet bss) to 150,000 mg/kg (CCSK-SE-21, 2.0-2.5 feet bss).

- An attempt was made to collect a sample of the mineral soil below the sediment at location CCSK-SE-21. Sampling equipment refusal was experienced at approximately 4 feet bss and a sample could not be collected. In addition, a dark, oily substance was noted at this location, so no further samples were collected below CCSK-SE-21, 2.0-2.5 feet bss.
- The primary Aroclor detected in Site sediments was Aroclor 1242. Aroclor 1232 (3 samples) and Aroclor 1254 (12 samples) were also detected at much lower frequencies, and generally at lower concentrations than Aroclor 1242.
- The results of this supplemental investigation are compiled with previous investigations and presented in **Table 1** and illustrated on **Figure 3**.

- *Polychlorinated Biphenyls (PCBs) in Far-Field Sediment Samples:*
  - PCBs were not detected at or above the laboratory quantitation limit in the three far-field sediment samples collected east of the railroad (CCSK-SE-26, CCSK-SE-27, and CCSKSE-28), indicating that off-Site migration has likely not occurred in this area. PCBs were detected in the three far-field sediment samples collected north of the ponded area: CCSK-SE-29 – 0.18 mg/kg; CCSK-SE-30 – 0.27 mg/kg; and CCSK-SE-31 – 0.832 mg/kg. These concentrations are below the screening value of 1 mg/kg, but above the potential remedial objective of 0.1 mg/kg, indicating that these locations should be included in the evaluation of remedial options.
  - The primary Aroclor detected in far-field sediments was Aroclor 1242. Aroclor 1254 was also detected in one far-field sample at a significantly lower concentration than Aroclor 1242.
  - The results of the far-field sediment sample analyses for PCBs are presented in **Table 1** and on **Figure 3**.

- *VOCs, SVOCs, and Pesticides in Sediment Samples:*
  - VOCs, SVOCs, and pesticides were not detected at concentrations above the laboratory quantitation limits in either of the two sediment samples submitted for these analyses.
  - The results of the sediment sample analyses for VOCs, SVOCs, and Pesticides are presented in **Table 2**, **Table 3**, and **Table 4**, respectively.

- *Metals and Cyanide in Sediment Samples:*
  - Except for copper and nickel, metals and cyanide were not detected at concentrations exceeding Class A SGVs in either of the two sediment samples submitted for metals and cyanide analysis. Copper and nickel were detected in sample CCSK-SE-42 at 32 mg/kg and 23 mg/kg, respectively. Since these detections are at the lowest end of the range for Class B sediments, the concentrations detected are not considered a significant concern with respect to Site sediments.
  - The results of the sediment sample analyses for metals and cyanide are presented in **Table 4**.

- *Per- and Polyfluoroalkyl Substances (PFAS) in Supplemental Sediment Samples:*
  - PFAS were not detected at concentrations above the laboratory quantitation limit in either of the two sediment samples submitted for PFAS analysis.
  - The results of the sediment sample analyses for PFAS are presented in **Table 5**.

Groundwater Data

A brief summary of the groundwater analytical results is presented below. There was no physical/ visual/olfactory evidence of contamination observed in any of the groundwater samples collected.

- *VOCs, SVOCs, and PCBs in Groundwater:*
  - VOCs, SVOCs (except 1,4-dioxane), and PCBs were not detected at concentrations above Class GA Standards/Guidance Values in any of the eight groundwater samples submitted for analysis. 1,4-Dioxane was detected in 5 of the 8 samples collected at concentrations ranging from 0.22 µg/L to 1 µg/L (at or below the SCG of 1.0 µg/L).
  - The results of the groundwater sample analyses for VOCs, SVOCs, and PCBs are presented in **Table 6**, **Table 7**, and **Table 8**, respectively.

- *Per- and Polyfluoroalkyl Substances (PFAS) in Groundwater:*
  - PFAS were detected above the Screening Levels in four of the eight groundwater samples collected. Perfluorooctanoic acid (PFOA) was detected at concentrations exceeding the PFOA Screening Level of 10 ng/L in samples collected from groundwater monitoring wells CCSK-MW-5A (36 ng/L), CCSK-MW-5B (64 ng/L), CCSK-MW-20A (28 ng/L), and CCSK-MW-20B (26 ng/L). Perfluorooctanesulfonic acid (PFOS) was detected at concentrations exceeding the PFOS Screening Level of 10 ng/L in samples collected from the same groundwater monitoring wells: CCSK-MW-5A (87 ng/L), CCSK-MW-5B (100 ng/L), CCSK-MW-20A (35 ng/L), and CCSK-MW-20B (36 ng/L). Both of these well pairs are located adjacent to the northeastern landfill toe of slope. Total PFAS concentrations (combined concentrations of PFOA and PFOS) were below the PFAS Screening Level of 500 ng/L in all samples.
  - The results of the groundwater sample analyses for PFAS are presented in **Table 9**.

Geotechnical Investigation Data

Sand and coarse, gravelly fill were encountered within the top 18 inches of the soil boring (potentially gravel roadbed material). Silty sand with some gravel was encountered between 18 inches and approximately 10 feet below ground surface (bgs). Densely packed sand-gravel mixtures were encountered between 10 feet bgs and 12 feet bgs. The remainder of the soil boring to the terminal depth of 16 feet bgs consisted of silty sand with some gravel. Groundwater was observed at approximately 2.0 feet bgs and moisture content of the soil samples ranged between 9.0 percent and 17.4 percent.

A total of seven samples were submitted for sieve analysis. Five of the samples were further analyzed for Atterberg limits and moisture content (sample volume limited the analyses that could be performed). Atterberg limit testing indicated non-plastic silt behavior (little clay content). Fine soil content generally increased with depth.

Standard Penetration Testing (SPT) blow counts were measured during split spoon sampling. The resulting values of Standard Penetration Resistance (SPR) ranged between 19 and 23 from ground surface to 10.0 feet bgs. SPR increased from 31 to 73 between 12.0 and 17.0 feet bgs. Although the split spoon sampler was driven to 17.0 feet bgs, the auger could only be advanced to a depth of 16.0 feet bgs, and the soil boring was terminated at this depth.

In summary, the upper 12 feet of soil is considered to be medium dense; below this depth the soil is considered to be dense to very dense. The information collected would be adequate to assign unit weigh and strength parameters necessary for design of an excavation shoring system (i.e., sheet pile system). The geotechnical parameters describing the soil conditions are presented below:

Soil Type (depth in ft bgs)	Average SPT N	γ_{total} (pcf)	$\gamma_{effective}$ (pcf)	c'_a (psf)	φ' (deg)
Silty Sand with Gravel (1.5 – 10)	20	110	60	0	32
Sand and Gravel (10 – 12)	Attempted Shelby Sample – No Split Spoon				
Silty Sand with Gravel (12 – 16)	>30	110	60	0	35

Notes

γ_{total} – total unit weight in pounds per cubic foot (pcf)
$\gamma_{effective}$ – effective unit weight in pcf
c'_a – soil cohesion in pounds per square foot (psf)
φ' – internal friction angle in degrees (deg)

Geophysical Investigation Results

The main trunk line of the leachate collection system was snaked with a rodder starting at the manhole and moving north for a distance of 200 feet, where a hard obstruction was encountered. NAEVA was able to locate the main trunk line over the entire 200-foot length using an underground utility locator. It was determined that the main trunk line of the leachate collection system is situated between 5 and 7 feet bgs, with the shallowest depth measured at the furthest extent, indicating the pipe slopes downward toward the manhole. The ground surface above the 200-foot length of pipe was marked with paint, flagged, and Global Positioning System (GPS) coordinates were collected. No visual signs of contamination (product, odors, sheen, etc.) were observed upon retrieval of the rodder.

Based on the elevations of the surface markings and the estimated depth to the leachate collection system pipe, TRC estimated that, if present, the leachate system outlets are approximately 2 feet bss in the wetland. No other noteworthy observations were made.

Due to the limited effectiveness of the GPR, standing water, and lack of other access points for snaking the system with the rodder, the exact locations of the discharge laterals (if present) could not be identified.

3.1.5 Wetland Delineation

TRC conducted a review of publicly available data from appropriate agencies prior to the delineation of resources at, and in the vicinity of, the Site. The online National Wetlands Inventory (NWI) Mapper was accessed to identify the presence of federal-mapped wetlands and waters. The New York State Environmental Resource Mapper was accessed to identify the presence of state-mapped wetlands and waters. The Natural Resources Conservation Service (NRCS) online Web Soil Survey was accessed to determine the mapped soils within the vicinity of the Site, and the subsequently generated list of soil map units was compared to the NRCS Soil Data Access Hydric Soils List (2017).

A resource delineation was conducted in accordance with the methodologies described in the United States Army Corps of Engineers (USACE) Wetlands Delineation Manual (Environmental Laboratory, 1987) and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0; 2012). One palustrine emergent (PEM) wetland was identified at and in the vicinity of the Site during the delineation on August 1, 2019. The same wetland delineation was extended to the north and south on December 16, 2019. Wetland W-WH-1 is a PEM wetland located to the northeast of the capped landfill and includes the wetland areas delineated at the Site (refer to **Appendix A**, Figure 3). The portion of the wetland delineated measured approximately 4.35 acres with the wetland continuing to the south and north.

Indicators of wetland hydrology include surface water (A1), high water table (A2), saturation (A3), inundation visible on aerial imagery (B7), drainage patterns (B10), saturation visible on aerial imagery (C9), geomorphic position (D2), and FAC-neutral test (D5).

The wetland delineation was documented in a memorandum titled "Resource Delineation Report" prepared by TRC and dated January 20, 2020. The completed report is included in **Appendix A**.

3.1.6 Fish and Wildlife Resource Impact Analysis

A Fish and Wildlife Resource Impact Analysis (FWRIA) was conducted in accordance with the guidance provided in the document "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites", dated October 1994. The focus of this FWRIA was limited to the wetland identified and delineated as described above. The Site visit and inspection were conducted on December 16, 2019. A summary of the FWRIA findings is presented below, and the full report is included in **Appendix B**.

Several state-listed rare animal and plant species have been previously noted within one mile of the Site. Based on recent correspondence with the New York Natural Heritage Program, nine plants, one reptile, and one mammal that are state-listed have been documented in the vicinity of the Site.

The two of the nine rare/endangered plants, spreading globeflower (*trollies laxus*), State-listed as Rare, and fairywand (*chamaelirium luteum*), State-listed as Endangered, were previously noted within a nearby wetland located approximately 0.25 miles southwest of the Site. This nearby wetland is a rich, sloping fen that is associated with a stream that is a tributary to Muddy Brook. In addition, NYSDEC Division of Fish and Wildlife has indicated (based on NYSDEC records) that the following seven (7) listed species may also be present in the vicinity of the Site:

- Swamp Birch (Betula pumila)
- Carolina Whitlow grass (Tomostina reptans)
- Spotted Pondweed (Potamogeton pulcher)
- Hop sedge (Cyperus lupulinus)
- Marsh horsetail (Equisetum palustre)
- Yellow wild flax (Linum sulcatum)
- Narrow-leaved sedge (Carex amphibola)

The bog turtle (*glyptemys muhlenbergii*) has previously been documented within 0.6 miles of the Site. These turtles have the potential to be present at the Site, as individual turtles may travel up to one mile from documented locations. The bog turtle is State-listed as Endangered and is federally-listed as Threatened. Bog turtles are found within low-lying, open wetlands bordered by woodlands – particularly calcareous fens, herbaceous sedge meadows, and pastures. These wetlands are characterized by a continuous flow of water seeping through the saturated soil surface. Within these wetlands, bog turtles need a variety of micro-habitats for basking, foraging, nesting, shelter, and hibernation – including dry pockets, saturated areas, and areas that are subject to flooding.

A Phase 1 Bog Turtle Habitat Survey was performed on June 1, 2020, to determine whether or not the wetland is a potential bog turtle habitat, and to understand what (i.e., Phase 2, education, etc.), if anything, would need to be considered as part of the remedial plan for the wetland. As part of the Phase 1 survey, the following three

criteria were evaluated at the Site, in accordance with the U.S. Fish and Wildlife Services (USFWS), Guidelines for Bog Turtle Surveys, to determine the potential for bog turtle habitat:

1. Suitable hydrology;
2. Suitable soils; and,
3. Suitable vegetation.

In summary, wetlands at the Site were regarded by the survey scientist as sub-optimal bog turtle habitat. The Site did not contain any seeps or springs which would provide oxygenated cold water upwelling and therefore potential hibernacula locations. The wetland did contain a shallow mucky peat as a substrate, but the underlying dense rocky mineral soil layer would inhibit the ability for bog turtles to dig deeply into the substrate. The wetland was also densely choked with invasive phragmites, purple loosestrife, and cattails, creating a dense, shaded understory, not conducive to bog turtle foraging, basking and nesting. Based on the Site history, presence of contamination, measured nitrogen levels (elevated), and pH measurements, the wetland does not provide the preferred conditions and alkaline pH normally associated with the species. In addition, the physical barrier created by the railroad makes seasonal movement to this wetland by bog turtles unlikely. Based on these findings, no further studies, investigations, or permitting (i.e., Article 11) are recommended related to the bog turtle. In accordance with NYSDEC Department of Fish and Wildlife recommendations, the following conservative/preventative steps will be taken and/or incorporated into the remedial action:

1. Education and encounter planning for site workers: Based on Department recommendations, the elements of the education and encounter plan for contractors and workers would likely include training on identifying protected turtles (and other species) and steps to be taken if turtles (or other species) are encountered. As appropriate, the encounter plan would outline the steps to be taken if a turtle is encountered during construction (stoppage of work, required notifications, next steps including the potential need to move the turtle) and conditions under which work may resume in the area.
2. Silt fence will be installed as needed to both prevent sediment discharge to the downstream environment as well as in locations contiguous with the large DP-22 wetland complex as a barrier against non-resident turtles entering the construction area during the work. Per US Fish and Wildlife Service (USFWS) request, silt fence will be installed between October 1 and March 31, when bog turtles are in hibernation. If installation occurs during the active season (between April 1 and September 31), then a monitoring biologist, permitted by NYSDEC to handle bog turtles, will be on site to make sure there are no bog turtles in the work area. The silt fence will be examined each day by workers until remediation activities are complete. Any breaches in the fence must be repaired immediately and work will not begin until they are repaired.
3. If a bog turtle is found within the work area, a monitoring biologist, permitted by NYSDEC to handle bog turtles, must be notified to safely move the bog turtle out of the remediation zone and place it back into the wetland in the direction it was heading. The USFWS will also be contacted within 24 hours if a bog turtle is found.

As required, a technical memorandum summarizing the Phase 1 Bog Turtle Survey results and findings has been prepared and is attached as **Appendix C**. The results of the FWRIA indicate that significant ecological resources may be present at and in the immediate vicinity of the Site that may be impacted by contamination associated with the Site. These resources include CEA, a State-significant natural community (which is also a Class 1 Freshwater Wetland), potential habitat for multiple State-listed RTE species, and habitat for wildlife including amphibians, reptiles, birds, and mammals. In addition, a cold-water fishery is located 1,000 feet

north of the Site. Potentially affected resources at the Site and in the vicinity include components of the aquatic food chain that are directly associated with sediment (i.e., benthic macroinvertebrates) as well as higher trophic level receptors that may forage on vegetation and/or aquatic invertebrates that are present within the Site's shallow emergent marsh habitat. Both aquatic vegetation and invertebrates may bioaccumulate PCBs to levels that are potentially harmful to ecological receptors that forage within the Site. Based on the findings of this assessment, remediation of the sediment was deemed necessary.

New England cottontail rabbits (*sylvilagus transitionalis*) have also been previously documented within 0.5 miles to the north/northeast of the Site. This rabbit is State-listed as Special Concern. This species has disappeared from many historical locations in New York due to forest maturation habitat loss, habitat fragmentation, and competition with Eastern cottontails. The New England cottontail is an early-successional species, preferring open woods, disturbed areas, shrubby areas, thickets, and marshes. Current populations in southeastern New York can be found in isolated habitat patches that have undergone some form of disturbance; such habitats include agricultural fields and edges, and occasionally brushy edges of transportation corridors.

3.2 Nature and Extent of Contamination

Contaminated Site media include groundwater, surface water, and sediment. As discussed previously, the principal contaminants of concern found in groundwater are PFAS. Since PFAS are not believed to be associated with past Site operations, and investigation into the PFAS contamination in the Site groundwater monitoring wells is ongoing, Site groundwater is not evaluated any further in this RSO.

Wetland surface water is contaminated with PCBs, ranging in concentration up to 0.45 µg/L. Since this surface water contamination is believed to be directly related to the presence of relatively high concentrations of PCBs in sediment, and surface water contamination is expected to attenuate following sediment remediation, no further separate analysis of surface water is conducted in this RSO Report. Based on the measured depth of water in the pond and the aerial extent of inundation, approximately 150,000 gallons of surface water are held in the pond. In addition, based on the documented dimensions of the leachate collection drainpipe, manhole, and gravel pore space, approximately 10,000 gallons of water could also be stored in this system.

Wetland sediment is contaminated with PCBs, ranging in concentration from 0.18 mg/kg to 0.832 mg/kg in far-field samples CCSK-SE-29 and CCSK-SE-31, respectively, and up to 150,000 mg/kg in sample CCSK-SE-21 (2.0-2.5 feet bss) in close proximity to the landfill toe of slope (near the former drum removal areas).

The horizontal delineation has been completed to the investigation area boundaries (i.e., up to the limits of the landfill cap and the eastern property boundary line); however, there are locations where the concentrations of PCBs detected in the deepest sample collected is above 1 mg/kg (i.e., CCSK-SE-2, CCSK-SE-6, CCSK-SE-7, CCSK-SE-8, CCSK-SE-13, CCSK-SE-16, CCSK-SE-19, CCSK-SE-20, CCSK-SE-21, CCSK-SE-23, CCSK-SE-25, CCSK-SE-34 and CCSK-SE-36). It should be noted that all PCB detections exceeded the Class A sediment guidance value (0.1 mg/kg) and the lowest detection level achieved throughout the sediment sampling program was 0.11 mg/kg. Remediation of the wetland to this low level would essentially involve removal of sediment from all sampling locations. It should also be noted that sampling of the mineral soil below CCSK-SE-21, 2.0-2.5 feet bss was attempted; however, due to refusal of the hand-driven sampling equipment a sample could not be collected.

Detected PCB concentrations did not consistently decrease with depth of samples, as would be expected with recent PCB deposition. Rather, some of the highest concentrations of PCBs were found in the deepest samples.

For example, at CCSK-SE-21, the highest concentration of PCBs was found at 2.0-2.5 feet bss, while the sediment sample concentrations nearer to the sediment surface were three orders of magnitude less. In other cases, PCB concentrations consistently decreased with depth. For example, at CCSK-SE-20, the concentrations of PCBs decreased from 21 mg/kg at the sediment surface, to 8 mg/kg at 0.5-1.0 feet bss, and to 1.4 mg/kg at 1.0-1.5 feet bss. These observations of inconsistent contaminant distributions make development of conclusions related to contamination source difficult.

The approximate extent of contamination greater than or equal to 0.1 mg/kg (estimated to include all sediment sampling areas and depth intervals, except east of the railroad) is depicted in **Figure 4**. As shown, contaminated sediment encompasses an area of approximately 56,000 square feet, and the volume of contaminated sediment is estimated at approximately 3,280 cubic yards. The deepest elevated concentrations of PCBs are centered around the locations of CCSK-SE-2 and CCSK-SE-21, as shown on **Figure 3**. The extent of contamination above 50 mg/kg encompasses an area of approximately 3,200 square feet as shown in **Figure 5**.

Based on NYSDEC Department of Fish and Wildlife recommendations, removal of all sediment above the Class A SGV (0.1 mg/kg) should be attempted. These recommendations also suggested that in locations where the contaminant concentrations have been reduced below 1.0 mg/kg and at least 2 feet of sediment has been removed, in-place capping of the residual contamination may be considered. Under this scenario, the residual contamination would need to be capped beneath at least 2 feet of imported, clean material without any change to the final sediment surface contours. The estimated mass of sediment (assuming an in-place density of approximately 95 pound per cubic foot [lb/ft^3]) requiring disposal, including approximately 330 tons of solidifying agent, would be approximately 4,500 tons.

3.3 Qualitative Exposure Assessment

A qualitative exposure assessment consists of characterizing the exposure setting, identifying potential exposure pathways, and evaluating contaminant fate and transport. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from the Site, and consists of five elements: (1) a contaminant source, (2) a contaminant release and transport mechanism, (3) a point of exposure, (4) a route of exposure, and (5) a receptor population. An exposure pathway is complete when all five elements of an exposure pathway are complete. If one or more of the elements is absent, the pathway is potentially incomplete. An exposure pathway may be eliminated from consideration if any one of the five elements has not existed in the past, does not exist in the present, and will not exist in the future.

Based on the findings of the sediment investigation and delineation activities, the principal contaminant of concern in the focus area is PCBs, primarily in surface soil and wetland sediment. Concentrations of PCBs have also been detected in surface water at levels above the screening criteria.

Dermal contact, incidental ingestion, or inhalation of dust emanating from the Site represent the potential routes of exposure. Potential receptors include property owners, Site visitors (i.e., recreation/hunting/fishing, trespassers, etc.), Site workers (regular maintenance, future construction), downstream surface water users, and native fish and animals (secondary exposure potential to humans that consume these animals). As such, a qualitative exposure assessment was prepared to evaluate the potential for these receptor populations to be exposed to Site related contaminants and environmental media identified above, based on the findings of the investigation and delineation activities.

Considering the current conditions at the Site, the following exposure routes are considered potentially complete:

- **Dermal contact – sediment and surface water**: Although the duration would likely be short, on-Site activities (e.g., excavation, logging, hiking, hunting, etc.) by the property owner, Site visitors, or Site workers could result in contact with impacted media and contaminants. Impacted media or contaminants may contact skin directly or adhere to clothing or shoes, facilitating off-Site tracking and potential for future contact.
- **Inhalation – sediment**: The duration of exposure to Site contaminants through inhalation would also be short term and seasonal. Inhalation exposures could occur due to tracking material off-Site resulting in dust generation. Exposures could also occur during dry periods where dried surface soil and sediment particles are released as dust due to on-Site activities (e.g., excavation, logging, hiking, hunting, etc.) by the property owner, Site visitors, or Site workers.
- **Ingestion – surface water and sediment**: The surface water exposure route is considered potentially complete due to the seasonal connection of the wetland/ponded area at the Site with downstream drinking water reservoirs. Although the possibility for anything other than negligible concentrations of contaminants to migrate downstream to surface water users is extremely low, the pathway is noted. It should also be noted that the possibility exists for native fish and wildlife species to bio-accumulate Site related contaminants. Indirect ingestion of bio-accumulated contaminants could then occur during consumption of the fish and wildlife.

The above exposure pathways are consistent with those outlined in the ROD: (1) potential risk to an individual ingesting fish from the Great Swamp; (2) potential risk to a site worker through exposure to surface soil; and (3) potential risk to a (child) trespasser through exposure to surface soil.

Considering the current conditions at the Site and the absence of any known groundwater use for consumption in the area, the groundwater ingestion pathway is considered incomplete.

4.0 VIABLE REMEDIAL TECHNOLOGIES AND OPTIONS

Due to the requirement to eliminate risks to human health and the environment by complete removal, in-situ options have not been considered in this RSO. Excavation and removal of material above the cleanup goals will be, by definition, most effective. The options to be considered for use in a site-specific remedy are therefore limited to two commonly implemented excavation options and three potential waste management options:

- Sediment Removal Options
  - Removal Option 1: "Dry" Excavation – this method of excavation/dredging involves pumping (and treatment) of standing water, to the extent practicable, prior to excavating sediment using standard construction/excavation equipment
  - Removal Option 2: "Wet" Excavation – this method involves implementing excavation/ dredging of sediment and all associated tasks (i.e., confirmation sample collection, backfilling, and restoration) from below the water surface
- Sediment Management Options
  - Management Option 1: Incineration
  - Management Option 2: Thermal Desorption
  - Management Option 3: Off-Site Landfilling
    - TSCA Landfill
    - Non-TSCA landfill

4.1 Evaluation of Sediment Removal Options

Results from recent environmental remediation excavation/dredging projects demonstrate significant risk reduction is consistently achieved as a result of the cleanup. Long-term environmental benefits greatly outweigh short-term exposures. Mass removal of contaminated sediments by excavation/dredging results in effective reductions in contaminant concentrations in sediment, surface water and associated receptors (e.g., fish).

4.1.1 "Dry" vs. "Wet" Excavation – Advantages and Disadvantages

For environmental evaluation, sediment excavation (or "dredging") operations are best distinguished based on the contrast of "dry" versus "wet" excavation/dredging. Dry excavation/dredging involves removing most water from the area, followed by mechanical removal of the sediment, an excavation method similar to conventional earthmoving. In most cases, dewatering would involve water treatment with a permitted discharge. Wet excavation/dredging projects are conducted under water, commonly using specialized equipment which may involve mechanical or hydraulic processes.

Dry Excavation/Dredging

Dry excavation/dredging involves pumping water from the area targeted for sediment removal. Prior to pumping out the water ("dewatering"), the target area must be hydraulically isolated using strategies such as earthen dams or sheet piling. Once the physical isolation structure(s) is in place, the water body can be pumped (in the case of a pond or other standing water body). If implemented at the Site, dewatering would involve water treatment with a permitted discharge. After water is pumped out, the area is excavated with conventional earthmoving equipment. After excavation and confirmation sampling are completed, the wetland restoration

tasks (backfilling and planting) would be completed, and the earthen dams or other barriers would be removed, and water levels allowed to return to natural levels.

Dry excavation/dredging is most practical for smaller streams or creeks, small ponds that can be easily isolated, and in general, shallower water bodies. The following conditions are generally less favorable for dry excavation/dredging:

- Deeper water bodies or water bodies that are difficult to isolate,
- Contaminants that have high concentrations of volatile compounds (i.e., air emissions may be a greater concern), or
- Remediation projects within areas of significant groundwater recharge.

However, if site characteristics indicate the viability of dry excavation/dredging, the following general advantages may be observed:

- Sediments targeted for removal are clearly visible and more easily located/identified,
- Debris is easier to remove and less likely to interfere with contaminant removal,
- Sediments are drier, easier to handle, and easier to solidify,
- Waterborne releases of suspended sediments are unlikely, and
- Sediment resuspension and resettling of contaminants following remediation is generally not an issue.

If a site's characteristics allow dry excavation/dredging, it is usually the preferred approach, from both a standpoint of implementability and effectiveness. From a Site-specific perspective, dry excavation would provide an opportunity to visually inspect the toe of the landfill and the leachate collection system outlets. The ability to inspect these areas would provide better forensics in terms of assessing the cause of contamination and mitigating the potential for recurrence.

Wet Excavation/Dredging

Wet excavation/dredging is conducted under water and employs either mechanical (i.e., "clamshell") or hydraulic removal processes. Wet excavation/dredging is usually more complex operationally than dry excavation/dredging due to the underwater operation and requires a greater degree of sediment dewatering or stabilization after removal. Typical post-removal handling of sediments includes:

- Debris screening,
- Sediment dewatering,
- Water treatment and discharge, and
- Sediment disposal.

Advantages of wet excavation/dredging include:

- Less potential for volatilization from exposure of sediments during removal,
- Smaller footprint for equipment staging and operations, and
- Water infiltration into the work area is not a concern.

Disadvantages of wet excavation/dredging include:

- It is a "blind" operation during removal, assessment (e.g., confirmation sampling), and restoration,

- Water is flowing throughout the dredge area during removal with greater potential for waterborne releases of suspended sediments as well as creating operational difficulties,
- Excavation surface conditions (i.e., debris and nature of underlying material) and the nature of the sediment (grain size, specific gravity, etc.) may cause operational problems, and
- Potential for suspended sediment settlement following excavation/dredging may cause low-level contaminant detections during confirmation sampling and may require follow-up excavation/dredging.

A key Site-specific disadvantage of wet excavation/dredging would be the inability to examine the toe of the landfill and the leachate collection system outlets and assess the cause of contamination.

4.1.2 Environmental Results

Environmental results of dry and wet excavation/dredging often differ. While both approaches are expected to achieve significant mass removal of PCBs in Site sediments, dry excavation/dredging often results in more complete removal of contaminated sediments and contaminant mass, and more consistently achieves cleanup goals.

There is potential for post-remediation settling of suspended sediments during wet excavation/dredging. As these sediments could contain low levels of PCBs, achieving very low cleanup criteria (such as the Class A sediment criteria for PCBs of 0.1 mg/kg) could also be problematic for wet excavation/dredging.

4.2 Evaluation of Waste Management Options

Three of the most commonly used waste management strategies for non-liquid PCB remediation waste with concentrations above 50 mg/kg are (1) high temperature incineration, (2) thermal desorption, and (3) landfill disposal. The potential applicability of these three options is discussed in the following subsections.

4.2.1 Incineration

Incineration treats organic contaminants in solids and liquids by subjecting them to temperatures typically greater than 760°C (1,400°F) in the presence of oxygen, which causes volatilization, combustion, and destruction of these compounds. The primary factors affecting the design and performance of the system are the furnace temperature, residence time, and turbulence required to expose the combustible material to oxygen in order to obtain complete combustion. The EPA has approved high efficiency incinerators to destroy PCBs with concentrations above 50 mg/kg. The destruction and removal efficiency (DRE) for non-liquid PCB-contaminated materials must be equivalent to 99.9999% (less than 1 mg/kg).

The Federal Remediation Technology Roundtable (FRTR) Remediation Technologies Screening Matrix and Reference Guide suggests unit costs for applying incineration at sites of varying size (all larger than this Site) and complexity range from $800 to $1,200 per cubic yard (not including sediment excavation and handling costs). Based on the high unit cost for incineration over more readily available off-site disposal options, incineration is not considered to be a viable option for the PCB-impacted sediment at the Site.

4.2.2 Thermal Desorption

Ex-situ thermal desorption has been proven effective in treating PCB contaminated soil and sediment. Ex-situ thermal desorption is applicable to sites where the target matrix can be excavated or dredged readily for processing and where the organic contaminants are amenable to desorption at kiln temperatures between 315°C

(600°F) and 590°C (1,100°F). The technology can accept a range of particle sizes, from granular to silty clays. Debris in the waste stream would need to be separated and disposed of using another option.

Based on the relatively high cost of procuring and setting up thermal desorption systems, the relatively small volume of waste for processing, and the need to dispose of the waste stream following treatment (likely would not meet reuse specifications and not be suitable for use as backfill), thermal desorption is not considered to be a viable option for the PCB-impacted sediment at the Site.

4.2.3 Landfill Disposal

Landfill disposal is one of the most common methods for disposal of PCB contaminated soils and sediments. For most wastes, especially persistent substances like PCBs, burial in landfills is not considered a destruction technology; rather, a method of disposal and containment.

Landfill disposal of PCB contaminated soil and sediment is relatively inexpensive compared to other available treatment technologies. TSCA landfills appropriately licensed to accept soil and sediment with concentrations over 50 mg/kg, in general, have yearly tonnage acceptance limits. These limits are determined by the state in which they are located and are specified in the landfill operating permit. The landfills are typically able to receive large shipments of materials, often by rail, thereby reducing overall costs of disposal by lowering the material transportation costs.

Since PCB-disposal took place prior to 1978, soil/sediment containing PCBs at a concentration less than 50 mg/kg are not regulated under TSCA and the most cost effective means of disposal would be a local landfill. Waste containing PCBs over 50 mg/kg would be disposed as a TSCA-regulated under a performance-based cleanup, with no USEPA approval or notice required.

4.3 Summary of Options

Based on the discussions above, the only excavation option that provides the best opportunity to inspect the landfill toe of slope is the “dry” excavation/dredging option. Using this approach would eliminate the need for additional investigations aimed at evaluating the possibility of a continued source from the landfill. In addition, the most cost effective way to dispose of the excavated sediment is off-site disposal. Under this approach, the least expensive disposal option would be to use a local (non-TSCA) disposal facility for sediment with PCB concentrations below 50 mg/kg, and a TSCA disposal facility for sediment with PCB concentrations equal to or greater than 50 mg/kg.

5.0 SOURCE INVESTIGATION AND UNCERTAINTY

Early in the investigation into possible sources of PCBs in the wetland, a dye tracer study was conducted to evaluate the leachate collection system outlets as a possible continuing source of contamination. This study did confirm that there is a hydraulic connection between the leachate collection system and the wetland (as expected and as indicated by the available "issued-for-bid" drawings), but the connection has not been quantified.

Multiple samples have been collected of the water in the leachate collection system. The analytical data from these samples has been evaluated and, based on the data, a determination has been made that the high concentrations of PCBs in the wetland could not have been caused by seepage of this water from the leachate collection system alone. In addition, review of the sediment data in close proximity to the landfill indicates that several locations exhibit the highest concentrations of PCBs near the surface, while other locations exhibit concentrations increasing with depth. This inconsistent distribution of PCBs adjacent to the landfill, and the widespread moderate and low levels of contamination throughout the wetland area, does not point to a specific, isolated, continuing source of contamination. Instead, a more likely conceptual site model, although not confirmed, is the potential for contamination to have been left behind following remediation, and subsequently spread throughout the wetland during backfill placement and planting. In summary, the source of contamination in the wetland is not known, but may be due to releases that pre-date the previous remedial actions conducted at the Site.

Nevertheless, in the worst case, the source and migration pathway is still uncertain, may still exist, and will need to be confirmed during remediation. Questions related to the potential need to conduct additional investigations into the source of contamination in the vicinity of CCSK-SE-2 and CCSK-SE-21 were discussed among the project team. Discussions also involved the potential need to include contingencies in the remedial design, aimed at repair of toe of slope issues identified or potential source discharges emanating from the leachate collection system. Overall, the project team believes that the most efficient and cost effective means of remediating the sediment and investigating for potential continuing sources is to perform the work under a single phase approach. If a continuing source is identified or if the landfill toe of slope is found to have failed during implementation of the remedy, design modifications will be undertaken at that time to complete the remediation and remove potential remaining sources.

6.0 RECOMMENDATIONS

Important to the success of the remedy as well as long-term performance and effectiveness is confirmation and removal of the source of contamination. Since "wet" methods do not afford the opportunity to inspect the excavation and evaluate the landfill toe and leachate collection outlets for the presence of a continuing source, "wet" methods have been eliminated from consideration. "Wet" methods also represent the following disadvantages which would be difficult to overcome at the Site and further support eliminating this dredging/excavation method from consideration:

- May require over-excavation to provide sufficient draft for floating equipment;
- Dewatering may ultimately be required if NAPL is observed;
- Generally more difficult than dry methods to manage debris that may be encountered;
- Confirmation sampling cannot proceed until after a resettling period;
- Over-dredging is relatively common with this type of remedy, particularly when RAOs are low, as is the case with this project;
- If RAOs cannot be achieved after multiple dredging passes, an alternate approach such as filling with clean cover, may be required; and
- Performing sampling, backfilling, and planting in an underwater environment is generally more difficult.

In summary, "dry" excavation/dredging of sediment with TSCA and non-TSCA disposal is the recommended approach for the RSO. This approach is recommended due to the advantage of providing for inspection of the landfill toe of slope and the leachate collection system outlets, and the opportunity for evaluation of the general conditions in the vicinity of sediment sampling locations CCSK-SE-2 and CCSK-SE-21 during dewatering. This approach is expected to provide greater assurance of proper long-term removal of the PCB impacts to the pond.

As discussed earlier, since the original disposal/contamination at the Site occurred prior to 1978 (prior to TSCA regulations), sediment with PCB concentrations below 50 mg/kg would be segregated and disposed of as non-TSCA waste. Material with as-found concentrations equal to or greater than 50 mg/kg would be managed as TSCA-regulated waste and disposed of in an appropriately licensed facility.

A conceptual plan for the recommended RSO approach is illustrated in **Figure 6**. The conceptual approach would include the following activities:

- Planning and Permitting – The permits that are expected to be required for implementation of the recommended approach consist of:
    - Section 7 of the Rivers and Harbors Appropriation Act of 1899/Section 404 Clean Water Act;
    - Section 7 US Fish and Wildlife Service Threatened and Endangered Species Review and Consultation;
    - State Pollutant Discharge Elimination System (SPDES) Permit for Construction and Dewatering Activities;
    - NYSDEC Threatened and Endangered Species Inventory Review;
    - Section 106 of the National Historic Preservation Act and Section 14.09 of the New York State Historic Preservation Act of 1980: Cultural and Historic Resources Review and Consultation;
    - Local permitting through Patterson Planning Department, Building Department, and/or, Zoning Department, as well as the Putnam County Soil and Water Conservation District; and
    - Access agreement with the MTA Metro-North Railroad for construction of dewatering berms (to be tied into the elevated railroad ballast) and for removal of contaminated sediment from the

railroad right-of-way. Full-time flag-persons may be required for work on railroad property or for work that may have the potential to foul the railroad track.

- Site Preparation and Pond Isolation – After contractor procurement and selection, contract award, approval of pre-mobilization submittals, and mobilization, required sediment and erosion controls would be installed in accordance with the approved design. The existing access road into the landfill area would be reconstructed as needed to support the heavy traffic and equipment that is anticipated for the work and the construction access road would be extended to the north end of the pond. A construction laydown area and water treatment equipment area would also be constructed on the landfill to facilitate these activities. Once the access ways are completed, the pond would be isolated at the points of connection to the larger wetland to the north, adjacent to the railroad track. This surface water connection would be blocked using a compacted soil dam or similar portable water dam product (e.g., Tiger Dam™ System). A small berm would also be installed at the south end of the pond to prevent landfill drainage/surface water from entering the pond from this location. If needed, access roads would be extended into the pond area, as discussed below. Monitoring wells MW-20A and MW-20B would be removed in accordance with standard monitoring well decommissioning procedures, prior to undertaking pond dewatering and excavation/dredging. Well replacement would be undertaken following construction.

- Pond Dewatering (including leachate collection system) – Pond dewatering would be accomplished using pumps and sumps situated throughout the pond area as needed. Pumping would also be undertaken from the leachate collection system manhole (MHC-1). A portable water management/treatment system would be installed to process collected water with discharge under a SPDES individual permit (no known sanitary/POTW system exists in this area). The conceptual treatment system includes portable tanks for influent storage and initial clarifying, mechanical filtration (e.g., bag filter train), carbon filtration, and discharge system. Water would be discharge to an upland location to the north of the landfill. Water pumping and management would be setup early in the project and, to the extent practicable, the existing ponded water would be decanted and processed prior to disturbance of the underlying sediment. The treatment system would be operational throughout the remediation, backfilling and wetland restoration. Due to the significantly larger volumes of water to be managed under the "dry" alternatives, the estimated costs for water management and treatment are higher than the corresponding "wet" alternatives.

- Stabilization of Sediment – Sediment stabilization would be performed in place prior to excavation, or ex-situ, prior to shipping. Stabilization would be accomplished using lime kiln dust, fly ash, Portland cement, Calciment, or other readily available agents. In concept, solidification materials would be delivered to the Site in bags or in supersacks, dispersed to portions of the affected area being addressed (or in roll-off containers), and mixed into the sediment using extended reach excavation equipment. If necessary, an access roadway will be installed into the pond area to facilitate mixing and sediment removal. Solidification and removal would commence in the area with the highest PCB concentrations to mitigate the potential for spreading this material into other areas of the pond.

- Excavation of Sediment Equal to or Above 0.1 mg/kg PCBs – Conventional methods would be used to remove sediment equal to or above the Class A Guidance Value of 0.1 mg/kg throughout the pond area. The data collected during the investigation phase would be used to delineate, excavate, and segregate the sediment with PCB concentrations at 50 mg/kg or greater separately from the sediment with PCB concentrations of 0.1 mg/kg to less than 50 mg/kg. Removal would commence at the landfill toe of slope in the areas of highest PCB impacts. Excavation of this material down to the underlying mineral soil

would also facilitate movement of equipment into and out of the wetland as needed. Excavated material would be solidified and removed, followed by inspection of the landfill toe of slope, and confirmation sampling to allow backfilling to proceed at the toe of slope. Solidification (as needed) and removal of sediment would continue throughout the pond area.

- Confirmatory Sampling – Based on discussions with USEPA, the confirmation sediment sampling would be conducted over a 20-foot by 20-foot grid, with 4 individual sample aliquots being collected and composited from each grid. Composite samples would be analyzed for PCBs. Excavation would be expanded, where feasible, in any grid area where the cleanup criterion has not been demonstrated by the composite sample. In locations where the contaminant concentrations have been reduced below 1.0 mg/kg and at least 2 feet of sediment has been removed, in-place capping of the residual contamination may be considered. Under this scenario, the residual contamination would need to be capped beneath at least 2 feet of imported, clean material without any change to the final sediment surface contours.

- Offsite Management/Disposal of Sediment – Excavated sediment would need to be segregated, as appropriate, for disposal at TSCA and non-TSCA facilities. Sediment with PCBs at 50 mg/kg or greater would be disposed of at a TSCA facility. Sediment with PCBs at 0.1 mg/kg to less than 50 mg/kg would be disposed of at a commercial landfill facility.

- Wetland Restoration – After completion of confirmation sampling, the wetland would be backfilled with an appropriate soil from an approved source. Pond restoration would be performed in-kind in accordance with the approved restoration plan. Once restoration is completed, the soil dams would be removed, the wetland would be flooded, and Site demobilization would be undertaken.

7.0 REFERENCES

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TABLES

Table 1
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Sediment (2016, 2017, and 2018)

				Sample Location:	CCSK-SE-1				CCSK-SE-2						CCSK-SE-3	
				Sample Depth (ft. bss):	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	2.5 - 3.0	0.0 - 0.5	0.5 - 1.0
				Sample Date:	10/26/2016	10/26/2016	11/9/2017	09/25/2018	10/26/2016	10/26/2016	11/9/2017	11/9/2017	09/26/2018	09/26/2018	10/26/2016	10/26/2016
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Aroclor-1016	NS	NS	NS	NS	7 U	6.6 U	19 U	0.63 U	3,000 U	2,500 U	19 U	19 U	300 U	850 U	0.15 U	0.13 U
Aroclor-1221	NS	NS	NS	NS	7 U	6.6 U	19 U	0.63 U	3,000 U	2,500 U	19 U	19 U	300 U	850 U	0.15 U	0.13 U
Aroclor-1232	NS	NS	NS	NS	7 U	6.6 U	19 U	0.63 U	3,000 U	2,500 U	19 U	19 U	300 U	850 U	0.15 U	0.13 U
Aroclor-1242	NS	NS	NS	NS	**12**	**33**	**200**	**0.92**	**23,000**	**11,000**	**210**	**200**	**3,500**	**4,300**	**0.58**	**0.86**
Aroclor-1248	NS	NS	NS	NS	7 U	6.6 U	19 U	0.63 U	3,000 U	2,500 U	19 U	19 U	300 U	850 U	0.15 U	0.13 U
Aroclor-1254	NS	NS	NS	NS	7 U	6.6 U	19 U	0.63 U	3,000 U	2,500 U	19 U	19 U	**210 J**	850 U	0.15 U	0.13 U
Aroclor-1260	NS	NS	NS	NS	7 U	6.6 U	19 U	0.63 U	3,000 U	2,500 U	19 U	19 U	300 U	850 U	0.15 U	0.13 U
Aroclor-1262	NS	NS	NS	NS	7 U	6.6 U	19 U	0.63 U	3,000 U	2,500 U	19 U	19 U	300 U	850 U	0.15 U	0.13 U
Aroclor-1268	NS	NS	NS	NS	7 U	6.6 U	19 U	0.63 U	3,000 U	2,500 U	19 U	19 U	300 U	850 U	0.15 U	0.13 U
Total PCBs	< 0.1	0.1 - 1.0	> 1.0	3.2	**12**	**33**	**200**	**0.92**	**23,000**	**11,000**	**210**	**200**	**3,710 J**	**4,300**	**0.58**	**0.86**

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated non-detect.

Values in **bold** indicate the analyte was detected.

Shading indicates result above the corresponding SGV/SCO.

PCBs - Polychlorinated Biphenyls.

Table 1
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Sediment (2016, 2017, and 2018)

				Sample Location:	CCSK-SE-4		CCSK-SE-5		CCSK-SE-6				CCSK-SE-7			
				Sample Depth (ft. bss):	0.0 - 0.5	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0
				Sample Date:	10/26/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016	09/25/2018	09/25/2018	10/26/2016	10/26/2016	11/9/2017	09/25/2018
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Aroclor-1016	NS	NS	NS	NS	0.14 U	0.13 U	0.17 U	0.13 U	9.1 U	1.6 U	2.6 U	2.2 U	1.5 U	3.1 U	13 U	0.53 U
Aroclor-1221	NS	NS	NS	NS	0.14 U	0.13 U	0.17 U	0.13 U	9.1 U	1.6 U	2.6 U	2.2 U	1.5 U	3.1 U	13 U	0.53 U
Aroclor-1232	NS	NS	NS	NS	0.14 U	0.13 U	0.17 U	0.13 U	9.1 U	1.6 U	2.6 U	**18**	1.5 U	3.1 U	13 U	0.53 U
Aroclor-1242	NS	NS	NS	NS	**0.78**	**0.15**	**0.7**	**0.38**	**27**	**11**	**29 J**	2.2 U	**10**	**26**	**41**	**1.6**
Aroclor-1248	NS	NS	NS	NS	0.14 U	0.13 U	0.17 U	0.13 U	9.1 U	1.6 U	2.6 U	2.2 U	1.5 U	3.1 U	13 U	0.53 U
Aroclor-1254	NS	NS	NS	NS	0.14 U	0.13 U	0.17 U	0.13 U	9.1 U	1.6 U	2.6 U	2.2 U	1.5 U	3.1 U	13 U	0.53 U
Aroclor-1260	NS	NS	NS	NS	0.14 U	0.13 U	0.17 U	0.13 U	9.1 U	1.6 U	2.6 U	2.2 U	1.5 U	3.1 U	13 U	0.53 U
Aroclor-1262	NS	NS	NS	NS	0.14 U	0.13 U	0.17 U	0.13 U	9.1 U	1.6 U	2.6 U	2.2 U	1.5 U	3.1 U	13 U	0.53 U
Aroclor-1268	NS	NS	NS	NS	0.14 U	0.13 U	0.17 U	0.13 U	9.1 U	1.6 U	2.6 U	2.2 U	1.5 U	3.1 U	13 U	0.53 U
Total PCBs	< 0.1	0.1 - 1.0	> 1.0	3.2	**0.78**	**0.15**	**0.7**	**0.38**	**27**	**11**	**29 J**	**18**	**10**	**26**	**41**	**1.6**

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated non-detect.

Values in **bold** indicate the analyte was detected.

Shading indicates result above the corresponding SGV/SCO.

PCBs - Polychlorinated Biphenyls.

Table 1
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Sediment (2016, 2017, and 2018)

				Sample Location:	CCSK-SE-8			CCSK-SE-9			CCSK-SE-10		CCSK-SE-11		CCSK-SE-12	
				Sample Depth (ft. bss):	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0
				Sample Date:	10/26/2016	10/26/2016	11/9/2017	10/26/2016	10/26/2016	09/26/2018	10/26/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Aroclor-1016	NS	NS	NS	NS	7.6 U	14 U	0.51 U	0.28 U	1.4 U	0.62 U	0.15 U	0.13 U	0.16 U	0.14 U	6 U	0.14 U
Aroclor-1221	NS	NS	NS	NS	7.6 U	14 U	0.51 U	0.28 U	1.4 U	0.62 U	0.15 U	0.13 U	0.16 U	0.14 U	6 U	0.14 U
Aroclor-1232	NS	NS	NS	NS	7.6 U	14 U	0.51 U	0.28 U	1.4 U	0.62 U	0.15 U	0.13 U	0.16 U	0.14 U	6 U	0.14 U
Aroclor-1242	NS	NS	NS	NS	**22**	**81**	**3.1**	**2.4**	**6.5**	**0.91**	**0.8**	**0.63**	**0.83**	**0.75**	**31**	**0.64**
Aroclor-1248	NS	NS	NS	NS	7.6 U	14 U	0.51 U	0.28 U	1.4 U	0.62 U	0.15 U	0.13 U	0.16 U	0.14 U	6 U	0.14 U
Aroclor-1254	NS	NS	NS	NS	7.6 U	14 U	0.51 U	0.28 U	1.4 U	0.62 U	0.15 U	0.13 U	0.16 U	0.14 U	6 U	0.14 U
Aroclor-1260	NS	NS	NS	NS	7.6 U	14 U	0.51 U	0.28 U	1.4 U	0.62 U	0.15 U	0.13 U	0.16 U	0.14 U	6 U	0.14 U
Aroclor-1262	NS	NS	NS	NS	7.6 U	14 U	0.51 U	0.28 U	1.4 U	0.62 U	0.15 U	0.13 U	0.16 U	0.14 U	6 U	0.14 U
Aroclor-1268	NS	NS	NS	NS	7.6 U	14 U	0.51 U	0.28 U	1.4 U	0.62 U	0.15 U	0.13 U	0.16 U	0.14 U	6 U	0.14 U
Total PCBs	< 0.1	0.1 - 1.0	> 1.0	3.2	**22**	**81**	**3.1**	**2.4**	**6.5**	**0.91**	**0.8**	**0.63**	**0.83**	**0.75**	**31**	**0.64**

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated non-detect.

Values in **bold** indicate the analyte was detected.

Shading indicates result above the corresponding SGV/SCO.

PCBs - Polychlorinated Biphenyls.

Table 1
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Sediment (2016, 2017, and 2018)

				Sample Location:	CCSK-SE-13					CCSK-SE-14		CCSK-SE-15		CCSK-SE-16	
				Sample Depth (ft. bss):	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	0.0 - 0.5	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0
				Sample Date:	10/26/2016	10/26/2016	11/9/2017	09/25/2018	09/25/2018	10/26/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Aroclor-1016	NS	NS	NS	NS	1.5 U	7.2 U	5.4 U	2.3 U	2.2 U	0.13 U	0.13 U	0.34 U	0.16 U	0.15 U	0.15 U
Aroclor-1221	NS	NS	NS	NS	1.5 U	7.2 U	5.4 U	2.3 U	2.2 U	0.13 U	0.13 U	0.34 U	0.16 U	0.15 U	0.15 U
Aroclor-1232	NS	NS	NS	NS	1.5 U	7.2 U	5.4 U	2.3 U	**41 J**	0.13 U	0.13 U	0.34 U	0.16 U	0.15 U	0.15 U
Aroclor-1242	NS	NS	NS	NS	**9.3**	**37**	**23**	**16**	2.2 U	**0.52**	**0.28**	**2.5**	**0.54**	**1.8**	**1.3**
Aroclor-1248	NS	NS	NS	NS	1.5 U	7.2 U	5.4 U	2.3 U	2.2 U	0.13 U	0.13 U	0.34 U	0.16 U	0.15 U	0.15 U
Aroclor-1254	NS	NS	NS	NS	1.5 U	7.2 U	5.4 U	2.3 U	2.2 U	0.13 U	0.13 U	0.34 U	0.16 U	0.15 U	0.15 U
Aroclor-1260	NS	NS	NS	NS	1.5 U	7.2 U	5.4 U	2.3 U	2.2 U	0.13 U	0.13 U	0.34 U	0.16 U	0.15 U	0.15 U
Aroclor-1262	NS	NS	NS	NS	1.5 U	7.2 U	5.4 U	2.3 U	2.2 U	0.13 U	0.13 U	0.34 U	0.16 U	0.15 U	0.15 U
Aroclor-1268	NS	NS	NS	NS	1.5 U	7.2 U	5.4 U	2.3 U	5.5 U	0.13 U	0.13 U	0.34 U	0.16 U	0.15 U	0.15 U
Total PCBs	< 0.1	0.1 - 1.0	> 1.0	3.2	**9.3**	**37**	**23**	**16**	**41 J**	**0.52**	**0.28**	**2.5**	**0.54**	**1.8**	**1.3**

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated non-detect.

Values in **bold** indicate the analyte was detected.

Shading indicates result above the corresponding SGV/SCO.

PCBs - Polychlorinated Biphenyls.

Table 1
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Sediment (2016, 2017, and 2018)

				Sample Location:	CCSK-SE-17		CCSK-SE-18		CCSK-SE-19					CCSK-SE-20			
				Sample Depth (ft. bss):	0.0 - 0.5	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5
				Sample Date:	10/26/2016	10/26/2016	10/26/2016	10/26/2016	11/8/2017	11/8/2017	11/8/2017	09/26/2018	09/26/2018	11/8/2017	11/8/2017	11/8/2017
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Aroclor-1016	NS	NS	NS	NS	0.99 U	0.14 U	0.13 U	0.13 U	2.7 U	0.59 U	2 U	1.9 U	1.8 U	5.6 U	1.6 U	0.38 U
Aroclor-1221	NS	NS	NS	NS	0.99 U	0.14 U	0.13 U	0.13 U	2.7 U	0.59 U	2 U	1.9 U	1.8 U	5.6 U	1.6 U	0.38 U
Aroclor-1232	NS	NS	NS	NS	0.99 U	0.14 U	0.13 U	0.13 U	2.7 U	0.59 U	2 U	1.9 U	1.8 U	5.6 U	1.6 U	0.38 U
Aroclor-1242	NS	NS	NS	NS	**5.5**	**0.49**	**0.57**	**0.35**	**32**	**5.1**	**18**	**8.2**	**20**	**21**	**8**	**1.4**
Aroclor-1248	NS	NS	NS	NS	0.99 U	0.14 U	0.13 U	0.13 U	2.7 U	0.59 U	2 U	1.9 U	1.8 U	5.6 U	1.6 U	0.38 U
Aroclor-1254	NS	NS	NS	NS	0.99 U	0.14 U	0.13 U	0.13 U	2.7 U	0.59 U	2 U	**1.1 J**	1.8 U	5.6 U	1.6 U	0.38 U
Aroclor-1260	NS	NS	NS	NS	0.99 U	0.14 U	0.13 U	0.13 U	2.7 U	0.59 U	2 U	1.9 U	1.8 U	5.6 U	1.6 U	0.38 U
Aroclor-1262	NS	NS	NS	NS	0.99 U	0.14 U	0.13 U	0.13 U	2.7 U	0.59 U	2 U	1.9 U	1.8 U	5.6 U	1.6 U	0.38 U
Aroclor-1268	NS	NS	NS	NS	0.99 U	0.14 U	0.13 U	0.13 U	2.7 U	0.59 U	2 U	1.9 U	1.8 U	5.6 U	1.6 U	0.38 U
Total PCBs	< 0.1	0.1 - 1.0	> 1.0	3.2	**5.5**	**0.49**	**0.57**	**0.35**	**32**	**5.1**	**18**	**9.3 J**	**20**	**21**	**8**	**1.4**

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

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PCBs - Polychlorinated Biphenyls.

Table 1
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Sediment (2016, 2017, and 2018)

				Sample Location:	CCSK-SE-21					CCSK-SE-22			
				Sample Depth (ft. bss):	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0
				Sample Date:	11/8/2017	11/8/2017	11/8/2017	09/26/2018	09/26/2018	11/8/2017	11/8/2017	11/8/2017	09/25/2018
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Aroclor-1016	NS	NS	NS	NS	130 U	50 U	230 U	3,700 U	17,000 UJ	2.8 U	2.2 U	2.6 U	0.11 U
Aroclor-1221	NS	NS	NS	NS	130 U	50 U	230 U	3,700 U	17,000 UJ	2.8 U	2.2 U	2.6 U	0.11 U
Aroclor-1232	NS	NS	NS	NS	130 U	50 U	230 U	3,700 U	17,000 UJ	2.8 U	2.2 U	2.6 U	0.11 U
Aroclor-1242	NS	NS	NS	NS	**690**	**270**	**1,200**	**22,000**	**150,000 J**	**15**	**14**	**15**	**0.34**
Aroclor-1248	NS	NS	NS	NS	130 U	50 U	230 U	3,700 U	17,000 UJ	2.8 U	2.2 U	2.6 U	0.11 U
Aroclor-1254	NS	NS	NS	NS	130 U	50 U	230 U	3,700 U	17,000 UJ	2.8 U	2.2 U	2.6 U	0.11 U
Aroclor-1260	NS	NS	NS	NS	130 U	50 U	230 U	3,700 U	17,000 UJ	2.8 U	2.2 U	2.6 U	0.11 U
Aroclor-1262	NS	NS	NS	NS	130 U	50 U	230 U	3,700 U	17,000 UJ	2.8 U	2.2 U	2.6 U	0.11 U
Aroclor-1268	NS	NS	NS	NS	130 U	50 U	230 U	3,700 U	17,000 UJ	2.8 U	2.2 U	2.6 U	0.11 U
Total PCBs	< 0.1	0.1 - 1.0	> 1.0	3.2	**690**	**270**	**1,200**	**22,000**	**150,000 J**	**15**	**14**	**15**	**0.34**

Notes:

ft. bss - Feet below sediment surface.

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J - Estimated value.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

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PCBs - Polychlorinated Biphenyls.

Table 1
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Sediment (2016, 2017, and 2018)

				Sample Location:	CCSK-SE-23					CCSK-SE-24			CCSK-SE-25				
				Sample Depth (ft. bss):	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5
				Sample Date:	11/9/2017	11/9/2017	11/9/2017	09/25/2018	09/25/2018	11/9/2017	11/9/2017	11/9/2017	11/9/2017	11/9/2017	11/9/2017	09/25/2018	09/25/2018
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Aroclor-1016	NS	NS	NS	NS	0.54 U	10 U	12 U	2.5 U	0.56 U	0.14 U	0.15 U	0.16 U	0.46 UJ	0.12 U	1.1 U	0.29 U	0.23 U
Aroclor-1221	NS	NS	NS	NS	0.54 U	10 U	12 U	2.5 U	0.56 U	0.14 U	0.15 U	0.16 U	0.46 UJ	0.12 U	1.1 U	0.29 U	0.23 U
Aroclor-1232	NS	NS	NS	NS	0.54 U	10 U	12 U	2.5 U	**4.8**	0.14 U	0.15 U	0.16 U	0.46 UJ	0.12 U	1.1 U	0.29 U	0.23 U
Aroclor-1242	NS	NS	NS	NS	**3.2**	**65**	**72**	**3.6**	0.56 U	**0.36**	**0.11 J**	0.16 U	**1.9 J**	**0.79**	**6**	**2.2**	**1.9**
Aroclor-1248	NS	NS	NS	NS	0.54 U	10 U	12 U	2.5 U	0.56 U	0.14 U	0.15 U	0.16 U	0.46 UJ	0.12 U	1.1 U	0.29 U	0.23 U
Aroclor-1254	NS	NS	NS	NS	0.54 U	10 U	12 U	2.5 U	0.56 U	0.14 U	0.15 U	0.16 U	0.46 UJ	0.12 U	1.1 U	0.29 U	0.23 U
Aroclor-1260	NS	NS	NS	NS	0.54 U	10 U	12 U	2.5 U	0.56 U	0.14 U	0.15 U	0.16 U	0.46 UJ	0.12 U	1.1 U	0.29 U	0.23 U
Aroclor-1262	NS	NS	NS	NS	0.54 U	10 U	12 U	2.5 U	0.56 U	0.14 U	0.15 U	0.16 U	0.46 UJ	0.12 U	1.1 U	0.29 U	0.23 U
Aroclor-1268	NS	NS	NS	NS	0.54 U	10 U	12 U	2.5 U	0.56 U	0.14 U	0.15 U	0.16 U	0.46 UJ	0.12 U	1.1 U	0.29 U	0.23 U
Total PCBs	< 0.1	0.1 - 1.0	> 1.0	3.2	**3.2**	**65**	**72**	**3.6**	**4.8**	**0.36**	**0.11 J**	0.16 U	**1.9 J**	**0.79**	**6**	**2.2**	**1.9**

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

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PCBs - Polychlorinated Biphenyls.

Table 1
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Sediment (2016, 2017, and 2018)

				Sample Location:	CCSK-SE-26	CCSK-SE-27	CCSK-SE-28	CCSK-SE-29	CCSK-SE-30	CCSK-SE-31	CCSK-SE-32			CCSK-SE-33		
				Sample Depth (ft. bss):	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5
				Sample Date:	09/10/2018	09/10/2018	09/13/2018	09/10/2018	09/10/2018	09/10/2018	09/12/2018	09/12/2018	09/12/2018	09/13/2018	09/13/2018	09/13/2018
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Aroclor-1016	NS	NS	NS	NS	0.37 UJ	0.24 U	0.15 U	0.12 U	0.11 U	0.12 U	0.15 U	0.16 U	0.26 U	0.16 U	0.1 U	0.094 U
Aroclor-1221	NS	NS	NS	NS	0.37 UJ	0.24 U	0.15 U	0.12 U	0.11 U	0.12 U	0.15 U	0.16 U	0.26 U	0.16 U	0.1 U	0.094 U
Aroclor-1232	NS	NS	NS	NS	0.37 UJ	0.24 U	0.15 U	0.12 U	0.11 U	0.12 U	0.15 U	0.16 U	0.26 U	0.16 U	0.1 U	0.094 U
Aroclor-1242	NS	NS	NS	NS	0.37 UJ	0.24 U	0.15 U	**0.18**	**0.27**	**0.75**	**0.31**	**0.22**	**0.37**	**0.85**	**0.45**	**0.13**
Aroclor-1248	NS	NS	NS	NS	0.37 UJ	0.24 U	0.15 U	0.12 U	0.11 U	0.12 U	0.15 U	0.16 U	0.26 U	0.16 U	0.1 U	0.094 U
Aroclor-1254	NS	NS	NS	NS	0.37 UJ	0.24 U	0.15 U	0.12 U	0.11 U	**0.082 J**	**0.2 J**	**0.18**	**0.43**	0.16 U	0.1 U	0.094 U
Aroclor-1260	NS	NS	NS	NS	0.37 UJ	0.24 U	0.15 U	0.12 U	0.11 U	0.12 U	0.15 U	0.16 U	0.26 U	0.16 U	0.1 U	0.094 U
Aroclor-1262	NS	NS	NS	NS	0.37 UJ	0.24 U	0.15 U	0.12 U	0.11 U	0.12 U	0.15 U	0.16 U	0.26 U	0.16 U	0.1 U	0.094 U
Aroclor-1268	NS	NS	NS	NS	0.37 UJ	0.24 U	0.15 U	0.12 U	0.11 U	0.12 U	0.15 U	0.16 U	0.26 U	0.16 U	0.1 U	0.094 U
Total PCBs	< 0.1	0.1 - 1.0	> 1.0	3.2	0.37 UJ	0.24 U	0.15 U	**0.18**	**0.27**	**0.832 J**	**0.51 J**	**0.4**	**0.8**	**0.85**	**0.45**	**0.13**

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated non-detect.

Values in **bold** indicate the analyte was detected.

Shading indicates result above the corresponding SGV/SCO.

PCBs - Polychlorinated Biphenyls.

Table 1
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Sediment (2016, 2017, and 2018)

				Sample Location:	CCSK-SE-34			CCSK-SE-35			CCSK-SE-36			CCSK-SE-37		
				Sample Depth (ft. bss):	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5
				Sample Date:	09/11/2018	09/11/2018	09/11/2018	09/11/2018	09/11/2018	09/11/2018	09/11/2018	09/11/2018	09/11/2018	09/11/2018	09/11/2018	09/11/2018
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Aroclor-1016	NS	NS	NS	NS	1 U	0.65 U	0.54 U	0.24 U	0.36 U	0.12 U	0.58 UJ	1.8 U	2 U	0.14 U	0.14 U	0.14 U
Aroclor-1221	NS	NS	NS	NS	1 U	0.65 U	0.54 U	0.24 U	0.36 U	0.12 U	0.58 UJ	1.8 U	2 U	0.14 U	0.14 U	0.14 U
Aroclor-1232	NS	NS	NS	NS	1 U	0.65 U	0.54 U	0.24 U	0.36 U	0.12 U	0.58 UJ	1.8 U	2 U	0.14 U	0.14 U	0.14 U
Aroclor-1242	NS	NS	NS	NS	**6.5**	**3**	**1.8**	**1.7**	**2.1**	**0.85**	**4.3 J**	**5.8**	**5.4**	0.14 U	0.14 U	0.14 U
Aroclor-1248	NS	NS	NS	NS	1 U	0.65 U	0.54 U	0.24 U	0.36 U	0.12 U	0.58 UJ	1.8 U	2 U	0.14 U	0.14 U	0.14 U
Aroclor-1254	NS	NS	NS	NS	**0.49 J**	0.65 U	0.54 U	**0.11 J**	**0.17 J**	0.12 U	0.58 UJ	1.8 U	2 U	0.14 U	0.14 U	0.14 U
Aroclor-1260	NS	NS	NS	NS	1 U	0.65 U	0.54 U	0.24 U	0.36 U	0.12 U	0.58 UJ	1.8 U	2 U	0.14 U	0.14 U	0.14 U
Aroclor-1262	NS	NS	NS	NS	1 U	0.65 U	0.54 U	0.24 U	0.36 U	0.12 U	0.58 UJ	1.8 U	2 U	0.14 U	0.14 U	0.14 U
Aroclor-1268	NS	NS	NS	NS	1 U	0.65 U	0.54 U	0.24 U	0.36 U	0.12 U	0.58 UJ	1.8 U	2 U	0.14 U	0.14 U	0.14 U
Total PCBs	< 0.1	0.1 - 1.0	> 1.0	3.2	**6.99 J**	**3**	**1.8**	**1.81 J**	**2.27 J**	**0.85**	**4.3 J**	**5.8**	**5.4**	0.14 U	0.14 U	0.14 U

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated non-detect.

Values in **bold** indicate the analyte was detected.

Shading indicates result above the corresponding SGV/SCO.

PCBs - Polychlorinated Biphenyls.

Table 1
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Sediment (2016, 2017, and 2018)

				Sample Location:	CCSK-SE-39			CCSK-SE-40			CCSK-SE-41			CCSK-SE-42		
				Sample Depth (ft. bss):	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5
				Sample Date:	09/12/2018	09/12/2018	09/12/2018	09/12/2018	09/12/2018	09/12/2018	09/13/2018	09/13/2018	09/13/2018	09/13/2018	09/13/2018	09/13/2018
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Aroclor-1016	NS	NS	NS	NS	0.79 U	0.12 U	0.1 U	0.15 U	0.11 U	0.1 U	0.14 U	0.12 U	0.098 U	0.16 U	0.12 U	0.12 U
Aroclor-1221	NS	NS	NS	NS	0.79 U	0.12 U	0.1 U	0.15 U	0.11 U	0.1 U	0.14 U	0.12 U	0.098 U	0.16 U	0.12 U	0.12 U
Aroclor-1232	NS	NS	NS	NS	0.79 U	0.12 U	0.1 U	0.15 U	0.11 U	0.1 U	0.14 U	0.12 U	0.098 U	0.16 U	0.12 U	0.12 U
Aroclor-1242	NS	NS	NS	NS	**3.4**	**0.93**	**0.39**	**0.31**	**0.13**	**0.38**	**0.5**	**0.23**	**0.51**	**1**	**1.2**	**0.67**
Aroclor-1248	NS	NS	NS	NS	0.79 U	0.12 U	0.1 U	0.15 U	0.11 U	0.1 U	0.14 U	0.12 U	0.098 U	0.16 U	0.12 U	0.12 U
Aroclor-1254	NS	NS	NS	NS	**0.61 J**	0.12 U	0.1 U	**0.094 J**	0.11 U	0.1 U	0.14 U	0.12 U	0.098 U	0.16 U	0.12 U	0.12 U
Aroclor-1260	NS	NS	NS	NS	0.79 U	0.12 U	0.1 U	0.15 U	0.11 U	0.1 U	0.14 U	0.12 U	0.098 U	0.16 U	0.12 U	0.12 U
Aroclor-1262	NS	NS	NS	NS	0.79 U	0.12 U	0.1 U	0.15 U	0.11 U	0.1 U	0.14 U	0.12 U	0.098 U	0.16 U	0.12 U	0.12 U
Aroclor-1268	NS	NS	NS	NS	0.79 U	0.12 U	0.1 U	0.15 U	0.11 U	0.1 U	0.14 U	0.12 U	0.098 U	0.16 U	0.12 U	0.12 U
Total PCBs	< 0.1	0.1 - 1.0	> 1.0	3.2	**4.01 J**	**0.93**	**0.39**	**0.404 J**	**0.13**	**0.38**	**0.5**	**0.23**	**0.51**	**1**	**1.2**	**0.67**

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated non-detect.

Values in **bold** indicate the analyte was detected.

Shading indicates result above the corresponding SGV/SCO.

PCBs - Polychlorinated Biphenyls.

Table 1
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Sediment (2016, 2017, and 2018)

				Sample Location:	CCSK-SE-43			CCSK-SE-44			CCSK-SE-45		CCSK-SE-50	CCSK-SE-51	CCSK-SE-52
				Sample Depth (ft. bss):	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	0.0 - 0.5	0.5 - 1.0	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5
				Sample Date:	09/13/2018	09/13/2018	09/13/2018	09/13/2018	09/13/2018	09/13/2018	09/12/2018	09/12/2018	09/26/2018	09/26/2018	09/26/2018
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Aroclor-1016	NS	NS	NS	NS	0.27 UJ	0.19 U	0.11 U	0.15 U	0.2 U	0.18 U	0.11 U	0.1 U	0.13 U	0.13 U	0.11 U
Aroclor-1221	NS	NS	NS	NS	0.27 UJ	0.19 U	0.11 U	0.15 U	0.2 U	0.18 U	0.11 U	0.1 U	0.13 U	0.13 U	0.11 U
Aroclor-1232	NS	NS	NS	NS	0.27 UJ	0.19 U	0.11 U	0.15 U	0.2 U	0.18 U	0.11 U	0.1 U	0.13 U	0.13 U	0.11 U
Aroclor-1242	NS	NS	NS	NS	**0.76 J**	**0.2**	0.11 U	**0.85**	**1.3**	**0.17 J**	**0.096 J**	**0.13**	**0.17**	**0.14**	**0.37**
Aroclor-1248	NS	NS	NS	NS	0.27 UJ	0.19 U	0.11 U	0.15 U	0.2 U	0.18 U	0.11 U	0.1 U	0.13 U	0.13 U	0.11 U
Aroclor-1254	NS	NS	NS	NS	0.27 UJ	0.19 U	0.11 U	0.15 U	0.2 U	0.18 U	**0.049 J**	0.1 U	0.13 U	0.13 U	0.11 U
Aroclor-1260	NS	NS	NS	NS	0.27 UJ	0.19 U	0.11 U	0.15 U	0.2 U	0.18 U	0.11 U	0.1 U	0.13 U	0.13 U	0.11 U
Aroclor-1262	NS	NS	NS	NS	0.27 UJ	0.19 U	0.11 U	0.15 U	0.2 U	0.18 U	0.11 U	0.1 U	0.13 U	0.13 U	0.11 U
Aroclor-1268	NS	NS	NS	NS	0.27 UJ	0.19 U	0.11 U	0.15 U	0.2 U	0.18 U	0.11 U	0.1 U	0.13 U	0.13 U	0.11 U
Total PCBs	< 0.1	0.1 - 1.0	> 1.0	3.2	**0.76 J**	**0.2**	0.11 U	**0.85**	**1.3**	**0.17 J**	**0.145 J**	**0.13**	**0.17**	**0.14**	**0.37**

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated non-detect.

Values in **bold** indicate the analyte was detected.

Shading indicates result above the corresponding SGV/SCO.

PCBs - Polychlorinated Biphenyls.

Table 2
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for Volatile Organic Compounds in Sediment (2018)

				Sample Location:	CCSK-SE-33		CCSK-SE-42	
				Sample Depth (ft. bss):	0.0 - 0.5		0.0 - 0.5	
				Sample Date:	09/13/2018		09/13/2018	
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Protection of Groundwater SCO[(2)] (mg/kg)**	**Results (mg/kg)**		**Results (mg/kg)**	
Acetone	NS	NS	NS	0.05	0.13	U	0.16	U
Benzene	< 0.53	0.53 - 1.9	> 1.9	0.06	0.0027	U	0.0032	U
Bromochloromethane	NS	NS	NS	NS	0.0027	U	0.0032	U
Bromodichloromethane	NS	NS	NS	NS	0.0027	U	0.0032	U
Bromoform	NS	NS	NS	NS	0.0027	U	0.0032	U
Bromomethane	NS	NS	NS	NS	0.013	UJ	0.016	U
2-Butanone (MEK)	NS	NS	NS	0.12	0.054	U	0.064	U
Carbon disulfide	NS	NS	NS	NS	0.008	U	0.0095	U
Carbon tetrachloride	< 1.07	1.07 - 9.6	> 9.6	0.76	0.0027	U	0.0032	U
Chlorobenzene	< 0.2	0.2 - 1.7	> 1.7	1.1	0.0027	U	0.0032	U
Dibromochloromethane	NS	NS	NS	NS	0.0013	U	0.0016	U
Chloroethane	NS	NS	NS	NS	0.027	U	0.032	U
Chloroform	NS	NS	NS	0.37	0.0054	U	0.0064	U
Chloromethane	NS	NS	NS	NS	0.013	U	0.016	U
Cyclohexane	NS	NS	NS	NS	0.0027	U	0.0032	U
1,2-Dibromo-3-chloropropane	NS	NS	NS	NS	0.0027	U	0.0032	U
1,2-Dibromoethane (Ethylene dibromide)	NS	NS	NS	NS	0.0013	U	0.0016	U
1,2-Dichlorobenzene	< 0.28	0.28 - 2.5	2.5	1.1	0.0027	U	0.0032	U
1,3-Dichlorobenzene	< 1.8	1.8 - 7.1	> 7.1	2.4	0.0027	U	0.0032	U
1,4-Dichlorobenzene	< 0.72	0.72 - 3.3	> 3.3	1.8	0.0027	U	0.0032	U
Dichlorodifluoromethane	NS	NS	NS	NS	0.027	U	0.032	U
1,1-Dichloroethane	NS	NS	NS	0.27	0.0027	U	0.0032	U
1,2-Dichloroethane	NS	NS	NS	0.02	0.0027	U	0.0032	U
1,1-Dichloroethene	< 0.52	0.52 - 4.7	> 4.7	0.33	0.0054	U	0.0064	U
cis-1,2-Dichloroethene	NS	NS	NS	0.25	0.0027	U	0.0032	U
trans-1,2-Dichloroethene	< 1.2	1.2 - 11	> 11	0.19	0.0027	U	0.0032	U
1,2-Dichloropropane	NS	NS	NS	NS	0.0027	U	0.0032	U
cis-1,3-Dichloropropene	NS	NS	NS	NS	0.0013	U	0.0016	U
trans-1,3-Dichloropropene	NS	NS	NS	NS	0.0013	U	0.0016	U
1,4-Dioxane	NS	NS	NS	0.1		R		R
Ethylbenzene	< 0.43	0.43 - 3.7	> 3.7	1	0.0027	U	0.0032	U
2-Hexanone	NS	NS	NS	NS	0.027	U	0.032	U
Isopropylbenzene	< 0.21	0.21 - 1.8	> 1.8	NS	0.0027	U	0.0032	U
Methyl acetate	NS	NS	NS	NS	0.0027	UJ	0.0032	UJ
Methyl tert-butyl ether	NS	NS	NS	0.93	0.0054	U	0.0064	U
Methylcyclohexane	NS	NS	NS	NS	0.0027	U	0.0032	U
Methylene chloride	NS	NS	NS	0.05	0.027	U	0.032	U
4-Methyl-2-pentanone	NS	NS	NS	NS	0.027	U	0.032	U
Styrene	NS	NS	NS	NS	0.0027	U	0.0032	U
1,1,2,2-Tetrachloroethane	< 2.8	2.8 - 5.4	> 5.4	NS	0.0013	U	0.0016	U
Tetrachloroethene	< 16	16 - 57	> 57	1.3	0.0027	U	0.0032	U
Toluene	< 0.93	0.93 - 4.5	> 4.5	0.7	0.0027	U	0.0032	U
1,2,3-Trichlorobenzene	< 0.23	0.23 - 2.8	> 2.8	NS	0.0027	UJ	0.0032	U
1,2,4-Trichlorobenzene	< 35	35 - 55	> 55	NS	0.0027	U	0.0032	U
1,1,1-Trichloroethane	< 1.9[(a)]	1.9 - 3.5[(a)]	> 3.5[(a)]	0.68	0.0027	U	0.0032	U
1,1,2-Trichloroethane	< 1.9[(a)]	1.9 - 3.5[(a)]	> 3.5[(a)]	NS	0.0027	U	0.0032	U
Trichloroethene	< 1.8	1.8 - 8.6	> 8.6	0.47	0.0027	U	0.0032	U
Trichlorofluoromethane	NS	NS	NS	NS	0.013	UJ	0.016	UJ
1,1,2-Trichloro- 1,2,2-trifluoroethane (Freon 113)	NS	NS	NS	NS	0.013	U	0.016	U
Vinyl chloride	NS	NS	NS	0.02	0.013	U	0.016	U
m,p-Xylene	< 480	480 - 4,200	> 4,200	1.6[(b)]	0.0054	U	0.0064	U
o-Xylene	< 820	820 - 7,200	> 7,240	1.6[(b)]	0.0027	U	0.0032	U

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

R - Rejected data point during data validation.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated nondetect.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

(a) - Criteria applicable to the sum of the trichloroethane isomers.

(b) - Criteria applicable to the sum of xylene isomers.

Table 3
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for Semi-Volatile Organic Compounds in Sediment (2018)

				Sample Location:	CCSK-SE-33		CCSK-SE-42	
				Sample Depth (ft. bss):	0.0 - 0.5		0.0 - 0.5	
				Sample Date:	09/13/2018		09/13/2018	
Analytes	**Class A SGV[1] (mg/kg)**	**Class B SGV[1] (mg/kg)**	**Class C SGV[1] (mg/kg)**	**Protection of Groundwater SCO[2] (mg/kg)**	**Results (mg/kg)**		**Results (mg/kg)**	
Atrazine	NS	NS	NS	NS	1.3	U	1.4	U
Benzaldehyde	NS	NS	NS	NS	0.66	UJ	0.69	UJ
1,1'-Biphenyl	NS	NS	NS	NS	1.3	U	1.4	U
Caprolactam	NS	NS	NS	NS	0.66	UJ	0.69	UJ
Acenaphthene	NS	NS	NS	98	0.33	U	0.34	U
Acenaphthylene	NS	NS	NS	107	0.33	U	0.34	U
Acetophenone	NS	NS	NS	NS	0.66	U	0.69	U
Anthracene	NS	NS	NS	1000	0.33	U	0.34	U
Benzo(a)anthracene	NS	NS	NS	1	**0.49**		**0.3**	**J**
Benzo(a)pyrene	NS	NS	NS	22	**0.44**		**0.29**	**J**
Benzo(b)fluoranthene	NS	NS	NS	1.7	**0.73**		**0.35**	
Benzo(g,h,i)perylene	NS	NS	NS	1000	**0.27**	**J**	**0.19**	**J**
Benzo(k)fluoranthene	NS	NS	NS	1.7	**0.26**	**J**	**0.13**	**J**
Bis(2-chloroethoxy)methane	NS	NS	NS	NS	0.66	U	0.69	U
Bis(2-chloroethyl) ether	NS	NS	NS	NS	0.66	U	0.69	U
2,2'-Oxybis(1-chloropropane)	NS	NS	NS	NS	0.66	U	0.69	U
Bis(2-ethylhexyl)phthalate	< 360	> 360	NS	NS	0.66	U	0.69	U
4-Bromophenyl-phenylether	NS	NS	NS	NS	0.66	U	0.69	U
Butylbenzylphthalate	NS	NS	NS	NS	0.66	U	0.69	U
Carbazole	NS	NS	NS	NS	0.33	U	0.34	U
4-Chloroaniline	NS	NS	NS	NS	1.3	UJ	1.3	U
4-Chloro-3-methylphenol	NS	NS	NS	NS	1.3	U	1.3	U
2-Chloronaphthalene	NS	NS	NS	NS	0.66	U	0.69	U
2-Chlorophenol	NS	NS	NS	NS	0.66	U	0.69	U
4-Chlorophenyl-phenyl ether	NS	NS	NS	NS	0.66	U	0.69	U
Chrysene	NS	NS	NS	1	**0.63**		**0.28**	**J**
Dibenz(a,h)anthracene	NS	NS	NS	1000	0.33	U	0.34	U
Dibenzofuran	NS	NS	NS	210	**0.15**	**J**	0.69	U
Di-n-butylphthalate	NS	NS	NS	NS	0.66	U	0.69	U
3,3'-Dichlorobenzidine	NS	NS	NS	NS	0.33	U	0.34	U
2,4-Dichlorophenol	NS	NS	NS	NS	0.66	U	0.69	U
Diethyl phthalate	NS	NS	NS	NS	0.66	U	0.69	U
2,4-Dimethylphenol	NS	NS	NS	NS	0.66	U	0.69	U
Dimethylphthalate	NS	NS	NS	NS	0.66	U	0.69	U
4,6-Dinitro-2-methylphenol	NS	NS	NS	NS	0.66	U	0.69	U
2,4-Dinitrophenol	NS	NS	NS	NS	1.3	UJ	1.3	UJ
2,4-Dinitrotoluene	NS	NS	NS	NS	0.66	U	0.69	U
2,6-Dinitrotoluene	NS	NS	NS	NS	0.66	U	0.69	U
Di-n-octylphthalate	NS	NS	NS	NS	0.66	U	0.69	U
Fluoranthene	NS	NS	NS	1000	**0.88**		**0.56**	
Fluorene	NS	NS	NS	386	0.33	U	0.34	U
Hexachlorobenzene	NS	NS	NS	3.2	0.66	U	0.69	U
Hexachlorobutadiene	< 1.2	1.2 - 12	> 12	NS	0.66	U	0.69	U
Hexachlorocyclopentadiene	< 0.81	0.81 - 8.1	> 8.1	NS	0.66	UJ	0.69	U
Hexachloroethane	NS	NS	NS	NS	0.66	U	0.69	U
Indeno(1,2,3-cd)pyrene	NS	NS	NS	8.2	**0.32**	**J**	0.34	U
Isophorone	NS	NS	NS	NS	0.66	U	0.69	U
2-Methylnaphthalene	NS	NS	NS	NS	**0.31**	**J**	0.34	U
2-Methylphenol	NS	NS	NS	0.33	0.66	U	0.69	U
3,4-Methylphenol	NS	NS	NS	NS	0.66	U	0.69	U
Naphthalene	NS	NS	NS	12	**0.2**	**J**	0.34	U
Nitrobenzene	NS	NS	NS	NS	0.66	U	0.69	U
2-Nitroaniline	NS	NS	NS	NS	0.66	U	0.69	U
3-Nitroaniline	NS	NS	NS	NS	0.66	U	0.69	U
4-Nitroaniline	NS	NS	NS	NS	0.66	U	0.69	U
2-Nitrophenol	NS	NS	NS	NS	0.66	U	0.69	U
4-Nitrophenol	NS	NS	NS	NS	1.3	U	1.3	U
N-Nitrosodiphenylamine	NS	NS	NS	NS	0.66	U	0.69	U
n-Nitroso-di-n-propylamine	NS	NS	NS	NS	0.66	U	0.69	U
Pentachlorophenol	< 14	14 - 19	> 19	0.8	0.66	U	0.69	U
Phenanthrene	NS	NS	NS	1000	**0.4**		**0.33**	**J**
Phenol	NS	NS	NS	0.33	0.66	U	0.69	U
Pyrene	NS	NS	NS	1000	**0.85**		**0.47**	
1,2,4,5-Tetrachlorobenzene	< 3	3 - 14	> 14	NS	0.66	U	0.69	U
2,4,5-Trichlorophenol	NS	NS	NS	NS	0.66	U	0.69	U
2,4,6-Trichlorophenol	NS	NS	NS	NS	0.66	U	0.69	U

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated nondetect.

NS - No NYSDEC standard exists for this analyte.

[1] - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

[2] - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

Values in **bold** indicate the analyte was detected.

Table 4
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for Pesticides and Metals in Sediment (2018)

			Sample Location:	CCSK-SE-33	CCSK-SE-42
			Sample Depth (ft. bss):	0.0 - 0.5	0.0 - 0.5
			Sample Date:	09/13/2018	09/13/2018
Analytes	**Class A SGV[(1)] (mg/kg)**	**Class B SGV[(1)] (mg/kg)**	**Class C SGV[(1)] (mg/kg)**	**Results (mg/kg)**	**Results (mg/kg)**
Pesticides					
alpha-Chlordane	< 0.068[(a)]	0.068 - 38[(a)]	> 38[(a)]	0.047 U	0.0097 U
trans-Chlordane	< 0.068[(a)]	0.068 - 38[(a)]	> 38[(a)]	0.047 U	0.0097 U
Alachlor	NS	NS	NS	0.19 U	0.039 U
Aldrin	NS	NS	NS	0.047 U	0.0097 U
alpha-BHC	NS	NS	NS	0.047 U	0.0097 U
beta-BHC	NS	NS	NS	0.047 U	0.0097 U
delta-BHC	NS	NS	NS	0.047 U	0.0097 U
gamma-BHC (Lindane)	< 0.047	0.047 - 0.078	> 0.078	0.019 U	0.0039 U
4,4'-DDD	NS	NS	NS	0.037 U	0.0078 U
4,4'-DDE	NS	NS	NS	0.037 U	0.0078 U
4,4'-DDT	< 0.044	0.044 - 48	> 48	0.037 U	0.0078 U
Dieldrin	< 0.18	0.18 - 0.78	> 0.78	0.037 U	0.0078 U
Endosulfan I	< 0.001[(b)]	0.001 - 0.02[(b)]	> 0.02[(b)]	0.047 U	0.0097 U
Endosulfan II	< 0.001[(b)]	0.001 - 0.02[(b)]	> 0.02[(b)]	0.074 U	0.016 U
Endosulfan sulfate	< 0.001[(b)]	0.001 - 0.02[(b)]	> 0.02[(b)]	0.074 U	0.016 U
Endrin	< 0.09	0.09 - 0.22	> 0.22	0.074 U	0.016 U
Endrin aldehyde	NS	NS	NS	0.074 U	0.016 U
Endrin ketone	NS	NS	NS	0.074 U	0.016 U
Heptachlor	< 0.075	0.075 - 10	> 10	0.047 U	0.0097 U
Heptachlor epoxide	< 0.015	0.015 - 2.1	> 2.1	0.047 U	0.0097 U
Methoxychlor	< 0.059	> 0.059	NS	0.47 U	0.097 U
Toxaphene	< 0.006	0.006 - 0.25	> 0.25	0.93 U	0.19 U
Metals, total					
Aluminum	NS	NS	NS	**12,000**	**18,000**
Antimony	NS	NS	NS	3.2 UJ	3.4 UJ
Arsenic	< 10	10 - 33	> 33	**9.2**	**3.7**
Barium	NS	NS	NS	**91**	**110**
Beryllium	NS	NS	NS	**0.49**	**0.72**
Cadmium	< 1	1 - 5	> 5	**0.4**	**0.39**
Calcium	NS	NS	NS	**9,000**	**6,700**
Chromium	< 43	43 - 110	> 110	**16**	**21**
Cobalt	NS	NS	NS	**9.2**	**10**
Copper	< 32	32 - 150	> 150	**24**	**32**
Iron	NS	NS	NS	**22,000**	**27,000**
Lead	< 36	36 - 130	> 130	**19**	**28**
Magnesium	NS	NS	NS	**11,000**	**9,900**
Manganese	NS	NS	NS	**290**	**500**
Mercury	< 0.2	0.2 - 1	>1	**0.033 J**	**0.065**
Nickel	< 23	23 - 49	> 49	**17**	**23**
Potassium	NS	NS	NS	**1,300**	**1,400**
Selenium	NS	NS	NS	6.5 U	6.8 U
Silver	< 1	1 - 2.2	> 2.2	0.65 U	0.68 U
Sodium	NS	NS	NS	**1,100**	**830**
Thallium	NS	NS	NS	3.2 U	3.4 U
Vanadium	NS	NS	NS	**20**	**24**
Zinc	< 120	120 - 460	> 460	**59**	**85**
General Chemistry					
Cyanide	NS	NS	NS	0.79 UJ	**0.5 J**

Notes:

ft. bss - Feet below sediment surface.

mg/kg - Milligrams per kilogram.

J - Estimated value.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated nondetect.

NS - No NYSDEC standard exists for this analyte.

(1) - Sediment Guidance Values (SGVs) from NYSDEC "Screening and Assessment of Contaminated Sediment".

(2) - Soil Cleanup Objectives (SCOs) from Title 6 New York Codes, Rules, and Regulations Part 375 (6NYCRR375) and Supplemental SCOs from CP-51 / NYSDEC Soil Cleanup Guidance.

Values in **bold** indicate the analyte was detected.

Shading indicates result above the corresponding SGV/SCO.

(a) - Criteria for Chlordane (alpha) used.

(b) - Criteria applicable to the sum of endosulfan I, endosulfan II and endosulfan sulfate.

(c) - Criteria for Chromium (VI) used.

Table 5
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for Per- and Polyfluoroalkyl Substances in Sediment (2018)

	Sample Location:	CCSK-SE-33	CCSK-SE-42
	Sample Depth (ft. bss):	0.0 - 0.5	0.0 - 0.5
	Sample Date:	09/26/2018	09/26/2018
Analyte		**Results (ug/kg)**	**Results (ug/kg)**
Perfluorobutanesulfonic acid (PFBS)		0.002 U	0.0019 U
Perfluorohexanoic acid (PFHxA)		0.002 U	0.0019 U
Perfluoroheptanoic acid (PFHpA)		0.002 U	0.0019 U
Perfluorobutanoic acid (PFBA)		0.002 U	0.0019 U
Perfluorodecanesulfonic acid (PFDS)		0.002 U	0.0019 U
Perfluoroheptanesulfonic acid (PFHpS)		0.002 U	0.0019 U
Perfluorooctane Sulfonamide (PFOSA)		0.002 U	0.0019 U
Perfluoropentanoic acid (PFPeA)		0.002 U	0.0019 U
6:2 Perfluorooctane Sulfonate (6:2 FTS)		0.002 U	0.0019 U
8:2 Perfluorodecane Sulfonate (8:2 FTS)		0.002 U	0.0019 U
Perfluorohexanesulfonic acid (PFHxS)		0.002 U	0.0019 U
Perfluorooctanoic acid (PFOA)		0.002 U	0.0019 U
Perfluorooctanesulfonic acid (PFOS)		0.002 U	0.0019 U
Perfluorononanoic acid (PFNA)		0.002 U	0.0019 U
Perfluorodecanoic acid (PFDA)		0.002 U	0.0019 U
2-(N-methyl perfluorooctanesulfonamido) acetic acid (N-MeFOSAA)		0.002 U	0.0019 U
Perfluoroundecanoic acid (PFUnA)		0.002 U	0.0019 U
N-Ethyl-N-((heptadecafluorooctyl)sulphonyl) glycine (N-EtFOSAA)		0.002 U	0.0019 U
Perfluorododecanoic acid (PFDoA)		0.002 U	0.0019 U
Perfluorotridecanoic acid (PFTriA)		0.002 U	0.0019 U
Perfluorotetradecanoic acid (PFTeA)		0.002 UJ	0.0019 U
PFOA + PFOS		0.002 U	0.0019 U

Notes:

ft. bss - Feet below sediment surface.

ug/kg - Micrograms per kilogram.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated non-detect.

No standards, criteria or guidance (SCG) values are currently available for PFAS in sediment under the NYSDEC Inactive Hazardous Waste Disposal Site remedial program.

PFAS - Per- and polyfluoroalkyl Substances.

Table 6
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for Volatile Organic Compounds in Groundwater (2018)

	Sample Location:	CCSK-MW-1A	CCSK-MW-1B	CCSK-MW-3A	CCSK-MW-3B	CCSK-MW-5A	CCSK-MW-5B	CCSK-MW-20A	CCSK-MW-20B
	Sample Date:	09/28/2018	09/28/2018	09/27/2018	09/27/2018	09/28/2018	09/28/2018	09/28/2018	09/28/2018
Analytes	**Class GA Value* (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**
Acetone	50	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ
Benzene	1	1 U	1 U	1 U	1 U	1 U	**0.91 J**	**0.4 J**	1 U
Bromochloromethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	50	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Bromomethane	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
2-Butanone (MEK)	50	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Carbon disulfide	60	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Carbon tetrachloride	5	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Chlorobenzene	5	1 U	1 U	1 U	1 U	**0.45 J**	**3.8**	1 U	1 U
Dibromochloromethane	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Chloroform	7	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Chloromethane	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Cyclohexane	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	0.04	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane (Ethylene dibromide)	0.0006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	**0.69 J**	1 U	1 U
1,3-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	**1.1**	1 U	1 U
Dichlorodifluoromethane	5	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
1,1-Dichloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	**0.86 J**	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U	1 U	**0.36 J**	**0.69 J**	**0.51 J**
trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	0.4[a]	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	0.4[a]	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isopropylbenzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl acetate	NS	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Methyl tert-butyl ether	10	1 U	1 U	**0.72 J**	**0.57 J**	1 U	**0.12 J**	1 U	1 U
Methylcyclohexane	NS	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	NS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	5	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
1,1,2-Trichloro- 1,2,2-trifluoroethane (Freon 113)	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	2	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
m,p-Xylene	5[b]	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
o-Xylene	5[b]	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Notes:

ug/L - Micrograms per liter.

J - Estimated value.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated non-detect.

* - NYSDEC Ambient Water Quality Standards and Guidance Values for Class GA water.

NS - No NYSDEC standard exists for this analyte.

Values in **bold** indicate the analyte was detected.

[a] - criteria applicable to the sum of the cis and trans isomers.

[b] - criteria applicable to xylene (total), the sum of the xylene isomers.

Table 7
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for Semi-Volatile Organic Compounds in Groundwater (2018)

	Sample Location:	CCSK-MW-1A	CCSK-MW-1B	CCSK-MW-3A	CCSK-MW-3B	CCSK-MW-5A	CCSK-MW-5B	CCSK-MW-20A	CCSK-MW-20B
	Sample Date:	09/28/2018	09/28/2018	09/27/2018	09/27/2018	09/28/2018	09/28/2018	09/28/2018	09/28/2018
Analytes	**Class GA Value* (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**
Atrazine	7.5	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzaldehyde	NS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1'-Biphenyl	5	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Caprolactam	NS	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Acenaphthene	20	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acenaphthylene	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetophenone	NS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(a)anthracene	0.002	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(a)pyrene	ND	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(b)fluoranthene	0.002	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(g,h,i)perylene	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(k)fluoranthene	0.002	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bis(2-chloroethoxy)methane	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-chloroethyl) ether	1	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-Oxybis(1-chloropropane)	5	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Bis(2-ethylhexyl)phthalate	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	NS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	NS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	1[(a)]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	1[(a)]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenyl ether	NS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	0.002	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibenz(a,h)anthracene	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibenzofuran	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Di-n-butylphthalate	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	5	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
2,4-Dichlorophenol	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethyl phthalate	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dimethylphthalate	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,6-Dinitro-2-methylphenol	1[(a)]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	5	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
2,6-Dinitrotoluene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-octylphthalate	NS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

Table 7
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for Semi-Volatile Organic Compounds in Groundwater (2018)

	Sample Location:	CCSK-MW-1A	CCSK-MW-1B	CCSK-MW-3A	CCSK-MW-3B	CCSK-MW-5A	CCSK-MW-5B	CCSK-MW-20A	CCSK-MW-20B
	Sample Date:	09/28/2018	09/28/2018	09/27/2018	09/27/2018	09/28/2018	09/28/2018	09/28/2018	09/28/2018
Analytes	**Class GA Value* (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**
Fluoranthene	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Fluorene	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorobenzene	0.04	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	0.5	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Hexachlorocyclopentadiene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	0.002	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Isophorone	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Methylphenol	1[(a)]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,4-Methylphenol	1[(a)]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Nitrobenzene	0.4	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	1[(a)]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitrophenol	1[(a)]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
n-Nitroso-di-n-propylamine	NS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	1[(a)]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenanthrene	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Phenol	1[(a)]	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
Pyrene	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4,5-Tetrachlorobenzene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	1[(a)]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	1[(a)]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dioxane	1[(b)]	0.2 U	0.2 U	**0.22**	0.19 U	**0.28**	**1**	**0.54**	**0.46**

Notes:

ug/L - Micrograms per liter.

J - Estimated value.

U - Analyte was not detected at specified quantitation limit.

UJ - Estimated non-detect.

* - NYSDEC Ambient Water Quality Standards and Guidance Values for Class GA water (with exception of 1,4-dioxane - see note [(b)] below)

ND - A non-detectable concentration by the approved analytical method specified in Section 700.3 of the NYCRR Water Quality Regulations.

NS - No NYSDEC standard exists for this analyte.

Values in **bold** indicate the analyte was detected.

[(a)] - Criteria applicable to total phenolics.

[(b)] - New York Codes, Rules and Regulations, Title 10, Chapter I, Part 5, Subpart 5-1: Public Water Systems, Maximum Contaminant Level

Table 8
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for PCBs in Groundwater (2018)

	Sample Location:	CCSK-MW-1A	CCSK-MW-1B	CCSK-MW-3A	CCSK-MW-3B	CCSK-MW-5A	CCSK-MW-5B	CCSK-MW-20A	CCSK-MW-20B
	Sample Date:	09/28/2018	09/28/2018	09/27/2018	09/27/2018	09/28/2018	09/28/2018	09/28/2018	09/28/2018
Analytes	**Class GA Value* (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**	**Results (ug/L)**
Aroclor-1016	NS	0.2 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Aroclor-1221	NS	0.2 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Aroclor-1232	NS	0.2 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Aroclor-1242	NS	0.2 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Aroclor-1248	NS	0.2 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Aroclor-1254	NS	0.2 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Aroclor-1260	NS	0.2 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Aroclor-1262	NS	0.2 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Aroclor-1268	NS	0.2 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
PCBs, Total	0.09	0.2 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Notes:

ug/L - Micrograms per liter.

U - Analyte was not detected at specified quantitation limit.

* - NYSDEC Ambient Water Quality Standards and Guidance Values for Class GA water.

NS - No NYSDEC standard exists for this analyte.

PCBs - Polychlorinated biphenyls.

Table 9
New York State Department of Environmental Conservation
Cross-County Sanitary / Kessman Landfill, Site No. 340011
Summary of Results of Analysis for Per- and Polyfluoroalkyl Substances in Groundwater (2018)

	Sample Location:	CCSK-MW-1A	CCSK-MW-1B	CCSK-MW-3A	CCSK-MW-3B	CCSK-MW-5A	CCSK-MW-5B	CCSK-MW-20A	CCSK-MW-20B
	Sample Date:	09/28/2018	09/28/2018	09/27/2018	09/27/2018	09/28/2018	09/28/2018	09/28/2018	09/28/2018
Analytes	**Screening Level* (ng/L)**	**Results (ng/L)**	**Results (ng/L)**	**Results (ng/L)**	**Results (ng/L)**	**Results (ng/L)**	**Results (ng/L)**	**Results (ng/L)**	**Results (ng/L)**
Perfluorobutanesulfonic acid (PFBS)	100	2 U	2 U	2 U	2 U	**5.1**	**3.9**	**2.8**	**2**
Perfluorohexanoic acid (PFHxA)	100	2 U	2 U	**5.7**	**4.3**	**7**	**11**	**8.9**	**7.7**
Perfluoroheptanoic acid (PFHpA)	100	2 U	2 U	**2.1**	**2.2**	**5.6**	**10**	**5.7**	**4.7**
Perfluorobutanoic acid (PFBA)	100	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	**2.3 J-**	2 UJ	**2.1 J-**
Perfluorodecanesulfonic acid (PFDS)	100	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Perfluoroheptanesulfonic acid (PFHpS)	100	2 U	2 U	2 U	2 U	**2**	**3.2**	2 U	2 U
Perfluorooctane Sulfonamide (PFOSA)	100	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
Perfluoropentanoic acid (PFPeA)	100	**3**	**2.3**	**4.9**	**7.5**	**6.1**	**13**	**4.7**	**4.6**
6:2 Perfluorooctane Sulfonate (6:2 FTS)	100	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 U	2 U
8:2 Perfluorodecane Sulfonate (8:2 FTS)	100	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 U	2 U
Perfluorohexanesulfonic acid (PFHxS)	100	2 U	2 U	2 U	**3**	**6.4**	**7.8**	**7.9**	**4.6**
Perfluorooctanoic acid (PFOA)	10	2 U	**2.5**	2 U	**5.9**	**36**	**64**	**28**	**26**
Perfluorooctanesulfonic acid (PFOS)	10	2 U	**2.6**	2 U	**2.6**	**87**	**100**	**35**	**36**
Perfluorononanoic acid (PFNA)	100	2 U	2 U	2 U	2 U	**6.7**	**20**	**2.2**	2 U
Perfluorodecanoic acid (PFDA)	100	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
2-(N-methyl perfluorooctanesulfonamido) acetic acid (N-MeFOSAA)	100	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Perfluoroundecanoic acid (PFUnA)	100	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
N-Ethyl-N-((heptadecafluorooctyl)sulphonyl) glycine (N-EtFOSAA)	100	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Perfluorododecanoic acid (PFDoA)	100	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Perfluorotridecanoic acid (PFTriA)	100	2 U	2 U	2 U	2 UJ	2 U	2 U	2 U	2 U
Perfluorotetradecanoic acid (PFTeA)	100	2 U	2 U	2 U	2 UJ	2 U	2 U	2 U	2 U
Total PFAS	500	**3**	**7.4**	**12.7**	**25.5**	**161.9**	**235.2**	**95.2**	**87.7**

Notes:

ng/L - Nanograms per liter.

U - Analyte was not detected at specified quantitation limit.

J- - Estimated value, biased low.

UJ - Estimated non-detect.

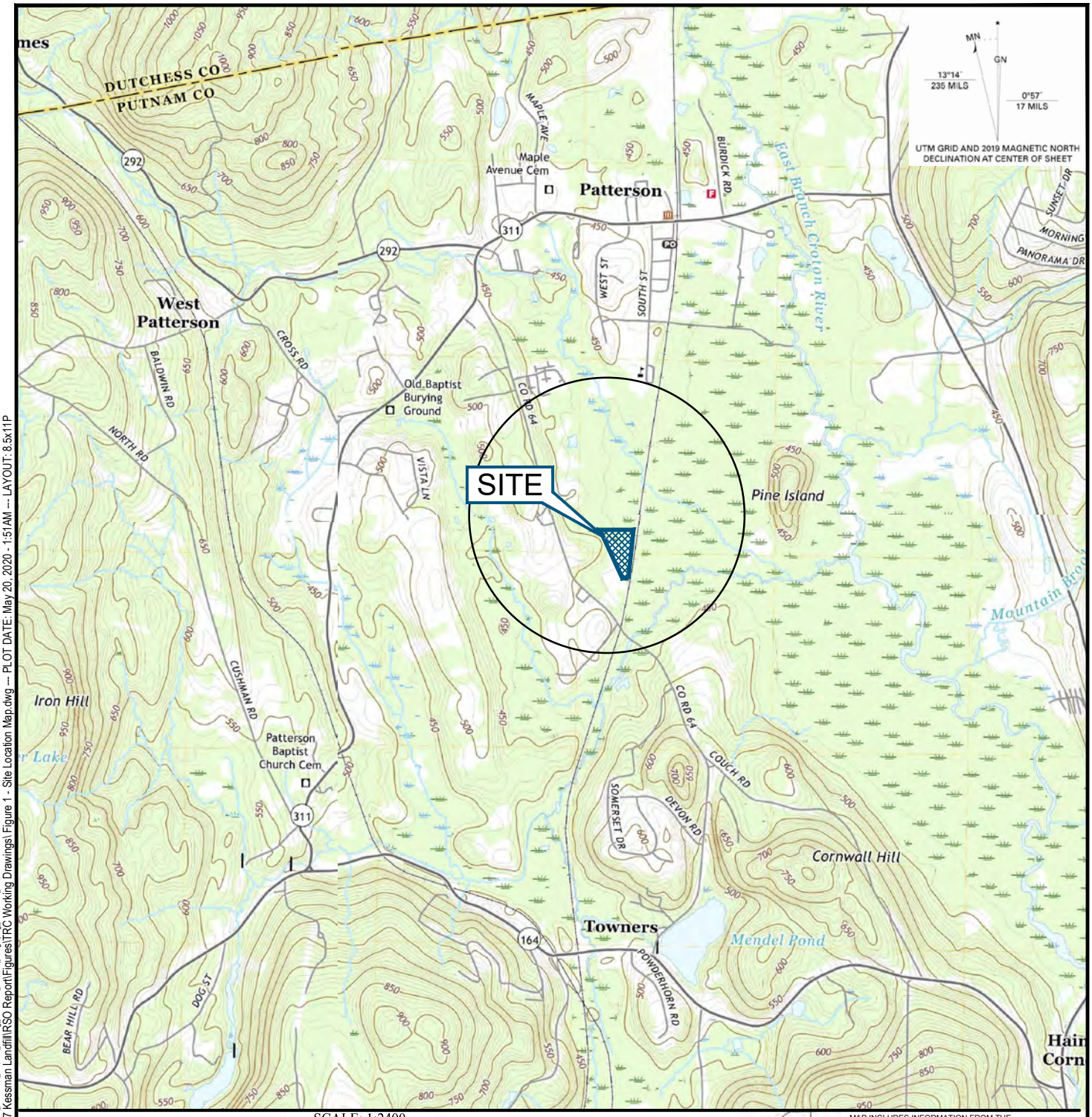
* - NYSDEC Guidelines for Sampling and Analysis of PFAS, January 2020

NS - No NYSDEC standard exists for this analyte.

Values in **bold** indicate the analyte was detected.

Shading indicates result above the listed value.

FIGURES



SCALE: 1:2400

1 0.5 0 KILOMETERS 1 2

1000 500 0 METERS 1000 2000

1 0.5 0 1

MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

FEET

QUADRANGLE LOCATION

MAP INCLUDES INFORMATION FROM THE FOLLOWING MAP SHEET(S):
TP, BREWSTER, NY, CT, 7.5-MINUTE DATED 2019,
NE, PAWLING, NY, CT, 7.5-MINUTE DATED 2019,
NW, POUGHQUAG, NY, 7.5-MINUTE DATED 2019,
W, LAKE CARMEL, NY, 7.5-MINUTE DATED 2019.

MAP OBTAINED THROUGH USE OF TOPOVIEW WITH THE INTERFACE CREATED BY THE NATIONAL GEOLOGIC MAP DATABASE PROJECT (NGMDB), IN SUPPORT OF THE TOPOGRAPHIC MAPPING PROGRAM, MANAGED BY THE USGS NATIONAL GEOSPATIAL PROGRAM (NGP).

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PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SITE NO. 340011 - CROSS-COUNTY SANITARY/KESSMAN LANDFILL
286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563

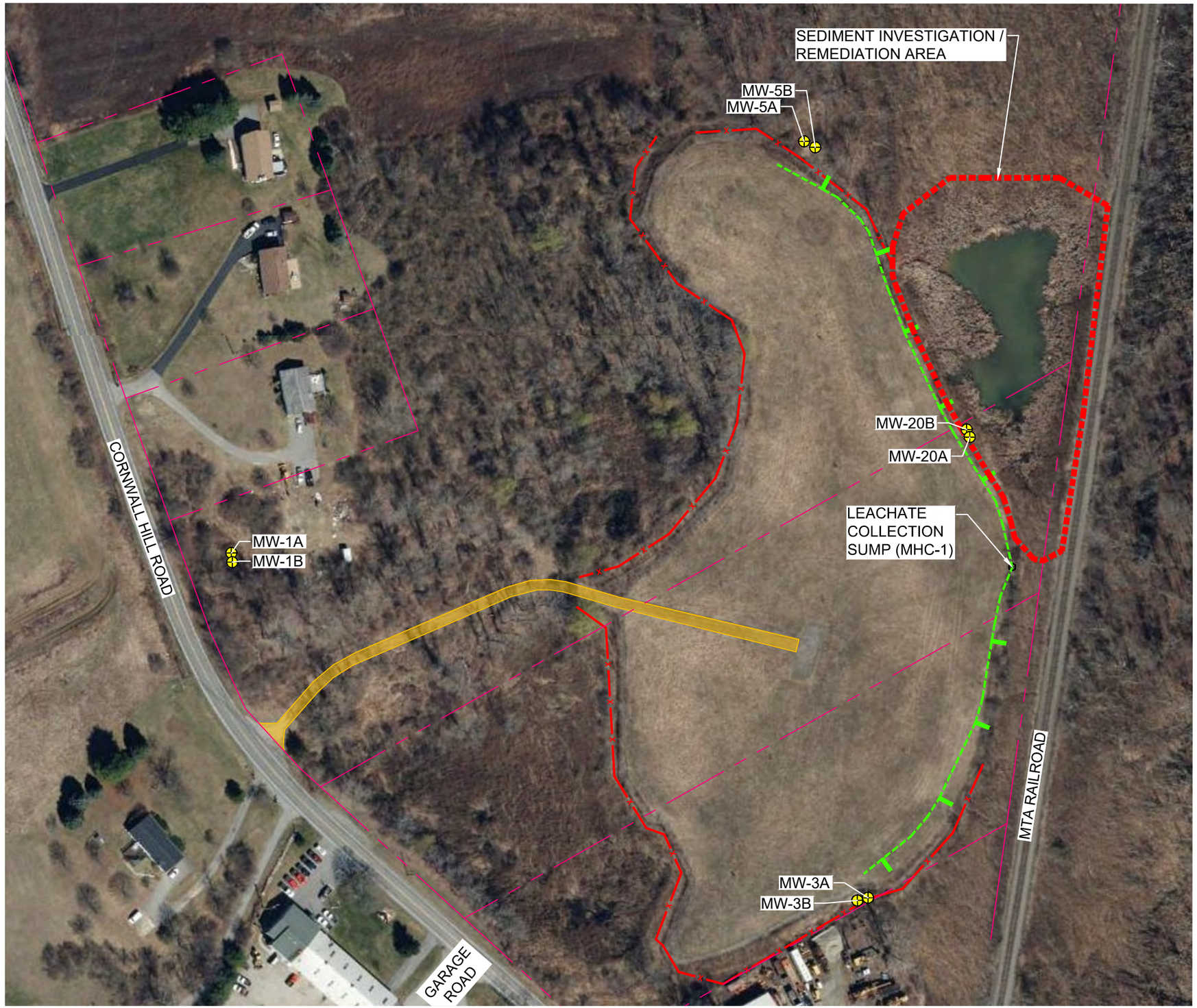
TITLE:

SITE LOCATION MAP

DRAWN BY:	H. DELGADO
CHECKED BY:	J. YAEGER
APPROVED BY:	K. SULLIVAN
DATE:	JUNE 2020
PROJ. NO.:	387570.0000.0000
FILE:	Figure 1 - Site Location Map.dwg

FIGURE 1

8.5x11 --- ATTACHED XREFS: --- ATTACHED IMAGES: NY_Brewster_20190930_TM; NY_Lake_Carmel_20190930_TM; NY_Pawling_20190926_TM; NY_Poughquag_20190927_TM;
DRAWING NAME: B:\NYSDEC\D009812\Work Assignments\D009812-07 Kessman Landfill\RSO Report\Figures\TRC Working Drawings\Figure 1 - Site Location Map.dwg --- PLOT DATE: May 20, 2020 - 1:51AM --- LAYOUT: 8.5x11P



0 120' 240'

SCALE: 1" = 120'

LEGEND (SYMBOLS NOT TO SCALE):

- ACCESS ROAD
- FENCE LINE
- PROPERTY BOUNDARY
- SEDIMENT INVESTIGATION / REMEDIATION AREA
- MW-XX — MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- MH — LEACHATE MANHOLE LOCATION
- LEACHATE COLLECTION PIPE (WITH APPROXIMATE LOCATION OF OUTLETS SHOWN. NOT FIELD VERIFIED.)

N

NOTES:

1. BASEMAP IMAGERY SOURCED FROM ESRI DATABASE DATED NOVEMBER 5, 2019.
2. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND BOUNDARIES ARE APPROXIMATE.

SHEET SIZE: 11" BY 17"

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SITE NO. 340011 - CROSS-COUNTY SANITARY/KESSMAN LANDFILL
286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563

TITLE:
SITE LAYOUT

DRAWN BY:	H. DELGADO	PROJ NO.:	387570.0000.0000
CHECKED BY:	J. YAEGER		**FIGURE 2**
APPROVED BY:	K. SULLIVAN		
DATE:	JUNE 2020		

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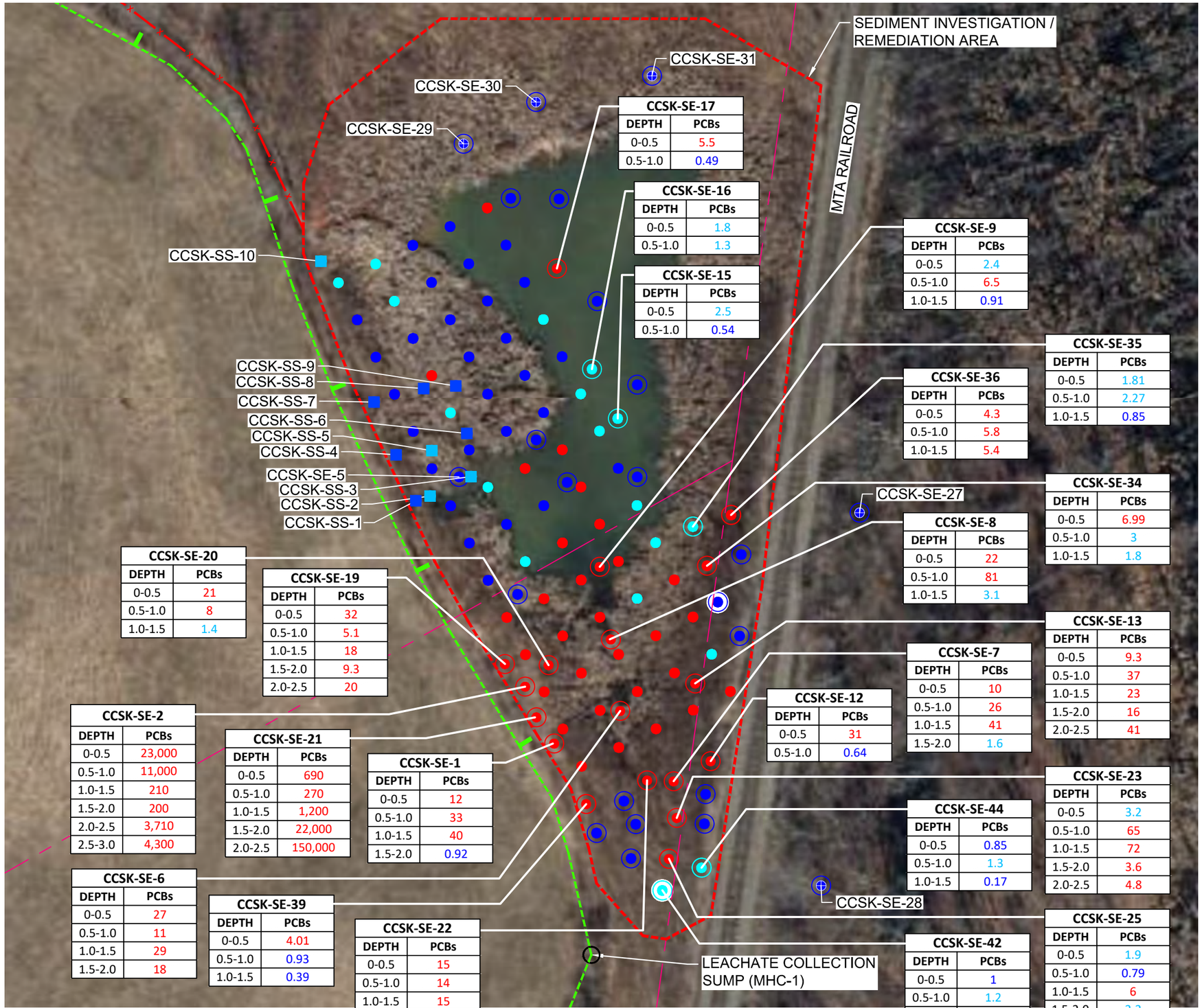
FILE NO.: Figure 2 - Site Layout.dwg



CCSK-SE-17	
DEPTH	PCBs
0-0.5	5.5
0.5-1.0	0.49

CCSK-SE-16	
DEPTH	PCBs
0-0.5	1.8
0.5-1.0	1.3

CCSK-SE-15	
DEPTH	PCBs
0-0.5	2.5
0.5-1.0	0.54

CCSK-SE-9	
DEPTH	PCBs
0-0.5	2.4
0.5-1.0	6.5
1.0-1.5	0.91

CCSK-SE-35	
DEPTH	PCBs
0-0.5	1.81
0.5-1.0	2.27
1.0-1.5	0.85

CCSK-SE-36	
DEPTH	PCBs
0-0.5	4.3
0.5-1.0	5.8
1.0-1.5	5.4

CCSK-SE-34	
DEPTH	PCBs
0-0.5	6.99
0.5-1.0	3
1.0-1.5	1.8

CCSK-SE-8	
DEPTH	PCBs
0-0.5	22
0.5-1.0	81
1.0-1.5	3.1

CCSK-SE-20	
DEPTH	PCBs
0-0.5	21
0.5-1.0	8
1.0-1.5	1.4

CCSK-SE-19	
DEPTH	PCBs
0-0.5	32
0.5-1.0	5.1
1.0-1.5	18
1.5-2.0	9.3
2.0-2.5	20

CCSK-SE-13	
DEPTH	PCBs
0-0.5	9.3
0.5-1.0	37
1.0-1.5	23
1.5-2.0	16
2.0-2.5	41

CCSK-SE-7	
DEPTH	PCBs
0-0.5	10
0.5-1.0	26
1.0-1.5	41
1.5-2.0	1.6

CCSK-SE-12	
DEPTH	PCBs
0-0.5	31
0.5-1.0	0.64

CCSK-SE-2	
DEPTH	PCBs
0-0.5	23,000
0.5-1.0	11,000
1.0-1.5	210
1.5-2.0	200
2.0-2.5	3,710
2.5-3.0	4,300

CCSK-SE-21	
DEPTH	PCBs
0-0.5	690
0.5-1.0	270
1.0-1.5	1,200
1.5-2.0	22,000
2.0-2.5	150,000

CCSK-SE-1	
DEPTH	PCBs
0-0.5	12
0.5-1.0	33
1.0-1.5	40
1.5-2.0	0.92

CCSK-SE-23	
DEPTH	PCBs
0-0.5	3.2
0.5-1.0	65
1.0-1.5	72
1.5-2.0	3.6
2.0-2.5	4.8

CCSK-SE-44	
DEPTH	PCBs
0-0.5	0.85
0.5-1.0	1.3
1.0-1.5	0.17

CCSK-SE-6	
DEPTH	PCBs
0-0.5	27
0.5-1.0	11
1.0-1.5	29
1.5-2.0	18

CCSK-SE-39	
DEPTH	PCBs
0-0.5	4.01
0.5-1.0	0.93
1.0-1.5	0.39

CCSK-SE-22	
DEPTH	PCBs
0-0.5	15
0.5-1.0	14
1.0-1.5	15
1.5-2.0	0.34

CCSK-SE-25	
DEPTH	PCBs
0-0.5	1.9
0.5-1.0	0.79
1.0-1.5	6
1.5-2.0	2.2
2.0-2.5	1.9

CCSK-SE-42	
DEPTH	PCBs
0-0.5	1
0.5-1.0	1.2
1.0-1.5	0.67

LEGEND (SYMBOLS NOT TO SCALE):

- FENCE LINE
- PROPERTY BOUNDARY
- SEDIMENT INVESTIGATION / REMEDIATION AREA
- LEACHATE COLLECTION PIPE (WITH APPROXIMATE LOCATION OF OUTLETS SHOWN. NOT FIELD VERIFIED.)
- LEACHATE MANHOLE LOCATION
- ONE RING IF SAMPLED IN 2016-2018
- SEDIMENT SAMPLE LOCATION - ZERO RINGS - SAMPLED IN 2012
- CONCENTRATION OF TOTAL PCBs ≤ CLASS B SEDIMENT GUIDANCE VALUE (SGV) (0.1-1.0 mg/kg)
- CONCENTRATION OF TOTAL PCBs > CLASS C SGV (>1.0 mg/kg) ≤ PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVE (3.2 mg/kg)
- CONCENTRATION OF TOTAL PCBs > PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVE (3.2 mg/kg)
- FAR-FIELD SEDIMENT SAMPLE LOCATION

N

NOTES:

1. BASEMAP IMAGERY SOURCED FROM ESRI DATABASE DATED NOVEMBER 5, 2019.
2. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND BOUNDARIES ARE APPROXIMATE.
3. LOCATIONS OF 2012 SAMPLING POINTS ARE FROM THE "PCB SEDIMENT DELINEATION REPORT, NYSDEC SITE NO. 340011" BY AZTECH TECHNOLOGIES, INC.
4. ALL DATA IN mg/kg.
5. mg/kg - MILLIGRAMS PER KILOGRAM.
6. MTA - METROPOLITAN TRANSPORTATION AUTHORITY.
7. PCBs - POLYCHLORINATED BIPHENYLS.
8. PFAS - PER- AND POLYFLUOROALKYL SUBSTANCES.
9. SVOCs - SEMIVOLATILE ORGANIC COMPOUNDS.
10. VOCs - VOLATILE ORGANIC COMPOUNDS
11. SAMPLES WITH WHITE RINGS HAVE BEEN ANALYZED FOR PCBs, VOCs, SVOCs, PESTICIDES, METALS, CYANIDE, AND PFAS.
12. RESULTS SHOWN FOR SAMPLES COLLECTED BETWEEN 2016 AND 2018 WHERE MULTIPLE DEPTH INTERVALS WERE SAMPLED.
13. SEDIMENT SAMPLE LOCATIONS ARE INDICATED BY CIRCLES, AND SURFACE SOIL SAMPLE LOCATIONS ARE INDICATED BY SQUARES.

SHEET SIZE: 11" BY 17"

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SITE NO. 340011 - CROSS-COUNTY SANITARY/KESSMAN LANDFILL
286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563

TITLE:
SUMMARY OF SEDIMENT INVESTIGATION & DELINEATION RESULTS

DRAWN BY:	H. DELGADO	PROJ NO.:	387570.0000.0000
CHECKED BY:	J. YAEGER		
APPROVED BY:	K. SULLIVAN		**FIGURE 3**
DATE:	JUNE 2020		

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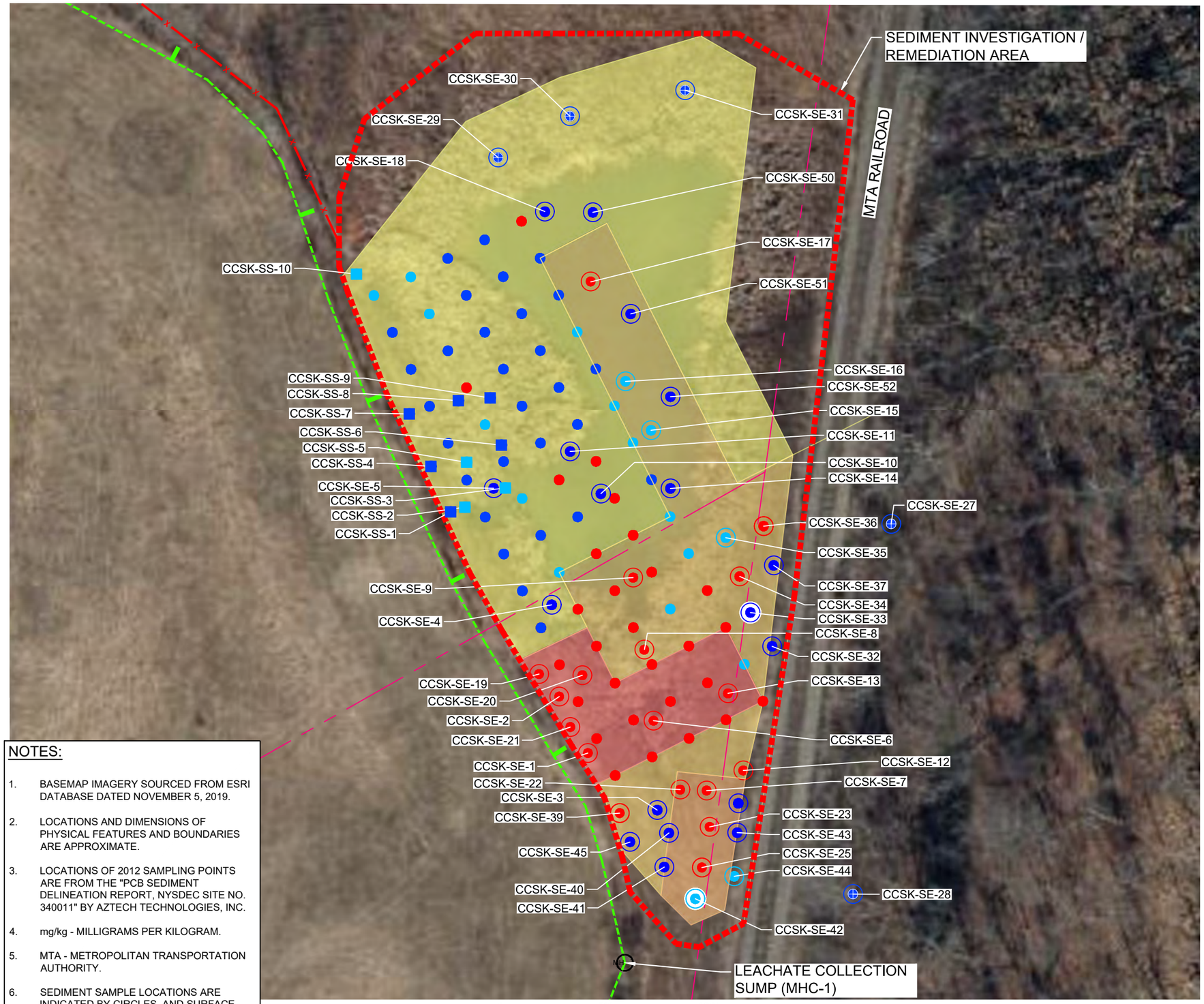
FILE NO.: Figure 3 - Sum. of Sed. Inv. & Delin. Res..dwg



LEGEND (SYMBOLS NOT TO SCALE):

- FENCE LINE
- PROPERTY BOUNDARY
- SEDIMENT INVESTIGATION / REMEDIATION AREA
- LEACHATE COLLECTION PIPE (WITH APPROXIMATE LOCATION OF OUTLETS SHOWN. NOT FIELD VERIFIED.)
- LEACHATE MANHOLE LOCATION
- ONE RING IF SAMPLED IN 2016-2018
- SEDIMENT SAMPLE LOCATION - ZERO RINGS - SAMPLED IN 2012 (REFER TO FIGURE 3 FOR CONCENTRATION INFORMATION)
- CONCENTRATION OF TOTAL PCBs ≤ CLASS B SEDIMENT GUIDANCE VALUE (SGV) (0.1-1.0 mg/kg)
- CONCENTRATION OF TOTAL PCBs > CLASS C SGV (>1.0 mg/kg) ≤ PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVE (3.2 mg/kg)
- CONCENTRATION OF TOTAL PCBs > PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVE (3.2 mg/kg)
- FAR-FIELD SEDIMENT SAMPLE LOCATION
- ESTIMATED AREA OF PCBs IN SEDIMENT ≥ 0.1 mg/kg TO 4 FEET BELOW SEDIMENT SURFACE (4,700 FT^2)
- ESTIMATED AREA OF PCBs IN SEDIMENT ≥ 0.1 mg/kg TO 3 FEET BELOW SEDIMENT SURFACE (2,200 FT^2)
- ESTIMATED AREA OF PCBs IN SEDIMENT ≥ 0.1 mg/kg TO 2 FEET BELOW SEDIMENT SURFACE (14,500 FT^2)
- ESTIMATED AREA OF PCBs IN SEDIMENT ≥ 0.1 mg/kg TO 1 FOOT BELOW SEDIMENT SURFACE (34,100 FT^2)

APPROXIMATE EXCAVATION VOLUME (PCBs ≥ 0.1 mg/kg) = 3,280 YD^3

N

NOTES:

1. BASEMAP IMAGERY SOURCED FROM ESRI DATABASE DATED NOVEMBER 5, 2019.
2. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND BOUNDARIES ARE APPROXIMATE.
3. LOCATIONS OF 2012 SAMPLING POINTS ARE FROM THE "PCB SEDIMENT DELINEATION REPORT, NYSDEC SITE NO. 340011" BY AZTECH TECHNOLOGIES, INC.
4. mg/kg - MILLIGRAMS PER KILOGRAM.
5. MTA - METROPOLITAN TRANSPORTATION AUTHORITY.
6. SEDIMENT SAMPLE LOCATIONS ARE INDICATED BY CIRCLES, AND SURFACE SOIL SAMPLE LOCATIONS ARE INDICATED BY SQUARES.

SHEET SIZE: 11" BY 17"

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SITE NO. 340011 - CROSS-COUNTY SANITARY/KESSMAN LANDFILL
286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563

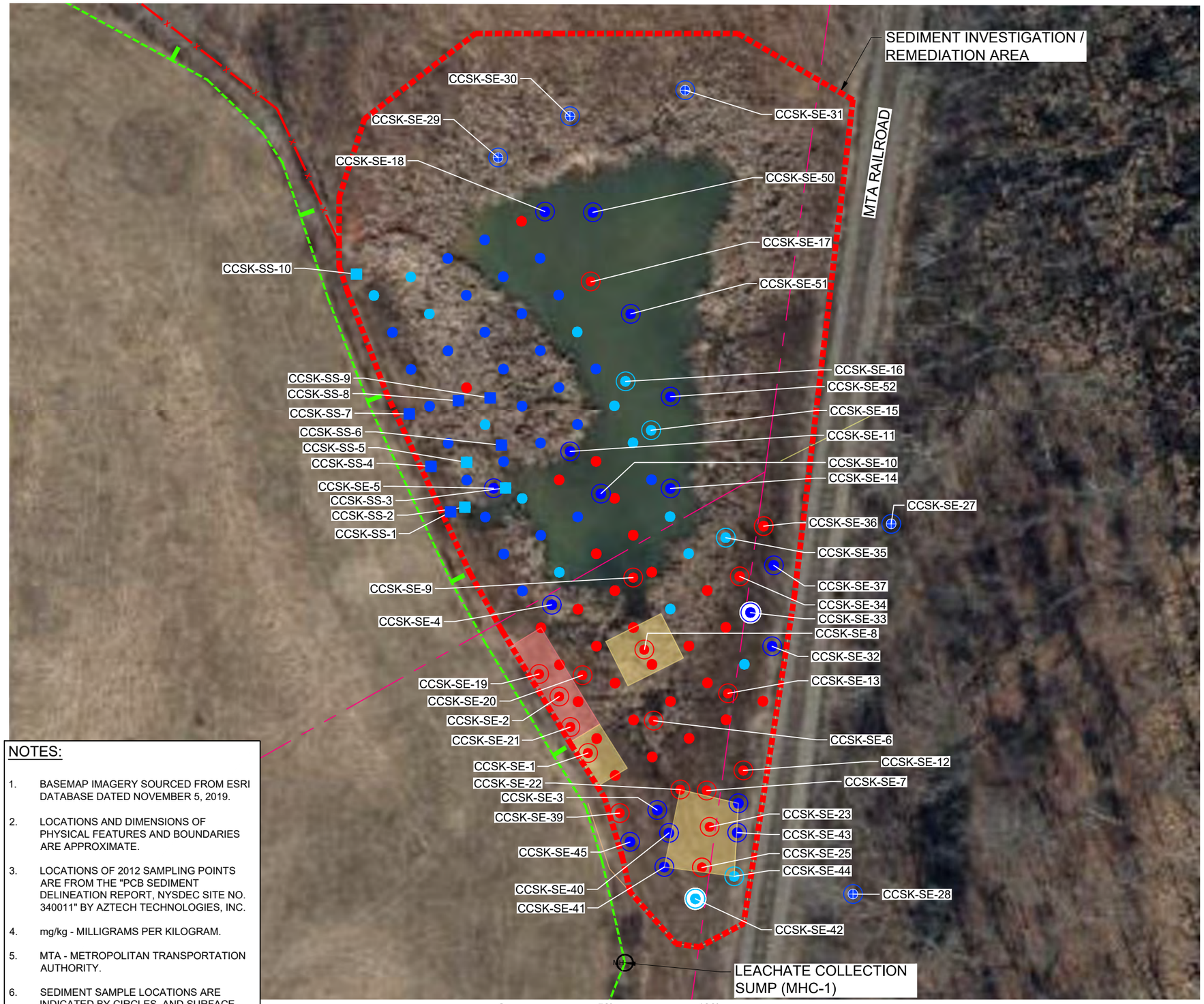
TITLE:
ESTIMATED LIMITS & VOLUME OF IMPACTED SEDIMENT (PCBs ≥ 0.1 mg/kg)

DRAWN BY:	H. DELGADO	PROJ NO.:	387570.0000.0000
CHECKED BY:	J. YAEGER		
APPROVED BY:	K. SULLIVAN		**FIGURE 4**
DATE:	JUNE 2020		

TRC
1090 Union Road, Suite 280
West Seneca, NY 14224
Phone: 716.221.0774
www.TRCcompanies.com

FILE NO.: Figure 4 - Est. Lim. & Vol. of Impact. Sed. (greater than 1ppm).dwg

11x17 -- ATTACHED XREFS: TRC-ASMAP.DFF; SURVEY (1); Surface and Samples (NYSLEF) -- ATTACHED IMAGES: ESRI Database 11.05.2019.mxrh; ESRI Database 11.05.2019-South; New Figure 4 - 0.1 PPM;
DRAWING NAME: B:\NYSDEC\D009812\Work Assignments\D009812-07 Kessman Landfill\RSO Report\Figures\TRC Working Drawings\ Figure 4 - Est. Lim. & Vol. of Impact. Sed (greater than 1ppm).dwg --- PLOT DATE: June 24, 2020 - 10:52AM --- LAYOUT: 11X17L



NOTES:

1. BASEMAP IMAGERY SOURCED FROM ESRI DATABASE DATED NOVEMBER 5, 2019.
2. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND BOUNDARIES ARE APPROXIMATE.
3. LOCATIONS OF 2012 SAMPLING POINTS ARE FROM THE "PCB SEDIMENT DELINEATION REPORT, NYSDEC SITE NO. 340011" BY AZTECH TECHNOLOGIES, INC.
4. mg/kg - MILLIGRAMS PER KILOGRAM.
5. MTA - METROPOLITAN TRANSPORTATION AUTHORITY.
6. SEDIMENT SAMPLE LOCATIONS ARE INDICATED BY CIRCLES, AND SURFACE SOIL SAMPLE LOCATIONS ARE INDICATED BY SQUARES.

LEGEND (SYMBOLS NOT TO SCALE):

- FENCE LINE
- PROPERTY BOUNDARY
- SEDIMENT INVESTIGATION / REMEDIATION AREA
- LEACHATE COLLECTION PIPE (WITH APPROXIMATE LOCATION OF OUTLETS SHOWN. NOT FIELD VERIFIED.)
- LEACHATE MANHOLE LOCATION
- ONE RING IF SAMPLED IN 2016-2018
- SEDIMENT SAMPLE LOCATION - ZERO RINGS - SAMPLED IN 2012 (REFER TO FIGURE 3 FOR CONCENTRATION INFORMATION)
- CONCENTRATION OF TOTAL PCBs ≤ CLASS B SEDIMENT GUIDANCE VALUE (SGV) (0.1-1.0 mg/kg)
- CONCENTRATION OF TOTAL PCBs > CLASS C SGV (>1.0 mg/kg) ≤ PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVE (3.2 mg/kg)
- CONCENTRATION OF TOTAL PCBs > PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVE (3.2 mg/kg)
- FAR-FIELD SEDIMENT SAMPLE LOCATION
- ESTIMATED AREA OF PCBs IN SEDIMENT ≥ 50 mg/kg TO 4 FEET BELOW SEDIMENT SURFACE (900 FT^2)
- ESTIMATED AREA OF PCBs IN SEDIMENT ≥ 50 mg/kg TO 2 FEET BELOW SEDIMENT SURFACE (2,300 FT^2)

APPROXIMATE EXCAVATION VOLUME
(PCBs ≥ 50 mg/kg) = 300 YD^3

N

SHEET SIZE: 11" BY 17"

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SITE NO. 340011 - CROSS-COUNTY SANITARY/KESSMAN LANDFILL
286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563

TITLE:
ESTIMATED LIMITS & VOLUME OF IMPACTED SEDIMENT (PCBs ≥ 50 mg/kg)

DRAWN BY:	H. DELGADO	PROJ NO.:	387570.0000.0000
CHECKED BY:	J. YAEGER		**FIGURE 5**
APPROVED BY:	K. SULLIVAN		
DATE:	JUNE 2020		

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FILE NO.: Figure 5 - Est. Lim. & Vol. of Impact. Sed. (greater than 50ppm).dwg

LEGEND (SYMBOLS NOT TO SCALE):

- FENCE LINE
- PROPERTY BOUNDARY
- MW-XX — MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- MH — LEACHATE MANHOLE LOCATION
- LEACHATE COLLECTION PIPE (WITH APPROXIMATE LOCATION OF OUTLETS SHOWN. NOT FIELD VERIFIED.)
- DEWATERING DAM LOCATION
- ESTIMATED AREA OF PCBs IN SEDIMENT ≥ 0.1 mg/kg TO 4 FEET BELOW SEDIMENT SURFACE (4,700 FT^2)
- ESTIMATED AREA OF PCBs IN SEDIMENT ≥ 0.1 mg/kg TO 3 FEET BELOW SEDIMENT SURFACE (2,200 FT^2)
- ESTIMATED AREA OF PCBs IN SEDIMENT ≥ 0.1 mg/kg TO 2 FEET BELOW SEDIMENT SURFACE (14,500 FT^2)
- ESTIMATED AREA OF PCBs IN SEDIMENT ≥ 0.1 mg/kg TO 1 FOOT BELOW SEDIMENT SURFACE (34,100 FT^2)
- APPROXIMATE EXCAVATION VOLUME (PCBs ≥ 0.1 mg/kg) = 3,280 YD^3

N

NOTES:

1. BASEMAP IMAGERY SOURCED FROM ESRI DATABASE DATED NOVEMBER 5, 2019.
2. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND BOUNDARIES ARE APPROXIMATE.

SHEET SIZE: 11" BY 17"

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SITE NO. 340011 - CROSS-COUNTY SANITARY/KESSMAN LANDFILL
286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563

TITLE:
CONCEPTUAL PLAN

DRAWN BY:	H. DELGADO	PROJ NO.:	387570.0000.0000
CHECKED BY:	J. YAEGER		**FIGURE 6**
APPROVED BY:	K. SULLIVAN		
DATE:	JUNE 2020		

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West Seneca, NY 14224
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FILE NO.: Figure 6 - Conceptual Plan.dwg

APPENDICES

APPENDIX A

Resource Delineation Report

1090 Union Road, Suite 280
West Seneca, New York 14224

T 716.221.0774
TRCcompanies.com

Letter Report

To:	Gail Dieter, Project Manager New York State Department of Environmental Conservation
From:	Kevin D. Sullivan, Weston Hillegas TRC
Subject:	Resource Delineation Report Cross County Sanitary/Kessman Landfill (Site No. 340011)
Date:	January 29, 2020
CC:	D. Glass (TRC) J. Magda (TRC)

Introduction

This Letter Report summarizes the results of a resource (wetland and waterbody) delineation conducted for the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation, at the Cross County Sanitary/Kessman Landfill (the Site). The resource delineation survey was conducted by TRC on August 1 and December 16, 2019. The Site is located at 286 Cornwall Hill Road in the Town of Patterson, Putnam County, New York (**Attachment A – Figure 1**). Site land use primarily consists of altered land used for waste disposal. The Site is bordered to the west by the Cornwall Hill Road; to the east by the NYSDEC wetland DP-22 and Metro North Railroad; to the north by the NYSDEC wetland DP-22; and to the south by the Patterson Recycling Center.

TRC conducted a review of publicly available data from the following agencies prior to the resource delineations. The online National Wetlands Inventory (NWI) Mapper was accessed to identify the presence of federal-mapped wetlands and waters. The New York State Environmental Resource Mapper was accessed to identify the presence of state-mapped wetlands and waters. The Natural Resources Conservation Service (NRCS) online Web Soil Survey was accessed to determine the mapped soils within the focus area. The subsequently generated list of soil map units was compared to the NRCS Soil Data Access Hydric Soils List (2017).

General Site Conditions

The approximately 10-acre portion of the property surveyed during the two site visits is depicted as "Site Location" on the Site Location Map (**Figure 1**). The area depicted as the "Sampling Area" (**Figure 1**) is where potential remediation for contaminated soils exists. The weather during the August 1, 2019 investigation was 80 degrees Fahrenheit, partly sunny, and humid. The weather during the December 16, 2019 investigation was approximately 30 degrees Fahrenheit (low temperature for the day) and overcast with no precipitation.

The Site is situated on a relatively flat, man-made terrace. A capped landfill is the predominant Site feature, and a steep slope descends from the top of the landfill to the east and north, where the cap meets the NYSDEC state-mapped wetland. Based on historical records, the Site was operated as a municipal landfill by the Town of Patterson on property owned by the Kessman family until 1972. In 1972, the property was purchased by Cross County Sanitation, Inc., which operated the landfill until 1974. The NYSDEC has indicated that unknown types and quantities of industrial and

hazardous wastes were disposed of at the landfill between 1972 and 1974. In 1974, the NYSDEC closed the landfill and the Kessman family repossessed the property. The Site and adjacent wetland area underwent extensive investigation and remediation in the 1980s and early 1990s, the majority of which was substantially completed in 1995.

At the time of both inspections, the landfill cap area was vegetated with grasses and forbs. In addition, TRC made note of other surface features including the various groundwater monitoring wells, a perimeter drain manhole (at the northeastern toe of the landfill), a series of landfill gas vents (penetrating from the top of the cap), and a chain link fence surrounding the majority of the landfill area.

Delineation Methodology

The resource delineation was conducted in accordance with the methodologies employed by both the NYSDEC and the United States Army Corps of Engineers' (USACE). These methods are described in the NYSDEC 1995 Freshwater Delineation Manual and the USACE *Wetlands Delineation Manual* (Environmental Laboratory, 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2.0; 2012).

Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and bottomlands. The two approaches identify three environmental factors to consider when making wetland determinations. This three-factor approach involves indicators of hydrophytic vegetation, hydric soil, and wetland hydrology as described below.

- Vegetation - Vegetation was documented and evaluated based on NWI classifications for dominant wetland and upland vegetative communities. Hydrophytic vegetation was identified and categorized by using the National Wetland Plant List (NWPL) for the Northcentral and Northeast Region. The NWPL provides wetland indicator status ratings of vascular plants in the United States. An important characteristic of the vegetation ratings in the NWPL is that plants that generally tend to be on the drier end of the spectrum may be considered hydrophytic if they display morphological adaptations to living in a wet soil (e.g. very shallow roots or buttressed trunks).
- Hydric Soils - Subsurface Site soils within the upper 24 inches of ground surface were inspected for the presence of hydric soils, defined as soils "that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part". Hydric soil indicators were assessed based on the presence of soil morphologies used to make on-site determinations of hydric soil conditions.
- Hydrology - Evidence of Site wetland hydrology was determined based on observations of surface saturation and inundation, topographic depressions, surface water connections and drainage patterns, and water-stained leaves, along with evidence of hydrology based on plant characteristics such as adventitious roots or moss growth on the lower parts of trees.

Prior to conducting the wetland delineation, TRC reviewed a number of references to gain a preliminary understanding of the Site characteristics including:

- United States Geographic Survey (USGS) 7.5-minute series topographic quadrangles;
- Aerial photographs;

- NYSDEC wetland maps;
- NWI mapped wetlands;
- Federal Emergency Management Agency (FEMA) Floodplain; and
- United States Department of Agriculture (USDA) National Resource Conservation Service (NRCS) Web Soil Surveys.

During the Site visits, identified wetlands were delineated and marked with flagging. Each of the marking flags was sequentially numbered and placed at inflection points along the interpreted wetland boundaries. The boundary points/flags were field-located using a hand-held mapping grade (sub-meter accuracy) global positioning system unit for digital wetland boundary mapping purposes. Digital data (.shp, .kmz, and .dwg data) collected on Site were then downloaded and used to prepare wetland boundary maps. Data on wetland vegetation, soils, hydrology, including representative wetland and adjacent upland plots were documented on Wetland Determination Data Forms (**Attachment B**).

Delineation Results

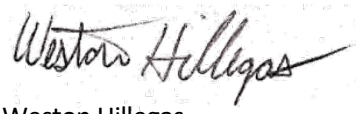
One palustrine emergent (PEM) wetland (W-WH-1) was identified within the inspected area, during the August 1, 2019 delineation. The same wetland, which ultimately extends off Site, was further delineated to the north and south on December 16, 2019. This wetland, identified by TRC as W-WH-1, corresponds to NYSDEC-mapped class wetland DP-22. Wetland W-WH-1 is located adjacent to the north and east edges of the landfill (**Attachment A – Figure 3**). The delineated wetland portion identified in and around the Sampling Area measured approximately 4.35 acres, with the wetland continuing to the south and north beyond the survey limits. Hydrology originates from outside the study area as well as along the toe of the landfill slope. Indicators of wetland hydrology (as indicated on the Wetland Determination Data Forms (**Attachment B**)) include surface water (A1), high water table (A2), saturation (A3), inundation visible on aerial imagery (B7), drainage patterns (B10), saturation visible on aerial imagery (C9), geomorphic position (D2), FAC-neutral test (D5). Dominant vegetation includes common reed (*Phragmites australis*). Non-dominant vegetation also includes lakeshore rush (*Schoenoplectus lacustris*), purple loosestrife (*Lythrum salicaria*), narrowleaf cattail (*Typha angustifolia*) and northern water plantain (*Alisma triviale*). Soils have a silt loam with an organic matter modifier and sandy loam texture. Hydric soil indicators include a sandy gleyed matrix (S4). Soils mapped by the NRCS in the vicinity of W-WH-1 consisted of Fluvaquents-Udifluvents complex, frequently flooded (Ff). See **Attachment A, Figure 4**, for the Site soils map.

The common plant species observed on the Site were common reed, narrow-leaf cattail (*Typha angustifolia*), silky dogwood *(Cornus amomum),* red maple *(Acer rubrum*), lakeshore rush (*Schoenoplectus lacustris*), Northern water plantain (*Alisma triviale*), green ash *(Fraxinus pennsylvanica),* Virginia creeper *(Parthenocissus quinquefolia*), Oriental bittersweet (*Celastrus orbiculatus*), cottonwood *(Populus deltoides),* autumn olive (*Elaeagnus umbellata*), riverbank grape (*Vitis riparia*), Queen Anne's lace (*Daucus carota*), red clover (*Trifolium pratense*), Kentucky bluegrass (*Poa pratensis*), and false baby's breath (*Galium mollugo*).

As a result of TRC's Site visits, the delineated wetland W-WH-1 is located northeast of the Cross County Sanitary/Kessman Landfill, as shown on **Figure 3**. A soil map of the Site can be found on **Figure 4.** A photographic log of TRC's activities is provided in **Attachment C**. The FEMA Flood Insurance Rate Map is provided on **Figure 5**.

If you have any questions regarding this Site or the wetland delineation conclusions presented, please contact either Kevin Sullivan at (716) 221-0774 (email: KSullivan@trccompanies.com), or Weston Hillegas at (551) 251-0012 (email: WHillegas@trccompanies.com).

Sincerely,



Weston Hillegas
Senior Environmental Specialist

Kevin D. Sullivan, P.E.
Project Manager

Enclosures:

Attachment A – Figures

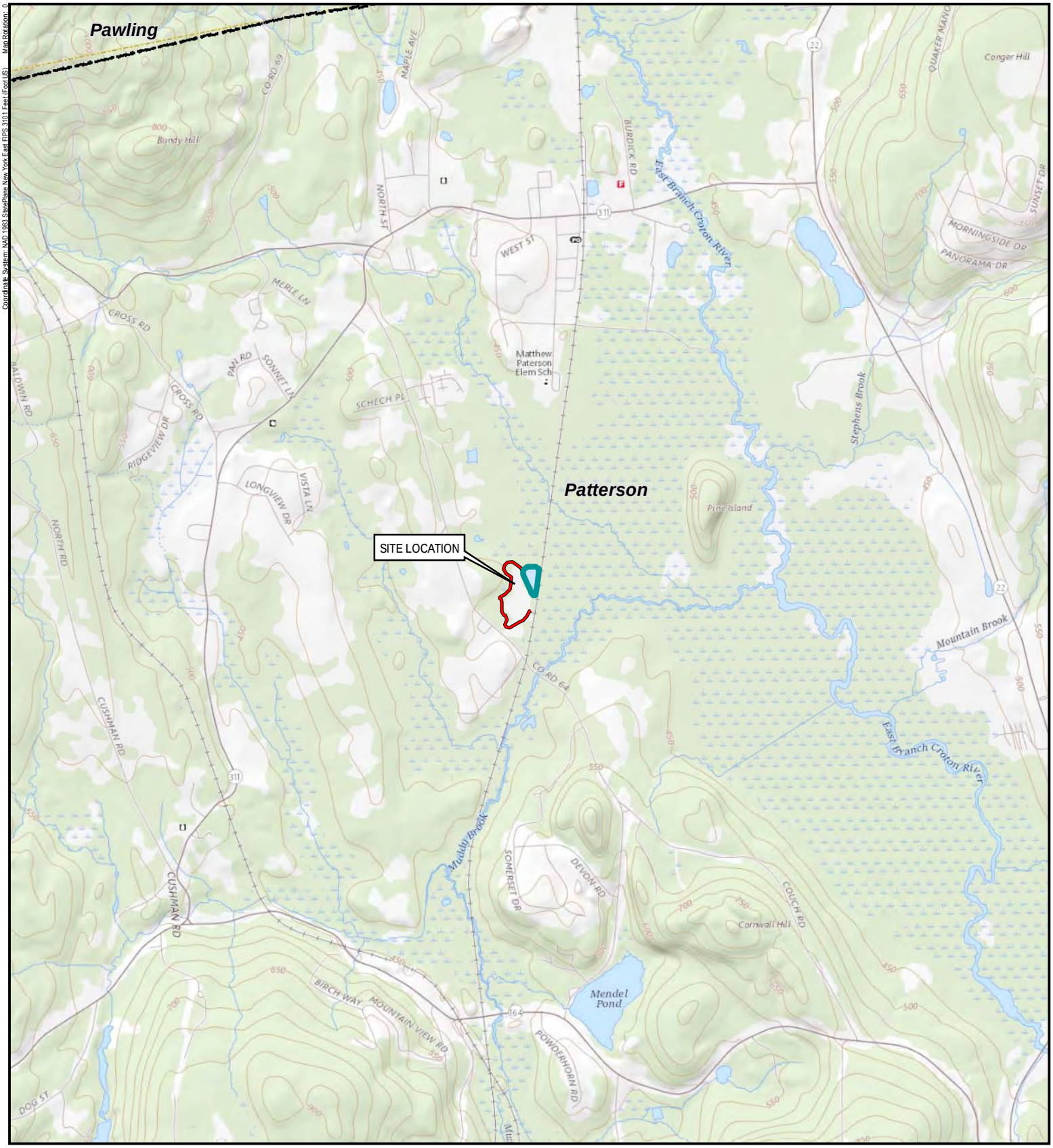
Figure 1 – Site Location Map
Figure 2 – Site Resources Map
Figure 3 – Site Delineated Wetlands Map
Figure 4 – Site Soils Map
Figure 5 – Site FEMA Flood Insurance Rate Map

Attachment B – Data Forms

Attachment C – Photographic Log

ATTACHMENT A

Figures



NEW YORK OVERVIEW

LEGEND

- TOWN BOUNDARY
- SAMPLING AREA
- FENCE LINE

1:24,000

1 " = 2,000 '

N

1. BASEMAP IMAGERY FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

0 1,000 2,000 Feet

PROJECT:

286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563

TITLE:

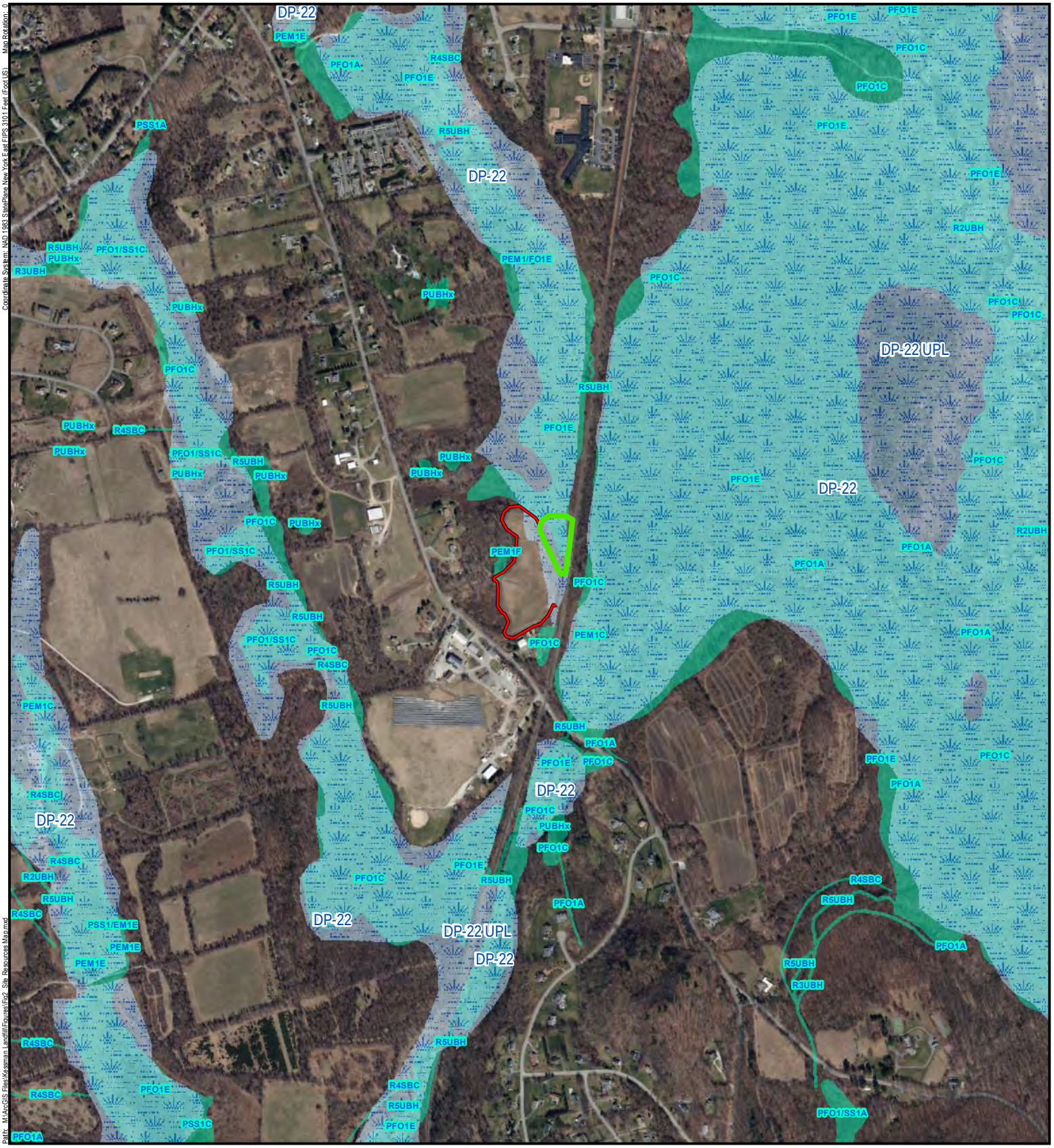
SITE LOCATION MAP

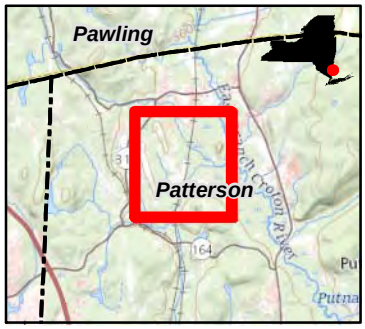
DRAWN BY:	L. BOCHKIS	PROJ NO.:	259633
CHECKED BY:	M. GIAMBATTISTA		
APPROVED BY:	H. WESTON		**FIGURE 1**
DATE:	JANUARY 2020		

TRC

1099 WALL ST WEST, SUITE 250B
LYNDHURST, NJ 07071

Path: M:\ArcGIS Files\Kossman Landfill\Figures\Fig1_Site Location Map.mxd Coordinate System: NAD 1983 StatePlane New York East FIPS 3101 Feet (Foot US) Map Rotation: 0





LEGEND

- SAMPLING AREA
- FENCE LINE
- Wetlands (NYSDEC)
- Wetlands (NWI)

N

1. BASEMAP IMAGERY FROM ESRI/NAIP, "WORLD IMAGERY" WEB BASEMAP SERVICE LAYER, 2017.
2. DATA ACQUIRED FROM THE NYSDEC, CUGIR, NWI.

1:12,000
1 " = 1,000 '
0 100200
Feet

PROJECT:
286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563

TITLE:
SITE RESOURCES MAP

DRAWN BY:	L. BOCHKIS	PROJ NO.:	259633
CHECKED BY:	M. GIAMBATTISTA		
APPROVED BY:	H. WESTON		**FIGURE 2**
DATE:	JANUARY 2020		

TRC

1099 WALL ST WEST, SUITE 250B
LYNDHURST, NJ 07071

Path: M:\ArcGIS Files\Kosman Landfill\Figures\Fig2_Site Resources Map.mxd
Coordinate System: NAD 1983 StatePlane New York East FIPS 3101 Feet (Feet US) Map Rotation: 0

LEGEND

- SAMPLING AREA
- FENCE LINE
- USACE DATA PLOTS
- WETLAND FLAG
- WETLAND_BOUNDARY
- WETLAND AREA (APPROX.)

N

1. BASEMAP IMAGERY FROM ESRI/NAIP, "WORLD IMAGERY" WEB BASEMAP SERVICE LAYER, 2017.

2. RESOURCE DELINEATION COMPLETED IN THE FIELD BY TRC IN AUGUST AND DECEMBER 2019..

1:2,400

1 " = 200 '

0 200 Feet

PROJECT:

286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563

TITLE:

SITE DELINEATED WETLANDS MAP

DRAWN BY:	L. BOCHKIS	PROJ NO.:	259633
CHECKED BY:	M. GIAMBATTISTA		
APPROVED BY:	H. WESTON		**FIGURE 3**
DATE:	JANUARY 2020		

TRC

1099 WALL ST WEST, SUITE 250B
LYNDHURST, NJ 07071

Path: M:\ArcGIS Files\Kassman Landfill Figures\Fig3_Delineated Wetlands Map.mxd Coordinate System: NAD 1983 StatePlane New York East FIPS 3101 Feet (Ficot US) Map Rotation: 0

LEGEND

- SAMPLING AREA
- FENCE LINE
- SSURGO Soils

N

1. BASEMAP IMAGERY FROM ESRI/NAIP, "WORLD IMAGERY" WEB BASEMAP SERVICE LAYER, 2017.

2. SOILS DATA ACQUIRED FROM THE NATURAL RESOURCES CONSERVATION SERVICE, USING THE UNITED STATES DEPARTMENT OF AGRICULTURE WEB SOIL SURVEY.

1:2,400

1 " = 200 '

0 100 200 Feet

PROJECT:

286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563

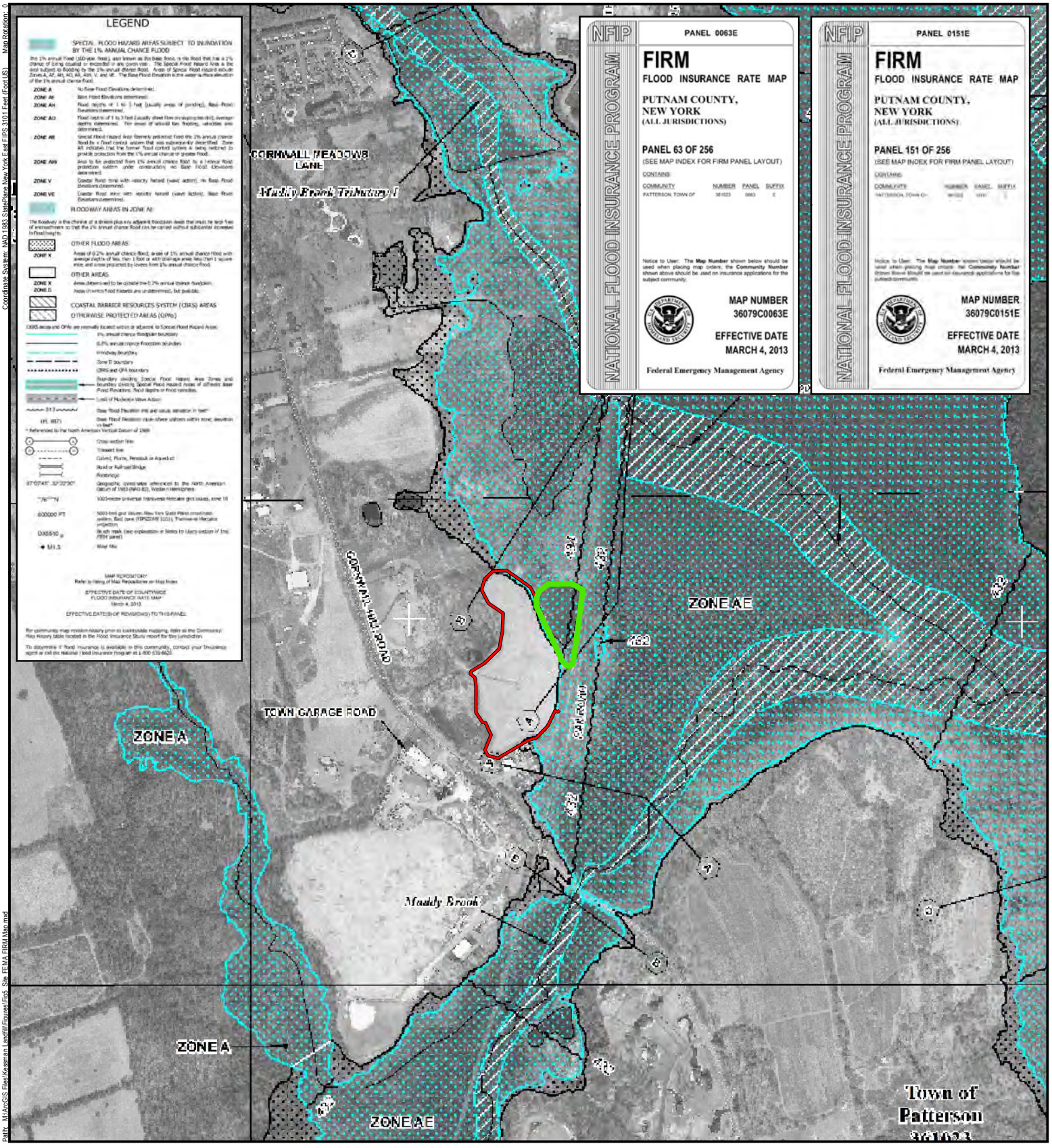
TITLE:

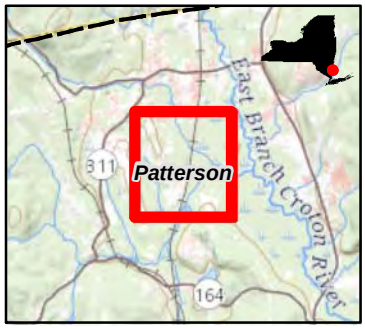
SITE SOILS MAP

DRAWN BY:	L. BOCHKIS	PROJ NO.:	259633
CHECKED BY:	M. GIAMBATTISTA		
APPROVED BY:	H. WESTON		**FIGURE 4**
DATE:	JANUARY 2020		

TRC

1099 WALL ST WEST, SUITE 250B
LYNDHURST, NJ 07071





LEGEND

- SAMPLING AREA
- FENCE LINE

N

1. BASEMAP FEMA FIRM PANELS 0063E, 0151E.
2. FEMA DATA AQUIRED FROM FEMA'S NFHL VIEWER.

1:8,400
1 " = 700 '
0 350 700 Feet

PROJECT:
286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563

TITLE:
SITE FEMA FLOOD INSURANCE RATE MAP

DRAWN BY:	L. BOCHKIS	PROJ NO.:	259633
CHECKED BY:	M. GIAMBATTISTA		
APPROVED BY:	H. WESTON		**FIGURE 5**
DATE:	JANUARY 2020		

TRC

1099 WALL ST WEST, SUITE 250B
LYNDHURST, NJ 07071

Path: M:\ArcGIS Files\Kassman Landfill\Figures\Final\Site FEMA FIRM Map.mxd
Coordinate System: NAD 1983 StatePlane New York East FIPS 3101 Feet (Ftcst US) Map Rotation: 0

ATTACHMENT B

Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Cross Co. Sanitary/Kessman Landfill **City/County:** Patterson, Putnam County **Sampling Date:** 2019-Aug-01
Applicant/Owner: NYSDEC **State:** New York **Sampling Point:** W-WH-1_PEM-1
Investigator(s): Weston Hillegas, Nick DeJohn **Section, Township, Range:**
Landform (hillslope, terrace, etc.): Depression **Local relief (concave, convex, none):** Concave **Slope (%):** 0 to 1
Subregion (LRR or MLRA): MLRA 144A of LRR R **Lat:** 41.4977762 **Long:** -73.6072566 **Datum:** WGS84
Soil Map Unit Name: Fluvaquents-Udifluvents complex, frequently flooded (Ff) **NWI classification:** PFO1E
Are climatic/hydrologic conditions on the site typical for this time of year? Yes _✓_ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes _✓_ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _✓_ No ____		
Hydric Soil Present?	Yes _✓_ No ____	**Is the Sampled Area within a Wetland?**	**Yes _✓_ No ____**
Wetland Hydrology Present?	Yes _✓_ No ____	**If yes, optional Wetland Site ID:**	W-WH-1

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is PEM. Area is wetland, all three wetland parameters are present. Toe of slope of landfill.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- _✓_ Surface Water (A1)
- _✓_ High Water Table (A2)
- _✓_ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- _✓_ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- _✓_ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- _✓_ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- _✓_ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- _✓_ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _✓_ No ____	Depth (inches):	1
Water Table Present?	Yes _✓_ No ____	Depth (inches):	7
Saturation Present? (includes capillary fringe)	Yes _✓_ No ____	Depth (inches):	0

Wetland Hydrology Present? Yes _✓_ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The criterion for wetland hydrology is met.

VEGETATION -- Use scientific names of plants.

Sampling Point: W-WH-1_PEM-1

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Phragmites australis*	85	Yes	FACW
2. *Schoenoplectus lacustris*	20	No	OBL
3. *Lythrum salicaria*	10	No	OBL
4. *Typha angustifolia*	5	No	OBL
5. *Alisma triviale*	3	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	123	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	38	x 1 =	38
FACW species	85	x 2 =	170
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals	123	(A)	208 (B)
Prevalence Index = B/A =	1.7		

Hydrophytic Vegetation Indicators:

✓ 1- Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤ 3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W-WH-1_PEM-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 2/1	100					Silt Loam	Organic Matter modifier
5 - 20	Gley1 4/5GY	100					Sandy Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. [2]Location: PL = Pore Lining, M = Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
_✓_ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR R, MLRA 149B)**
___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
___ Loamy Mucky Mineral (F1) **(LRR K, L)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
___ Coast Prairie Redox (A16) **(LRR K, L, R)**
___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
___ Dark Surface (S7) **(LRR K, L)**
___ Polyvalue Below Surface (S8) **(LRR K, L)**
___ Thin Dark Surface (S9) **(LRR K, L)**
___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches):

Hydric Soil Present? Yes _✓_ No ____

Remarks:

The criterion for hydric soil is met.

Vegetation Photos

Soil Photos

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Cross Co. Sanitary/Kessman Landfill **City/County:** Patterson, Putnam County **Sampling Date:** 2019-Aug-01
Applicant/Owner: NYSDEC **State:** New York **Sampling Point:** W-WH-1_UPL-1
Investigator(s): Weston Hillegas, Nick DeJohn **Section, Township, Range:**
Landform (hillslope, terrace, etc.): Hillslope **Local relief (concave, convex, none):** Convex **Slope (%):** 10 to 20
Subregion (LRR or MLRA): MLRA 144A of LRR R **Lat:** 41.497763 **Long:** -73.607326 **Datum:** WGS84
Soil Map Unit Name: Udorthents, smoothed (Ub) **NWI classification:**
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No ✓		
Hydric Soil Present?	Yes ____ No ✓	**Is the Sampled Area within a Wetland?**	**Yes ____ No ✓**
Wetland Hydrology Present?	Yes ____ No ✓	**If yes, optional Wetland Site ID:**	

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is UPL. Area is upland, not all three wetland parameters are present. Maintained landfill hill slope..

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____ No ✓	Depth (inches):	
Water Table Present?	Yes ____ No ✓	Depth (inches):	**Wetland Hydrology Present?** Yes ____ No ✓
Saturation Present? (includes capillary fringe)	Yes ____ No ✓	Depth (inches):	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No positive indication of wetland hydrology was observed.

VEGETATION -- Use scientific names of plants.

Sampling Point: W-WH-1_UPL-1

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Poa pratensis*	75	Yes	FACU
2. *Daucus carota*	20	No	UPL
3. *Trifolium pratense*	20	No	FACU
4. *Galium mollugo*	15	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	130	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	110	x 4 =	440
UPL species	20	x 5 =	100
Column Totals	130	(A)	540 (B)

Prevalence Index = B/A = 4.2

Hydrophytic Vegetation Indicators:

_____ 1- Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is > 50%

_____ 3 - Prevalence Index is ≤ 3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Vegetation Strata:

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Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W-WH-1_UPL-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 4/3	100					Silt Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. [2]Location: PL = Pore Lining, M = Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR R, MLRA 149B)**
___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
___ Loamy Mucky Mineral (F1) **(LRR K, L)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
___ Coast Prairie Redox (A16) **(LRR K, L, R)**
___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
___ Dark Surface (S7) **(LRR K, L)**
___ Polyvalue Below Surface (S8) **(LRR K, L)**
___ Thin Dark Surface (S9) **(LRR K, L)**
___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Landfill gravel
Depth (inches): 6

Hydric Soil Present? Yes ____ No ✓

Remarks:

No positive indication of hydric soils was observed.

Vegetation Photos

ATTACHMENT C

Photographic Log

PHOTOGRAPHIC LOG

Client Name: NYSDEC

Site Location: Cross County Sanitary/Kessman Landfill, Town of Patterson, New York

Photo Number: 1	Date: 08/01/2019

Description:

Upland area in center of landfill with visible stick-up aeration pipes.

Photo facing northeast.

Photo Number: 2	Date: 08/01/2019

Description:

Overview of wetland W-WH-1 from the eastern edge of the landfill.

Photo facing east.

PHOTOGRAPHIC LOG

Client Name: NYSDEC	Site Location: Cross County Sanitary/Kessman Landfill, Town of Patterson, New York

Photo Number: 3	Date: 08/01/2019

Description:

Representative hydrophytic vegetation of W-WH-1.

Photo facing east.

Photo Number: 4	Date: 08/01/2019

Description:

MW-20A along the W-WH-1 boundary.

Photo facing east.

PHOTOGRAPHIC LOG

Client Name: NYSDEC	Site Location: Cross County Sanitary/Kessman Landfill, Town of Patterson, New York

Photo Number: 5	Date: 08/01/2019

Description:

MW-20B along the W-WH-1 boundary.

Photo facing east.

Photo Number: 6	Date: 08/01/2019

Description:

Boundary between upland landfill area and W-WH-1

Photo facing north.

PHOTOGRAPHIC LOG

Client Name: NYSDEC	Site Location: Cross County Sanitary/Kessman Landfill, Town of Patterson, New York

Photo Number: 7	Date: 08/01/2019

Description:

MHC-1 along the W-WH-1 boundary.

Photo facing east.

Photo Number: 8	Date: 08/01/2019

Description:

Representative upland vegetation of landfill.

Photo facing west.

PHOTOGRAPHIC LOG

Client Name: NYSDEC	Site Location: Cross County Sanitary/Kessman Landfill, Town of Patterson, New York

Photo Number: 9	Date: 08/01/2019

Description:

Overview of NYSDEC W-WH-1 from top of landfill.

Photo facing northeast.

Photo Number: 10	Date: 08/01/2019

Description:

The eastern edge of W-WH-1, with representative hydrophytic vegetation.

Photo facing southeast.

PHOTOGRAPHIC LOG

Client Name: NYSDEC	Site Location: Cross County Sanitary/Kessman Landfill, Town of Patterson, New York

Photo Number: 11	Date: 12/16/2019

Description:

Representative hydrophytic vegetation of W-WH-1.

Photo facing southeast.

Photo Number: 12	Date: 12/16/2019

Description:

Representative wetland cover along the W-WH-1 and landfill boundary.

Photo facing east.

PHOTOGRAPHIC LOG

Client Name: NYSDEC	Site Location: Cross County Sanitary/Kessman Landfill, Town of Patterson, New York

Photo Number: 13	Date: 12/16/2019

Description:

Representative hydrophytic vegetation of W-WH-1 along the railroad tracks boundary.

Photo facing north.

Photo Number: 14	Date: 12/16/2019

Description:

Representative hydrophytic vegetation of W-WH-1 along the railroad tracks boundary.

Photo facing southwest.

APPENDIX B

Fish and Wildlife Resource Impact Analysis

FISH AND WILDLIFE RESOURCE IMPACT ANALYSIS

CROSS-COUNTY SANITARY/KESSMAN LANDFILL
286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563
PUTNAM COUNTY
NYSDEC Site No. 340011
Work Assignment No. D009812-07

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233

Prepared by:

TRC

JUNE 2020

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

1.0 INTRODUCTION

This Fish and Wildlife Resource Impact Analysis (FWRIA) report has been prepared on behalf of the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER), for the Cross-County Sanitary / Kessman Landfill, located in the Town of Patterson, Putnam County, New York. The FWRIA was conducted in accordance with the guidance provided in Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (NYSDEC, 1994). The focus of this FWRIA is on a 1.3-acre wetland located to the east of the landfill (Site). Scott Heim (TRC Ecologist) conducted an inspection of the Site and vicinity on December 16, 2019. This report describes the first phase (Step 1) of the FWRIA.

Step 1 of the FWRIA involves preparation of descriptions of the Site and its surrounding area, including physical characteristics (e.g., topography, drainage, and habitat cover types) and wildlife resources. These descriptions are presented in **Section 2.0** of this report. **Section 3.0** identifies the fish and wildlife resources in the vicinity of the Site. **Section 4.0** identifies the applicable regulatory criteria to be used for this analysis. **Section 5.0** presents the contaminant migration and exposure pathways as well comparison of site-specific data to the applicable toxicity criteria. **Section 6.0** presents conclusions to be considered in development of further remedial investigations or remediation options.

2.0 SITE DESCRIPTION

As indicated in the introduction, the Site consists of a 1.3-acre wetland area located immediately east of the former landfill that is currently capped and maintained as a grassland community. The Site is bounded to the west (and south) by the former landfill, to the east by an active railroad, and to the north by a large, connected wetland that extends northward into a tributary to Muddy Brook.

The objectives of the Step 1 FWRIA are to describe the fish and wildlife resources and habitat that may exist in the vicinity of the Site, and assess the overall value of those resources to the surrounding human and wildlife communities. The following site-specific maps were created to illustrate important Site features, including fish and wildlife resources within the vicinity of the Site:

- **Figure 1** illustrates the Site location and the topography, streams, rivers and ponds within a two-mile radius of the Site;
- **Figure 2** identifies the type and location of Critical Environmental Areas (CEAs) within a two-mile radius of the Site;
- **Figure 3** identifies Significant Natural Communities within a two-mile radius of the Site;
- **Figure 4** identifies rare, threatened, and endangered (RTE) plant species and animal habitats within a two-mile radius of the Site;
- **Figure 5** illustrates the New York State regulated wetlands within a two-mile radius of the Site;
- **Figure 6** identifies existing ecological natural communities within a one-quarter-mile radius of the Site; and
- **Figure 7** illustrates existing stormwater drainage patterns present on the Site to evaluate whether the surrounding fish and wildlife habitat resources will be adversely impacted by site contamination.

Visible signs of stress to fish and wildlife resources were also evaluated at the Site and vicinity.

2.1 Streams, Rivers and Ponds

Several waterways and ponds are located within two miles of the Site (**Figure 1**). The East Branch Croton River is located approximately 3,500 feet to the east, and represents the largest flowing waterbody in the vicinity of the Site. Muddy Brook is present approximately 700 feet to the southeast, while a large tributary to this brook is present 1,000 feet north of the Site. Both the large tributary to Muddy Brook and the East Branch Croton River are classified as Class C(T), indicating a best usage for fishing, including trout. Muddy Brook is classified as Class C, indicating that its best usage is for fishing, but that it's generally unsuitable for trout.

Several additional streams and sources that are tributaries to Muddy Brook (including Mendel Pond) are present within two miles to the west and south of the Site. These tributaries are also classified as either C or C(T). Tributaries to the East Branch Croton River (including Stephens Brook and Mountain Brook) are also present within two miles of the Site to the east. Mountain Brook is a Class C stream while Stephens Brook is classified as C(TS), indicating that this stream is suitable for trout spawning.

2.2 Critical Environmental Areas

A review of the New York State Environmental Resource Mapper shows that the Site is located within a Critical Environmental Area (CEA) known as the Great Swamp (**Figure 2**). This CEA was designated due to its exceptional or unique characteristics. The Great Swamp consists of a 19.8-mile long, 6,000-acre riverine/wetland. The Site is associated with the South Flow portion of the Great Swamp, as the East Branch Croton River flows southward and eventually discharges into the East Branch Reservoir.

2.3 Significant Natural Communities

Several state-significant natural communities associated with the Great Swamp are present within the vicinity of the Site. These significant ecological natural communities include red maple-hardwood swamp and floodplain forest (see **Figure 3**). The floodplain forest community is associated with the East Branch Croton River while red maple-hardwood swamp is present adjacent to the Site to the east and north.

2.4 Rare Species Habitat

Plants
Several state-listed rare animal and plant species have been previously noted within one mile of the Site (see **Figure 4**). Based on recent correspondence with the New York Natural Heritage Program (see **Attachment A**), two plants, one reptile, and one mammal that are state-listed have been documented in the vicinity of the Site. In addition, based on comments provided by NYSDEC Division of Fish and Wildlife, seven additional species may be present in the vicinity of the Site.

The two rare plants are spreading globeflower (*Trollius laxus*) and fairywand (*Chamaelirium luteum*). Spreading globeflower is state-listed as Rare, while fairywand is state-listed as Endangered. Both of these species were previously noted within a nearby wetland located approximately 0.25 miles southwest of the Site. This nearby wetland is a rich, sloping fen that is associated with a stream that is a tributary to Muddy Brook.

Based on NYSDEC GIS records, the following listed species may also be present in the vicinity of the Site:

- Swamp birch (*Betula pumila*)
- Carolina whitlow grass (*Tomostina reptans*)
- Spotted pondweed (*Potamogeton pulcher*)
- Hop sedge (*Cyperus lupulinus*)
- Marsh horsetail (*Equisetum palustre*)
- Yellow wild flax (*Linum sulcatum*)
- Narrow-leaved sedge (*Carex amphibola*)

Animals

The bog turtle (*Glyptemys muhlenbergii*) has previously been documented within 0.6 miles of the Site. These turtles have the potential to be present at the Site, as individual turtles may travel up to one mile from documented locations. This species is state-listed as Endangered and is federally-listed as Threatened. Bog turtles occur within low-lying, open wetlands bordered by woodlands - particularly calcareous fens, herbaceous sedge meadows, and pastures. These wetlands are characterized by a continuous flow of water seeping through the saturated soil surface. Within these wetlands, bog turtles need a variety of micro-habitats for basking, foraging, nesting, shelter, and hibernation - including dry pockets, saturated areas, and areas that are subject to flooding. Hibernation occurs in more densely vegetated areas of the wetland complex, where turtles use channels beneath hummocks that are covered with small trees and shrubs. Individuals may also hibernate in the soft mud of spring-fed rivulets. Natural succession necessitates that bog turtles find new suitable habitat when wetlands become shrubby or are flooded due to extensive beaver activity. Bog turtles move between adjacent areas of suitable habitat. They are naturally limited by low rate of reproductivity, low juvenile survivorship, and a long maturation period. Sexual maturity is reached in 8 to 11 years. In New York, bog turtles are active from late April to mid-September. Clutches range from 1 to 5 eggs and average 3 to 5. In New York, eggs hatch in the fall and hatchlings begin growth during the following summer. Bog turtles are suspected to live 30 years. They are most seriously threatened by destruction and fragmentation of suitable wetland habitat from alterations in groundwater, nonpoint source pollution (fertilizer and septic runoff), invasive plant species (common reed, purple loosestrife), off-road vehicle traffic, and filling of wetlands.

A Phase 1 Bog Turtle Habitat Survey was performed on June 1, 2020, to determine whether or not the wetland is a potential bog turtle habitat, and to understand what (i.e., Phase 2, education, etc.), if anything, will need to be considered as part of the remedial plan for the wetland. As part of the Phase 1 survey, the following three criteria were evaluated at the Site, in accordance with the U.S. Fish and Wildlife Services (USFWS), Guidelines for Bog Turtle Surveys, to determine the potential for bog turtle habitat:

1. Suitable hydrology;
2. Suitable soils; and,
3. Suitable vegetation.

In summary, wetlands at the Site were regarded by the survey scientist as sub-optimal bog turtle habitat. The Site did not contain any seeps or springs which would provide oxygenated cold water upwelling and therefore potential hibernacula locations. The wetland did contain a shallow mucky peat as a substrate, but the underlying dense rocky mineral soil layer would inhibit the ability for bog turtles to dig deeply into the substrate. The wetland was also densely choked with invasive phragmites, purple loosestrife, and cattails, creating a dense, shaded understory, not conducive to bog turtle foraging, basking and nesting. Based on the Site history, presence of contamination, measured nitrogen levels (elevated), and pH measurements, the wetland does not provide the preferred conditions and alkaline pH normally associated with the species. In addition, the physical barrier created by the railroad makes seasonal movement to this wetland by bog turtles unlikely. Based on these findings, no further studies, investigations, or permitting (i.e., Article 11) are recommended related to the bog turtle.

New England Cottontail rabbits (*Sylvilagus transitionalis*) have also been previously documented within 0.5 miles to the north/northeast of the Site. This rabbit is state-listed as Special Concern. This species has disappeared from many historical locations in New York due to forest maturation, habitat loss, habitat fragmentation, and competition with Eastern cottontails. The New England cottontail is an early-successional species, preferring open woods, disturbed areas, shrubby areas, thickets, and marshes. Current populations in southeastern New York can be found in isolated habitat patches that have undergone some form of disturbance; such habitats include agricultural fields and edges, and occasionally brushy edges of transportation corridors.

In accordance with NYSDEC Department of Fish and Wildlife recommendations, the following preventative steps will be taken and/or incorporated into the remedial action:

1. Education and encounter planning for site workers: Based on Department recommendations, the elements of the education and encounter plan for contractors and workers would likely include training on identifying protected turtles (and other species) and steps to be taken if turtles (or other species) are encountered. As appropriate, the encounter plan would outline the steps to be taken if a turtle is encountered during construction (stoppage of work, required notifications, next steps including the potential need to move the turtle) and conditions under which work may resume in the area.
2. Silt fence will be installed as needed to both prevent sediment discharge to the downstream environment as well as in locations contiguous with the large DP-22 wetland complex as a barrier against non-resident turtles and New England Cottontail rabbit entering the construction area during the work.

Impacts on bog turtle and habitats found in the larger DP-22 complex would also be addressed with basic water quality/hydrology protection measures applied through Article 24/15 permitting review. Applicable requirements and standards would be incorporated into the design, as needed. It should be noted that the proposed project will not include construction of a perimeter security fence and will be relatively slow moving. The potential to trap rabbits and other species within the work area is therefore unlikely and preclearing the area unnecessary.

2.5 Regulated Wetlands

New York State regulates freshwater wetlands that are typically 12.4 acres or larger in extent. These wetlands are classified from Class 1 (which provide the most benefits) to Class 4 (which provide the least benefits). Six state-regulated freshwater wetlands are present within two miles of the Site (see **Figure 5**). The largest of these wetlands (DP-22) is a Class 1 wetland. It consists of approximately 5,513 acres, the vast majority of which is palustrine forested wetland (red maple-hardwood swamp) with areas of palustrine emergent marsh also present. The limits of wetland DP-22 are fairly consistent with the designated CEA associated with Great Swamp. A Class 1 wetland represents the highest level of wetland benefits based on providing habitat for rare species and/or hydrological/pollution control features.

Four of the six state-regulated wetlands (PA-2, PA-3, PQ-50, and PQ-51) are Class 2 wetlands, and range in size from 14.2 acres (PA-3) to 33.1 acres (PA-2). The final wetland (LC-10) is a

Class 3 wetland that is 21.4 acres in size. With the exception of PA-2, each of the six state-regulated wetlands is associated with small streams and includes areas of palustrine forested/scrub-shrub and palustrine emergent marsh. Wetland PA-2 is a seasonally-flooded, palustrine forested wetland that has previously been ditched (at least partially).

2.6 Ecological Communities

Based on aerial photographs and the Site inspection, a habitat cover assessment and classification was conducted using "Ecological Communities of New York State" (Edinger et al., 2014). In order to assist in the cover type mapping, some community cover types were combined (e.g., rural structures were combined with mowed lawn with trees). A map of the natural communities within a one-quarter-mile radius of the Site is depicted on **Figure 6**. A total of 11 different community types or community type combinations were identified and are listed and quantified in **Table 1** below.

TABLE 1. COVER TYPES IN VICINITY OF SITE

Natural Communities / Cover Types	Acres	Percent Cover Within ¼ Mile Radius
Shallow Emergent Marsh	1.35	0.83%
Red Maple – Hardwood Swamp	79.80	49.11%
Common Reed Marsh	1.27	0.78%
Red Maple – Common Reed Wetland	10.46	6.44%
Farm Pond	0.41	0.25%
Successional Old Field	9.34	5.75%
Successional Southern Hardwoods	7.61	4.69%
Allegheny Oak – Pine Forest	16.51	10.16%
Cropland / Field Crops	10.60	6.52%
Rural Structure / Mowed Lawn with Trees	21.51	13.24%
Paved Road	1.81	1.11%
Railroad	1.82	1.12%

The Site itself is covered primarily by shallow emergent marsh. Of the 11 community types surrounding the site, red maple – hardwood swamp covers nearly one-half of the area within a one-quarter-mile radius. The other communities in the vicinity of the Site include common reed marsh, red maple – common reed wetland, successional old field, successional southern hardwoods, Allegheny oak – pine forest, farm pond, rural exterior buildings/mowed lawn with trees, cropland/field crops, paved road, and railroad. The descriptions of the natural communities observed during the Site inspection are cited below. These descriptions are primarily from Edinger et al. (2014), and are supplemented with observations from the Site inspection.

Shallow Emergent Marsh: A shallow emergent marsh is a marsh meadow community that occurs on mineral soil or deep muck soils (rather than true peat), that is permanently saturated and seasonally flooded. This marsh is better drained than a deep emergent marsh; water depths may range from 6 inches to 3.3 feet during flood stages, but the water level usually drops by mid to late

summer and the substrate is exposed during an average year. This is a very broadly-defined type that includes several distinct variants and many intermediates. Shallow emergent marshes are very common and quite variable. They may be co-dominated by a mixture of species or have a single dominant species.

The most abundant herbaceous plant noted during the Site inspection were cattails (*Typha latifolia*), with purple loosestrife (*Lythrum salicaria*) and common reed (*Phragmites australis*) present along the periphery and within hummocks in the marsh. Those last two species are invasive, weedy, non-native species that are generally a result of previous disturbance. Royal fern (*Osmunda regalis*) was also noted within this cover type. Other common species that may be present, but that were not observed during the winter inspection, include sedges (*Carex* spp.), marsh fern (*Thelypteris palustris*), manna grasses (*Glyceria pallida, G. canadensis*), spikerushes (*Eleocharis palustris, E. obtusa*), bulrushes (*Scirpus cyperinus, S. atrovirens, Schoenoplectus tabernaemontani*), three- way sedge (*Dulichium arundinaceum*), sweetflag (*Acorus americanus*), tall meadow-rue (*Thalictrum pubescens*), marsh St. John's-wort (*Triadenum virginicum*), arrowhead (*Sagittaria latifolia*), goldenrods (*Solidago rugosa, S. gigantea*), spotted joe-pye-weed (*Eutrochium maculatum*), boneset (*Eupatorium perfoliatum*), smartweeds (*Persicaria amphibia, P. hydropiperoides*), marsh bedstraw (*Galium palustre*), jewelweed (*Impatiens capensis*), and loosestrifes (*Lysimachia thyrsiflora, L. terrestris, L. ciliata*).

Approximately 20 percent of the shallow emergent marsh was covered with open water/ice at the time of the site inspection. Iron staining was evident at the southwestern edge of the marsh, adjacent to the landfill toe of slope. Water quality within the shallow emergent marsh was evaluated during the inspection. The following measurements were collected:

Water Temperature	3.97° Celsius
pH	6.91 S.U.
Dissolved Oxygen	11.34 milligrams per liter (mg/L)
Conductivity	0.454 micro-Siemens per centimeter (uS/cm)
Oxidation-Reduction Potential (ORP)	-206.4 millivolts (mV)

Characteristic amphibians that breed in in shallow emergent marshes include frogs such as northern spring peeper, American toad, and wood frog. Characteristic birds with varying abundance include red-winged blackbird, marsh wren, swamp sparrow, and common yellowthroat. Waterfowl such as Canada goose and mallard may also nest in this habitat.

Shallow emergent marshes typically occur in lake basins and along streams, often intergrading with deep emergent marshes, shrub swamps, and sedge meadows These natural communities may occur together in a complex mosaic in a large wetland. It appears that hydroperiod may be an important factor in determining shallow emergent marsh species composition (e.g., permanently saturated and seasonally flooded vs. saturated and temporarily inundated).

Red Maple – Hardwood Swamp: Red maple (*Acer rubrum*) is the dominant overstory species for this cover type. Some ash (*Fraxinus nigra, F. pensylvanica*) are also present. Red maple - hardwood swamp generally occurs on inorganic soils in poorly drained depressions that may be saturated to the surface throughout the year. Understory vegetation is dense and includes the following shrubs and understory vegetation that were noted during the inspection: silky dogwood

(*Cornus amomum*), winterberry (*Ilex verticillata*), sensitive fern (*Onoclea sensiblis*), and jewelweed (*Impatiens capensis*). Additionally, bur-reed (*Spharganium americanum*) and cat-tail may be present within more open patches of this habitat.

Tree-dominated wetland ecosystems including this cover type support the greatest breeding bird diversity in the Great Swamp. Over 180 species have been noted within this community - over 60 of which are breeding species. Characteristic bird species in this habitat include wood duck, red-tailed hawk, cooper's hawk, pileated woodpecker, least flycatcher, veery, yellow-throated vireo, scarlet tanager, and rose breasted grosbeak. Other species typically present include river otter and mink. These swamps provide breeding habitat for many wetland-dependent species, such as northern spring peeper, American toad, wood frog, and spotted salamander. Species noted within this habitat during the Site inspection included pileated woodpecker, red-bellied woodpecker, downy woodpecker, song sparrow, black-capped chickadee, northern cardinal, and American crow.

Common Reed Marsh: This community represents a marsh that has been disturbed by draining, filling, road salts, etc. in which common reed has become dominant. In extreme examples, common reed forms monotypic stands, as is present around the periphery of the Site and to the south of the Site. Common reed marsh may form a mosaic with, or grade into, purple loosestrife marsh, or may occur as a patch within other palustrine communities. Although remnant native plants may be present, the abundance of common reed makes it impossible to classify the marsh as one of the palustrine natural communities. This community has much less value to wildlife than other wetland communities present in the vicinity.

Red Maple - Common Reed Wetland: This wetland area contains a dense common reed cover with scattered, red maple and ash trees present in the overstory. Although the understory contains a dense common reed stand, the overstory trees (including many dead trees or snags) provide nesting areas for a variety of avian species. Species noted within this cover type during the Site inspection included Carolina wren, song sparrow, black-capped chickadee, downy woodpecker and rusty blackbird.

Farm Pond: This aquatic community generally consists of a small pond constructed on agricultural or residential property. These ponds typically lack perennially flowing inlets and outlets. They are often eutrophic, and may be stocked with panfish such as bluegill and yellow perch. The biota is variable (within limits), reflecting the species that were naturally or artificially seeded, planted, or stocked in the pond.

Successional Old Field: Successional old field is a meadow dominated by forbs and grasses that occurs on sites that have been cleared and plowed (for farming or development), and then abandoned. The landfill cover itself, as well as fields that are mowed at an interval (e.g., less than once per year) that favor the reproduction of characteristic successional old field species, are considered successional old field. This is a relatively short-lived community that succeeds to a shrubland, woodland, or forest community unless maintained as forb/grassland by mowing (such as on the landfill cover). If the landfill cover is mowed several times each year, then it may be more representative of a mowed lawn community rather than a successional old field.

Characteristic herbs include goldenrods (*Solidago altissima, S. nemoralis, S. rugosa, S. juncea, S. canadensis*, and *Euthamia graminifolia*), bluegrasses (*Poa pratensis, P. compressa*), timothy (*Phleum pratense*), quackgrass (*Elymus repens*), smooth brome (*Bromus inermis*), sweet vernal grass (*Anthoxanthum odoratum*), orchard grass (*Dactylis glomerata*), common chickweed (*Cerastium arvense*), common evening primrose (*Oenothera biennis*), old-field cinquefoil (*Potentilla simplex*), calico aster (*Sympyotrichum lateriflorum* var. *lateriflorum*), New England aster (*Sympyotrichum novae-angliae*), wild strawberry (*Fragaria virginiana*), Queen-Anne's-lace (*Daucus carota*), ragweed (*Ambrosia artemisiifolia*), hawkweeds (*Hieracium* spp.), dandelion (*Taraxacum officinale*), and ox-tongue (*Picris hieracioides*).

Shrubs may be present, but they collectively cover less than 50% of the community. Characteristic shrubs include gray dogwood (*Cornus racemosa*), silky dogwood (*C. amomum*), arrowwood (*Viburnum dentatum*), raspberries (*Rubus* spp.), sumac (*Rhus typhina, R. glabra*), and eastern red cedar (*Juniperus virginiana*). Shrub vegetation noted along the periphery of the landfill or recently cut on the landfill cover itself included Russian olive (*Elaeagnus angustifolia*).

Characteristic butterflies include black swallowtail, orange sulphur, eastern tailed blue, and copper. Characteristic birds include field sparrow, savannah sparrow, and American goldfinch. Characteristic mammals include meadow vole and woodchuck. Species noted within this cover type during the Site inspection included eastern meadowlark, white-tailed deer and woodchuck (burrow present).

Successional Southern Hardwoods: This forest type is a hardwood or mixed forest that occurs on sites that have been cleared or otherwise disturbed. Characteristic trees and shrubs include any of the following: American elm (*Ulmus americana*), slippery elm (*U. rubra*), white ash (*Fraxinus americana*), red maple, box elder (*Acer negundo*), silver maple (*Acer saccharinum*), sassafras (*Sassafras albidum*), gray birch (*Betula populifolia*), hawthorns (*Crataegus* spp.), eastern red cedar (*Juniperus virginiana*), and choke-cherry (*Prunus virginiana*). Certain introduced species are commonly found in successional forests, including black locust (*Robinia pseudo-acacia*) and buckthorn (*Rhamnus cathartica*). Any of these may be dominant or codominant in a successional southern hardwood forest. Southern indicators include American elm, white ash, red maple, box elder, choke-cherry, and sassafras. This is a broadly defined community and several seral and regional variants are known. A characteristic bird is chestnut-sided warbler.

Allegheny Oak – Pine Forest: This forest type is a mixed forest that occurs on sandy soils or on slopes with rocky soils that are well-drained. The canopy is dominated by a mixture of oaks and white pine (*Pinus strobus*). The oaks include one or more of the following: black oak (*Quercus velutina*), chestnut oak (*Q. montana*), red oak (*Q. rubra*), and white oak (*Q. alba*). Red maple, eastern hemlock (*Tsuga canadensis*), American beech (*Fagus grandifolia*), and black cherry *(Prunus serotina*) are common associates occurring at low densities.

The tall shrub layer includes saplings of canopy trees plus witch hazel (*Hamamelis virginiana*), serviceberry (*Amelanchier arborea*), and hazelnuts (*Corylus americana, C. cornuta*). The short shrub layer is predominantly ericaceous, usually with lowbush blueberries (*Vaccinium angustifolium, V. pallidum*) and black huckleberry (*Gaylussacia baccata*), but also includes maple-leaf viburnum (*Viburnum acerifolium*) and tree canopy seedlings.

The groundlayer is relatively sparse, and comprised of Pennsylvania sedge (*Carex pensylvanica*), Canada mayflower (*Maianthemum canadense*), star flower (*Trientalis borealis*), wild sarsaparilla (*Aralia nudicaulis*), common hairgrass (*Avenella flexuosa*), partridge berry (*Mitchella repens*), bracken fern (*Pteridium aquilinum var. latiusculum*), woodferns (*Dryopteris intermedia, D. marginalis*), and wintergreen (*Gaultheria procumbens*).

Cropland/Field Crops: Cropland/field crops are agricultural fields planted in field crops such as alfalfa, wheat, timothy, and oats. This community includes hayfields that are rotated to pasture. Characteristic birds with varying abundance include grasshopper sparrow, vesper sparrow, bobolink, and mourning dove.

Exterior Rural Structures/Mowed Lawn with Trees: Residential, recreational, or commercial land in which the groundcover is dominated by clipped grasses and forbs, and includes some cover of overstory trees are the basic characteristics of this land type. Ornamental and/or native shrubs may be present, usually with less than 50 percent cover. The groundcover is maintained by mowing. Characteristic animals include gray squirrel, American robin, mourning dove, and mockingbird.

Paved Road: As the name indicates, this feature is a road that is paved with asphalt, concrete, brick, stone, etc. There may be sparse vegetation rooted in cracks in the paved surface. This cover type is associated with Cornwall Hill Road.

Railroad: Again as the name indicates, this feature is a permanent road having a line of steel rails fixed to wood ties and laid on a gravel roadbed that provides a track for cars or equipment drawn by locomotives or propelled by self-contained motors. There may be sparse vegetation rooted in the gravel substrate along regularly maintained railroads. The railroad right of way may be maintained by mowing or herbicide spraying. Characteristic plants include invasive weeds such as spotted knapweed (*Centaurea stoebe* ssp. *micranthos)*, downy chess (*Bromus tectorum*), coltsfoot (*Tussilago farfara*), Cypress spurge (*Euphorbia cyparissias*), sheep sorrel (*Rumex acetocella*), and crown-vetch (*Coronilla varia*). The Metropolitan Transit Authority (MTA) railroad directly abuts the Site to the east.

2.7 Site Drainage

Field reconnaissance concluded that the shallow emergent marsh at the Site is relatively flat and generally enclosed within a shallow basin. During periods of heavy precipitation and during wetter periods of the year (e.g., spring), surface waters within the wetland may be discharged to the north toward a large tributary of Muddy Brook. This tributary then flows to the east under a bridge associated with the MTA railroad and eventually discharges into Muddy Brook approximately 2,500 feet downstream. **Figure 7** (Drainage Map) shows the current surface water drainage patterns associated with the Site.

2.8 Observation of Stress

Although iron staining was noted along the southwestern edge of the Site, signs of stress to vegetation and wildlife from site-related chemicals were not observed during the field reconnaissance conducted in December. However, it should be noted that evidence of vegetation stress would be difficult to determine at the time of year the inspection was conducted.

3.0 FISH AND WILDLIFE RESOURCE VALUE

3.1 Value of Habitat to Fauna

The description of fish and wildlife resources within the vicinity of the Site indicate that valuable resource areas are present. A CEA, a state-significant natural community, and several RTE species habitats exist within, adjacent to, and/or in close proximity to the Site. A 300-acre parcel of the Great Swamp Wildlife Management Area managed by the NYSDEC is present adjacent to the Site to the east and southeast. Wildlife previously identified as occurring within the Great Swamp are provided in **Attachment B**.

The Great Swamp and perhaps the Site itself provides habitat for several state-listed rare species including the bog turtle (also federally-listed as Threatened) and New England cottontail - as well as healthy populations of blue-spotted salamanders, wood turtles, painted turtles, and river otters. The Great Swamp has been designated an Important Bird Area by the National Audubon Society, as it supports an exceptional representative bird community and is important for migrating shorebirds including greater yellowlegs, solitary sandpipers, spotted sandpipers, Wilson's snipe, and American woodcock. Tree-dominated wetland ecosystems support the greatest breeding bird diversity in the Great Swamp. Many of these species are neotropical migrants that have experienced significant population declines.

Special concern species that are presumed to be breeding in the Great Swamp include red shouldered hawk, black billed cuckoo, yellow billed cuckoo, cerulean warbler, and Canada warbler. Many additional at-risk species utilize the Great Swamp as breeding areas, during spring/fall migrations and during the winter. At-risk breeding species include American bittern, Cooper's hawk, American woodcock, willow flycatcher, wood thrush, blue-winged warbler, cerulean warbler, worm-eating warbler, and Canada warbler. Large numbers of black ducks, mallards, wood ducks, and Canada geese use the Great Swamp during migration. The area also provides significant breeding habitat for wood ducks, mallards, and Canada geese during all times of year except winter, when the East Branch Croton River channel is frozen.

The Site itself is a shallow emergent marsh that provides habitat for a variety of aquatic plants and invertebrates, which may subsequently be consumed by herbivorous and insectivorous wildlife such as waterfowl, various songbirds (e.g., swallows, warblers, sparrows), mammals such as muskrats and bats, various amphibians (e.g., frogs, salamanders), and reptiles (e.g., snakes, turtles). This aquatic habitat may also provide breeding habitat for amphibians such as the American toad and leopard frogs.

The nearest surface waterway to the Site is a perennial stream tributary to Muddy Brook that is located approximately 1,000 feet to the north. This stream is located downgradient of the Site and provides habitat for various fish, including trout. Piscivorous wildlife including herons, mink, and otter may forage within this portion of the stream.

3.2 Value of Resources to Humans

The Great Swamp is the second largest freshwater wetland in New York State. Surface water within the South Flow associated with the East Branch Croton River is very important to the supply of drinking water to Putnam and Westchester counties, as well as to New York City. The East Branch Croton River is located approximately 3,500 feet east of the Site.

The tributary to Muddy Brook located approximately 1,000 feet north of the Site and the East Branch Croton River both provide suitable habitat for trout, which provide opportunities for recreational fishing.

Overall, the Site and aquatic/wetland habitats present nearby provide significant value to society, which is reflected in the designation of these areas as a state-listed CEA. Site-related contaminants could result in exposure to wildlife and fish populations that are present in the aquatic and wetland communities within and/or adjacent to the Site. Therefore, a contaminant-specific impact assessment that includes identification of exposure pathways and applicable regulatory criteria is warranted, and is presented in the sections that follow.

4.0 APPLICABLE FISH AND WILDLIFE REGULATORY CRITERIA

Early sediment and surface water investigation activities were undertaken between 2002 and 2013. During these early investigation phases, a total of 70 sediment samples were collected from 0-3 inches below sediment surface (bss) and submitted for analysis of polychlorinated biphenyls (PCBs). PCBs were detected in all sediment samples ranging in concentration from 0.11 milligrams per kilogram (mg/kg) to 130 mg/kg. In addition, during these early investigations, a total of 7 surface water samples were collected (including one sample from the landfill perimeter drain manhole) and analyzed for PCBs. PCBs were detected in all samples (except for the sample from the perimeter drain manhole) at concentrations ranging from 0.28 micrograms per liter (µg/L) to 40 µg/L.

Additional investigation and delineation activities commenced in 2016 and continued through 2018. In 2016, 30 surface water samples were collected along two parallel lines transecting the pond, and one surface water sample was collected at a location north (downstream) of the Site. The surface water samples were collected approximately five feet apart along each line/transect. Surface water samples were collected as "grab" type samples and submitted for laboratory analysis of PCBs. Nineteen (19) of the surface water samples contained PCB concentrations above the NYSDEC TOGS 1.1.1 Class A surface water standard of 0.09 µg/L (ranging from 0.2 µg/L up to 1.5 µg/L). PCBs were not detected at twelve (12) sampling locations (including the additional location to the north), however, the detection limit for each of these samples exceeded 0.09 µg/L. All of the surface water PCB detections were Aroclor-1242.

Additional sediment samples were collected from the Site during three subsequent sediment investigation phases in October 2016, November 2017, and September 2018. Throughout these investigations, a total of 129 sediment samples were collected from 47 locations and various depth intervals. Each of these sediment samples was analyzed for PCBs by SW-846 method 8082A. Two of the sediment samples collected were also analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, per- and polyfluoralkyl substances (PFAS), and inorganics.

PCBs were detected at 43 of 47 shallow sediment sample locations (0 to 6 inches bss), which represents the primary exposure depth for ecological receptors. Concentrations of PCBs ranged from 0.14 mg/kg up to 23,000 mg/kg in these surface sediment samples. VOCs, pesticides or PFAS were not detected in either of the sediment samples where these constituents were analyzed. Polycyclic aromatic hydrocarbons (PAHs) were the only SVOCs detected in the two sediment samples. Cyanide and 19 metals were also detected in these samples.

4.1 Contaminant-Specific Regulatory Criteria

Surface Water

Results for concentrations of PCBs detected in surface water samples can be compared to New York State ambient water quality standards in Title 6 of New York Code, Rules, and Regulations (6 NYCRR) Part 703. Comparisons in this section were limited to those samples collected during the 2016 to 2018 timeframe. Standards are available for protection of human health via consumption of

fish and protection of wildlife from ingestion of contaminated prey (i.e., fish). These standards are presented in **Table 2** along with a comparison of sampling results.

TABLE 2. FRESHWATER SURFACE WATER-SPECIFIC STANDARDS

Constituent	Standard	# Samples > Standard
Total PCBs	0.000001 µg/L - H(FC)	19 of 31 samples
	0.00012 µg/L - W	19 of 31 samples

Notes: H(FC): Human Consumption of Fish; W: Wildlife Protection

As noted in **Table 2**, 19 of 31 surface water samples collected at the Site contained PCB concentrations that exceed the standards protective of both human health and that of wildlife. Considering that the detection limit for the remaining 12 samples (0.20 µg/L) exceeds the standards, it would be reasonable to assume that all samples exceeded these standards.

Sediment

The sediment analytical results for PCBs, PAHs, and metals can be compared to the NYSDEC Division of Fish, Wildlife and Marine Resources Bureau of Habitat Screening and Assessment of Contaminated Sediment Class A, Class B and Class C Freshwater Sediment Guidance Values (SGVs). These categories are defined as (NYSDEC, 2014):

- Class A - If the concentration of a contaminant in sediment is below the SGV that defines this class, the contaminant can be considered to present little or no potential for risk to aquatic life. For equilibrium partitioning-based SGVs, the Class A threshold concentrations were derived using chronic ambient water quality standard/guidance values (AWQS/GVs). For empirically-based SGVs, the Class A threshold was derived from the threshold effects concentration (TEC).
- Class B - If the concentration of a contaminant lies between the SGVs that define Class A and Class C, additional information is needed to determine the potential risk to aquatic life. For equilibrium partitioning-based SGVs, the contaminant concentration is greater than the SGV derived from a chronic AWQS/GV but less than the SGV derived from an acute AWQS/GV. For empirically-derived SGVs, the contaminant concentration is between the TEC where toxicity is observed infrequently, and the probable effects concentration (PEC), where toxicity is observed frequently. The potential for risk to aquatic life cannot be ascertained from contaminant concentration data alone.
- Class C - If the concentration of a contaminant is above the SGV that defines this class, there is a high potential for the sediments to be toxic to aquatic life. For equilibrium partitioning-based SGVs, the Class C threshold concentrations were derived using acute AWQS/GVs. For empirically-based SGVs, the Class C threshold was derived from the PEC.

The TEC and PEC values for metals from MacDonald, et al. (2000) are adopted by NYSDEC (2014) as the Class A and C SGVs in sediments from freshwater. In general, these values represent a 75% likelihood that toxicity will not be observed if the concentration of a metal is below the Class A SGV, and a 75% likelihood that that toxicity will be observed if the contaminant

concentration exceeds the Class C SGV. Exceeding an SGV for a metal provides only limited information on the type, magnitude, or extent of toxicity that could be observed. The Class A SGV (i.e., TEC) for mercury could be under-protective, as it only correctly identified sediments as toxic 35% of the time, instead of 75%, and should be used with caution.

Similarly, Long and Morgan (1991) compiled a database of numerous sediment contaminant concentrations from both fresh waters and marine waters across the United States, and compared those contaminant concentrations to the observed, associated biological effects. The 10th percentile concentration associated with adverse effects was designated as the effects range – low (ERL), and 50th percentile concentration was designated as the effects range – median (ERM). Contaminant concentrations for which no effects were associated were not used. The ERL and ERM were selected by NYSDEC as the Class A and C SGVs in freshwater sediments for total PAHs, respectively.

The ecological risk associated with PCBs is generally not associated with toxicity to benthic organisms or fish exposed directly to these constituents, but to wildlife that occupy the upper levels of the food chain that consume invertebrates and fish that have accumulated body burdens of PCBs. These higher-order consumers can experience significant adverse impacts from PCBs at concentrations lower than those that produce impacts in organisms directly exposed to these compounds.

The NYSDEC has had significant experience with the assessment and remediation of PCB-contaminated sites. While addressing known PCB-contaminated sediment problems, the NYSDEC identified a set of values to assess risks to aquatic life and animals higher on the food chain (through bioaccumulation). When the concentration of total PCBs in sediment was less than 100 micrograms per kilogram (µg/kg), or 0.1 mg/kg, ecological risk has generally been considered acceptable. Conversely, a concentration of total PCBs in sediment exceeding 1,000 µg/kg, or 1.0 mg/kg, is likely to be harmful to aquatic organisms or organisms exposed through the food chain. These values were subsequently proposed by NYSDEC to represent the Class A and C SGVs for PCBs. **Table 3** presents the contaminant specific criteria for Class A, B and C SGVs.

TABLE 3. NYSDEC CONTAMINANT-SPECIFIC SGVs

Constituent	Class A	Class B	Class C
Total PCBs	< 0.1	0.1 – 1.0	> 1.0
Total PAHs	< 4	4 - 35	> 35
Arsenic	< 10	10 - 33	> 33
Cadmium	< 1	1 - 5	> 5
Chromium	< 43	43 - 110	> 110
Copper	< 32	32 - 150	> 150
Lead	< 36	36 - 130	> 130
Mercury	< 0.2	0.2 - 1	> 1
Nickel	< 23	23 - 49	> 49
Zinc	< 120	120 - 460	> 460

Note: All concentrations in mg/kg or parts per million (ppm).

One of the outcomes of the screening and classification process should be the elimination of all contaminant concentrations classified as B. This is accomplished by integrating additional information, evidence, and testing into the process until Class B contaminant concentrations are re-classified to either Class A or Class C. If the assessment procedures do not result in a Class B contaminant being reclassified as acceptable (Class A) or toxic (Class C), then determining the appropriate actions for addressing the contaminants at that station becomes a part of the overall sediment project management for the site.

A comparison of the SGVs listed above with the detected concentrations of constituents in the Site sediment is presented in **Table 4**. An additional 12 inorganics were detected in one or both of the two sediment samples, but a corresponding SGV is unavailable.

TABLE 4. SITE SEDIMENT COMPARISON TO SGVs

Constituent	Total # Samples	# Class A Samples	# Class B Samples	# Class C Samples
Total PCBs	47	4	22	21
Total PAHs	2	1	1	0
Arsenic	2	2	0	0
Cadmium	2	2	0	0
Chromium	2	2	0	0
Copper	2	1	1	0
Lead	2	2	0	0
Mercury	2	2	0	0
Nickel	2	1	1	0
Zinc	2	2	0	0

Note: Sampling results from 0 to 6 inches only.

In one of the two samples analyzed for metals, copper and nickel were detected at concentrations equal to the threshold concentration between Class A and Class B SGVs. As these concentrations represent the corresponding TECs, it would appear unlikely that these constituents present a significant risk to ecological receptors at the Site.

The total PAHs concentration at one of two sediment samples analyzed for PAHs was nearly 6.0 mg/kg. This is slightly above the classification for the Class B SGV. Therefore, additional information (e.g., total organic carbon content of sediment) is needed in order to reclassify these constituents as either Class A or Class C.

Total PCB sediment results are classified as Class B or C sediment at all but four sampling locations where they were not detected. Three of these four locations are situated east of the MTA railroad (i.e., outside the Site boundary), while the remaining sample is located just west of the railroad.

In addition to the ecological SGVs identified above, NYSDEC (2014) has also developed bioaccumulation-based sediment guidance values (BSGVs) for the protection of human health (fish consumption) and wildlife for several constituents detected in Site sediment (total PCBs and

benzo(a)pyrene). However, unlike the SGVs discussed above, the BSGVs are not intended to be used to classify sediment. Instead, they are intended to indicate the risk potential of food chain bioaccumulation to humans and/or wildlife. The BSGVs are normalized to the organic carbon content of sediment and are presented below in **Table 5**, assuming that organic carbon is at 2 percent for the Site sediment. Note that BSGVs are only available for two constituents (total PCBs and benzo(a)pyrene) detected within the Site sediment samples.

TABLE 5. NYSDEC CONTAMINANT-SPECIFIC BSGVs

Constituent	Human Health BSGV	Wildlife BSGV
Benzo(a)pyrene	0.018	NA
Total PCBs	0.0002	0.0041

Note: All concentrations in milligrams per kilogram (mg/kg) or parts per million (ppm) assuming 2 percent organic carbon.

The concentrations of total PCBs and benzo(a)pyrene exceed their respective BSGVs in all samples where these constituents were detected. Therefore, a potential risk exists if exposure pathways are present between the Site sediment and human and wildlife receptors.

4.2 Site-Specific Regulatory Criteria

Surface water bodies located in the vicinity of the Site include Muddy Brook, a tributary to Muddy Brook, and the East Branch Croton River. Muddy Brook is designated as a Class C Water, while its tributary and East Branch Croton River are Class C(T) Waters. Class C waters are defined by the State of New York as water that shall be suitable for fish propagation and survival, as well as primary and secondary contact recreation. Class C(T) waters are suitable for trout (cold-water fishery). Class C(T) streams are regulated under New York's Environmental Conservation Law (ECL) under Title 5 of Article 15. A Protection of Waters Permit would be required if any remediation activities proposed disturbance to the streambed or its banks.

The wetland within the Site is classified as a Class 1 wetland by NYSDEC. Wetlands within and adjacent to the Site are regulated under the Freshwater Wetlands Act by the NYSDEC under 6 NYCRR Part 663 and by the U.S. Army Corps of Engineers (USACE) under Section 404 of the U.S. Clean Water Act. Permits from both of these programs would be required if excavation or fill placement are proposed within the Site. The NYS Freshwater Wetlands regulations assign different levels of standards for projects, depending on the type of project and the wetland classification. For Class 1 wetlands, a permit shall be issued only if it is determined that the proposed activity satisfies a compelling economic or social need that clearly and substantially outweighs the loss of or detriment to the benefit(s) of the Class 1 wetland. Since the proposed work will be limited to the Site area, it is unlikely that the proposed remedial activities would disturb or otherwise impact Muddy Brook, the tributary to Muddy Brook, or the East Branch Croton River.

Since the Phase 1 Bog Turtle survey (habitat assessment) did not identify sufficient habitat to sustain the species, an Article 11 Endangered and Threatened Species Incidental Take Permit will not be required for the proposed work. However, as recommended by NYSDEC, the preventative steps listed above in **Section 2.4** will be incorporated into the remedial action and implemented in the field to ensure protection of the Bog Turtle (and other species).

5.0 POTENTIAL MIGRATION AND EXPOSURE PATHWAYS

The potential contaminant migration pathways present in the Site sediment are directly related to the Site drainage characteristics noted in **Section 2.7** and **Figure 7**. Topography and the existing MTA railroad largely mitigate the migration of Site contaminants to portions of the Great Swamp located to the east of the Site. However, during periods of high surface water, a potential intermittent migration pathway exists where surface water and sediment contaminants may be transported towards a large tributary stream of Muddy Brook located 1,000 feet north of the Site. It is unknown if Site-related contaminants have migrated to this tributary. Low concentrations of PCBs were detected in the most northerly surface water and sediment samples collected at the Site. If contaminants have been discharged to this tributary, then subsequent intermittent migration pathways would be to the east into Muddy Brook and eventually to the East Branch Croton River.

As described above, the direction of the stormwater flow is towards the large tributary to Muddy Brook located to the north. Therefore, the fish and wildlife resources in this stream and the Site itself are the subjects of the pathway analysis.

5.1 Site-Specific Exposure Pathways

Macroinvertebrates inhabiting the shallow emergent marsh at the Site would be exposed to sediment contaminants through direct contact and ingestion. Concentrations of total PCBs, and to a lesser extent, total PAHs, may result in direct mortality or reductions in growth and/or reproduction rates for benthic organisms. The shallow emergent marsh is not anticipated to support populations of fish given the shallow surface water depth that is present only intermittently during the drier portion of the year (late summer and fall). Therefore, exposure pathways at the Site from fish to humans or piscivorous wildlife are not present.

PCBs typically do not accumulate significantly within aquatic vegetation. However, the primary PCB Aroclors detected in Site sediment are Aroclor 1242 and to a lesser extent Aroclor 1232 and Aroclor 1254. These represent lower chlorinated isomers, which are more soluble in water and consequently, more likely to be taken up by plants present within the shallow marsh (Eisler, 1986). PCBs are expected to readily bioaccumulate within the tissues of aquatic invertebrates present at the Site.

Wildlife that forage on vegetation or prey upon aquatic invertebrates within the shallow emergent marsh at the Site may ingest PCBs through direct ingestion of plants or invertebrates or indirectly via incidental ingestion of sediment as they forage. Example receptors include waterfowl, shorebirds, songbirds such as red-winged blackbird and song sparrow, and mammals such as muskrat and Virginia opossum. In addition, the emerging adults of aquatic insect larvae (e.g., damselflies, mayflies, caddis flies, etc.) may be preyed upon by insectivores such as various warblers, swallows, and bats.

5.2 Off-Site Exposure Pathways

Exposure pathways described above for the Site would also apply to off-Site areas such as the large tributary to Muddy Brook, which is located approximately 1,000 feet north of the Site. In

addition, if Site-related contaminants have discharged to this stream, then bioaccumulation of PCBs (and PAHs to a much lesser extent) by fish present within this stream would represent another exposure pathway for humans and wildlife such as great blue heron, river otter, and mink that consume fish.

6.0 CONCLUSION

The results of the FWRIA indicate that there are significant ecological resources at and in the immediate vicinity of the Site that may be impacted by contamination associated with the Site. These resources include a CEA, a state-significant natural community (which is also a Class 1 Freshwater Wetland), potential habitat for multiple state-listed RTE species, and habitat for wildlife including amphibians, reptiles, birds, and mammals. In addition, a cold water fishery is located 1,000 feet north of the Site. Potentially affected resources at the Site and vicinity include components of the aquatic food chain that are directly associated with sediment (i.e., benthic macroinvertebrates) as well as higher trophic level receptors that may forage on vegetation and/or aquatic invertebrates that are present within the Site's shallow emergent marsh habitat. Both aquatic vegetation and invertebrates may bioaccumulate PCBs to levels that are potentially harmful to ecological receptors that forage within the Site. Based on the findings of this assessment, additional assessment should be conducted and/or remediation of the sediment exhibiting contamination is warranted.

7.0 REFERENCES

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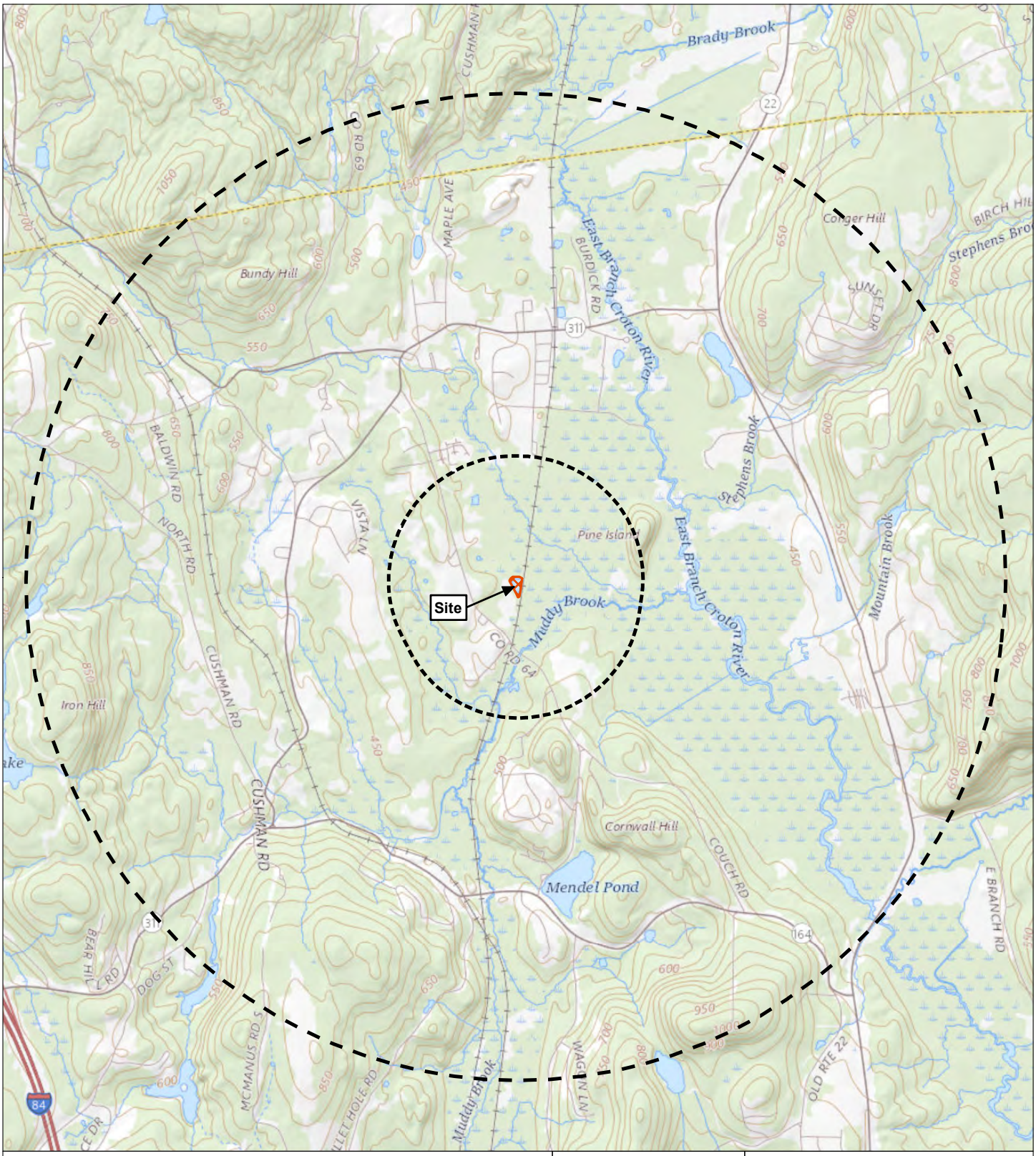
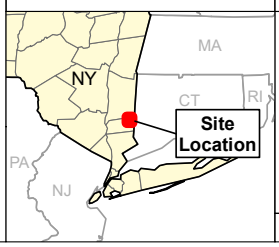
FIGURES



Project Area
Half Mile Buffer from Project Area
2-Mile Buffer from Project Area
USGS 24k Quadrangle

N

0 1,500 3,000
Feet



Data Sources: TRC, Esri
Base Map: USGS The National Map, "USGSTopo"

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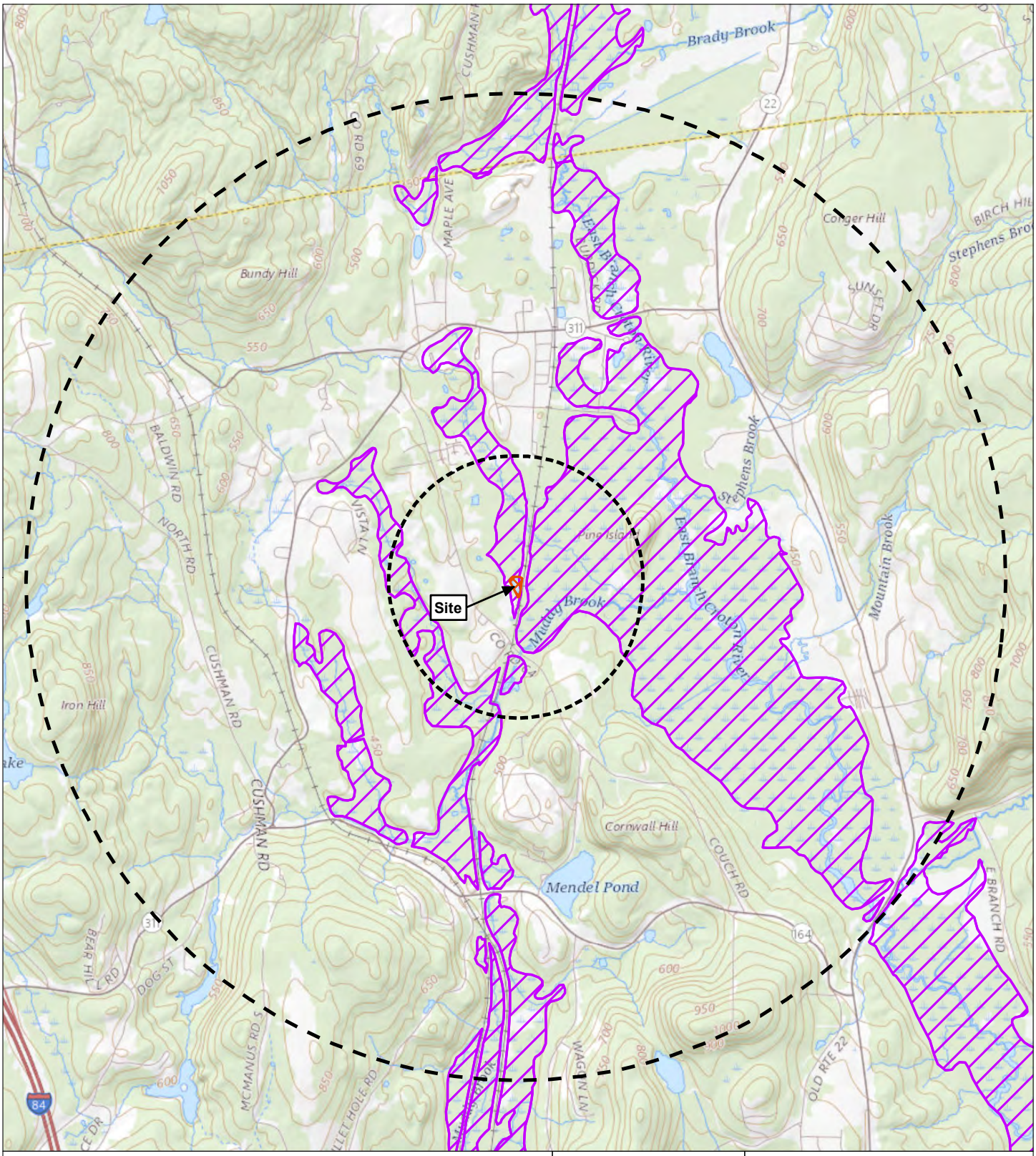
SITE LOCATION

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SITE NO. 340011 - CROSS COUNTY SANITARY/ KESSMAN LANDFILL

286 CORNWALL HILL RD
PATTERSON, NEW YORK 12563

FIGURE 1	JANUARY 2020

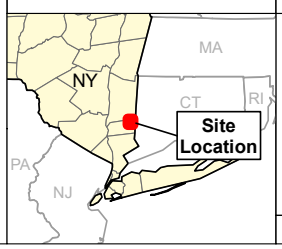
S:\1-PROJECTS\NYSDEC\259633_Kessman_Landfill\5-MXD\Fig1_SiteLoc_8x11_20200106.mxd



Project Area
Half Mile Buffer from Project Area
2-Mile Buffer from Project Area
Critical Environmental Areas (CEAs)

0 1,500 3,000
Feet

N



Data Sources: TRC, NYDEC
Base Map: USGS The National Map, "USGSTopo"

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CRITICAL ENVIRONMENTAL AREAS

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SITE NO. 340011 - CROSS COUNTY SANITARY/ KESSMAN LANDFILL

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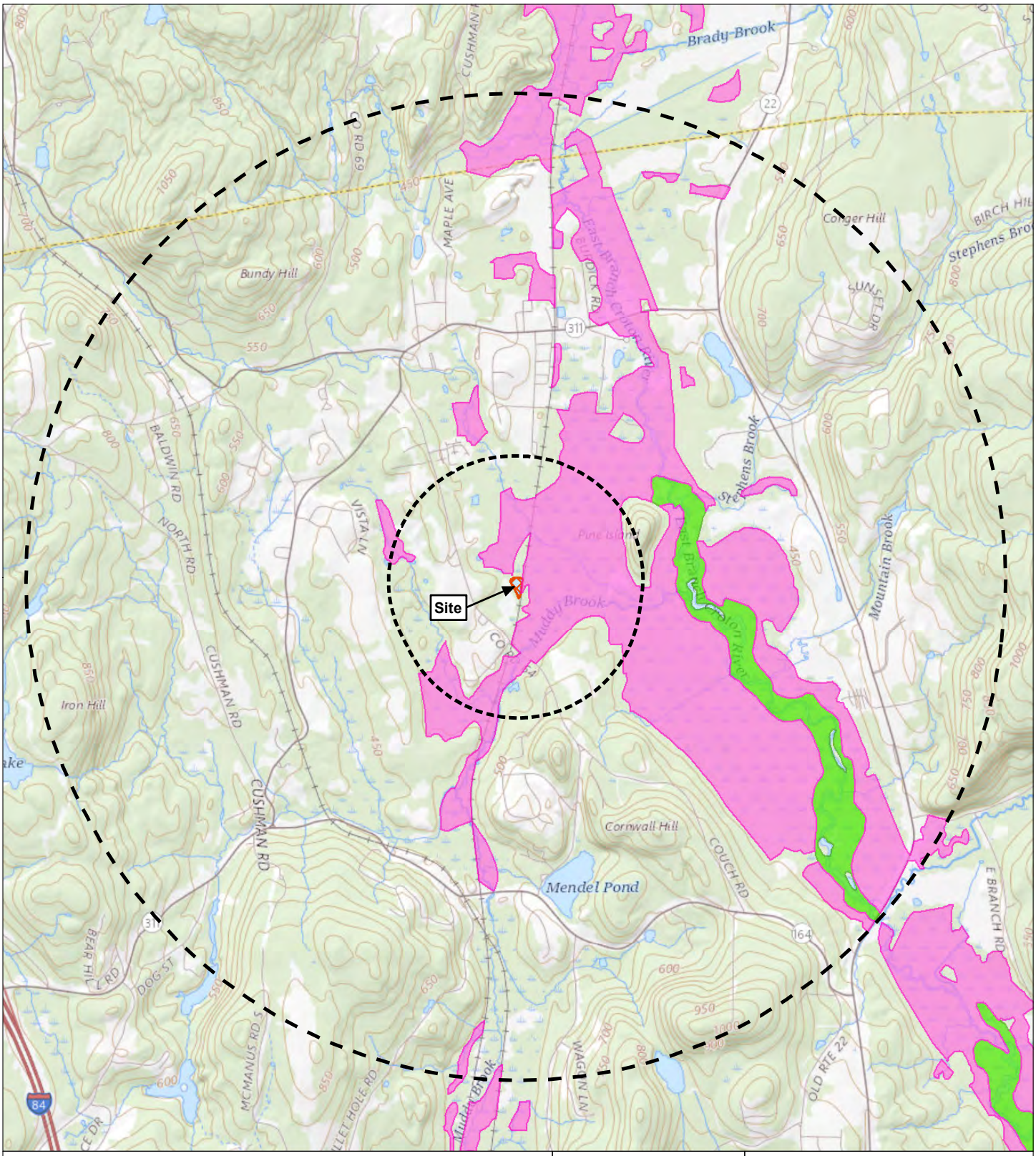
PATTERSON, NEW YORK 12563

FIGURE 2	JANUARY 2020

S:\1-PROJECTS\NYSDEC\259633_Kessman_Landfill\5-MXD\Fig4_CritEnvAreas_8x11_20200106.mxd



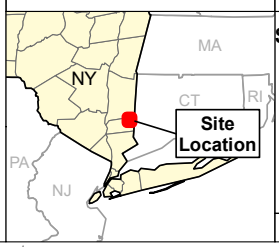
Project Area
Half Mile Buffer from Project Area
2-Mile Buffer from Project Area

Significant Natural Communities

Red Maple-Hardwood Swamp
Floodplain Forest

0 1,500 3,000
Feet

N



Data Sources: TRC, NYDEC
Base Map: USGS The National Map, "USGSTopo"

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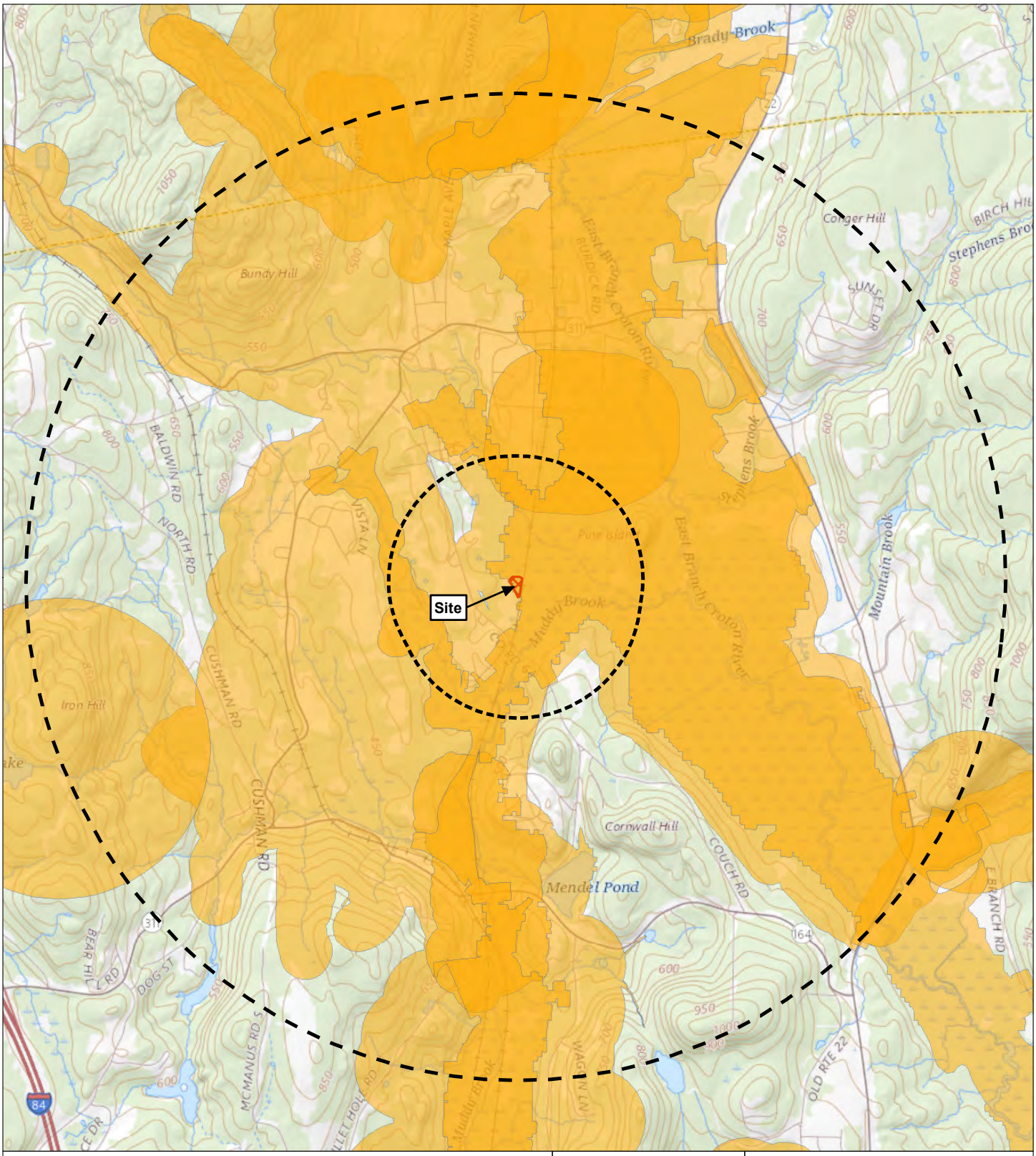
SIGNIFICANT NATURAL COMMUNITIES

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SITE NO. 340011 - CROSS COUNTY SANITARY/ KESSMAN LANDFILL

286 CORNWALL HILL RD PATTERSON, NEW YORK 12563

FIGURE 3 | JANUARY 2020

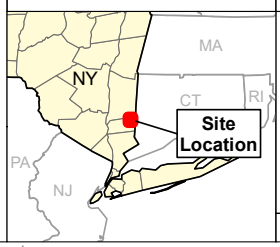
S:\1-PROJECTS\NYSDEC\259633_Kessman_Landfill\5-MXD\Fig2_SignificantNatComm_8x11_20200106.mxd



Project Area
Half Mile Buffer from Project Area
2-Mile Buffer from Project Area
Natural Heritage Areas for Rare Plants & Animals

0 1,500 3,000
Feet

N



Data Sources: TRC, NYDEC
Base Map: USGS The National Map, "USGSTopo"

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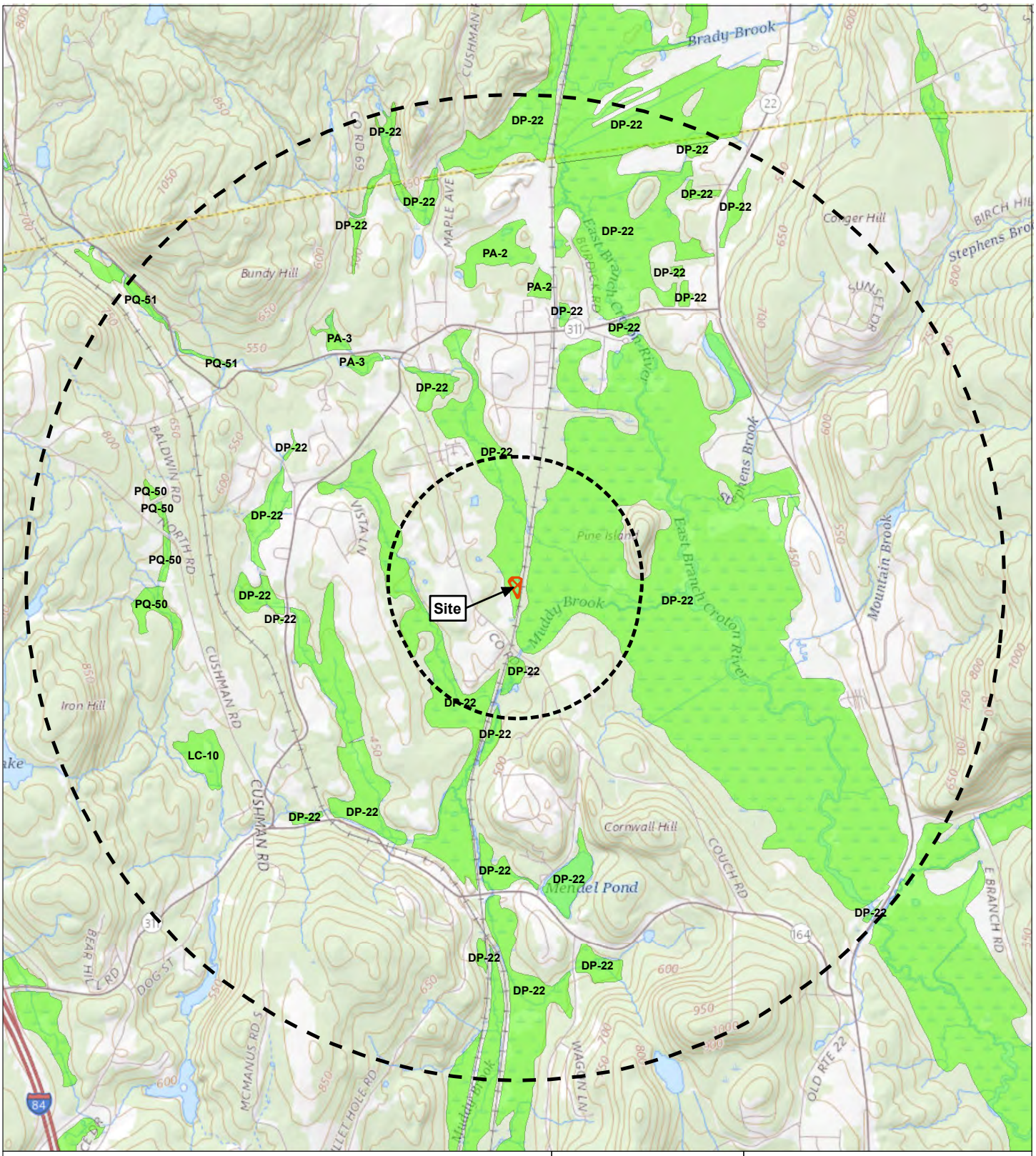
RARE PLANTS & ANIMALS

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SITE NO. 340011 - CROSS COUNTY SANITARY/ KESSMAN LANDFILL

286 CORNWALL HILL RD
PATTERSON, NEW YORK 12563

FIGURE 4	JANUARY 2020

S:\1-PROJECTS\NYSDEC\259633_Kessman_Landfill\5-MXD\Fig3_RarePlants_Animals_8x11_20200106.mxd


Brady Brook
DP-22
PA-2
PA-3
PQ-51
PQ-50
LC-10
Site
Bundy Hill
Iron Hill
Cornwall Hill
Mendel Pond
Pine Island
Muddy Brook
East Branch Croton River
Mountain Brook
Stephens Brook
CUSHMAN RD
MAPLE AVE
BALDWIN RD NORTH RD
VISTA LN
COUCH RD
BEAR HILL RD
DOG ST
MCMANUS RD S
WAGNER LN
OLD RTE 22
E BRANCH RD
Project Area
Half Mile Buffer from Project Area
2-Mile Buffer from Project Area
State Regulated Freshwater Wetlands
0 1,500 3,000
Feet
N
NY
MA
CT
RI
PA
NJ
Site Location
Data Sources: TRC, NYDEC
Base Map: USGS The National Map, "USGSTopo"
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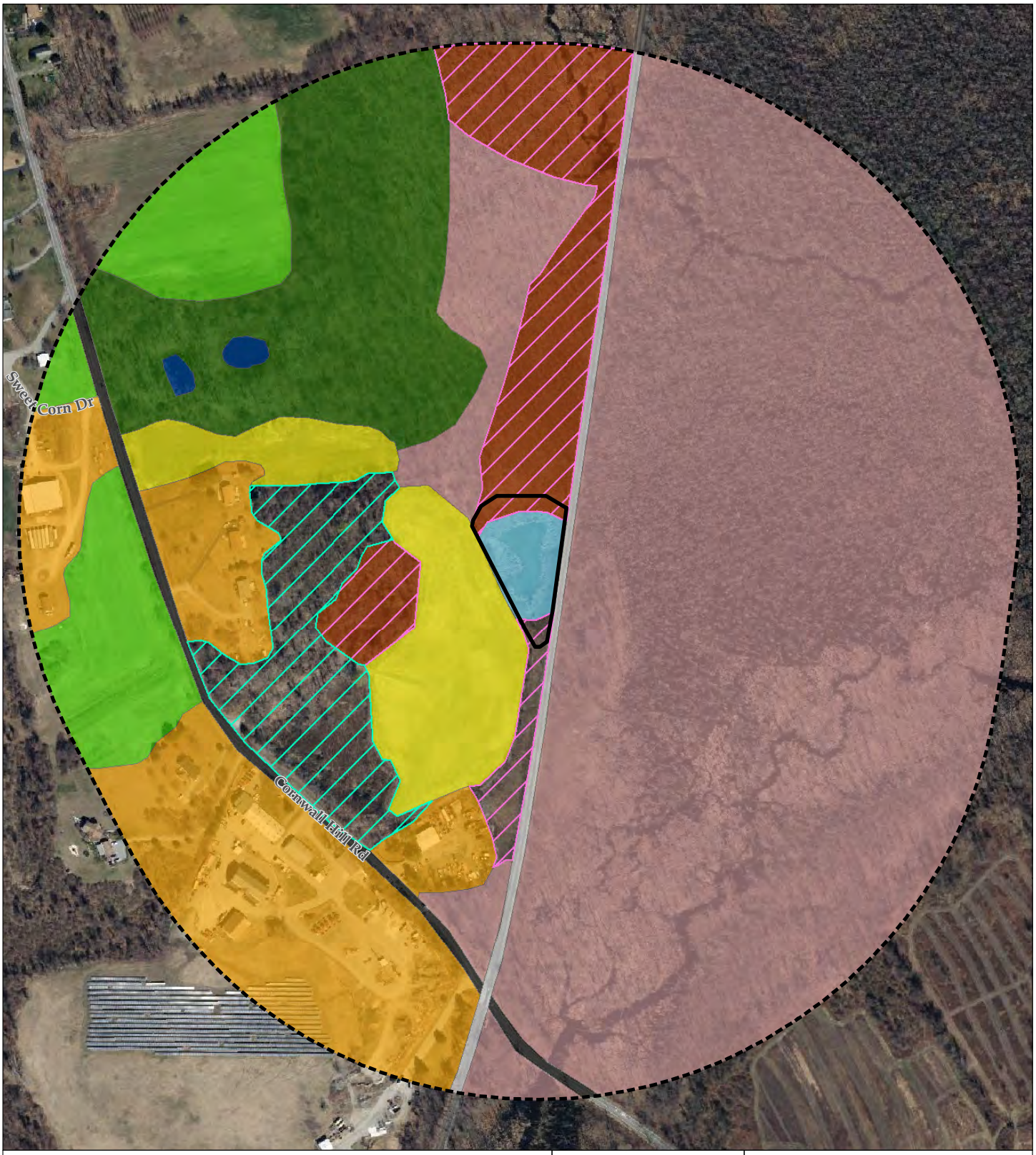
New York
NY 10018
STATE REGULATED FRESHWATER WETLANDS
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SITE NO. 340011 - CROSS COUNTY SANITARY/ KESSMAN LANDFILL
286 CORNWALL HILL RD
PATTERSON, NEW YORK 12563
FIGURE 5
JANUARY 2020
S:\1-PROJECTS\NYSDEC\259633_Kessman_Landfill\5-MXD\Fig5_NYDEC Wetlands_8x11_20200106.mxd



Project
Quarter Mile Buffer from Project Area

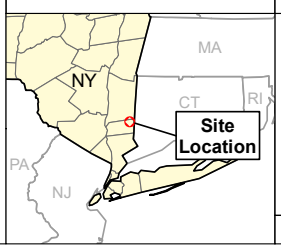
Ecological Community

- Appalachian Oak-Pine Forest
- Common Reed Marsh
- Cropland/ Field Crops
- Farm Pond
- Railroad
- Red Maple - Common Reed Marsh
- Red Maple - Hardwood Swamp
- Road
- Rural Structure/ Mowed Lawn with Trees
- Shallow Emergent Marsh
- Successional Old Field
- Successional Southern Hardwoods

Data Sources: TRC, NYDEC
Base Map: USGS The National Map, "USGSTopo"

0 200 400
Feet

N



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ECOLOGICAL COMMUNITIES

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SITE NO. 340011 - CROSS COUNTY SANITARY/ KESSMAN LANDFILL

286 CORNWALL HILL RD
PATTERSON, NEW YORK 12563

FIGURE 6	JANUARY 2020

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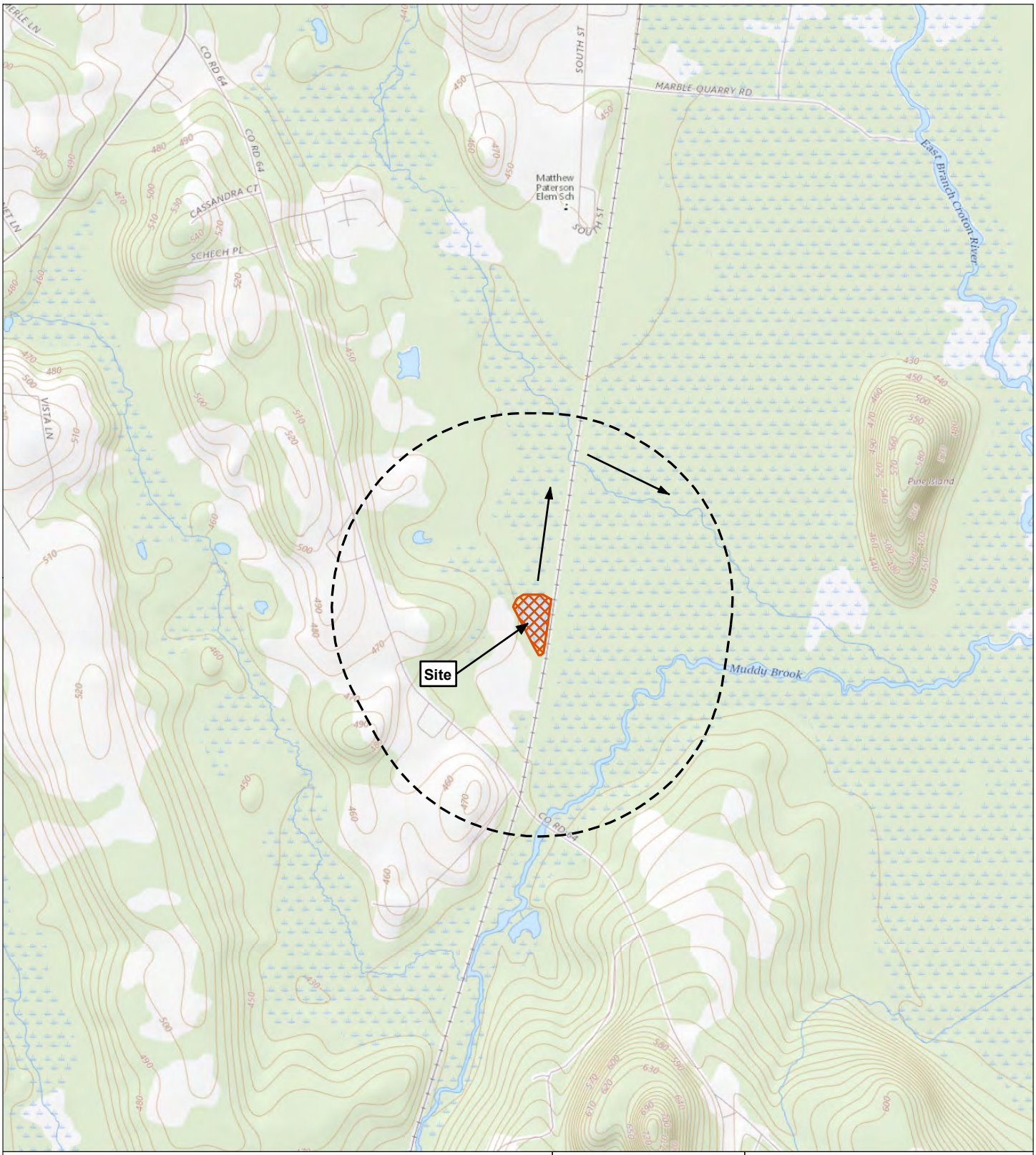


Project Area

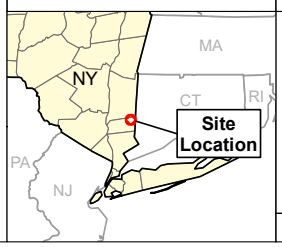
Quarter Mile Buffer from Project Area

Direction of Surface Water Flow

N

0 500 1,000

Feet



Data Sources: TRC, Esri

Base Map: USGS The National Map, "USGSTopo"

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DRAINAGE PATTERN

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SITE NO. 340011 - CROSS COUNTY SANITARY/ KESSMAN LANDFILL

286 CORNWALL HILL RD PATTERSON, NEW YORK 12563

FIGURE 7	JANUARY 2020

S:\1-PROJECTS\NYSDEC\259633_Kessman_Landfill\5-MXD\Fig7_Drainage_8x11_20200106.mxd

ATTACHMENT A

NATURAL HERITAGE PROGRAM RESPONSE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12233-4757
P: (518) 402-8935 | F: (518) 402-8925
www.dec.ny.gov

December 31, 2019

Scott Heim
TRC Environmental
650 Suffolk Street
Lowell, MA 01854

Re: Kessman Landfill
County: Putnam Town/City: Patterson

Dear Mr. Heim:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur in the vicinity of the project site.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

Sincerely,

Nicholas Conrad
Information Resources Coordinator
New York Natural Heritage Program

1444

The following state-listed animals and plants have been documented in the vicinity of the project site.

For more information on state-listed animals, please contact the NYSDEC Region 3 Office.

The following species have been documented within 1/4 mile west/southwest of the project site, along a tributary to Muddy Brook.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*HERITAGE CONSERVATION STATUS*
Spreading Globeflower	*Trollius laxus*	Rare	Vulnerable in NYS and Globally Uncommon

1999-04-28: Diverse stream and spring-fed wetland (rich sloping fen) on gentle slopes intermixed with a higher area of old pastures and wet meadows with red cedars. Wetland has small pocket of elms in saturated soil with carpet of skunk cabbage.

Fairywand	*Chamaelirium luteum*	Endangered	Critically Imperiled in NYS

1990-08-22: An old pasture with red cedars on a small hillside near a small headwater stream. The area is a mosaic of old pasture, a wet meadow that has been grazed, artificial ponds, and a rich sloping fen.

This site also includes a state-significant natural community, **rich sloping fen**.

The following species has been documented within .6 mile of the project site. Individual animals may travel one mile from documented locations.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*
Bog Turtle	*Glyptemys muhlenbergii*	Endangered	Threatened

The following species have been documented within 1/2 mile north/northeast of the project site. in and at the edge of the Great Swamp.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*
New England Cottontail	*Sylvilagus transitionalis*	Special Concern	

Much of the Great Swamp is a state-significant natural community, **red maple-hardwood swamp**. This very large swamp with good diversity extends onto the northeastern portion of the project site.

This report only includes records from the NY Natural Heritage database.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

ATTACHMENT B

ANIMALS, PLANTS AND NATURAL COMMUNITIES FOUND IN THE GREAT SWAMP (FROM SIEMANN, 1999)

II. Animals, Plants and Natural Communities Found in the Great Swamp

OCCURRENCE STATUS

A
Accidental occurrence with only one or two sightings in the past three years during the breeding season.

B
Breeding activity is confirmed or expected due to regular sighting during the breeding season.

M
Seen during the migration season in larger numbers than in breeding season.

I
Irregular occurrence during the non-breeding season.

PB
Possible breeder based on a few sightings during the breeding season.

R
Year round resident and breeder.

V
Visitor seen regularly during breeding season, but not showing any characteristics of breeding activity.

W
Overwinters in the Great Swamp in much greater or smaller numbers than in breeding season.

U
Unconfirmed

S
Found in the watershed but not the wetland

RARITY STATUS

E
Endangered

T
Threatened

SC
Special Concern

Source: NYS DEC 1998a

Birds The following list identifies 185 birds seen in the Great Swamp wetland and its 100 foot buffer zone only. Bird surveys were conducted by Dr. James Utter and William Wallace, Jr. of Purchase College, SUNY during 1997 and 1998. Sibyll Gilbert, Barbara Butler, Allan Michelin, and Helen Andrews also contributed occurrence records.

COMMON NAME	SCIENTIFIC NAME	STATUS
Grebes		
Pied-billed Grebe	*Podilymbus podiceps*	M
Cormorants		
Double-crested Cormorant	*Phalacrocorax auritus*	V
American Bittern	*Botaurus lentiginosus*	M, PB
Least Bittern	*Ixobrychus exilis*	M, PB
Great Blue Heron	*Ardea herodias*	B, M
Great Egret	*Ardea alba*	I
Green Heron	*Butorides virescens*	B, M
Black-crowned Night-Heron	*Nycticorax nycticorax*	A
New World vultures		
Black Vulture	*Coragyps atratus*	V, M
Turkey Vulture	*Cathartes aura*	R, M
Waterfowl		
Canada Goose	*Branta canadensis*	R, M
Snow Goose	*Chen caerulescens*	I, M
Mute Swan	*Cygnus olor*	R
Wood Duck	*Aix sponsa*	B, M
American Black Duck	*Anas rubripes*	M, W
Mallard	*Anas platyrhynchos*	R, M
Blue-winged Teal	*Anas discors*	M, V
Green-winged Teal	*Anas crecca*	M, V
Ring-necked Duck	*Aythya collaris*	M, W
White-winged Scoter	*Melanitta fusca*	A
Bufflehead	*Bucephala albeola*	M
Common Goldeneye	*Bucephala clangula*	M
Hooded Merganser	*Lophodytes cucullatus*	M
Common Merganser	Mergus merganser	M, W
Hawks, Eagles and Kites		
Osprey	*Pandion haliaetus*	M
Bald Eagle	*Haliaeetus leucocephalus*	M, I
Hawks, Eagles and Kites cont'd		
Northern Harrier	*Circus cyaneus*	M, I
Sharp-shinned Hawk	*Accipiter striatus*	M, W
Cooper's Hawk	*Accipiter cooperii*	R, M
Northern Goshawk	*Accipiter gentilis*	M, W
Red-shouldered Hawk	*Buteo lineatus*	PB, M, W
Broad-winged hawk	*Buteo platypterus*	PB, M
Red-tailed Hawk	*Buteo jamaicensis*	R, M
Falcons and Caracaras		
American Kestrel	*Falco sparverius*	B, M
Merlin	*Falco columbarius*	M
Peregrine Falcon	*Falco peregrinus*	M
Pheasants, Grouse, Quail and Turkeys		
Ring-necked Pheasant	*Phasianus colchicus*	R
Ruffed Grouse	*Bonasa umbellus*	R
Wild Turkey	*Meleagris gallopavo*	R
Rails and Coots		
Virginia Rail	*Rallus limicola*	B, M
Sora	*Porzana carolina*	B, M
Common Moorhen	*Gallinula chloropus*	I
Plovers and Lapwings		
Killdeer	*Charadrius vociferus*	B, M
Sandpipers		
Greater Yellowlegs	*Tringa melanoleuca*	M
Lesser Yellowlegs	*Tringa flavipes*	M
Solitary Sandpiper	*Tringa solitaria*	M
Spotted Sandpiper	*Actitis macularia*	B, M
Semipalmated Sandpiper	*Calidris pusilla*	M
Least Sandpiper	*Calidris minutilla*	M
Pectoral Sandpiper	*Calidris melanotos*	M
Common Snipe	*Gallinago gallinago*	M
American Woodcock	*Scolopax minor*	B, M
Gulls and Terns		
Ring-billed Gull	*Larus delawarensis*	V
Herring Gull	*Larus argentatus*	V
Great Black-backed Gull	*Larus marinus*	V
Pigeons and Doves		
Rock Dove	*Columba livia*	R
Mourning Dove	*Zenaida macroura*	R
Old World Cuckoos		
Black-billed Cuckoo	*Coccyzus erythropthalmus*	B, M
Yellow-billed Cuckoo	*Coccyzus americanus*	B, M
Owls		
Eastern Screech-Owl	*Otus asio*	R
Great Horned Owl	*Bubo virginianus*	R
Barred Owl	*Strix varia*	R
Northern Saw-whet Owl	*Aegolius acadicus*	M, W?
Nightjars		
Common Nighthawk	*Chordeiles minor*	M
Swifts		
Chimney Swift	*Chaetura pelagica*	B, M
Hummingbirds		
Ruby-throated Hummingbird	*Archilochus colubris*	B, M
Kingfishers		
Belted Kingfisher	*Ceryle alcyon*	R
Woodpeckers		
Red-bellied Woodpecker	*Melanerpes carolinus*	R
Yellow-bellied Sapsucker	*Sphyrapicus varius*	M, W
Downy Woodpecker	*Picoides pubescens*	R
Hairy Woodpecker	*Picoides villosus*	R
Northern Flicker	*Colaptes auratus*	B, M, W
Pileated Woodpecker	*Dryocopus pileatus*	R
Tyrant Flycatchers		
Olive-sided Flycatcher	*Contopus borealis*	M
Eastern Wood-Pewee	*Contopus virens*	B, M
Yellow-bellied Flycatcher	*Empidonax flaviventris*	M

COMMON NAME	SCIENTIFIC NAME	STATUS
Tyrant Flycatchers cont'd		
Acadian Flycatcher	*Empidonax virescens*	M
Alder Flycatcher	*Empidonax alnorum*	B, M
Willow Flycatcher	*Empidonax traillii*	B, M
Least Flycatcher	*Empidonax minimus*	B, M
Eastern Phoebe	*Sayornis phoebe*	B, M
Great Crested Flycatcher	*Myiarchus crinitus*	B, M
Eastern Kingbird	*Tyrannus tyrannus*	B, M
Vireos and Allies		
White-eyed Vireo	*Vireo griseus*	B, M
Yellow-throated Vireo	*Vireo flavifrons*	B, M
Blue-headed Vireo	*Vireo solitarius*	M
Warbling Vireo	*Vireo gilvus*	B, M
Philadelphia Vireo	*Vireo philadelphicus*	M
Red-eyed Vireo	*Vireo olivaceus*	B, M
Crows and Jays		
Blue Jay	*Cyanocitta cristata*	R
American Crow	*Corvus brachyrhynchos*	R
Fish Crow	*Corvus ossifragus*	PB
Common Raven	*Corvus corax*	R
Larks		
Horned Lark	*Eremophila alpestris*	W
Swallows		
Purple Martin	*Progne subis*	M
Tree Swallow	*Tachycineta bicolor*	B, M
N. Rough-winged Swallow	*Stelgidopteryx serripennis*	B, M
Bank Swallow	*Riparia riparia*	B, M
Cliff Swallow	*Petrochelidon pyrrhonota*	M
Barn Swallow	*Hirundo rustica*	B, M
Tits and Allies		
Black-capped Chickadee	*Poecile atricapillus*	R
Tufted Titmouse	*Baeolophus bicolor*	R
Nuthatches		
Red-breasted Nuthatch	*Sitta canadensis*	M, W
White-breasted Nuthatch	*Sitta carolinensis*	R
Creepers		
Brown Creeper	*Certhia americana*	R
Wrens		
Carolina Wren	*Thryothorus ludovicianus*	R
House Wren	*Troglodytes aedon*	B, M
Winter Wren	*Troglodytes troglodytes*	W
Marsh Wren	*Cistothorus palustris*	B
Kinglets		
Golden-crowned Kinglet	*Regulus satrapa*	M, W
Ruby-crowned Kinglet	*Regulus calendula*	M, W
Old World Warblers		
Blue-gray Gnatcatcher	*Polioptila caerulea*	B, M
Thrushes		
Eastern Bluebird	*Sialia sialis*	R
Veery	*Catharus fuscescens*	B, M
Swainson's Thrush	*Catharus ustulatus*	M
Hermit Thrush	*Catharus guttatus*	M
Wood Thrush	*Hylocichla mustelina*	B, M
American Robin	*Turdus migratorius*	B, M, W
Mockingbirds and Thrashers		
Gray Catbird	*Dumetella carolinensis*	B, M
Northern Mockingbird	*Mimus polyglottos*	R
Brown Thrasher	*Toxostoma rufum*	B, M
Starlings		
European Starling	*Sturnus vulgaris*	R, M, W
Waxwings and Silky-flycatchers		
Cedar Waxwing	*Bombycilla cedrorum*	R, M, W
New World Warblers		
Blue-winged Warbler	*Vermivora pinus*	B, M
Tennessee Warbler	*Vermivora peregrina*	M
Nashville Warbler	*Vermivora ruficapilla*	M

COMMON NAME	SCIENTIFIC NAME	STATUS
New World Warblers cont'd		
Northern Parula	*Parula americana*	M
Yellow Warbler	*Dendroica petechia*	B, M
Chestnut-sided Warbler	*Dendroica pensylvanica*	B, M
Magnolia Warbler	*Dendroica magnolia*	M
Black-throated Blue Warbler	*Dendroica caerulescens*	M
Yellow-rumped Warbler	*Dendroica coronata*	M
Black-throated Green Warbler	*Dendroica virens*	M
Blackburnian Warbler	*Dendroica fusca*	M
Pine Warbler	*Dendroica pinus*	M
Prairie Warbler	*Dendroica discolor*	B, M
Palm Warbler	*Dendroica palmarum*	M
Bay-breasted Warbler	*Dendroica castanea*	M
Blackpoll Warbler	*Dendroica striata*	M
Cerulean Warbler	*Dendroica cerulea*	B, M
Black-and-white Warbler	*Mniotilta varia*	B, M
American Redstart	*Setophaga ruticilla*	B, M
Worm-eating Warbler	*Helmitheros vermivorus*	B, M
Ovenbird	*Seiurus aurocapillus*	B, M
Northern Waterthrush	*Seiurus noveboracensis*	B, M
Louisiana Waterthrush	*Seiurus motacilla*	B, M
Connecticut Warbler	*Oporornis agilis*	M
Mourning Warbler	*Oporornis philadelphia*	M
Common Yellowthroat	*Geothlypis trichas*	B, M
Hooded Warbler	*Wilsonia citrina*	M
Wilson's Warbler	*Wilsonia pusilla*	M
Canada Warbler	*Wilsonia canadensis*	B, M
Yellow-breasted Chat	*Icteria virens*	M
Tanagers		
Scarlet Tanager	*Piranga olivacea*	B, M
Tanagers, Buntings, Sparrows and Allies		
Eastern Towhee	*Pipilo erythrophthalmus*	B, M
American Tree Sparrow	*Spizella arborea*	M, W
Chipping Sparrow	*Spizella passerina*	B, M
Field Sparrow	*Spizella pusilla*	B, M
Savannah Sparrow	*Passerculus sandwichensis*	PB, M
Fox Sparrow	*Passerella iliaca*	M, W
Song Sparrow	*Melospiza melodia*	R, M
Lincoln's Sparrow	*Melospiza lincolnii*	M
Swamp Sparrow	*Melospiza georgiana*	B, M, W
White-throated Sparrow	*Zonotrichia albicollis*	M, W
White-crowned Sparrow	*Zonotrichia leucophrys*	M
Dark-eyed Junco	*Junco hyemalis*	M, W
Cardinals, Grosbeaks and American Buntings		
Northern Cardinal	*Cardinalis cardinalis*	R
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	B, M
Blue Grosbeak	*Guiraca caerulea*	V
Indigo Bunting	*Passerina cyanea*	B, M
Troupials and Allies		
Bobolink	*Dolichonyx oryzivorus*	B, M
Red-winged Blackbird	*Agelaius phoeniceus*	B, M
Eastern Meadowlark	*Sturnella magna*	PB
Rusty Blackbird	*Euphagus carolinus*	M
Common Grackle	*Quiscalus quiscula*	B, M
Brown-headed Cowbird	*Molothrus ater*	B, M
Orchard Oriole	*Icterus spurius*	PB
Baltimore Oriole	*Icterus galbula*	B, M
Siskins, Crossbills and Allies		
Purple Finch	*Carpodacus purpureus*	PB, M
House Finch	*Carpodacus mexicanus*	R
Common Redpoll	*Carduelis flammea*	M, W
Pine Siskin	*Carduelis pinus*	M, W
American Goldfinch	*Carduelis tristis*	R
Evening Grosbeak	*Coccothraustes vespertinus*	M, W
Old World Sparrows		
House Sparrow	*Passer domesticus*	R

Reptiles and Amphibians (Herpetofauna) This list is based on surveys conducted by Dr. Michael Klemens and Diane Murphy of the Wildlife Conservation Society between 1992 and 1998.

COMMON NAME	SCIENTIFIC NAME	STATUS
Reptiles		
Snapping Turtle	*Chelydra s. serpentina*	
Painted Turtle	*Chrysemys picta*	
Spotted Turtle	*Clemmys guttata*	SC
Wood Turtle	*Clemmys insculpta*	SC
Bog Turtle	*Clemmys muhlenbergii*	E
Common Musk Turtle	*Sternotherus odoratus*	
Eastern Box Turtle	*Terrapene c. carolina*	SC
Copperhead	*Agkistrodon contortrix mokasen*	
Northern Black Racer	*Coluber c. constrictor*	
Timber Rattlesnake	*Crotalus horridus*	T
Northern Ringneck Snake	*Diadophis punctatus edwardsii*	
Black Rat Snake	*Elaphe o. obsoleta*	
Hognose Snake	*Heterodon platirhinos*	SC
Eastern Milk Snake	*Lampropeltis t. triangulum*	
Northern Water Snake	*Nerodia s. sipedon*	
Smooth Green Snake	*Opheodrys vernalis*	
Brown Snake	*Storeria d. dekayi*	
Redbelly Snake	*Storeria o. occipitomaculata*	
Ribbon Snake	*Thamnophis s. sauritus*	
Eastern Garter Snake	*Thamnophis s. sirtalis*	
Amphibians		
Jefferson Salamander	*Ambystoma jeffersonianum*	SC
Blue-spotted Salamander	*Ambystoma laterale*	SC
Spotted Salamander	*Ambystoma maculatum*	SC
Marbled Salamander	*Ambystoma opacum*	SC (proposed)
Northern Two-lined Salamander	*Eurycea bislineata*	
Four-toed Salamander	*Hemidactylium scutatum*	
Red-spotted Newt	*Notophthalmus v. viridescens*	
Redback Salamander	*Plethodon cinereus*	
Northern Slimy Salamander	*Plethodon glutinosus*	
American Toad	*Bufo americanus*	
Gray Tree Frog	*Hyla versicolor*	
Spring Peeper	*Pseudacris c. crucifer*	
Bullfrog	*Rana catesbeiana*	
Green Frog	*Rana clamitans melanota*	
Pickerel Frog	*Rana palustris*	
Wood Frog	*Rana sylvatica*	

Fish and Crayfish This list is based on surveys conducted in the Great Swamp and its tributaries by Dr. Scott Silver, Dr. Michael Klemens, Diane Murphy, Tracy Van Holt, and Kristi MacDonald of the Wildlife Conservation Society during the 1997 field season.

COMMON NAME	SCIENTIFIC NAME	STATUS
Fish		
Black Crappie	*Pomoxis nigromaculatus*	
Bluegill	*Lepomis macrochirus*	
Brook Trout	*Salvelinus fontinalis*	
Brown Bullhead	*Ameiurus nebulosus*	
Brown Trout	*Salmo trutta*	
Common Shiner	*Luxilus cornutus*	
Creek Chub	*Semotilus atromaculatus*	
Creek Chubsucker	*Erimyzon oblongus*	
Cutlips Minnow	*Exoglossum maxillingua*	
Eastern Blacknose Dace	*Rhinichthys atratulus*	
Fallfish	*Semotilus corporalis*	
Fathead Minnow	*Pimephales promelas*	
Golden Shiner	*Notemigonus crysoleucas*	
Green Sunfish	*Lepomis cyanellus*	
Johnny Darter	*Etheostoma nigrum*	
Largemouth Bass	*Micropterus salmoides*	
Longear Sunfish	*Lepomis megalotis*	T
Longnose Dace	*Rhinichthys cataractae*	
Pickerel	*Esox americanus*	
Pumpkinseed	*Lepomis gibbosus*	
Redbreast Sunfish	*Lepomis auritus*	
Rock Bass	*Ambloplites rupestris*	
Slimy Sculpin	*Cottus cognatus*	
Smallmouth Bass	*Micropterus dolomieu*	
Spottail Shiner	*Notropis hudsonius*	
Tessellated Darter	*Etheostoma olmstedi*	
White Sucker	*Catostomus commersoni*	
Yellow Bullhead	*Ameiurus natalis*	
Yellow Perch	*Perca flavescens*	
Crayfish		
	Cambarus bartonii	
	Cambarus robustus	
	Orconectes immunis	
	Orconectes limosus	
	Orconectes robustus	
	Orconectes rusticus	
	Orconectes virilis	
	Procambarus acutus	

Butterflies (Lepidoptera) This list is based on surveys conducted by Dr. Scott Silver and Dr. Fred Koontz of the Wildlife Conservation Society in 1997.

Acadia Hairstreak	*Satyrium acadica*	
American Buckeye	*Junonia coenia*	
American Copper	*Lycaena phlaeas*	
American Lady	*Vanessa virginiensis*	
Aphrodite Fritillary	*Speyeria aphrodite*	
Appalachian Brown	*Satyrodes appalachia*	
Baltimore	*Euphydryas phaeton*	
Banded Hairstreak	*Satyrium calanus*	
Black Swallowtail	*Papilio polyxenes*	
Bronze Copper	*Lycaena hyllus*	
Broadwing Skipper	*Poanes viator*	
Cabbage White	*Pieris rapae*	
Clouded Sulphur	*Colias philodice*	
Cobweb Skipper	*Hesperia metea*	
Common Ringlet	*Coenonympha cymela*	
Common Wood Nymph	*Cercyonis pegala*	
Coral Hairstreak	*Satyriums titus*	
Crossline Skipper	*Polites origenes*	U
Delaware Skipper	*Atrytone delaware*	
Dion Skipper	*Euphyes dion*	
Dreamy duskywing	*Erynnis icelus*	
Dun Skipper	*Euphyes vestris*	
Eastern Comma	*Polygonia comma*	
Eastern-Tailed Blue	*Everes comyntas*	
Eastern Tiger Swallowtail	*Pterourus glaucus*	
European Skipper	*Thymelicus lineola*	
Eyed Brown	*Satyrodes eurydice*	
Falcate Orangetip	*Anthocharis midea*	
Great Spangled Fritillary	*Speyeria cybele*	
Harvester	*Feniseca tarquinia*	
Hobomok Skipper	*Poanes hobomok*	
Indian Skipper	*Hesperia sassacus*	
Juvenal's duskywing	*Erynnis juvenalis*	U
Least Skipper	*Ancyloxypha numitor*	

COMMON NAME	SCIENTIFIC NAME	STATUS
Butterflies cont'd		
Little Glassywing	*Pompeius verna*	
Little Wood Satyr	*Megisto cymela*	
Long Dash Skipper	*Polites mystic*	
Meadow Fritillary	*Boloria bellona*	
Monarch	*Danaus plexippus*	
Mourning Cloak	*Nymphalis antiopa*	
Mulberry Wing	*Poanes massasoit*	
Northern Broken Dash	*Wallengrenia egeremet*	U
Northern Cloudywing	*Thorybes pylades*	
Olive Hairstreak	*Callophrys gryneus*	
Orange Sulphur	*Colias eurytheme*	
Painted Lady	*Vanessa cardui*	
Pearl Crescent	*Phyciodes tharos*	
Peck's Skipper	*Polites peckius*	
Question Mark	*Polygonia interrogationis*	
Red Admiral	*Vanessa atalanta*	
Red-spotted Purple	*Basilarchia astyanax*	
Silver-bordered Fritillary	*Boloria selene*	
Silver-spotted Skipper	*Epargyreus clarus*	
Spicebush Swallowtail	*Pterourus troilus*	
Spring Azure	*Celastrina ladon*	
Summer Azure	*Celastrina ladon*	
Tawny edged Skipper	*Polites themistocles*	
Viceroy	*Limenitis archippus*	
West Virginia White	*Pieris virginiensis*	
Wild Indigo Duskywing	*Erynnis baptisiae*	
Zabulon Skipper	*Poanes zabulon*	

Damselflies and Dragonflies (Odonates) This list is based primarily on surveys conducted by Ken Soltesz during the 1997 field season with the Wildlife Conservation Society.

Damselflies: Suborder Zygoptera	
Broad-winged Damsels: Family Calopterygidae	
River Jewelwing	*Calopteryx aequabilis*
Ebony Jewelwing	*Calopteryx maculata*
Spreadwing Damsels: Family Lestidae	
Spotted Spreadwing	*Lestes congener*
Amber-winged Spreadwing	*Lestes eurinas*
Sweetflag Spreadwing	*Lestes forcipatus*
Elegant Spreadwing	*Lestes inaequalis*
Slender Spreadwing	*Lestes rectangularis*
Swamp Spreadwing	*Lestes vigilax*
Pond Damsels: Family Coenagrionidae	
Violet Dancer	*Argia fumipennis violacea*
Aurora Damsel	*Chromagrion conditum*
Azure Bluet	*Enallagma aspersum*
Familiar Bluet	*Enallagma civile*
Northern Bluet	*Enallagma cyathigerum*
Turquoise Bluet	*Enallagma divagans*
Stream Bluet	*Enallagma exsulans*
Skimmimg Bluet	*Enallagma geminatum*
Orange Bluet	*Enallagma signatum*
Fragile Forktail	*Ischnura posita*
Eastern Forktail	*Ischnura verticalis*
Dragonflies: Suborder Anisoptera	
Darners: Family Aeshnidae	
Canada Darner	*Aeshna canadensis*
Spatterdock Darner	*Aeshna mutata*
Black-tipped Darner	*Aeshna tuberculifera*
Shadow Darner	*Aeshna umbrosa*
Green-striped Darner	*Aeshna verticalis*
Green Darner	*Anax junius*
Springtime Darner	*Basiaeschna janata*
Fawn Darner	*Boyeria vinosa*

COMMON NAME	SCIENTIFIC NAME	STATUS
Darners: Family Aeshnidae cont'd		
Swamp Darner	*Epiaeschna heros*	
Harlequin Darner	*Gomphaeschna furcillata*	
Cyrano Darner	*Nasiaeschna pentacantha*	
Clubtails: Family Gomphidae		
Unicorn Clubtail	*Arigomphus villosipes*	
Black-shouldered Spinyleg	*Dromogomphus spinosus*	
Lancet Clubtail	*Gomphus exilis*	
Ashy Clubtail	*Gomphus lividus*	
Spiketails: Family Cordulegastridae		
Delta-spotted Spiketail	*Cordulegaster diastatops*	
Twin-spotted Spiketail	*Cordulegaster maculata*	
Emeralds: Family Corduliidae		
American Emerald	*Cordulia shurtleffi*	
Beaverpond Baskettail	*Epitheca canis*	
Common Baskettail	*Epitheca cynosura*	
Water Prince	*Epitheca princeps*	
Clamp-tipped Emerald	*Somatochlora tenebrosa*	
Skimmers: Family Libellulidae		
Calico Pennant	*Celithemis elisa*	
Halloween Pennant	*Celithemis eponina*	
Eastern Pondhawk	*Erythemis simplicicollis*	
Chalk-fronted Corporal	*Ladona julia*	
Dot-tailed Whiteface	*Leucorrhinia intacta*	
Spangled Skimmer	*Libellula cyanea*	
Slaty Skimmer	*Libellula incesta*	
Widow Skimmer	*Libellula luctuosa*	
Twelve-spotted Skimmer	*Libellula pulchella*	
Four-spotted Skimmer	*Libellula quadrimaculata*	
Painted Skimmer	*Libellula semifasciata*	
Blue Dasher	*Pachydiplax longipennis*	
Eastern Amberwing	*Perithemis tenera*	
Common Whitetail	*Plathemis lydia*	
Jane's Meadowhawk	*Sympetrum janeae*	
Band-winged Meadowhawk	*Sympetrum semicinctum*	
Yellow-legged Meadowhawk	*Sympetrum vicinum*	
Black Saddlebags	*Tramea lacerata*	

Bees and Wasps This list of bees (pollinators) and hunting wasps (predators) is based on surveys conducted by Dr. Parker Gambino in 1998 at three sites in the Great Swamp. Specimens were identified to the genus level.

COMMON NAME	SCIENTIFIC NAME	STATUS
Bees		
Plasterer bees	***Colletidae***	
Plasterer bees	*Colletes*	
Yellowfaced bees	*Hylaeus*	
Mining bees	***Andrenidae***	
	Andrena	
	Heterosarus	
Sweat bees	***Halictidae***	
	Augochlora	
	Augochlorella	
	Augochloropsis	
	Agapostemon	
	Halictus	
	Lasioglossum	
Leafcutter bees	***Megachilidae***	
	Coelioxys	
	Megachile	
	Anthophoridae	
Cuckoo bees	*Nomada*	
Small carpenter bees	*Ceratina*	
Large carpenter bees	*Xylocopa*	

COMMON NAME	SCIENTIFIC NAME	STATUS
Bees cont'd		
Social bees	***Apidae***	
Honey bees	*Apis*	
Bumble bees	*Bombus*	
Wasps		
Aphid wasps	***Sphecidae***	
	Sceliphron	
	Sphex	
	Isodontia	
Organ pipe mud daubers	*Trypoxylon*	
	Ectemnius	
beewolves or bee-killers	*Philanthus*	
beetle wasps	*Cerceris*	
	Astatinae sp.	
	Pemphredoninae sp.	
Potter wasps	***Eumenidae***	
	Ancistrocerus	
	Eumenes	
	Monobia	
	Parancistrocerus	
	Euodynerus	
Social wasps	***Vespidae***	
	Polistes	
	Vespula	
	Dolichovespula	

Ferns This list of ferns is based on surveys conducted in the Pawling area by Don Lubin of Allston Massachusetts on August 7 & 8 1996. The nomenclature and order follow that in the Flora of North America.

Rattlesnake	*Botrychium virginianum*	S
Cinnamon	*Osmunda cinnamomea*	
Interrupted	*Osmunda claytoniana*	
Royal	*Osmunda regalis*	
Maidenhair	*Adiantum pedantum*	
Hayscented	*Dennstaedtia punctilobula*	S
Bracken	*Pteridium aquilinum*	
New York	*Thelypteris noveboracencis*	
Marsh	*Thelypteris palustris*	
Broad Beech	*Phegopteris hexagonoptera*	
Ebony Spleenwort	*Asplenium platyneuron*	S
Walking	*Asplenium rhizophylum*	S
Ostrich	*Matteuccia struthiopteris*	
Sensitive	*Onoclea sensibilis*	
Silvery Glade	*Deparia acrostichoides*	
Lady	*Athyrium filix-femina*	
Bulblet	*Cystopteris bulbifera*	S
Fragile (Mackay's)	*Cystopteris tenuis*	S
Blunt-lobed Woodsia	*Woodsia obtusa*	S
Spinulose Woodfern	*Dryopteris carthusiana*	
Clinton's	*Dryopteris clintoniana*	
Crested	*Dryopteris cristata*	
Evergreen Woodfern	*Dryopteris intermedia*	
Marginal Woodfern	*Dryopteris marginalis*	
Christmas	*Polystichum acrostichoides*	
Rock Polypody	*Polypodium virginianum*	
Hybrids	*Dryopteris intermedia X marginalis*	
	Polypodium appalachianum X virginianum	
Allies		
Shining Clubmoss	*Huperzia lucidula*	
Common Horsetail	*Equisetum arvens*	
Scouring Rush	*Equisetum hyemale*	

Natural Communities Natural vegetation communities were identified and mapped in 1997-1998 by Adele Olivero of the New York Natural Heritage Program (1998). The community, system and subsystem classification is based on Reschke (1990).

SYSTEM	SUBSYSTEM	NATURAL COMMUNITY
Riverine	Natural Streams	Marsh headwater stream
Lacustrine	Natural Lakes and Ponds	Bog lake
		Eutrophic pond
Palustrine	Open Mineral Soil Wetlands	Deep emergent marsh
		Shallow emergent marsh
		Shrub swamp
		Sinkhole wetland
	Open Peatlands	Sedge meadow
		Rich sloping fen*
		Rich graminoid fen*
		Rich shrub fen*
		Inland poor fen
		Dwarf shrub bog*
		Highbush blueberry bog thicket
	Forested Mineral Soil Wetlands	Floodplain forest*
		Red maple-hardwood swamp*
		Vernal pool
		Hemlock hardwood swamp
	Forested Peatlands	Inland Atlantic white cedar swamp*
Terrestrial	Open Uplands	Cliff community
		Successional shrubland
	Barrens and Woodlands	Acidic talus slope woodland
		Pitch pine-oak-heath rocky summit*
		Successional red cedar woodland
	Forested uplands	Appalachian oak-hickory forest
		Chestnut oak forest
		Oak-tulip tree forest
		Appalachian oak-pine forest
		Beech-maple mesic forest
		Hemlock-northern hardwood forest
		Successional northern hardwoods

*Indicates significant occurrence

APPENDIX C

Bog Turtle Habitat (Phase 1) Survey Report

BOG TURTLE HABITAT (PHASE 1) SURVEY REPORT

CROSS-COUNTY SANITARY/KESSMAN LANDFILL
286 CORNWALL HILL ROAD
PATTERSON, NEW YORK 12563
PUTNAM COUNTY
NYSDEC Site No. 340011
Work Assignment No. D009812-07

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233

Prepared by:

JULY 2020

TABLE OF CONTENTS

ATTACHMENTS

ACRONYMS

CWA	Clean Water Act
ECL	Environmental Conservation Law
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GIS	Geographical Information System
GPS	Global positioning system
NHD	National Hydrography dataset
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
NYSDEC	New York State Department of Environmental Conservation
PEM	Palustrine Emergent Wetland
PFO	Palustrine Forested Wetland
PSS	Palustrine Scrub-Shrub Wetland
PUB	Palustrine Unconsolidated Bottom Wetland
RTE	Rare, threatened or endangered species
TRC	TRC Engineers, Inc.
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 INTRODUCTION

This report summarizes the results of a Phase 1 Bog Turtle Habitat Survey conducted for the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation, at the Cross-County Sanitary / Kessman Landfill (Site). The purpose of the Phase 1 Bog Turtle Habitat survey was to evaluate the existing Site conditions and determine whether suitable Bog Turtle habitat exists within the vicinity of the proposed project. The Site visit portion of the habitat survey was conducted by TRC Engineers, Inc. (TRC) on June 1, 2020. This report describes the methods used during the survey, and summarizes the findings of the Site-specific assessment.

2.0 PROJECT AND SITE INFORMATION

2.1 Survey Request

This Phase 1 habitat survey for the Site was conducted on behalf of the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation. The Site is located at 286 Cornwall Hill Road in the Town of Patterson, in Putnam County, New York (Attachment A – Figure 1).

Name:	New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation
Address:	625 Broadway, 12th Floor
City/State/Zip:	Albany, New York 12233
Telephone:	(518) 402-9764
Project Name:	Cross-County Sanitary/Kessman Landfill Site (No. 340011)

2.2 Project/Property Location

Address:	286 Cornwall Hill Road
City/State/Zip:	Patterson, New York 12563
Township/Municipality:	Town of Patterson
County:	Putnam
Watershed (Minor):	Lower Hudson Basin, 02301002-East Branch Croton
Watershed (Major):	Lower Hudson River

The Site Location Map is presented in **Figure 1 (Attachment A)**. An illustration of the Site Layout and Survey Area is presented in **Figure 2 (Attachment A)**.

2.3 Survey Area/Property Size and Extent

The sampling area for the overall project includes 1.3-acres of wetland located immediately east of the former landfill, which is currently capped and maintained as a grassland community (Figure 1). The landfill is located between Tax Map Parcel Nos. 13.-3-14 and 13.-3-16 (Putnam County eParcel Viewer). This sediment investigation/remediation area i.e. "Sampling Area" is being evaluated for remediation options and represents the limit of disturbance for potential work at this site. To determine the area for phase 1 bog turtle habitat survey, the sampling area was buffered by 300 feet. The phase 1 bog turtle habitat Survey Area included all wetlands within in the property located inside the 300' buffer. The Survey Area size is approximately 4.35 acres. The Survey Area is bounded to the west and south by the former landfill, to the east by an active railroad, and to the north by a large, connected wetland that extends northward into a tributary to Muddy Brook. The Sampling Area and Survey area are depicted on **Figure** 2.

2.4 Current Land Use and Setting

Land use within the Project Site consists primarily of an altered wetland previously used for waste disposal, with a railroad bordering the eastern side of the property. The Survey Area within the site consists of a rebuilt wetland, within NYSDEC-mapped wetland DP-22. This wetland was

rebuild and restored as part of an extensive remediation effort for the landfill in the 1980's and early 1990's. The Town of Patterson Zoning Map indicates that the Site and Survey Area are located within an area designated as R4 – Residential. In addition, based on a review of the Putnam County eParcel Viewer, the current property classes for the Site (and Survey Area) are designated as "852 – Landfill", and "105 – Vacant Farmland".

The Site is bordered to the west by Cornwall Hill Road; to the east by the NYSDEC wetland and Metro North Railroad; to the north by the NYSDEC wetland; and to the south by the Patterson Recycling Center. **Figure 2** represents a detailed aerial view of the Project Site and includes the results of wetland delineations performed on August 1 and December 16, 2019 (reported under separate cover).

2.5 Project Description

TRC has been retained by the NYSDEC to prepare a Remedial System Optimization (RSO) Report to evaluate remediation options that are being considered for implementation at the Site. The Site has been under investigation and/or remediation since it was repossessed in 1974, with the overall goals of remediating contaminated soil, surface water, and sediment at the Site. Initial site assessments and remedial investigations were completed in the 1980s, leading to the completion of a Feasibility Study (FS) Report in December of 1992. A Record of Decision (ROD) was issued in November 1994. Subsequent to the ROD, the Remedial Design was prepared, and the remedial action was completed in September 1996.

Post-construction, Site-related contamination was first detected in wetland sediment in 2003. This finding has been the focus of ongoing investigations, culminating in the investigation and delineation activities performed by TRC between 2016 and 2019. These investigations included sediment sampling, groundwater sampling, geotechnical investigation, and geophysical investigation. The primary goal of the investigations conducted to date has been to assess the nature and extent of contamination (polychlorinated biphenyls [PCBs]) in the wetland sediment adjacent to the landfill.

As part of the project permitting and approvals process, wetland, waterbody and wildlife factors are evaluated. Bog turtles have been recorded in the Great Swamp, an especially large and diverse wetland system, within 0.6 miles of the Project Area. A Phase 1 bog Turtle survey was conducted to determine the quality of habitat on-Site for this species. Phase 1 habitat survey protocols were based upon the US Fish and Wildlife Service Guidelines for Bog Turtle Surveys for the Northern Population Range (Revised April 29, 2020 https://www.fws.gov/northeast/nyfo/es/Surveyor%20Lists/REVISED%20Phase%201%20and%202%20Protocols_04.29.20_FINAL.pdf). As required, the Phase 1 Bog Turtle Survey Reporting Data Sheet has been completed and is included as **Attachment B.** A log of photographs is included as **Attachment C**. Detailed discussion of the survey results is presented in **Section 4**.

2.6 Permit Considerations

Several permits are assumed necessary to support the proposed project. A list of applicable permits and regulatory jurisdictions follow:

- Section 404 Clean Water Act;
- Section 401 Clean Water Act (NYSDEC) Water Quality Certification;
- ECL Article 24 (NYSDEC) Freshwater Wetlands Act;
- Section 7 US Fish and Wildlife Service Threatened and Endangered Species Review and Consultation;
- State Pollutant Discharge Elimination System (SPDES) Permit for Construction and Dewatering Activities;
- NYSDEC Threatened and Endangered Species Inventory Review;
- NYSDEC Threatened and Endangered Species Incidental Take Permit pursuant to ECL Section 11-0535 (Part 182 of the regulations at 6 NYCRR);
- Section 106 of the National Historic Preservation Act;
- Section 14.09 of the New York State Historic Preservation Act of 1980: Cultural and Historic Resources Review and Consultation; and
- Local permitting through Patterson Planning Department, Building Department, and/or, Zoning Department, as well as the Putnam County Soil and Water Conservation District.

3.0 WETLAND INFORMATION

Prior to field investigations, wetland scientists conducted a desktop analysis to identify potential wetlands, streams, and vernal pools within the Survey Area, utilizing the following publicly available data:

- USGS topographic mapping;
- USGS National Hydrography Dataset (NHD);
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping;
- Natural Resources Conservation Service (NRCS) medium-intensity soil survey mapping;
- FEMA FIRMs;
- NYSDEC Environmental Resource Mapper
- Recent and historic aerial photography.

3.1 Wetland Delineations

Wetlands are regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA). The CWA defines wetlands as:

> *"…areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances (do) support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas."*

Wetland delineations were conducted according to the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, v2* (USACE 2012). This supplement follows criteria established in the USACE Wetlands Delineation Manual (Environmental Laboratory, Technical Report T-87-1, 1987), but is region specific, giving the wetland delineator a better tool to apply to regional vegetation communities, indicators of hydrology, and indicators of hydric soils when conducting a wetland boundary determination. Wetlands on Site are also regulated by the NYSDEC under Article 24 of the Environmental Conservation Law. As such, the delineation took into account NYSDEC delineation survey protocol, per the July 1995 NYSDEC Freshwater Wetlands Delineation Manual. In this instance, the boundary was congruent between the USACE and NYSDEC approaches to demarcation.

The wetland delineation for the Survey Area was completed on August 1, 2019 and December 16, 2019 by:

Name: Weston Hillegas
Affiliation: TRC Engineers, Inc.
Address: 1200 Wall Street West
City/State/Zip: Lyndhurst New Jersey 07071
Telephone: (201) 933-5541
Email: WHillegas@trccompanies.com

A wetland report for this project was submitted to the New York State Department of Environmental Conservation on January 20, 2020. Wetland permitting is underway for the proposed project.

TABLE 1: Wetland Size and Location

Wetland ID	Wetland (Actual Size)	Designated Survey Area	Latitude / Longitude	Is the entire wetland On-Site?
W-WH-1	5,513.3 acres*	4.35 acres	41.4977762, -73.6072566	No
• The overall wetland size is estimate based on NYSDEC Environmental Resource Mapper for Wetland ID DP-22 (NYSDEC 2020)				

4.0 PHASE 1 SURVEY RESULTS

The Phase 1 Bog Turtle Survey was conducted on June 1, 2020 by:

Name: Duane Choquette
Affiliation: TRC Engineers, Inc.
Address: 6 Ashley Drive
City/State/Zip: Scarborough, ME 04074
Telephone: (518) 222-1383
Email: Dchoquette@trccompanies.com

In general, contaminant investigation and remediation efforts have been/will be limited to the 1.3-acre Sampling Area designated on **Figure 2**. Project support activities may extend beyond this area (i.e., waste management, water treatment, etc) but will not impact any additional wetland area. This Phase 1 survey was conducted on the Survey Area and was comprised of all wetlands on the property that were within 300 feet of the Sampling Area to identify and quantify potential bog turtle habitat within this area. This buffer was based on the protocols set forth in the Guidelines for Bog Turtle surveys for the Northern Population Range Phase 1 and 2 *surveys revised April 29, 2020*. This resulted in a bog turtle habitat Survey Area of approximately 4.35acres. Additional wetland area beyond this designated limit was not surveyed.

A summary of the Phase 1 survey results is included in **Table 2**. Detailed information about the wetland follows the table. Completed bog turtle Phase 1 survey forms for this wetland are in Attachment B. Photographs are in Attachment C.

Table 2: Summary of Phase 1 Bog Turtle Survey Results

Wetland ID	Wetland Size	Wetland Type and Amount	Extent of "Mucky" Soils	Survey Effort (Person Hours)	Bog Turtle Habitat
W-WH-1	4.35 acres*	PEM 50% PSS 30% PFO 20% PUB 10%	PEM 60% PSS 30% PFO 10% PUB 100%	6	No

*The area surveyed within the property bounds was 4.35 acres. The overall wetland complex is over 5,513.3acres.

4.1 Wetlands

Wetland W-WH-1 is primarily a PEM wetland located to the north and east of the Site (**Attachment A – Figure 2**). Wetland W-WH-1 is a small portion of the Great Swamp, a 19.8-mile long, 4,202-acre sprawling wetland complex of state significance and an important stopover for migrating waterfowl.

In summary, the portion of the wetland identified in the 300' buffered Survey Area measures approximately 4.35 acres, with the wetland continuing off-Site to the south and north. Hydrology

originates from outside the study area as well as along the toe of slope of the landfill. Indicators of wetland hydrology include surface water (A1), high water table (A2), saturation (A3), inundation visible on aerial imagery (B7), drainage patterns (B10), saturation visible on aerial imagery (C9), geomorphic position (D2), FAC-neutral test (D5). Dominant vegetation includes common reed (*Phragmites australis*). Non-dominant vegetation also includes lakeshore rush (*Schoenoplectus lacustris*), purple loosestrife (*Lythrum salicaria*), narrowleaf cattail (*Typha angustifolia*) and northern water plantain (*Alisma triviale*). Soils have an organic matter, silt loam and sandy loam texture. Hydric soil indicators include sandy gleyed matrix (S4). Soils mapped by the NRCS in the vicinity of W-WH-1 consisted of Fluvaquents-Udifluvents complex, frequently flooded (Ff).

4.2 Bog Turtle Habitat Evaluation - Vegetation

Wetland cover types were assigned to each segment of the surveyed wetland according to Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979). The Cowardin classification system is a hierarchical system based primarily on the general classification of wetlands into marine, estuarine, palustrine (freshwater wetland), riverine (stream), or lacustrine (lake) systems, and the dominant vegetation layer. Only palustrine classification types were identified within the Survey Area. Using this hierarchical wetland classification system, four primary cover types were identified for vegetated wetland in the Survey Area: palustrine forested (PFO), palustrine scrub shrub (PSS), palustrine emergent (PEM), and palustrine unconsolidated bottom (PUB) wetland.

4.2.1 *PFO Wetland Vegetation*

PFO wetlands are characterized by woody vegetation that is 6 meters (approximately 20 feet) tall or taller and normally include an overstory of trees, an understory of young trees or shrubs, and an herbaceous layer (Cowardin et al., 1979). In the Survey Area, forested wetlands represented approximately 20% of all wetland cover types. Vegetation communities for PFO wetlands in the Survey Area were dominated by the following species: red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica),* silky dogwood (*Cornus amomum*), common reed, purple loosestrife, skunk cabbage (*Symplocarpus foetidus*), and jewelweed (*Impatiens capensis*). The PFO portions of the wetland were located along the western extent of the Survey Area and contained little to no muck (<10%).

4.2.2 *PSS Wetland Vegetation*

PSS wetlands are dominated by woody vegetation less than 20 feet in height (Cowardin et al., 1979). The species found in PSS wetlands include true shrubs, saplings, young trees, and trees or shrubs that are small or stunted because of environmental conditions. Scrub-shrub wetlands represented approximately 30% of all wetland cover types in the Survey Area. Vegetation communities for PSS wetlands in the Survey Area were dominated by the following species: red maple, green ash, silky dogwood, black willow (*Salix nigra*), honeysuckle (*Lonicera spp*.), common reed, purple loosestrife, and jewelweed (*Impatiens capensis*). The PSS portions of the wetland were primarily located to the north of the 1.3-acre Sediment Investigation/Remediation Area, where it appears there was historically a green ash swamp. The ash has died, leaving a

regenerating layer of ash and red maple saplings, with a dense understory of common reed. This area was comprised of approximately 30% mucky soils, with the remainder of the PSS habitat having dense saturated mineral soils.

4.2.3 *PEM Wetland Vegetation*

PEM wetlands are non-tidal wetlands characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. PEM wetlands usually are dominated by perennial plants (Cowardin et al., 1979). These wetlands are commonly referred to by a host of terms, including marsh, wet meadow, and slope seeps. Marshes represent emergent wetlands that are flooded for all or most of the year. These wetlands are often associated with currently active or fallow agricultural areas, abandoned or reclaimed mined areas, slopes, depressions, and the edges of open waterbodies. In the Survey Area, emergent wetlands are the primary cover type, representing approximately 40% of all wetland cover types. Vegetation communities for PEM wetlands in the Survey Area consisted of the following species: common reed, purple loosestrife, narrowleaf cattail, and to lesser degrees lakeshore rush, northern water plantain, common rush (*Juncus effusus*), and marsh bedstraw (*Galium palustre).* The PEM portion of the Survey Area was located directly east of the capped landfill and comprises 100% of the 1.3-acre Sediment Investigation/Remediation area. The PEM wetlands were comprised of an open water cattail marsh in the center, surrounded by a dense stand of common reed and purple loosestrife that extended throughout the overall wetland. The common reed has formed thick dense mats of dead stems, making passage difficult. Approximately 60% of the PEM wetland contains 6" – 10" of organic muck. No sedge tussocks/hummocks were observed in the wetland.

4.2.4 *PUB Wetland Vegetation*

PUB cover types include wetlands with at least 25 percent cover of particles smaller than stones, and a vegetative cover less than 30 percent (Cowardin et al., 1979). These wetlands are seasonally to permanently flooded. PUB areas are dominated by mineral soils with a small percentage of the soil surface covered by vegetation. In the Survey Area, unconsolidated bottom wetlands represented approximately 10% of all wetland cover types. Vegetation communities for PUB wetlands in the Survey Area consisted of the following species: narrowleaf cattail, purple loosestrife, lakeshore rush, and northern water plantain. The PUB portion of the wetland represents a small open water component of the marsh, with 2 to 4 feet of water over a thick organic layer of rotting stems and plant detritus on the bottom, from 12 to 18 inches deep.

4.2.5 *Vegetation Summary*

Common reed dominated all the wetland communities it was found in, shading out and competing with other herbaceous species, creating a monoculture on-Site. Along the shaded forest edges, and at the deeper open water fringes, the common reed gave way to other species, though many of these, such as purple loosestrife and honeysuckle are also invasive in origin. The thick, dense persistent stands of common reed throughout the Site are not ideal for bog turtles and inhibit

passage of the turtles through the wetland. No sedge hummocks or tussocks were observed, and combined with the shading from the common reed, limits nesting opportunities for bog turtles.

4.3 Bog Turtle Habitat Evaluation - Soils

Soil profiles were examined with a hand auger, and muck depth was probed with a 10' pole. The soils within the Survey Area are part of the Fluvaquents-Udifluvents complex, frequently flooded. Soil profiles revealed a varying layer of organic matter overlaid on a dense, gleyed sandy loam. This organic layer varied from 1-2 inches of saturated organic loam along the wetland margins, to moderate (4-8 inch) layers of organic muck in the marsh, to deep deposits of decaying plant material on the bottom of the open water portions in the center of the Survey Area. The mineral soils underlying the organic layer were dense and compacted. In dry years, the outer fringes of the wetland likely dry out, but the center of the marsh likely retains water permanently. Stone aggregate can be found underlying the organic layer along the landfill cap and extending into the wetland parallel to the railroad bed, likely from past landfill remediation and rail construction efforts. This acts as a restrictive layer, inhibiting a bog turtles' ability to burrow.

4.4 Bog Turtle Habitat Evaluation - Hydrology

The hydrology of the wetland within the Survey Area appears to be permanent, with spring high water retreating from the fringes, and the deeper, central portion of the wetland retaining water permanently throughout the year. Field reconnaissance concluded that the shallow emergent marsh in the Survey Area is relatively flat and generally enclosed within a shallow basin. During periods of heavy precipitation and during wetter periods of the year (e.g., spring), surface waters within the wetland may be discharged overland to the north, toward a large tributary of Muddy Brook. Hydrologic sources for this wetland are likely based on surface precipitation, and water table depth. No streams are present in the Survey Area, nor were any springs/seeps found. Water movement through the wetland is inhibited by dense common reed growth, with the water percolating through the dense dead stems of previous years' growth. Occasional muskrat or other game trails provide open water passage through the reeds but are not especially common. Surficial flow is further inhibited by the presence of a raised commuter rail bed along the eastern border of the wetland. The nearest passage around the rail bed is a culvert for a tributary of Muddy Brook, located approximately 1,000 feet to the north of the Survey Area.

4.5 Project Phase 1 Habitat Summary

In summary, one wetland was found in the Survey Area, wetland W-WH-1. This wetland is part of a larger wetland complex that extends off-Site and is connected to the Great Swamp wetland complex to the east, though this connection is restructured due to the presence of a raised rail bed on the eastern side of the Survey Area. This active rail bed creates a physical barrier for turtle migration, and a dead painted turtle (*Chrysemys picta*) was found trapped between the raised steel rails at the time of survey (**Attachment C** photolog). For bog turtles to move from the great swamp to the Survey Area, they would have to cross under the railroad tracks though a culvert located 1,000 feet to the north of the Site, and then bend south through a dense PSS and PEM wetland, dominated by common reed to reach the wetland at the landfill. The dense vegetation restricts passage, and with no streams found entering the Survey Area, the bog turtles would have to walk

overland to reach the Site. Conversely, if there were any relict populations at the Site, the absence of raised tussocks onsite means the bog turtles would have to travel overland to find a suitable nesting habitat, and would also face the same dense restrictive vegetation, making the long term viability of any relic animals onsite questionable.

The Survey Area does contain approximately 44% mucky organic soils, with the majority of these located in the PEM and PUB sections around the deep marsh adjacent to the landfill. Underlying this muck is a dense mineral soil layer that would inhibit the ability for bog turtles to dig deeply into the substrate. There is a thick organic layer of decaying vegetation and muck on the bottom of the open water component, but the warm open water habitat lacks the cool springs and upwellings that bog turtles prefer for hibernation. These conditions, combined with a lack of observed seeps and springs, limit the Site's usefulness as a winter hibernaculum.

The wetland itself was part of a restoration/remediation effort in the 1980's, and this legacy leaves the water quality of the Site compromised. The wetland does not have a basic pH, as is preferred for bog turtle habitat, and is contaminated with various materials, notably PCB, due to its history as a landfill. Based on the Site history, presence of contamination, measured nitrogen levels (elevated), and pH measurements, the wetland does not provide the preferred conditions and alkaline pH normally associated with the bog turtle species.

Overall, though the Site does contain mucky substrates, but much of this soil is too shallow for adequate submersion. The Site lacks the cold-water springs and open sedge meadow habitat preferred by bog turtles. The presence of the invasive common reed and purple loosestrife, the Site's contamination, and the loss of interconnectivity due to the railroad, further degrade the Site's overall habitat value for bog turtles. In conclusion, the wetland within the Survey Area has low to very low potential as suitable bog turtle habitat, and the presence of bog turtles utilizing this wetland unlikely. I would conclude that the Site is not suitable bog turtle habitat.

5.0 REFERENCES

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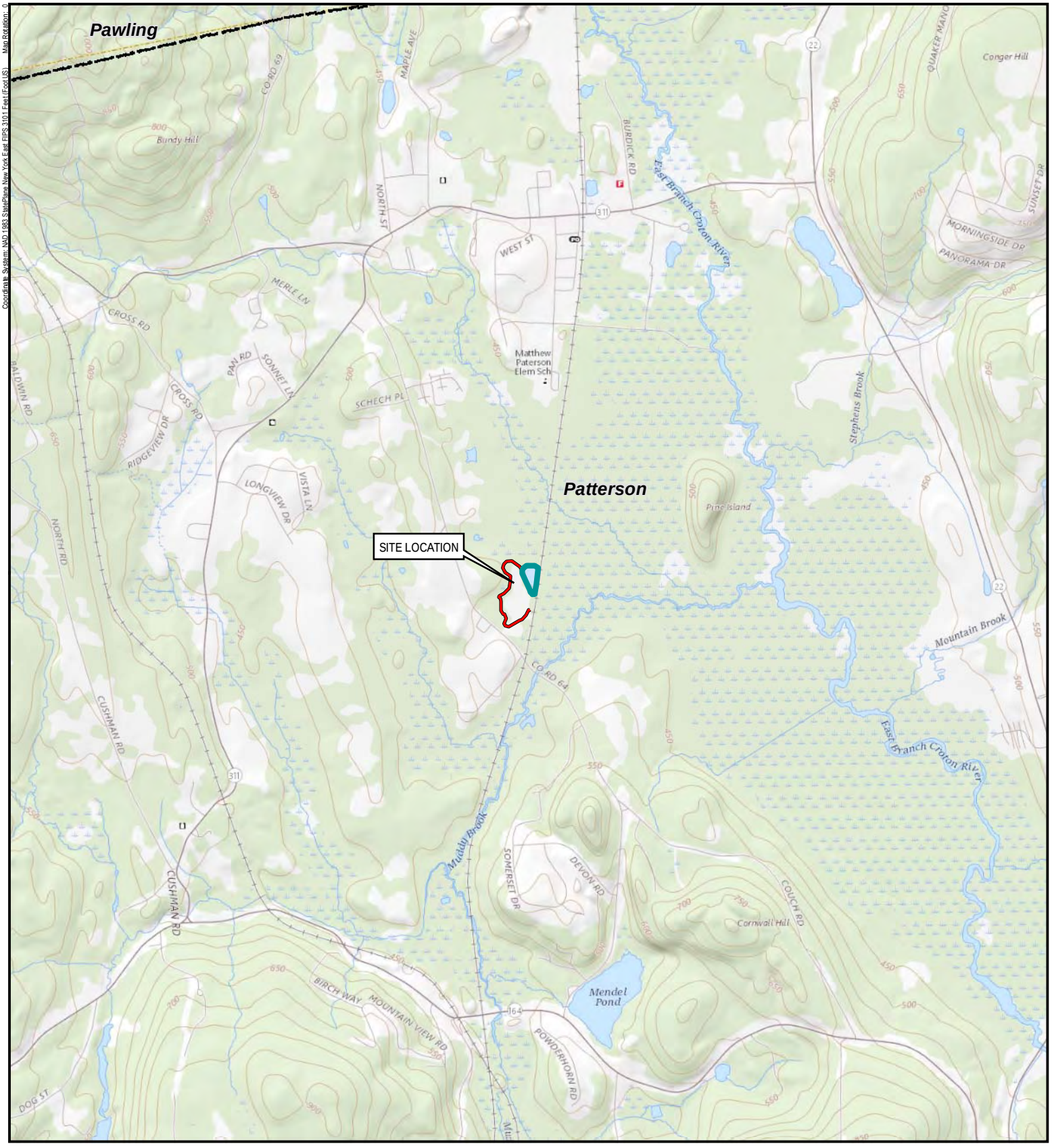
Attachment A

FIGURES



NEW YORK OVERVIEW

LEGEND

- TOWN BOUNDARY
- SEDIMENT INVESTIGATION/REMEDIATION AREA
- FENCE LINE

Brewster Quadrangle
Putnam County
Town of Patterson

1:24,000
1 " = 2,000 '

1. BASEMAP IMAGERY FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

N

0 1,000 2,000 Feet

PROJECT:
CROSS-COUNTY SANITARY / KESSMAN LANDFILL
286 CORNWALL HILL ROAD, PATTERSON, NEW YORK 12563

TITLE:
SITE LOCATION MAP

DRAWN BY:	L. BOCHKIS	PROJ NO.:	259633
CHECKED BY:	M. GIAMBATTISTA		
APPROVED BY:	D. CHOQUETTE		**FIGURE 1**
DATE:	JULY 2020		

TRC
1099 WALL ST WEST, SUITE 250B
LYNDHURST, NJ 07071

Path: M:\ArcGIS Files\Kessman Landfill\Figures\Fig1_Site Location Map.mxd
Coordinate System: NAD 1983 StatePlane New York East FIPS 3101 Feet (Post US) Map Rotation: 0

LEGEND

- SAMPLING AREA
- FENCE LINE
- WETLAND_BOUNDARY
- WETLAND AREA (APPROX.)
- SURVEY AREA

N

1. BASEMAP IMAGERY FROM ESRI/NAIP, "WORLD IMAGERY" WEB BASEMAP SERVICE LAYER, 2017.

2. RESOURCE DELINEATION COMPLETED IN THE FIELD BY TRC IN AUGUST AND DECEMBER 2019..

1:2,400

1 " = 200 '

0 200 Feet

PROJECT:

CROSS-COUNTY SANITARY / KESSMAN LANDFILL
286 CORNWALL HILL ROAD, PATTERSON, NEW YORK 12563

TITLE:

SITE LAYOUT AND SURVEY AREA

DRAWN BY:	L. BOCHKIS	PROJ NO.:	259633
CHECKED BY:	M. GIAMBATTISTA		
APPROVED BY:	D. CHOQUETTE		**FIGURE 2**
DATE:	JULY 2020		

TRC

1099 WALL ST WEST, SUITE 250B
LYNDHURST, NJ 07071

ATTACHMENT B

PHASE 1 BOG TURTLE SURVEY REPORTING DATA SHEET

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range

(Revised April 29, 2020) Please do not edit document.

Wetland ID: W-WH-1

PNDI # (for PA):_____

General Info

Property/Project Name Kessman Landfill

Coordinates -73.607, 41.498 **Project Type** Remediation

Entity Requesting Phase 1 Survey Cross County Sanitary/Kessman Landfill

County/Township/Municipality 286 Cornwall Hill Road, Town of Patternson, Putnam County, NY

Lead Surveyor Duane Choquette **Affiliation** Biologist - TRC

Other Assistants Present None

Date/Condition

Date of Survey 6/1/2020 **Time In** 9:00AM **Time Out** 3:00PM **Air Temp.** 65 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** X Yes __ No __ Unknown

Drought Index*[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)

Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

The region was experiencing abnormally dry conditions at the time of survey.

Wetland Info

Wetland Size 4,202 acres, if known **# Wetlands w/in Project Area[2]** 1

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 X 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 X 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

__ Springs/Seeps __ Springhouse __ Trib/Stream X Pond X Stormwater X Iron Bacteria __ Watercress

X Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])

X Rivulets (4 inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk

X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

There is a drainage swale located along the eastern edge of the wetland, located along the railroad bed's toe of slope. Hydrology flows south along this ditch.

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 X 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

No, the ditches present were dry at the time of survey, lined with rocky rip-rap covered in a thin organic layer (2-4" thick). The entire ditch was colonized by dense stand of Phragmites australis.

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.

[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.

[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.

[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.

[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: W-WH-1

Wetland Info

X Yes __ No Are there any signs of disturbance to ***vegetation*** (*e.g.*, mowing, pasturing, burning)? If yes, describe:
Vegetation adjacent to the landfill is periodically mowed. Vegetation along the rail bed is cut back and maintained, but in both cases this is a very narrow strip of the overall wetalnd vegetation. In general the wetland is undisturbed and does not recieve any forms of cutting or moving.

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:
Fluvaquents-Udifluvents complex, frequently flooded.

How much suitable habitat is in this wetland? Estimate acreage or percentage: 44% (approximately 1.87 acres)

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	40	60	8 in.	16 in.
PSS Portion of Wetland:	30	30	4 in.	12 in.
PFO Portion of Wetland:	20	10	4 in.	12 in.
POW/PUB Portion of Wetland:	10	100	12 in.	18 in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):
Dead green ash stand to the north, with younger sapling regeneration.

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: W-WH-1

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

There is a capped landfill to the south that is routinely mowed. There is a raised active rail bed to the east, seperating the site from a large green ash, red maple, skunk cabbage and Phragmytes swamp to the east. To the north are mixed canopy decidious forests, with residential communities and agricultural fields to the west.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

__ None of it – the entire wetland is within the property boundaries
X Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

X__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? __ Yes X__ No __ Unk Habitat **off-site**? X Yes __ No __ Unk

If yes, how did you conclude this?

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? X Yes __ No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Chrysemys picta, Chelydra serpentina, Lithobates catesbeianus, Anaxyrus americanus

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Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
X Yes __ No __ Unsure The **soils** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
_ Yes X __ No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
_X_ This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?):

The wetland is permanently innundated and ponded, with shallow muck soils over a hard restrictive substrate. The plant community consistes almost entirely of Phragmites australis and Lythrum salicaria, with Typha angustifilia in the deeper habitats. Thereare no cold water seeps/spring present, and interconnectivity to surrounded habitat is limited by railroad bed and roads.

Lead Surveyor – **please sign** below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Duane M Choquette **Signature** Duane Choquette

Date 6-18-2020

Contact Information dchoquette@trccompanies.com 518-222-1383

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Additional space for notes, color photos, or maps/sketch of wetland (or attach printed map with each wetland type carefully outlined; include all wetland types [PEM, PSS, PFO, POW/PUB], streams/ditches, north arrow, property/project borders, and areas of core bog turtle habitat. Include **color photos** for each wetland assessed and separate Phase 1 data forms for each when submitting to agencies, as well as any reptile and amphibian species you encounter, if possible.

Attachment C

PHOTOGRAPHS

Cross-County Sanitary / Kessman Landfill	
Photo: #1 **Date**: 6/1/2020 **ID**: N/A **Comments**: Kessman Landfill, looking north over capped landfill toward wetland W-WH-1	
Photo: #2 **Date**: 6/1/2020 **ID**: W-WH-1 **Comments**: Photo looking north across wetland W-WH-1	

Cross-County Sanitary / Kessman Landfill	
Photo: #3 **Date**: 6/1/2020 **ID**: W-WH-1 **Comments**: Looking North across open marsh in center of wetland W-WH-1	
Photo: #4 **Date**: 6/1/2020 **ID**: W-WH-1 **Comments**: Mucky iron rich soils under the phragmites canopy.	

Cross-County Sanitary / Kessman Landfill	
Photo: #5 **Date**: 6/1/2020 **ID**: W-WH-1 **Comments**: Looking west from Rail bed across PSS habitat. Primarily dead green ash, with red maple and green ash saplings surrounded by common reed.	
Photo: #6 **Date**: 6/1/2020 **ID**: W-WH-1 **Comments**: Looking south along rail bed. Wetland W-WH-1 is on the right site, the Great Swamp is located on the left.	

Cross-County Sanitary / Kessman Landfill	
Photo: #7 **Date**: 6/1/2020 **ID**: W-WH-1 **Comments**: dead painted turtle trapped between railroad tracks on rail bed.	
Photo: #8 **Date**: 6/1/2020 **ID**: W-WH-1 **Comments**: mucky shallow water along toe of landfill.