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

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York

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Date

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LIST OF ABBREVIATIONS & ACRONYMS

AWQS	Class GA Ambient Water Quality Standards
COCs	Contaminants of concern
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
ng/L	Nanograms per liter
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
OM&M	Operation, Maintenance and Monitoring
OU	Operable Unit
PDD	Post-Decision Document
PFAS	Per- and poly-fluoroalkyl substances
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.

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

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

The FYR was led by Thomas Mongelli, EPA's remedial project manager for the site. Participants included Rachel Griffiths, EPA's hydrogeologist; Lora Smith-Staines, EPA's human health risk assessor; Julie McPherson and Emma Mendelsohn, EPA's ecological risk assessors; Mike Basile, EPA's community involvement coordinator; and Payson Long, New York State Department of Environmental Conservation's (NYSDEC's) project manager. The potentially responsible parties (PRPs) were notified of the initiation of the FYR. The FYR began on September 24, 2024.

Site Background

The 85-acre Volney Municipal Landfill Superfund site includes a 55-acre closed landfill located in a rural area of the Town of Volney, Oswego County, New York. It is situated at the intersection of Silk Road and Howard Road (see Appendix A, Figure 1, attached). 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 mobile home community 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 riprap 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.

Prior to the commencement of landfilling operations in 1969, the area that the landfill now occupies was mined for sand and gravel. Until 1983, the excavated area and area above it was used for the disposal of municipal and other refuse. 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.

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 history, geology/hydrogeology and land use. Additional details related to background, physical characteristics, geology/hydrogeology, land/resource use, and history related to the Site can be found at https://www.epa.gov/superfund/volney-landfill, EPA's webpage for the site.

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		
Author name (Federal or State Project Manager): Thomas Mongelli		
Author affiliation: EPA		
Review period: 9/24/2024 – 6/1/2025		
Date of site inspection: 6/25/2025		
Type of review: Statutory		
Review number: 5		
Triggering action date: 7/7/2020		
Due date *(five years after triggering action date)*: 7/7/2025		

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. The RI/FS identified the following contaminants of potential concern (COPCs) 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 top of landfill had been previously capped, the side slopes were covered with soil, 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 side slope leachate breakout, was identified. In addition, because 25 single-family residences dependent on private wells are located downgradient from the landfill, they were determined to be 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.

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 site was included on the Superfund National Priorities List in 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 the site wastes.

The selected remedy included:

- 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 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 and EPA. 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 an ESD issued in October 2001.

Status of Implementation

Construction of the supplemental cap on the side slopes of the landfill was performed from 2000 to 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, improving 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 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 2005, the Town of Volney requested an easement from Oswego County to install a waterline 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; 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 in 2009. The other discrepancies in the easements, which were related to how some of the parcels were mapped, 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.

Table 1, below, summarizes the implemented ICs.

Table 1: Summary of 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 (R2003-007783, R2003-007784, and R2003-007785), May 2003 Environmental Protection Easement and Declaration of Restrictive Covenant (R2009-000425), January 2009
Surface Water	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 (R2003-007784), May 2003
Landfill Cap	Yes	Yes	Town of Volney, Lot #: 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 (R2003-007785), 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 ICs, 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 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 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 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 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 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 for vandalism, damage, and if secure;
- The access roads are inspected for ruts, puddles, and drivability; and
- The site for debris, litter and/or waste.

Because contamination attributable to the landfill was not detected in the sediment and surface water during more than fifteen years of sampling, it was concluded that further monitoring was not necessary. Accordingly, the 2002 Operation, Maintenance and Monitoring (OM&M) Manual recommended discontinuing the surface water/sediment sampling; sediment and surface water sampling was subsequently discontinued.

Pumping from recovery well VBW-8DR typically occurs May-November. Annually, approximately 234,000 gallons of leachate that is pumped from the leachate collection tank is transported to the City of Fulton Wastewater Treatment Plant.

Remedy Resilience

Potential impacts to the site area from severe weather have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of weather-related events in the region and near the Site. Please see Appendix D, attached, for the full evaluation.

III. PROGRESS SINCE THE LAST REVIEW

The protectiveness determination from the last FYR is summarized below in Table 2, below.

Table 2: **Protectiveness Determinations/Statements from the 2020 FYR**

OU #	Protectiveness Determination	Protectiveness Statement
1	Short-term Protective	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	Short-term Protective	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.

The previous FYR had one recommendation. The status of the recommendation is summarized in Table 3, below.

Table 3: **Status of Recommendations from the 2020 FYR**

OU #	Issue	Recommendation	CurrentStatus	Current Implementation Status Description	Completion Date (if applicable)
1	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.	Determine the extent of the 1,4-dioxane contamination at the site.	Ongoing	Additional sampling was performed during this FYR period. 1,4-Dioxane was detected at several wells. The downgradient extent associated with well SHW-4 was not delineated. The results are further discussed under Data Review in Section IV. Additional samples needed are further described in Sections V and VI.	Click here to enter a date

In addition, the following item was included as an Other Finding in the last FYR that did not impact protectiveness, but would improve O&M at the site:

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.

A site inspection was conducted in relation to this FYR and inspections will resume on a regular or as needed basis.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On August 7, 2024, 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, and Puerto Rico, including the Volney Municipal Landfill site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews.

In addition to this notification, Mr. Basile posted a public notice on the EPA site webpage (www.epa.gov/superfund/volney-landfill) and provided the notice to the town by email on February 19, 2025 with a request that the notice be posted in municipal offices and on the village/town webpages. This notice indicated that a FYR would be conducted at the site to ensure that the cleanup continues to be protective of human health and the environment. Once the FYR is completed, the results will be made available at the following repository/ies: 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. In addition, the final report will be posted on the EPA's site webpage, noted above. Efforts will be made to reach out to local public officials to inform them of the results.

Data Review

The current monitoring well network includes 15 shallow wells screened in the unconsolidated geologic units, five wells screened in the bedrock unit, and three leachate sampling points. Sampling of all media occurs on a semiannual basis. Data evaluated in this review period were collected between May 2020 and November 2024.

Chemical Monitoring

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 two overburden monitoring wells during the review period. The benzene exceedances were observed in monitoring well SHW-3 (see Appendix A, Figure 1, for the monitoring well locations) with a maximum observed concentration of 8 µg/L in May 2020, decreasing to 4.1 µg/L in November 2024, and monitoring well SHW-4 which had an exceedance of 2 µg/L in November 2024. Chlorobenzene exceeded its AWQS of 5 µg/L in monitoring well GW-9R, at a maximum concentration of 26 µg/L in May 2020 and October 2021 decreasing to 7.1 µg/L in November 2024. Exceedances of toluene, acetone, and 2-butanone were noted at monitoring well VBW-8DR between the September 2020 and November 2021 sampling events, however, these compounds are common laboratory contaminants and are unlikely to be representative of site conditions. These compounds were detected at maximum concentrations of 43 µg/L, 27 µg/L, and 36 µg/L, respectively. Further, these compounds were not detected after November 2021 with the exception of acetone at a concentration of 11 µg/L during the June 2022 sampling event.

Concentrations of 1,4-dioxane were detected in monitoring wells SHW-1, SHW-3, SHW-4, SHW-8, VBW-8D, GW-3C, GW-9R, SGW-30B, MW-6BR, MW-8BR, and MW-10S during the review period and most detections only marginally exceeded its NYSDEC Ambient Water Quality Guidance Value (AWQGV) of 0.35 µg/L. Higher concentrations of 1,4-dioxane were observed at monitoring wells SHW-3, SHW-4, and VBW-8D. In monitoring well SHW-3, most 1,4-dioxane concentrations were below 15 ug/L, but a maximum concentration of 150 ug/L was observed in May 2024. The 1,4-dioxane concentrations in overburden monitoring well SHW-4, which is located on the eastern side of the landfill, consistently exceeded the AWQGV, fluctuating between 1.9 µg/L (May 2024) and 310 µg/L (October 2020) during the review period. Concentrations of 1,4-dioxane in SHW-4 are lower overall than those observed during the previous FYR period, but still typically exceed 150 µg/L. Monitoring well VBW-8D is also an overburden monitoring well on the eastern side of the landfill. During the review period, 1,4-dioxane concentrations in this well fluctuated between 24 µg/L (May 2021) and 120 µg/L (October 2021 and November 2024). Groundwater flow in the overburden aquifer in the vicinity of SHW-4 and VBW-8D is to the east. Concentrations of 1,4-dioxane near VBW-8D are delineated by downgradient monitoring wells GW-9R, MW-6BR, MW-7BR, and MW-10S, all of which have non-detected concentrations or sporadic low-level exceedances. Concentrations of 1,4-dioxane near SHW-4 have decreased compared to the last FYR period, but the downgradient extent in this area has not been determined. The elevated concentrations of 1,4-dioxane are generally limited to overburden wells, although bedrock monitoring wells MW-6BR and MW-8BR each had a single exceedance of the NYSDEC AWQGV of 0.35 µg/L during the review period of 3.4 µg/L and 1.6 µg/L, respectively.

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.

Leachate Parameter Monitoring

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 screened at 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, monitoring wells MW-6BR, MW-7BR, and MW-8BR, have varying degrees of specific conductivity and ammonia concentrations. The specific conductivity and ammonia concentrations in monitoring wells MW-6BR and MW-7BR, about 500-600 feet east of Silk Road, have decreased over time, indicating less impact from the landfill. Monitoring well MW-8BR, approximately 150 feet east of Silk Road, still has significantly higher levels of specific conductivity and ammonia, indicating continued impacts in this area related to the landfill.

Emerging Contaminants Sampling

Emerging contaminants sampling was performed on-site in July 2021 at seven monitoring well locations to evaluate the presence of per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. In July 2023, sampling for emerging contaminants was performed at five potable wells near the site. In April 2024, EPA finalized federal drinking water MCLs for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) at 4 nanograms per liter (ng/L). In 2020, NYSDEC established drinking water MCLs for PFOA and PFOS of 10 ng/L. In 2023. NYSDEC released AWQGVs for groundwater of 6.7 ng/L for PFOA and 2.7 ng/L for PFOS. Concentrations of PFOA slightly exceeded its EPA MCL in monitoring well GW-3C (4.6 ng/L), and exceeded both its EPA and NYSDEC MCLs and NYSDEC guidance value in monitoring wells SHW-1 (23 ng/L), and SHW-4 (19 ng/L). Concentrations of PFOS exceeded the EPA MCL and NYSDEC guidance value in monitoring well GW-3C (5.3 ng/L). EPA will work with NYSDEC to determine future sampling needs.

Analysis of 1,4-dioxane has been part of the routine LTM since 2015 as discussed above in the data review, and 1,4-dioxane was also analyzed during the 2021 emerging contaminants sampling. NYSDEC adopted a 1,4-dioxane drinking water MCL of 1 µg/L in 2020 and an AWQGV of 0.35 µg/L in 2023. During the 2021 emerging contaminants sampling event, concentrations of 1,4-dioxane exceeded its NYSDEC MCL and guidance value in monitoring wells GWC-3 (1.4 µg/L), SHW-1 (9.8 µg/L), and SHW-3 (190 µg/L).

Concentrations of both PFAS and 1,4-dioxane were below EPA and NYSDEC MCLs in all five of the potable well samples.

Site Inspection

The inspection of the site was conducted on 6/25/25. In attendance was Mark Granger, EPA RPM, Payson Long and Kira Bruno from NYSDEC, Chris Williams, Leah Spiegel, and Vera Dunsmoor from the Oswego County Health Department, Michael Lutestanski from the Oswego County Department of Solid Waste, and Bryce Dingman and Kyle Williams from Barton & Loguidice. The purpose of the inspection was to assess the protectiveness of the remedy. No deficiencies were noted during the inspection. The site fencing, monitoring wells, gas flares, and leachate collection tank all appeared in good condition. The landfill cap was well maintained with no visible areas of erosion.

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, although sampling from this FYR period have not shown impacts to potable wells near the landfill. ICs 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?

The 1987 risk assessment was completed prior to the current Risk Assessment Guidance for Superfund used currently by EPA. 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. Based on the RI/FS, it was determined that exposure to groundwater contamination was the primary human health risk at the site.

During this FYR period, groundwater was screened against the most stringent of the NYSDEC Class GA AWQS, NYSDEC MCLs, or EPA MCLs, which is valid. Groundwater sampling results collected during this review period generally indicate decreasing conditions for site-related COCs. Although exceedances persist (see Data Review section), it is anticipated that groundwater standards will be reached in the future. During the 2021 emerging contaminants sampling event at the site, both 1,4-dioxane and PFAS compounds exceeded their respective ARARs in site monitoring wells (see Emerging Contaminants Sampling section). However, concentrations of both 1,4-dioxane and PFAS were below EPA and NYSDEC MCLs in all five of the potable well samples in July 2023. Aside from emerging contaminants, no other contaminants were analyzed in residential wells because concentrations were below risk-based standards for the last five-year review. Further, in June 2003, Oswego County issued an environmental easement prohibiting the installation of new potable wells; therefore, this pathway should remain incomplete.

Soil vapor intrusion (SVI) is evaluated when soils and/or groundwater are known or suspected to contain VOCs. VOCs in groundwater are now below a level of concern for this pathway. 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. Since the landfill and the surrounding properties have been purchased by Oswego County, future construction is unlikely. The SVI pathway remains incomplete at the Site.

The RAOs selected at the time of the remedy remain valid. Since the landfill is now fully capped and the site is fenced, the direct contact pathway has been interrupted. Further, as part of the 2001 ESD, in June 2003, an institutional control was put in place to prohibit any activity that would affect the integrity of the landfill cap.

The remedy continues to interrupt ecological exposure. The landfill is closed and capped, which eliminates the terrestrial exposure pathway. The 2001 Contamination Pathways RI/FS found that site-related contaminants present in the surface water and sediments in the immediate area (inner perimeter) of the site did not pose an ecological threat and did not require remediation. Further, the 2001 ESD included prohibitions on any activities that would alter surface water drainage as an additional layer of protection. Previously collected surface water samples were below their respective NYS AWQS.[1]

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

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

VI. ISSUES/RECOMMENDATIONS

[1] As was noted in the "Systems Operations/Operation & Maintenance" section, above, following the issuance of the 2002 OM&M Manual, surface water/sediment sampling was discontinued.

Table 4, below, presents the recommendations and follow-up actions for this FYR.

Table 4: Issues and 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 State MCL. The extent of the 1,4-dioxane contamination downgradient of monitoring well SHW-4 is not delineated.			
	Recommendation: Evaluate options for determining the extent of the 1,4-dioxane groundwater contamination downgradient of monitoring well SHW-4 and potential impacts to surface water and/or sediments in Bell Creek. If migration further east of the site is observed, appropriate actions should be taken to optimize containment.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	12/31/2026

VII. PROTECTIVENESS STATEMENT

Table 5, below, provides protectiveness statements.

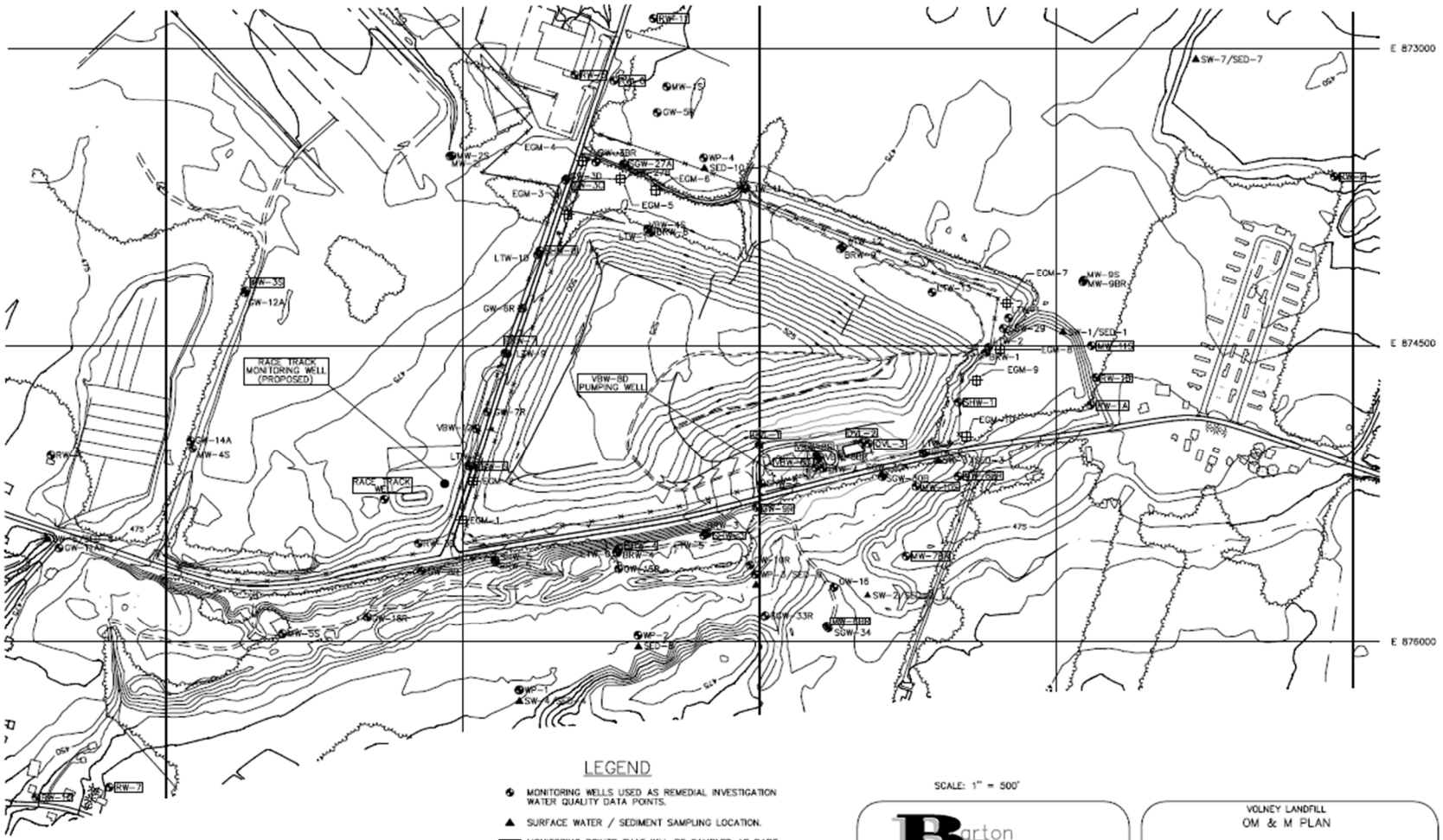
Table 5: Protectiveness Statements

Protectiveness Statement(s)	
Operable Unit: 01	*Protectiveness Determination:* Short-term Protective
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 1,4-dioxane contamination downgradient of monitoring well SHW-4 needs to be determined.	
Sitewide Protectiveness Statement	
Protectiveness Determination: Short-term Protective	
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 1,4-dioxane contamination downgradient of monitoring well SHW-4 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



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
4th Five-Year Review, EPA	2020
OM&M Quarterly Inspection Reports, Oswego County/B&L	2020-2024

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 – REMEDY RESILIENCE EVALUATION

Three tools were utilized to assess the Volney Landfill site. Screenshots from each of the tools used are included below.

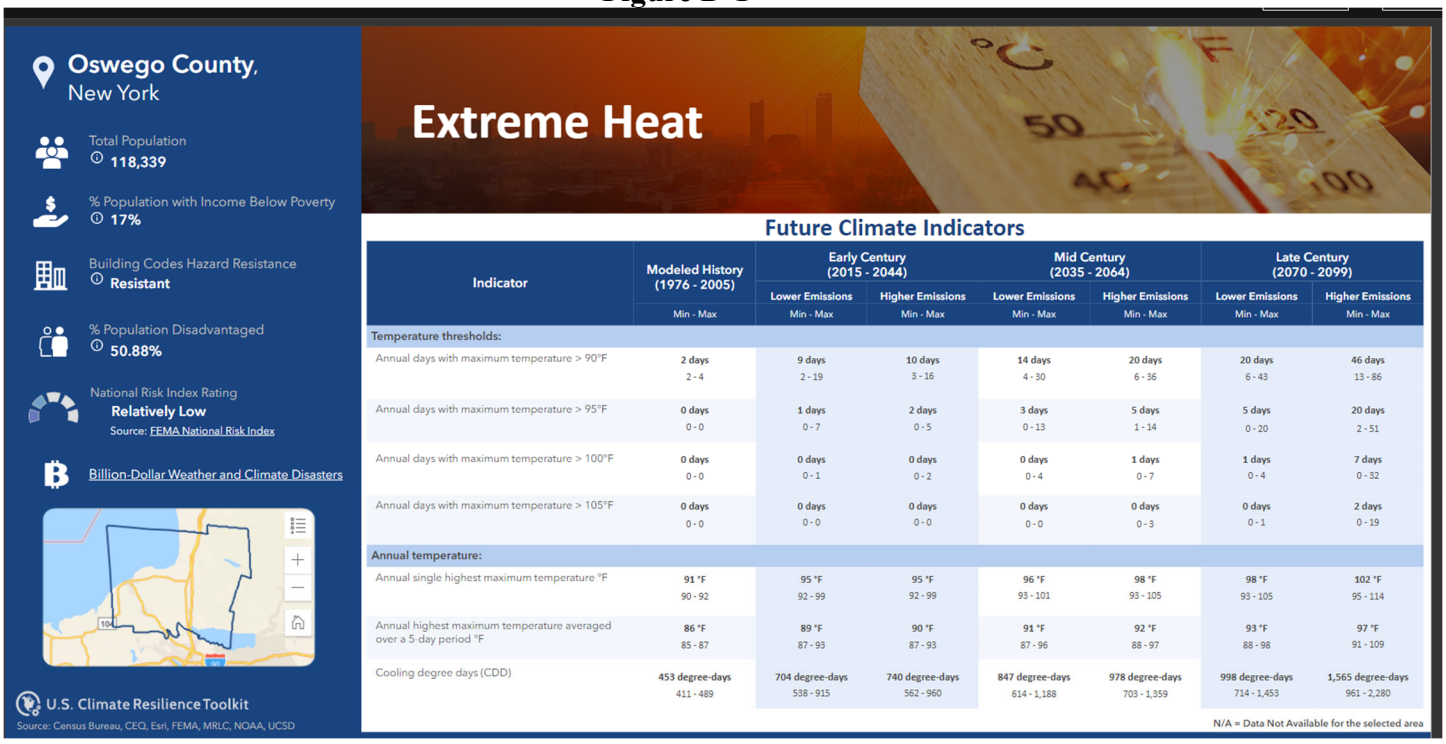
The first tool, the CMRA (see CMRA) examined five hazards (extreme heat, drought, wildfire, flooding, and costal inundation) for Oswego County, the county in which the Site is located. According to the CMRA tool, the National Risk Index Ratings for extreme heat, flooding and coastal inundation across the County are "Relatively Moderate" (see Figures D-1 through D-3). However, no impacts from these hazards to the Site area or to the implementation or performance of the OU3 remedy have been observed. In addition, although the Site sits adjacent to the Delaware River, the remediated area is significantly elevated above the surrounding area, which makes it less vulnerable to impacts from flooding and coastal inundation. The CMRA tool reported the risks for drought and wildfire, shown in Figures D-4 and D-5, respectively, as "Relatively Low."

The second tool is called the NOAA Sea Level Rise Viewer (SLRV) (see https://coast.noaa.gov/slr/). This tool assessed the potential for impacts to the site vicinity from sea level rise and coastal flooding. The site is located approximately 12 miles from the coast. Therefore, coastal flooding is unlikely. Because the Oswego River is located approximately two and a half miles west of the site, flooding attributable to flooding from the river is highly likely. Figure D-6 from the SLRV shows that a 10-foot increase in the current mean higher high water (MHHW) level (i.e., the maximum increase viewable using the tool) would not result in any increased risk of impacts from sea level rise to the site vicinity.

The final tool is called the USGS U.S. Landslide Inventory (see https://www.usgs.gov/tools/us-landslide-inventory-and-susceptibility-map). As shown by Figure D-7, there is a low to moderate vulnerability of landslides at the site and no landslides have been observed in the site vicinity in the past.

Based on this information, potential site impacts from severe weather have been assessed, and the performance of the remedy is currently not at risk due to these effects in the region and near the site.

Figure D-1



Oswego County, New York

Total Population
118,339

% Population with Income Below Poverty
17%

Building Codes Hazard Resistance
Resistant

% Population Disadvantaged
50.88%

National Risk Index Rating
Relatively Low
Source: FEMA National Risk Index

Billion-Dollar Weather and Climate Disasters

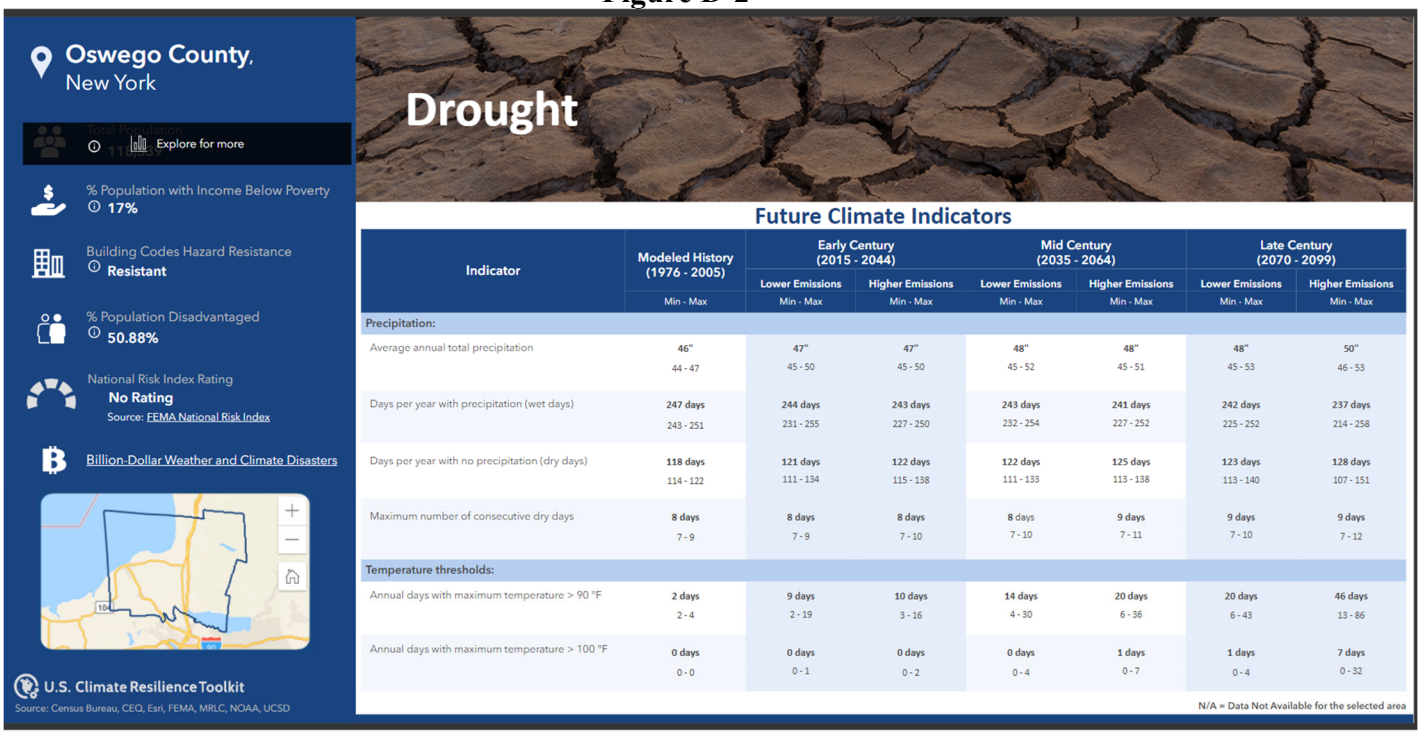
U.S. Climate Resilience Toolkit
Source: Census Bureau, CEQ, Esri, FEMA, MRLC, NOAA, UCSD

Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Temperature thresholds:							
Annual days with maximum temperature > 90°F	2 days 2 - 4	9 days 2 - 19	10 days 3 - 16	14 days 4 - 30	20 days 6 - 36	20 days 6 - 43	46 days 13 - 86
Annual days with maximum temperature > 95°F	0 days 0 - 0	1 days 0 - 7	2 days 0 - 5	3 days 0 - 13	5 days 1 - 14	5 days 0 - 20	20 days 2 - 51
Annual days with maximum temperature > 100°F	0 days 0 - 0	0 days 0 - 1	0 days 0 - 2	0 days 0 - 4	1 days 0 - 7	1 days 0 - 4	7 days 0 - 32
Annual days with maximum temperature > 105°F	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 3	0 days 0 - 1	2 days 0 - 19
Annual temperature:							
Annual single highest maximum temperature °F	91 °F 90 - 92	95 °F 92 - 99	95 °F 92 - 99	96 °F 93 - 101	98 °F 93 - 105	98 °F 93 - 105	102 °F 95 - 114
Annual highest maximum temperature averaged over a 5-day period °F	86 °F 85 - 87	89 °F 87 - 93	90 °F 87 - 93	91 °F 87 - 96	92 °F 88 - 97	93 °F 88 - 98	97 °F 91 - 109
Cooling degree days (CDD)	453 degree-days 411 - 489	704 degree-days 538 - 915	740 degree-days 562 - 960	847 degree-days 614 - 1,188	978 degree-days 703 - 1,359	998 degree-days 714 - 1,453	1,565 degree-days 961 - 2,280

N/A = Data Not Available for the selected area

Figure D-2



Oswego County, New York

Explore for more

% Population with Income Below Poverty
17%

Building Codes Hazard Resistance
Resistant

% Population Disadvantaged
50.88%

National Risk Index Rating
No Rating
Source: FEMA National Risk Index

Billion-Dollar Weather and Climate Disasters

U.S. Climate Resilience Toolkit
Source: Census Bureau, CEQ, Esri, FEMA, MRLC, NOAA, UCSD

Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Average annual total precipitation	46" 44 - 47	47" 45 - 50	47" 45 - 50	48" 45 - 52	48" 45 - 51	48" 45 - 53	50" 46 - 53
Days per year with precipitation (wet days)	247 days 243 - 251	244 days 231 - 255	243 days 227 - 250	243 days 232 - 254	241 days 227 - 252	242 days 225 - 252	237 days 214 - 258
Days per year with no precipitation (dry days)	118 days 114 - 122	121 days 111 - 134	122 days 115 - 138	122 days 111 - 133	125 days 113 - 138	123 days 113 - 140	128 days 107 - 151
Maximum number of consecutive dry days	8 days 7 - 9	8 days 7 - 9	8 days 7 - 10	8 days 7 - 10	9 days 7 - 11	9 days 7 - 10	9 days 7 - 12
Temperature thresholds:							
Annual days with maximum temperature > 90 °F	2 days 2 - 4	9 days 2 - 19	10 days 3 - 16	14 days 4 - 30	20 days 6 - 36	20 days 6 - 43	46 days 13 - 86
Annual days with maximum temperature > 100 °F	0 days 0 - 0	0 days 0 - 1	0 days 0 - 2	0 days 0 - 4	1 days 0 - 7	1 days 0 - 4	7 days 0 - 32

N/A = Data Not Available for the selected area

Figure D-3

Oswego County, New York

Total Population
118,339

% Population with Income Below Poverty
17%

Building Codes Hazard Resistance
Resistant

% Population Disadvantaged
50.88%

National Risk Index Rating
Very Low
Source: FEMA National Risk Index

Billion-Dollar Weather and Climate Disasters

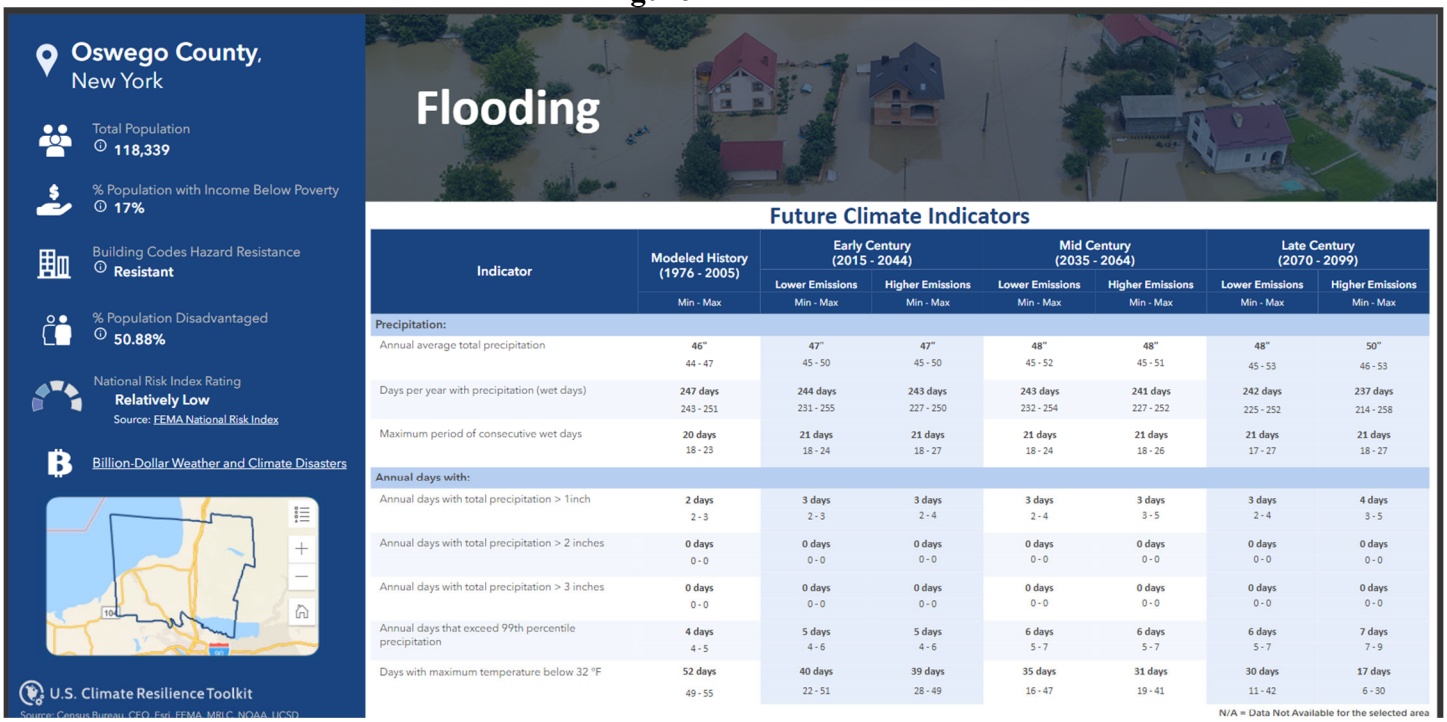
U.S. Climate Resilience Toolkit
Source: Census Bureau, CEQ, Esri, FEMA, MRLC, NOAA, UCSD

Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Days per year with no precipitation (dry days)	118 days 114 - 122	121 days 111 - 134	122 days 115 - 138	122 days 111 - 133	125 days 113 - 138	123 days 113 - 140	128 days 107 - 151
Maximum number of consecutive dry days	8 days 7 - 9	8 days 7 - 9	8 days 7 - 10	8 days 7 - 10	9 days 7 - 11	9 days 7 - 10	9 days 7 - 12
Days per year with precipitation (wet days)	247 days 243 - 251	244 days 231 - 255	243 days 227 - 250	243 days 232 - 254	241 days 227 - 252	242 days 225 - 252	237 days 214 - 258
Temperature thresholds:							
Annual days with maximum temperature > 90°F	2 days 2 - 4	9 days 2 - 19	10 days 3 - 16	14 days 4 - 30	20 days 6 - 36	20 days 6 - 43	46 days 13 - 86
Annual days with maximum temperature > 100°F	0 days 0 - 0	0 days 0 - 1	0 days 0 - 2	0 days 0 - 4	1 days 0 - 7	1 days 0 - 4	7 days 0 - 32

N/A = Data Not Available for the selected area

Figure D-4



Oswego County, New York

Total Population
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National Risk Index Rating
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Source: Census Bureau, CEQ, Esri, FEMA, MRLC, NOAA, UCSD

Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Annual average total precipitation	46" 44 - 47	47" 45 - 50	47" 45 - 50	48" 45 - 52	48" 45 - 51	48" 45 - 53	50" 46 - 53
Days per year with precipitation (wet days)	247 days 243 - 251	244 days 231 - 255	243 days 227 - 250	243 days 232 - 254	241 days 227 - 252	242 days 225 - 252	237 days 214 - 258
Maximum period of consecutive wet days	20 days 18 - 23	21 days 18 - 24	21 days 18 - 27	21 days 18 - 24	21 days 18 - 26	21 days 17 - 27	21 days 18 - 27
Annual days with:							
Annual days with total precipitation > 1inch	2 days 2 - 3	3 days 2 - 3	3 days 2 - 4	3 days 2 - 4	3 days 3 - 5	3 days 2 - 4	4 days 3 - 5
Annual days with total precipitation > 2 inches	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0
Annual days with total precipitation > 3 inches	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0
Annual days that exceed 99th percentile precipitation	4 days 4 - 5	5 days 4 - 6	5 days 4 - 6	6 days 5 - 7	6 days 5 - 7	6 days 5 - 7	7 days 7 - 9
Days with maximum temperature below 32 °F	52 days 49 - 55	40 days 22 - 51	39 days 28 - 49	35 days 16 - 47	31 days 19 - 41	30 days 11 - 42	17 days 6 - 30

N/A = Data Not Available for the selected area

Figure D-5

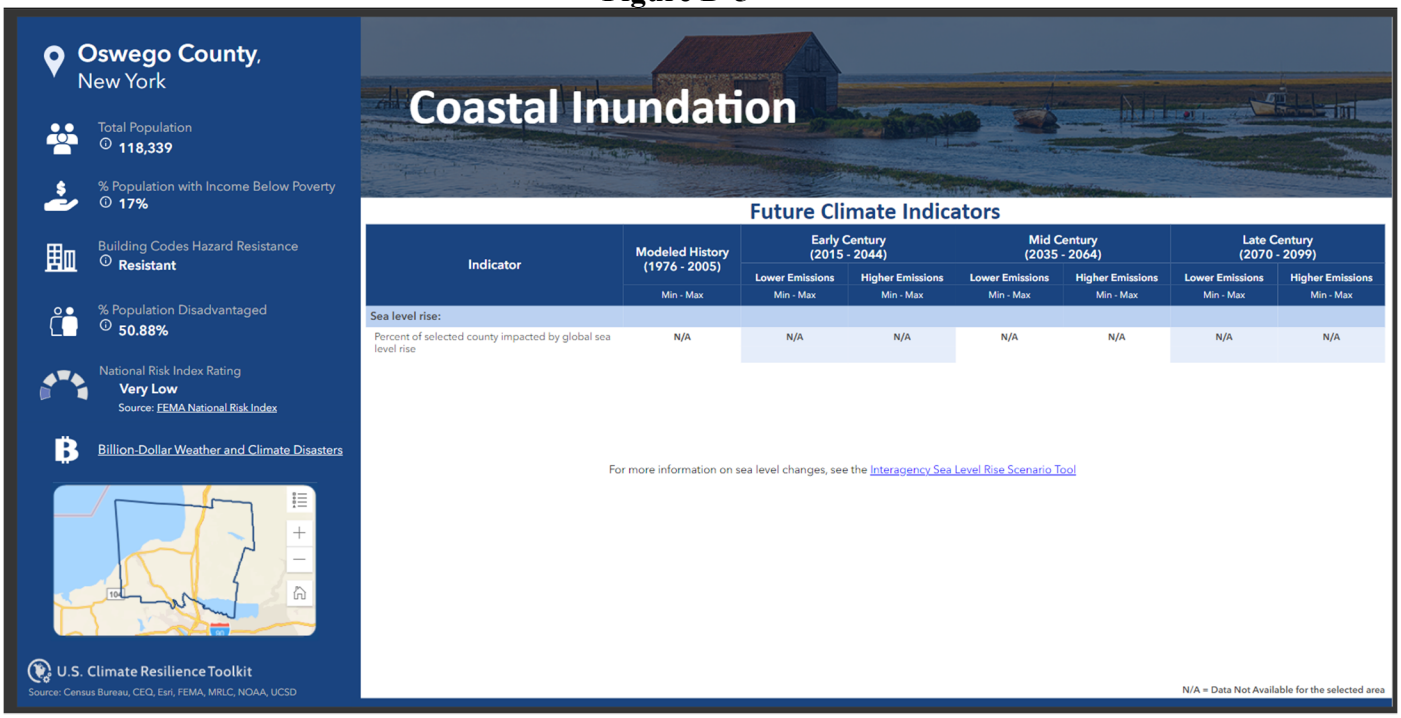


Figure D-6

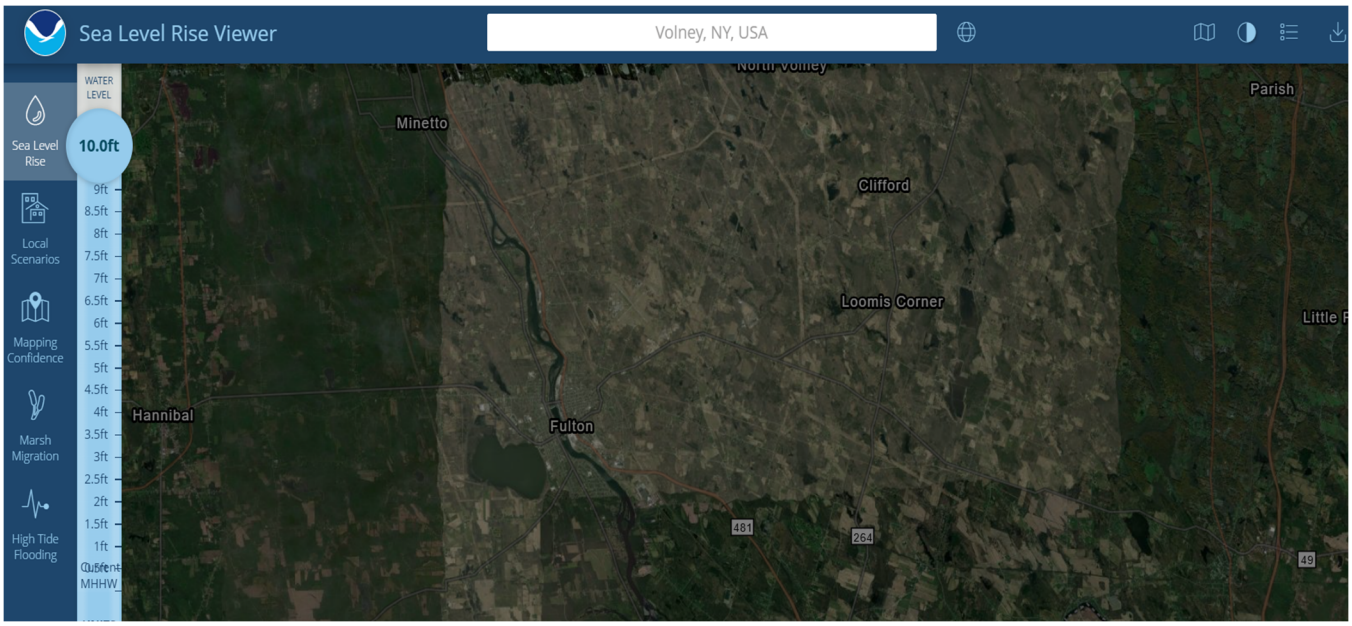
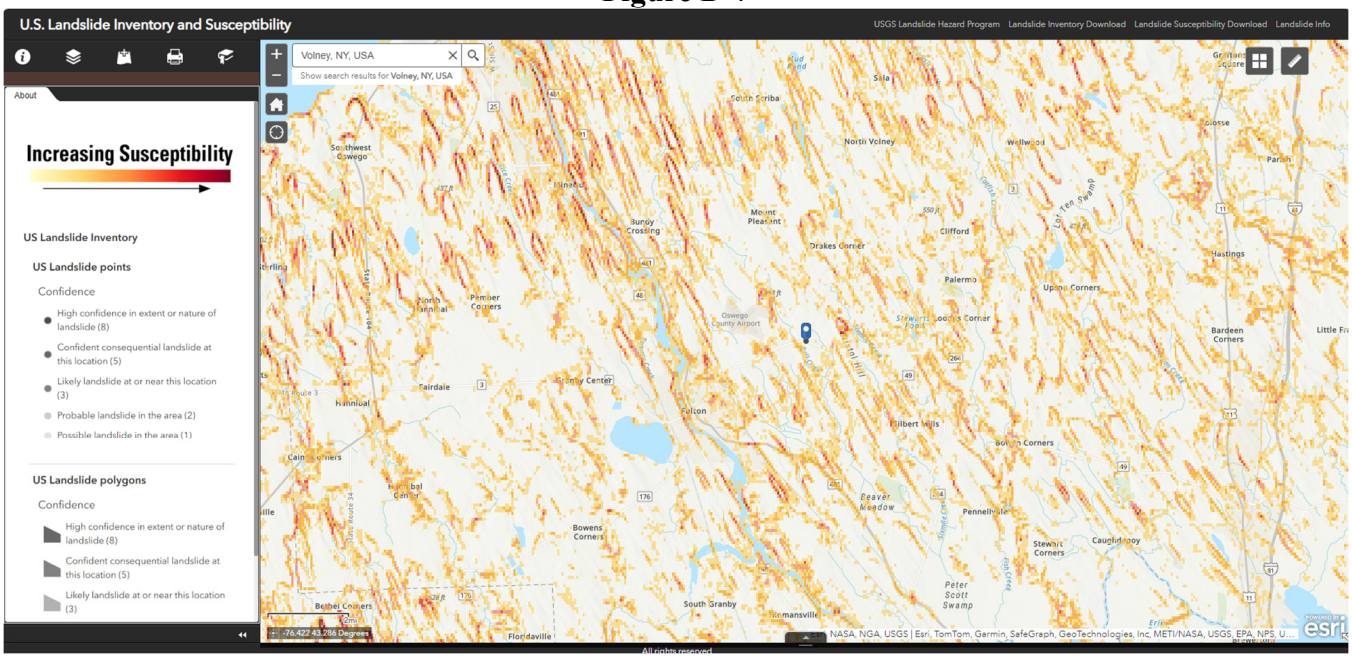


Figure D-7



*The site location is denoted by the blue tag.