

**SIXTH FIVE-YEAR REVIEW REPORT FOR  
PORT WASHINGTON L-4 LANDFILL SUPERFUND SITE  
NASSAU COUNTY, NEW YORK**



**Prepared by**

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

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**March 28, 2024**

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**Date**

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## LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
BBL	Blasland, Bock & Lee, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
ICs	Institutional Controls
LKB	LKB Associates, Inc.
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
OU	Operable Unit
O&M	Operation and Maintenance
PFAS	Polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
TBC	To be considered
TNH	Town of North Hempstead
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 in order 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 (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the sixth FYR for the Port Washington L-4 Landfill Superfund Site (Site). The triggering action for this statutory review is the August 28, 2019 completion date of the previous FYR. The FYR has been prepared due to the fact that 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 three operable units (OUs) and all three will be addressed in this FYR. The main components of the selected remedy for the site included: construction of a perimeter gas collection system (OU1); construction of a Title 6 New York Codes, Rules and Regulations Part 360 landfill cap (OU2); construction of a groundwater extraction and treatment system (OU3); and implementation of long-term landfill gas and water quality monitoring.

The Site FYR was led by EPA: Victoria Sacks, Remedial Project Manager, Paul Zarella, Geologist, William Yeung, Geologist, Julie McPherson, Human-health Risk Assessor and Chuck Nace, Ecological Risk Assessor. Melissa Sweet, Project Manager from the New York State Department of Environmental Conservation (NYSDEC), also contributed. The Town of North Hempstead (Town) was notified of the initiation of the FYR. The review began on July 1, 2023.

### Site Background

The Port Washington Landfill is located in the northwestern portion of Nassau County, in Long Island, New York. The landfill is located on a 139-acre lot, owned and operated by the Town. This property contains two landfilled parcels separated by a vacant area (see **Figure 1**). The L-4 parcel is a 53-acre inactive closed landfill on the western portion of the property. It is the designated Superfund site. The L-5 parcel, a closed landfill on the eastern portion of the property, is not considered to be part of the site, and is being addressed under Title 6 New York Codes, Rules and Regulations (6 NYCRR) Part 360 municipal landfill closure requirements.

The Site is located on the Cow Neck Peninsula of Long Island and is bordered by Hempstead Harbor to the east, an industrial park to the south, residential property and the North Hempstead Country Club to the west and the Town-owned Harbor Links Golf Club (the former Morewood Property) to the north.

Groundwater generally migrates toward the adjacent Hempstead Harbor to the east. Two potable water supply wells remain in use in the area. The Stonytown Well (Lloyd Aquifer (LA)) is located 3,000 feet southwest and hydraulically upgradient of L-4 and the Hewlett Well (Magothy Aquifer (MA)) is located 3,000 feet south and hydraulically upgradient of L-4. Three wells have been taken out of service: the Southport Well (MA), located 1,300 feet west and hydraulically upgradient from L-4, and two Bar Beach Wells (Upper Glacial Aquifer (UGA)), located 4,000 feet north and possibly hydraulically downgradient of L-4.

Landfilling at L-4 began in March 1974 with the disposal of incinerator residue, residential and commercial refuse, and construction debris by the Town of North Hempstead. During the winters of 1979, 1980 and 1981

furnace explosions occurred in homes directly west of the landfill. In 1981, air monitoring was performed in the area by the Nassau County Fire Commission, which revealed excessive levels of methane in several area residences. As a result, the Town initiated remedial measures to prevent the uncontrolled migration of subsurface gases to the west of the landfill. A system of both active and passive gas vents were utilized to collect vented gases and to flare them in a horizontal combustion unit to destroy the hazardous chemicals commonly detected in sanitary landfill gas.

In 1981, the Nassau County Department of Health also tested for and discovered contamination from volatile organic compounds (VOCs), primarily chlorinated hydrocarbons, in the Southport Well. As a result, the well was removed from service as a potable water supply. The Town stopped accepting waste at L-4 in 1983. Since then, the Town has continued to monitor the landfill's immediate environment for both methane and hazardous chemicals.

The Site was given final status on EPA's National Priorities List (NPL) in September 1983. NYSDEC assumed the role of lead agency for the Site until February 1984, when DEC requested that EPA assume that role. Based upon the findings of the Remedial Investigation/Feasibility Study (RI/FS), EPA signed a September 1989 Record of Decision (ROD) for the Site.

#### **FIVE-YEAR REVIEW SUMMARY FORM**

SITE IDENTIFICATION		
<b>Site Name:</b> Port Washington L-4 Landfill		
<b>EPA ID:</b> NYD980654206		
<b>Region: 2</b>	<b>State:</b> NY	<b>City/County:</b> Port Washington/Nassau County
SITE STATUS		
<b>NPL Status:</b> Final		
<b>Multiple OUs?</b> Yes	<b>Has the site achieved construction completion?</b> Yes	
REVIEW STATUS		
<b>Lead agency:</b> EPA		
<b>Author name (Federal or State Project Manager):</b> Lorenzo Thantu		
<b>Author affiliation:</b> EPA RPM		
<b>Review period:</b> 7/1/2023 – 3/1/2024		
<b>Date of site inspection:</b> 8/23/2023		
<b>Type of review:</b> Statutory		
<b>Review number:</b> 6		
<b>Triggering action date:</b> 8/28/2019		
<b>Due date (five years after triggering action date):</b> 8/28/2024		

## **II. RESPONSE ACTION SUMMARY**

### **Basis for Taking Action**

The media of concern at the site include groundwater and soil gas. There is a groundwater plume containing VOCs, heavy metals and leachate indicator parameters (*e.g.*, ammonia and total organic carbon). Gases from the landfill were migrating into the adjacent residential community.

A human health risk assessment, conducted during the RI/FS, found that Site contaminants, predominately arsenic, vinyl chloride, 1,1-dichloroethane, 1,1-dichloroethylene, trichloroethylene (TCE) and tetrachloroethylene (PCE) posed an unacceptable risk from exposure to and use of contaminated groundwater in the vicinity of the Site. The risk assessment also concluded that contaminant vapors posed a potential risk to residences adjacent to the landfill.

### **Response Actions**

#### **Remedy Selection**

Based upon the findings of the RI/FS, EPA issued a September 1989 ROD for the Site selecting the following remedy for the three OUs:

- Closure of L-4 in accordance with the 6 NYCRR Part 360 requirements for New York State sanitary landfills;
- Rehabilitation of the existing active gas venting system;
- Extension of the existing active gas venting system around the entire perimeter of L-4;
- Addition of a second gas combustion unit as standby;
- Placement of extraction wells in the Upper Glacial Aquifer in areas with elevated levels of groundwater contamination;
- Treatment of extracted groundwater from the Upper Glacial Aquifer through metals removal and air stripping prior to discharge to an aquifer recharge basin;
- Treatment of groundwater at the Southport Well through air stripping should the Port Washington Water District decide to use the Southport Well as a potable water source;
- Installation of groundwater monitoring wells to define further the extent of the L-4 leachate and VOC plumes, as well as to refine the placement of the proposed extraction wells;
- Installation of additional groundwater and landfill gas monitoring wells around L-4 to be used in conjunction with the existing landfill gas and groundwater monitoring network in order to monitor L-4 comprehensively;
- Development and execution of a comprehensive monitoring plan for L-4, including performance monitoring of the gas venting system;
- Development and execution of an operation and maintenance plan for remedial actions selected in the ROD, as well as those previously employed for L-4.

Based on the risk assessment, the following Remedial Action Objectives (RAOs) were developed for the Site:

- Protect human health and the environment by controlling sources of contamination at the site.
- Eliminate the potential exposure pathways.

- Restore lost resources. This includes the restoration of the aquifer and the loss of the local water district's capacity to provide public water.

The contaminants of concern for this Site included the complete list of chemicals on EPA's listing of hazardous chemicals of concern. This list was eventually narrowed to contaminants detected above drinking water standards (1,1-dichloroethene, cis - 1,2-dichloroethene, PCE, vinyl chloride, TCE and arsenic).

### **Status of Implementation**

In October 1990, EPA entered into a Consent Decree with the Town for implementation of the September 1989 ROD. In September 1990, the Town tasked its existing contractor, LKB Associates, Inc. (LKB), to implement the provisions in the ROD, whereby LKB produced the initial action plans for Site remediation. This included the plans for monitoring the affected groundwater and soil gases on- and off-site. Following a change in the Town's administration, the Town's contracted support was reevaluated. In October 1992, the Town then entered into an agreement with Blasland, Bouck & Lee, Inc. (BBL) who began performing the remedial design of the above-described remedial activities and further groundwater investigations of the contamination related to L-4.

### **Gas Migration Mitigation**

In June 1993, design work for the rehabilitation of the existing active gas venting system was finalized, and the remedial action work began immediately thereafter. This phase of the Site remedy was undertaken first in order to ensure protection of the adjacent residences. A contingency plan was developed by the Town, in cooperation with EPA, NYSDEC, and the local residents' Citizen Advisory Council, in order to establish the operational parameters of the facilities to assure the protectiveness of the system. Under this contingency plan, a negative air pressure is to be maintained in the gas monitoring wells immediately outside of the L-4 boundary, and, if a power failure were to occur, the modified landfill gas extraction system would be the first system to receive power. There is an emergency generator on standby at the Site in case of power loss and large portable generators as backup. In addition, the system can be vented to reduce methane build up if the emergency generator and large portable generators fail.

In December 1999, the construction of the extension of the active landfill gas extraction system was completed. This system circumscribes the northern and eastern edges of L-4 where soil gas monitoring had detected some minor migration of landfill gases.

In November 2018, the Town submitted to EPA and NYSDEC a plan to modify the existing gas collection systems at the Site. The new design improves the system's efficiency and operational integrity while maintaining protectiveness to the nearby community. Following a meeting held at the Solid Waste Management Authority offices in December 2018, EPA and NYSDEC approved the modifications. Construction of the improvements began in February 2019 and were completed that summer. However, through these construction efforts, refurbishing of the gas extraction wells due to their age and modifying flaring at the L-4 Landfill due to decreasing methane production was considered necessary. EPA and NYSDEC approved a plan to complete these actions later in 2019. Subsequently, the

OU1 perimeter landfill gas collection and flare systems underwent a replacement and modification effort by the Town which was completed in 2023. Adjustments were made to emplace the landfill gas collection system headers below grade but above the impervious landfill cap membrane, assuring easier maintenance of the cap cover while protecting the gas system header pipes from degrading conditions. The OU2 L-4 Landfill cap remains fully intact, functional, and protective to human health and the environment.

#### Capping and Closure of L-4 Cell

The remedial design for the closure of L-4, in accordance with the 6 NYCRR Part 360 requirements for New York State sanitary landfills, was completed on March 31, 1995. The remedial action work commenced with the Town's emplacing the subgrade for L-4. On December 14, 1995, the Town's contractor, BBL, subcontracted the remaining cap construction activities to Breco Mechanical Group, Inc., which mobilized to the Site on January 22, 1996. Construction was completed for the L-4 cap, and the final walkthrough Site inspection was held September 30, 1997.

#### L-4 Groundwater Extraction and Treatment

The expanded groundwater investigation required by the ROD began in September 1990 with a monitoring plan designed by the Town's original contractor, LKB. Once BBL was under contract, the first of the additional monitoring wells was installed west of L-4. The first Supplemental Groundwater Investigation Report was finalized in March 1994. In 1996, it was decided that sufficient data had been gathered to design a groundwater extraction and treatment system (GWETS) to extract the contamination at its source, but that additional investigation would be necessary in order to determine the fate and transport of the plume of contamination migrating northward from L-4 that would not be captured by the GWETS. The results of the groundwater investigation were presented to EPA in the Phase II Groundwater Investigation Report in January 1997. The construction of the GWETS was completed in January 1999.

Negotiations between the Port Washington Water District and the Town resulted in replacing the Southport Well by installing another public supply well outside of the local vicinity. This well was constructed approximately two miles from the Site as a result of the State water use restrictions for this part of Long Island. Construction of this well was completed in July 2000.

The OU3 GWETS has undergone regular maintenance since its construction in 1999 and was overhauled in 2019 to assure its continual containment of the contaminant plume migrating from the L-4 Landfill. The Town has replaced much of the electronics and the pumps, along with a maintenance plan, in order to assure a continual performance of the system. These actions brought the OU3 Remedial Action into proper operation and the subsequent data has shown that the contamination in the off-property monitoring wells has reduced to acceptable levels.



## IC Summary Table

**Table 1:** Summary of Planned and/or Implemented ICs

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	No	Entire Site	Assure No Use of Contaminated Groundwater for Potable Use	New York State Sanitary Code 10 NYCRR Part 5, Subpart 5-2

## Systems Operations/Operation & Maintenance

An Operation and Maintenance (O&M) Manual was approved for the Site operations in March 2000. The O&M manual outlined the regular maintenance procedures that the Town is to follow during the operation of the remedial systems at the Site. O&M activities include the maintenance of the GWETS, maintenance of the soil gas extraction system, maintenance of the landfill cap and cover, and monitoring Site conditions by means of semi-annual sampling of the monitoring well network.

The Town has expended good efforts in bringing the remedial systems to proper working order. The groundwater extraction pumps and the controlling electronics have been replaced and modified so that they are working continually. The Landfill Gas Extraction Systems were modified and replaced between 2019 and 2023 to assure continual operation and maintain constant protectiveness to the adjacent residential community.

Potential Site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk as a result of expected effects of climate change in the region and near the Site. The full climate change assessment can be found in **Appendix A**.

## **III. PROGRESS SINCE THE LAST REVIEW**

This section includes the protectiveness determinations and statements from the **last** FYR, as well as the recommendations from the **last** FYR and the current status of those recommendations.

**Table 2:** Protectiveness Determinations/Statements from the 2019 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The implemented action at OU1 protect human health and the environment.
2	Protective	The implemented action at OU2 protect human health and the environment.
3	Protective	The implemented action at OU3 protect human health and the environment.
Sitewide	Protective	The remedial actions at the Port Washington L-4 Landfill site are protective of human health and the environment.

There were no issues or recommendations associated with the 2019 FYR.

#### IV. FIVE-YEAR REVIEW PROCESS

##### **Community Notification, Involvement & Site Interviews**

On August 7, 2023, 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 U.S. Virgin Islands, including the Port Washington Landfill Superfund site. The announcement can be found at the following web address: <https://www.epa.gov/superfund/R2-fiveyearreviews>.

In addition to this notification, the EPA Community Involvement Coordinator (CIC) for the site, Shereen Kandil, posted a public notice on the EPA Site webpage: <https://www.epa.gov/superfund/port-washington-landfill> and provided the notice to the Town by email on November 13, 2023 with a request that the notice be posted in municipal offices and on the town webpage. This notice indicated that a FYR would be conducted at the Port Washington Landfill Superfund site to ensure that the cleanup at the Site continues to be protective of people's health and the environment. Once the FYR is completed, the results will be made available at the following repositories: Town Of North Hempstead Town Hall, 220 Plandome Road, Manhasset NY 11030; EPA Region 2, 290 Broadway, 18th floor, New York, NY 10007. In addition, the final FYR report will be posted on the following website: <https://www.epa.gov/superfund/port-washington-landfill>. Efforts will be made to reach out to local public officials to inform them of the results.

##### **Data Review**

Groundwater data at the Site is collected by the Town. The Town presented a combined sampling program that samples the entire landfill facility (L-4 and the former Morewood property for EPA and L-5 for NYSDEC). Groundwater sampling occurs on an annual basis, except for the Morewood wells which are sampled quarterly. This FYR evaluates VOC and monitored natural attenuation (MNA) data parameters collected from monitoring wells at the L-4 landfill (wells TNH-5 and TNH-6) and the former Morewood property downgradient (wells TNH-18S, TNH-21S, TW-2R, TNH-28S, and TNH-28D) as shown on **Figure 1**.

#### L-4 Groundwater Extraction and Treatment System

The GWETS extracts groundwater from three extraction wells (EW-1, EW-2, and EW-3 shown on **Figure 1**) located at the western portion of the Site at a rate of 50 – 100 gpm. During the November 2022 sampling event, only two VOCs (chloromethane and PCE) were detected above the laboratory detection limit in the influent to the treatment system; the concentrations of these VOCs were below their respective New York State Water Quality Standards for Class GA Groundwater of 5 µg/L. Only chloromethane was detected in the effluent sample at a concentration of 2.7 µg/L. VOC data collected during the rest of the review period show similar results.

The treatment plant relies only on air-stripping to meet effluent discharge requirements and has been compliant throughout the review period. These results suggest that the landfill capping system and ongoing remedial actions, including operation of the Groundwater Remediation Facility, continue to be effective in reducing and capturing VOC contamination in the vicinity of the L-4 Landfill. This is illustrated by the long-term VOC sampling results for Morewood Monitoring Well TW-2R (**Figure 2**) which shows significant reductions in VOC concentrations that are now at or below maximum contaminant levels (MCLs).

During the review period, non-VOCs were observed above Class GA Groundwater Standards in both influent and effluent. This included exceedances of non-health-based values for manganese, sodium, ammonia, and nitrate that are likely background concentrations. Arsenic and phenolics were detected above the Standard in influent only.

Treated effluent water from the L-4 GWETS is discharged into a retention pond which allows for infiltration or use as irrigation for the adjacent golf course. Samples were collected from the retention pond at 14 sampling events from March 11, 2020 to May 4, 2023 for VOC and metals analysis. Concentrations for these sampling events have all been below both NYSDEC Class GA Groundwater Standards and NYSDEC Effluent Limitations for discharge to Class GA groundwater. Analysis for metals have shown some low concentrations. Concentrations for metals have had exceedances for total iron for TNH-18S; total manganese, dissolved manganese, and, occasionally, ammonia for TW-2R; total iron, total manganese, dissolved manganese, and occasionally ammonia and chloride for TNH-28S; and total iron, total manganese, and dissolved manganese for TNH-28D during this review period.

#### Landfill Leachate

Leachate is treated via aeration at the Site. Treated leachate from the Site's leachate treatment system is stored within tanks prior to being discharged to the Port Washington Water District for further treatment. The Town provides the results of monthly leachate sampling to the Water district for review as part of the Town's leachate disposal agreement. Sampling events for the treated leachate took place between January 16, 2019 and August 3, 2023 on a monthly basis for metals and wet chemistry analytes. Samples consistently have detections of boron, dissolved iron, ammonia, nickel, nitrate, nitrite, and phenolics with a few exceptions in sampling events. Arsenic, manganese, mercury, and total cyanide have also been detected during these sampling events. Although certain constituents are routinely detected in treated leachate, concentrations are low enough to be accepted by the Port Washington Water District for treatment and discharge.

## Groundwater Monitoring Data

Monitoring wells are sampled semi-annually. During the review period, monitoring wells in the L-4 network (TNH-5 and TNH-6) did not have exceedances of VOCs above NYSDEC Class GA Groundwater Standards, consistent with historic results. Downgradient of L-4 on the former Morewood property, no monitoring wells exhibited VOC concentrations above Class GA Groundwater Standards during the review period. Monitoring well TW-2R has historically exhibited high VOC concentrations, as shown on the trend graph in **Figure 2**, but is currently showing concentrations either non-detect or below the Class GA Groundwater Standards. During this FYR period, concentrations of VOCs have been below cleanup levels for each sampling event except for TW-2R during the June 2019 sampling event. During this event, concentrations of 1,1-dichloroethane (5.2 µg/L) and total 1,2-dichloroethene (6.1 µg/L) were detected slightly above the NYSDEC Class GA Groundwater Standards. Subsequent sampling events for VOCs have been predominately non-detect with the few instances of detections being below the NYSDEC Class GA Groundwater Standards.

Monitoring for metals during the review period showed iron exceedances of the Class GA Groundwater Standard of 0.3 mg/L in L-4 well TNH-5 in 2021 (0.41 mg/L) and 2022 (0.66 mg/L). Natural attenuation and landfill indicator parameters were also evaluated at Site monitoring wells. During the 2023 sampling event, total iron was detected above the standard of 0.3 mg/L in Morewood Wells TNH-18S (1.92 mg/L) and TNH-21S (0.411 mg/L). Total and dissolved manganese were detected above the standard of 0.3 mg/L (with total manganese results slightly greater than dissolved) in TW-2R (2.1 (Total)/1.45 (Dissolved) mg/L), TNH-28S (11.2 (Total)/9.66 (Dissolved) mg/L) and TNH-28D (3.2 (Total)/2.44 (Dissolved) mg/L). Ammonia was detected above the standard of 2 mg/L in TW-2R (17.4 mg/L) and TNH-28S (3.3 mg/L). Chloride was detected above the standard of 250 mg/L in TNH-28S (278 mg/L). These 2023 sampling results are generally consistent with the rest of the review period and historic results with concentration fluctuation above and below the standard.

## Emerging Contaminants

In 2018, groundwater sampling was conducted for the emerging contaminants: 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS), including perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). The NYS MCL for PFOS and PFOA is 10 nanograms per liter (ng/L) and the MCL for 1,4-dioxane is 1 µg/L. PFOA was detected in L-5 well TNH-23S, upgradient well TNH-6, and Morewood well TW-2R at 35.50, 11.60, and 58.00 ng/L, respectively. PFOS was detected in TNH-23S, TNH-6, and TW-2R at 56.20, 2.35, and 11.90 ng/L, respectively. Total PFAS results for TNH-23S, TNH-6, TW-2R were 190.81, 31.51, and 265.10 ng/L, respectively. Results for 1,4-dioxane analyses for TNH-23S, TNH-6, TW-2R were 5.9 µg/L, non-detect and 63 µg/L. It should be noted that the air-stripping system does not treat PFAS or 1,4-dioxane, so treated groundwater that has been discharged into the retention ponds could contain concentrations of emerging contaminants. Afterwards, this water is used to irrigate the neighboring golf course. EPA will continue to work with the State to determine future groundwater monitoring needs for emerging contaminants and any potential mitigation.

## **Site Inspection**

EPA conducted the Site inspection on August 23, 2023. In attendance were Victoria Sacks, Paul Zarella, and William Yeung of EPA, Melissa Sweet of NYSDEC, and Omar Barrett of the Town. The purpose of the inspection was to assess the protectiveness of the remedy. At the time of the visit, the Landfill Gas Mitigation system upgrade was operating and all systems, including the leachate collection and GWETS, were operating properly.

## **V. TECHNICAL ASSESSMENT**

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

The remedy selected for the Site included (1) closing of the landfill in accordance with 6 NYCRR Part 360, (2) rehabilitation of the existing gas collection system and installation of additional active vents around the perimeter of the landfill, (3) replacing lost drinking water capacity due to the closure of the Southport well and (4) installation of additional extraction wells.

The RAOs, as identified in the 1989 ROD, are (1) control the sources of contamination at the Site, (2) eliminate the potential exposure pathways and (3) restore lost resources.

The remedy selected to address the soil is currently in place. L-4 has been closed and capped in accordance with 6 NYCRR Part 360 and is currently being maintained by the Town. The cap is inspected regularly by the Town to ensure that the landfill cover has not been compromised. As a result of the remedy and follow up maintenance of the landfill cap, the exposure pathway to potential receptors via exposure to landfill soil has been interrupted. The source control remedy as identified in the ROD is currently functioning as intended.

The remedy selected to address the groundwater has been implemented. The groundwater plume emanating from the L-4 landfill has been continually and regularly monitored. Since the 2009 refurbishment of the GWETS, VOC concentrations downgradient of the landfill have decreased significantly, indicating that contaminated groundwater is being captured as intended and is not migrating offsite.

The existing institutional controls prevent the installation of wells on the property. In addition, residents are connected to a municipal water supply. Groundwater use is not expected to change in this area within the next five years, the period of time until the next FYR.

In 2018, emerging contaminants were included in the analysis of several wells at the Site. The data indicates concentrations of emerging contaminants are higher downgradient compared to background. However, additional sampling is recommended in order to determine whether these impacts are Site-related. Treated groundwater that has been discharged into the retention ponds has not been sampled for PFAS or 1,4-dioxane. The onsite treatment system may not treat emerging contaminants; therefore, the presence of these chemicals within the retention ponds is possible. Future investigations should include sampling for emerging contaminants in the retention ponds.

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

#### Human Health

Although specific parameters may have changed since the time the human health risk assessment was completed, the process that was used remains valid and is not expected to affect the remedy. The exposure assumptions, toxicity data, cleanup levels and RAOs identified for the Site remain valid. There are no changes in the physical conditions of the site or site uses that would affect the protectiveness of the selected remedy.

Groundwater use is not expected to change during the next five years. Currently, the residential properties within the potential downgradient plume area are connected to the public municipal water supply. The landfill has been capped in accordance with 6 NYCRR Part 360. As noted in the 2004 FYR, the land use downgradient from the landfill has changed since the ROD was signed. An elder-care facility was constructed relatively close to the residential development directly downgradient from the Site. As a result of the 2004 FYR recommendations, soil vapor intrusion was evaluated as a potential exposure pathway. Several homes within the development were evaluated. The evaluation determined that vapor intrusion is not of concern in this area. Groundwater VOC concentrations in wells in this area have decreased when the Soil Vapor Analysis Study was done in 2008. EPA believes that the Harbor View Residential Community remains unaffected by migration of VOCs emanating from the plume of contamination that is migrating from L-4. In addition, MW-28 S and D, closest to the development, have not shown VOC contamination since their installation.

Although some chemical toxicity values have changed, and some new toxicity values were developed for other contaminants since the Site was originally assessed (1989, ARCS II), the groundwater remedy selected federal or state National Primary Drinking Water Standards MCLs as cleanup levels and remains valid. In addition, the RAOs discussed under Section II continue to remain valid.

In 2018, emerging contaminants were included in the analysis of several wells at the Site. The data indicates concentrations of emerging contaminants are higher downgradient compared to background. Treated effluent water from the GWETS is discharged into a retention pond which allows for infiltration or use as irrigation for the adjacent golf course. Samples for emerging contaminants have not been collected from the retention pond. Although exposure to the effluent is expected to be minimal based on the nature of irrigation water use and the concentrations identified in 2018, additional samples should be collected to understand what concentrations may be used by the golf course.

#### Ecological

The previous FYRs indicated that there were no adverse ecological impacts due to Site-related contaminants, since there were no completed ecological pathways. Monitoring well data from TNH-18S, the closest shallow well to Port Washington Harbor, was evaluated, and no Site-related contaminants were identified so the plume is not migrating to the harbor. Given that the contaminants

in the groundwater do not discharge to any surface water body, and the residual contamination in the landfill is capped, there are no likely impacts to ecological receptors. However, additional samples from the retention pond for emerging contaminants are needed.

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

Yes, emerging contaminants have been detected above MCLs downgradient of the Site (TW-2R) that are higher than levels present in the well located upgradient of the site (TNH-6). Further evaluation of PFAS and 1,4-dioxane contaminants should be included in future sampling at the Site.

## VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the Five-Year Review:				
OU1 and OU2				
OU(s): OU3	<b>Issue Category: Monitoring</b>			
	<b>Issue:</b> Groundwater treated by the extraction system is discharged to a retention pond and used as irrigation for the adjacent golf course. Wells in the vicinity of the Site showed PFAS and 1,4-dioxane impacts, and it is unclear whether these impacts are from the Site. The retention ponds were also not sampled during the last emerging contaminant event in 2018.			
	<b>Recommendation:</b> Sample groundwater from all monitoring wells (including background), influent, GWETS effluent, retention pond surface water, and retention pond sediments for PFAS constituents and 1,4-dioxane in addition to the constituents already included in the monitoring plan.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	8/28/2026

## VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
<i>Operable Unit:</i> OU1	<i>Protectiveness Determination:</i> Protective
<i>Protectiveness Statement:</i> The OU1 remedy (perimeter gas extraction system) is protective of human health and the environment.	

Protectiveness Statement(s)	
<i>Operable Unit:</i> OU2	<i>Protectiveness Determination:</i> Protective
<i>Protectiveness Statement:</i> The OU2 remedy (landfill cap) is protective of human health and the environment.	

Protectiveness Statement(s)	
<i>Operable Unit:</i> OU3	<i>Protectiveness Determination:</i> Short-term protective
<i>Protectiveness Statement:</i> The OU3 remedy (groundwater extraction and treatment system) is protective of human health and environment in the short term because the groundwater extraction system is operating as intended and there are no known drinking water exposures. To be protective in the long-term, additional data needs to be collected and evaluated to delineate the nature and extent of emerging contaminants in groundwater and the retention pond.	

Sitewide Protectiveness Statement	
<i>Protectiveness Determination:</i> Short-term Protective	
<i>Protectiveness Statement:</i> The remedy at the Port Washington L-4 Landfill site is protective of human health and environment in the short term since the landfill is capped, the groundwater extraction and treatment system is functioning as intended and there are currently no known drinking water exposures. To be protective in the long term, additional data needs to be collected and evaluated to delineate the nature and extent of emerging contaminants in groundwater and the retention pond.	

## VIII. NEXT REVIEW

The next FYR report for the Port Washington L-4 Landfill Superfund Site is required five years from the completion date of this review.



<b>Table 3: DOCUMENTS REVIEWED</b>		
<b>Author</b>	<b>Date</b>	<b>Title/Description</b>
USEPA	June 1989	Remedial Investigation Report
USEPA	September 1989	Record of Decision
USEPA	March 2000	O&M Manual for Remedial Activities at Port Washington L-4 Landfill
Town of North Hempstead	August 2001	Port Washington Landfill Groundwater Treatment System Off-Gas Evaluation Report
Town of North Hempstead	August 2004 – Present	Progress Reports/Monitoring Data
USEPA	April 2014	Fourth Five-Year Review Report
USEPA	September 2019	Fifth Five-Year Review Report

**Figure 1. Site Plan and Sample Location Map**

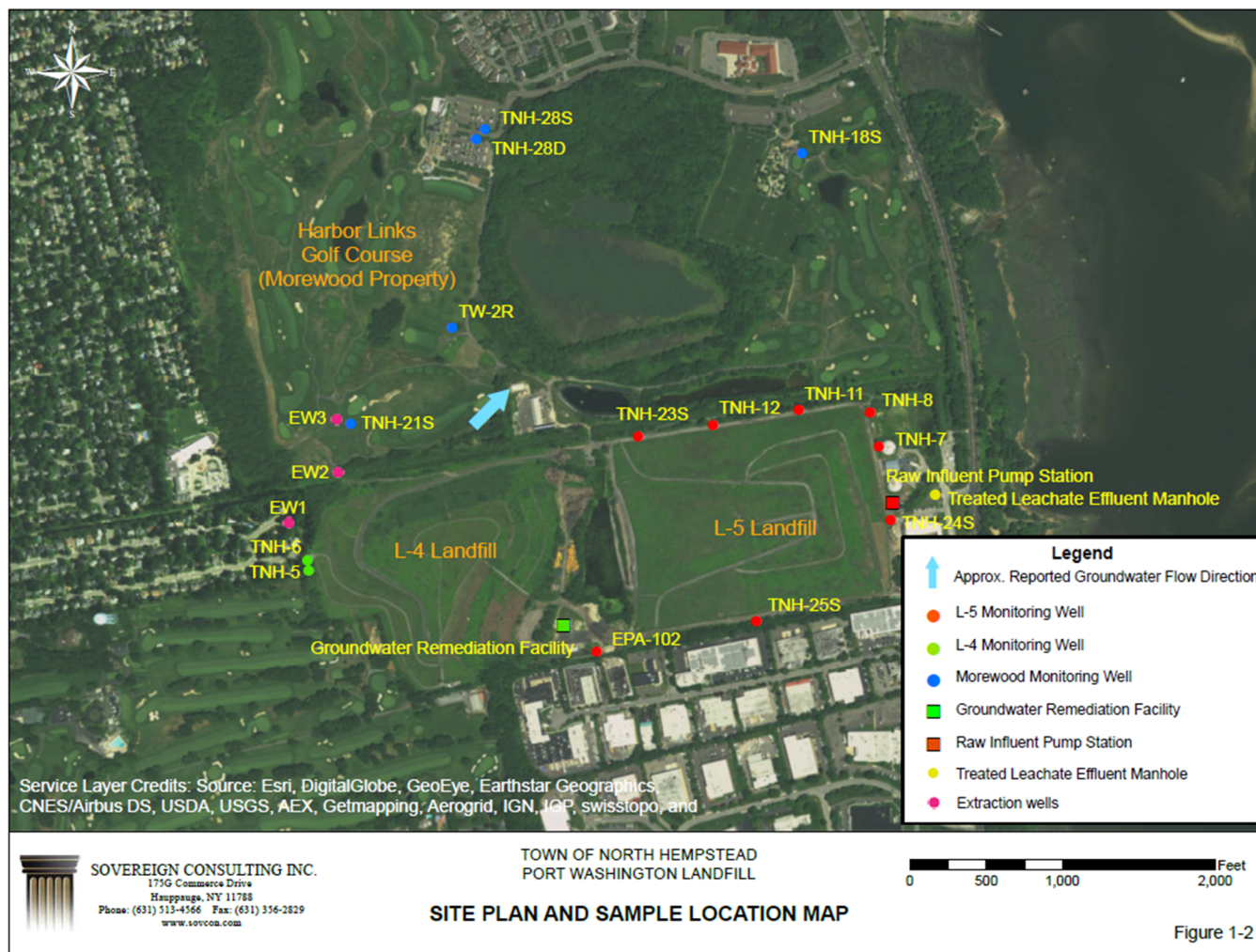
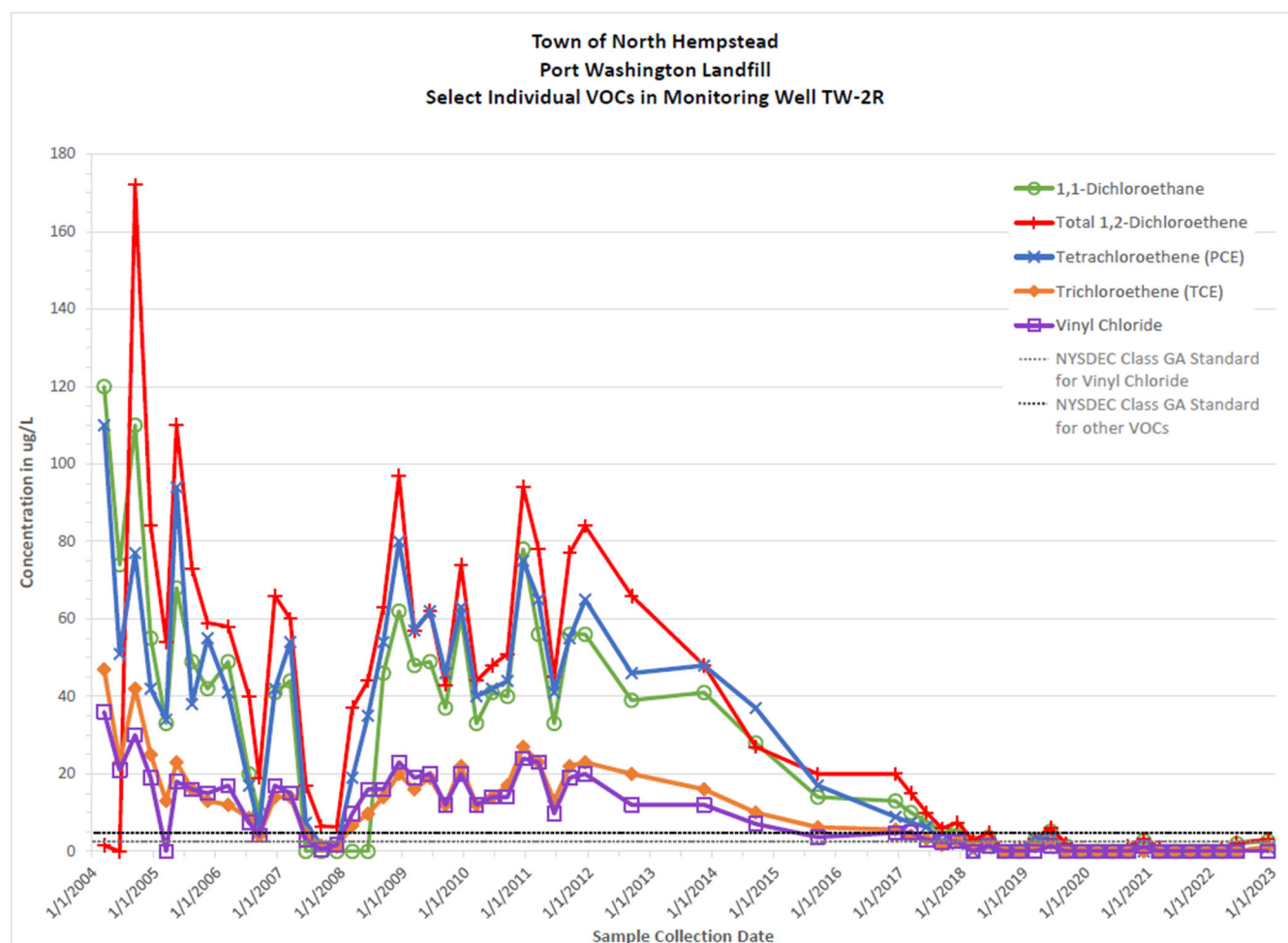


Figure 1-2

**Figure 2. Select Individual VOCs in Monitoring Well TW-2R**



## APPENDIX A – CLIMATE CHANGE ASSESSMENT

According to the Region 2 Guidance for Incorporating Climate Change Considerations in Five Year Reviews, three climate change tools were utilized to assess the Port Washington Landfill Site. Screenshots from each of the tools assessed are shown below.

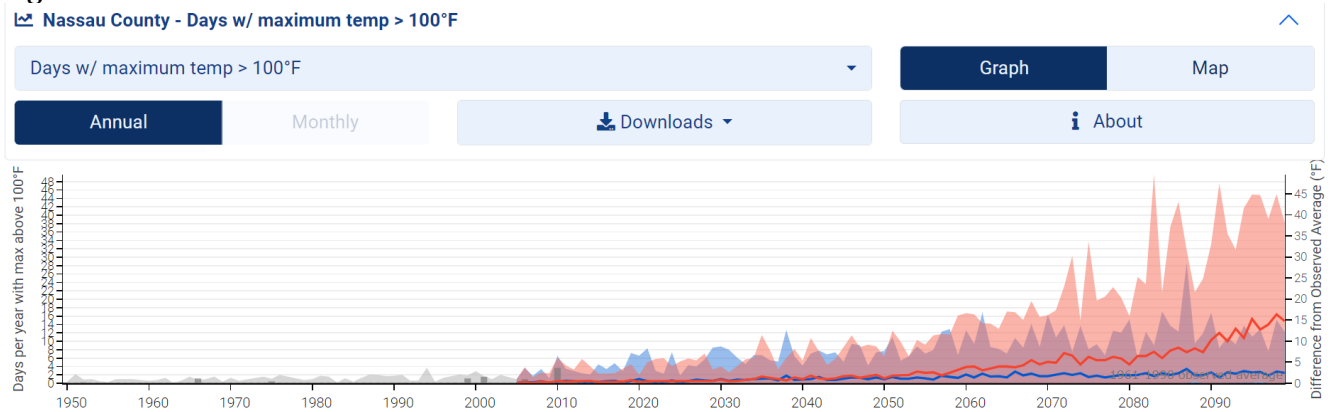
The first tool utilized to assess Port Washington Landfill Site is called *The Climate Explorer*. According to this tool, frequency of coastal flooding may increase as global sea level rises 0.5-2 feet, and relative sea level rise may be amplified in the Northeastern United States. Intense rainfall is projected to increase by 1%. As seen in **Figure 1**, there is a projected increase in days per year with a maximum temperature > 100° F. There is an increase of potential drought conditions due to a slight increase of days with no precipitation as seen in **Figure 2**. As seen in **Figure 3**, there is a projected increase in days per year with precipitation > 3”, which may indicate an increasing flood risk over time. A summary of the Top Climate Concerns from the tool can be seen in **Figure 4**.

The second tool utilized is called *Risk Factor (formerly Flood Factor)*. According to this tool, there are 466 properties in Port Washington that have a > 26% risk of being severely affected by flooding over the next 30 years, which represents 11% of all properties in Port Washington. Overall, Port Washington has a moderate risk of flooding over the next 30 years (**Figure 6**). The Operation and Maintenance Plan includes regular cap inspections and repairs, as needed, should the landfill be affected by any serious flooding. EPA will emphasize to the Town of North Hempstead the need for monitoring the landfill with respect to this moderate risk of flooding potential.

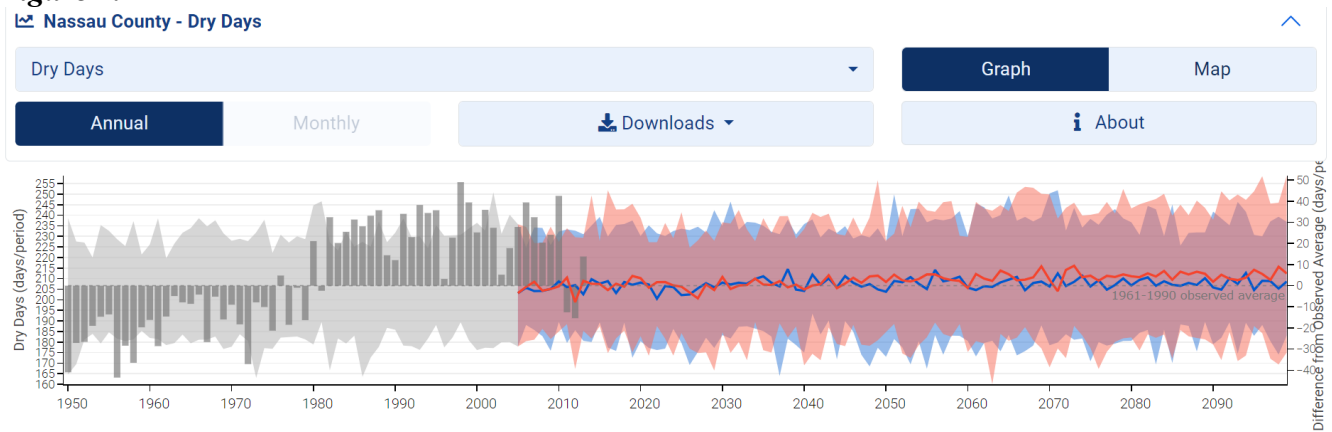
The final tool utilized is called *Sea Level Rise*. Port Washington, New York is vulnerable to sea level rise, however, the Port Washington Landfill Site is located on the east side of the peninsula and expected to have less impacts from sea level rise than the west side of the peninsula. The Port Washington Landfill Site would not be affected by a rise in sea-level. **Figure 7** displays the area with a 10-foot sea level rise which shows other areas of Port Washington affected by the rise but the Site unaffected. The site being unaffected is also displayed in **Figure 8**, which shows high-tide flooding frequency.

Based on this information, 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.

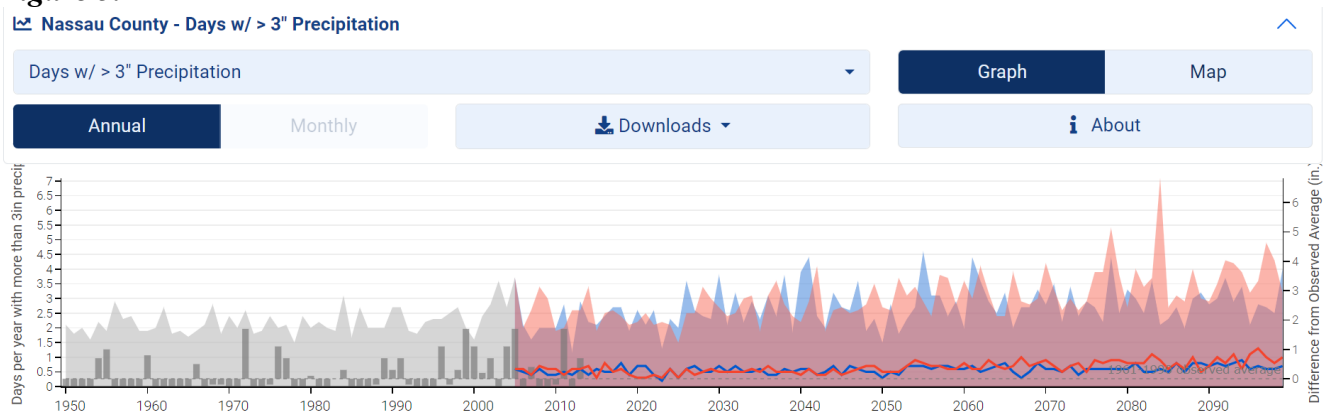
**Figure 1.**



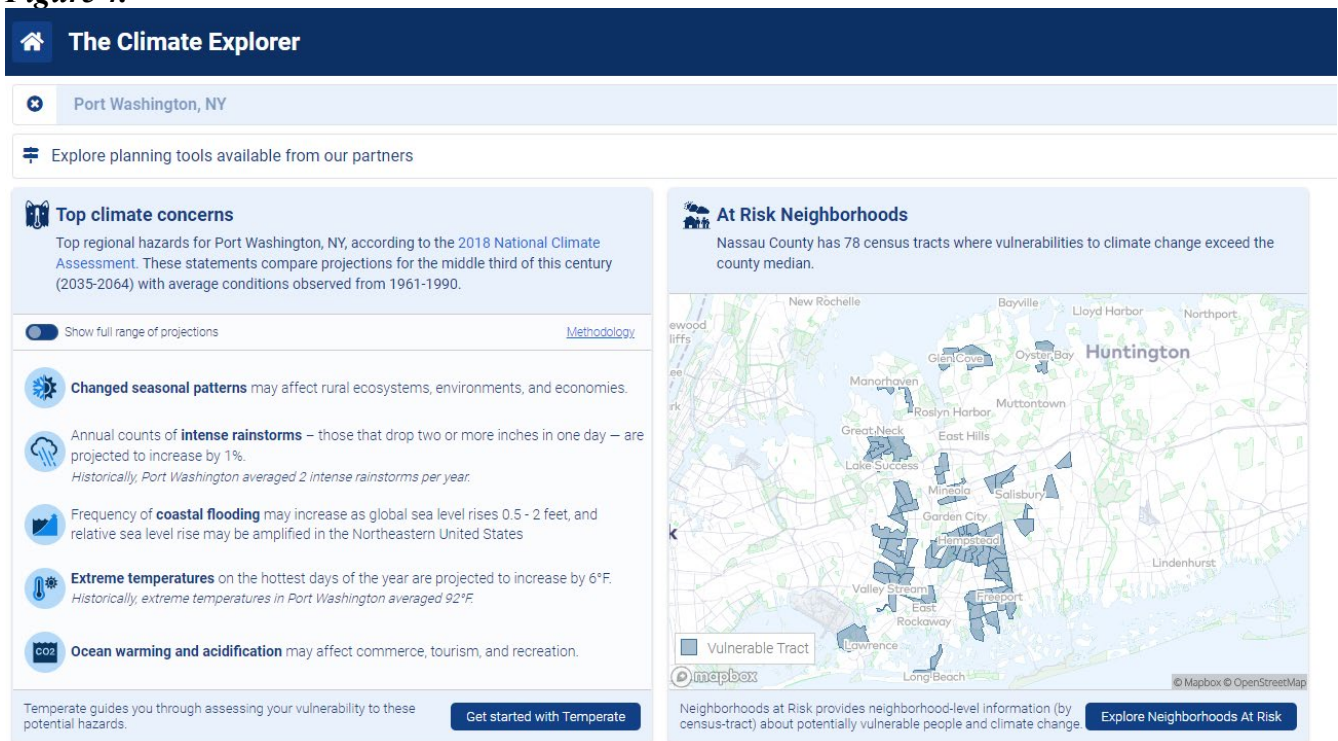
**Figure 2.**



**Figure 3.**



**Figure 4.**



**Figure 5.**

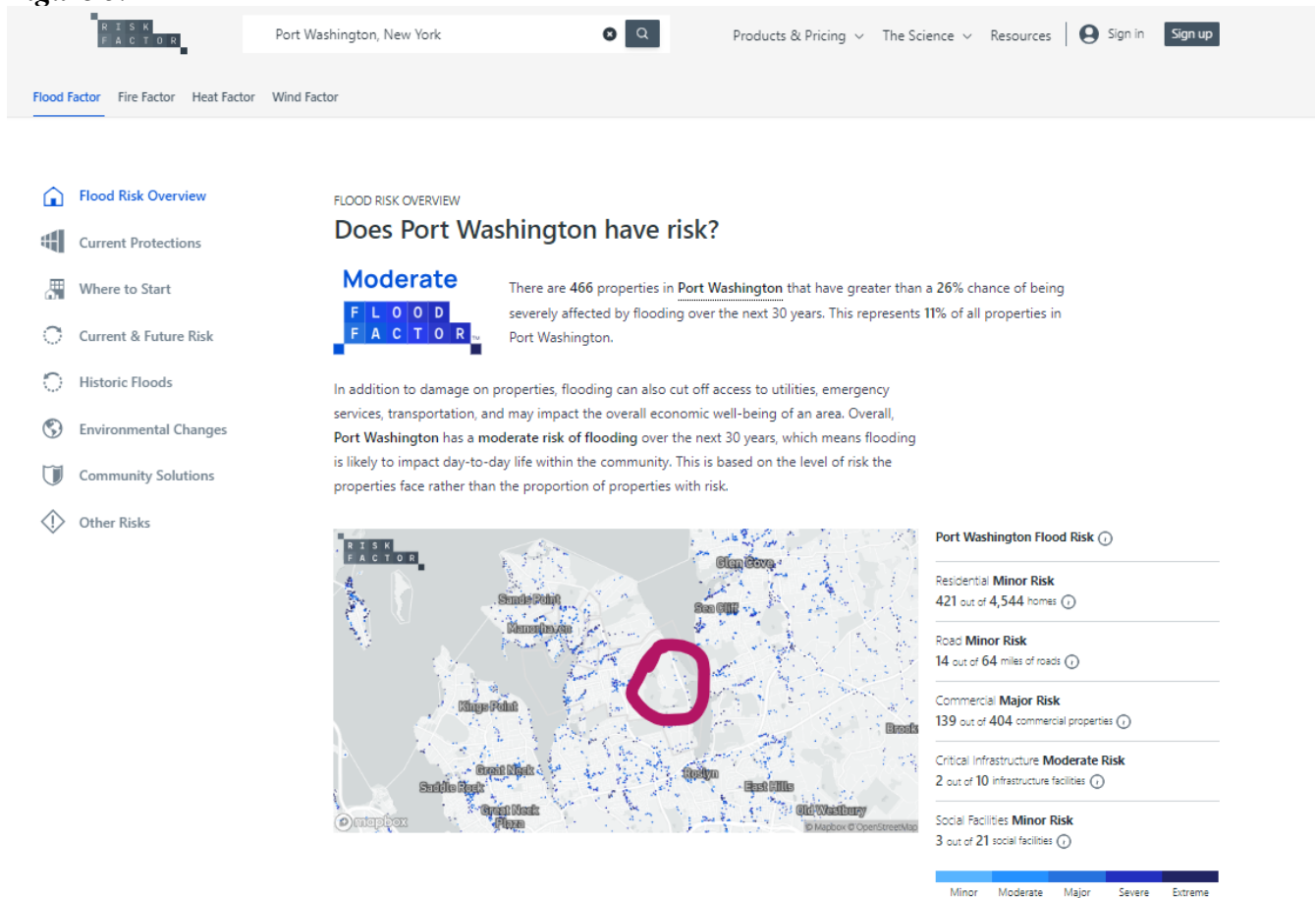




Figure 6.

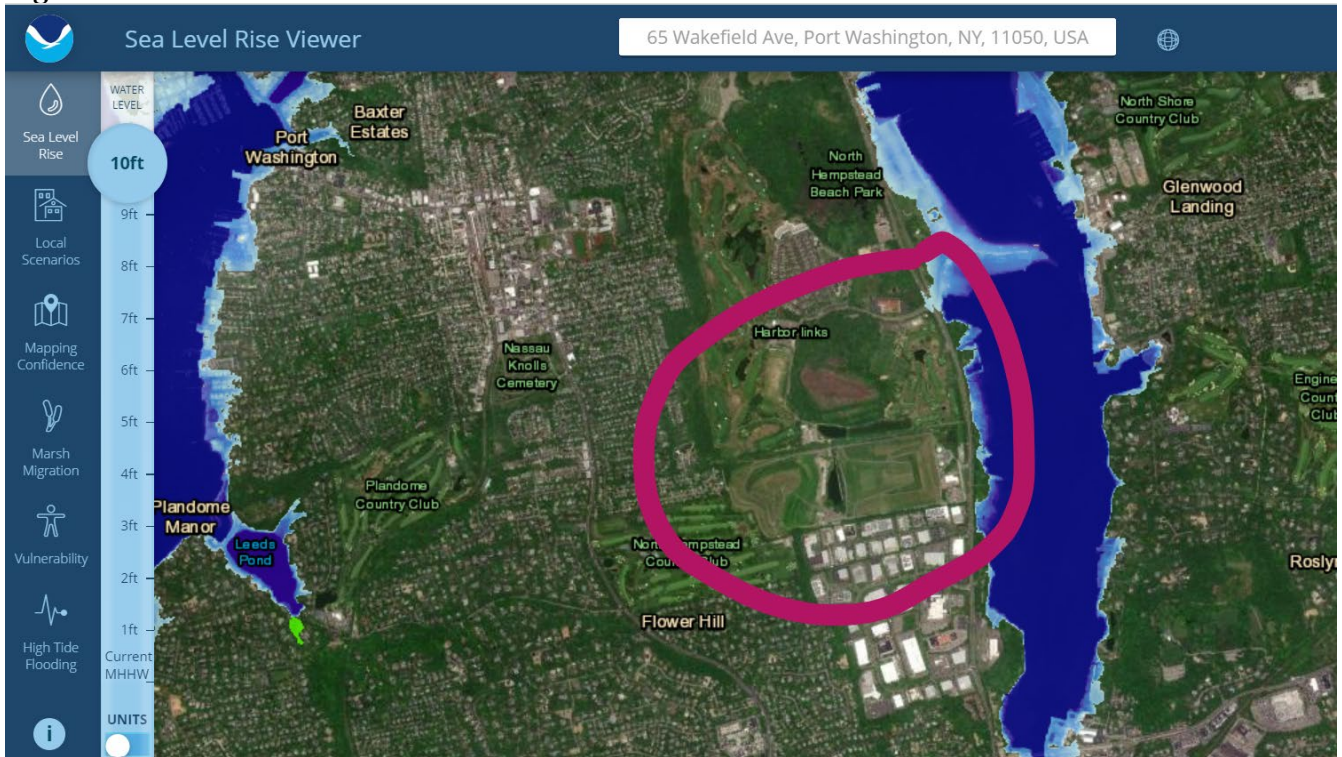


Figure 7.

