PERIODIC REVIEW REPORT No. 6
(JULY 1, 2017 – JUNE 30, 2018)
CARRIAGE CLEANERS-BRIGHTON
NYSDEC SITE NO. 828120

WORK ASSIGNMENT NO. D007619-08

Prepared for:

New York State Department of Environmental Conservation
Albany, New York

Prepared by:

MACTEC Engineering and Consulting, P.C.
Portland, Maine

MACTEC: 3612112223

NOVEMBER 2018

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

EC	engineering control
FS	Feasibility Study
GES	Groundwater & Environmental Services, Inc.
gpm	gallon(s) per minute
GWETS	groundwater extraction and treatment system
IC	institutional control
lbs/hr	pounds per hour
MACTEC	MACTEC Engineering and Consulting, P.C.
µg/L	microgram(s) per liter
µg/m^3	microgram(s) per cubic meter
mg/L	milligrams per liter
ND	non-detect
NYSDEC	New York State Department of Environmental Conservation
O&M	operation and maintenance
OBG	O'Brien and Gere Engineers
ORP	oxidation reduction potential
PCE	tetrachloroethene
PID	photoionization detector
ppbv	part(s) per billion by volume
PRR	periodic review report

GLOSSARY OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

Q	Quarter
RA	Remedial Action
RI	Remedial Investigation
ROD	Record of Decision
RSO	Remedial System Optimization
Site	Carriage Cleaners site
SM	site management
SMP	Site Management Plan
SSDS	sub-slab depressurization system
SVE	soil vapor extraction
TCE	trichloroethylene
VE	vapor extraction
VI	vapor intrusion
VMP	vapor monitoring point
VOC	volatile organic compound

EXECUTIVE SUMMARY

The Carriage Cleaners site (Site No. 828120; hereinafter referred to as the Site) is a commercially zoned parcel approximately 0.35 acres in size located at the intersection of Brooklawn Drive and Monroe Avenue, in Brighton, New York where dry cleaning operations have occurred for at least 30 years.

The remedy for the Site was selected and a Record of Decision (ROD) issued in March 2008 (New York State Department of Environmental Conservation [NYSDEC], 2008). Contaminants of concern at the Site are volatile organic compounds, specifically tetrachloroethene and its breakdown components. Remedial Action (RA) work began in June 2011 and was completed in December 2011. The following RA activities were completed at the Site in 2011:

1. At a suspected contaminant source area adjacent to the active dry cleaner building, contaminated soil was excavated to bedrock (approximately sixteen feet below ground surface). Excavated material was transported and disposed at an off-site facility. The excavation was backfilled with clean soil.
2. A soil vapor extraction (SVE) system was installed. Contaminated air from the extraction wells moves through the treatment system to remove contaminants before being discharged to the atmosphere. Note that the SVE system was shut down on December 20, 2017 to commence the ongoing rebound study.
3. A groundwater extraction treatment system (GWETS) was installed. The GWETS consists of one extraction well which collects groundwater on site to prevent continued off-site migration of contaminants. Contaminated water from the extraction well is treated to remove contaminants before being discharged to the sanitary sewer in accordance with an approved permit.

A Site Management (SM) Plan was created to outline the controls established to meet the ROD requirements. Because remaining contaminated groundwater exists beneath the Site, engineering controls (ECs)/institutional controls are required to protect human health and the environment. EC systems at the Site include:

1. A cover system consisting of asphalt pavement, concrete sidewalks, and concrete building slabs.
2. Site fencing to keep the public from approaching the Site treatment trailer.
3. An SVE system to treat soil contamination on-site.

4. A GWETS to prevent off-site migration of contaminants through groundwater.
5. Seventeen sub-slab depressurization systems (SSDS) continue to operate and mitigate soil vapor in the neighboring community. The SSDSs are being monitored and maintained by the NYSDEC under a separate contract and are not discussed further in this Periodic Review Report (PRR).

This PRR is the sixth PRR for the Site. The PRR summarizes the SM activities completed at the Site from July 1, 2017 through June 30, 2018 and evaluates the effectiveness of the RA conducted in 2011. During the reporting period, SM requirements were met. Based on this review, the remedy continues to be protective of the public health and the environment and is compliant with the ROD.

1.0 SITE OVERVIEW

1.1 INTRODUCTION

The remedy for the Carriage Cleaners site (Site) was selected and a Record of Decision (ROD) issued in March 2008 (New York State Department of Environmental Conservation [NYSDEC], 2008). Remedial Action (RA) work began in June 2011 and was completed in December 2011 (MACTEC Engineering and Consulting, P.C. [MACTEC], 2012).

Site Management (SM) ongoing now consists of the operation of a groundwater extraction and treatment system (GWETS) to contain the contaminant plume, and a soil vapor extraction (SVE) system to treat contaminated soils beneath the Site.

The following major RA activities were completed at the Site in 2011:

1. At a suspected contaminant source area adjacent to the active dry cleaner building, contaminated soil was excavated to bedrock (approximately sixteen feet below ground surface). Excavated material was transported and disposed at an off-site facility. The excavation was backfilled with clean soil.
2. An SVE system was installed. Contaminated air from the extraction wells moves through the treatment system to remove contaminants before being discharged to the atmosphere.
3. A GWETS was installed. The GWETS consists of one extraction well which collects groundwater on site to prevent continued off-site migration of contaminants. Contaminated water from the extraction well is treated to remove contaminants before being discharged to the sanitary sewer in accordance with an approved permit.

Full-time combined SVE and GWETS operations – and corresponding SM activities - were initiated in January 2012. The treatment systems are currently being operated, monitored, and maintained by Groundwater & Environmental Services, Inc. (GES) under contract to the NYSDEC and under direction by MACTEC.

This Periodic Review Report (PRR) represents the sixth PRR for the Site. This PRR, which covers the period of performance from July 1, 2017 to June 30, 2018, includes:

- required institutional control/engineering control (IC/EC) certification

- summary and documentation of site-related data to support IC/EC certification
- discharge monitoring data for the certification period
- a description of the on-line treatment system(s) performance.

1.2 SITE HISTORY AND DESCRIPTION

The Site is located at 2101 Monroe Avenue, Town of Brighton, Monroe County, New York (Figure 1.1). The Site is a commercially zoned parcel approximately 0.35 acres in size located at the intersection of Brooklawn Drive and Monroe Avenue. The area is a densely populated, mixed commercial and residential area. The Site is currently occupied by a one-story cement block dry cleaning facility, a two-story wood house, and a paved parking lot.

Dry cleaning operations have occurred at the Site for at least 30 years; a Town of Brighton Sewer inspection suggests that dry cleaning operations may have occurred at the Site as early as 1959. Carriage Cleaners currently utilizes tetrachloroethene (PCE) as well as petroleum-based solvents during daily dry cleaning operations. A petroleum spill (Spill Number 0306131) occurred adjacent to the Site at a former Newcomb Oil/Citgo Gasoline Station located at 2087 Monroe Avenue.

PCE was discovered within groundwater downgradient of the Site during a series of investigations related to the petroleum spill. Due to the proximity of the Site and the history of PCE used during dry cleaning operations at the Site, the Carriage Cleaners Property was determined to be a potential source of the PCE detected within the groundwater (NYSDEC, 2008).

Because of the PCE detections, a Phase II Environmental Site Assessment was completed by the site owner in 2004. This investigation did not identify an onsite source for the PCE; however, the assessment suggested that potential ruptures within the sanitary and storm sewer line could be a source for the PCE detected within groundwater. The NYSDEC completed an offsite vapor intrusion (VI) study at four nearby residential properties. The results from this study led to the installation of one basement ventilation system and four sub-slab depressurization systems (SSDS) as part of an interim remedial measure (NYSDEC, 2008).

As a result of these investigations, the NYSDEC listed the Site as a Class 2 Site in the Registry of Inactive Hazardous Waste Disposal Sites in New York in June of 2004. The NYSDEC ordered a Remedial Investigation (RI) and Feasibility Study (FS) to be completed (NYSDEC, 2008).

1.3 PHYSICAL SETTING

The geology beneath and near the Site directly influences the distribution and ability for so contaminants to migrate from the Site. Site geology consists of a sandy glacial till (overburden beneath the Site) comprised of loose to dense, fine, and medium sand with some silt and gravel overlying a medium dark gray dolomite (bedrock beneath the Site) of the Lockport Group. The thickness of the overburden ranges from approximately 3 feet to 15 feet. Based on data collected as part of the RI, O'Brien and Gere Engineers (OBG) reported that three zones can be distinguished within the bedrock unit. These include a weathered bedrock zone immediately below the till deposit ranging from 1 to 3 feet in thickness, a shallow fractured bedrock zone with a thickness of approximately 6 to 15 feet, and a more competent intermediate bedrock zone where fracture frequency decreases with depth. The data suggest that there is a hydraulic connection/communication between the overburden zone and the shallow bedrock groundwater zone (OBG, 2007).

1.4 CLEANUP GOALS AND REMEDIAL PROGRESS

Description of Selected Remedy

Based on the results of the RI/FS and the criteria identified for evaluation of alternatives, the NYSDEC selected excavation (to the extent practical) to remove contaminated soil exhibiting concentrations of PCE greater than soil cleanup objectives for unrestricted use (1.3 parts per million) from the Site. The intent of the selected remedy is that residual contaminated soil (i.e., beneath the building) is treated with the operation of an on-site SVE system and residual contaminated shallow bedrock groundwater is extracted and contained via a groundwater extraction and treatment system, along with the continued operation of the existing off-site SSDS and periodic VI monitoring at nearby residences.

ICs in the form of an environmental easement are being used to impose land use restrictions and groundwater use restrictions at the Site. Specifically, the environmental easements include: (a)

limiting use and development of the property to commercial and industrial activities; (b) land use restrictions which require proper worker protections during construction or excavation activities that would potentially cause a worker to contact contaminated soil, groundwater, or soil vapor; (c) compliance with the approved SM Plan (SMP); (d) groundwater use restrictions which preclude the use of groundwater at the Site without prior notification and approval from NYSDEC; (e) restrictions related to soil, groundwater, and soil vapor implemented on the site property; and (f) a periodic certification of ICs/ECs.

Operation of the remedy components will continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

The SVE system was taken offline from December 20, 2017 through the end of the reporting period to perform a rebound study to evaluate the need for continued operation of the system.

2.0 EVALUATION OF REMEDY PERFORMANCE, EFFECTIVENESS AND PROTECTIVENESS

In this section, SM activities are discussed. Ongoing SM activities include ICs/ECs, the monitoring program, and the implementation of the site Operation and Maintenance (O&M) Plan which is included in the SMP. The comprehensive SMP developed for the Site includes plans for ICs/ECs, O&M, long term monitoring, and associated reporting (MACTEC, 2013).

2.1 SITE MANAGEMENT STATUS

During this reporting period, MACTEC performed O&M oversight of the on-site standby remedial contractor GES, and prepared quarterly O&M monitoring reports. Since the previous PRR, MACTEC has prepared four quarterly O&M monitoring reports, two for 2017 (Quarter [Q]3 and Q4) and two for 2018 (Q1 and Q2) (MACTEC, 2017c; MACTEC, 2018a; MACTEC, 2018b; and MACTEC, 2018c). In addition, MACTEC prepared a Soil Vapor Extraction System Rebound Study Work Plan (MACTEC, 2017b). Since the previous PRR, GES provided MACTEC with a monthly transmittal of field data tables and a summary of site activities included in quarterly reporting.

This PRR was completed using site specific documentation including the Site's ROD (NYSDEC, 2008), periodic site inspections conducted by GES, quarterly environmental monitoring reports, and the SMP. This review was conducted to confirm that established controls according to the SMP are operational and effective, that the SMP is being implemented and conducted accordingly, and that the remedy remains protective of the environment and/or public health. A summary of SM activities completed during the reporting period and an evaluation of the performance, protectiveness, and effectiveness of the remedy is provided below.

2.2 INSTITUTIONAL CONTROLS/ENGINEERING CONTROLS

Because contamination is present in the subsurface soils at this Site, ICs/ECs have been implemented to protect public health and the environment for the applicable future use. The IC/ECs are designed to prevent:

- ingestion/direct contact with contaminated soil

- inhalation of or exposure to contaminants volatilizing from contaminated soil
- ingestion of groundwater with contaminant levels that exceed drinking water standards
- contact with or inhalation of volatiles from contaminated groundwater.

2.2.1 Institutional Controls

A series of ICs are required to implement, maintain and monitor the ECs. Currently, the ICs in place consist of a groundwater use restriction and a land use restriction. Based on inspections conducted throughout the reporting period, there has not been a change in property use, and the Site is in compliance with the ICs.

2.2.2 Engineering Controls

The Controlled Property has the following ECs:

- a cover system consisting of asphalt pavement, concrete sidewalks, and concrete building slabs
- site fencing to keep the public from approaching the treatment trailer
- an SVE system to treat soil contamination on-site
- a GWETS to prevent off-site migration of contaminants through groundwater.

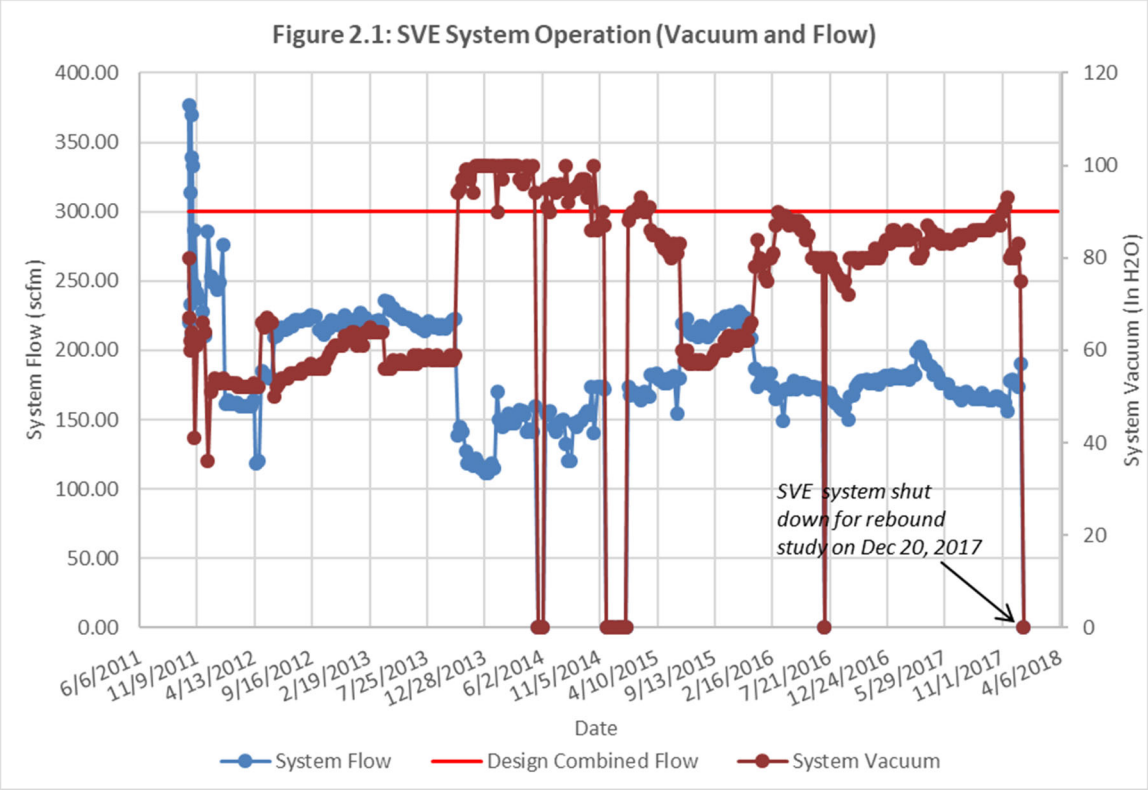
2.2.2.1 Asphalt and Concrete Cover System

Exposure to remaining contamination in soil at the Site is prevented by an asphalt and concrete cover system over the contaminated soils at the Site. The cover system is comprised of asphalt pavement and concrete building slabs. The extent of the cover system is documented in the ALTA/ACSM Land Title Survey included in Appendix A of the SMP (MACTEC, 2013). The cover system was observed during the reporting period to be intact and continuing to function as a cover system.

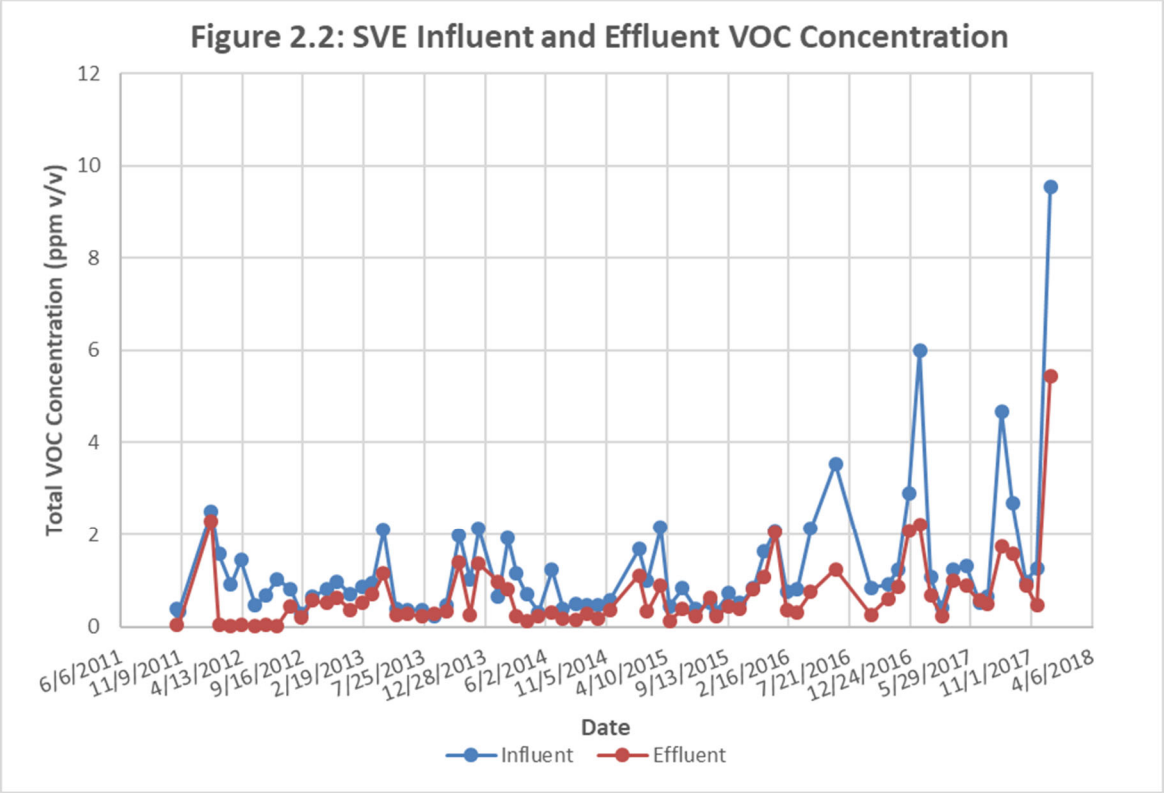
2.2.2.2 Soil Vapor Extraction System

The general configuration of the SVE system components, with the exception of the vapor monitoring point VP-8 conversion to vapor extraction (VE) point VE-8, is presented in the O&M Manual appended to the SMP (MACTEC, 2013).

Based on a review of the data, it is concluded that the operation of the SVE system - up until its shutdown in December 2017 to support the rebound study - was in general conformance with the design intent. VE well flow rates and system vacuum have generally been operating below the designed combined flow rate of 300 standard cubic feet per minute. Vacuum and flow performance are shown on Figure 2.1.



During this period of performance, average total volatile organic compound (VOC) concentration per quarter in the combined influent soil vapor samples (via TO-15 analysis) was 2,670 parts per billion by volume (ppbv) for Q3 2017 and 3,923 ppbv for Q4 2017; the SVE system was shut down during Q1 2018 and Q2 2018 to perform a rebound test. Influent and effluent VOC concentrations are shown on Figure 2.2.



Through December 2017, the aggregate mass of total VOCs extracted by the SVE system is estimated to be approximately 322 pounds. Of this amount, 58 pounds is estimated to have been extracted during the period July 2017 through December 2017. The SVE system was turned off on December 20, 2017 for the ongoing rebound study.

During the reporting period (through December 2017) monthly effluent samples were collected to evaluate compliance with the discharge criteria for the Site, defined in the DAR-1 Guidelines for the Control of Toxic Ambient Air Contaminants and Title 6 of the New York Codes, Rules, and Regulations Part 212. The average monthly combined stack discharge for the period did not exceed the discharge objective of 0.1 pounds per hour (lbs/hr) of high toxicity contaminants, with the maximum monthly average combined stack discharge occurring in the month of August 2017 at 0.0212 lbs/hr (MACTEC, 2017c; MACTEC, 2018a; MACTEC, 2018b; and MACTEC 2018c).

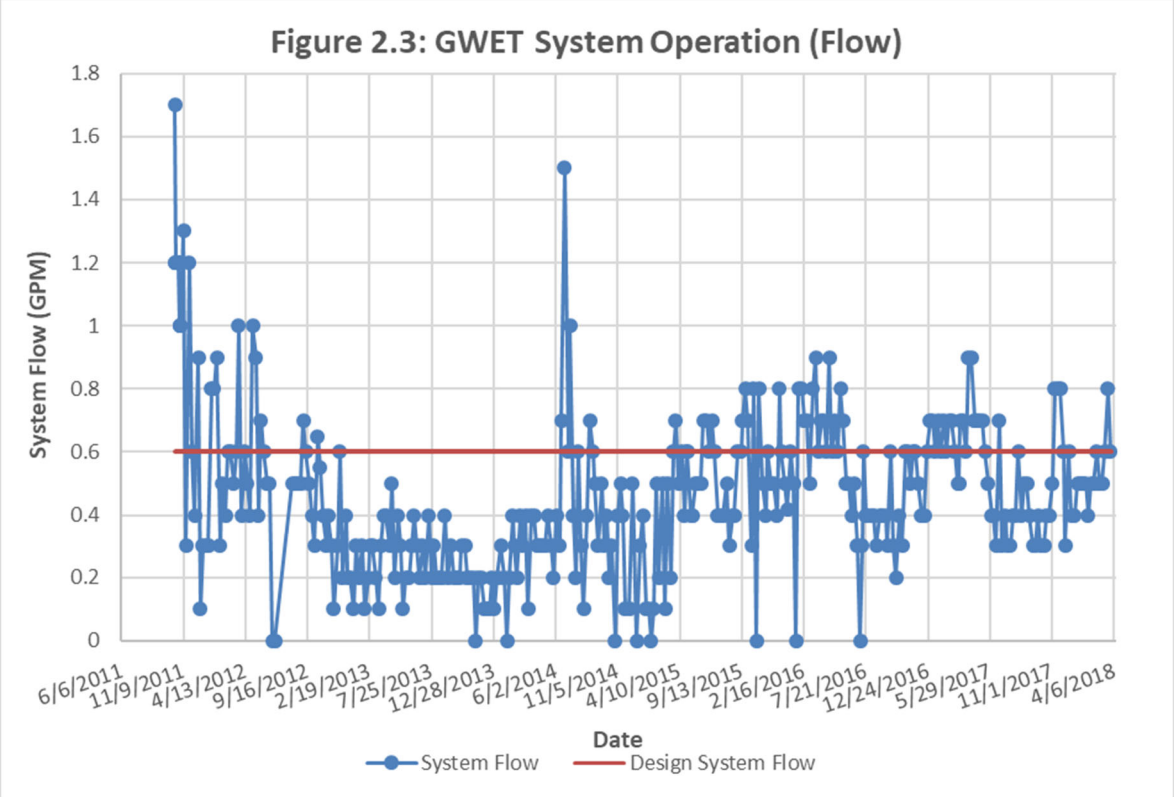
The items listed below are SVE system maintenance and testing activities conducted by GES during the reporting period.

- The SVE and treatment system was shut down on December 20, 2017 to support the SVE rebound study.
- Weekly photoionization detector (PID) readings of vapor monitoring points and VE wells were collected through Q1 and Q2 of 2018.

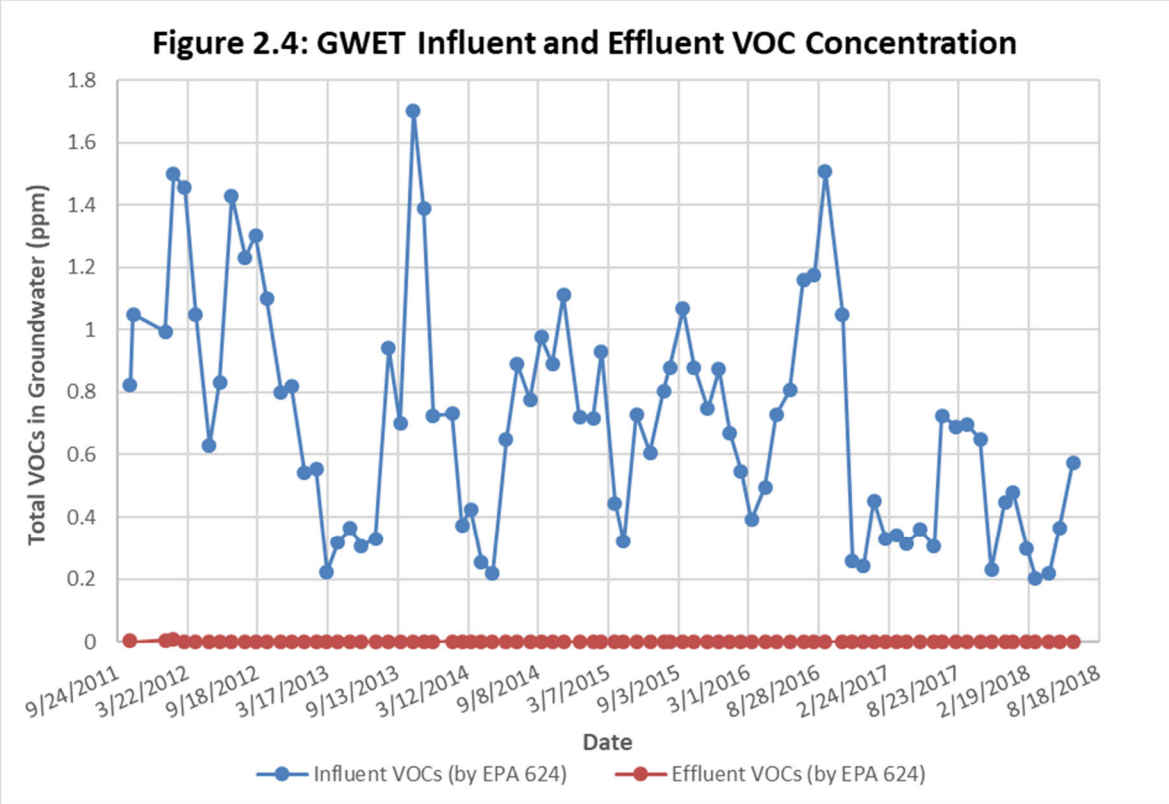
2.2.2.3 Groundwater Extraction and Treatment System

The general configuration of the GWETS components is presented in the O&M Manual appended to the SMP (MACTEC, 2013).

Groundwater samples at the GWETS have been collected by GES personnel and submitted to TestAmerica in Buffalo, New York for analysis. The sampling and analysis locations and analyses for the reporting period are tabulated below. System performance (sample results) for this reporting period is shown on Figures 2.3 and 2.4. The average flow rate (0.48 gallons per minute [gpm]) of the extraction well for this reporting period is less than the design flow of 0.6 gpm (Figure 2.4).



The average influent VOC concentration to the GWETS during the reporting period varied from 704 micrograms per liter (µg/L) in Q3 (2017); 442 µg/L in Q4 (2017); 327 µg/L in Q1 (2018); and 386 µg/L in Q2 (2018). The GWETS effluent water was analyzed to evaluate compliance with the discharge criteria for the Site, determined by the County of Monroe Sewer Use Permit. The discharge criteria of 2.3 milligrams per liter (mg/L) for the summation of purgeable aromatics and halocarbons was not exceeded during the reporting period; VOCs were not detected during Q3 and Q4 2017 and were 0.00034 mg/L and 0.0018 mg/L for Q1 and Q2 2018, respectively.



The items listed below are GWETS maintenance and testing activities conducted by GES during the reporting period.

- The air filters of the system were checked, and air filters associated with the stripper blower were changed in the month of September 2017.
- Muriatic acid continues to be used to clean scaling in the diffused aerator, per manufacturer instructions, as part of regular maintenance activities to mitigate scaling and fouling.
- Monthly cleaning of the flow meter continues to be performed as a part of regular maintenance activities.

2.3 ADDITIONAL ACTIVITIES

2.3.1 Downgradient Well Monitoring

Monitoring wells MW-111I, HA-114, MW-210, MW-8B, MW-9, and MW-9B were sampled by GES on November 1st and 2nd, 2017 and May 2nd and 3rd, 2018 as part of semiannual monitoring well sampling at the Site. MW-6 and MW-6B were not sampled due to the presence of the permanganate cylinders (see report subsection 2.3.2). Figure 2.5 shows the onsite and offsite groundwater monitoring well network. Below is a table summarizing groundwater PCE concentrations in monitoring wells onsite and adjacent to the Site.

Table 2.1: Groundwater Monitoring Well PCE Concentrations

Date	Groundwater PCE Concentration (µg/L)					
	MW-111I	HA-114	MW-210	MW-8B	MW-9	MW-9B
January 2009	240	-	230	-	-	-
December 2012	-	31	-	-	-	-
2/14/2013	-	-	4.3	-	-	-
10/10/2013	-	-	5.1	-	-	-
4/4/2014	-	-	2.6	-	-	-
12/17/2014	83	13	3.5	-	-	-
5/26/2015	96	55	1.8	620	-	ND
8/25/2015	150	76	2.8	810	5.5	ND
4/25/2016	200	6.3	1.1	450	1.9	ND
11/9/2016	290	19	160	380	3.9	46
5/10/2017	190	2.8	7.5	140	1.7	0.73
11/1/17*	92	10	5.6	490	5.19	ND
5/2/2018**	170	42	2.6	480	0.94	ND

- – not sampled
ND – non-detect
*Sample for well HA-114 was collected on 11/2/2017
**Samples for wells HA-114 and MW-210 were collected on 5/3/2018

Reported PCE concentrations in the monitoring wells closest to EW-1 decreased from May 2017 to November 2017 and increased from November 2017 to May 2018. The PCE concentration at MW-111I continued to decline during the November 2017 sampling round and increased to a level consistent with past samples during the May 2018 sampling. PCE concentrations at HA-114, MW-

8B and MW-9 increased from historic lows to levels within past ranges in November 2017. The PCE concentration at MW-9B was not present in a detectable amount in the November 2017 or the May 2018 sampling event.

MW-210 is the only downgradient well that has been monitored consistently on a semiannual basis since GWETS and SVE system startup. Historical results have indicated a seasonal fluctuation in PCE concentration, with a slight rise in concentration in the summer/fall. Results from the samples collected on November 1, 2017 and May 3, 2018 were found to be within the range of past observations.

2.3.2 Bedrock Remediation

RemOx® SR permanganate cylinders were installed in groundwater monitoring wells MW-6 and MW-6B during the second quarter of 2014 to passively treat groundwater and bedrock PCE in the vicinity of the well pair. Influent water at the GWETS continues to be routinely checked for color and oxidation reduction potential (ORP) to monitor for persistence of permanganate in the area extending from the monitoring wells to the treatment system, and quarterly monitoring occurs at MW-6 and MW-6B to check for the presence of permanganate. To date, based on visual observations at MW-6 and at MW-6B, the permanganate continues to persist. Routine monitoring at the GWETS influent did not detect adverse color or ORP levels during the reporting period.

2.3.3 Indoor Air Sampling Results – 2113 Monroe Avenue

On March 14, 2018 ambient/outdoor air samples and indoor air samples were collected from the residence at 2113 Monroe Avenue, located east of the site building. A single indoor air sample and a duplicate were collected from the basement, and the results showed PCE concentrations of 5.2 micrograms per cubic meter ($\mu g/m^3$) and 6.0 $\mu g/m^3$, respectively. The indoor air sample results from the previous monitoring event on January 13, 2016 reported PCE concentrations of 8.8 and 11 $\mu g/m^3$, demonstrating a decline during the two years between monitoring events. Outdoor sample results reported PCE concentrations ranging from 2.2 to 3.0 $\mu g/m^3$ in 2018. Outdoor results from the previous outdoor sampling event in 2016 reported PCE concentrations ranging from 2.3 to 10 $\mu g/m^3$.

2.3.4 Remedial Optimization – Soil Vapor Extraction Rebound Study

As discussed in the previous PRR, remedial system optimization (RSO) activities were performed in March 2017, per the Final Field Activities Plan – RSO Recommendations Implementation (MACTEC, 2017a). These activities included:

- Soil samples near the location of the previous DP-14A samples were collected to assess progress toward achieving the PCE soil cleanup goal.
- The depth of VE-8 was reduced to prevent moisture uptake during high groundwater conditions.
- Indoor air and sub-slab vapor sampling were conducted in addition to the monthly SVE influent and effluent samples to determine if indoor air was contaminated and if so, whether running the SVE system was causing drawdown of indoor air into the sub-slab.

The results of the RSO field investigations suggested that the objectives set forth in the ROD with regard to soil and indoor air may have been achieved. Based on these results, a rebound study was proposed for the SVE system to evaluate the need for continued operation. Starting on December 20, 2017, the SVE system was shut down with the intent to perform a year-long rebound study, per the Soil Vapor Extraction Rebound Study Work Plan (MACTEC, 2017b)

Field monitoring associated with the SVE system during the rebound study has been modified to be collection of PID readings. PID readings are collected weekly at vapor extraction wells, vapor monitoring points (VMPs), and indoor air. PID readings at vapor extraction wells and vapor monitoring points for the past 12 months are presented below in Figures 2.6 and 2.7, respectively. These graphs show total VOC concentrations as parts per million by volume as recorded by the PID. As shown on these graphs, PID readings in both the vapor extraction wells and the vapor monitoring points have increased during the rebound study but appear relatively consistent throughout the reporting period.

Figure 2.6: Vapor Extraction Well VOC Concentrations
Last Twelve Months

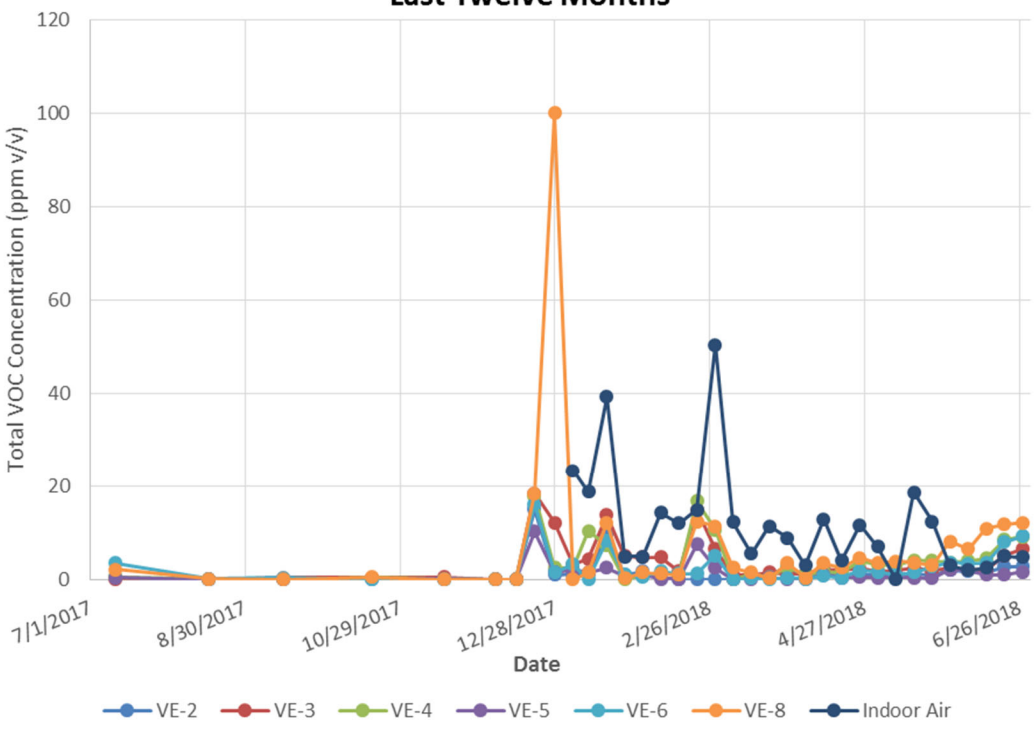
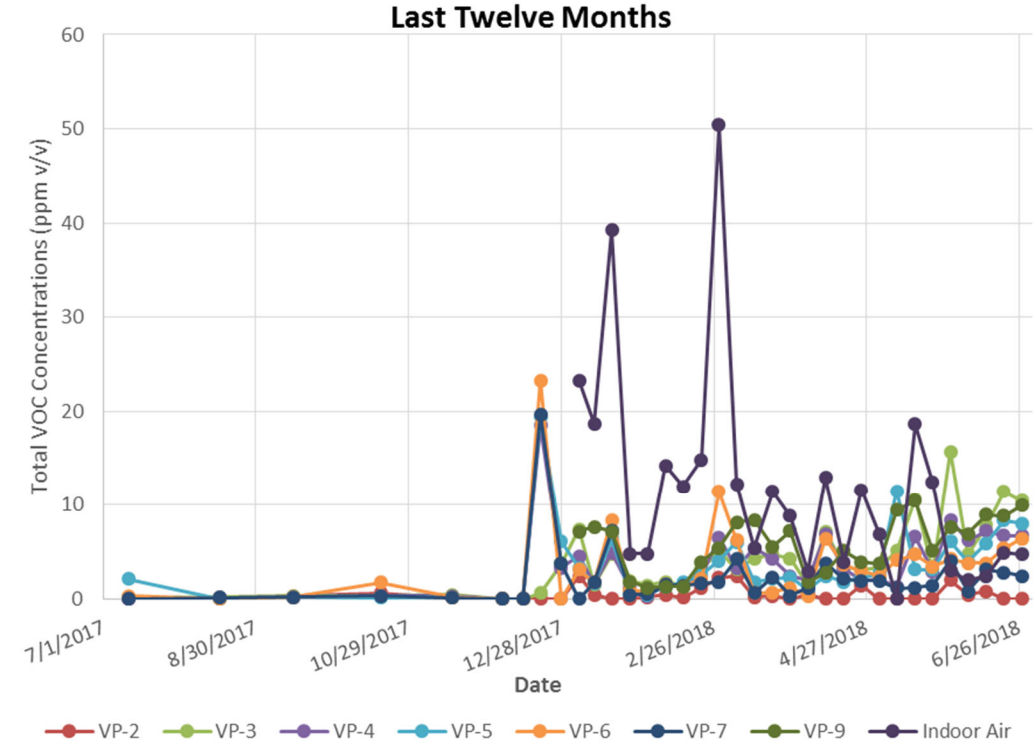


Figure 2.7: Vapor Monitoring Point VOC Concentrations
Last Twelve Months



Monthly vapor samples are collected from VE-4 and VP-9, and quarterly samples from indoor and outdoor air. Figure 2.8 shows vapor and soil monitoring locations at the Site. Vapor samples collected from VP-9, VE-4, Indoor Air, and Outdoor air are collected over an 8-hr period into Suma canisters and are analyzed by Test America by method TO-15. The PCE and trichloroethylene (TCE) results of the vapor sampling collected to date, including baseline samples collected in March 2017, are summarized below.

Table 2.2 Soil Vapor Extraction Rebound Study TO-15 Results

	VP-9		**VE-4 (March 2017 was Combined Influent Sample)**		**Indoor**		**Outdoor***	
Date	PCE ($\mu g/m^3$)	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)	TCE ($\mu g/m^3$)
3/19/2017 (Baseline)	8,100	650	2,600	130	7,200	360	4.2	1.3
12/20/2017	47,000	3,500	1,900	54	NA	NA	NA	NA
1/10/2018	27,000	1,400	24,000	720	27,000	1,100	4.4	< 0.21
2/14/2018	17,000	870	2,900	150	NA	NA	NA	NA
3/4/2018	27,000	1,200	410	23	NA	NA	NA	NA
4/11/2018	16,000	680	1,700	61	33,000	8,800	300 / 200	7.5 / 6
5/9/2018	26,000	1,100	2,700	81	NA	NA	NA	NA
6/13/2018	33,000	1,100	13,000	370	NA	NA	NA	NA

*Single outdoor samples were collected for comparison to ambient conditions during the baseline and first quarter 2018. During second quarter 2018, two outdoor samples were collected, one upgradient and one downgradient from the dry cleaner. Results are shown as upgradient / downgradient.
$\mu g/m^3$ = micrograms per cubic meter.

Monthly sampling results from vapor extraction well VE-4 indicate fluctuations of PCE and TCE influent concentrations above and below the baseline SVE measurements observed on December 20, 2017 prior to system shutdown, as shown in Table 2.2. Fluctuations in vapor influent concentrations have been observed periodically during SVE operations, as demonstrated in Figure 2.2.

PCE and TCE results from VP-9 located below the building slab coincide with relatively high indoor air concentrations, which are a result of dry cleaning operations due to the continued use of PCE-based dry cleaning chemicals. Concentrations in VE-4 remain lower than in VP-9. There is an

upward rebounding trend in PCE and TCE concentrations in both VP-9 and VE-4; there do not appear to be other preferential pathways contributing to the trend. Prior to this trend, PCE and TCE results increased then decreased again as shown in Table 2.2.

3.0 CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the site remedy continues to be protective of the public health and the environment and is compliant with the decision document.

3.1 INSTITUTIONAL CONTROLS

The current ICs are adequate to achieve the objectives for protection of human health and the environment based on current site use.

3.2 ENGINEERING CONTROLS

The current ECs are adequate to achieve the objectives for protection of human health and the environment based on current Site use.

3.3 OTHER SITE-RELATED ACTIVITIES

Based on the information presented in this PRR, the following activities are recommended to be completed within the next annual reporting period (July 2018 through June 2019) in efforts to optimize operations and accelerate the timeframe to site delisting:

- Continue monitoring groundwater extraction quality weekly for the presence of permanganate via color, and periodically via specific conductance and ORP. Also, continue to monitor MW-6/6B for the presence of permanganate on a quarterly basis, and when permanganate is completely dissipated collect a groundwater sample from both wells for VOC analyses.
- Continue semiannual sampling of groundwater monitoring wells MW-210, MW-111I, MW-9/9B, MW-8B, MW-6/6B, and HA-114.
- Rehabilitate the GWETS to achieve the design flow of 0.6 gpm. The last occurrence of rehabilitation was approximately 3 years ago.
- Based on data observed during the 1st and 2nd quarters of 2018, as well as data received outside of the reporting period for this PRR, it is recommended that the SVE rebound study be discontinued.
- Before the SVE rebound study is discontinued (blower maintenance and mechanical checks will likely be necessary), it is recommended to increase indoor air TO-15 analysis from a

quarterly to monthly basis to more accurately compare indoor air VOC concentrations with subgrade VOC concentrations.

- Evaluate the SVE system rebound study results and provide a formal rebound study assessment.

4.0 REFERENCES

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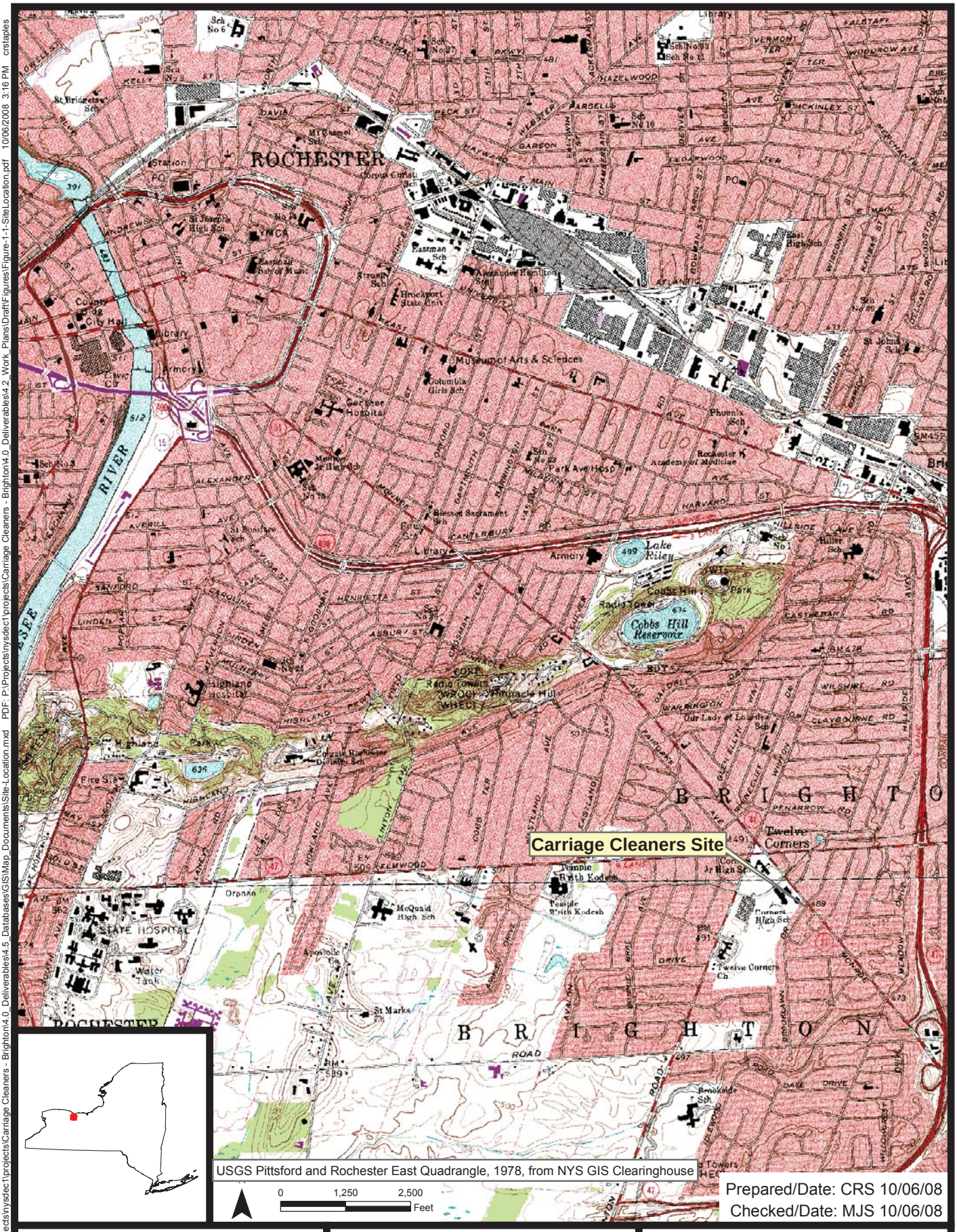
FIGURES



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NYSDEC
Carriage Cleaners Site
Brighton, NY

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Site Location
Project 3612112223
Figure 1.1

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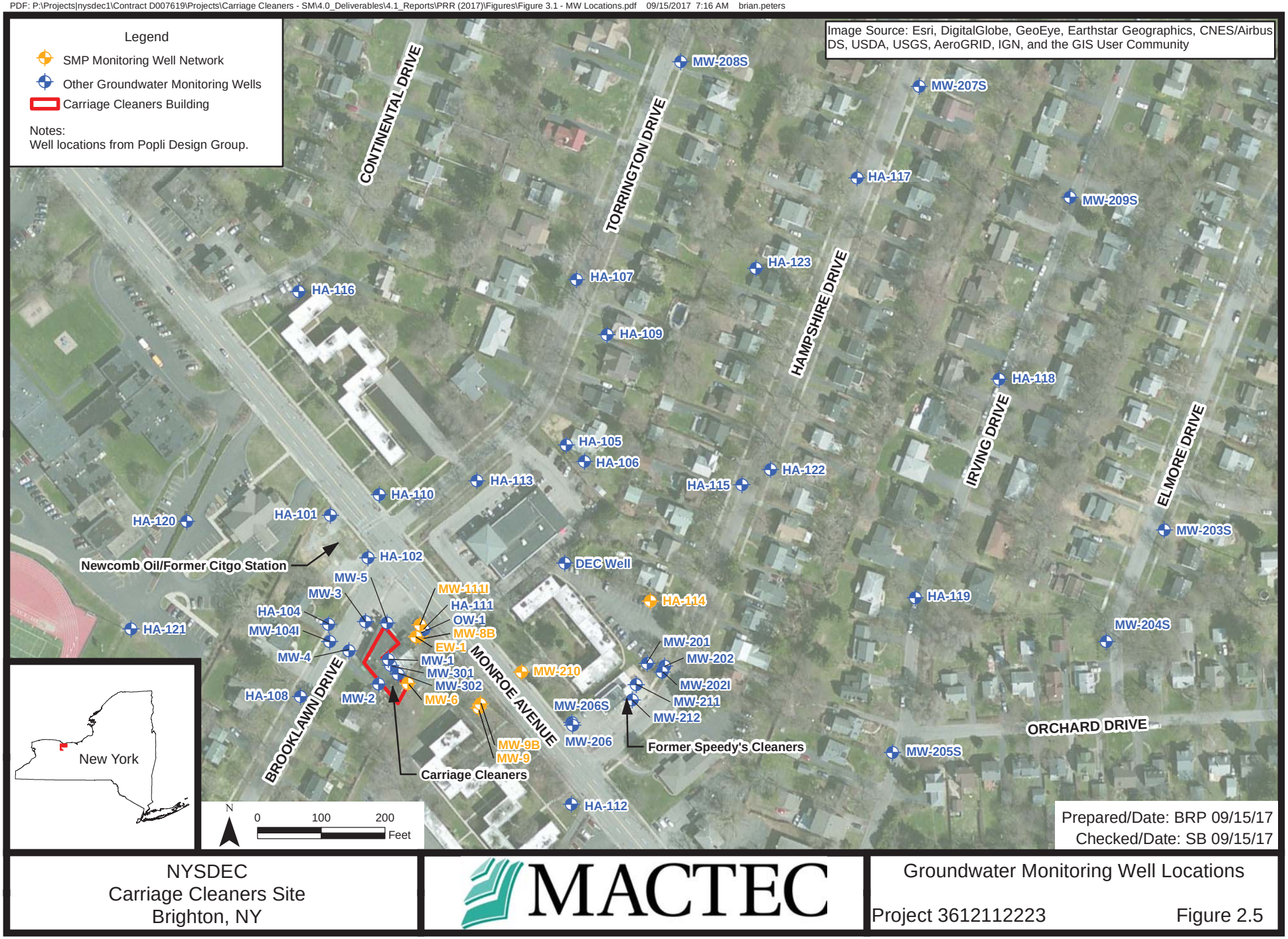

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Groundwater Monitoring Well Locations

Project 3612112223 Figure 2.5

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Brighton, NY

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Vapor and Soil
Sampling Locations
Project 3612112223 Figure 2.8

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