FOURTH FIVE-YEAR REVIEW REPORT FOR
MATTIACE PETROCHEMICAL CO., INC. SUPERFUND SITE
NASSAU COUNTY, NEW YORK

Prepared by

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

Approved by:

ERIC WILSON Digitally signed by ERIC WILSON
Date: 2020.05.22 15:55:56 -04'00'

Eric Wilson, Acting Director
Superfund and Emergency Management Division

Date

Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
AST	Above ground Storage Tanks
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
FFS	Focused Feasibility Study
FYR	Five-Year Review
ICs	Institutional Controls
IRIS	Integrated Risk Information System
ISTR	In-Situ Thermal Remediation
LNAPL	Light Non-aqueous Phase Liquid
MCL	Maximum Contaminant Level
mg/kg	milligrams/kilogram
µg/L	micrograms/liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PCBs	Polychlorinated biphenyls
PCE	Tetrachloroethylene
PRP	Potentially Responsible Party
RA	Remedial Actions
RAO	Remedial Action Objectives
RAR	Remedial Action Report
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation and Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SMP	Site Management Plan
SRI	Supplemental Remedial Investigation
SVOCs	Semi-volatile organic compounds
TBC	To be considered
TCE	Trichloroethylene
UST	Underground Storage Tanks
SVE	Soil vapor extraction

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 fourth FYR for the Mattiace Petrochemical Co., Inc. Superfund Site (Site). The triggering action for this policy review is the completion date of the previous FYR. The FYR has been prepared due to the fact that the remedial action (RA) will not leave hazardous substances, pollutants or contaminants on site above levels that allow for unlimited use and unrestricted exposure, but requires five or more years to complete .

The cleanup work at the Site has been organized into six operable units (OUs) to facilitate implementation, as follows:

- OU 1 -Excavation of pesticide hot spot;
- OU 2 -Excavation and off-site disposal of drums and contaminated soils;
- OU 3 -Extraction/treatment/reinjection of contaminated groundwater;
- OU 4 -*In-situ* vapor extraction of residually contaminated soil;
- OU 5 -Demolition and disposal of existing Site structures, including Aboveground Storage Tanks (ASTs) and Underground Storage Tanks (USTs); and
- OU 6 -Pumping/disposal of floating product layer of light non-aqueous phase liquid (LNAPL).

Three of these OUs, OU 3, OU 4 and OU 6 are the subject of this FYR.

The Site FYR was led by EPA: Ashley Similo (remedial project manager (RPM)), Michael Scorca (hydrogeologist), Marian Olsen (human health risk assessor), Michael Clemetson (ecological risk assessor), and Cecilia Echols (community involvement coordinator). The Potentially Responsible Party (PRP) was notified of the initiation of the FYR. The review began on December 4, 2019.

Site Background

The Site consists of the 1.9 acre former Mattiace Property, located at 16 Garvies Point Road in Glen Cove, Nassau County, New York, and a groundwater plume, that is contaminated with volatile organic compounds (VOCs) extending approximately 700 feet northwest from the former Mattiace Property. A Site location map is provided as Figure 1.

Mattiace Petrochemical Company began its operations in the mid-1960s with the storing, blending, and repackaging of organic solvents in 55-gallon drums for sale. Operations stopped in September 1987. An underground tank farm, used for the storage of organic solvents, was located in the northeast corner of the Property. In the western part of the Property, the M and M Drum Cleaning Company, owned by

Mattiace, also operated at the Site until 1982. The company cleaned, pressure tested and repainted drums in a metal Quonset hut located on the western portion of the Property. Any liquid wastes were collected in a wet well and were periodically discharged to above-ground tanks or into an on-site leaching pool.

The former Mattiace Property is zoned Marine Waterfront District. The immediate area in the vicinity of the Site includes light industry, commercial businesses, a sewage treatment plant, a County public works facility, State and Federally-designated hazardous waste sites and Brownfields properties. In addition, there is a large redevelopment project under construction in the immediate area which includes shops and residences. Other land uses in the vicinity include marinas, yacht clubs, public beaches, and the Nassau County Garvies Point Preserve (NCGP or the Preserve). There are also residences located just over 400 feet north of the former Mattiace Property.

EPA added the Site to the National Priorities List (NPL) on March 30, 1989.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Mattiace Petrochemical Co., Inc. Superfund Site		
EPA ID: NYD000512459		
Region: 2	**State:** NY	**City/County:** Glen Cove/Nassau County

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**
Author name (Federal or State Project Manager): Ashley Similo
Author affiliation: EPA
Review period: 8/17/2015 – 6/2/2020
Date of site inspection: 10/29/2019
Type of review: Policy
Review number: 4
Triggering action date: 9/22/2015
Due date *(five years after triggering action date)*: 9/22/2020

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Soils

According to the Remedial Investigation (RI) Report, the contaminants of concern (COC) are tetrachloroethylene (PCE) , trichloroethylene (TCE); xylenes, and 1,4-alpha chlordane.

Groundwater

The groundwater contamination includes localized layers of non-aqueous phase liquids under the Site. Contaminants of concern identified in the groundwater during the 1989 RI included PCE, TCE, chloroform, ethylbenzene, xylenes, methylene chloride, isophorone, and 1,2-dichlorobenzene. Concentrations observed were several orders of magnitude above federal and state drinking water standards.

None of the area's potable water supply wells are in locations that would cause them to be affected or threatened by the groundwater contamination from the Site.

EPA determined that the actual or threatened releases of hazardous substances from the Site could present a current or potential threat to human health and the environment through inhalation of particulates and/or vapors from contaminated soils, dermal absorption of contaminated soils, and ingestion, inhalation or dermal absorption of contaminated groundwater (future residential land use scenario).

A full list of groundwater COCs are shown in Appendix C.

Glen Cove Creek

A Glen Cove Creek sediment and surface water monitoring program indicated that there were elevated levels of metals which exceed ecological screening values. Given the industrial nature of this area, there are many potential sources of contamination in the Creek in addition to Mattiace. Although the surface water and sediment data were evaluated, the SLERA concluded that there were no complete ecological pathways at the Site and, therefore, the Site does not pose a risk to ecological receptors. It is likely that contaminated groundwater from the Mattiace site is responsible for a portion of the contamination that had been detected in Glen Cove Creek sediments. However, it is very difficult to delineate and quantify the constituents which could be directly related to the Site given the documented releases of organic and inorganic chemicals from other facilities in the area, many of which are the same as those substances potentially released from the Mattiace facility. Radiological contamination in the Creek sediments was attributed to releases from the Li Tungsten NPL site; excavation of radiologically contaminated sediments was performed as part of the Li Tungsten remedy. The Creek is also periodically dredged for navigational purposes.

Response Actions

In February 1988, EPA conducted a removal action to remove approximately 100,000 gallons of

hazardous materials in drums and in ASTs and USTs. In 1990, EPA conducted a second removal action to remove a collapsed retaining wall along the western Property boundary, with subsequent regrading and replacement with a lower retaining wall.

In October 1989, EPA initiated a sitewide RI and feasibility study (FS). In December 1989, EPA conducted a focused feasibility study (FFS) to evaluate remedial alternatives for removing a cache of drums buried along the western perimeter of the Property.

In September 1990, EPA issued the OU 2 ROD for buried drums, requiring excavation and off-site disposal of the drums.

The 1990 OU2 ROD established the following remedial action objectives (RAOs):

- eliminate the threat of fire or explosion associated with the buried hazardous drums and containers; and
- ensure protection of public health and the environment by eliminating a concentrated and toxic source of groundwater contamination

EPA identified the following remedies for OU 2:

- excavation, bulking/overpacking, and offsite disposal of buried drums

In June 1991, EPA issued the OU 1 ROD, selecting a comprehensive remedy for the remaining contamination issues at the Site. The OU 1 remedy components were subsequently organized into 5 OUs (described above) to facilitate the implementation of the work.

EPA established the following remedial action objectives (RAOs) for the comprehensive Site remedy:

- reduce the on-site potential health effects associated with contaminated soils and residual leakage from underground tanks to acceptable levels;
- minimize the off-site migration of contaminated groundwater and surface runoff to potential environmental receptors; and
- restore the groundwater currently being degraded as a result of the Site to its most beneficial use.

EPA identified the following remedies for the Site in the RODs:

- *in-situ* soil vapor extraction (SVE) of volatile organic chemicals from soil in the general Site area;
- excavation of pesticide hot spots with off-site treatment and disposal;
- demolition, removal, and landfill disposal of Site structures, ASTs and USTs, and concrete and asphalt debris;
- groundwater extraction and treatment via air stripping and carbon adsorption, followed by reinjection;
- monitoring of groundwater in the area of the Site, as well as surface water and sediments in Glen Cove Creek; and
- excavation and off-site disposal of buried drums and containers that were found on the Mattiace Property during the OU 2 investigation (September 1990 ROD).

In Sepetmber 2014, EPA issued an amendment to the OU 1 ROD which identified the following RAOs for the selected remedy:

- Reduce to acceptable levels the risk to human health associated with potential ingestion, dermal contact with, and inhalation of VOCs in groundwater;
- Prevent LNAPL from acting as a continuing source of groundwater and soil gas contamination; and
- Restore the impacted aquifer to its most beneficial use as a source of drinking water by reducing contaminant levels to the Federal and State Maximum Contaminant Levels (MCLs) on the former Mattiace Property and north of the groundwater divide.

The selected remedy in the September 2014 ROD Amendment included:

- Discontinuance of the operation of the existing groundwater pump and treat system;
- Bioventing the residual source of contamination to groundwater, which consists of both free-phase LNAPL and LNAPL in the smear zone on the former Mattiace Property and extending west northwest onto the Nassau County Garvies Point Preserve property (Preserve). This remedy component will require the installation of new horizontal bioventing wells that would be connected to the existing vapor treatment system;
- *In-situ* thermal treatment of contaminated soil and nearby groundwater in "hot spot" areas of known elevated soil and groundwater contamination on the former Mattiace Property;
- Enhanced reductive bioremediation, utilizing vertical injection wells, in areas of the former Mattiace Property where thermal treatment does not address contamination and in the Preserve areas where elevated concentrations of VOCs have been detected in groundwater;
- Installation of a partial vertical containment barrier (e.g. slurry wall and/or sheet pile wall) along the former Mattiace Property line, with the exception of the area north and west, where the depth to the underlying clay layer deepens and where nonaqueous-phase liquid is present;
- Hydraulic control, via phytoremediation, to address the potential increase in water levels on the southern portion of the former Mattiace Property behind the partial vertical barrier;
- Performance monitoring of groundwater to evaluate the effects of active remedial components on natural attenuation processes, to determine if contaminant migration is controlled, to monitor changes in the VOC contaminants over time, and to ensure the RAOs are achieved;
- Implementation of institutional controls (ICs) that will include the establishment of an environmental easement/restrictive covenants to be filed in the property records of Nassau County until such time that RAOs are attained. The ICs will: prevent inappropriate withdrawals of groundwater; require evaluation of the need for vapor barriers and vapor intrusion systems for any future buildings that may be constructed on the former Mattiace Property; and prevent activities or uses of the Property that might interfere with any of the treatment systems (including the barrier wall) that are in place at the Site;
- Development of an Site Management Plan (SMP) to ensure the effectiveness of the engineering and ICs, as well as the long-term peormance and groundwater monitoring, periodic reviews and certifications; and
- Development of a restoration plan for the Preserve.

A table of groundwater cleanup criteria can be found in Appendix C.

There are sufficient ICs and health and safety protections presently in place, *e.g.,* fencing, posting of signs, security, etc., to minimize potential exposures on the former Mattiace Property while RAs are

occurring. The conceptual site plan for the remedial components is shown in Figure 2.

Status of Implementation

OU 1 - Pesticides Hot Spots

RA activities for OU 1 included the excavation and disposal of three relatively small areas contaminated with pesticides were completed by March 1995.

OU 2 - Buried Drum Removal

RA activities for OU 2 included the excavation and disposal of approximately 400 drum carcasses and adjacent contaminated soils on the western perimeter of the Site, between the former Quonset hut and the perimeter retaining wall and were completed in 1991.

OU 3 and 4 - Integrated Soil/Groundwater Collection and Treatment Facility

In August 1998, EPA and its contractors completed Construction of the OU 3 and OU 4 integrated groundwater treatment facility. On September 1, 1999, after approximately a year of shakedown, the long-term response action (LTRA) began at the treatment facility. While in operation, the facility's effluent discharged to Nassau County's publicly owned treatment works. Monthly progress reports included sampling results for both treated air and treated groundwater. Biannual monitoring and reporting for soil vapor in the vadose zone, and annual groundwater and Creek monitoring were also performed.

In July 2003, as a result of a Consent Decree (CD) between EPA and numerous potentially responsible parties (PRPs), the operation of the facility was taken over by TRC Environmental (TRC) acting on behalf of the PRPs. Since then, TRC implemented several major process and operational modifications, including the introduction of carbon adsorption for organic vapor treatment and pulse pumping the SVE system to optimize results.

Contaminated groundwater and associated subsurface soil vapor continues to require remediation. The OU 3 and 4 treatment facility was fully operational from September 1999 until 2011, when the systems were shut off to conduct the secondary RI. To date, the system has removed an estimated 10,000 pounds of VOCs from groundwater and soil since startup. As a result of some inefficiencies with the groundwater treatment facility, in January 2010, TRC submitted a draft FFS to evaluate the feasibility of replacing the existing remedy with a combination of phytoremediation with perimeter air sparging, which is intended to control the migration of and treat contaminants while the trees initially grow. After reviewing the FFS, EPA determined that a supplemental RI/FS was necessary in order to evaluate current site conditions and alternative technologies for remediation. Between September 2011 and May 2013, TRC completed the supplemental RI and FS. In September 2014, as a result of the supplemental RI/FS, EPA issued a ROD Amendment which modified the selected remedy as described above.

TRC implemented the amended remedy while negotiations of the modified CD were ongoing. A CD Amendment was executed in June 2018. In September 2016, TRC began implementation of the selected remedy.

Partial Vertical Containment Barrier

Between July 17 and November 2, 2017, the partial vertical containment barrier was constructed, together with excavation and off-Site disposal/recycling of various debris; excavation and stockpiling of contaminated soil, an underground storage tank (UST), and buried drums; sealant application; driving, cutting, and surveying interlocked sheet-piles; utility bedding and reconnection; restoration activities; and noise, vibration, and settlement monitoring.

Thermal Remediation

Between March 12 and November 5, 2018, the In-Situ Thermal Remediation (ISTR) system was constructed, including the installation of the various subsurface components (electrodes, vapor recovery wells and performance monitoring wells), off-site disposal/recycling of construction waste and debris and off-site disposal of approximately 28.35 tons of hazardous waste. The ISTR system was operational from November 2018 to June 2019. Results indicated a probable hot spot located in the horizontal area of Treatment Zones 3 and 4 that was located outside of the treatment zone. In order to address the contamination, a limited soil excavation was conducted in the area between January 13 and 24, 2020. During backfilling, a total of 15 gallons of Regenesis HRC® were mixed and applied from 35 feet bgs to 20 feet bgs to enhance ongoing biological reductive dechlorination of chlorinated VOCs.

Bioventing

A draft Bioventing Design Basis Report is under review by EPA. Construction of the bioventing remedy is anticipated to begin later in 2020.

<u>OU 5 -Site Demolition/Decommissioning</u>

RA activities for OU 5 included the demolition of all existing Site structures, including ASTs and USTs, piping, and sumps, as well as above-ground structures such as the Quonset hut and loading dock.

<u>OU 6 -Floating Product Removal</u>

An interim RA activitiy for OU 6 included the removal of LNAPL with skimmer pump located in the northeast corner of the Property and, in the Fall 1997, was discontinued upon commencement of construction activities for OUs 3 and 4. In June 2009, hand-bailing of LNAPL began and was found to be much more effective in removing LNAPL than the OU 6 skimmer pump. However, hand-bailing of LNAPL was discontinued after the ROD Amendment was finalized included an alternative remedy to treat LNAPL through bioventing.

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	Yes	Former Mattiace Property and groundwater plume area	Prevent inappropriate withdrawals of groundwater	Nassau County Public Health Ordinance Article 4, New York Environmental Conservation Law Section 15-527, and New York Sanitary Code (Title 10 of the New York Code of Rules and Regulations Section 5-2.4)
Soil Vapor	Yes	Yes	Former Mattiace Property	Evaluate the need for vapor barriers and vapor intrusion systems for any future buildings constructed	Environmental Easement/Restrictive Covenants (planned)
Remedial Components	Yes	Yes	Former Mattiace Property, barrier wall and well locations	Prevent activities or uses of the Property that might interfere with any of the treatment systems	Environmental Easement/Restrictive Covenants, Site Management Plan (planned)

Systems Operations/Operation & Maintenance

The groundwater treatment system has remained inactive since 2014. However, groundwater monitoring continues during the design and implementation of the amended remedy. If data indicates an significant migration of the contaminants in the plume, EPA may direct the resumption of the operations during the design and construction of the new remedial components. Subqequently, an updated O&M plan will be developed.

O&M activities associated with the containment barrier include inspection of the fencing and containment barrier and monitoring of groundwater elevations in piezometer pairs.

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

III. PROGRESS SINCE THE LAST REVIEW

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 2015 FYR

OU #	Protectiveness Determination	Protectiveness Statement
3	Short-term Protective	The remedy for OU 3 (groundwater contamination) currently protects human health and the environment in the short-term because local and State laws exist to restrict contaminated groundwater withdrawals from the underlying aquifer for potable water purposes. However, in order for the remedy to be protective in the long-term, the amended remedy for groundwater treatment must be implemented.
4	Short-term Protective	The remedy for OU 4 (soil/soil vapor contamination) currently protects human health and the environment in the short-term because surface soils are not contaminated and soil vapors have not been found inside residences. In order for the remedy to be protective in the long-term, the amended remedy for soil vapor must be implemented.
6	Short-term Protective	The remedy for OU 6 (LNAPL contamination) currently protects human health and the environment in the short-term because there is no human health exposure. Exposure is under control through the depth of contamination and local and State laws that exist to restrict installation of new wells and contaminated groundwater withdrawals from the underlying aquifer for potable water purposes. However, in order for the remedy to be protective in the long-term, the amended remedy for LNAPL treatment must be implemented.
Sitewide	Short-term Protective	The remedy currently protects health and the environment in the short-term because exposure pathways that could result in unacceptable risks are interrupted and no exposures to Site contaminants are expected as long as the engineering, access, and ICs discussed in this report continue to be properly operated, monitored and maintained. However, in order for it to be protective in the long-term, the amended remedy to address remaining groundwater and soil vapor contamination at the Site must be implemented.

Table 3: Status of Recommendations from the 2015 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
3, 4 and 6	The remedy selected in the 1991 ROD has been determined to no longer be functioning as intended, and an amended remedy was selected in a 2014 ROD Amendment.	The amended remedy should be implemented in a timely fashion to ensure long-term protectiveness.	Ongoing	See below	9/30/2025
3 and 4	The 2014 ROD Amendment is limited to the area of contamination found on the former Mattiace Property and property to north and west. Previous investigations found contamination in the soil and groundwater south of the former Mattiace Property boundary.	Remedial investigation to the south of the former Mattiace Property should be conducted. The investigations should include the adjacent properties at 1 Garvies Point Road and 20/30 Garvies Point Road.	Under Discussion	See below	9/30/2023

Recommendation 1

The remedy selected in the 2014 ROD Amendment contains multiple remedial components. Prior to the Supplemental RI (SRI), the groundwater pump and treat system had been discontinued. Since the last FYR, the partial vertical barrier has been constructed and the ISTR remedial component of the remedy has been implemented. Refer above to the *Status of Implementation* section of this document for a more detailed status of this recommendation.

Recommendation 2

The property at One Garvies Point Road has been approved to be addressed through the New York State Brownfields Program. One Garvies Point submitted a RI work plan to New York State for their review on October 3, 2017. The RI workplan is currently still under review by the State.

Annual vapor intrusion sampling has been conducted by the property owner at 20/30 Garvies Point Road since 2017. The indoor air sampling results presented in the Respondents Summary Reports suggest that vapor intrusion into the building is not presently occurring at a level that would present a long-term, chronic health threat to building occupants. However, the sub-slab vapors beneath the commercial building at the Property continue to exceed threshold concentrations for PCE, TCE, cis-l,2-dichloroethylene (cis-1,2-DCE) and vinyl chloride (VC), four types of VOCs, and indicate a potential for human health impact. Because sub-slab sampling results continue to be significantly elevated above screening levels, the potential for sub-slab contaminants to impact indoor air conditions remains an ongoing concern. Based on these results, it is EPA's determination that the installation of a vapor mitigation system or the performance of continued monitoring at this property is warranted. The property owner has agreed to continue monitoring at this time.

In late 2017, the EPA provided 20/30 Garvies Point Road with a proposed Scope of Work (SOW) that included soil and groundwater sampling at the property. A revised SOW, with a large reduction in sampling locations, was provided to 20/30 Garvies Point Road in early 2018. 20/30 Garvies Point Road believes it would be more efficient and effective to perform the Brownfield remediation at 1 Garvies Point before beginning an investigation at 20/30 Garvies Point Road. EPA is currently discussing this approach while reserving its enforcement alternatives with respect to the required investigatory work at 20/30 Garvies Point Road.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 1, 2019, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at Superfund sites in New York, New Jersey, Puerto Rico and the U.S. Virgin Islands, including the Mattiace Petrochemical Co., Inc. site. The announcement can be found at the following web address: https://www.epa.gov/aboutepa/fiscal-year-2020-five-year-reviews. In addition to this notification, a public notice was made available by a posting to the township website, http://www.glencove-li.us/mattiace-petrochemical-co-inc-superfund-site/, in April stating that there was a FYR and inviting the public to submit any comments to the U.S. EPA. The results of the review and the report will be made available at the Site information repository located at the U.S. EPA Records Center, 290 Broadway, 18th floor, New York, New York and at www.epa.gov/region2/superfund/npl/mattiace.

No interviews were conducted during the FYR process.

Data Review

ISTR RD established three performance standards (MH-GW-A, MH-GW-B, and MH-V) to determine when heating in each Treatment Zone was complete. Details regarding each performance standard are included in the ISTR RD Report. Treatment zones 1A and 1 B achieved performance standard MH-V (asymptotic removal rates) and routine operating stage ended April 22, 2019. Treatment Zones 2 and 5 also achieved performance standard MH-V and were subsequently de-energized on May 13 and 28, 2019, respectively. Treatment Zones 3 and 4 did not achieve a performance standard, but were de-energized on April 30, 2019 (see below for additional information regarding these treatment areas). Subsequent to completion of the Routine Operating Stage in each Treatment Zone the electrode array was de-energized and remaining components of the ISTR system were operated for 30 days. Vapor

recovery and treatment systems were operated for an additional 10 days in Treatment Zones 3 and 4. ISTR operations were completed on June 26, 2019.

During ISTR operations, it became apparent that performance standards would not be achieved in Treatment Zones 3 and 4. Evidence provided that it was likely the source(s) of continuing elevated concentrations of target VOCs in recovered soil vapor were present beyond the limits of the ISTR System. To address the probable source, TRC completed a limited soil excavation between January 13 and 24, 2020. The excavation was advanced to a depth of 35 feet bgs. Removed soil was screened with a PID equipped with an 11.7 eV bulb. Soil exhibiting PID measurements less than 50 parts per million were stockpiled for reuse during backfilling. Soil exhibiting PID measurements greater than 50 parts per million were stockpiled on-Property and sampled for waste characterization purposes. TRC collected three post-excavation samples, which were submitted for laboratory analysis of TCL VOCs. Results of analysis indicated VOCs were not detected above New York State Department of Environmental Conservation (NYSDEC) Part 375 Residential Soil Cleanup Objectives. The excavation was then backfilled. During backfilling, a total of 15 gallons of Regenesis HRC® were mixed and applied from 35 feet bgs to 20 feet bgs to enhance ongoing biological reductive dechlorination of chlorinated VOCs. Additionally, the installation of the vertical containment barrier should prevent future migration of any residual contamination remaining post exvacation. Further investigation and evaluation of groundwater contamination and its potential sources south of the former Mattiace Property are necessary. 1 Garvies Point Road is being addressed under the state Brownfields program, and EPA is currently in discussions with the property owner at 20/30 Garvies Point Road.

During this FYR period, several on-property wells were abandoned and replaced as a result of the construction of the vertical containment barrier and the ISTR. Additional wells were installed at new locations within the former Mattiace Property as part of the ISTR. During 2016, 2018, and 2019, three rounds of groundwater samples were collected from selected monitoring wells. PCE, TCE, *cis*-1,2-DCE, and VC, BTEX compounds and other VOCs (1,1,1- trichloroethane, 1,2-dichlorobenzene, chloroform, and 2-butanone) were detected. Total targeted VOCs were as high as 3,063 ug/L at MW-11A in 2019, 3,082 ug/L at MW-07 in 2019, 4,568 at MW-12 in 2020, and 9,700 at STMP-12 in Feb. 2020. Because the effects of thermal operations are ongoing, these concentrations are representative of site conditions immediately upon completion of thermal operations. However, since the effects of the thermal remediation continue as the groundwater cools, they may not be representive of current site conditions. Additonal rounds of post-ISTR sampling are expected to occur in 2020.

The LNAPL sampling data showed benzene, toluene, ethylbenzene, and total xylenes (BTEX) but it also contains several chlorinated VOCs, *cis*-1,2-DCE, TCE, and VC. During the 2019 groundwater sampling event, concentrations of some COCs at well MW-07 remain elevated, particularly vinyl chloride at 1,000 ug/L and cis-1,2-DCE at 1,900 ug/L.

Concentrations of COCs at well MW-07S remain fairly stable at highly elevated levels and are likely affected by residual phase LNAPL levels. Concentrations in 2019 include toluene 39,000 ug/L and cis-1,2-DCE 86,000 ug/L. Downgradient, further to the west, well TRC-MW-34 has shown generally rising concentrations of several COCs.; in 2019, concentrations showed TCE at 1,200 ug/L, cis-1,2-DCE at 430 ug/L and PCE at 190 ug/L. However, it should be noted that these concentrations have decreased since spikes in 2016. Concentrations of VOCs at the further downgradient well TRC-MW-26D are generally decreasing.

In 2019, the farthest downgradient wells TRC-MW-41 and TRC-MW-42 showed low level exceedances of groundwater standards for some VOCs. For TRC-MW-41, data showed toluene at 19 ug/L, TCE at 5.7 ug/L, and cis-1,2-DCE at 13 ug/. For TRC-MW-42, data showed toluene at 12 ug/L and cis-1,2-DCE at 10 ug/L. These results show a slight impact of the groundwater plume. The bioventing remedy is expected to address this area of contamination.

Results from the sampled wells indicate that elevated concentrations are still present in groundwater on and off the Property. The ranges and trends of COC concentrations have been fairly variable over time. Additional active remedial treatments including bioventing and potential enhanced biological remediation are still to occur at the Site to address remaining contamination. Monitoring of the groundwater well network will continued during and after the implementation of the RAs.

Site Inspection

A FYR Site visit and inspection was conducted on Tuesday, October 29, 2019. The inspection team included: Damian Duda, Section Chief, Lorenzo Thantu, RPM and Michael Scorca, hydrogeologist from EPA. The FYR site inspection at the Li Tungsten site was also being conducted at the same time so some of that team were also present. The purpose of the inspection was to assess the protectiveness of the remedy.

During the inspection, Mr. Duda presented an overview of some of the remedial activities that had been conducted at the Site. The team walked around the Site property and observed the former groundwater extraction and treatment building, as well as the area where the thermal treatment operations were conducted. Also noted was the area where the future bioventing remedial activities will take place. Overall, no issues were identified during the inspection, nor were any corrective actions deemed necessary.

V. TECHNICAL ASSESSMENT

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

Although the original remedy selected in the 1991 ROD made some progress towards meeting its objectives, it was determined not to be functioning as intended by the decision documents. Data suggested the time needed to achieve cleanup goals was greater than that which had been identified in the 1991 ROD.

In 2013-2014, TRC completed a SRI in order to delineate the groundwater and LNAPL plumes and characterize the existing Site conditions. An FS was performed and a ROD Amendment was signed in September 2014.

The amended remedy is in the process of being implemented. The partial vertical containment barrier was complete in 2018, which prevents the potential for contamination migration. The in-situ thermal remediation was constructed and operational in 2019. The ongoing effects of thermal remediation will continue to be evaluated as groundwater temperatures decrease and natural biological activity is expected to increase. The ROD Amendment does include the option for enhanced biological treatment, if needed. This technology is under consideration for areas of elevated groundwater concentrations that remain on the former Mattiace Property post-ISTR. Furthermore, design and construction of the

bioventing treatment system to address the downgradient groundwater and LNAPL plume is expected to be completed in 2020. It is anticipated that the 2014 amended remedy will function, as intended.

Currently, the Upper Glacial Aquifer (UGA) is not used as a drinking water source in this area and direct contact with on-site groundwater is not a completed pathway, since all nearby residents are connected to City's public water supply. In addition, County Ordinance Article 4 prohibits the installation of new private potable water systems in areas served by a public water supply precluding any future potable water well installations in this portion of the aquifer. The former Mattiace Property is currently zoned for Marine Waterfront District use, and residential development at the Site is not currently anticipated as remediation will continue for many years. The Property is not an active component of the City's revitalization plan for the Glen Cove Creek area. ICs are in place to protect the components of the remedy and to ensure that vapor intrusion is considered in any future development.

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 risk assessments for OU 2 and the 2013 Supplemental RI were based on residential exposure assumptions. Although the Property is currently zoned Marine Waterfront District, the surrounding area is zoned to allow for residential use. The SRI was based on current residential exposure assumptions including updates to the toxicity values used in the previous HHRAs in 1990 and 1991.

Soils. The RAs at the Site to address RAOs for OUs 1, 2 and 5 have been completed including excavation of pesticide hot spot (OU 1); excavation and off-site disposal of drums and contaminated soils (OU 2); and demolition and disposal of existing site structures including ASTs and USTs reducing potential direct exposures to surface soils (OU 5). Fencing, signs, and other measures have been installed at the Site to minimize potential exposures while remedial activities are ongoing. The remedy remains protective for exposures to surface soils.

Groundwater. Residents are not currently exposed to groundwater since drinking water is provided through a municipal system. In addition, Nassau County Public Health Ordinance Article 4 prohibits the installation of new private potable water systems in areas served by a public water supply, which should effectively preclude any future potable water well installations in this portion of the UGA. Currently, consumption of drinking water is not a completed exposure pathway.

Vapor Intrusion. Treatment systems continue to operate to address contaminated groundwater and soil thus further reducing soil gas concentrations. Currently, there are no residential buildings on-site where potential exposures to vapors through vapor intrusion is possible so this pathway is not complete. In the event that future buildings may be constructed on the Property, EPA will evaluate the need for vapor intrusion remediation.

Toxicity Values. Since the original ROD was signed, several chemicals have been identified for further toxicological review by the Agency through the Integrated Risk Information System (IRIS), EPA's consensus database for toxicity values. Inorganic arsenic is currently under review through the IRIS process, a Tier 1 source for toxicity information used in FYRs. At the next FYR, the toxicity of inorganic arsenic will be re-evaluated to determine if there were any changes in toxicity information that would impact the protectiveness of the remedy.

In addition, the ROD Amendment identifies the MCLs among the RAOs. Updated toxicity values were

identified in the previous FYR for TCE and PCE. Based on these updates to the toxicity values, the MCLs remain protective.

Ecological – The previous FYR indicated that there were elevated concentrations of metals in Glen Cove Creek sediments; however, there was no determination made of whether the contaminants were site-related. A screening level ecological risk assessment was recently conducted as part of the evaluation for the ROD Amendment which focused on exposure pathways associated with the soil and groundwater on/near the former Mattiace Property. Although the surface water and sediment data were evaluated, the SLERA concluded that there were no complete ecological pathways at the Site and, therefore, the Site does not pose a risk to ecological receptors. It is likely that contaminated groundwater from the Mattiace site is responsible for a portion of the contamination that had been detected in Glen Cove Creek sediments. However, it is very difficult to delineate and quantify the constituents which could be directly related to the Site given the documented releases of organic and inorganic chemicals from other facilities in the area, many of which are the same as those substances potentially released from the Mattiace facility. Thus, the remedy is protective of ecological receptors.

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

There is no other information that calls into question the protectiveness of EPA's remedies selected for this Site.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
3, 4 and 6

OTHER FINDINGS

In addition, the following are recommendations that were identified during the FYR and may improve performance of the remedy and accelerate closeout but do not affect current and/or future protectiveness:

- Implement remaining components of the selected remedy.
- Perform additional investigations at the properties south of the Site.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: 3	*Protectiveness Determination:* Will be Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy for OU 3 (groundwater contamination) is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas because local and State laws exist to restrict contaminated groundwater withdrawals from the underlying aquifer for potable water purposes.		

Protectiveness Statement(s)		
Operable Unit: 4	*Protectiveness Determination:* Will be Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy for OU 4 (soil/soil vapor contamination) is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas because surface soils are not contaminated and soil vapors have not been found inside residences.		

Protectiveness Statement(s)		
Operable Unit: 6	*Protectiveness Determination:* Will be Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy for OU 6 (LNAPL contamination) is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas. Exposure is under control through the depth of contamination and local and State laws that exist to restrict installation of new wells and contaminated groundwater withdrawals from the underlying aquifer for potable water purposes.		

Sitewide Protectiveness Statement	
Protectiveness Determination: Will be Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas and no exposures to Site contaminants are expected as long as the engineering, access, and ICs discussed in this report continue to be properly operated, monitored and maintained.	

VIII. NEXT REVIEW

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

APPENDIX A – REFERENCE LIST

Document	Date
Record of Decision for the Mattiace Superfund Site, Operable Unit 2 Drum Removal	September 27, 1990
Record of Decision for the Mattiace Superfund Site, Operable Unit 1 Comprehensive Sitewide Remedy	June 27, 1991
OU 1 Remedial Action Report	July 11, 1995
OU 5 Remedial Action Report	March 27, 1997
OU 3 and 4 Remedial Action Report	September 29, 2000
OU 2 final POLREP	March 31, 1992
Monthly Progress Reports for OUs 3 and 4	1999 to present
Semiannual and Annual Environmental Monitoring Reports for OUs 3 and 4	1999 to present
Draft Focused Feasibility Study TRC	January 2010
Second FYR Report	August 2010
Supplemental RI/FS	May 2013
ROD Amendment OU 2	September 2014
Third FYR Report	September 2015
Final Mattiace Barrier Wall Remedial Action Construction Completion Report	March 2018
Draft Mattiace ISTR Remedial Action Construction Completion Report	March 2020

APPENDIX B

1991 ROD Selected Constituents of Concern for Soils

Metals	**Volatiles**	**Semi-Volatiles**
Antimony	1,1,1-Trichloroethane	1,2-Dichlorobenzene
Arsenic	2-Butanone	1,4-Dichlorobenzene
Barium	1-1, 2-Dichloroethene	2-Methylnaphthalene
Beryllium	Chloroform	Aldrin
Cadmium	Ethylbenzene	Alpha Chlordane
Chromium	Tetrachloroethene	Heptachlor Epoxide
Lead	Toluene	Napthalene
Manganese	Trichloroethene	
	Xylenes	

APPENDIX C

Summary of Potential Chemical-Specific Groundwater ARARS and TBCs and Selected Criteria

Chemicals	Federal ARAR[1]	NY ARAR and (Groundwater Quality Standards)[3] and TBCs [4]	EPA Calculated Risk-Based Concentration[5]	Selected Criteria
	ppb	ppb	ppb	ppb
Volatile Organic Compounds				
2-Butanone (MEK)	-	50	-	50
Chlofororm	-	7	-	7
Cis-1,2-dichloroethene	70	5*	-	5*
1,2-dichlorobenzene	600	3	-	3
1,2-dichloroethane	5	0.6	-	0.6
Dichloromethane	5	-	-	5
Ethylbenzene	700	5*	-	5*
Tetrachloroethylene (PCE)	5	5*	-	5*
1,1,1-Trichloorethane	200	5*	-	5*
Trichloroethene (TCE)	5	5*	-	5*
Vinyl chloride	2	2	-	2
1,1-Dichloroethane	-	5	-	5
1,4-Dichlorobenzene	-	3	-	3
Benzene	5	1	-	1
Toluene	1,000	5	-	5
Xylene	10,000	5*	-	5*
Semi-volatile Organic Compounds				
Naphthalene	-	10	-	10
Bis(2-ethylhexylphthalate)	-	5	-	5
			-	
Pesticides				
4,4'-DDD	-	0.3	-	0.3
			-	
Metals				
		NY MCL[2]		
Manganese	-	300	430[6]	430
Aresenic	10	25	-	10
Cadmium	5	5	-	5
Cobalt	-	5	-	5
Iron	-	300	14,000	14,000
Nickel	-	100	-	100

*Principal Organic Contaminant standard

- No criterion established

[1] 40 CFR Part 141.

[2] 10 NYCRR 5-1.

[3] Groundwater Quality Standard - 6 NYCRR 703.
[4] NYC – TBC – from Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 June 1998 last revised in 2004: Class GA Groundwater.
[5] EPA calculated concentrations based on the risk to human health for iron and manganese. The NY MCL is a secondary standard which is based on aesthetics.
[6] The IRIS RfD (0.14 mg/kg-day) used in the calculation of hazards includes manganese from all sources, including diet. The author of the IRIS assessment for manganese recommended that the dietary contribution from the normal U.S. diet (an upper limit of 5 mg/day) be subtracted when evaluating non-food (e.g., drinking water or soil) exposures to manganese, leading to a RfD of 0.071 mg/kg-day for non-food items. The explanatory text in IRIS further recommends using a modifying factor of 3 when calculating risks associated with non-food sources due to a number of uncertainties that are discussed in the IRIS file for manganese, leading to a RfD of 0.024 mg/kg-day. The non-cancer hazards calculated in this BHHRA were calculated using the IRIS RfD of 0.14 mg/kg-day which may underestimate the hazards by a factor of 5.8.

FIGURES

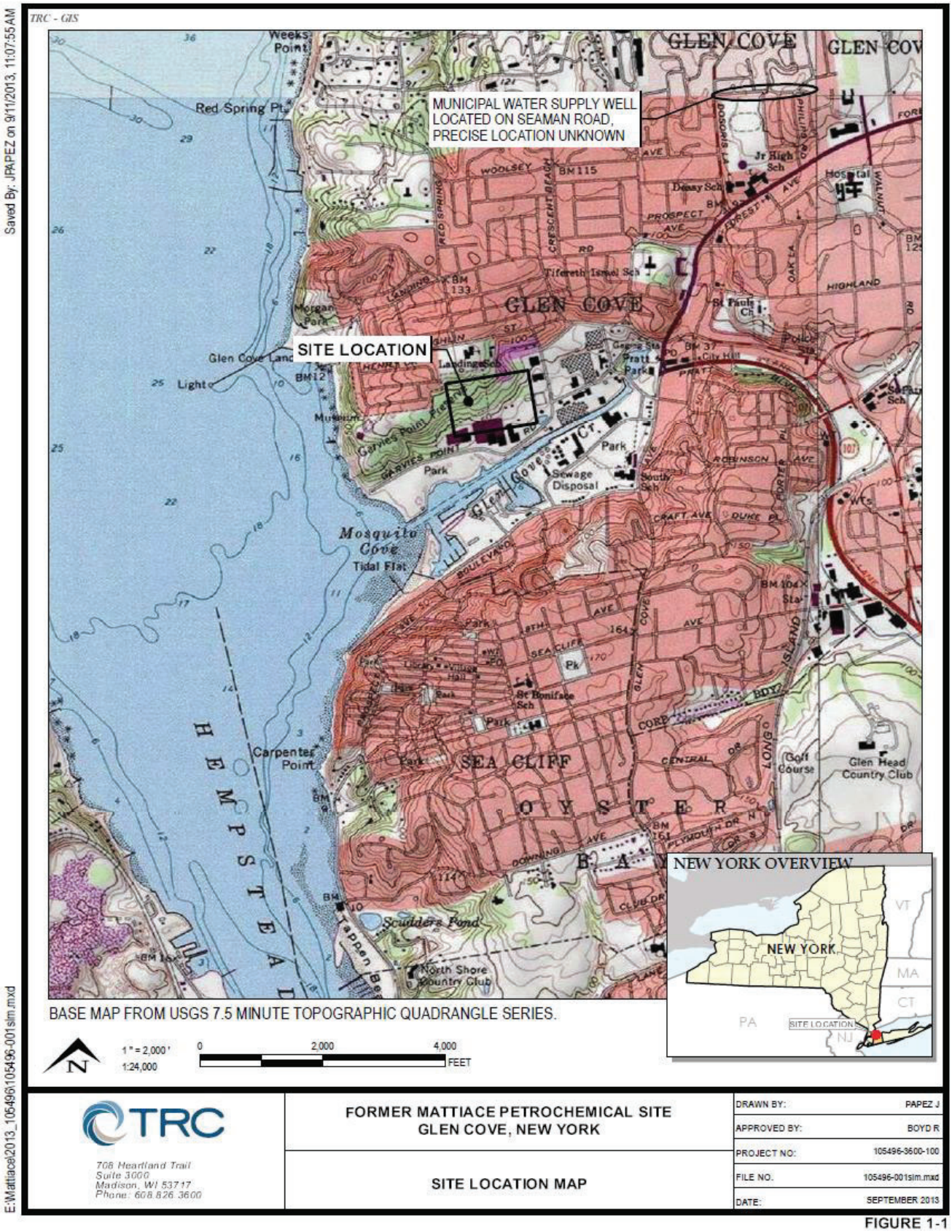
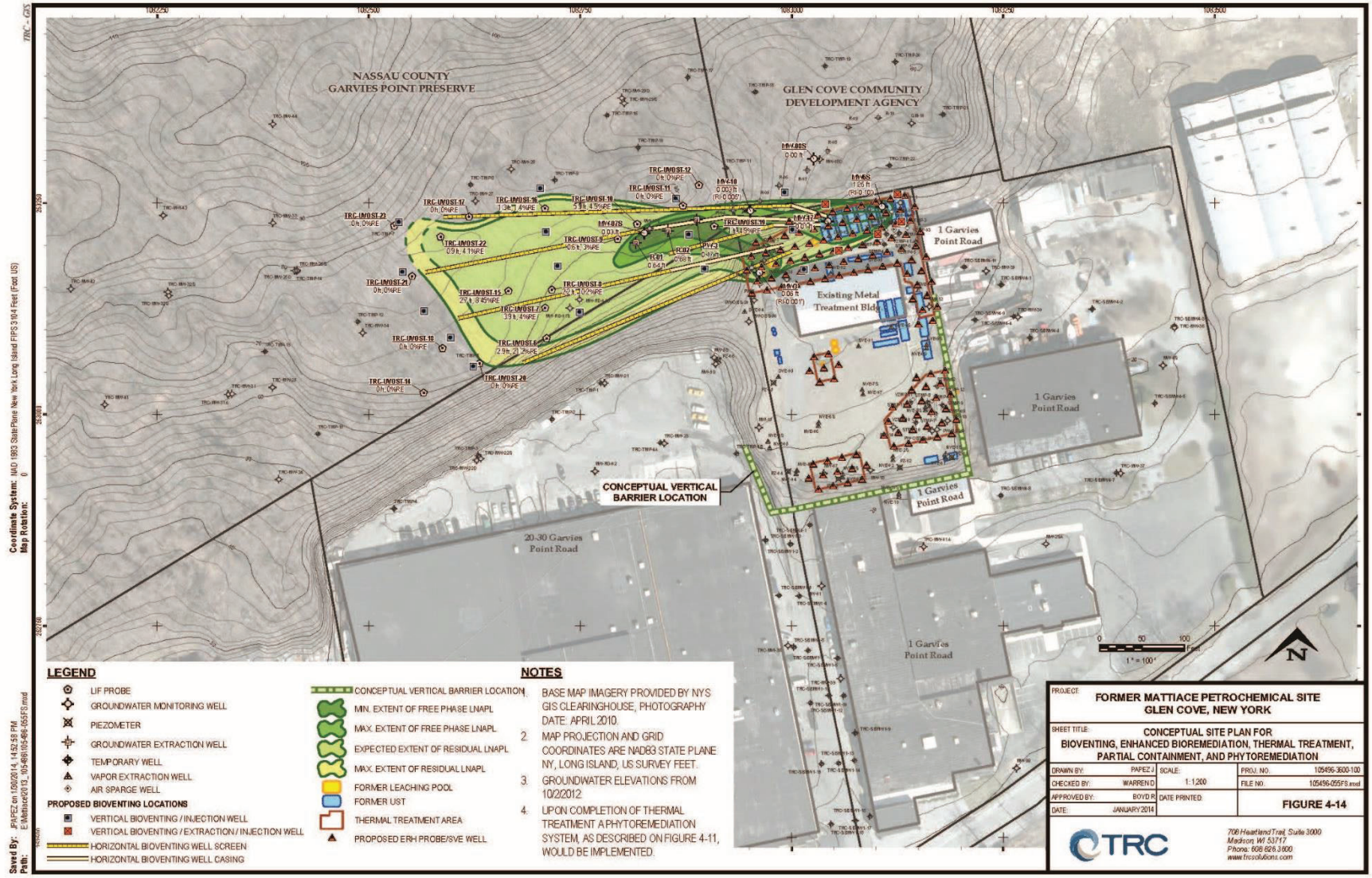

TRC - GIS
Saved By: JPAPEZ on 9/11/2013, 11:07:55 AM
MUNICIPAL WATER SUPPLY WELL LOCATED ON SEAMAN ROAD, PRECISE LOCATION UNKNOWN
SITE LOCATION
GLEN COVE
SEA CLIFF
HEMPSTEAD
OYSTER
BAY
Weeks Point
Red Spring Pt.
Glen Cove Light
Morgan Park
Garvies Point
Mosquito Cove Tidal Flat
Sewage Disposal
Carpenter Point
Scudder's Pond
North Shore Country Club
Glen Head Country Club
Golf Course
NEW YORK OVERVIEW
NEW YORK
VT
MA
CT
PA
NJ
SITE LOCATION
BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.
N
1 " = 2,000 '
1:24,000
0
2,000
4,000
FEET
E:\Mattiace\2013_105496\105496-001slm.mxd
TRC
708 Heartland Trail
Suite 3000
Madison, WI 53717
Phone: 608.826.3600
FORMER MATTIACE PETROCHEMICAL SITE
GLEN COVE, NEW YORK
SITE LOCATION MAP
DRAWN BY: PAPEZ J
APPROVED BY: BOYD R
PROJECT NO: 105496-3600-100
FILE NO. 105496-001slm.mxd
DATE: SEPTEMBER 2013

FIGURE 1-1


NASSAU COUNTY
GARVIES POINT PRESERVE
GLEN COVE COMMUNITY
DEVELOPMENT AGENCY
1 Garvies Point Road
Existing Metal Treatment Bldg
20-30 Garvies Point Road
CONCEPTUAL VERTICAL BARRIER LOCATION
LEGEND
LIF PROBE
GROUNDWATER MONITORING WELL
PIEZOMETER
GROUNDWATER EXTRACTION WELL
TEMPORARY WELL
VAPOR EXTRACTION WELL
AIR SPARGE WELL
PROPOSED BIOVENTING LOCATIONS
VERTICAL BIOVENTING / INJECTION WELL
VERTICAL BIOVENTING / EXTRACTION / INJECTION WELL
HORIZONTAL BIOVENTING WELL SCREEN
HORIZONTAL BIOVENTING WELL CASING
CONCEPTUAL VERTICAL BARRIER LOCATION
MIN. EXTENT OF FREE PHASE LNAPL
MAX. EXTENT OF FREE PHASE LNAPL
EXPECTED EXTENT OF RESIDUAL LNAPL
MAX. EXTENT OF RESIDUAL LNAPL
FORMER LEACHING POOL
FORMER UST
THERMAL TREATMENT AREA
PROPOSED ERH PROBE/SVE WELL
NOTES
1. BASE MAP IMAGERY PROVIDED BY NYS GIS CLEARINGHOUSE, PHOTOGRAPHY DATE: APRIL 2010.
2. MAP PROJECTION AND GRID COORDINATES ARE NAD83 STATE PLANE NY, LONG ISLAND, US SURVEY FEET.
3. GROUNDWATER ELEVATIONS FROM 10/2/2012
4. UPON COMPLETION OF THERMAL TREATMENT A PHYTOREMEDIATION SYSTEM, AS DESCRIBED ON FIGURE 4-11, WOULD BE IMPLEMENTED.
0 50 100 Feet
1" = 100'
N
PROJECT: FORMER MATTIACE PETROCHEMICAL SITE GLEN COVE, NEW YORK
SHEET TITLE: CONCEPTUAL SITE PLAN FOR BIOVENTING, ENHANCED BIOREMEDIATION, THERMAL TREATMENT, PARTIAL CONTAINMENT, AND PHYTOREMEDIATION
DRAWN BY: PAPEZ J
CHECKED BY: WARREN D
APPROVED BY: BOYD R
DATE: JANUARY 2014
SCALE: 1:1,200
DATE PRINTED:
PROJ. NO. 105496-3600-100
FILE NO. 105496-055FS.mxd
FIGURE 4-14
TRC
708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com
Coordinate System: WAD 1983 StatePlane New York Long Island FIPS 3104 Feet (Foot US)
Map Rotation: 0
Saved By: JPAPEZ on 1/30/2014, 1:45:58 PM
Path: E:\Mattiace\2013_105-496\105-496-055FS.mxd