FOURTH FIVE-YEAR REVIEW REPORT FOR VOLNEY MUNICIPAL LANDFILL SUPERFUND SITE OSWEGO COUNTY, NEW YORK

Prepared by

U.S. Environmental Protection Agency
Region 2
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Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS

AWQS	Class GA Ambient Water Quality Standards
COCs	Contaminants of concern
COVID-19	Corona Virus Disease 2019
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
ICs	Institutional Controls
LLDPE	Low density polyethylene
MCLs	Maximum Contaminant Levels
µg/L	Micrograms per liter
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
OU	Operable unit
PDD	Post-Decision Document
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
ROD	Record of Decision
RI/FS	Remedial investigation/feasibility study
TCA	Trichloroethane
UU/UE	Unlimited use and unrestricted exposure
VOCs	Volatile organic compounds

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports, such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, Section 121, consistent with the National Contingency Plan (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Volney Municipal Landfill Superfund site. The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The site consists of one operable unit (OU), which will be addressed in this FYR. OU1 addresses the landfill cap and groundwater remedy.

The Volney Municipal Landfill Superfund site FYR was led by Thomas Mongelli, EPA's remedial project manager for the site. The review team included Rachel Griffiths (EPA hydrogeologist), Lora Smith-Staines (EPA human health risk assessor), and Julie McPherson (EPA ecological risk assessor), and Payson Long of the New York State Department of Environmental Conservation (NYSDEC). The Potentially Responsible Parties (PRPs) were notified of the initiation of the FYR. The review began on October 28, 2019.

Site Background

The Volney Municipal Landfill Superfund site is a closed landfill located in a rural area of the Town of Volney, Oswego County, New York. The site is approximately 85 acres in size and includes a capped fill area of about 55 acres. It is situated at the intersection of Silk Road and Howard Road (see Appendix A, Figure 1). The site is bordered to the north by Potter Spring; to the east by Silk Road, Bell Creek and wetlands; to the south by a quarter midget race car track and the Oswego County Airport, and to the west and northwest by open space, wooded areas, wetlands and tributaries of Black Creek. A trailer park is located approximately 1,000 feet north of the site on Silk Road and a few residences to the northeast are within 400-600 feet of the site boundary.

The capped area has evenly-distributed gas vents for the landfill gas control system. Two major rip-rap swales divert surface water off the cap, which is drained from the site through conduits under Silk and Howard Roads. The fill area is fenced and there is an entrance gate midway along Silk Road in the east and another in the southwest corner of the site along Howard Road. A utility building is located inside the entrance gate on Silk Road. There is an aboveground, open 350,000-gallon concrete leachate collection tank located in the northeastern corner of the site, along Silk Road.

Landfilling operations were conducted at the site in an unlined disposal area from 1969 to 1983. Most of the waste materials disposed of in the landfill consisted of residential, commercial, institutional, and light industrial wastes; however, approximately 8,000 drums from Pollution Abatement Services, a hazardous waste incineration facility located in Oswego, New York, were approved for disposal at the landfill by NYSDEC. While the approval applied only to discarded drums containing known and limited chemical residues, it was later reported that approximately 50 to 200 of these drums contained liquid waste of unknown volume and composition. The physical condition and locations of these drums in the landfill are unknown. The landfill was owned by the Oswego Valley Solid Refuse Disposal District Board from 1969 to 1975, when it was sold to Oswego County.

Prior to 1969, the property that the landfill now occupies was mined for sand and gravel, with the excavated area being subsequently used for the disposal of municipal and other refuse. Between 1981 and 2002, Oswego County acquired the adjoining properties surrounding the landfill. Part of each of the County-owned parcels to the east and west of the landfill had been strip-mined over the years for cover material for the landfill operation, as well as for the construction of the remedy.

Appendix B, attached, summarizes the documents utilized to prepare this FYR.

Appendix C, attached, summarizes the site's surface drainage, geology/hydrogeology and land use. For more details related to background, physical characteristics, geology/hydrogeology, land/resource use, and history related to the site, please refer to https://www.epa.gov/superfund/volney-landfill.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Volney Municipal Landfill		
EPA ID: NYD980509376		
Region: 2	**State:** NY	**City/County:** Town of Volney/Oswego County
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**		
Author name (Federal or State Project Manager): Thomas Mongelli		

Author affiliation: EPA
Review period: 10/28/2019 – 6/30/2020
Date of site inspection: N/A
Type of review: Statutory
Review number: 4
Triggering action date: 8/31/2015
Due date *(five years after triggering action date)*: 8/31/2020

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

A remedial investigation/feasibility study (RI/FS), which was conducted from 1985 to 1987 by NYSDEC, identified significant surface water/sediment and groundwater contamination resulting from releases from the unlined fill area at the site. It was also determined that 25 single-family residences dependent on private wells downgradient of the site were potential receptors of contaminated groundwater from the site. Based upon the results of the RI/FS, it was concluded that groundwater contamination was the primary human health risk at the site. The RI/FS identified the following contaminants of concern (COCs) for the groundwater: vinyl chloride; 1,1-dichloroethane; 2-butanone; 1,1,1-trichloroethane (1,1,1-TCA); benzene; toluene; ethylbenzene; total xylenes; phenol; arsenic; beryllium; lead; manganese; mercury; nickel; selenium; thallium; and zinc. Because the landfill top had been previously capped and the entire site is fenced, the possibility of direct contact with waste materials was found to be minimal. However, a direct contact threat associated with the soil-capped side slopes, as well as side slope leachate breakout, was identified.

Response Actions

In 1979, because of the exceedance of groundwater standards, NYSDEC entered into an Administrative Order on Consent with Oswego County, the owner of the landfill, that required capping of the landfill top with a liner, capping the side slopes with compacted soil, installation of a gas collection system, and installation of a leachate collection system. This work was performed between 1979 and 1985. Off-site leachate disposal and groundwater monitoring were initiated by Oswego County during the early 1980s. The Volney Municipal Landfill site was included on the Superfund National Priorities List in October 1984.

Following the completion of the RI/FS, a Record of Decision (ROD) was signed by EPA on July 31, 1987. The remedial action objectives (RAOs) identified in the ROD are as follows:

- Reduce the potential for human/animal direct contact with site waste;
- Minimize the migration of landfill leachate through surface and groundwater; and

- Minimize the potential for precipitation/infiltration contact with site wastes.

The selected remedy called for:

- Supplemental capping of the landfill side slopes with an impermeable membrane;
- Installation of a more extensive leachate collection system and a subsurface groundwater containment barrier (slurry wall);
- Treatment of the collected leachate either on- or off-site, to be determined by treatability studies;
- Operation and maintenance of the cap and leachate collection system, and long-term groundwater monitoring;
- An evaluation of the cost-effectiveness of the slurry wall (*i.e.,* in conjunction with a decision regarding on-site versus off-site leachate treatment and disposal); and
- A supplemental investigation to evaluate the potential for the migration of contaminants in the groundwater and to surface water and sediments of the creeks and wetlands surrounding the site.

After the signing of the ROD, it was learned that a quality assurance/quality control review of the analytical data associated with the RI data had not been performed. EPA resampled the site in 1988 and, based upon the sampling results, concluded that hazardous substances were present at the site at levels that posed a risk to public health and the environment. On September 29, 1989, EPA issued a Post-Decision Document (PDD), which reaffirmed the remedy selected in the ROD.

As called for in the ROD studies were conducted at the site from 1989 to 1990 to provide information about off-site and on-site leachate treatment and disposal, as well as updated construction costs. The studies concluded that before any cost-effectiveness decisions related to the slurry wall or leachate treatment could be made, additional testing was needed to resolve several critical issues concerning the hydrogeology at the site (*i.e.*, groundwater flow issues, possible artesian conditions, and the lack of any reduction in leachate collection volumes since the 1985 capping of the top of the landfill).

An Administrative Order on Consent was signed in 1993 for the performance of a pre-design study by a group of 33 PRPs. Based upon the results of this pre-design study which was completed in 1997, EPA determined that there was no definable contaminant groundwater plume at the site, only intermittent changes in contaminant concentrations in the groundwater migrating from the landfill area, and that natural attenuation was occurring in a sizable buffer zone between the landfill and eight downgradient residential wells. This conclusion was based upon the fact that site-related contamination had not been found in the downgradient private wells, with the closest well located approximately 450 feet from the landfill. In addition, it was determined that the installation of a slurry wall and a more extensive leachate collection drain system would not offer a significant protective benefit when considering its relatively high cost and the relatively low contaminant concentration of the leachate generated from the landfill. It was also determined that off-site treatment and disposal of the leachate would be more cost-effective than on-site treatment and disposal (*i.e.,* due to the low concentration of the leachate being generated and the significant cost to construct and operate an on-site treatment facility). Based upon these findings, an Explanation of Significant Differences (ESD) was issued by EPA in August 1997, which concluded that a slurry

wall would not be installed, the intermittent groundwater contamination would be extracted on an as-needed basis, and the extracted groundwater would be treated off-site.

A Contamination Pathways investigation to evaluate the potential for the migration of contaminants in the groundwater to outlying areas and to the surface waters and sediments of Bell Creek, Black Creek, and the wetlands surrounding the site, as called for in the ROD and PDD, commenced in 1990 under an Administrative Order on Consent with 37 PRPs. The investigation, however, was postponed while the pre-design study, noted above, was completed. The Contamination Pathways investigation was reactivated in 1998 (concurrent with the initiation of the source area design). This investigation, which was completed in 2001, found that the groundwater in the more outlying areas from the site did not contain site-related contaminants and that the level of site-related contaminants present in the surface water and sediments in the immediate area (inner perimeter) of the site did not pose a public health or ecological threat. Based upon the results of this investigation, it was concluded that intermittent groundwater extraction and treatment, in combination with natural attenuation, would adequately address the site-related groundwater contamination at the site (*i.e.*, in the immediate perimeter around the site), the surface water and sediments did not have to be remediated, and a supplemental groundwater remedy for the outlying areas at the site did not need to be implemented. In addition, to avoid any risk to human health, it was determined that institutional controls (ICs) (*i.e.*, deed restrictions) were needed to prevent groundwater withdrawal in the areas adjacent to the site. The findings noted above were documented in ESD issued in October 2001

Status of Implementation

Construction of the supplemental cap on the side slopes of the landfill, which commenced in August 2000, was completed in September 2001. The effort involved the installation of a 40-mil textured, low density polyethylene (LLDPE) liner, which was overlapped by the existing 40-mil polyvinyl chloride top liner by 5 feet. A gas venting system was also installed and the LLDPE liner was followed by (in ascending order) a 12-inch lateral drainage layer, Type I Geotextile, 12-inch protective soil cover layer, and 6 inches of topsoil. Numerous other activities were also performed at the site, including abandoning monitoring wells that would be under the cap and would not be used in the long-term monitoring program, improvements to surface water drainage, upgrading the electric service to the site, and installing new chain-link fencing. During the cap installation, a previously-unknown waste area was discovered in the northeast of the site, between the Silk Road entrance gate and the leachate collection tank. The area of waste was a little less than 1-acre and the cap was extended to include that area.

Institutional Controls

The 2001 ESD required the implementation of ICs to prevent the use of contaminated groundwater downgradient from the landfill. At the time of the ESD, Oswego County owned five parcels of land surrounding the landfill; a 45-acre parcel located to the east along Silk Road was acquired in October 2002. In June 2003, Oswego County granted three environmental easements related to the landfill parcel and the six county-owned parcels surrounding the landfill portion of the property. These easements include prohibitions on the use of groundwater, any activity that would affect the integrity of the landfill cap, and any activities that would alter surface water drainage.

In March 2005, the Town of Volney requested an easement from Oswego County to install a waterline[1] through the County-owned parcel on the west side of the landfill, which was one of the parcels previously subject to the environmental easements placed on the parcels adjacent to the landfill in 2003. EPA and NYSDEC's approval to proceed with the waterline easement was granted in May 2005; however, a review of the easement led to the discovery of a number of discrepancies in the easements. One discrepancy was the failure to include a parcel of land in the easement that was owned by National Grid (in the southwest corner of the landfill). Subsequently, Oswego County reached an agreement with National Grid, whereby National Grid abandoned its (uncontaminated) well after it connected its facility to the new Town of Volney water system, and National Grid then granted an easement prohibiting the further use of groundwater on its property. The easement was recorded with the Oswego County Clerk on January 9, 2009. The other discrepancies in the easements were related to how some of the parcels were mapped. These discrepancies were addressed by Oswego County by providing a revised parcel description for the parcel which contains a quarter midget race car track and a revised master map for the three easements. A 2011 ESD documented the incorporation of the aforementioned easements into the selected remedy.

Institutional Controls Summary Table

Table 1: Summary of Planned and/or Implemented Institutional Controls

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	Town of Volney, Lot #: 91, 92, 93, 100, 101	Restrict the installation of groundwater wells until groundwater cleanup standards have been achieved.	Environmental Protection Easement and Declaration of Restrictive Covenants (R-2003-007783, R-2003-007784, and R-2003-007785), May 2003 Environmental Protection Easement and Declaration of Restrictive Covenant (R-2009-000425), January 2009

[1] The waterline installation was conducted by the Town of Volney independent of the remedy at the site. Residential wells have not shown any impacts from landfill leachate, nor are they expected to in the future.

Surface Water Drainage	Yes	Yes	Town of Volney, Lot #: 91 and 92	Prevent activities that could alter surface water drainage conditions.	Environmental Protection Easement and Declaration of Restrictive Covenants (R-2003-007784), May 2003
Landfill Cap	Yes	Yes	Town of Volney, Lots 91 and 92	Prevent activities that could interfere with or adversely affect the integrity of the landfill cap and side slopes.	Environmental Protection Easement and Declaration of Restrictive Covenants (R-2003-007785), May 2003

Systems Operations/Operation & Maintenance

The Operation, Maintenance, and Monitoring Manual for the Volney Landfill site contains the procedures for inspecting and evaluating the landfill cap, off-site disposal of the collected leachate and extracted groundwater, provision and certification of institutional controls, decommissioning of monitoring wells, monitoring of groundwater and air quality in the immediate perimeter of the landfill, and long-term monitoring of downgradient groundwater wells. Repairs are made to the cap, drainage, and leachate collection systems, as necessary, to control the effects of settling, subsidence, erosion or other events that might interfere with the performance of the remedy.

The site is inspected on a quarterly basis as follows:

- The landfill cap is inspected for signs of erosion, excessive settlement, surface water ponding, seedling growth, impacts from terrestrial receptors (*i.e.,* burrowing), and stressed vegetation;
- The surface water drainage system is inspected for signs of erosion and/or siltation, seedling growth, etc., in the swales, ditches, downchutes on the top and sides of the landfill, and the stone toe drain around the perimeter base;
- The landfill gas venting system is inspected for any damage to vents and extreme settlement around each vent and to determine if the vent is functioning (*i.e.*, odors) and the goosenecks are inspected for signs of blockages and any water is pumped out;
- Explosive gas readings are taken at the property boundary monitoring stations and at on-site structures;
- The site is inspected for any vectors and damage is reported;
- The groundwater monitoring wells are inspected for ease of locating, operation of locks, damage/vandalism, and the condition of the surface seals;

- The site access gates and fence are inspected for operational locks, vandalism, and damage;
- The manholes are inspected for signs of leakage, erosion, and if the pump station is operational;
- The leachate collection tank is inspected for cracking in the tank walls, signs of leakage or overflow, and volume (if the tank is more than 3/4 full, the leachate is removed);
- The utility building is inspected for vandalism, damage, and if secure;
- The access roads are inspected for ruts, puddles, and drivability; and
- The site is inspected for debris, litter and/or waste.

Since 2015, approximately 837,000 gallons of leachate have been removed from the leachate collection tank and transported to the City of Fulton Wastewater Treatment Plant.

Potential site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the site.

III. PROGRESS SINCE THE LAST REVIEW

The protectiveness determinations from the last FYR are summarized in Table 2, below.

Table 2: Protectiveness Determinations/Statements from the 2015 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The remedy at OU1 is protective of human health and the environment.
Sitewide	Protective	The sitewide remedy is protective of human health and the environment.

There were no recommendations in the previous FYR report.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 1, 2019, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at Superfund sites in New York, New Jersey, Puerto Rico, and the Virgin Islands, including the Volney Municipal Landfill Superfund site. The announcement can be found at the following web address: https://www.epa.gov/aboutepa/fiscal-year-2020-five-year-reviews.

In addition to this notification, a notice of the commencement of the FYR was sent to local public officials. The notice was provided to the town of Volney by email with a request that the notice be posted in public areas in the town hall. The purpose of the public notice was to inform the

community that the EPA would be conducting a FYR to ensure that the remedy implemented at the site remains protective of public health and is functioning as designed. In addition, the notice included contact information, including addresses and telephone numbers, for questions related to the FYR process or the site.

Once the FYR is completed, the results of the review and the FYR report will be made available online (www.epa.gov/superfund/volney) and at the site information repositories. The information repositories are maintained at the Fulton Public Library, 160 South First Street, Fulton, New York 13069 and EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York, as well as on the EPA's website.

Data Review

The current monitoring well network includes 15 shallow wells screened in the unconsolidated geologic units, five wells screened in the bedrock unit, three leachate sampling points, and five residential wells. Sampling of all media occurs on a semiannual basis.

Groundwater monitoring data from this FYR period exceeded NYSDEC Class GA Ambient Water Quality Standards (AWQS) or EPA Maximum Contaminant Levels (MCLs) for a limited number of contaminants in groundwater monitoring wells. The number of volatile organic compounds (VOCs) that were detected and their concentrations have decreased significantly since the initiation of the groundwater component of the remedy. The AWQS of 1 microgram per liter (µg/L) for benzene was exceeded in one monitoring well, overburden monitoring location SHW-3 (see Figure 1 for monitoring well locations), with a maximum observed concentration of 17 micrograms per liter (µg/L) in June 2015, decreasing to 8.8 µg/L in October 2018. Chlorobenzene exceeded its AWQS concentration of 5 µg/L in monitoring well GW-9R, at a maximum concentration of 24 µg/L in June 2016 and remained stable through the review period. Exceedances of toluene, acetone, and 4-methyl-2-pentanone were noted at monitoring well VBW-8DR during the June 2016 sampling event, however, these compounds are common laboratory contaminants and were not detected before or after the 2016 event. Coupled with exceedances of methylene chloride (another common laboratory contaminant) in most samples analyzed in June 2016, it is likely these detections are not representative of site conditions. While 1,4-dioxane was detected in monitoring wells VBW-8D, SHW-1, SHW-3, GW-3C, SGW-30B, and SHW-4, with the exception of monitoring well SHW-4, the detections only marginally exceeded the proposed NYSDEC MCL for 1,4-dioxane of 1 µg/L. 1,4-dioxane concentrations in monitoring well SHW-4, which is located on the southeastern side of the landfill, consistently exceeded the proposed MCL, with the highest concentration being 520 µg/L in November 2016.

Overall, groundwater contamination appears to be sporadic and limited to the landfill property and the immediate surrounding area. Both the number of COCs exceeding MCLs and their concentrations have decreased significantly since the last FYR.

The residential wells continue to exhibit concentrations of COCs that are below federal MCLs and NYSDEC AWQS.

Several monitoring wells surrounding the landfill property that are screened in the overburden (shallow) unit show little or no significant groundwater impacts from the landfill, including monitoring wells MW-10S, MW-11S, and SGW-27A. While shallow monitoring wells SHW-1, SHW-3, SHW-4, SHW-8, and GW-3C have been affected to some degree by the landfill, generally, with landfill leachate indicators, such as ammonia, iron, chloride, alkalinity, sodium, specific conductivity, and calcium, they have shown a general slow decline or a more stable trend in concentrations during the past five years.

Two monitoring wells screened in the bedrock (BRW-6 and BRW-7 106 feet deep) are located along Howard Road near the southern boundary of the landfill. The effects from the landfill have lessened over time as indicated by generally declining specific conductivity and pH measurements in these wells. Three other bedrock monitoring wells located to the northeast of the landfill, about 400 feet east of Silk Road, MW-6BR, MW-7BR, and MW-8BR, have significantly higher specific conductivity and ammonia concentrations. Due to their greater distance from the landfill, the effects of the capping remedy could take longer to be observed at these monitoring wells.

Site Inspection

Due to health and safety considerations from the COVID-19 pandemic, a site inspection was not completed by the review team during the review period. In lieu of a site inspection, current photographs of the site depicting the landfill cap, monitoring wells, site fencing, and the leachate collection tank were submitted by Bryce Dingman of Barton & Loguidice, the PRP Group's contractor. No issues impacting protectiveness were observed. The photographs are included in Appendix D of this report. A formal site inspection by the review team will be scheduled when it is determined to be safe to do so.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

The ROD, as modified by the PDD and ESDs, called for, among other things, the installation of a supplemental cap on the sideslopes, surface water controls, contaminated groundwater extraction, as needed, collection and off-site treatment of leachate, and institutional controls. The purpose of the response action was to reduce the risk to human health and the environment due to contaminants leaching from the landfill mound. The purpose of capping of the landfill was to minimize the infiltration of rainfall and snowmelt into the landfill, thereby reducing the potential for contaminants leaching from the landfill into the groundwater and negatively impacting groundwater quality, as well as impacting surface waters and sediments of adjacent Bell Creek, Black Creek, and nearby wetland habitats. Capping was also intended to prevent direct contact exposure to hazardous contaminants. The purpose of capturing and treating the contaminated leachate, as needed, was to control its migration and assure that groundwater beyond the site boundary meets MCLs in the shortest possible time.

Quarterly inspections of the landfill cap indicate that it continues to function as intended to prevent infiltration of rain and snowmelt into the waste material. The cap, along with the perimeter fencing continue to serve as a barrier preventing human and animal contact with the waste. Leachate continues to be pumped from the western slope seep resulting in a reversal of seep expansion.

While it appears that the remedy is functioning as intended by the decision documents, the groundwater has not yet been restored. Contaminants exceeding MCLs in the groundwater have decreased significantly since the installation of the cap, and are primarily confined to locations immediately adjacent to the landfill in the shallow overburden unit. The extent of 1,4-dioxane contamination in the vicinity of monitoring well SHW-4 needs to be further evaluated. Institutional controls are currently in place to restrict groundwater use, excavation that would affect the integrity of the cap, and activities that would alter surface water drainage on the landfill as well as all of the surrounding properties.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid*?*

Land-use considerations used in the baseline human health risk assessment are still valid. The exposure assumptions and toxicity values that were used to estimate the potential risks and hazards to human health and the environment followed the general risk assessment practice at the time the risk assessment was performed. Although the risk assessment process has been updated and specific parameters and toxicity values may have changed, the risk assessment process that was used is still consistent with current practice and the need to implement a remedial action remains valid.

The RAOs used at the time of the remedy selection are still valid.

There are no changes in the physical conditions of the site or site usage that would affect the protectiveness of the selected remedy, and there are no significant changes in site use expected over the next five years. The Volney Landfill has been capped and the cap is being maintained, removing direct contact (*i.e.*, ingestion or dermal contact with soil) exposures to the public as well as ecological receptors. A fence is in place to prevent further potential exposures to trespassers. Additionally, the County has purchased surrounding properties, which provide a buffer around the landfill. The 2001 Contamination Pathways RI/FS determined that surface water and sediments did not present unacceptable risk to human health or the environment and do not require remediation.

Potential exposure to groundwater contaminated by the landfill has been eliminated. Samples have been collected from eight residential potable water wells located closest to the site. Five of the eight wells are no longer sampled after many years of remaining below standards. The remaining three wells have been below risk-based standards for all site-related contaminants in the last five years. Based on data from current residential wells and the ICs that prevent the installation of additional potable wells in the area adjacent to the landfill, this pathway is incomplete.

One potential exposure pathway that was not evaluated at the time of the ROD is vapor intrusion. The maximum detected groundwater concentrations of benzene and ethylbenzene exceeded screening levels determined by the OSWER Vapor Intrusion Screening Level calculator (set at a cancer risk of 10^{-4} and a hazard quotient of 1). However, vapor intrusion is not expected to be an issue at the site as the exposure pathway is incomplete. There are no buildings located on the landfill except for a maintenance building, which is not regularly occupied, and the nearest residential buildings are not located in the vicinity of monitoring wells with VOC exceedances. Because the landfill and the surrounding properties have been purchased by Oswego County, future construction is unlikely.

No additional contaminants, sources of contamination, exposed populations or exposure pathways have been identified since the last FYR.

While state and federal groundwater standards have not been achieved for all COCs, the protectiveness of the remedy is not impacted. It is anticipated that groundwater standards will be reached in the future and these standards are still valid. While there are no known downgradient receptors, additional information related to the extent of 1,4-dioxane contamination is needed in the vicinity of monitoring well SHW-4.

The remedy is protective of ecological receptors since the landfill is closed and capped and previously collected surface water samples were detected below their respective NYS Ambient Water Quality Standards.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information had come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Table 3, below, presents the recommendations and follow-up actions for this FYR.

Table 3: Issues and Recommendations

Issues/Recommendations	
OU(s) without Issues/Recommendations Identified in the Five-Year Review:	
None	
Issues and Recommendations Identified in the Five-Year Review:	
OU(s): 01	**Issue Category:** Monitoring

	Issue: During the review period, 1,4-dioxane concentrations in monitoring well SHW-4 consistently exceeded the proposed MCL. The extent of the 1,4-dioxane contamination needs to be determined.			
	Recommendation: Determine the extent of the 1,4-dioxane contamination at the site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/30/2021

OTHER FINDINGS

A site inspection could not be performed during the review period due to the ongoing COVID-19 pandemic. An inspection should be scheduled when it is determined to be safe to do so.

VII. PROTECTIVENESS STATEMENT

Table 4, below, provides protectiveness statements.

Table 4: Protectiveness Statements

Protectiveness Statement(s)		
Operable Unit: 01	*Protectiveness Determination:* Short-term Protective	*Planned Addendum Completion Date:* N/A
Protectiveness Statement: The remedy at OU1 is protective of human health and the environment in the short-term because all human health and ecological exposure pathways have been eliminated. For the remedy at OU1 to be protective in the long-term, the extent of the 1,4-dioxane contamination needs to be determined.		
Sitewide Protectiveness Statement		
Protectiveness Determination: Short-term Protective		*Planned Addendum Completion Date:* N/A
Protectiveness Statement: The sitewide remedy is protective of human health and the environment in the short-term because all human health and ecological exposure pathways have been eliminated.. For the sitewide remedy at OU1 to be protective in the long-term, the extent of the 1,4-dioxane contamination needs to be determined.		

VIII. NEXT REVIEW

The next FYR report for the Volney Municipal Landfill Superfund site is required five years from the completion date of this review.

APPENDIX A – FIGURE

N

N 1221000

N 1222500

N 1224000

N 1225500

N 1227000

E 873000

E 874500

E 876000

RW-17
RW-5
RW-6
MW-7S
GW-5R
MW-2S
MW-2I
EGM-4
VBW-3BR
SGW-27A
SGW-27B
WP-4
SED-10
MW-3D
MW-3C
EGM-6
TW-11
EGM-3
EGM-5
VBW-1S
BRW-8
LTW-8
LTW-12
BRW-9
LTW-10
SHW-8
MW-3S
GW-12A
EGM-7
MW-9S
MW-9BR
LTW-13
GW-6R
LTW-1
SGW-29
SW-1/SED-1
BRW-7
LTW-9
LTW-2
MW-11S
EGM-8
BRW-1
RACE TRACK MONITORING WELL (PROPOSED)
VBW-8D PUMPING WELL
EGM-9
RW-1B
RW-1A
SHW-1
EGM-10
GW-7R
VBW-12D
GW-14A
MW-4S
RW-4
OVL-1
OVL-2
OVL-3
VBW-8S
VBW-8I
VBW-8BR
VBW-8D
LTW-3
BRW-2
SW-3/SED-3
LTW-4
SGW-30A
SGW-30B
MW-8BR
MW-10S
SHW-2
RACE TRACK WELL
BRW-6
EGM-2
GW-9R
EGM-1
BRW-3
SHW-3
RW-2B
SHW-4
LTW-5
LTW-6
SHW-5
BRW-5
BRW-4
GW-15R
GW-8R
GW-10R
MW-7BR
WP-3/SED-9
GW-16
SW-2/SED-2
GW-16/SED-8
GW-11AR
GW-18R
SGW-33R
MW-6BR
SGW-34
MW-5S
WP-2
SED-8
WP-1
SW-4/SED-4
RW-7
RW-10

LEGEND

- MONITORING WELLS USED AS REMEDIAL INVESTIGATION WATER QUALITY DATA POINTS.
- SURFACE WATER / SEDIMENT SAMPLING LOCATION.
- MONITORING POINTS THAT WILL BE SAMPLED AS PART OF ONGOING OM & M PROGRAM (SEE TABLE 1).
- EXPLOSIVE GAS MONITORING POINTS.

SCALE: 1" = 500'

Barton & Loguidice, P.C.
Consulting Engineers
290 Elwood Davis Road / Box 3107, Syracuse, New York 13220

VOLNEY LANDFILL
OM & M PLAN

LEACHATE AND GROUNDWATER MONITORING LOCATION

TOWN OF VOLNEY OSWEGO COUNTY, NEW YORK

Figure
1
Project No.
132.165

APPENDIX B – REFERENCE LIST

Documents, Data and Information Reviewed in Completing the Five-Year Review	
Document Title, Author	**Submittal Date**
Migration of Pollutants in Groundwater from the Oswego County Landfill Volney, New York, Scrudato and Hinriches, SUNY (Oswego)	1982
Engineering Investigations and Evaluations at Inactive Hazardous Waste Sites, Engineering-Science, Inc.	1983
Hydrogeologic Investigation of the Oswego Valley Landfill Site, Geraghty & Miller	1985
Remedial Investigation/Feasibility Study, URS Co.	1987
Record of Decision, EPA	1987
Post-Decision Document, EPA	1989
Design Data Evaluation Report, McLaren/Hart Inc.	1997
Explanation of Significant Differences, EPA	1997
Final Design Report, Barton & Loguidice, P.C. (B&L)	1999
Contamination Pathways Remedial Investigation Report, B&L	2000
Remedial Action Report, B&L	2001
Explanation of Significant Differences, EPA	2001
Preliminary Close-Out Report, EPA	2002
Operation, Maintenance, and Monitoring Manual, B&L	2002
1st Five-Year Review, EPA	2005
2nd Five-Year Review, EPA	2010
3rd Five-Year Review, EPA	2015
OM&M Quarterly Inspection Reports, Oswego County/B&L	2015-2019

APPENDIX C—SURFACE DRAINAGE, GEOLOGY/HYDROGEOLOGY AND LAND USE

Surface Drainage

Surface drainage in the area is generally by low-gradient streams—Bell Creek and tributaries of Black Creek, which both eventually drain into the Oswego River, a major regional river that empties into Lake Ontario at Oswego, New York. Several ponds, marshes, and wetlands are within a mile of the site. Potter Spring, which forms part of the headwaters to Bell Creek, is, as was noted above, located immediately north of the site.

Existing flood insurance maps (Federal Emergency Management Agency, 1983) indicate that no portions of the site are located in either the 100- or 500-year flood zone, although the adjacent areas to the north and east (*i.e.*, Potter Spring and Bell Creek, respectively) are in a flood zone.

Vegetation patterns at the site are a mixture of herbaceous field, weed, and grass species. Both open-field and forested habitats characterize the surrounding area. These habitats support a variety of avian and mammalian species. No New York State Department of Environmental Conservation Significant Habitat Areas are found on-site, and no endangered or threatened species were identified in this area.

Site Geology/Hydrogeology

The Volney Landfill is situated in the Lake Ontario section of the Interior Lowlands physiographic province. The topographic setting consists of gently rolling hills and intervening flatlands. The region is underlain by gently dipping bedrock of sedimentary nature (*e.g.*, sandstones, siltstones, and shales). Bedrock does not typically outcrop due to an overlying sequence of unconsolidated sediments, which primarily consists of glacial deposits. The glacial deposits include a nearly ubiquitous mantle of glacial till, which is locally formed into elongated ridges or drumlins. In the lower elevations, glacial till is covered with glacial meltwater deposits, glaciolacustrine, alluvium, and swamp deposits. Typically, drumlins form the hilltops in the region, although one underlies the lower part of the site in a northwest/southeast direction. The generalized sequence of unconsolidated stratigraphic units encountered beneath the site area in ascending order include bedrock, lodgement till, glaciolacustrine fine sand and silt, sand and gravel, alluvium and swamp deposits, and artificial fill.

Data obtained from surface water level measurements at Potter Spring and in creeks and tributaries surrounding the landfill imply that the aforementioned surface-water features act as hydraulic boundaries to groundwater flow and that groundwater from the landfill discharges, in part, into nearby surface waters.

Groundwater in the vicinity of the site area occurs in the unconsolidated deposits and underlying bedrock aquifers. The sand and gravel unit is also recognized as the water table aquifer and elevation data indicate that the water table surface generally conforms to the topographic surface and is largely controlled by the slope and geology of the underlying lodgement till. The lodgement till is also believed to function as a low-permeability confining unit which separates the shallow aquifer from the underlying bedrock units.

Groundwater flow in the shallow aquifer is radial from the immediate boundary of the site and thereafter, the groundwater in the north and east flow eastward toward Bell Creek. Groundwater in the northwestern part of the site flows toward Potter Spring in the north and groundwater in the southwestern and southern part of the site flows radially to the southwest and southeast. Groundwater flow in the bedrock is generally to the northeast and occurs under confined or artesian conditions with the low permeability till functioning as the overlying confining unit.

Land and Resource Use

Woodlands and farmlands are a prominent feature in the general vicinity of the site. A trailer park is located approximately 1,000 feet north of the site on Silk Road, and a few residences to the northeast are within 400-600 feet of the site boundary. A quarter midget racecar track and the Oswego County Airport are located on the south side of Howard Road, and there are also some residences and light industry immediately to the west along Howard Road.

Prior to 1969, the property that the landfill now occupies was mined for sand and gravel, with the excavated area being subsequently used for the disposals of municipal and other refuse. Between 1981 and 2002, Oswego County acquired the adjoining properties surrounding the landfill. Part of each of the County-owned parcels to the east and west of the landfill had been strip-mined over the years for cover material for the landfill operation, as well as for the construction of the remedy.

Oswego County has placed environmental easements on each of its six properties surrounding the landfill. The county has no plans to develop these properties which serve as a buffer around the landfill. Within 1,000 feet of the site, there are approximately 25 residences and light industry which formerly relied on groundwater for drinking water and other uses. A municipal water district was developed to eliminate the need for the withdrawal of groundwater in the area around the site. A water tower was erected approximately 1,750 feet to the west of the landfill on Howard Road. All but two of the properties in proximity to the landfill, a residence and the mobile home park, have been connected to the public water system. These wells are routinely sampled and have shown no signs of being impacted by the site.

APPENDIX D – SITE PHOTOGRAPHS

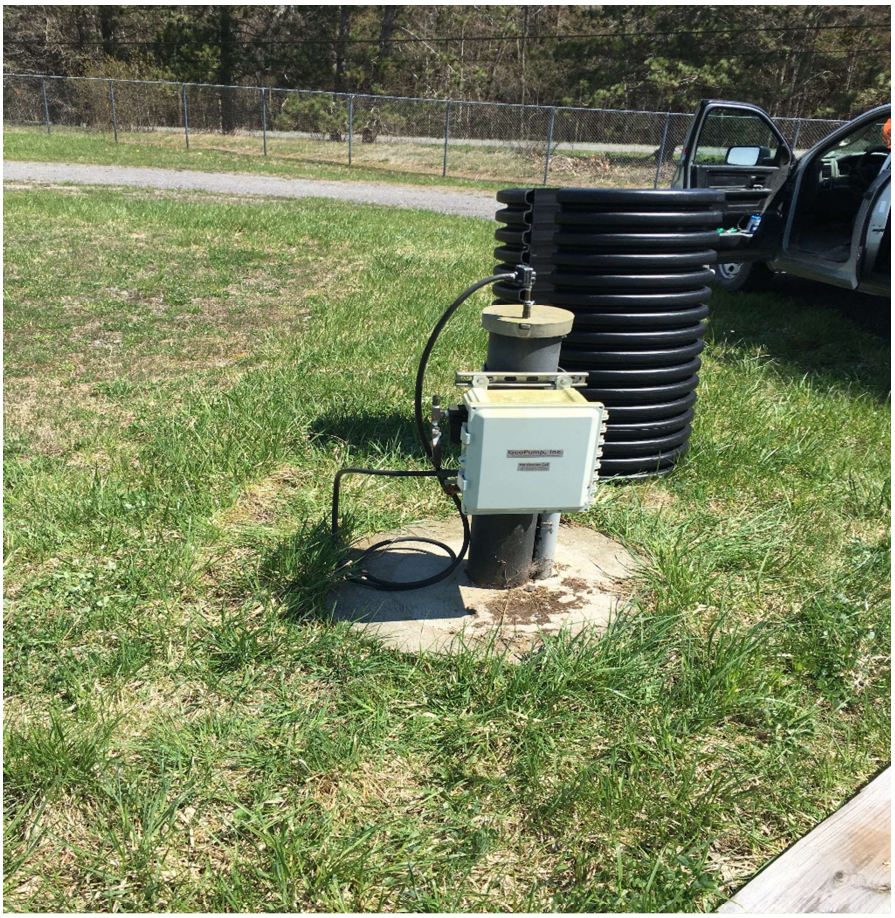

Photo of Remedial Pumping Well – East Side

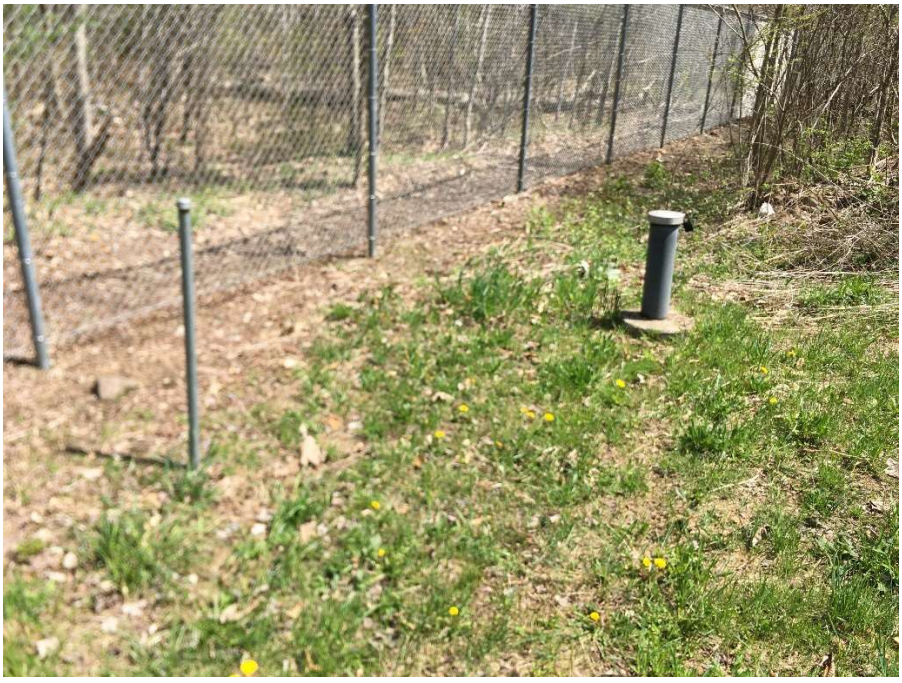

Photo of Perimeter Monitoring Well – North Side

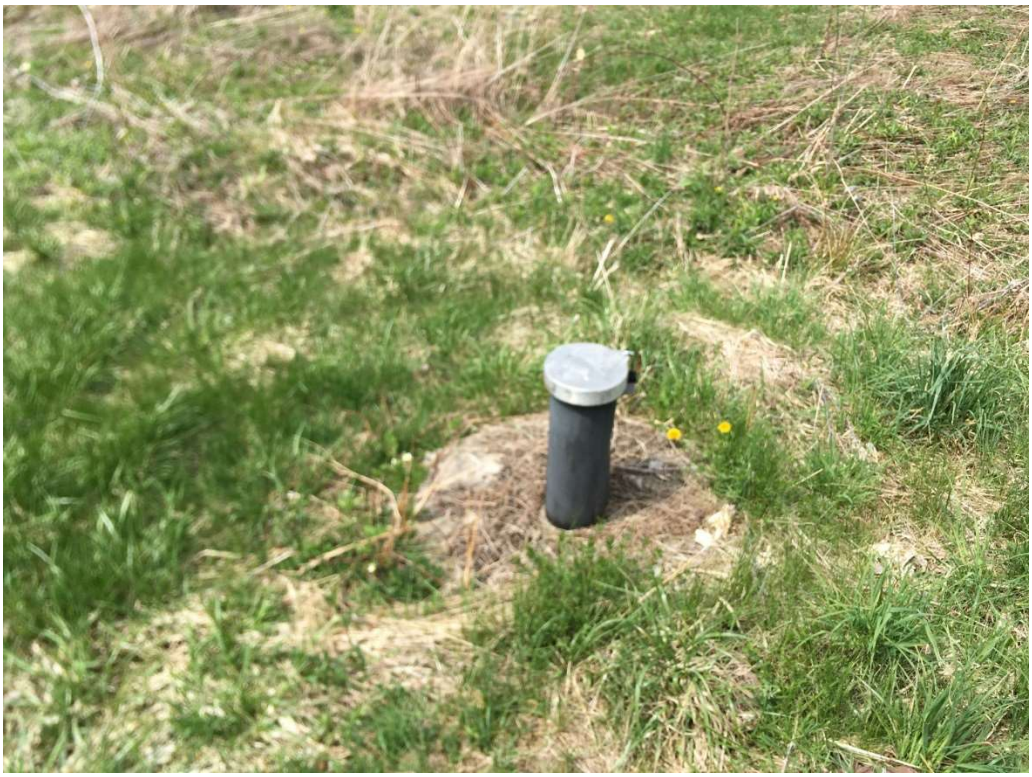

Photo of Perimeter Monitoring Well – West Side

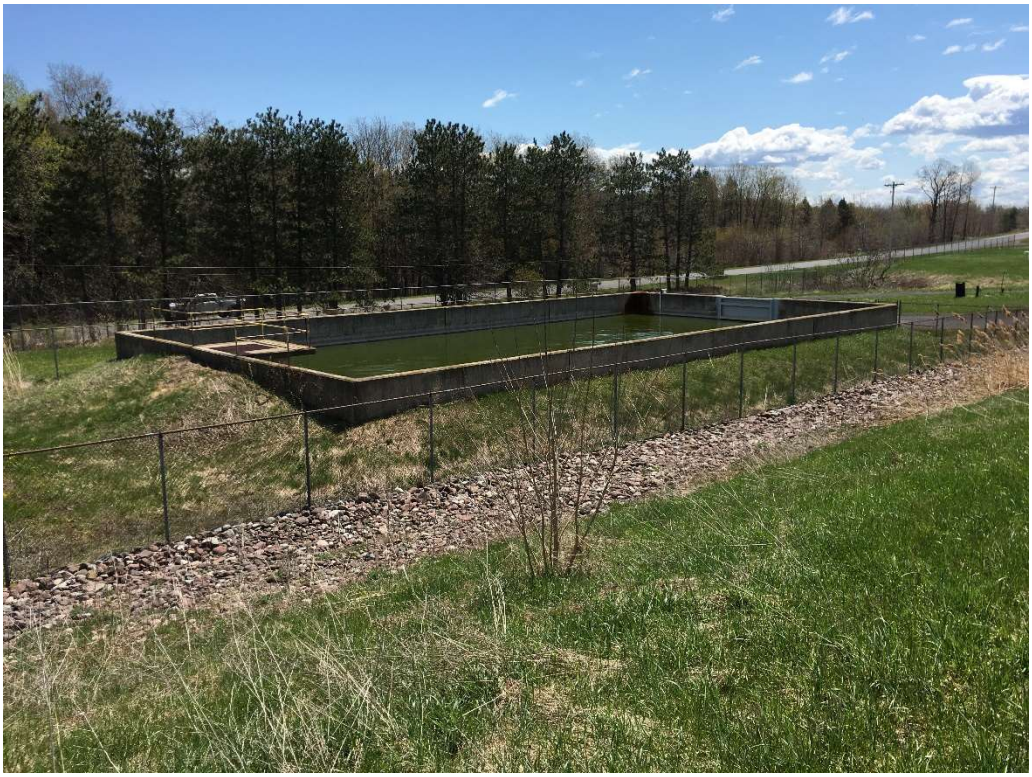

Photo of On-site Leachate Storage Structure

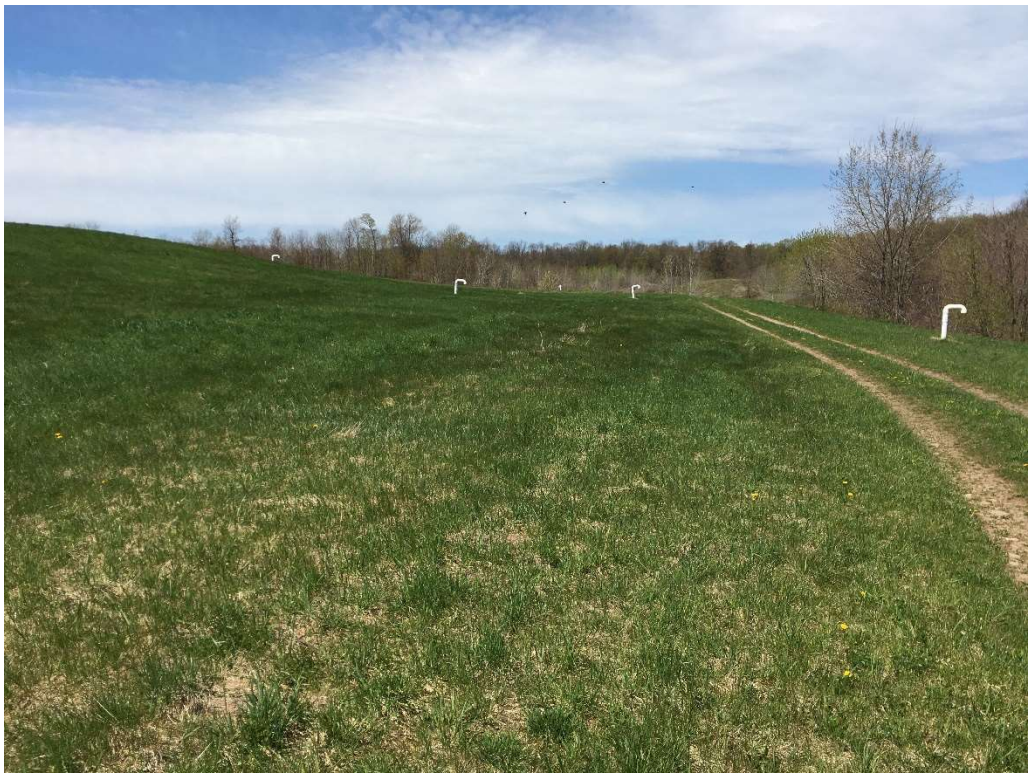

Photo of North Side of Landfill Facing West

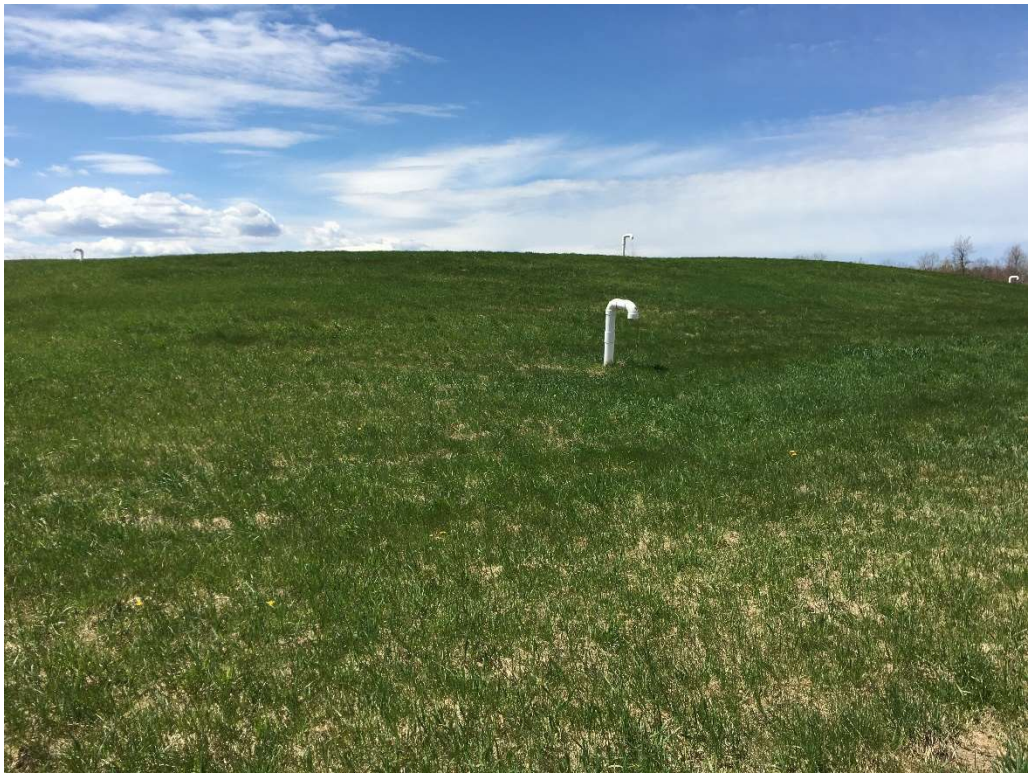

Photo of North Side of Landfill Facing South

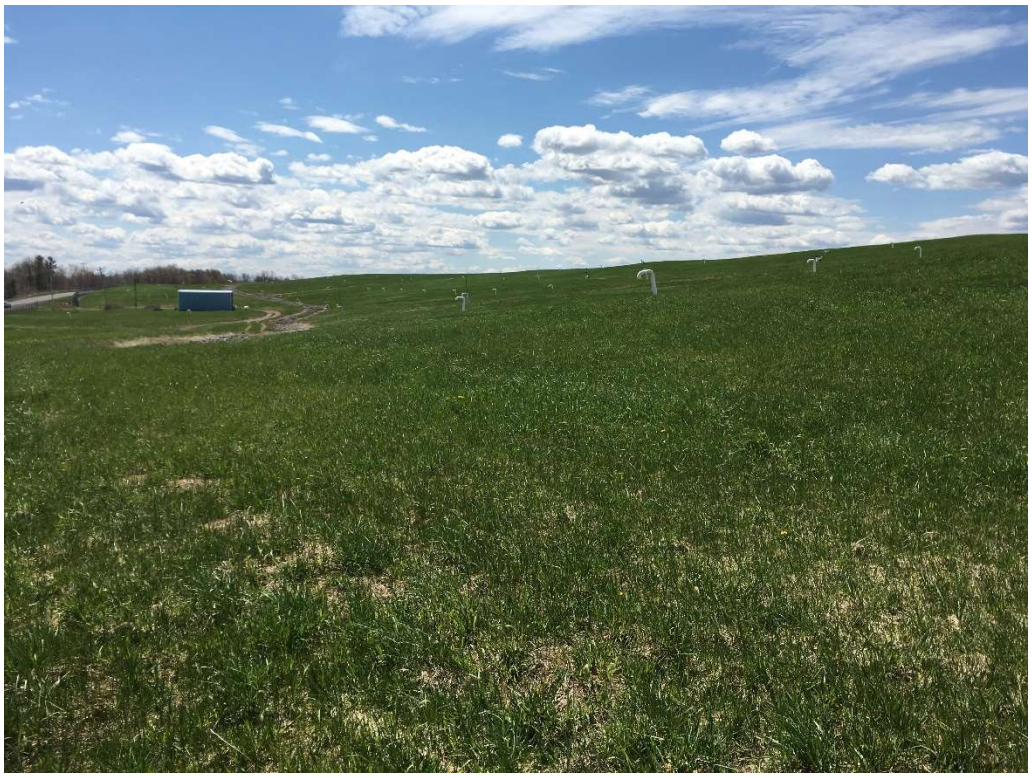

Photo of Eastern Side Slope Facing South

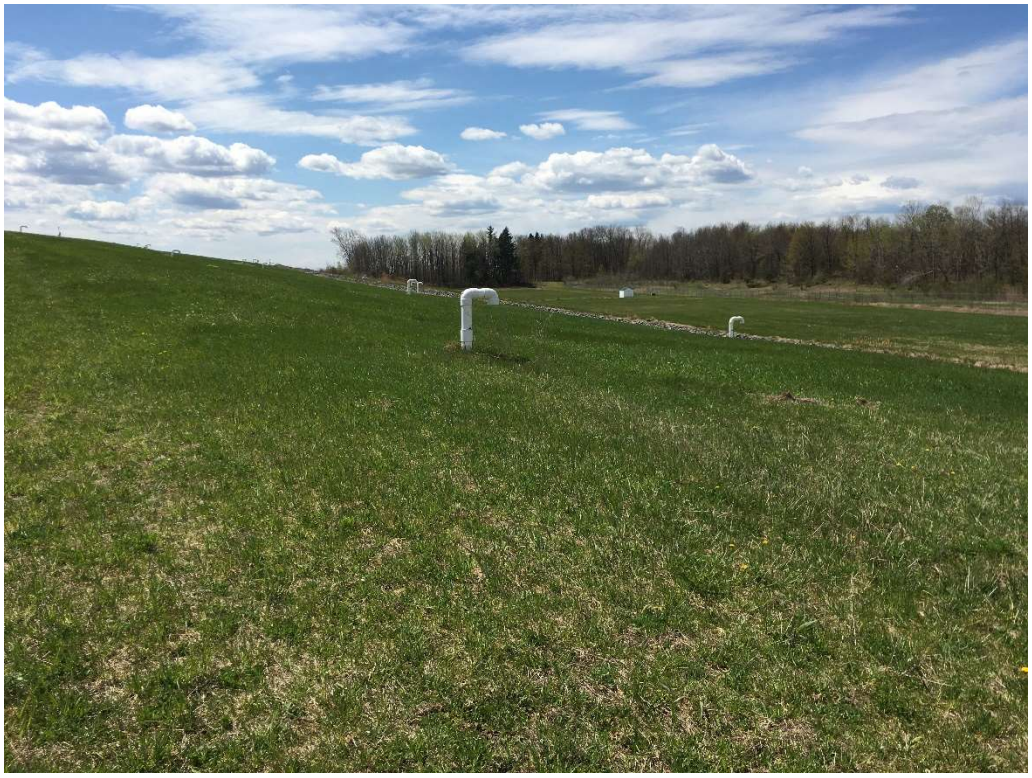

Photo of Western Side Slope Facing South

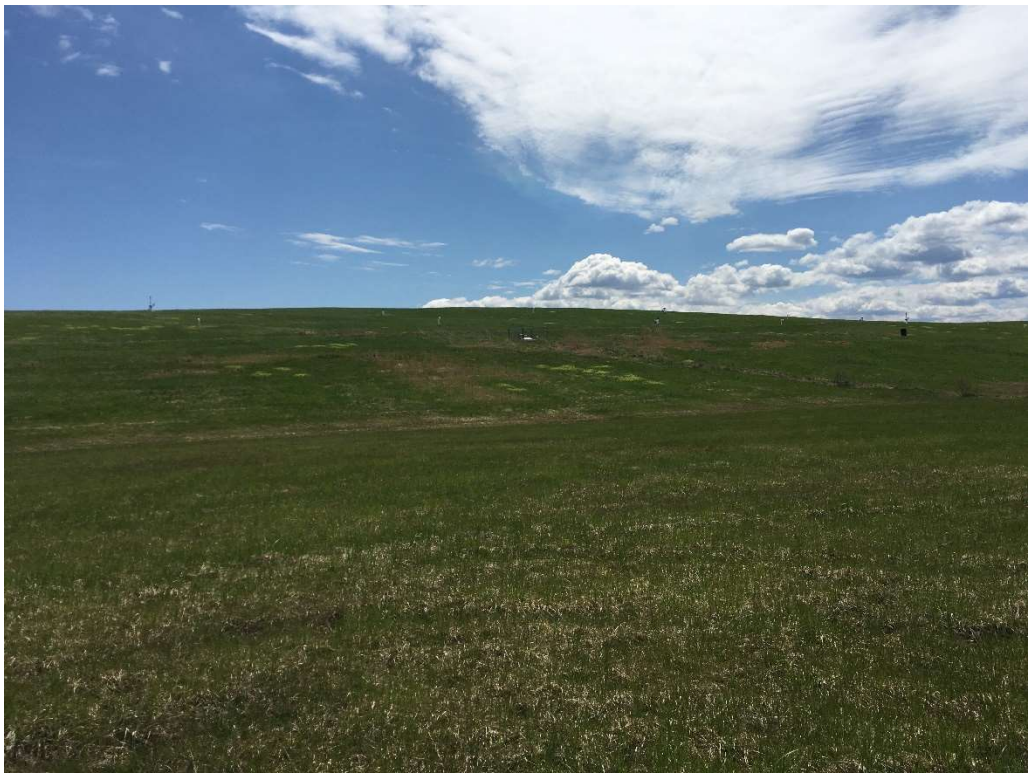

Photo of Western Side Slope Facing East

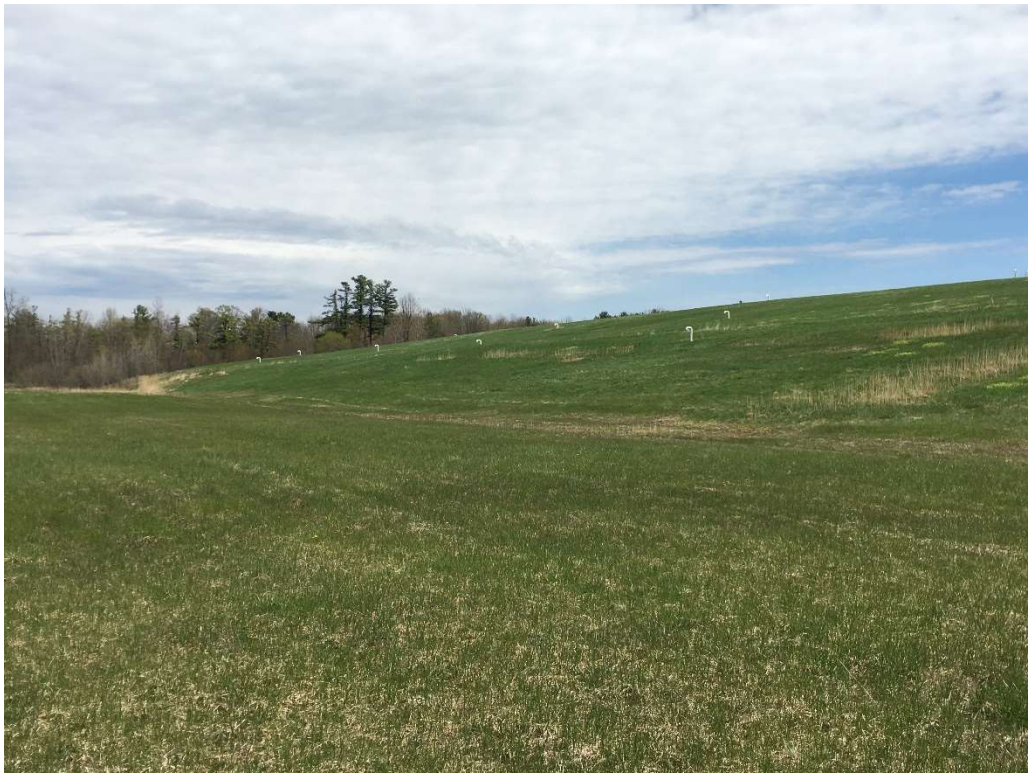

Photo of Western Side Slope Facing North

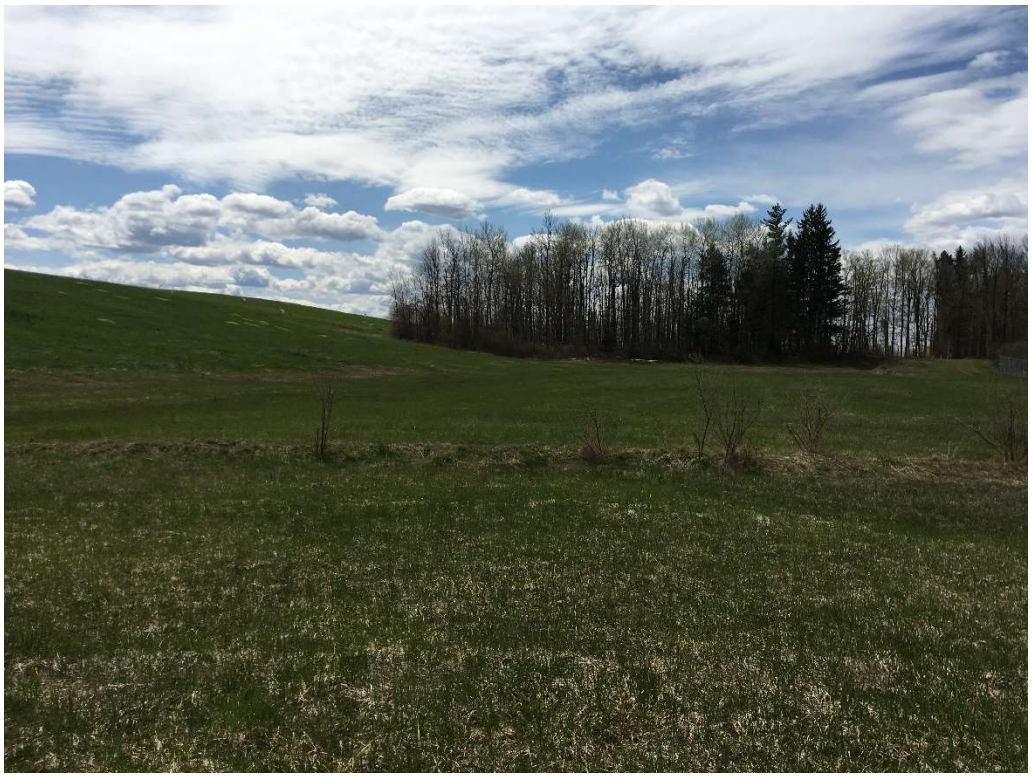

Photo of Western Side Slope Facing South

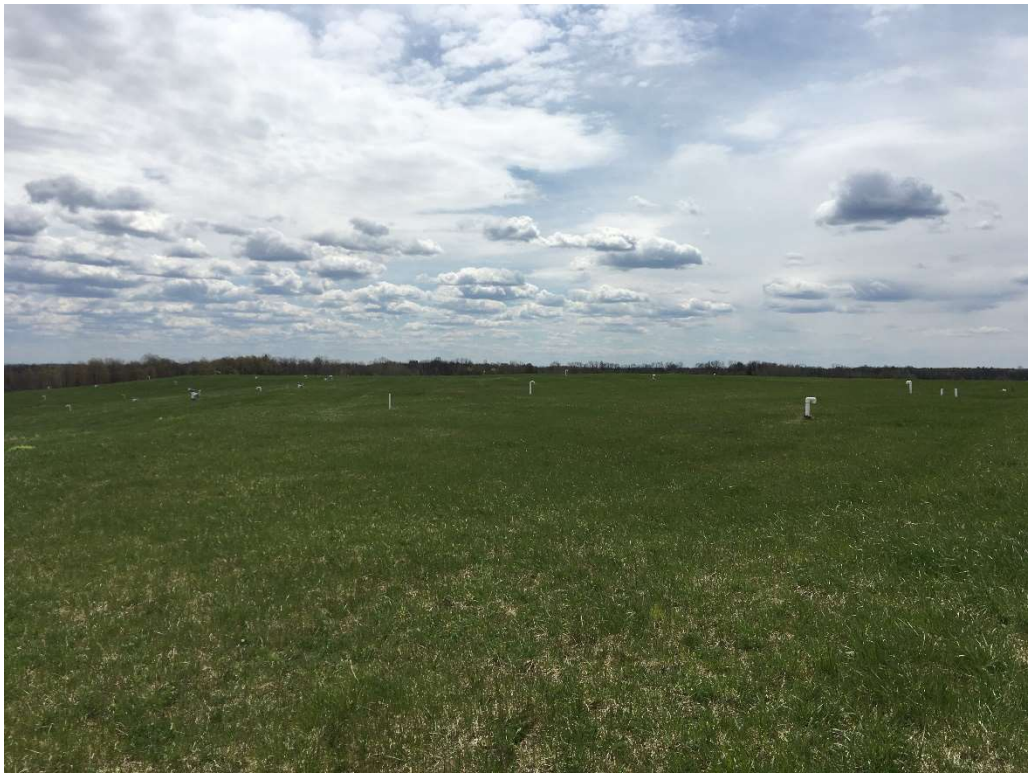

Photo of Top of Landfill Facing South

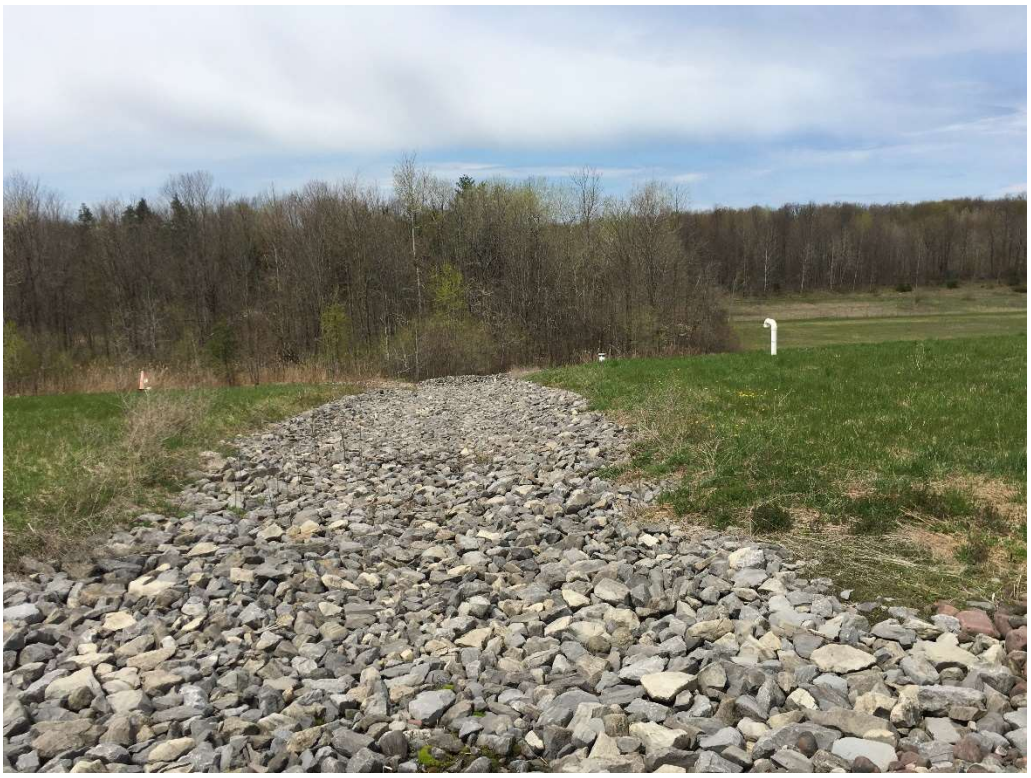

Photo of Western Downchute

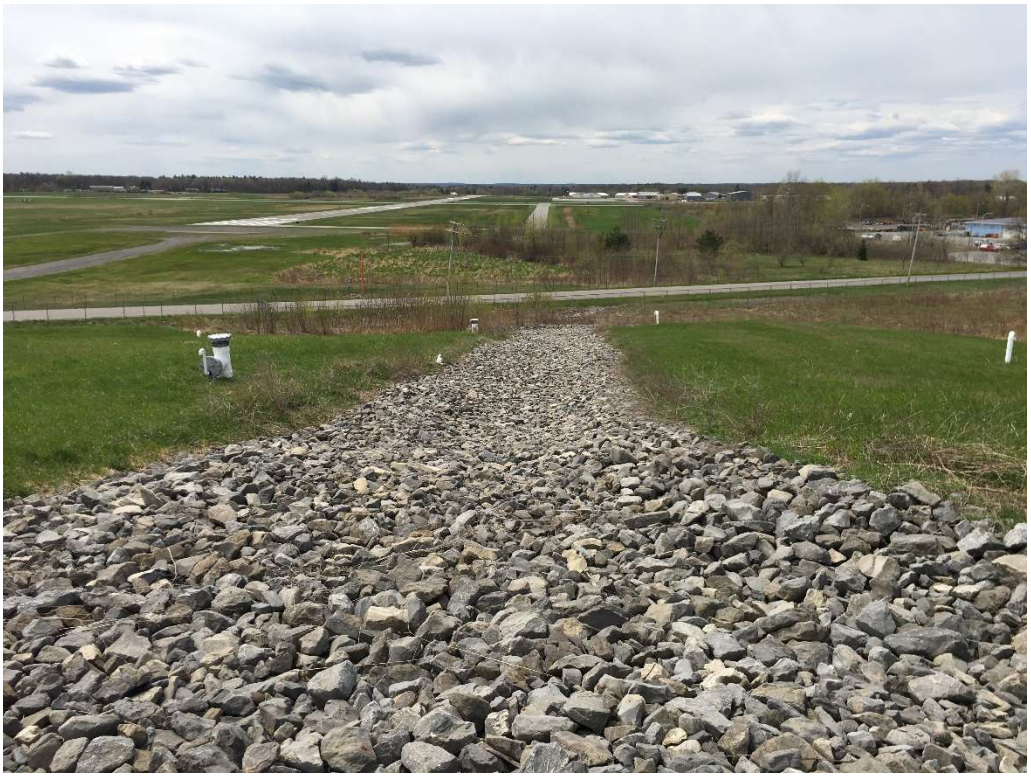

Photo of Southern Downchute

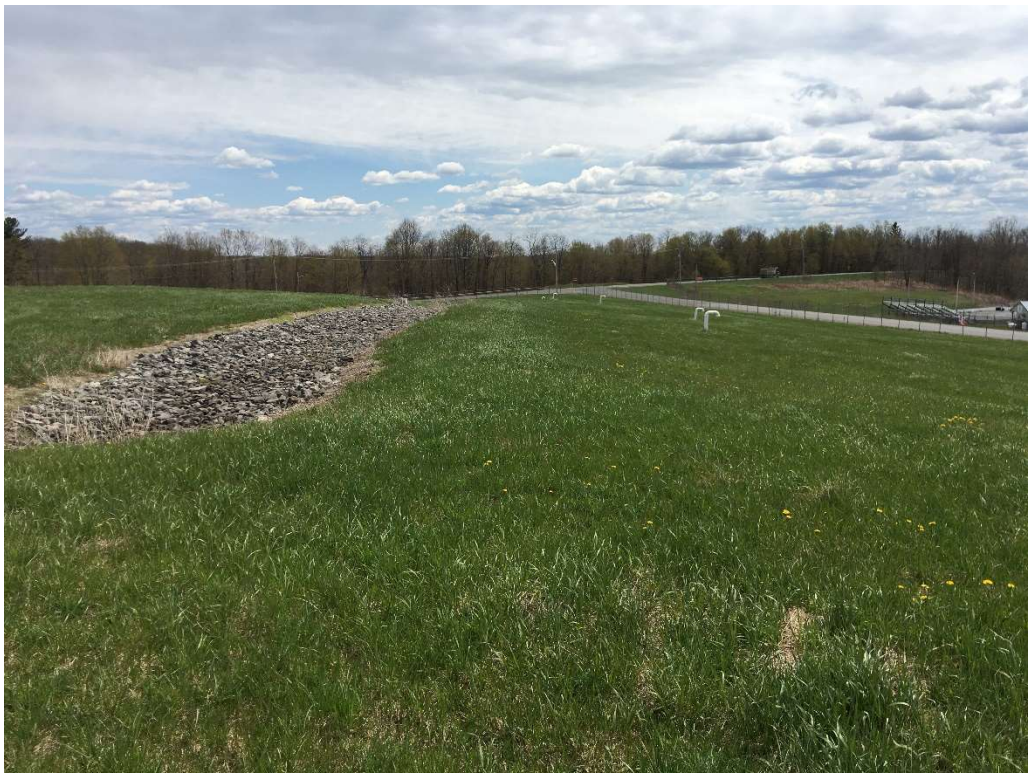

Photo of Southeast Downchute

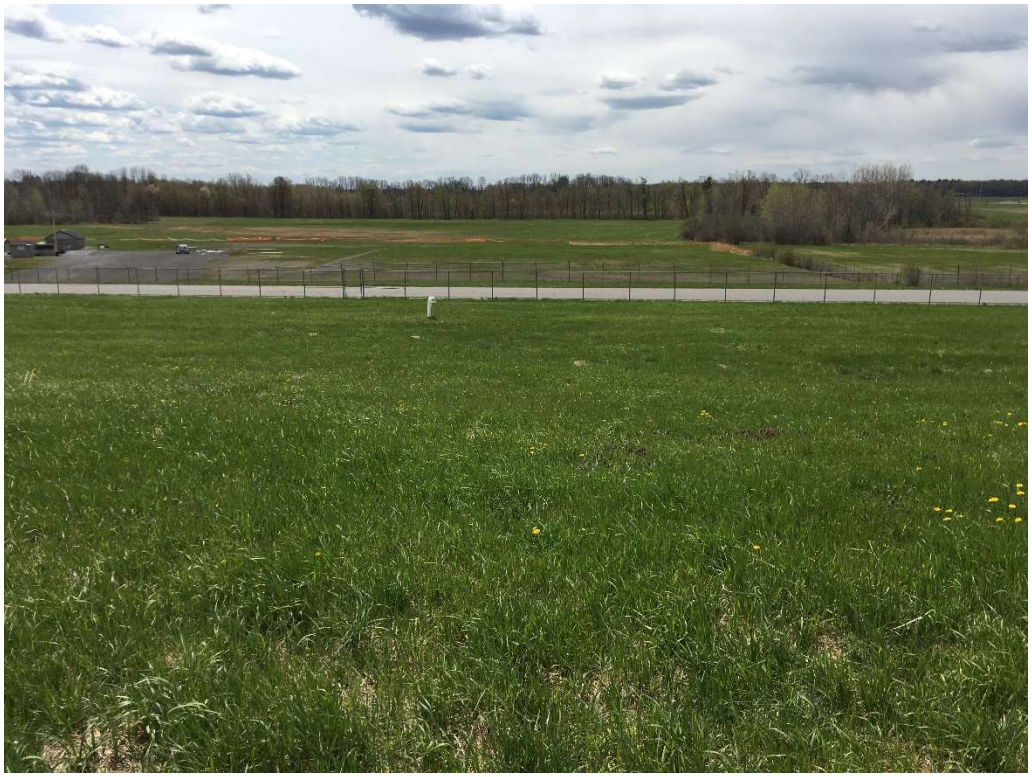

Photo of South Side Slope Facing South

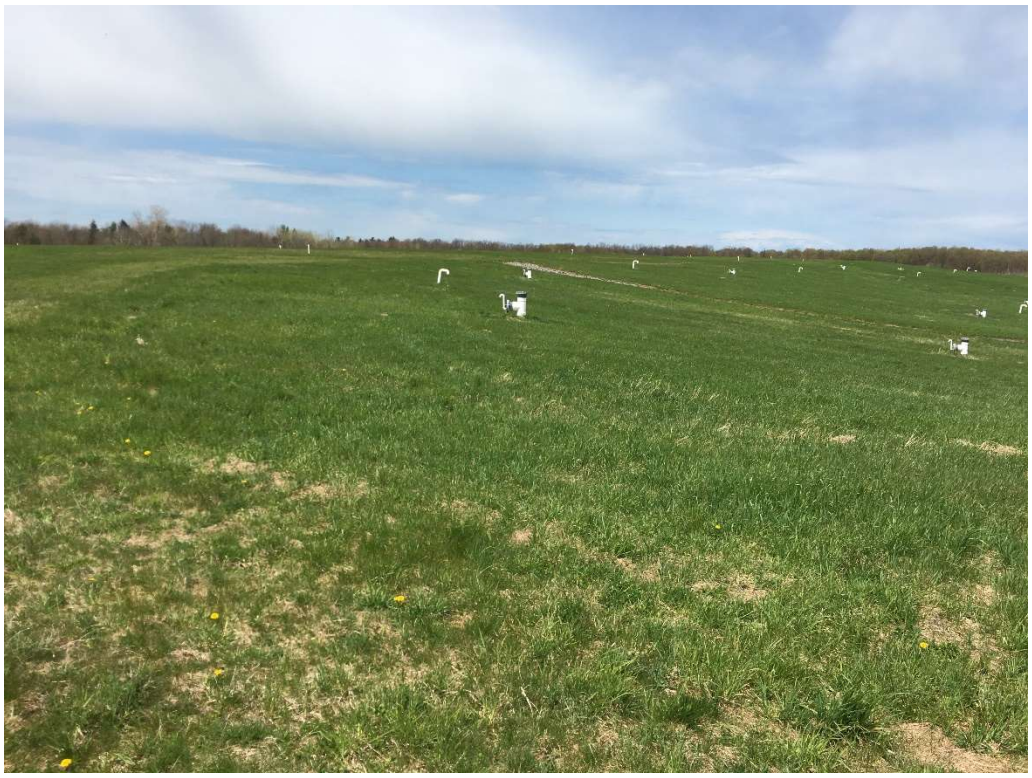

Photo from Top of Cap Facing North

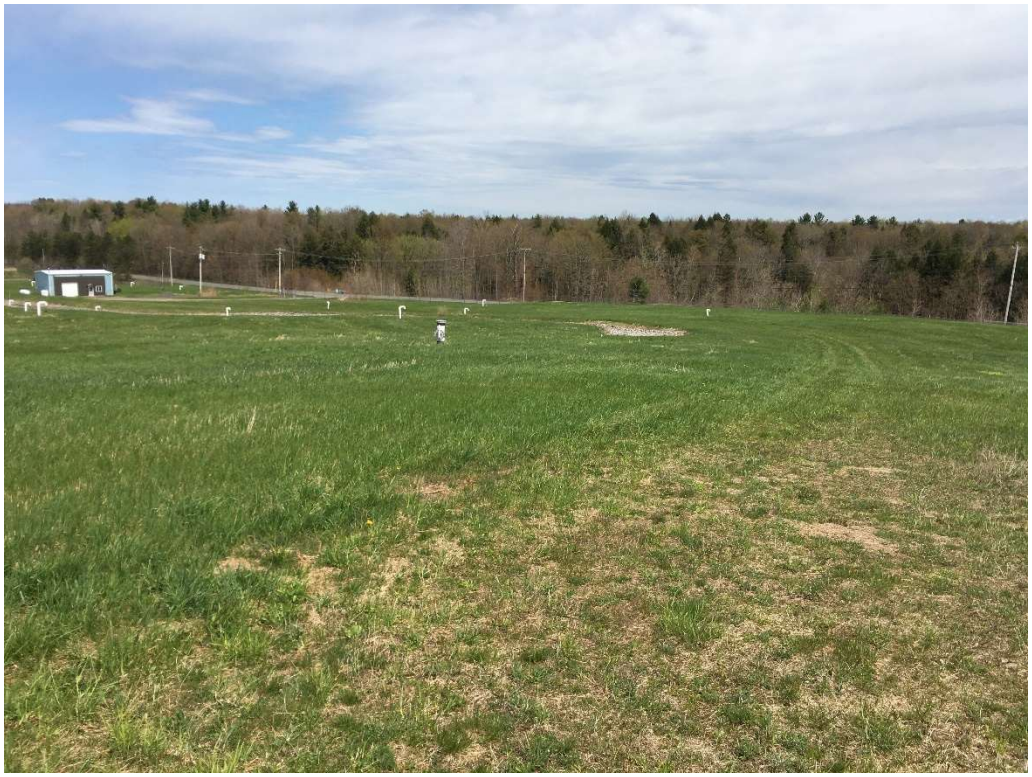

Photo from Top of Cap Facing East

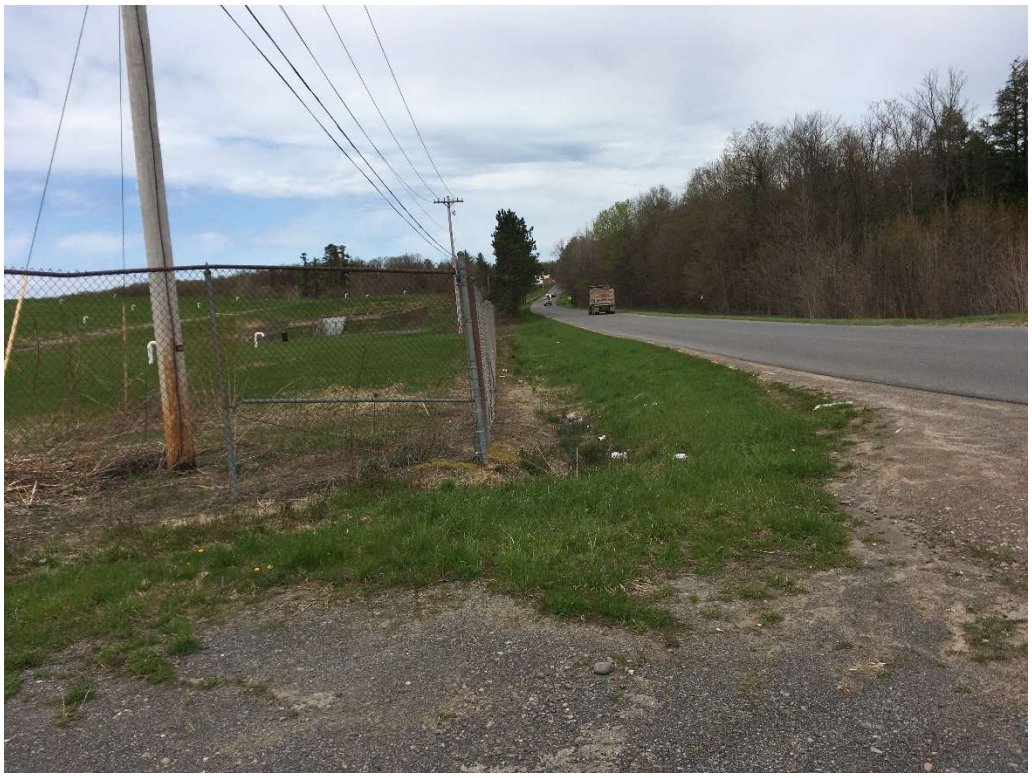

Photo of Eastern Perimeter Fence Facing North

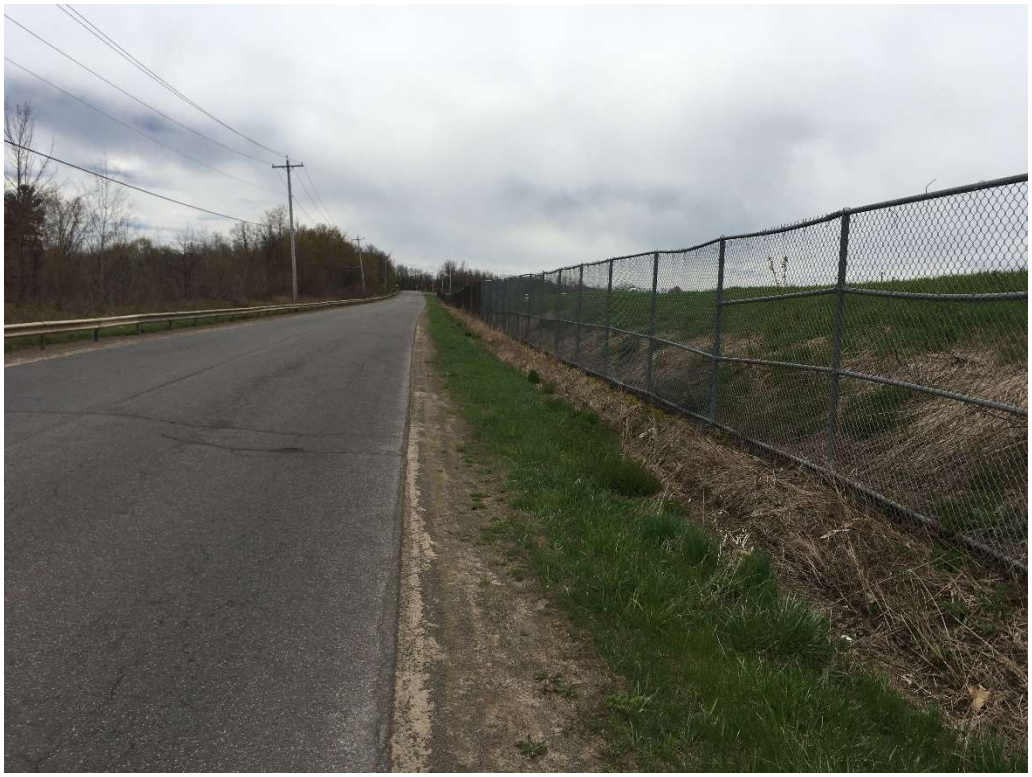

Photo of Eastern Perimeter Fence Facing South

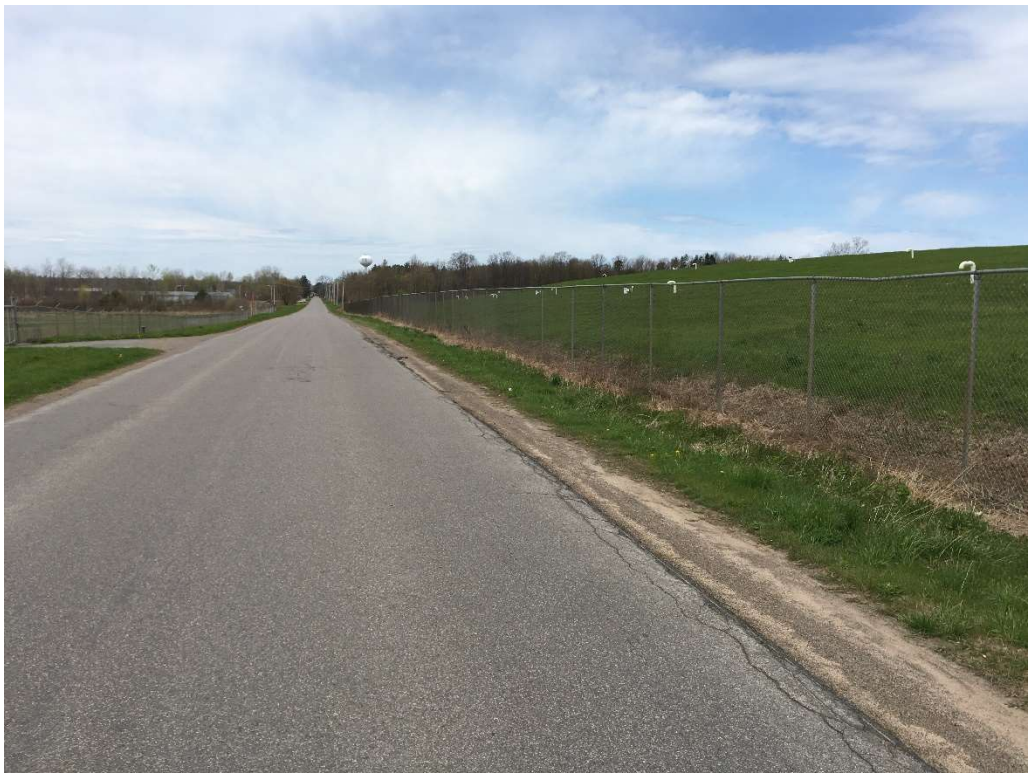

Photo of Southern Perimeter Fence Facing West

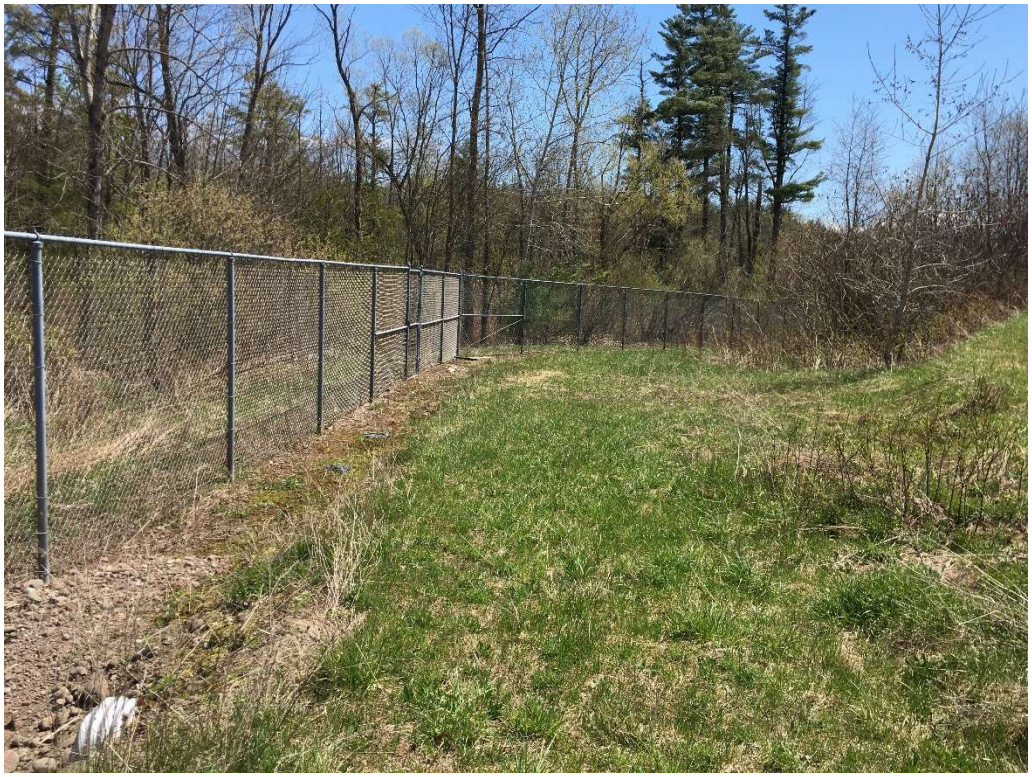

Photo of Northern Perimeter Fence Facing East

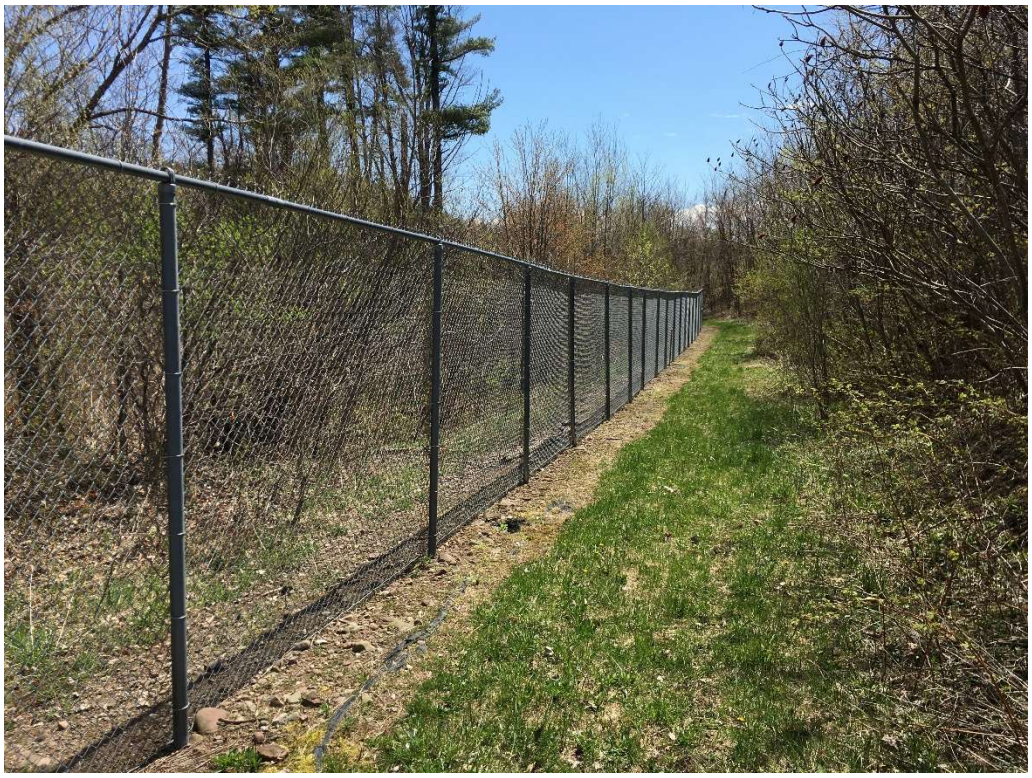

Photo of Northern Perimeter Fence Facing East

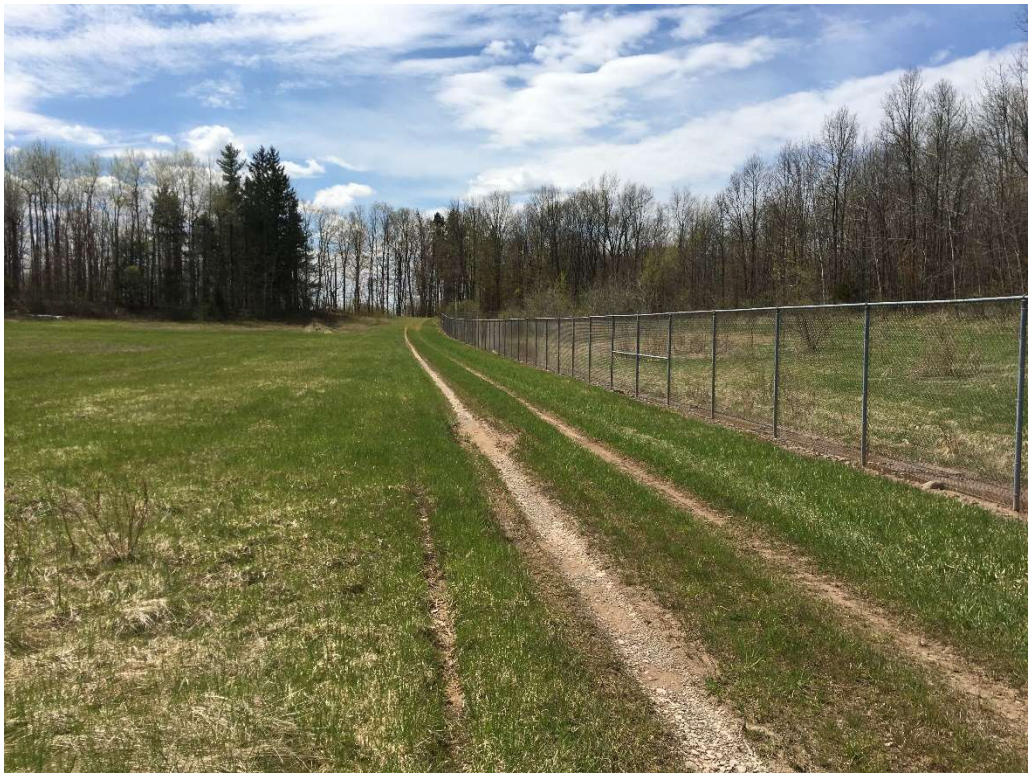

Photo of Western Perimeter Fence Facing South

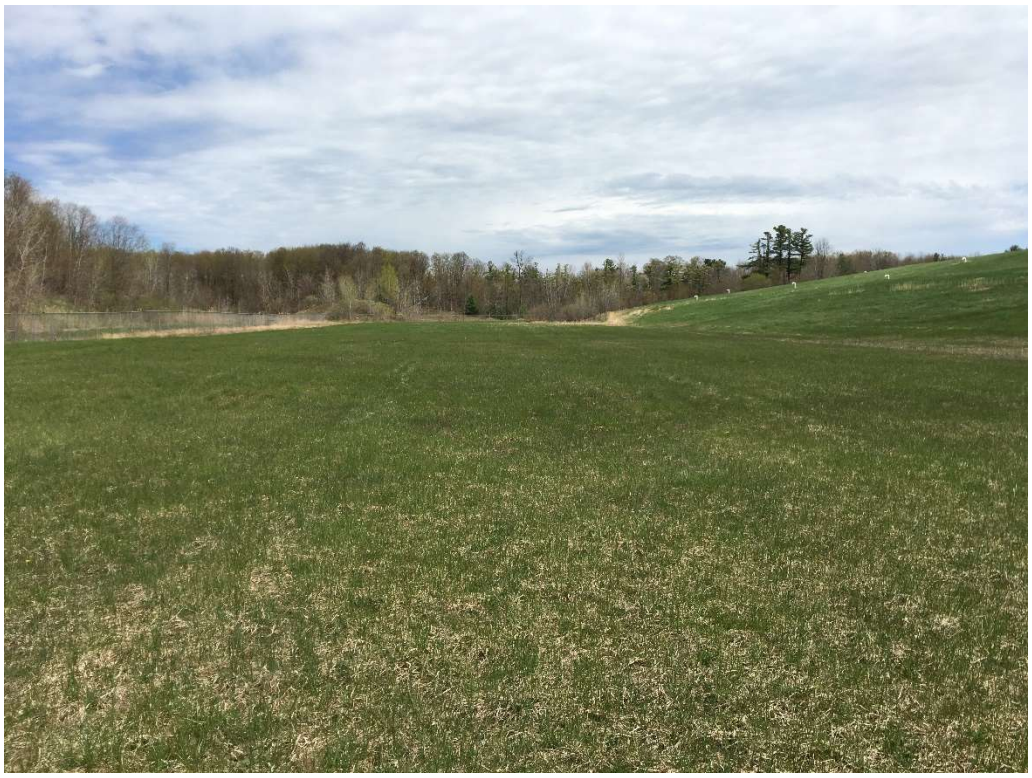

Photo of Western Perimeter Fence Facing North

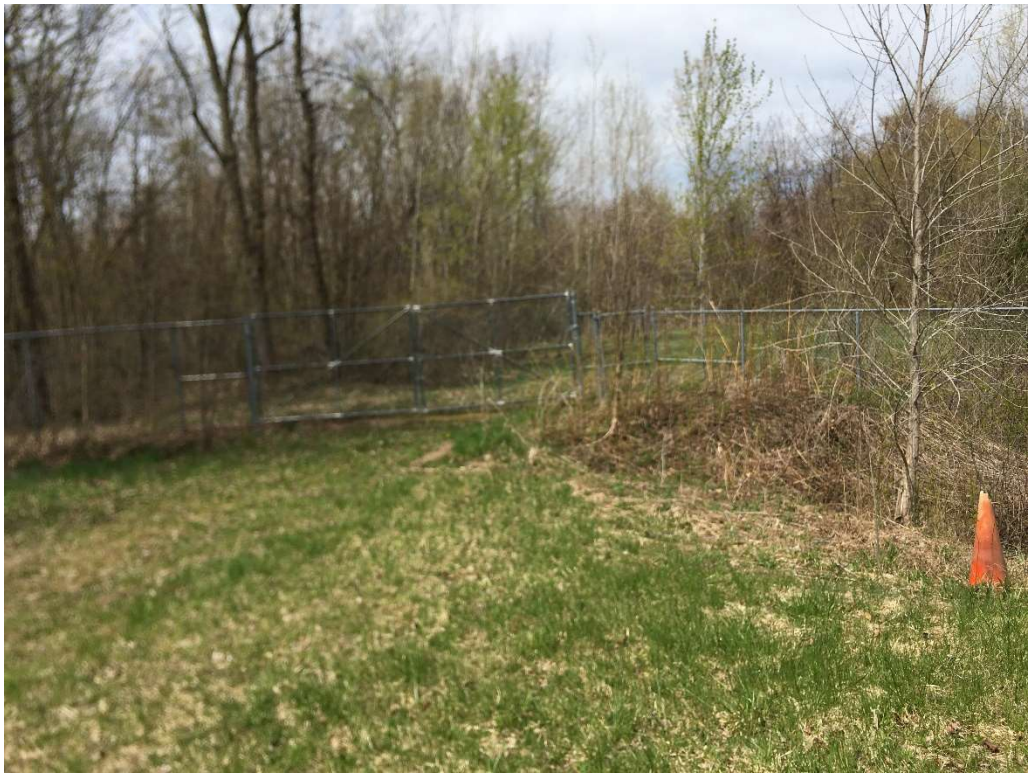

Photo of Western Access Gate

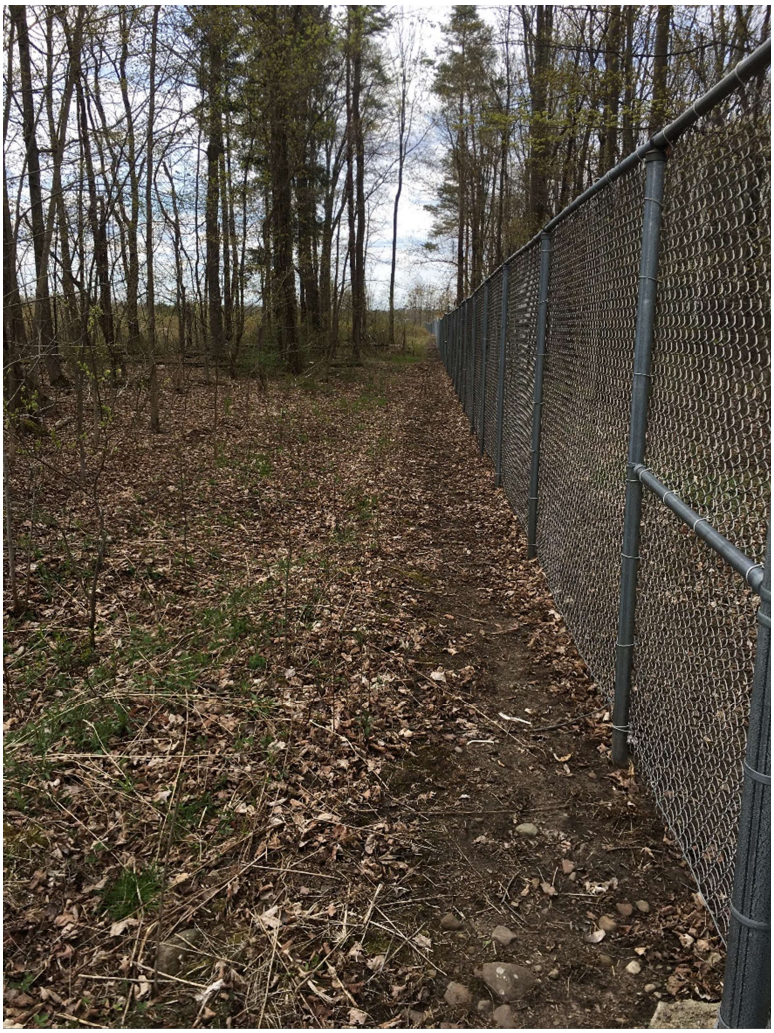

Photo of Western Perimeter Fence Facing South