SECOND FIVE-YEAR REVIEW REPORT FOR MERCURY REFINING, INC. SUPERFUND SITE ALBANY 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

AOC	Administrative Order on Consent
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm/s	Centimeters Per Second
DCR&EE	Declaration of Covenants and Restrictions & Environmental Easement
EPA	United States Environmental Protection Agency
ft bgs	Feet Below Ground Surface
FYR	Five-Year Review
ICs	Institutional Controls
ISS	In-Situ Solidification/Stabilization
MCL	Maximum Contaminant Level
MERECO	Mercury Refining Company, Inc.
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSAWQS	New York State Ambient Water Quality Standard
O&M	Operation and Maintenance
OU	Operable Unit
PFAS	Polyfluoroalkyl Substance
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
ppb	Parts Per Billion
ppm	Parts Per Million
ppt	Parts Per Trillion
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SMP	Site Management Plan
SPLP	Synthetic Precipitation Leaching Procedure
UU/UE	Unlimited Use/Unrestricted Exposure

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 second FYR for the Mercury Refining, Inc. Superfund Site (Site). The triggering action for this statutory review is the 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 one operable unit (OU) which will be addressed in this FYR. The OU1 remedy addressed the excavation and off-site disposal of mercury-contaminated sediments, the excavation and off-site disposal of mercury-contaminated soils above the water table, and the in-situ solidification/stabilization (ISS) of mercury-contaminated soils in the area where dissolved mercury concentrations in groundwater exceed the cleanup level for mercury.

The Site FYR was led by Thomas Mongelli, the EPA remedial project manager. Participants included Rachel Griffiths (EPA's hydrogeologist), Urszula Filipowicz (EPA's human health risk assessor), Abigail DeBofsky (EPA's ecological risk assessor), Larisa Romanowski (EPA's community involvement coordinator), Michael Ormanoski of the New York State Department of Environmental Conservation (NYSDEC), and Stephen Lawrence of the New York State Department of Health (NYSDOH). The Potentially Responsible Party (PRP) group, was notified of the initiation of the FYR through their project coordinator, Geoff Seibel of de maximis, inc. The review began on June 5, 2023.

Site Background

The Site (see **Appendix B, Figure B-1**) includes the Mercury Refining Company, Inc. (MERECO) property, located at 26 Railroad Avenue and owned by 26 Railroad Avenue, Inc., in an industrial area on the border of the towns of Colonie and Guilderland, Albany County, New York. This approximately 0.68 acre lot was formerly used as a mercury reclamation facility and is still in use by MERECO for precious metal reclamation. The Site also includes parts of surrounding properties impacted by the past mercury reclamation processes conducted at the MERECO property, namely portions of the Allied Building Products (Allied) property, the SealMaster property (formerly known as Diamond W), and the former Albany Pallet property (also owned by 26 Railroad Avenue, Inc.). The Site also includes the parcel south of the SealMaster property that is still owned by MERECO, as well as portions of the CSX property and an Unnamed Tributary to the Patroon Creek located on the south end of the MERECO property.

The Unnamed Tributary reportedly received contaminated stormwater drainage from the storm sewer system that formerly serviced the MERECO property. The Unnamed Tributary converges with the

Patroon Creek approximately 1,600 feet downstream of the MERECO property. Approximately one mile downstream of the MERECO property there is a dam in the Patroon Creek which forms the I-90 Pond. The creek flows over the dam's spillway and enters the Hudson River approximately five miles from the stormwater outfall. Groundwater at the Site flows generally in a southerly direction toward the Unnamed Tributary. The area is serviced by a public water supply. The MERECO property currently includes one building, a three-story concrete block structure known as the Phase 1 Building, which is used for MERECO's ongoing precious metals recovery operations. A commercial asphalt roadway and a wide business driveway provide access to the MERECO property.

The Site was placed on the National Priorities List (NPL) on September 8, 1983.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Mercury Refining, Inc. Superfund Site		
EPA ID: NYD048148175		
Region: 2	**State:** NY	**City/County:** Towns of Colonie and Guilderland/Albany 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: 6/5/2023 - 10/17/2023		
Date of site inspection: 6/5/2023		
Type of review: Statutory		
Review number: 2		
Triggering action date: 2/13/2019		
Due date *(five years after triggering action date)*: 2/13/2024		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The MERECO facility used retorts, specialized ovens to distill and recover mercury, to reclaim mercury from batteries and other mercury-bearing materials such as thermometers, fluorescent bulbs, spill debris, and dental amalgams. Before 1980, various solid waste materials contaminated with mercury from the reclamation processes were dumped over an embankment of the Unnamed Tributary. From 1980 to 1998, waste batteries and other mercury-containing materials were stored in drums on wooden pallets within paved areas of the MERECO property and disposed of off-site.

The results of initial sampling performed by the NYSDEC's Division of Fish and Wildlife in 1981 and 1982 indicated the presence of PCBs and mercury contamination on the southern edge of the MERECO property and on the embankment to the Unnamed Tributary. Results of further sampling confirmed the presence of these contaminants in soils at the MERECO property and mercury contamination in the Unnamed Tributary sediments.

Between September 2000 and February 2003, EPA conducted a remedial investigation/feasibility study (RI/FS) which revealed the presence of mercury contamination in surface and subsurface soils, groundwater, creek sediments, fish tissue and catch basins. Methyl mercury contamination was also observed in stream and pond sediments and surface water. The human health risk assessment (HHRA) determined that carcinogenic risks and noncarcinogenic hazards for exposures at the Site exceeded the EPA's target Hazard Index of 1 and EPA's target cancer risk range of 10^{-4} to 10^{-6} for recreational use of the creek/pond and for residential use of the groundwater from exposure to mercury. Potential future cancer risks to workers on the MERECO property and bordering the MERECO property were within the 10^{-4} to 10^{-6} range. Risks to other receptors were below the EPA threshold levels of concern. Results of the Screening Level Ecological Risk Assessment indicated the potential for risk to ecological receptors including aquatic invertebrates, freshwater fish, amphibians, insectivorous birds, and piscivorous birds and mammals from exposure to mercury in surface water, sediment, and soil.

Response Actions

Under a September 1985 Consent Decree with New York State, MERECO excavated and removed approximately 2,100 cubic yards (yd^3) of mercury-contaminated soil and debris and 300 yd^3 of PCB-contaminated soils from the MERECO and CSX properties. The excavated area was backfilled with clean fill and covered with a single-layer clay cap. In June 1989, MERECO entered into an Administrative Order on Consent (AOC) with NYSDEC which called for the identification and remediation of mercury-contaminated areas, both on and off of the MERECO property, development of a program to evaluate and abate migration of mercury and other contaminants from the facility, including mercury emissions from both permitted (*i.e.*, the retorts) and fugitive air sources, and investigation of the Patroon Creek.

Another AOC was signed by MERECO and NYSDEC in February 1993 which called for the establishment of a schedule for the completion of all activities, a permanent remedy for the abatement of emissions and migration of pollutants, quarterly groundwater monitoring for ten years, remediation/removal of contaminated soils beneath the old Retort Building, long-term monitoring of areas surrounding the Site, and payment for civil penalties and natural resource damages. In February

1994, construction of new retorts inside the Phase 1 Building was completed. The old Retort Building was demolished and an asphalt and concrete cap was placed over the area. In 1995, a soil investigation beneath the cap found visible free-phase mercury from just below the concrete to approximately 13-18 feet below ground surface (ft bgs).

In December 1996, MERECO received a Hazardous Waste Corrective Action Management Permit pursuant to the Resource Conservation and Recovery Act (RCRA) from NYSDEC for controlling the generation and storage of waste at the MERECO property and for completing the investigation and remediation of contamination at the property and surrounding areas. In November 1999, after unsuccessful efforts to have MERECO fully comply with the terms of its RCRA permit, NYSDEC requested that the EPA take over as lead agency for the Site under CERCLA.

EPA issued a Record of Decision on September 20, 2008 to address mercury contamination in soils and sediments. The ROD had the following remedial action objectives (RAOs):

- Prevent or minimize potential future human exposures including ingestion and dermal contact with mercury-contaminated soils in excess of 5.7 parts per million (ppm), which is based on New York State's Soil Cleanup Objectives at 6 NYCRR Part 375 for industrial use;
- Prevent or minimize potential ingestion of mercury-contaminated groundwater and minimize mercury contamination in soils as a source of groundwater contamination at the facility. The cleanup level will be applied to the subsurface in the aquifer where the groundwater has a dissolved mercury concentration which exceeds the New York State Ambient Water Quality Standard (NYSAWQS) of 0.7 parts per billion (ppb); and
- Remediate mercury-contaminated sediments in the Unnamed Tributary to levels that are protective of the biota such that the most significant impacts are eliminated.

In order to achieve the RAOs for the contaminated groundwater, soils and sediments, EPA selected the following remedy:

- Excavation and off-site disposal of surface soils and subsurface soils above the water table from the MERECO property and adjoining properties which exceed the cleanup level for mercury in soil of 5.7 ppm for industrial property usage. These soils also include the soils associated with the stormwater sewer/catch basin systems;
- ISS involving mixing or injection of treatment agents at the MERECO and Allied properties to immobilize contaminants in surface soils, subsurface soils, and soils below the water table where the groundwater has a dissolved mercury concentration which exceeds the cleanup level of 0.7 ppb for mercury in groundwater;
- Implementation of institutional controls (ICs) in the form of environmental easements/restrictive covenants to restrict future development/use of the Site. Specifically, environmental easements/restrictive covenants will be filed in the property records of Albany County. The easements/covenants will at a minimum: (a) limit the Site to industrial uses; (b) preserve the integrity of the existing clay cap on the southern portion of the Mercury Refining Property; (c) preserve the integrity of the solidified/stabilized mass; (d) prevent the excavation of soils which lay beneath the Phase 1 Building, which housed Mercury Refining's operations, and the Container Storage Building, which was used to store incoming mercury bearing material for processing, unless the excavation follows a Site Management Plan (see below); and (e) restrict the use of groundwater as a source of potable or process water until groundwater quality standards are met;

- Development and implementation of an EPA-approved Site Management Plan (SMP). The SMP will, among other things, address long-term operation and maintenance (O&M) of the Site, and future excavation of soils, including, but not limited to, soils beneath the Phase 1 and Container Buildings on the MERECO property, and soils on the Albany Pallet property, the Allied property, and the Diamond W property, which will not be remediated by this remedy, to ensure that the soils are properly tested and handled to protect the health and safety of workers and the nearby community. The approved SMP will also require an evaluation of the potential for vapor intrusion at all existing buildings on-Site and/or those to be constructed in the future, and mitigation, if necessary, in compliance with the SMP. Finally, the SMP will provide for the proper management of all Site remedy components post-construction and shall include: (a) monitoring of groundwater to ensure that, following Site remediation, the contamination has attenuated and the groundwater has been remediated; (b) monitoring and maintenance of institutional controls; (c) a provision for operation and maintenance of the clay cap; (d) periodic certifications by the owners/operators of the Site properties or other party implementing the remedy that the institutional and engineering controls are in place; and (e) a provision to manage the demolition or alteration of the existing buildings on-Site, if such demolition or alteration is proposed in the future, to protect the health and safety of the workers and the nearby community and to ensure proper disposal of any building debris;
- Removal, dewatering, and disposal of the mercury-contaminated sediments in the Unnamed Tributary exceeding the cleanup level for mercury in sediments of 1.3 ppm;
- Verification sampling to confirm the effectiveness of the remedy;
- Sampling of the fish, surface water, and sediments in the Patroon Creek, the Unnamed Tributary, and the I-90 Pond to assess impacts on the biota on an annual basis for five years. Sampling thereafter will be based on the results of the five annual sampling rounds, as reported within the first FYR. Should conditions change with regard to the I-90 Pond dam (i.e., the dam is repaired, removed, or if it should fail), the EPA will evaluate the potential impact of any significant releases and, if necessary, take or require response actions to mitigate their potential impact; and
- In accordance with CERCLA and because the remedy will result in contaminants remaining onsite above levels that will not allow for UU/UE, the remedy will be reviewed at least once every five years.

Table 1: Site Cleanup Goals

Contaminant	Media	Cleanup Goal	Source
Mercury	Soil	5.7 ppm	6 NYCRR Part 375
Mercury	Groundwater	0.7 ppb	NYSAWQS
Mercury	Sediment	1.3 ppm	NYSDEC Technical Guidance for Screening Contaminated Sediment, 1994

Status of Implementation

The remedial action was implemented in two phases. On October 1, 2013, the soil and sediment excavation and disposal portion of the remedy was initiated. Soils and sediments containing mercury at concentrations that exceeded the cleanup objectives were excavated and disposed off-site at an approved facility. Waste characterization sampling was performed prior to disposal, and soils with visible mercury or batteries and/or those soils above the toxicity characteristic leaching procedure limit of 0.2 milligrams per liter (mg/L) for mercury were disposed as hazardous waste. In total, 5,588 tons of soil and sediment

were disposed of as non-hazardous waste with another 173 tons of material disposed as RCRA hazardous waste. All excavated areas were backfilled with clean soil and returned to original grade and condition (*i.e.*, paved or reseeded). Work associated with this portion of the remedy was completed on December 30, 2013.

During June and July 2014, a pilot study initiated the work associated with the ISS portion of the remedy in order to determine the final cement and reagent mixture. The pilot test determined that a six-foot diameter auger would be used for full-scale implementation. The performance standards selected for the ISS material were an unconfined compressive strength (UCS) between 50 and 200 pounds per square inch, an average hydraulic conductivity less than or equal to 1×10^{-6} centimeters per second (cm/s) with no single value greater than 1×10^{-5} cm/s, and a reduction in mercury leachability of at least one order of magnitude from the untreated soil using synthetic precipitation leaching procedure (SPLP) testing.

Prior to full-scale implementation, the ISS area was pre-excavated to a depth ranging from seven to 10 ft bgs in order to allow space for the eventual swelling of the ISS material. This pre-excavation resulted in the off-site disposal on an additional 2,618 tons of non-hazardous soil. Additionally, a portion of the concrete pad overlying the ISS area was found to contain embedded button batteries and was disposed off-site as RCRA hazardous waste. On August 14, 2014, full-scale ISS implementation began and was completed on October 31, 2014.

A total of 235 columns were installed at the Site. Verification sampling for the ISS columns indicate that the UCS and SPLP performance standards were achieved.

IC Summary Table

Table 2: 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)
Site Use	Yes	Yes	MERECO, 26 Railroad Ave, Allied, SealMaster, and CSX Properties	Restrict site use to industrial activities.	See discussion below.
Soil	Yes	Yes	MERECO, 26 Railroad Ave, and CSX Properties	Preserve the integrity of the single-layer clay cap and pavement over the ISS area.	See discussion below.
Soil	Yes	Yes	MERECO, 26 Railroad Ave, Allied, and SealMaster Properties	Ensure proper testing and disposal of any future soil excavations.	See discussion below.
ISS Material	Yes	Yes	MERECO, 26 Railroad Ave, and Allied Properties	Prevent mechanical disturbance of the stabilized mass.	See discussion below.

Building Materials	Yes	Yes	MERECO and 26 Railroad Ave Properties	Require demolition activities of remaining on-site structures to be conducted in accordance with the SMP.	See discussion below.
Groundwater	Yes	Yes	MERECO, 26 Railroad Ave, Allied, SealMaster, and CSX Properties	Prohibit use of groundwater as a source of potable or process water until groundwater quality standards are met.	See discussion below.
Vapor Intrusion	Yes	Yes	MERECO, 26 Railroad Ave, Allied, and SealMaster Properties	Require a vapor intrusion investigation within the footprint of any proposed future construction in accordance with the SMP.	See discussion below.

ICs, as required in the ROD, are currently in place for all areas of the Site except the CSX property. A Declaration of Covenants and Restrictions and Environmental Easement (DCR&EE) for each of the Mercury Refining Property, the 26 Railroad Ave Property, the Allied Property, and the SealMaster Property have been signed and recorded in the Albany County Clerk's office on September 29, 2020, September 30, 2020, May 28, 2021, and May 28, 2021, respectively. Currently, the DCR&EE for the CSX property is being circulated for signature by the signatories. Also, a Notice to Successors-in-Title has been filed with the Albany County Clerk which describes the ICs called for in the ROD.

Systems Operations/Operation & Maintenance

Following the completion of the remedial action, regular monitoring of the Site has been conducted in accordance with the ROD and the SMP. Groundwater monitoring for mercury is currently completed every fifth quarter from a total of four monitoring wells located in three well clusters. Additionally, ecological monitoring at the Site includes surface water and sediment sampling from the Unnamed Tributary, Patroon Creek, and the I-90 Pond. The ROD required ecological sampling to take place annually for five years following the implementation of the remedy. These five rounds of ecological sampling have been completed as of the December 2019 ecological sampling event, though additional ecological sampling was conducted in January 2023 at EPA's request for the purpose of the FYR. On September 15, 2022, EPA agreed to a request from the PRP Group to omit fish tissue sampling from the January 2023 ecological sampling event. Long-term adjustments to the frequency of groundwater and ecological sampling are currently being considered by EPA.

The Site is inspected annually to confirm continued compliance with the SMP. This inspection includes verification that Site use remains the same, use of the Site buildings remains the same, and that groundwater is not being used for potable purposes. The clay cap, asphalt covering of the ISS area, and the bank of the Unnamed Tributary are inspected for cracks, erosion, or any other unsatisfactory conditions. Corrective actions, if needed, are taken in accordance with the SMP.

According to the Region 2 Guidance for Incorporating Climate Change Considerations in Five Year Reviews, three climate change tools were utilized to assess the Mercury Refining, Inc. Superfund site. A discussion of the results from each of the tools assessed are included in **Appendix C**.

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. There are no powered systems that could be affected from electricity loss during storm events. Areas where waste has been left in place are at high elevations (*i.e.*, approximately 15-20 feet or more) relative to the Unnamed Tributary and are not expected to be impacted by flooding.

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 3: Protectiveness Determinations/Statements from the 2019 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 exposure pathways have been addressed. In order for it to be protective in the long term, institutional controls need to be put in place.
Sitewide	Short-term Protective	The remedy at OU1 is protective of human health and the environment in the short term because all exposure pathways have been addressed. In order for it to be protective in the long term, institutional controls need to be put in place.

Table 4: Status of Recommendations from the 2019 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	Institutional controls are not yet in place.	Site surveys should be completed or updated, as appropriate, and environmental easements should be finalized for each of the on-site properties following EPA and State review of the draft documents.	Ongoing	Four environmental easements have been signed and filed with the Albany County clerk which cover all but one of the on-site properties. A Notice to Successors-in-Title has been filed for the remaining property, the "CSX property," until an easement is executed and recorded. The PRP Group has finalized its agreement with CSX.	N/A

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 Mercury Refining site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews.

In addition to this notification, EPA posted a public notice on the EPA site webpage (www.epa.gov/superfund/mercury-refining) and provided the notice to the Towns of Colonie and Guilderland by email on December 12, 2023 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 at the site continues to be protective of human health and the environment. Once the FYR is completed, the results will be made available at the following repositories the William K. Sanford Town Library, 629 Albany Shaker Road, Loudonville, NY 12211 and the EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York. In addition, the final report will be posted on the following website: www.epa.gov/superfund/mercury-refining. Efforts will be made to reach out to local public officials to inform them of the results.

Data Review

Groundwater

Groundwater samples are currently collected from four monitoring wells. These consist of an upgradient well, MW-15S, a side gradient well, MW-14S, and two plume wells, MW-12S and MW-12I (**Appendix B, Figure B-1**). During the review period, three groundwater sampling events have been conducted in October 2019, March 2021, and June 2023. Over the past five years, three of the four wells, MW-15S, -14S, and -12I have had no mercury detections. The fourth well, MW-12S, has had detections of mercury ranging from 0.17 ppb in a filtered sample collected in June 2023 to 2.3 ppb in an unfiltered sample collected in March 2021. None of the filtered samples collected from this well have exceeded the ROD cleanup goal of 0.7 ppb for dissolved mercury dating back to December 2017 (**Appendix B, Figure B-2**).

Statistical analysis of mercury concentrations in groundwater were performed using the EPA Groundwater Statistical Tool. The analysis focused on MW-12S because it was the only monitoring well where mercury was detected over the last five years. Mercury concentrations in MW-12S last exceeded NYSAWQS in 2017. Statistical analysis of mercury concentrations in MW-12S indicate a 95% UCL and mean below the NYSAWQS, and mercury concentrations are not expected to exceed NYSAWQS in the future. As such, cleanup levels have been achieved.

Emerging Contaminants

Emerging contaminant sampling was conducted at the site in October 2019. Five wells (MW-12S, 12I, 14S, 14D, and 15S) were sampled for 1,4-dioxane and 21 per-and polyfluoroalkyl substances (PFAS). Perfluorooctanoic acid (PFOA) was detected at a maximum concentration of 9.9 parts per trillion (ppt) in MW-14S compared to a concentration of 5.2 ppt in MW-15S (*i.e.*, the upgradient well). Both detected concentrations are below the NYSDEC Maximum Contaminant Level (MCL) of 10 ppt. Perfluorooctane sulfonate (PFOS) was detected at a maximum concentration of 14 ppt in MW-14S compared to a concentration of 11 ppt in MW-15S. Both detections of PFOS, including at the upgradient MW-15S, marginally exceed the NYSDEC MCL of 10 ppt. Concentrations of PFOA and PFOS were below the NYSDEC MCL or were not detected in samples from MW-12S, MW-12I, and MW-14D. No samples were found to contain detectable concentrations of 1,4-dioxane. PFAS in groundwater does not appear to be site-related, and no further monitoring of these contaminants is recommended.

Ecological Sampling (Surface Water, Sediment, Fish Tissue)

Sediment samples are collected from five locations (two in the Unnamed Tributary, two in the Patroon Creek, and one in the I-90 Pond (**Appendix B, Figure B-3**)). Since the last FYR, three rounds of sediment sampling have been conducted. Total mercury concentrations have ranged from 0.026 ppm at location SD-09 in the Patroon Creek in January 2023 to 1.2 ppm at location SD-06 in the Unnamed Tributary in December 2019. No observations have exceeded the ROD-specified sediment cleanup objective of 1.3 ppm over the past five years. Concentrations of methyl mercury have ranged from non-detect to 7.85 ppb at location SD-10 located in the I-90 Pond in December 2019. Currently, there is no NYSDEC or EPA criterion for methyl mercury in sediments.

Surface water samples are collected from three locations (one in each of the Unnamed Tributary, Patroon Creek, and I-90 Pond (**Appendix B, Figure B-3**)). Since the last FYR, three rounds of surface water sampling have been conducted. Total mercury was not detected in any sample collected over the past five years with the exception of the sample collected in the I-90 Pond in January 2023 which had a concentration of 100 ppt. The NYSDEC chronic water quality criterion for mercury for the protection of aquatic life is 770 ppt (dissolved). Using a more sensitive laboratory analytical method, methyl mercury concentrations since the last FYR have ranged from non-detect to 0.26 ppt in the sample collected in the I-90 Pond in January 2023. There is currently no NYSDEC criterion for methyl mercury, but the Oak Ridge National Laboratory Tier II Secondary Chronic Value for freshwater aquatic life is 2.8 ppt.

Fish tissue samples are collected from three locations (one in each of the Unnamed Tributary, Patroon Creek, and I-90 Pond (**Appendix B, Figure B-3**)). Since the last FYR, two rounds of fish tissue sampling have been conducted. Concentrations of total mercury in fish tissue have ranged from non-detect to 0.26 ppm.

Site Inspection

The inspection of the Site was conducted on June 5, 2023. In attendance were Thomas Mongelli, EPA, Stephen Lawrence of the NYSDOH, Geoff Seibel of de maximis, inc., project coordinator for the PRP group, and Brian Taylor of Brown and Caldwell, contractor for the PRP group. The purpose of the inspection was to assess the protectiveness of the remedy.

The Site was observed to be in good condition with no major issues to report. The pavement covering the ISS area was observed to be well-maintained and Site fencing was found to be in good condition with the access gate operational. Monitoring wells appeared to be in good condition with functional locks on each. The PRP group's contractor was conducting groundwater sampling during the Site inspection, and no issues were encountered. The clay cap and adjacent vegetated areas leading down the embankment to the tributary of the Patroon Creek were mowed and well-maintained with no areas of erosion noted.

V. TECHNICAL ASSESSMENT

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

The remedy is currently functioning as intended by the ROD. Mercury-contaminated sediments and shallow soils have been excavated and disposed off-site at an approved facility. Soil in areas where

mercury concentrations in groundwater exceeded MCLs has been treated via ISS, and long-term groundwater and ecological monitoring is ongoing. ICs are in place except for one property comprising part of the Site, though this does not effect the current protectiveness of the remedy as explained in further detail below.

Remedial Action Performance

The remedial actions taken at the Site continue to operate and function as designed. One shallow monitoring well located downgradient of the ISS area continues to exhibit detections for mercury though the results of filtered samples from that well have been below the ROD cleanup goal of 0.7 ppb for dissolved mercury over the past five rounds of sampling. All sediment samples taken since the completion of remedial actions have met the ROD cleanup goal of 1.3 ppm.

Implementation of Institutional Controls and Other Measures

ICs, in the form of DCR&EE, called for in the ROD include restricting the Site to industrial use, preventing use of groundwater for potable or process purposes until groundwater standards are met, and preventing disturbance of the ISS area. These controls are in place for all but one of the properties comprising the Site. The intentions of the ICs are also currently being met through adherence to the SMP and because groundwater is not currently used at the Site for any purpose. Progress continues to be made to finalizing an environmental easement for the final remaining Site property; as noted above, a Notice to Successors-in-Title has been filed with the Albany County Clerk for this property. Engineering controls, such as site fencing and paving, are being maintained due to the Site's continued use as an industrial facility.

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?

Human Health

There have been no changes in the physical conditions of the Site over the past five years that would change the protectiveness of the remedy. The HHRA concluded that future residential exposure to groundwater (via drinking water) and construction worker exposure to soil (via direct contact) would result in human health risk and hazard exceeding EPA threshold criteria due to mercury exposure. The exposure assumptions and pathways considered in the 2008 ROD followed the Risk Assessment Guidance for Superfund used by the Agency and remain valid. Although specific parameters may have changed since the time the risk assessment was completed, the process that was used remains valid. In addition, some of the toxicity values that were used in the HHRA have changed; however, the changes would not impact the remedial decision that was made for the Site.

The RAOs continue to remain valid and the selected remedy is protective of human health. The excavations performed, coupled with soil stabilization and cap implementation, effectively interrupt potential direct contact exposures to workers at the Site. Site fencing further reduces access to receptors other than site workers as well. Once established, the ICs provided in **Table 2** will continue to restrict site use to industrial activities, prevent exposure to stabilized soils beneath the cap, and ensure the proper handling and disposal of any future soil excavations in accordance with a SMP. Although groundwater beneath the Site is classified by New York State as "Class GA", indicating a potable source of drinking water, the Site and surrounding properties are connected to a municipal drinking water

supply. Establishing environmental easement/restrictive covenants, discussed in Section II, will further restrict access to site groundwater in the future, thereby interrupting all human exposure pathways of potential concern in both current and future timeframes. Ongoing groundwater monitoring has also indicated considerable reductions in mercury concentrations.

The ROD established the class GA NYSWQS, NYSDEC Part 375 SCO and NYSDEC Technical Guidance for Screening Contaminated Sediment values as the cleanup criteria for mercury in groundwater, soil and sediment, respectively. All of which remain valid.

Vapor Intrusion

At the time of the HHRA, worker exposure to mercury vapors in indoor air exceeded the EPA non-cancer threshold. However, the ROD determined that the selected remedy could not address this exposure pathway because the release of mercury vapor was occurring solely within the active workplace, and the release of hazardous substances within an active facility is not considered a release under CERCLA. Nevertheless, the O&M plan established for the Site called for two rounds of vapor monitoring within the facility. These sampling events were conducted in 2015 and 2016. The results from each event found non-detect to low levels (1.85 $\mu g/m^3$) of mercury collecting below the slab of the building, well below the sub-slab vapor intrusion screening level (VISL) of 43.8 $\mu g/m^3$. During the 2016 event, indoor air results exceeding the residential VISL of 0.31 $\mu g/m^3$ were observed but were determined to be from interior sources and not from subsurface vapor intrusion (*i.e.*, not coming from the site). Furthermore, these indoor results (ranging between 1 and 1.25 $\mu g/m^3$) were just below the applicable EPA commercial indoor air VISL of 1.31 $\mu g/m^3$. Based on these results, vapor sampling was discontinued. While vapor intrusion is not currently considered to be a pathway of concern at the Site, a vapor intrusion evaluation should be completed prior to any future construction at the Site in accordance with the SMP.

Ecological

Based upon the review of the Post-Remedial Monitoring Ecological Verification Sampling Reports, the remedy is protective of ecological receptors. This monitoring program assessed sediment and surface water chemistry in 2019, 2020, and 2023, as well as a fish tissue in 2019 and 2020 to confirm ecological protectiveness of the remedy. Total mercury concentrations in sediment have not exceeded the ROD-specified cleanup objective of 1.3 ppm. Total mercury and methyl mercury concentrations in surface water have not exceeded ecological screening values. Concentrations of mercury in fish tissue have also remained low, with concentrations below 0.26 ppm. Given that the remedy has eliminated exposure to ecological receptors through the excavation and disposal of contaminated soil and sediment in the Unnamed Tributary and since concentrations in surface water, sediment, and fish tissue remain low, the RAOs used at the time of the ROD remain protective of ecological receptors.

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

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): 1	**Issue Category:** Institutional Controls			
	Issue: Institutional controls are not yet fully in place.			
	Recommendation: A DCR&EE should be finalized for the CSX property.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	3/1/2024

VII. PROTECTIVENESS STATEMENT

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 exposure pathways have been addressed. In order for it to be protective in the long term, the remaining institutional control on the CSX property needs to be finalized.	

Sitewide Protectiveness Statement
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 exposure pathways have been addressed. In order for it to be protective in the long term, the remaining institutional control on the CSX property needs to be finalized.

VIII. NEXT REVIEW

The next FYR report for the Mercury Refining, Inc. Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

1) Record of Decision, Mercury Refining Site, EPA, September 2008
2) Superfund Preliminary Site Close-Out Report, Mercury Refining Superfund Site, EPA, April 2015
3) Remedial Action Report, Mercury Refining Superfund Site, Brown and Caldwell, August 2015
4) First Five-Year Review Report, Mercury Refining Superfund Site, EPA, February 2019
5) Periodic Review Reports, Mercury Refining Superfund Site, de maximis, inc., 2019-2023

APPENDIX B – FIGURES

Figure B-1: Site Map

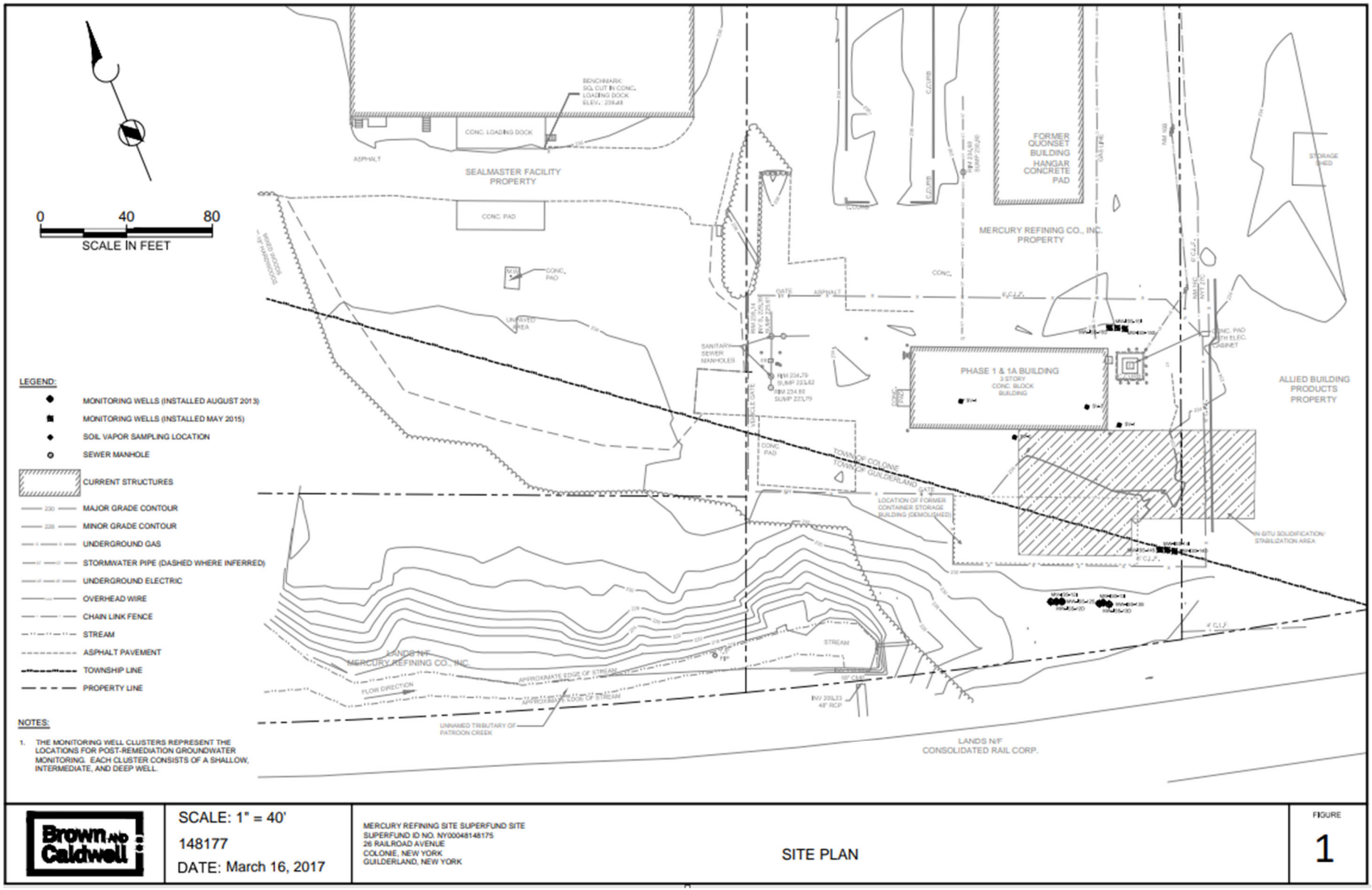


Figure B-2: Groundwater Concentration Trends – Dissolved Mercury

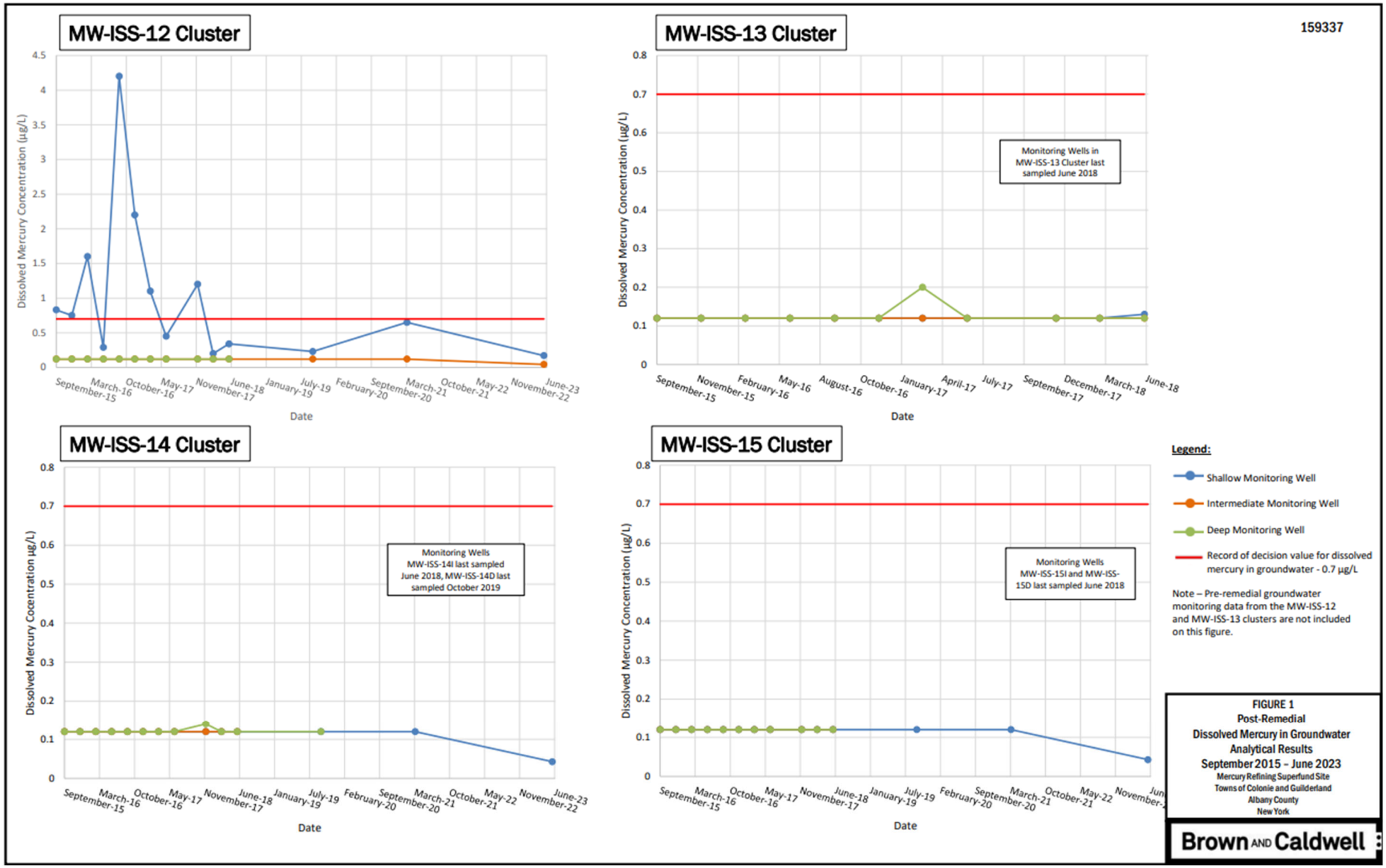
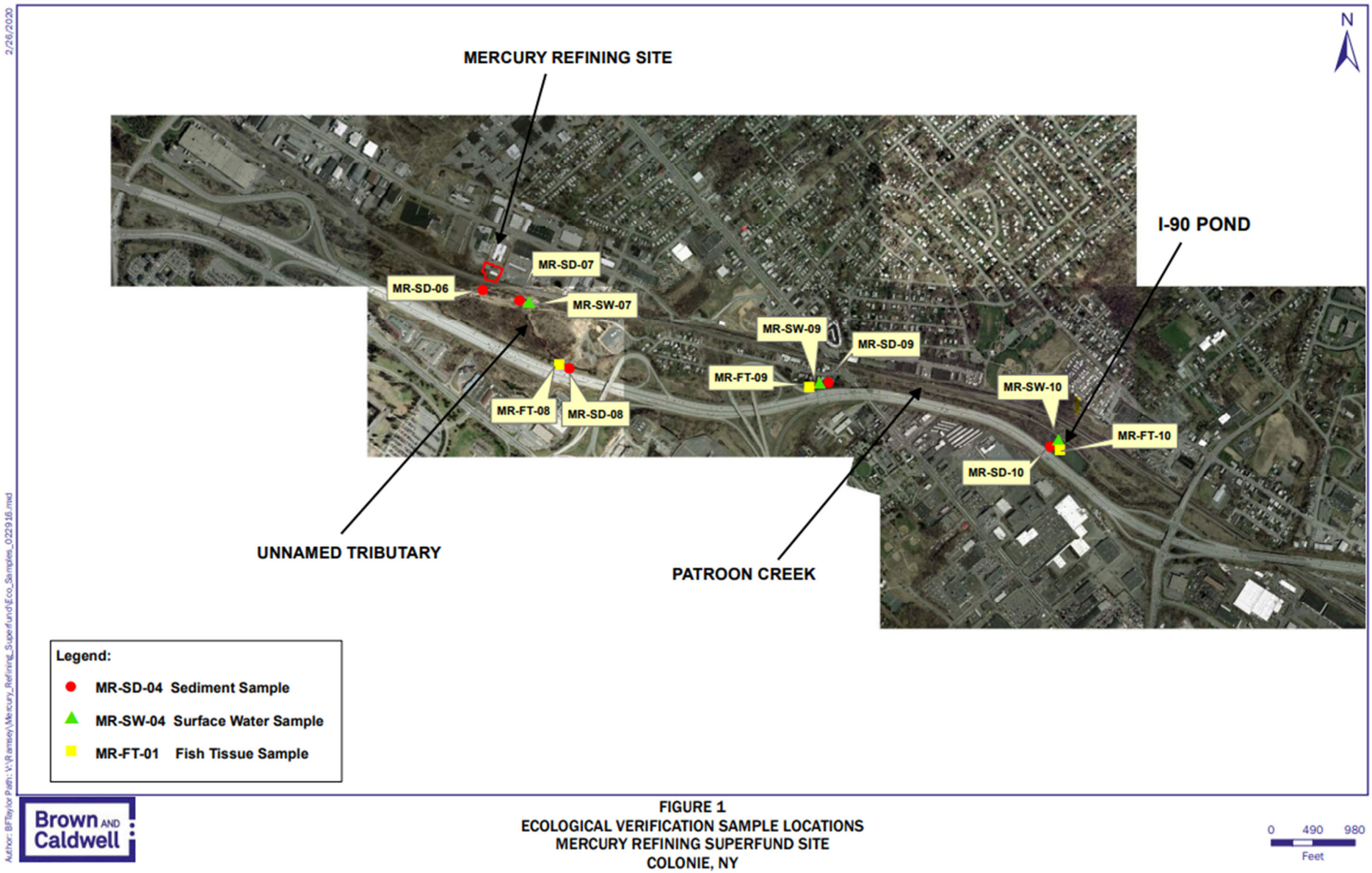


Figure B-3: Ecological Sampling Locations



APPENDIX C – CLIMATE CHANGE RESOURCES

In accordance with the Region 2 Guidance for Incorporating Climate Change Considerations in Five Year Reviews, three climate change tools were utilized to assess the Mercury Refining Superfund Site. Screenshots from each of the tools assessed are included below.

The first tool used to assess the Towns of Colonie and Guilderland was *The Climate Explorer*. As can be seen from **Figure C-1**, over the next several decades there is a projected increase between two and 14 days per year with maximum temperatures above 100°F in Albany County. However, as can be seen on **Figure C-2**, there is little change in drought conditions in the coming years. A summary of the Top Climate Concerns from the tool can be seen in **Figure C-3**.

The second tool utilized is called the *Risk Factor*. According to this assessment tool, there are 438 properties in the Town of Colonie, NY that have a greater than 26% chance of being severely affected by flooding over the next 30 years. This represents 20% of all properties in Colonie, giving the town a moderate risk overall. Since contaminated sediments in the Unnamed Tributary and soils along the bank of the tributary have been excavated and removed and remaining areas of contamination in the ISS area and beneath the clay cap are at a relatively high elevation compared to the tributary (i.e., approximately 15-20 feet or more), no flooding related impacts to the remedy are anticipated. There are also no powered systems that could be affected from electricity loss during storm events. See Figure C-4 with the approximate location of the Site outlined in red.

The final tool utilized is called *Sea Level Rise Viewer*. This tool showed no impacts to either the Site or the surrounding area with up to 10 feet of sea level rise. The nearest affected areas are located immediately adjacent to the Hudson River located approximately 4.5 miles from the Site. See Figure C-5, which depicts the current water level, and Figure C-6, which depicts the affect of a hypothetical 10 foot sea level rise.

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 C-1 – Albany County Days with Max Temperature >100°F

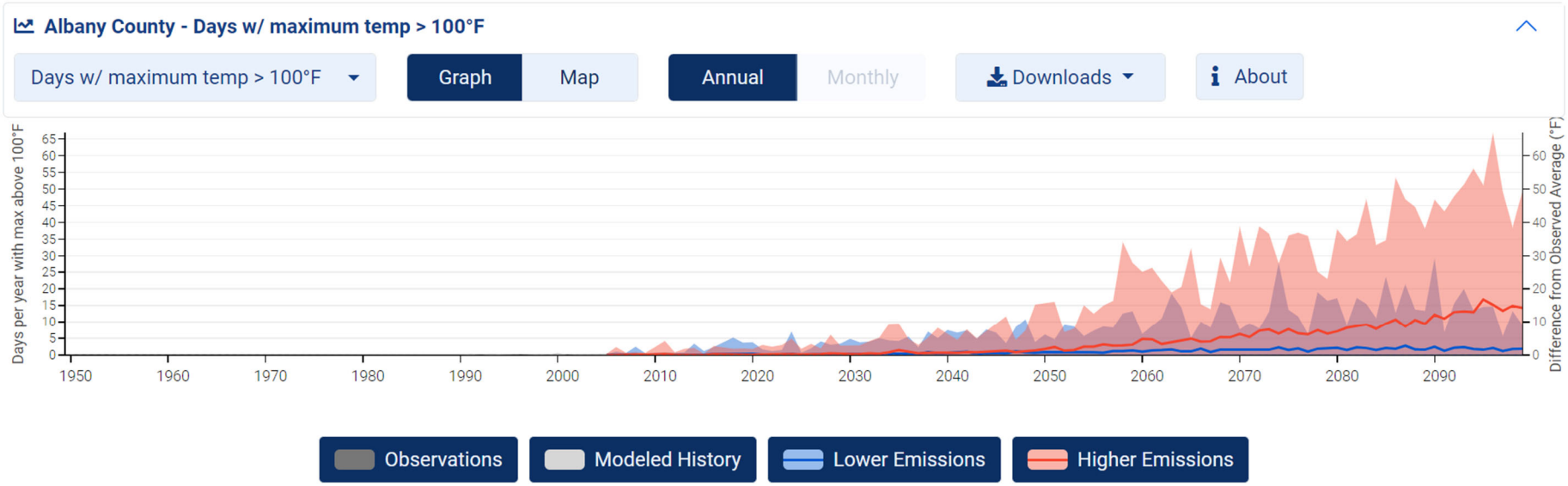


Figure C-2 – Albany County Drought Conditions

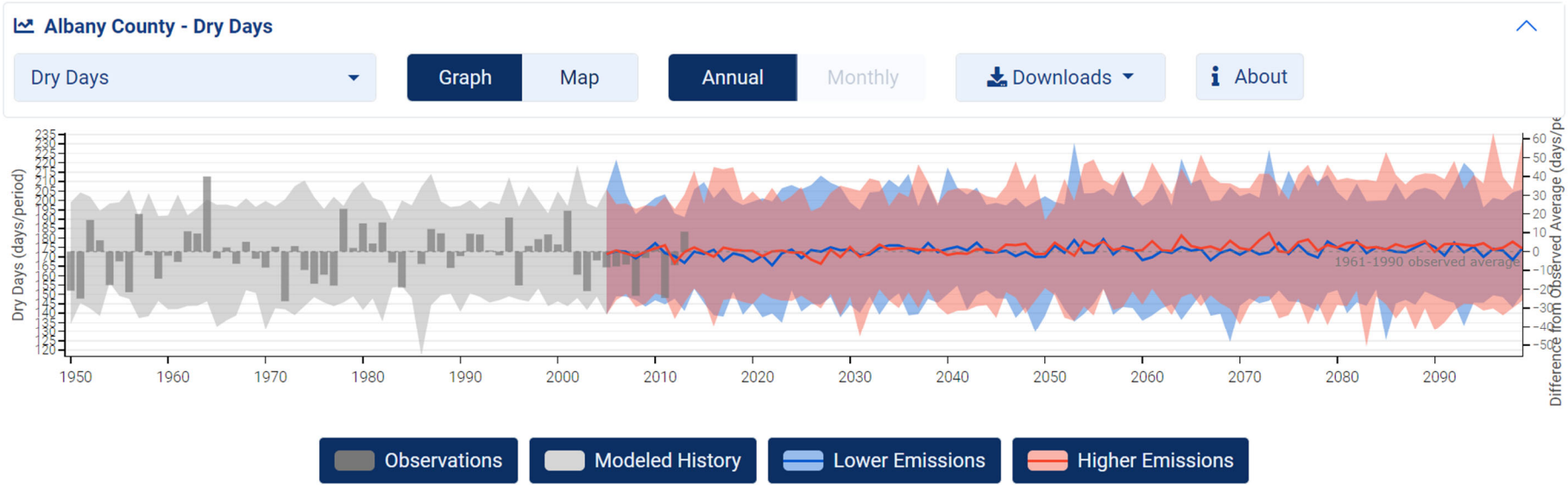


Figure C-3 – Summary of Top Climate Concerns for Albany County

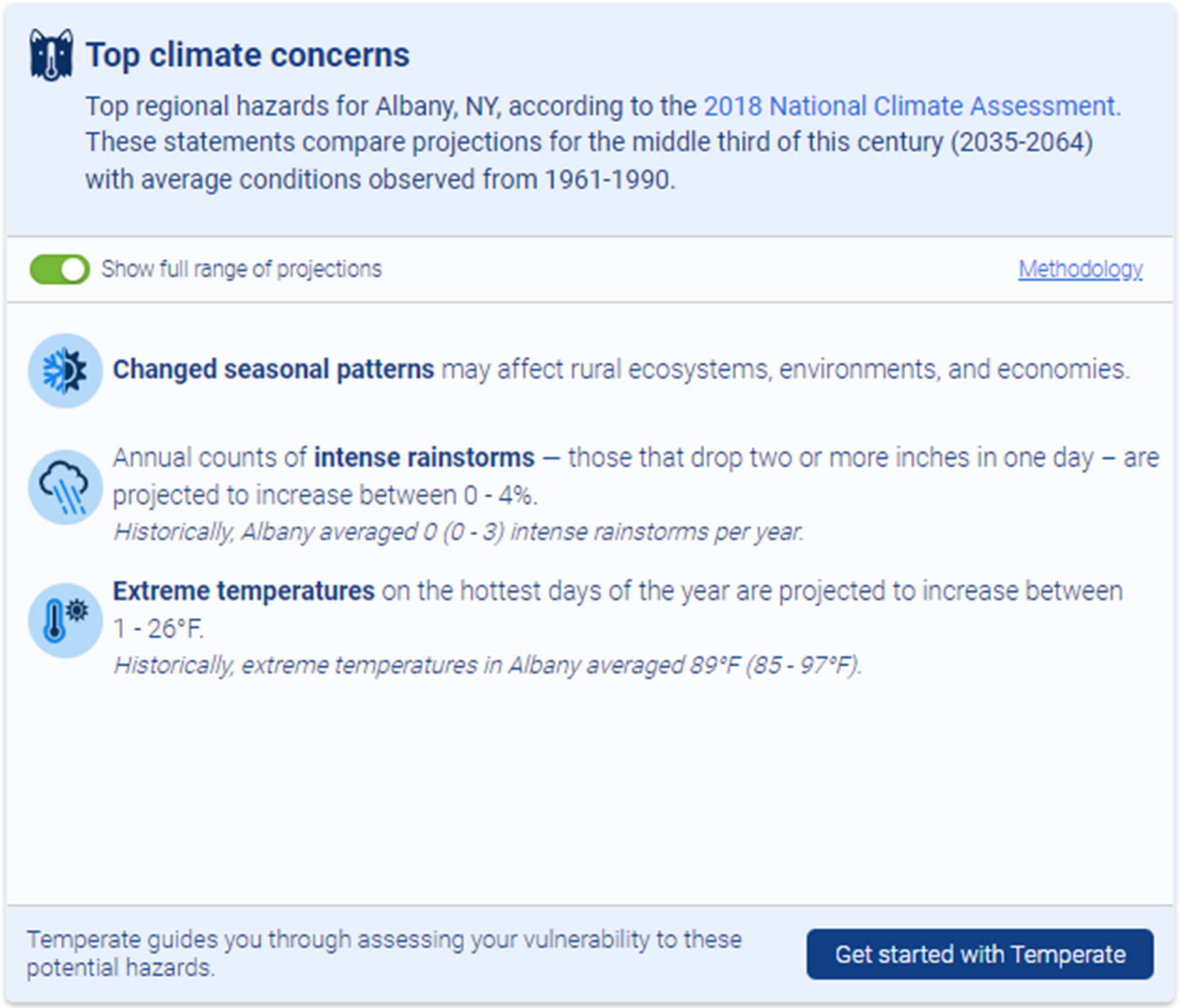


Figure C-4 – Flooding Risk Factor

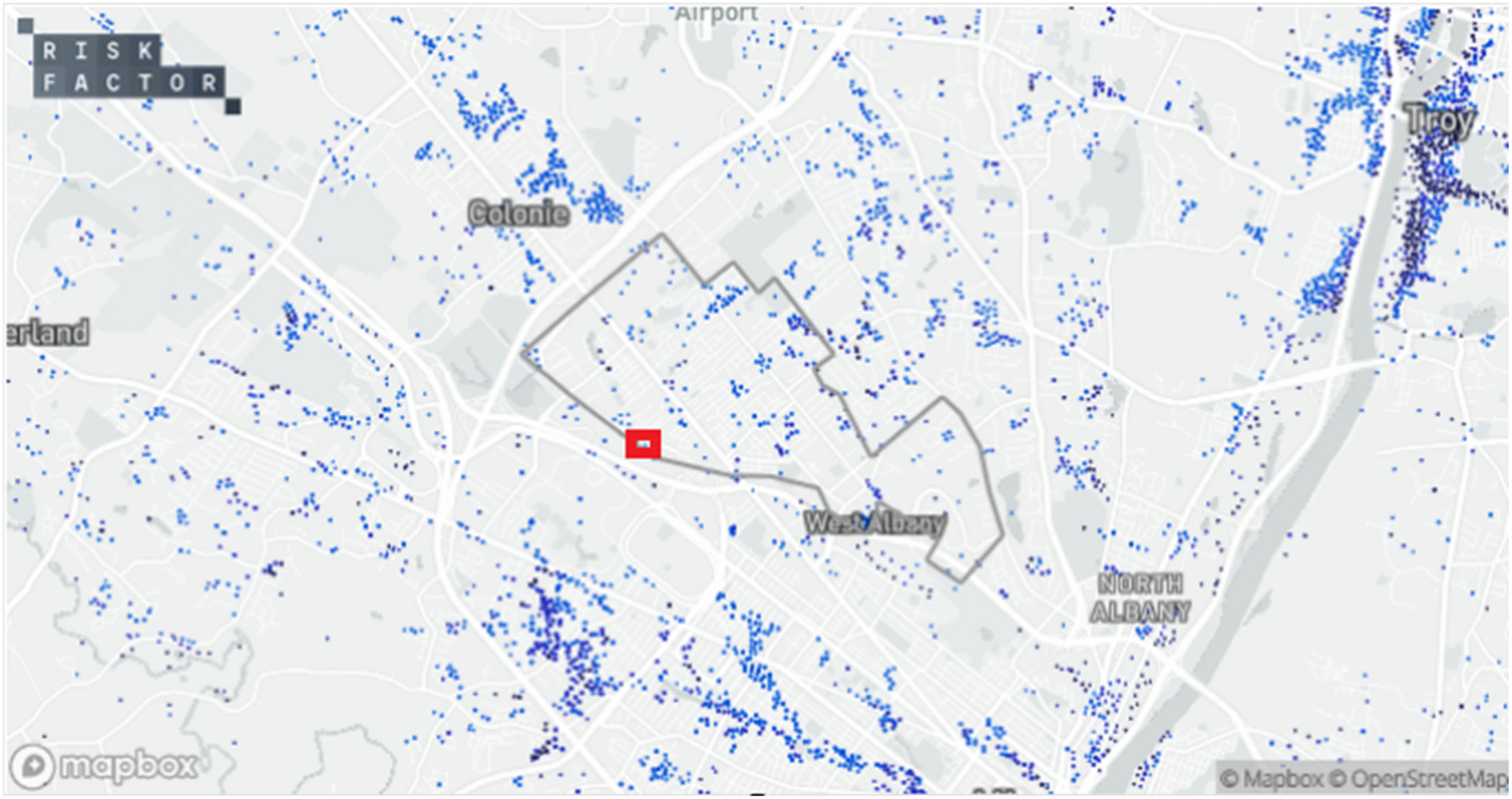


Figure C-5 – Site Area At Current Sea Level

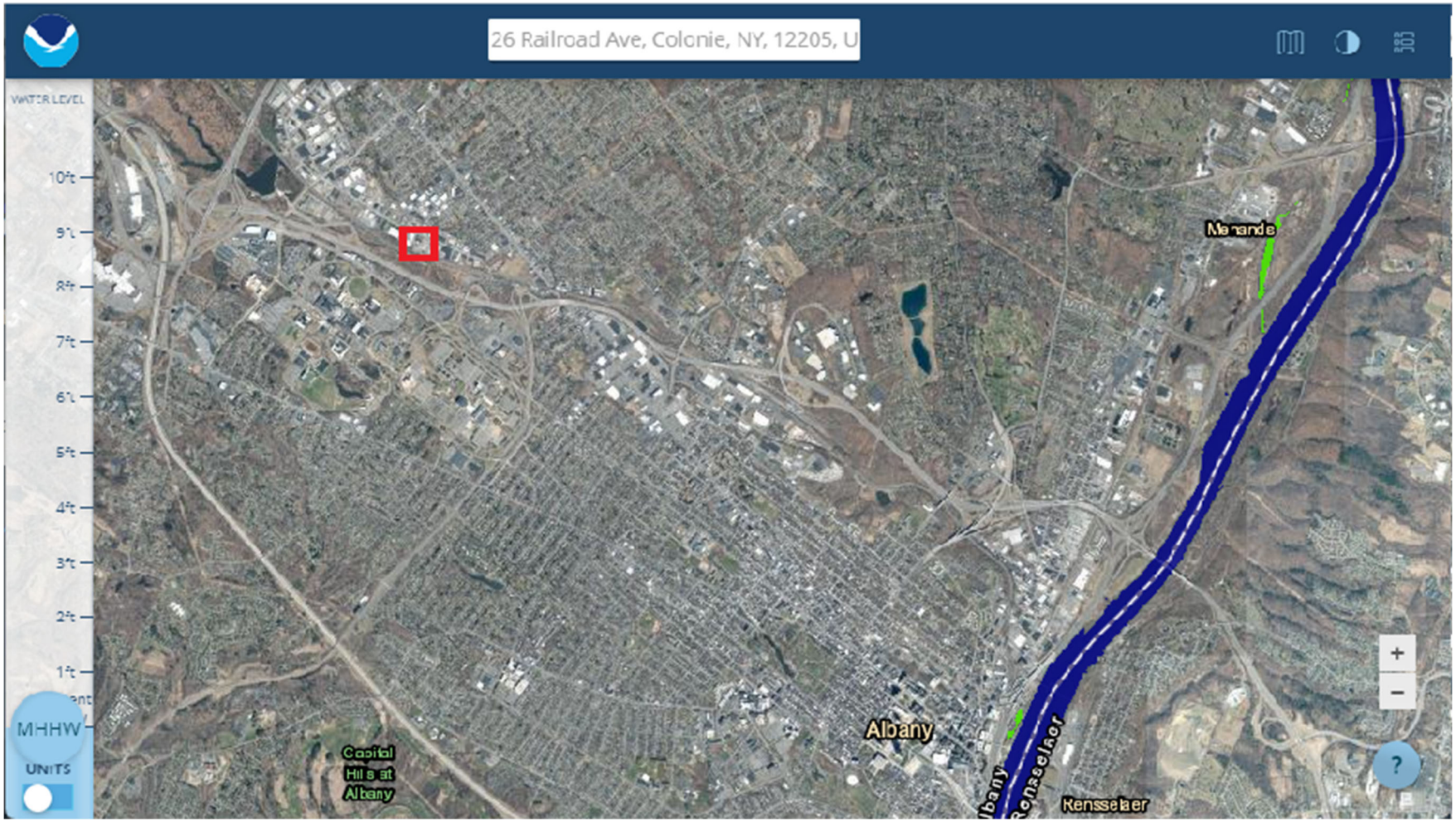


Figure C-6 – Site Area With 10 Foot Sea Level Rise