REMEDIAL INVESTIGATION REPORT
500 South Union Street – Offsite RI
(NYSDEC Site Number C828153A)

NYSDEC STANDBY ENGINEERING CONTRACT
Work Assignment #D007625-11

PREPARED FOR
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

1,1,1-TCA	1,1,1-trichloroethane
AA	Alternative Analysis
BCP	Brownfield Cleanup Program
Bgs	below ground surface
BTEX	benzene, toluene, ethylebenzene, and xylene
cis-1,2 DCE	cis-1,2 dicholorethene
COC	certificate of completion
cVOC	chlorinated volatile organic compound
DUSR	Data Usability Summary Report
ESA	Environmental Site Assessment
GWQS/GV	Groundwater Quality Standards and Guidance Values
HDR	Henningson, Durham & Richardson Architecture and Engineering, PC.
hsa	Hollow Stem Auger
ID	Inside Diameter
MNA	monitored natural attenuation
mw	Monitoring Well
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCE	tetrachloroethene
PPD	Proposed Decision Document
PVC	polyvinyl chloride
RI	Remedial Investigation
RAOs	Remedial Action Objectives
SMP	Site Management Plan
sVOCs	semi volatile organic compound
SCOs	Soil Cleanup Objectives
SVI	soil vapor intrusion
TCE	trichloroethene
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
YEC Inc.	YEC Engineering, P.C.
µg/l	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
µg/kg	micrograms per kilograms

EXECUTIVE SUMMARY

From December 2013 through March 2015, Henningson, Durham & Richardson Architecture and Engineering, PC. (HDR) conducted a Remedial Investigation (RI) of the off-site groundwater contamination plume associated with the 500 South Union Street Site (NYSDEC Site #C828153A), located at 500 South Union Street, Town of Spencerport, Monroe County, New York. The off-site RI focused on the area immediately surrounding and downgradient of the 1.2 acre site that entered the Brownfield Cleanup Program (BCP) in August 2009 (NYSDEC Site #C828153). On December 23, 2014 the certificate of completion (COC) for a Track 4 remediation under the BCP was issued for the subject site. The Track 4 cleanup addressed the on-site site-related contamination to allow commercial use of the site while being protective of human health and the environment. The purpose and objective of this RI report is to document the nature and extent of the off-site contamination associated with the 500 South Union Street Site.

Primary components of the RI included one round of vapor intrusion sampling conducted at residential properties adjacent to the site, installation of a series of off-site overburden and bedrock monitoring wells, and separate sampling events for both sets of these off-site RI wells.

Vapor intrusion sampling (indoor air and sub-slab) within adjacent properties did not indicate the presence of compounds of concern associated with the site at concentrations requiring mitigation or further monitoring of such compounds in accordance with New York State Department of Health (NYSDOH) guidance matrices pertaining to vapor intrusion.

Relatively low concentrations of compounds of concern (chlorinated volatile organic compounds or cVOCs) associated with the site were detected in the HDR-installed overburden monitoring wells. Two compounds, considered site related cVOCs, tetrachloroethene (PCE) and cis-1,2 dicholorethene (cis-1,2 DCE), were detected at concentrations exceeding applicable New York State Department of Environmental Conservation (NYSDEC) Class GA groundwater standards, however, off-site groundwater quality is impacted primarily by the presence of benzene, toluene, ethylbenzene, and xylene (BTEX compounds) not associated with the site. Significant concentrations of BTEX compounds were detected in several monitoring wells installed and sampled as part of the off-site RI. Bedrock monitoring wells installed during a second phase of

drilling at the site also exhibited limited impacts from BTEX compounds, however no contaminants of concern associated with the site were detected in the off-site bedrock wells. The presence of the BTEX compounds in the groundwater and soils is likely related to the retail petroleum station located west of the site. A limited program of soil sampling, consisting of samples collected at varying depths in the subsurface during drilling of the overburden monitoring wells, indicates that for the off-site locations sampled only residual concentrations of contaminants of concern associated with the site are present.

Hydrogeologic characterization of the off-site study area indicated groundwater flow patterns in the vicinity of the site similar to the southwesterly flow determined during previous on-site investigations. West of the site, overburden groundwater flow appears to transition to a more easterly direction in association with groundwater levels that vary over short distances in the vicinity of the South Union Street and Route 31 intersection. Overburden and bedrock well couplets were completed at three off-site locations and all exhibit downward vertical gradients, however analytical data indicate that only limited downward migration of contaminants (BTEX contaminants not associated with the site) appears to have occurred, suggesting that the hydraulic connection between the overburden and bedrock is relatively localized or otherwise inhibits the vertical migration of contaminated groundwater.

Based on the results of the groundwater sampling conducted from the off-site overburden and bedrock monitoring wells, off-site and deeper migration of contaminants of concern associated with the site are limited to low concentrations and are not a threat to public health or the environment. On-site remediation included excavation of impacted surficial soils and injection of biological amendments at depth in the aquifer to enhance bioremediation. This remediation addressed the source of the contamination and effectively limited the mass of contaminants available to contribute to on-going migration of these contaminants in the groundwater.

Given the detected presence of only residual levels of contaminants of concern in the off-site groundwater, soil, and soil vapor during the off-site RI as detailed in this report, and the on-going remediation occurring at the site, no remedial action is required for the off-site area associated with the 500 South Union Street site.

1.0 INTRODUCTION

1.1 Site Background & History

The 500 South Union site (NYSDEC Site No. C828153A) is a 1.2 acre site containing a 12,750 square foot multi-tenant commercial building (Figure 1). The building is currently occupied by a dry cleaner, a restaurant, a pizzeria, a salon, and a delicatessen. Prior to the 1940's the site was either vacant or in use as agricultural lands. Starting in the 1940's the site was used as a button factory until sometime in the 1970's when the multi-tenant building was constructed and became occupied by the dry cleaner. Prior to 1986 spent filters from the dry cleaning machines were disposed of in dumpsters located on the eastern portion of the site. The dry cleaner discontinued use of tetrachloroethene in their process in 2000. Subsurface investigations conducted at the site from 1989-2008 showed levels of chlorinated volatile organic compounds (cVOCs) in exceedance of the New York State Guidance values; specifically PCE and its breakdown products. The site eventually entered the New York State BCP and the results of the previous investigations conducted at the site are summarized in the following Section.

1.2 Previous Investigations

Documentation provided to HDR from NYSDEC indicates that the initial investigation of the 500 South Union site began in 1998. This investigation involved a Phase I/II Environmental Site Assessment (ESA) Report completed by Haley & Aldrich of Rochester, New York. This report found elevated concentrations of cVOCs, specifically PCE and TCE, within groundwater samples collected from each of the three on-site monitoring well locations. The elevated PCE concentrations, detected at all three well locations, and the TCE concentration, detected at a single well on the southern edge of the site building, exceeded NYSDEC Class "GA" Groundwater Quality Standards and Guidance Values (GWQS/GV). In addition, soil samples indicated elevated concentrations of PCE, as well as lower levels of BTEX. Two of the four soil borings shown in the report indicated concentrations of these compounds that exceeded the NYSDEC Part 375 Unrestricted and Groundwater Protection Soil Cleanup Objectives (SCOs).

In March 2008, a second Phase I/II ESA was performed by Turnkey Environmental Restoration, LLC of Buffalo, NY. The results of this investigation were generally consistent with the 1998 Haley & Aldrich Report. Analytical groundwater results indicated varying amounts of PCE and its breakdown products throughout the site, with the highest concentration of PCE found in the southwestern portion. PCE was also detected in the soil of the southwestern section of the site at a concentration that exceeded the Unrestricted Soil and Groundwater Protection SCOs but not the Restricted-Commercial SCO. Later in 2008, Turnkey conducted an additional subsurface investigation to assess groundwater quality upgradient and downgradient of the site. Results of this investigation indicated elevated levels of PCE and cis-1,2-DCE on-site and also off-site directly south on the opposite side of Rt. 31. In 2012, after entering into the BCP, Turnkey prepared a Remedial Investigation (RI)/Alternatives Analysis (AA) Report on behalf of Eyezon Associates, Inc. In groundwater samples collected during the RI, PCE and its breakdown products were detected above GWQS/GV in several locations on-Site, with the highest in the southwestern portion of the Site. Concentrations of iron, magnesium, manganese, and sodium were detected above GWQS/GVs in both shallow and deep monitoring wells across the Site but these compounds are naturally occurring minerals and are considered to be representative of Site background conditions. Cadmium and cobalt, along with several semi-volatile organic compound (sVOC), were detected above their respective GWQSs for one sampling event; however, all were reported below their GWQS/GV during the final sampling event of the report. No pesticides, herbicides or PCBs were detected in the groundwater above GWQS/GVs. In soil samples, the results of the RI indicated that all VOC concentrations were not detected above unrestricted SCOs for surface and subsurface soil samples. In soil vapor samples, PCE and its breakdown products were detected at locations along the northern and northeastern portion of the Site. In addition, cis-1,2-DCE was also detected in the southwestern portion of the site.

In February 2013, the NYSDEC issued a Decision Document (DD) to address contamination at the Site. Eyezon Associates, Inc., with oversight by the NYSDEC, conducted cleanup activities in accordance with the green remediation principles and techniques of the DER-31 guidelines. Cleanup was deemed complete by December 2014 (NYSDEC Fact Sheet, 2014). The cleanup involved (1) bioremediation effort whereby direct injections of biological amendments were made in the area of the cVOC contamination at approximately 30 ft. bgs. Microorganisms that

already exist in the soil and groundwater naturally clean up cVOC compounds over time. The biological amendments provide a food source and other key ingredients necessary for them to thrive and breakdown the contaminant at a faster rate. (2) A sub-slab depressurization system was installed at the on-site building to prevent migration of vapors into the building from soil and/or groundwater. (3) Contaminant-impacted areas of the surface soils that exceeded the 6 NYCRR Part 375 6.8(b) Restricted Use Cleanup Objectives for commercial use were excavated and disposed of off-site at a permitted landfill facility. (4) The site cover system, including the building, asphalt parking lot and sidewalks, was already in place and is to be maintained. Areas where surface soils were excavated were backfilled with soil/fill material that met the NYSDEC cover system requirements and were hydro-seeded. (5) An institutional control in the form of an environmental easement was placed on the property. This easement requires the remedial party or site owner to complete and submit to the NYSDEC a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3). It allows the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws. It restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or Monroe County Health Department. It also prohibits agriculture or vegetable gardens on the controlled property, and requires compliance with the Department approved Site Management Plan. (6) The Site Management Plan (SMP) for the site was developed and includes an Institutional and Engineering Controls Plan and a Monitoring Plan.

The Institutional and Engineering Control Plan identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the institutional controls such as the environmental easement, and engineering controls such as the site cover system and sub-slab depressurization system, remain in place and effective. It contains provisions of the environmental easement including any land use and groundwater use restrictions, a provision for evaluation of the potential for soil vapor intrusion for any current or future buildings to be occupied or developed on the site, provisions for implementing actions recommended to address exposures related to soil vapor intrusion, provisions for the management and inspection of the identified engineering controls, provisions for maintaining site access controls and NYSDEC notification, and the steps necessary for the periodic reviews and

certification of the institutional and/or Engineering controls. Lastly, the Institutional and Engineering Control Plan details an Excavation Plan that describes the provisions for management of future excavations. The other portion of the SMP is the Monitoring Plan. This plan assess the performance and effectiveness of the remedy and includes, but is not limited to, monitoring of groundwater to assess the performance and effectiveness of the remedy, a schedule of monitoring and frequency of submittals to the NYSDEC, and monitoring for vapor intrusion for any buildings occupied or developed on the site, as may be required by the Institutional and Engineering Control Plan.

1.3 Project Objectives & Approach

The objectives for the off-site investigation were the characterization of potential migration of organic vapors associated with the site into neighboring structures and the assessment of potential impacts to off-site soils and off-site groundwater in the overburden and bedrock aquifers. A vapor intrusion sampling program was implemented as part of the initial phase of the investigation, with multiple residential units in the vicinity of the site sampled to assess both indoor and sub-slab air quality for the presence of site related contaminants of concern. Off-site groundwater quality was evaluated based on the results of groundwater samples collected from monitoring wells installed in both the overburden and bedrock aquifers during subsequent phases of the field investigation. Off-site soil samples were also collected during the off-site RI well installation activities to characterize any potential site related soil contamination in the vicinity of the site.

1.4 Applicable Criteria

To determine the nature and extent of contamination at the site, standards and screening criteria were used during the RI to evaluate the analytical data for soil, groundwater, soil vapor, indoor air, and outdoor air. Applicable criteria utilized included:

<u>Soil</u>

Soil sample results were compared to 6NYCRR Part 375 Environmental Remediation Programs Tables 375-6.8(b) Protection of Groundwater, Unrestricted Use, and Restricted Commercial Use SCOs for organic and inorganic constituents (NYSDEC 2006).

Groundwater

Groundwater analytical results were compared to NYSDEC groundwater quality standards (GWQS) 6 NYCRR Part 703 (NYSDEC 1999).

Soil Vapor, Indoor Air and Outdoor Air

NYSDEC does not currently have any standards, criteria, or guidance values for subsurface soil vapor. Therefore, the air guideline values established by NYSDOH for a number of chemical compounds, including PCE, TCE, 1,1,1-trichloroethane (1,1,1-TCA) and methylene chloride (NYSDOH 2006) were used as applicable screening criteria.

Since the Off-site RI study area does not contain any surface water features applicable criteria for this media were not necessary. The applicable criteria values listed above are included for reference in the analytical data tables associated with the off-site RI report.

2.0 FIELD INVESTIGATION

2.1 Soil Vapor Intrusion – December 2013

During December 2013, the soil vapor intrusion (SVI) sampling event was conducted by HDR in 10 homes located to the northeast of the Site (Figure 3). These structures were selected based on the close proximity to the subject site. In addition, previous environmental samples collected near these properties indicated the presence of PCE and its breakdown products, including TCE and cis 1,2-DCE. As per NYSDOH Guidance, sub-slab and interior air samples were collected. At each location HDR constructed a temporary sampling point by drilling through the existing concrete slab using a hammer drill and installing a stainless steel vapor sampling point attached to Teflon tubing. The point was surrounded by course, washed sand, sealed below grade using a plug of volatile organic compound (VOC)-free permagum in the annulus around the tubing, and finally sealed at the surface with quick set cement. In accordance with NYSDOH Soil Vapor Guidance, each temporary point was tested for tracer gas intrusion during each sampling event to verify that short circuiting to ambient air did not occurring. The point was then purged using a personal air sampling pump at a rate below 0.2 L/minute. These points were constructed as

temporary installations and each point was drilled out and sealed with cement upon completion of the sampling event.

Sampling was conducted from December 9th through December 10th. Samples were collected into batch certified 6-liter Summa canisters with 24-hour regulators. After sample collection, the samples were shipped to TestAmerica in Knoxville, TN under the chain of custody protocol and were received on December 19th, 2013. The analytical data summary packages received from TestAmerica are found in Appendix G. Data Validation Services completed a Data Usability Summary Report (DUSR), provided in Appendix F. SVI sampling logs and NYSDOH inventory forms completed along with the sampling program are included in Appendix A.

2.2 RI Phase I – Overburden/Interface Monitoring Wells – August 2014

2.2.1 Overburden / Interface Monitoring Well Location Selection

Based on historical off-site groundwater quality data collected prior to the start of this phase of the RI for the site, off-site shallow overburden monitoring well locations were selected for installation during the first phase of the RI (Figure 2). The well locations were selected to provide a permanent upgradient sampling point northeast of the site, at the northern end of a residential building (MW-6), and at four points to the southeast, downgradient of the site at the intersection of South Union Street and State Highway 31 (MW-1, MW-2, MW-3 and MW-4). An additional well location, to the east, on the property of the Kwik-E gas station was also selected (MW-5). This configuration allowed sampling from a single upgradient point, and five downgradient points with four of those points located approximately along the long axis of the contaminant plume originating at the study site.

2.2.2 **Monitoring Well Installation and Sampling**

Drilling for the first five (5) downgradient wells occurred on June 23rd-26th, while drilling for the upgradient well occurred on August 4th. Each of the wells were drilled to and constructed at approximately 21-36 ft. bgs. at the proposed drilling locations. Nothnagle conducted the drilling using a truck mounted rotary drill rig outfitted with four and one quarter (4.25) inch ID hollow

stem augers (HSA). The target depth was specified to correspond with the top surface of the dolostone bedrock. During drilling, split spoon samples were collected every five (5) feet to allow field screening of the composition of the subsurface deposits, along the length of the well. Once advancement of the borehole was completed to the target depth, a standard two (2)-inch diameter schedule-40 PVC monitoring well was installed in the borehole following standard monitoring well construction procedures. The bottom 10 ft. of each well was constructed using 10-slot well screen and a sand filter pack consisting of #0 well sand was installed surrounding the well screen and above to a level two (2) – three (3) ft. above the top of the screened interval. To isolate the screened interval and prevent vertical migration of water downward through the borehole to the screen, a three (3) ft. bentonite seal was installed above the well sand filter pack. The seal consisted of bentonite chips added directly to the annulus between the wall of the borehole and the well screen and riser. The pellets were hydrated by their installation at a level below the local water table thereby insuring an effective seal above the sand pack surrounding the well screen.

Once the bentonite seal was adequately hydrated the remainder of the borehole was backfilled with a mixture of cement-bentonite grout. Each well had a six (6) inch flush-mount casing installed with a concrete apron to complete the well. Each well riser was secured with a locking compression plug to prevent infiltration through the top of the well.

Upon completion of the well installation, each well was developed by over-pumping and surging with a submersible pump. The development was conducted by Nothnagle and HDR monitored the progress of the development. HDR collected and logged water quality parameters to document that by the end of the development period the well was yielding representative formation groundwater. On June 24, 2014 MW-2 was pumped for 30 minutes to test well recovery at the site. Approximately 40 gallons were pumped from the well, and water level appeared to stabilize at a 2.5 gpm pumping rate. The test was stopped and development was finished several days later upon completion of all the well installation activities. Development of MW-1, -2, -3, -4, and -5 began on June 26, 2014 with MW-5. MW-5 was pumped with a submersible whale pump for two hours at a rate of 3 gpm. Approximately 295 gallons were removed from the well and development was considered to be complete. Development of MW-4

proceeded similarly, where 285 gallons were pumped from the well over a two hour period, at approximately 3 gpm, and development was considered complete. Development of MW-2 and MW-3 proceeded on June 27, 2014. MW-2 was pumped at approximately 4.5 gpm for 50 minutes. Water quality parameters stabilized and approximately 150 gallons of water were recovered from the well, and development was considered complete. MW-3 was purged at variable pumping rates between 1-2 gpm on and off for 1 hour and 30 minutes. The well drew down almost immediately each time the pump was turned on, and then recovered fairly quickly (within a few minutes) and then pumped down again. This purge method was performed continuously for 1 hour and 30 minutes, recovering approximately 57 gallons from the well before development was considered complete. Due to access issues, the installation of MW-6 was delayed until August 2014. Once installed development at MW-6 was achieved by restricting the flow with a flow valve to keep the pumping rate very low (approximately 0.19 gpm), and the well was pumped for about 1 hour, recovering less than 15 gallons. If the pumping rate was allowed to be any faster, the well would immediately pump dry and recovered very slowly. Boring logs, well construction logs, and well development logs associated with the wells installed during Phase I of the RI are compiled in Appendix B.

HDR subcontracted the Phase I well sampling program to YEC Engineering, P.C. (YEC Inc.) of Valley Cottage, NY and the site survey and mapping to Fisher Associates of Rochester, NY. Survey of the overburden monitoring well locations was conducted on August 8, 2014 by Fisher Associates. Each location was surveyed to document the point's latitude and longitude and for the monitoring wells the elevations of the top of the PVC risers were surveyed to provide reference points for subsequent water level measurements and calculations of groundwater elevations referenced to sea level.

Once the monitoring wells were surveyed, YEC Inc. conducted groundwater sampling at the six new wells. Each well was sampled following standard low flow sampling protocols using a bladder pump to purge each well until stabilization of groundwater chemistry data indicated representative aquifer formation water suitable for sampling was being purged. Typically this occurred after approximately one hour of pumping the well at about 0.25 liters per minute. Drawdown in the monitoring wells during sampling was minimized where possible, all wells

except MW-1 were kept below 10% drawdown of the water column height in the well. Recharge of MW-1 was very poor and drawdown of over 30% of the water column was measured over the course of purging. Once stabilization had occurred, groundwater VOC samples were collected from each well and submitted under chain of custody protocol to the NYSDEC callout analytical laboratory, TestAmerica, Inc. for analysis. Upon completion of the sample analyses, the laboratory provided the necessary documentation to the HDR's contracted data validator, Data Validation Services, Inc., to allow for preparation of a DUSR on the sampling results.

In addition to the VOC analyses conducted on the groundwater samples collected during the overburden monitoring well sampling program, a subset of the samples were also analyzed for a list of parameters that could be indicative of a geochemical environment favorable for natural attenuation of the contaminant plume due to biological/chemical reactions in the groundwater or may indicate that breakdown of the contaminants of concern are occurring. These parameters can be an indicator of the feasibility of designating monitored natural attenuation (MNA) as a viable remedial strategy for addressing the contamination. As part of the sampling program, several parameters were monitored from samples collected along the flow path in the aquifer in an effort to determine whether attenuation was occurring as the groundwater flows downgradient from the site. Since the evaluation of groundwater flow patterns in the area of the off-site investigation (and to some extent in the previous on-site investigations) proved difficult to contour, samples from each of the new overburden wells were analyzed for the MNA parameters in an attempt to gather as much data as possible regarding the potential for natural attenuation of contaminants in the overburden aquifer. The MNA parameters evaluated included:

- Alkalinity (as $CaCO_3$)
- Chloride
- Nitrate
- Nitrite
- Sulfate and sulfide
- Dissolved Fe (II)
- Dissolved Mn (II)

Detailed records from field work related to the Phase I monitoring well sampling program completed by YEC Inc. are compiled in Appendix C. The analytical data summary packages and DUSR are found is Appendix G and F respectively.

2.3 RI Phase II - Bedrock Monitoring Wells – March 2015

Based on the results from the initial phase of well installation and sampling conducted as part of the off-site RI, and, on the historical analytical data from on-site wells, a second round of drilling was initiated to determine whether contaminants had migrated through the overburden and into the bedrock aquifer. Bedrock wells constructed in the second round of drilling allowed for the characterization of the vertical gradient between the overburden and the bedrock, and of the deeper groundwater flow direction.

The Phase II well installation, consisting of the drilling and construction of wells BR01, BR02 and BR03, occurred from January 20, 2015 through January 22, 2015 (Figure 2). Nothnagle drilled the boreholes for each well using a six and one quarter (6.25) inch ID hollow stem augur to the top of the competent rock wherein a four (4) inch diameter spin casing was placed. The spin casing was advanced further into the bedrock, grouted in place and allowed to cure overnight. HX-diameter coring was conducted afterwards to reach the target depths of 44 - 66 ft. bgs. Well construction was completed by installing a 10 ft. long PVC well screen coupled with PVC riser (both 2-in diameter) into the open bedrock borehole and completing the well in the manner of a standard monitoring well with a sand filter pack installed over the screened interval, a bentonite slurry seal above the sand pack, and the remainder of the well annulus grouted to the surface with a six (6) inch flush mount casing in a concrete apron. The PVC screen and riser was installed to provide additional stability within the target zone of fractured bedrock and prevent potential collapse or blockage of the open bedrock zone of the borehole. These three bedrock wells are paired with overburden wells MW-2, MW-4 and MW-6, and are shown on Figure 3. Boring logs and well construction diagrams associated with the installation of the bedrock wells are found in Appendix D. BR03 was developed on January 22, 2014,approximately 150 gallons were pumped from the well at about 2 gpm. The pH, conductivity, turbidity, temperature, total dissolved solids, ORP and DTW were all monitored throughout development. Parameters

stabilized after about 1 hour and 30 minutes of pumping and development was considered complete. BR01 was bailed for approximately 50 minutes on the afternoon of January 22, 2014. Drawdown was noted consistently throughout the first 25 minutes of bailing the well with the lowest DTW recorded at 37 ft. bgs. During the second 25 minutes of bailing, the well made a minor recovery to 34 ft. bgs, 10 additional gallons were then bailed from the well. The well was left to recover overnight, and in the morning, the water level had returned to 24.9 ft. bgs and was left to recover further while BR02 was developed. The starting water level in BR02 was 19.1 ft. bgs on January 23, 2014. The well pumped dry in about 10 minutes and then recovered to 29 ft. bgs in 35 minutes. The well was subsequently pumped dry and allowed to recover two additional times. In total 10 gallons were recovered from the well, and it was considered developed after pumping dry three times. Development on BR01 was started on January 22, 2015 by bailing the well down and allowing it to recover overnight. The next morning the SWL had recovered to 25 ft. bgs and was pumped dry two additional times. Apparently this well exhibits a very low recovery rate and even with a very low pumping rate of 0.05 gpm can be pumped to dryness. Since the well had been bailed the evening before and allowed to recover overnight, it was considered developed after being pumped dry two additional times.

Fisher Associates was again contracted to survey the newly installed points associated with Phase II of the off-site investigation. Once the points were surveyed, YEC Inc. initiated a sampling program on March 10th – 11th, 2015 that incorporated the three new bedrock wells. Detailed field records from field work related to the Phase II bedrock monitoring well sampling program completed by YEC, Inc. are compiled in Appendix E.

Groundwater samples were submitted on March 11th and 12th, 2015, under the chain of custody protocol to the contracted analytical laboratory, TestAmerica, Inc. for VOC and MNA parameter analysis. MNA analysis consisted of the same set of natural attenuation indicator parameters / compounds as detailed in the overburden well MNA sampling discussion described in the previous section. Upon completion of the sample analyses, the laboratory provided the necessary documentation to the HDR's contracted data validator, Data Validation Services, Inc., to allow for preparation of a DUSR on the sampling results. The analytical data summary packages and DUSR for the bedrock wells are also found in Appendix G and F respectively.

3.0 PHYSICAL SETTING

3.1 Climatology, Topography and Surface Water Features

The climate of Spencerport, NY is characterized by warm, humid summers and cold, snowy winters. Temperatures in Monroe County average 24.7 °F in winter and 70.8 °F in summer. Annual precipitation averages are 34.3 inches for rain and 99.5 inches for snow.

The study area for the RI lies at an elevation ranging from approximately 550 to 600 ft. above MSL. Land cover in the area primarily consists of asphalt and concrete (parking areas, roads, and sidewalks), structures (businesses and homes), vegetation (lawns and agricultural property).The nearest surface water feature to the site is Northrup Creek, the nearest tributary of Lake Ontario to the site, and is divided into a western branch (approximately 0.36 miles west of the site) and an eastern branch (approximately 0.55 miles east of the site), both joining the Erie Canal approximately 0.76 miles north/northeast of the site.

3.2 Land Use and Ecology

The dry cleaner is currently housed in a multi-tenant commercial property at the northeast corner of South Union Street and Route 31. Land use for the off-site study area portion of the RI can primarily be classified as commercial development and residential development, with agricultural use to the south. The South Union Street corridor heading north of the site are the primary areas of concentrated commercial development, with large areas of residential development (primarily single family homes) extending on both sides of South Union Street. Residential property composed multi-family condominiums/apartments border the property to the north, business offices to the east, a gasoline station and convenience store to the west and Route 31 to the south with a restaurant and a large agricultural-use parcel.

Given the developed nature of study area for commercial, residential and agricultural purposes, the ecology of the area consists of habitats categorized under the Edinger subsystem classification of Terrestrial Cultural, with specific applicable habitat types characterized under Edinger's classification as paved road / path, urban vacant lot, urban structure exterior, interior of non-agricultural buildings, cropland/row crops, and mowed lawn with trees,. The Terrestrial

Cultural subsystem is generally characterized by "communities that are either created and maintained by human activities, or are modified by human influence to such a degree that the physical conformation of the substrate, or the biological composition of the resident community is substantially different from the character of the substrate or community as it existed prior to human influence" (Edinger et al., 2002).

3.3 Geology

Shallow surface soils observed during the installation of the overburden and bedrock monitoring wells were generally characterized during the RI as a thin layer of soil/fill materials overlying reddish brown clayey silt, sandy silt, or sandy lean clay, with some fine sand and trace coarse grained sand. Lacustrine deposits of stratified native clayey silt/sandy silt/sandy lean clay soils were encountered from approximately 1.5 ft. bgs. to the surface of the bedrock. Appendix B and D includes the Field Boring Logs.

Borehole data collected during the RI generally indicate split-spoon and auger refusal between 21 and 36 ft. bgs., and is suspected to be the top of the Silurian dolostone bedrock, part of the Clinton Group. The field boring logs describe fractured, argillaceous dolostone with occasional fossils and pinhole-sized solution features. Based on data collected during the RI borehole drilling program, the top of bedrock structure indicates an erosional surface that generally dips to the east-northeast and trends along S. Union St.

3.4 Hydrogeology

Groundwater elevation data collected during the RI in August 2014, January 2015 and March 2015, along with a review of groundwater elevation data from previous investigations was utilized to evaluate site hydrogeology.

Previous investigations at the site indicated groundwater depths range from 2.7 to 12.7 ft. bgs. within the parcel that contains the dry cleaner. In general, groundwater was encountered within two hydrostratigraphic units, a shallow overburden groundwater and deep overburden groundwater. The shallow overburden groundwater is estimated to have a west/southwest flow,

which is consistent with historic groundwater elevation data and generally follows Site topography. This unit consists of silty sand and sandy, lean clay with traces of fine sand and gravel. The deep overburden groundwater occurs just above the top of the fractured bedrock and appears to be separated by the shallow groundwater unit by a silty clay layer. The deep groundwater flow is inferred to flow north/northeast following the general northerly dip of the bedrock during most of the year but has a flow reversal during dryer months, to a west/southwest direction.

During the off-site RI, groundwater was found to occur at depths ranging from 5.1 to 26 ft. bgs. over the larger area that includes the 500 South Union site, the gas station across South Union St and the four corners of the intersection of South Union St and Rt. 31. Depth to water measurements from the bedrock and overburden monitoring wells installed as part of the off-site RI were used to calculate groundwater elevations and determine groundwater flow directions for the area surrounding the site (Figure 4 & 5).

On-site investigations have indicated that the localized shallow groundwater flow field at the site is consistently oriented with flow toward the southwest and groundwater elevations from the off-site investigation, interpolated over the area of the site, appear to agree with this assessment. In addition, the presence of contaminants of concern associated with the site in off-site overburden monitoring wells located to the southwest of the site is also indicative of a southwesterly groundwater flow direction in the immediate vicinity of the site. Groundwater elevations from overburden wells installed as part of the off-site RI and located west of the site property vary significantly from east to west over short separation distances, resulting in a flow field shifting to the southeast and east and an average hydraulic gradient of approximately 0.08 ft./ft. in the vicinity of South Union Street and its intersection with Route 31.

The previous on-site investigations indicate that the groundwater flow direction in the deeper overburden may vary seasonally, with flow observed both toward the northeast and toward the southwest. Groundwater elevations from the deepest intervals were obtained from the three bedrock wells installed during 2015 and result in a flow field consistent with the southwesterly

flow exhibited from most of the previous groundwater flow direction evaluations made for the site.

Groundwater elevations calculated from a synoptic round of depth-to-water measurements collected during March 2015 from the new off-site overburden and bedrock monitoring wells also indicate a significant downward vertical gradient between the overburden and bedrock in the three locations with co-located wells. The groundwater elevation in well MW-2 was determined to be approximately 15 ft. higher than that in bedrock well BR02, over a vertical distance of approximately 16 ft. between screened zones. Groundwater elevations in well pair MW-4 / BR03 were two (2) ft. higher in the overburden well than in the bedrock well, over a vertical distance between screened zones of approximately 25 ft. In well pair MW-6 / BR01, the overburden well exhibited elevations 13 ft. higher than those in the bedrock, with the screened zones of the two wells separated by approximately 30 ft. The groundwater elevations and vertical separation distances in these three well pairs result in downward vertical gradients ranging between 0.08 and 0.94 ft./ft.

Vertical gradients of this magnitude would imply the potential for significant downward migration of contamination between the overburden and bedrock aquifers if a sufficient hydraulic connection exists between the aquifers. Data collected during the on-site and off-site investigations are conflicting regarding the extent to which such a connection exists and whether contamination originating in the overburden aquifer has migrated into the bedrock aquifer. Results from the 2015 bedrock monitoring well sampling indicate that contaminants of concern associated with the site have not migrated downward into the bedrock in the off-site study area despite the presence of significant contamination in the deeper overburden aquifer as documented in the on-site RI. Off-site sampling of groundwater from overburden and bedrock monitoring wells does indicate that BTEX compounds detected in the overburden groundwater (and not associated with the site) are also present in the deeper bedrock aquifer, albeit at significantly lower concentrations, suggesting some degree of hydraulic connection and downward migration of contaminants between the overburden and bedrock.

4.0 NATURE AND EXTENT OF CONTAMINATION

The analytical data obtained during the RI is outlined in the sections below and has been qualified as needed as part of the DUSRs (Appendix F) that was conducted on all of the samples that were collected. The complete Analytical Data Summary Packages provided by the analytical laboratory are found in Appendix G.

4.1 Vapor Intrusion Sampling Results – December 2013

In December 2013, ten homes located northeast of the South Union site were sampled for soil vapor intrusion (Table 1; Figure 6). Results from the sampling event were compared to decision matrix 1 and 2 found in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Of the ten structures sampled, only one of the interior air samples tested positive for PCE or any of its breakdown products including TCE, cis-1,2 DCE and vinyl chloride, and the associated sub-slab sample from this location was ND, indicating a likely indoor source for the PCE. For sub-slab samples, only three locations tested positive for PCE but produced non-detect results for its breakdown products. The three sub-slab locations that contained measureable concentrations of PCE were all below 10 $\mu g/m^3$. Applying these detections with their respective indoor air results to the decision matrices, the Department of Health guidelines indicate that no further action is necessary. One particular analyte, carbon tetrachloride, was found in nine of the interior air samples and based on NYSDOH guidance would warrant the recommendation that reasonable and practical actions be taken to identify the source and reduce exposure. However, carbon tetrachloride is not a contaminant of concern for this RI and the absence of this compound in the sub-slab samples suggests a source other than the soil vapor. Other analytes such as Freon-12 and various BTEX compounds were found in varying degrees of concentration; however these analytes are also not attributable to the site.

4.2 Off-Site Soil Sampling Results

Off-site soil samples collected during the drilling of the shallow monitoring wells installed during June & August 2014 yielded only minor detections of contaminants of concern related to the site (Table 2; Figure 7). Several other VOCs, primarily BTEX compounds and others likely related to hydrocarbon (petroleum) contamination, were also detected at two of the sampled locations (two depth intervals at MW-2 and one interval at MW-4). These detections were

incidental detections made as part of the overall United States Environmental Protection Agency (USEPA) Method 8260 VOC analyses and are not associated with documented compounds of concern or historical activities for the 500 South Union site. Further evaluation of the nature and extent of these compounds, aside from noting their presence or absence in the samples collected as part of the off-site investigation, was not conducted.

Soil collected from MW-2 (11-12 ft. depth) contained the only compound detected in the soil at a concentration exceeding NYSDEC Unrestricted Soil Cleanup Objectives (SCOs). This compound was acetone, detected at an estimated concentration of 190 µg/kg. Acetone can be present as a result of its use in the laboratory environment and is thought to be the case for this detection. Given that the presence of acetone is likely due to laboratory processing of the soil samples, the off-site soils are suitable for unrestricted use.

Soil samples collected from two of the well locations, MW-5 and MW-6, did not contain any USEPA Method 8260 VOCs, while only methylene chloride at an estimated concentration of 3.7 µg/kg was detected at a depth of 12 ft. below grade from the sample collected at MW-3 located diagonally opposite from the site at the southwest corner of the intersection of South Union Street and State Highway 31.

The sample collected from a depth of six (6) ft. below grade at drilling location MW-1, located nearest to the site, at the northeast corner of the intersection of South Union Street and State Highway 31, contained the compounds of concern PCE and TCE. Both compounds are related to historical site activities but were detected at concentrations well below their respective Unrestricted Use SCOs. Unrestricted SCOs for PCE and TCE are 1.3 ppm and 0.47 ppm, respectively, and detected concentrations are 0.36 ppm PCE and 0.028 ppm TCE (36 µg/kg PCE and an estimated 2.8 µg/kg TCE).

A detection of PCE at an estimated concentration of 1.2 µg/kg from soil (30 ft. below grade) at the MW-4 drilling location (directly south across State Highway 31 from off-site well MW-1) was the only other detection of a compound of concern associated with historical activities at the site.

4.3 RI Phase I Sampling Results – Overburden / Interface Monitoring Wells

Contaminants of concern associated with the 500 South Union site detected in the off-site overburden groundwater during the August 2014 overburden monitoring well sampling program included PCE, TCE, and cis-1,2 DCE. These compounds were confined to the downgradient wells nearest to the site, MW-1 and MW-4, with two of the detections exceeding the applicable NYSDEC Class GA groundwater quality standards for the respective compounds (9.1 µg/l cis-1,2 DCE and 5.5 µg/l PCE), both in MW-4. Detected compounds of concern from MW-1 included 3.4 µg/l PCE and 0.98 µg/l cis-1,2 DCE, both of which were present at concentrations below their respective NYSDEC Class GA standards of 5 µg/l. The only detection of TCE was in MW-4 where it was present at an estimated concentration of 3.4 µg/l, also below its Class GA standard concentration of 5 µg/l.

As noted above regarding the soil sampling results, several detections of BTEX compounds were also made in the groundwater samples collected as part of the first phase of the off-site groundwater investigation, however these compounds are not associated with the 500 South Union site and a detailed analysis of their distribution is not within the scope of this report. These detections are shown on Figure 8, and compiled in Table 3a and 3b, as part of the overall presentation of groundwater analytical results from the overburden monitoring well sampling program conducted during August 2014.

Groundwater samples were collected to evaluate MNA parameters from the overburden and bedrock monitoring wells installed during the off-site investigation.

As summarized in Table 4a, groundwater collected from the overburden wells exhibited the following natural attenuation related parameters, indicative of a geochemical environment that may be favorable for the natural degradation of contaminants of concern related to the site:

- Alkalinity – elevated concentrations
- Chloride – elevated concentrations but likely due to nearby use of road salt
- Nitrate – slightly elevated concentrations

- Sulfate – elevated concentrations
- Manganese – elevated concentrations however background levels are likely high in this area due to underlying geology

While these parameters suggest that conditions may be favorable for natural attenuation to occur, given the low detected concentrations of contaminants of concern within the off-site study area and the lack of a defined groundwater plume; further MNA analysis and monitoring does not appear warranted at this site. The fact that only low concentrations were found off-site without a defined plume suggests that natural attenuation processes are on-going.

4.4 RI Phase II Sampling Results – Bedrock Monitoring Wells

No contaminants of concern (cVOCs) associated with the 500 South Union site were detected in groundwater samples collected from the three off-site bedrock wells during the March 2015 bedrock monitoring well sampling program (Table 4a; Table 4b; Figure 9). Various combinations of BTEX compounds at generally low concentrations were detected in the groundwater samples obtained from the bedrock wells, however these compounds are not associated with the site and a detailed analysis of their distribution was beyond the scope of the 500 South Union off-site investigation.

MNA parameters were sampled for during the bedrock monitoring well sampling program in the event that detections of contaminants of concern were made in the bedrock. Since no contaminants related to the site were detected in the bedrock groundwater, an evaluation of the suitability of MNA as a remedial alternative for the bedrock was not required. For reference, the results of the bedrock groundwater MNA sampling are included in the RI report as Table 4b.

5.0 REMEDIAL INVESTIGATION SUMMARY

5.1 Field Investigation

Components of the field investigation completed for obtaining data in support of the RI included:

- Off-site SVI samples were collected from residential units in structures located on the adjacent property northeast of the site. A combination of indoor air and sub-slab vapor samples were obtained from ten units for TO-15 plus vinyl chloride analysis.
- Field screening and collection of soil samples via split spoon sampling during borehole advancement at six off-site drilling locations during the overburden monitoring well installation. This sampling allowed additional characterization of the stratigraphy of the unconsolidated glacial deposits overlying bedrock in the vicinity of the site and an assessment of whether site contaminants of concern were present in the off-site surficial deposits.
- Installation and sampling of six off-site monitoring wells (MW-1 through MW-6) in the deeper portion of the glacial overburden and interface of weathered rock overlying competent bedrock based on site data indicating groundwater flow from the site off-site toward the southwest. These overburden / interface wells were installed to depths ranging between 21 and 36 feet below existing grade at their respective drilling locations.
- Installation and sampling of three off-site bedrock monitoring wells to determine whether contaminants of concern had migrated downward on-site – a possibility based on the presence of significant contamination observed at relatively deep levels on-site in the overburden during previous investigations and the lack of any well defined impermeable layer preventing hydraulic connection from overburden through the observed weathered bedrock zone and into fractured competent bedrock.
- Synoptic rounds of groundwater level measurements were completed at the completion of each phase of well installation and sampling. Groundwater elevations were then used to complete an analysis of groundwater flow direction and gradient for the various measurement events.

5.2 Data Interpretation

5.2.1 Off-site Groundwater and Vapor Intrusion

On-site remediation activities appear to have removed the source such that migration of contaminants of concern associated with the site has been limited to residual dissolved phase concentrations in the groundwater and any off-site impacts to groundwater quality have been limited to the shallower portion of the groundwater system since samples collected from wells isolated in the bedrock aquifer do not exhibit the presence of any site related contaminants. The presence of BTEX compounds at elevated concentrations in both the overburden and bedrock well samples collected as part of the off-site RI indicates that the overburden aquifer and deeper bedrock are hydraulically connected to some extent, however similar vertical migration of chlorinated VOCs associated with the site does not appear to have occurred in the off-site areas investigated.

5.3 Potential Exposure Pathways and Receptors

5.3.1 On-site and Off-site Soils

In the off-site area investigated, the extent of soil exposed at the surface is limited due to the coverage of the area by impervious surfaces associated with commercial properties and parking lots along with roadways and driveways bordering three sides of the site property. Areas where soil is present at the surface are limited to right-of-ways along the roadways and some small lawns associated with neighboring properties. The largest area of exposed soil is present on the opposite side of State Highway 31, south of the site.

On-site remediation of contaminated soils was completed during and the remedy was accepted as complete by NYSDEC (NYSDEC, 2014). No historical documentation or evidence of site contaminants of concern being released off-site in the immediate vicinity of the site exists and sampling of the surficial deposits at the drilling locations for the off-site investigation yielded only minor detections of contaminants of concern associated with the site.

The remediation of on-site contaminants as part of the clean-up under the brownfield program, the lack of historical off-site disposal of contaminants in the vicinity of the site, and the presence of only residual concentrations of contaminants in off-site soil samples indicates that there are no potential exposure pathways for off-site soils.

5.3.2 Groundwater and Surface Water

Off-site overburden and bedrock groundwater has been fully characterized in the vicinity of the site and only residual levels of contaminants of concern have been detected, with any detections in relatively close proximity to the site. No documented users of groundwater are present and water is supplied by a municipal system that does not utilize groundwater in the vicinity of the site. There are no proximal surface water bodies that would serve as a receptor for off-site migration of contamination and the results of the off-site RI indicate that only limited migration of contaminants has occurred. Given these findings, no exposure pathway has been identified that would present a threat to human health or the environment via off-site groundwater or surface water.

5.3.3 Soil Vapor

Limited soil vapor intrusion was noted for the contaminants of concern related to the site and the NYSDOH guidance matrix for those compounds which guidance has been developed, including PCE, TCE, and 1,1,1-TCA indicate that these compounds are present in the indoor air and sub-slab samples at concentrations below the threshold requiring either mitigation or additional monitoring. The NYSDOH has also developed a guidance matrix for carbon tetrachloride that indicates efforts should be taken to reduce the concentrations of this compound within the indoor air. Since this compound was not found in the sub-slab soil vapor it does not appear to be related to soil vapor intrusion from the site. The off-site exposure pathway via soil vapor therefore has been characterized as not presenting a threat to human health or the environment.

5.3.4 Fish and Wildlife Impact Analysis

HDR conducted a Fish and Wildlife Resource Impact Analysis (FWIA) to evaluate ecological impact to fish and wildlife resources from Site contaminants. The FWIA was conducted in

conformance with the guidance found in DER-10 and the 1994 Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites. The source of contaminated media at the Site is likely associated with the former dry cleaning operation. Based on the existing site conditions discharges from the dry cleaners would not reach surface water. The RI data shows that the contamination is located at depth and the Site is almost exclusively paved or covered with buildings. While contaminated groundwater has migrated off-Site, given its depth, it does not have the potential to migrate to, erode into or otherwise impact any off-site habitat of endangered, threatened or special concern species or other fish and wildlife resource. Based on two conditions described above (contamination is a result of a discharge, and it does not have the potential to migrate to, erode or otherwise impact resources), according to Appendix 3C of DER 10, this eliminates the need to fully evaluate the potential Site impact to the fish and wildlife resources in the vicinity of the Site. It is unlikely that the Site related contamination has an impact on the local ecological resources.

5.4 Site Specific Remedial Action Objectives

Remedial Action Objectives (RAOs) are developed for a site to determine the levels to what site specific concerns must be addressed to protect human health and environment. Included here are site specific RAOs that are recommended for the off-site areas associated with the 500 South Union Street Site:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore groundwater to pre-disposal/pre-release conditions, to the extent practicable.
- Reduce or remove the source of groundwater contamination, to the extent practicable.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants in soil

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings on-site and off-site.

6.0 CONCLUSIONS

An off-site investigation of potential soil and groundwater contamination and associated vapor intrusion was conducted between June 2014 and March 2015 to determine whether contamination originating on the 500 South Union Street Site extends to off-site areas in the vicinity of the site.

Soil sampling, overburden and bedrock groundwater sampling, and vapor intrusion sampling indicate that residual levels of contaminants of concern related to the site are present in limited off-site locations, however the data collected indicate that only two groundwater samples collected nearest to the site exhibit cVOC concentrations exceeding NYSDEC groundwater quality standards for the respective compounds. Various compounds related to site activities were detected in other samples collected as part of the off-site investigation, however none of these detections were at levels exceeding applicable GW standards / SCOs (for soil samples) or requiring the institution of a monitoring or mitigation program for vapor intrusion in accordance with guidance from NYSDOH's vapor intrusion evaluation matrix. An additional primary

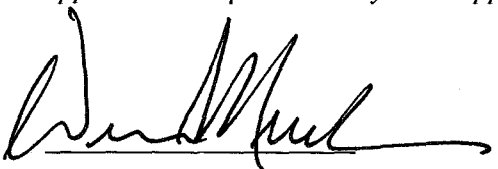
objective of the off-site investigation was to determine whether contaminants detected on-site (and subsequently off-site) in the overburden aquifer had migrated vertically into the underlying bedrock and further dispersed laterally to include contamination of the off-site bedrock aquifer. Samples collected from off-site bedrock wells isolated from the shallower overburden did not reveal the presence of any of the site related contaminants of concern.

On-site remediation conducted prior to the off-site investigation included the excavation and disposal of areas of surface soils impacted with site related contaminants of concern at levels exceeding commercial restricted use soil cleanup objectives. In addition, deeper on-site impacts to groundwater were addressed through the injection of biological amendments to enhance bioremediation in the deeper subsurface. The completed on-site remedy has removed or isolated potential sources of contamination to the groundwater and has reduced the concentration of cVOCs in the on-site groundwater. Monitoring of on-site groundwater quality is on-going in an effort to evaluate the continued effectiveness of the on-site remedies. It is anticipated that these actions will prevent any further migration of site related contaminants off-site and any site related low concentration contamination in the off-site groundwater will naturally attenuate over time.

Based on the very limited detections of site-related contaminants of concern in the various media sampled as part of the off-site investigation, and the fact that the on-site source has been remediated satisfactorily under the NYSDEC BCP, (i.e. completion of the on-site remedy has removed the source of the contamination as detailed in the engineering reports and certificate of completion previously referenced), no action is necessary off-site to protect human health and the environment.

7.0 CERTIFICATION

I Werner Mueller, certify that I am currently a NYS registered professional engineer and *that this Remedial Investigation Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.*



Werner Mueller, P.E., CFM
Contract Manager

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New York State Department of Environmental Conservation (NYSDEC) – 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives, December, 2006.

New York State Department of Environmental Conservation (NYSDEC) – Part 703: Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations, August, 1999.

Table 1
SVI Sampling Results - December 2013 - DRAFT
500 South Union Street RI/FS - Off-Site
NYSDEC Site # C828153A

Sample Name	SU23-IA-121013		SU23-SS-121013		SU29-IA-121013		SU29-SS-121013	
Sample Date	12/10/13 14:05		12/10/13 14:05		12/10/13 8:16		12/10/13 8:16	
Units	ug/m^3		ug/m^3		ug/m^3		ug/m^3	
Constituent								
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.66		ND	U	0.66		ND	U
1,2,4-TRIMETHYLBENZENE	0.77		ND	U	1.2		6.4	
1,2-DICHLOROETHANE	ND	U	ND	U	ND	U	ND	U
1,3,5-TRIMETHYLBENZENE (MESITYLENE)	ND	U	ND	U	ND	U	ND	U
1,4-DIOXANE (P-DIOXANE)	ND	U	ND	U	ND	U	ND	U
2,2,4-TRIMETHYLPENTANE	ND	U	ND	U	ND	U	11	
BENZENE	ND		ND	U	2.6		5.1	
CARBON TETRACHLORIDE	ND		ND	U	0.60		ND	U
CHLOROETHANE	ND	U	ND	U	ND	U	ND	U
CHLOROFORM	ND	U	ND	U	0.92		ND	U
CHLOROMETHANE	1.4		ND	U	4.1		ND	U
CYCLOHEXANE	ND	U	ND	U	0.92		ND	U
DICHLORODIFLUOROMETHANE	12		250		8.4		2500	
ETHANOL	340		740		470		1400	
ETHYLBENZENE	0.92		ND	U	1.8		3.6	
M,P-XYLENES	3.2		ND	U	5.7		17	
METHYL ETHYL KETONE (2-BUTANONE)	2.1		ND	U	1.7		19	
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	0.91		ND	U	3.4		ND	U
METHYLENE CHLORIDE	2.0		ND	U	5.1		ND	U
N-HEXANE	0.89		ND	U	1.5		10	
O-XYLENE (1,2-DIMETHYLBENZENE)	0.97		ND	U	1.9		5.3	
STYRENE	0.40		ND	U	0.48		ND	U
TERT-BUTYL ALCOHOL	1.0		15		ND	U	ND	U
TETRACHLOROETHYLENE(PCE)	ND	U	ND	U	ND	U	8.3	
TOLUENE	3.2		ND	U	13		18	
TRICHLOROFLUOROMETHANE	1.6		ND	U	1.6		5.5	

Notes:
Only rows with at least one detection are shown
U indicates Non Detect - Elevated detection limit due to sample turbidity
Units - for Soil Vapor results are in micrograms per cubic meter
ND - not detected. J - estimated. D - diluted. R- unusable.
E - estimated outside calibration.
B - detected in blank. NJ - tentatively identified and approximated.
New York State does not currently have any standards for subsurface soil vapor. Indoor air values established by NYSDOH for three chemical compounds - PCE, TCE, and methylene chloride - were used for the indoor/ambient air and outdoor air samples.

Table 1
SVI Sampling Results - December 2013 - DRAFT
500 South Union Street RI/FS - Off-Site
NYSDEC Site # C828153A

Sample Name	SU29-SS2-121013 Duplicate of SU29-SS-121013		SU32-IA-121013		SU32-SS-121013		SU33-IA-120913	
Sample Date	12/10/13 8:16		12/10/13 18:34		12/10/13 18:34		12/9/13 18:23	
Units	ug/m^3		ug/m^3		ug/m^3		ug/m^3	
Constituent								
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ND	U	ND	UJ	ND	U	ND	U
1,2,4-TRIMETHYLBENZENE	6.0		ND	UJ	ND	U	0.83	
1,2-DICHLOROETHANE	ND	U	1.7	J	ND	U	0.45	
1,3,5-TRIMETHYLBENZENE (MESITYLENE)	ND	U	ND	UJ	ND	U	ND	U
1,4-DIOXANE (P-DIOXANE)	ND	U	ND	UJ	ND	U	ND	U
2,2,4-TRIMETHYLPENTANE	ND		ND	UJ	ND	U	ND	U
BENZENE	ND		0.71	J	ND	U	0.94	
CARBON TETRACHLORIDE	ND	U	ND	UJ	ND	U	0.69	
CHLOROETHANE	ND	U	ND	UJ	ND	U	ND	U
CHLOROFORM	ND	U	ND	UJ	ND	U	0.45	
CHLOROMETHANE	ND	U	1.5	J	ND	U	1.8	
CYCLOHEXANE	ND	U	ND	UJ	ND	U	ND	U
DICHLORODIFLUOROMETHANE	2600		18	J	310		10	
ETHANOL	1200		230	J	20		560	J
ETHYLBENZENE	3.9		0.90	J	ND	U	0.51	
M,P-XYLENES	17		2.2	J	ND	U	1.4	
METHYL ETHYL KETONE (2-BUTANONE)	18		ND	UJ	ND	U	2.0	
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	ND	U	ND	UJ	ND	U	0.81	
METHYLENE CHLORIDE	ND	U	2.1	J	ND	U	1.9	
N-HEXANE	11		ND	UJ	ND	U	0.81	
O-XYLENE (1,2-DIMETHYLBENZENE)	5.5		ND	UJ	ND	U	0.64	
STYRENE	ND	U	ND	UJ	ND	U	ND	U
TERT-BUTYL ALCOHOL	ND	U	ND	UJ	ND	U	ND	U
TETRACHLOROETHYLENE(PCE)	8.0		ND	UJ	ND	U	ND	U
TOLUENE	19		4.5	J	ND	U	3.9	
TRICHLOROFLUOROMETHANE	5.1		1.6	J	ND	U	1.3	

Notes:
Only rows with at least one detection are shown
U indicates Non Detect - Elevated detection limit due to sample turbidity
Units - for Soil Vapor results are in micrograms per cubic meter
ND - not detected. J - estimated. D - diluted. R- unusable.
E - estimated outside calibration.
B - detected in blank. NJ - tentatively identified and approximated.
New York State does not currently have any standards for subsurface soil vapor. Indoor air values established by NYSDOH for three chemical compounds - PCE, TCE, and methylene chloride - were used for the indoor/ambient air and outdoor air samples.

Table 1
SVI Sampling Results - December 2013 - DRAFT
500 South Union Street RI/FS - Off-Site
NYSDEC Site # C828153A

Sample Name	SU33-SS-12913		SU33-SS2-12913 Duplicate of SU33-SS-12913		SU35-IA-121013		SU35-SS-121013	
Sample Date	12/9/13 18:22		12/9/13 18:22		12/10/13 17:03		12/10/13 17:03	
Units	ug/m^3		ug/m^3		ug/m^3		ug/m^3	
Constituent								
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ND	U	ND	U	0.70	J	ND	UJ
1,2,4-TRIMETHYLBENZENE	ND	U	ND	U	0.48	J	7.2	J
1,2-DICHLOROETHANE	ND	U	ND	U	ND	UJ	ND	UJ
1,3,5-TRIMETHYLBENZENE (MESITYLENE)	ND	U	ND	U	ND	UJ	ND	UJ
1,4-DIOXANE (P-DIOXANE)	ND	U	ND	U	ND	UJ	11	J
2,2,4-TRIMETHYLPENTANE	ND	U	ND	U	ND	UJ	ND	UJ
BENZENE	ND	U	ND	U	1.0	J	5.9	J
CARBON TETRACHLORIDE	ND	U	ND	U	0.55	J	ND	UJ
CHLOROETHANE	ND	U	ND	U	ND	UJ	ND	UJ
CHLOROFORM	ND	U	ND	U	ND	UJ	ND	UJ
CHLOROMETHANE	1.3		ND	U	1.3	J	ND	UJ
CYCLOHEXANE	ND	U	ND	U	ND	UJ	ND	UJ
DICHLORODIFLUOROMETHANE	1500		1600		4.1	J	720	J
ETHANOL	500		380		74	J	110	J
ETHYLBENZENE	ND	U	ND	U	0.64	J	ND	UJ
M,P-XYLENES	1.1		ND	U	2.3	J	8.8	J
METHYL ETHYL KETONE (2-BUTANONE)	3.7		ND	U	1.5	J	ND	UJ
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	ND	U	ND	U	0.99	J	12	J
METHYLENE CHLORIDE	ND	U	ND	U	1.6	J	ND	UJ
N-HEXANE	ND	U	ND	U	0.78	J	ND	UJ
O-XYLENE (1,2-DIMETHYLBENZENE)	ND	U	ND	U	0.88	J	ND	UJ
STYRENE	ND	U	ND	U	ND	UJ	ND	UJ
TERT-BUTYL ALCOHOL	ND	U	ND	U	ND	UJ	ND	UJ
TETRACHLOROETHYLENE(PCE)	1.4		ND	U	ND	UJ	ND	UJ
TOLUENE	ND	U	ND	U	4.6	J	19	J
TRICHLOROFLUOROMETHANE	1.7		ND	U	1.5	J	ND	UJ

Notes:
Only rows with at least one detection are shown
U indicates Non Detect - Elevated detection limit due to sample turbidity
Units - for Soil Vapor results are in micrograms per cubic meter
ND - not detected. J - estimated. D - diluted. R- unusable.
E - estimated outside calibration.
B - detected in blank. NJ - tentatively identified and approximated.
New York State does not currently have any standards for subsurface soil vapor. Indoor air values established by NYSDOH for three chemical compounds - PCE, TCE, and methylene chloride - were used for the indoor/ambient air and outdoor air samples.

Table 1
SVI Sampling Results - December 2013 - DRAFT
500 South Union Street RI/FS - Off-Site
NYSDEC Site # C828153A

Sample Name	SU41-IA-121013		SU41-SS-121013		SU43-IA-121013		SU43-SS-121013		SU49-IA-121013	
Sample Date	12/10/13 13:14		12/10/13 13:13		12/10/13 7:55		12/10/13 7:55		12/10/13 10:00	
Units	ug/m^3		ug/m^3		ug/m^3		ug/m^3		ug/m^3	
Constituent										
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.68	J	ND	U	0.67		ND	UJ	0.66	
1,2,4-TRIMETHYLBENZENE	3.0	J	7.9		ND	U	ND	UJ	ND	U
1,2-DICHLOROETHANE	ND	UJ	ND	U	ND	U	ND	UJ	ND	U
1,3,5-TRIMETHYLBENZENE (MESITYLENE)	0.61	J	ND	U	ND	U	ND	UJ	ND	U
1,4-DIOXANE (P-DIOXANE)	ND	UJ	ND	U	ND	U	ND	UJ	ND	U
2,2,4-TRIMETHYLPENTANE	ND	UJ	ND	U	ND	U	5.4	J	ND	U
BENZENE	1.9	J	ND	U	0.77		3.4	J	0.67	
CARBON TETRACHLORIDE	0.49	J	ND	U	0.47		ND	UJ	0.48	
CHLOROETHANE	ND	UJ	ND	U	ND	U	ND	UJ	ND	U
CHLOROFORM	ND	UJ	ND	U	ND	U	ND	UJ	ND	U
CHLOROMETHANE	1.3	J	ND	U	1.2		ND	UJ	1.3	
CYCLOHEXANE	0.71	J	ND	U	ND	U	14	J	ND	U
DICHLORODIFLUOROMETHANE	4.9	J	1100		3.1		130	J	12	
ETHANOL	270	J	600		25		93	J	570	
ETHYLBENZENE	1.4	J	ND	U	ND	U	4.5	J	ND	U
M,P-XYLENES	5.8	J	12		0.94		16	J	1.1	
METHYL ETHYL KETONE (2-BUTANONE)	1.3	J	ND	U	2.8		7.3	J	2.9	
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	ND	UJ	8.5		ND	U	ND	UJ	ND	U
METHYLENE CHLORIDE	ND	UJ	ND	U	1.3		5.4	J	ND	U
N-HEXANE	2.8	J	ND	U	1.1		9.9	J	0.76	
O-XYLENE (1,2-DIMETHYLBENZENE)	2.1	J	5.1		0.35		5.5	J	0.42	
STYRENE	ND	UJ	ND	U	ND	U	ND	UJ	ND	U
TERT-BUTYL ALCOHOL	ND	UJ	ND	U	ND	U	5.2	J	ND	U
TETRACHLOROETHYLENE(PCE)	ND	UJ	ND	U	ND	U	ND	UJ	ND	U
TOLUENE	6.8	J	9.7		1.9		19	J	5.0	
TRICHLOROFLUOROMETHANE	1.5	J	ND	U	1.4		ND	UJ	1.4	

Notes:
Only rows with at least one detection are shown
U indicates Non Detect - Elevated detection limit due to sample turbidity
Units - for Soil Vapor results are in micrograms per cubic meter
ND - not detected. J - estimated. D - diluted. R- unusable.
E - estimated outside calibration.
B - detected in blank. NJ - tentatively identified and approximated.
New York State does not currently have any standards for subsurface soil vapor. Indoor air values established by NYSDOH for three chemical compounds - PCE, TCE, and methylene chloride - were used for the indoor/ambient air and outdoor air samples.

Table 1
SVI Sampling Results - December 2013 - DRAFT
500 South Union Street RI/FS - Off-Site
NYSDEC Site # C828153A

Sample Name	SU49-SS-121013		SU52-IA-12913		SU52-SS-12913		SU56-IA-12913		SU56-SS-12913	
Sample Date	12/10/13 10:00		12/9/13 16:15		12/9/13 16:15		12/9/13 17:33		12/9/13 17:31	
Units	ug/m^3		ug/m^3		ug/m^3		ug/m^3		ug/m^3	
Constituent										
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ND	U	ND	U	ND	UJ	ND	UJ	ND	U
1,2,4-TRIMETHYLBENZENE	ND	U	0.58		2.9	J	ND	UJ	28	
1,2-DICHLOROETHANE	ND	U	ND	U	ND	UJ	ND	UJ	ND	U
1,3,5-TRIMETHYLBENZENE (MESITYLENE)	ND	U	ND	U	1.1	J	ND	UJ	11	
1,4-DIOXANE (P-DIOXANE)	ND	U	ND	U	3.4	J	1.3	J	ND	U
2,2,4-TRIMETHYLPENTANE	11		ND	U	4.4	J	ND	UJ	31	
BENZENE	ND	U	0.50		3.7	J	0.69	J	15	
CARBON TETRACHLORIDE	ND	U	0.54		ND	UJ	1.2	J	ND	U
CHLOROETHANE	ND	U	ND	U	0.79	J	ND	UJ	0.81	
CHLOROFORM	ND	U	ND	U	1.5	J	3.7	J	ND	U
CHLOROMETHANE	ND	U	1.0		1.6	J	3.2	J	ND	U
CYCLOHEXANE	ND	U	ND	U	6.1	J	ND	UJ	22	
DICHLORODIFLUOROMETHANE	2400		8.0		270	J	15	J	540	
ETHANOL	410		220	J	300	J	720	J	630	
ETHYLBENZENE	ND	U	0.38		1.4	J	ND	UJ	7.7	
M,P-XYLENES	6.5		1.2		7.3	J	0.82	J	47	
METHYL ETHYL KETONE (2-BUTANONE)	13		ND	U	6.9	J	1.2	J	18	
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	ND	U	2.3		ND	UJ	ND	UJ	5.8	
METHYLENE CHLORIDE	ND	U	1.7		1.9	J	1.2	J	2.7	
N-HEXANE	ND	U	ND	U	11	J	0.74	J	43	
O-XYLENE (1,2-DIMETHYLBENZENE)	ND	U	0.47		2.3	J	ND	UJ	14	
STYRENE	ND	U	ND	U	ND	UJ	ND	UJ	1.2	
TERT-BUTYL ALCOHOL	ND	U	ND	U	ND	UJ	ND	UJ	6	
TETRACHLOROETHYLENE(PCE)	ND	U	ND	U	ND	UJ	ND	UJ	2.8	
TOLUENE	12		1.8		10	J	1.9	J	48	
TRICHLOROFLUOROMETHANE	ND	U	1.2		1.3	J	1.3	J	2.6	

Notes:
Only rows with at least one detection are shown
U indicates Non Detect - Elevated detection limit due to sample turbidity
Units - for Soil Vapor results are in micrograms per cubic meter
ND - not detected. J - estimated. D - diluted. R- unusable.
E - estimated outside calibration.
B - detected in blank. NJ - tentatively identified and approximated.
New York State does not currently have any standards for subsurface soil vapor. Indoor air values established by NYSDOH for three chemical compounds - PCE, TCE, and methylene chloride - were used for the indoor/ambient air and outdoor air samples.

Table 1
SVI Sampling Results - December 2013 - DRAFT
500 South Union Street RI/FS - Off-Site
NYSDEC Site # C828153A

Sample Name	SUOA1-12913		SUOA2-121013	
Sample Date	12/9/13 17:56		12/10/13 14:00	
Units	ug/m^3		ug/m^3	
Constituent				
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ND	U	0.65	
1,2,4-TRIMETHYLBENZENE	ND	U	ND	U
1,2-DICHLOROETHANE	ND	U	ND	U
1,3,5-TRIMETHYLBENZENE (MESITYLENE)	ND	U	ND	U
1,4-DIOXANE (P-DIOXANE)	ND	U	ND	U
2,2,4-TRIMETHYLPENTANE	ND	U	ND	U
BENZENE	0.45		0.58	
CARBON TETRACHLORIDE	0.44		0.45	
CHLOROETHANE	ND	U	ND	U
CHLOROFORM	ND	U	ND	U
CHLOROMETHANE	1.2		1.3	
CYCLOHEXANE	ND	U	ND	U
DICHLORODIFLUOROMETHANE	2.4		2.1	
ETHANOL	6.3		12	
ETHYLBENZENE	ND	U	ND	U
M,P-XYLENES	ND	U	0.67	
METHYL ETHYL KETONE (2-BUTANONE)	ND	U	1.5	
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	1.0		ND	U
METHYLENE CHLORIDE	0.91		5.9	
N-HEXANE	ND	U	1.2	
O-XYLENE (1,2-DIMETHYLBENZENE)	ND	U	ND	U
STYRENE	ND	U	ND	U
TERT-BUTYL ALCOHOL	ND	U	ND	U
TETRACHLOROETHYLENE(PCE)	ND	U	ND	U
TOLUENE	0.65		1.5	
TRICHLOROFLUOROMETHANE	1.1		1.6	

Notes:
Only rows with at least one detection are shown
U indicates Non Detect - Elevated detection limit due to sample turbidity
Units - for Soil Vapor results are in micrograms per cubic meter
ND - not detected. J - estimated. D - diluted. R- unusable.
E - estimated outside calibration.
B - detected in blank. NJ - tentatively identified and approximated.
New York State does not currently have any standards for subsurface soil vapor. Indoor air values established by NYSDOH for three chemical compounds - PCE, TCE, and methylene chloride - were used for the indoor/ambient air and outdoor air samples.

Table 2
Soil Sampling Results - June - August 2014 - DRAFT
500 South Union Street RI/FS - Off-Site
NYSDEC #C828153A

Sample Location				MW-1 (6')		MW-2 (11-12')		MW-2 (20-21')		MW3 (12')	
Sample Name				MW-1 (6')-20140625		MW-2 (11-12')-20140623		MW-2 (20-21')-20140623		MW3 (12')-20140626	
Sample Date				6/25/14 11:30		6/23/14 14:15		6/23/14 14:31		6/26/14 12:30	
Sample Depth				6'		11-12'		20-21'		12'	
Laboratory ID				480626745		480626742		480626742		480628372	
Constituent	Commerical	Groundwater	Unrestricted Use								
ACETONE	500,000	50	50	ND	U	**190**	**J**	ND	U	ND	U
BENZENE	44,000	60	60	ND	U	ND	U	5.0	J	ND	U
ETHYLBENZENE	390,000	1000	1000	ND	U	350		42		ND	U
ISOPROPYLBENZENE (CUMENE)	NA	NA	NA	ND	U	79		2.9	J	ND	U
METHYL ETHYL KETONE (2-BUTANONE)	500,000	120	120	ND	U	65	J	ND	U	ND	U
METHYLCYCLOHEXANE	NA	NA	NA	ND	U	130		ND	U	ND	U
METHYLENE CHLORIDE	500,000	50	50	ND	UJ	ND	U	2.9	J	ND	U
TETRACHLOROETHYLENE(PCE)	150,000	1300	1300	36		ND	U	ND	U	ND	U
TRICHLOROETHYLENE (TCE)	200,000	470	470	2.8	J	ND	U	ND	U	ND	U
XYLENES, TOTAL	500,000	1600	1600	ND	U	430	NJ	1.8	J	ND	U

Units - ug/kg Bold/highlighted cell – exceedance of criteria
NS - No Standard - Only compounds with at least one detection are shown.
Qualifiers - NA - criteria or standard not available
R - rejected
B – also detected in associated method blank
J – estimated value; ND – not detected
NDJ – not detected, estimated reporting limit
NJ – positive identification of tentatively identified compound, estimated value
P – greater than 40% difference between primary and confirmation analyses
* - LCS or LCSD exceeds the control limits;
^ - Instrument related to QC exceeds control limits
Criteria – NYS DEC 6 NYCRR PART 375-6(b) Protection of Groundwater , Restricted Commercial Use SCO, and unrestricted Use

Table 2
Soil Sampling Results - June - August 2014 - DRAFT
500 South Union Street RI/FS - Off-Site
NYSDEC #C828153A

Sample Location				MW-4 (30')		MW-5 (20-21')		MW-6 (30-31')		MW-6-DUPE	
Sample Name				MW-4 (30')-20140624		MW-5 (20-21')-20140624		MW-6-(30-31') 20140804		DUPE	
Sample Date				6/24/14 14:47		6/24/14 10:00		8/4/14 9:27		8/4/14 0:00	
Sample Depth				30'		20-21'		30-31'			
Laboratory ID				480626744		480626743		480648871		480648872	
Constituent	Commerical	Groundwater	Unrestricted Use								
ACETONE	500,000	50	50	17	J	ND	U	ND	U	ND	U
BENZENE	44,000	60	60	0.55	J	ND	U	ND	U	ND	U
ETHYLBENZENE	390,000	1000	1000	0.38	NJ	ND	U	ND	U	ND	U
ISOPROPYLBENZENE (CUMENE)	NA	NA	NA	ND	U	ND	U	ND	U	ND	U
METHYL ETHYL KETONE (2-BUTANONE)	500,000	120	120	8.7	J	ND	U	ND	U	ND	U
METHYLCYCLOHEXANE	NA	NA	NA	3.1	J	ND	U	ND	U	ND	U
METHYLENE CHLORIDE	500,000	50	50	ND	U	ND	UJ	ND	U	ND	U
TETRACHLOROETHYLENE(PCE)	150,000	1300	1300	1.2	J	ND	U	ND	U	ND	U
TRICHLOROETHYLENE (TCE)	200,000	470	470	ND	U	ND	U	ND	U	ND	U
XYLENES, TOTAL	500,000	1600	1600	2.2	J	ND	U	ND	U	ND	U

Units - ug/kg Bold/highlighted cell – exceedance of criteria
NS - No Standard - Only compounds with at least one detection are shown.
Qualifiers - NA - criteria or standard not available
R - rejected
B – also detected in associated method blank
J – estimated value; ND – not detected
NDJ – not detected, estimated reporting limit
NJ – positive identification of tentatively identified compound, estimated value
P – greater than 40% difference between primary and confirmation analyses
* - LCS or LCSD exceeds the control limits;
^ - Instrument related to QC exceeds control limits
Criteria – NYS DEC 6 NYCRR PART 375-6(b) Protection of Groundwater , Restricted Commercial Use SCO, and unrestricted Use

Table 3a

Overburden Monitoring Well Sampling Results - VOCs - August 2014 - DRAFT

500 South Union Street RI/FS - Off-Site

NYSDEC #C828153A

Sample Location		MW-1		MW-2		MW-3		MW-4	
Sample Name		MW-1-20140821		MW-2-20140821		MW-3-20140820		MW-4-20140820	
Sample Date		8/21/2014 9:50		8/21/2014 13:20		8/20/2014 13:10		8/20/2014 11:00	
Laboratory ID		480-65983-1		480-65983-2		480-65902-2		480-65902-1	
Constituent	Criteria								
ACETONE	NA	ND	U	ND	U	ND	U	ND	U
BENZENE	1	**1.9**		**890**		**8.0**	NJ	ND	U
CARBON DISULFIDE	60	0.35	J	ND	U	ND	UJ	ND	UJ
CIS-1,2-DICHLOROETHYLENE	5	0.98	J	ND	U	ND	U	**9.1**	
ETHYLBENZENE	5	ND	U	**770**		ND	U	ND	U
ISOPROPYLBENZENE (CUMENE)	5	ND	U	**36**		ND	U	ND	U
TERT-BUTYL METHYL ETHER	NA	ND	U	ND	U	ND	U	ND	U
TETRACHLOROETHYLENE(PCE)	5	3.4		ND	U	ND	U	**5.5**	
TOLUENE	5	1.9		**42**		ND	U	ND	U
TRICHLOROETHYLENE (TCE)	5	ND	U	ND	U	ND	U	2.2	J
XYLENES, TOTAL	5	1.3	J	**45**		ND	U	ND	U

Units - ug/l Bold/highlighted cell – exceedance of criteria
Only rows with at least one detection are shown.
* - Blind Duplicate for MW-4
TB - Trip Blank
FB - Field Blank

Qualifiers -
NA - criteria or standard not available
B – also detected in associated method blank
J – estimated value; ND – not detected
R - rejected
NDJ – not detected, estimated reporting limit
NJ – positive identification of tentatively identified compound, estimated value
P – greater than 40% difference between primary and confirmation analyses
UJ- The analyte was analyzed for, but was not detected.
The associated reported quantitation limit it approximate and
may be inaccurate or imprecise
Criteria – Groundwater –
Part 703: Surface Water and Groundwater Quality Standards (Class GA)

Table 3a

Overburden Monitoring Well Sampling Results - VOCs - August 2014 - DRAFT

500 South Union Street RI/FS - Off-Site

NYSDEC #C828153A

Sample Location		MW-5		MW-54*		MW-6		TB-01		TB-02		FB-01	
Sample Name		MW-5-20140821		MW-54-20140820		MW-6-20140820		TB-01-20140811		TB-02-20140811		FB-01-20140820	
Sample Date		8/21/2014 11:35		8/20/2014 11:00		8/20/2014 16:10		8/21/2014 0:00		8/21/2014 0:00		8/20/2014 13:40	
Laboratory ID		480-65983-3		480-65902-3		480-65902-6		480-65902-5		480-65983-4		480-65902-4	
Constituent	Criteria												
ACETONE	NA	ND	U	ND	U	ND	U	ND	U	ND	U	4.1	J
BENZENE	1	**140**		ND	U	ND	U	ND	U	ND	U	ND	U
CARBON DISULFIDE	60	ND	U	ND	UJ	ND	UJ	ND	UJ	ND	U	ND	UJ
CIS-1,2-DICHLOROETHYLENE	5	ND	U	**7.4**		ND	U	ND	U	ND	U	ND	U
ETHYLBENZENE	5	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
ISOPROPYLBENZENE (CUMENE)	5	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
TERT-BUTYL METHYL ETHER	NA	ND	U	0.16	J	ND	U	ND	U	ND	U	ND	U
TETRACHLOROETHYLENE(PCE)	5	ND	U	3.7		ND	U	ND	U	ND	U	ND	U
TOLUENE	5	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
TRICHLOROETHYLENE (TCE)	5	ND	U	1.5		ND	U	ND	U	ND	U	ND	U
XYLENES, TOTAL	5	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U

Units - ug/l Bold/highlighted cell – exceedance of criteria
Only rows with at least one detection are shown.
* - Blind Duplicate for MW-4
TB - Trip Blank
FB - Field Blank

Qualifiers -
NA - criteria or standard not available
B – also detected in associated method blank
J – estimated value; ND – not detected
R - rejected
NDJ – not detected, estimated reporting limit
NJ – positive identification of tentatively identified compound, estimated value
P – greater than 40% difference between primary and confirmation analyses
UJ- The analyte was analyzed for, but was not detected.
The associated reported quantitation limit it approximate and
may be inaccurate or imprecise
Criteria – Groundwater –
Part 703: Surface Water and Groundwater Quality Standards (Class GA)

Table 3b

Overburden Monitoring Well Sampling Results - MNA - August 2014 - DRAFT

500 South Union Street RI/FS - Off-Site

NYSDEC #C828153A

Sample Location	MW-1		MW-2		MW-3		MW-4		MW-5		MW-6	
Sample Name	MW-1-20140821		MW-2-20140821		MW-3-20140820		MW-4-20140820		MW-5-20140821		MW-6-20140820	
Sample Date	8/21/2014 9:50		8/21/2014 13:20		8/20/2014 13:10		8/20/2014 11:00		8/21/2014 11:35		8/20/2014 16:10	
Laboratory ID	480-65983-1		480-65983-2		480-65902-2		480-65902-1		480-65983-3		480-65902-6	
Constituent												
ALKALINITY, BICARBONATE (AS CACO3)	309		559		650		392		439		202	
ALKALINITY, CARBONATE (AS CACO3)	ND	U	ND	U	ND	U	ND	U	ND	U	5.5	
ALKALINITY, HYDROXIDE (AS CACO3)	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
ALKALINITY, TOTAL (AS CACO3)	309		559		650		392		439		208	
CHLORIDE (AS CL)	632	B	1040		2070		903		715		35.3	
NITROGEN, NITRATE (AS N)	0.047	J	ND	U	2.9		0.025	J	1.8		ND	U
NITROGEN, NITRITE	ND	U	ND	U	0.024	J	ND	U	0.042	BJ	ND	U
SULFATE (AS SO4)	156		37.2		152		154		106		90.9	
SULFIDE	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
IRON	ND	U	ND	U	ND	U	0.73		ND	U	0.024	J
MANGANESE	0.083		0.42		0.63		0.021		0.31		0.0028	J

Units - mg/l Bold/highlighted cell – exceedance of criteria

Qualifiers -

NA - criteria or standard not available

B – also detected in associated method blank

J – estimated value; ND – not detected

R - rejected

NDJ – not detected, estimated reporting limit

NJ – positive identification of tentatively identified compound, estimated value

P – greater than 40% difference between primary and confirmation analyses

UJ- The analyte was analyzed for, but was not detected.
The associated reported quantitation limit it approximate and
may be inaccurate or imprecise

Criteria – Groundwater –

Part 703: Surface Water and Groundwater Quality Standards (Class GA)

Table 4a
Bedrock Well Sampling Results - VOCs - March 2014 - DRAFT
500 South Union Street RI/FS - Off-Site
NYSDEC #C828153A

Sample Location		BR01		BR02		BR03	
Sample Name		BR0120150311-20150311		BR0220150310-20150310		BR0320150310-20150310	
Sample Date		3/11/2015 11:20		3/10/2015 19:05		3/10/2015 16:00	
Laboratory ID		480-76504-1		480-76504-3		480-76408-3	
Constituent	Criteria						
ACETONE	NA	120	J	5.2		5.6	
BENZENE	1	ND	U	ND	U	ND	U
CARBON DISULFIDE	60	0.49		ND	U	ND	U
CHLOROFORM	7	0.65		ND	U	ND	U
CYCLOHEXANE	NA	12	J	ND	U	ND	U
ETHYLBENZENE	5	1.4		ND	U	ND	U
METHYLCYCLOHEXANE	NA	23	J	3.7		3.8	J
METHYLENE CHLORIDE	5	ND	U	ND	U	ND	U
TOLUENE	5	3.3		1.7		1.7	
XYLENES, TOTAL	5	**12**		2.4		2.6	

Units - ug/l Bold/highlighted cell – exceedance of criteria
Only compounds with at least one detection are shown
FB - Field Blank

Qualifiers -
NA - criteria or standard not available
B – also detected in associated method blank
J – estimated value; ND – not detected
R - rejected
NDJ – not detected, estimated reporting limit
NJ – positive identification of tentatively identified compound, estimated value
P – greater than 40% difference between primary and confirmation analyses
UJ- The analyte was analyzed for, but was not detected.
The associated reported quantitation limit it approximate and
may be inaccurate or imprecise
Criteria – Groundwater –
Part 703: Surface Water and Groundwater Quality Standards (Class GA)

Table 4a

Bedrock Well Sampling Results - VOCs - March 2014 - DRAFT

500 South Union Street RI/FS - Off-Site

NYSDEC #C828153A

Sample Location		BR03-DUP		TRIP BLANK		TRIP BLANK		FB-1	
Sample Name		BR0320150310 DUP-20150310		TRIP BLANK-20150310		TRIP BLANK-20150311		FB-120150311-20150311	
Sample Date		3/10/2015 16:00		3/10/2015 0:00		3/11/2015 0:00		3/11/2015 8:50	
Laboratory ID		480-76408-2		480-76408-4		480-76504-3		480-76504-2	
Constituent	Criteria								
ACETONE	NA	13		ND	U	ND	UJ	ND	UJ
BENZENE	1	0.74		ND	U	ND	U	ND	U
CARBON DISULFIDE	60	ND	U	ND	U	ND	U	ND	U
CHLOROFORM	7	1.1		ND	U	ND	U	ND	U
CYCLOHEXANE	NA	ND	U	ND	U	ND	UJ	ND	UJ
ETHYLBENZENE	5	0.81		ND	U	ND	U	ND	U
METHYLCYCLOHEXANE	NA	7.1	J	ND	U	ND	UJ	ND	UJ
METHYLENE CHLORIDE	5	ND	U	ND	U	0.72		ND	U
TOLUENE	5	1.2		ND	U	ND	U	ND	U
XYLENES, TOTAL	5	3.6		ND	U	ND	U	ND	U

Units - ug/l Bold/highlighted cell – exceedance of criteria

Only compounds with at least one detection are shown

FB - Field Blank

Qualifiers -

NA - criteria or standard not available

B – also detected in associated method blank

J – estimated value; ND – not detected

R - rejected

NDJ – not detected, estimated reporting limit

NJ – positive identification of tentatively identified compound, estimated value

P – greater than 40% difference between primary and confirmation analyses

UJ- The analyte was analyzed for, but was not detected.

The associated reported quantitation limit it approximate and

may be inaccurate or imprecise

Criteria – Groundwater –

Part 703: Surface Water and Groundwater Quality Standards (Class GA)

Table 4b
Bedrock Well Sampling Results - MNA - March 2014 - DRAFT
500 South Union Street RI/FS - Off-Site
NYSDEC #C828153A

Sample Location	BR01		BR02		BR03	
Sample Name	BR0120150311-20150311		BR0220150310-20150310		BR0320150310-20150310	
Sample Date	3/11/2015 11:20		3/10/2015 19:05		3/10/2015 16:00	
Laboratory ID	480-76504-1		480-76504-3		480-76408-3	
Constituent						
ALKALINITY, BICARBONATE (AS CACO3)	329	B	179	B	260	B
ALKALINITY, CARBONATE (AS CACO3)	ND	U	6.8		ND	U
ALKALINITY, HYDROXIDE (AS CACO3)	ND	U	ND	U	ND	U
ALKALINITY, TOTAL (AS CACO3)	329	BF	185	B	260	B
Nitrogen, Nitrate (As N)	0.043	J	0.026	J	ND	U
NITROGEN, NITRITE	ND	U	ND	U	ND	U
SULFIDE	ND	U	ND	U	ND	U
SULFATE (AS SO4)	3990		770		171	
CHLORIDE (AS CL)	75.1	B	23.1	B	274	B
IRON	0.038	J	ND	U	ND	U
MANGANESE	0.029		0.0018	J	0.0068	

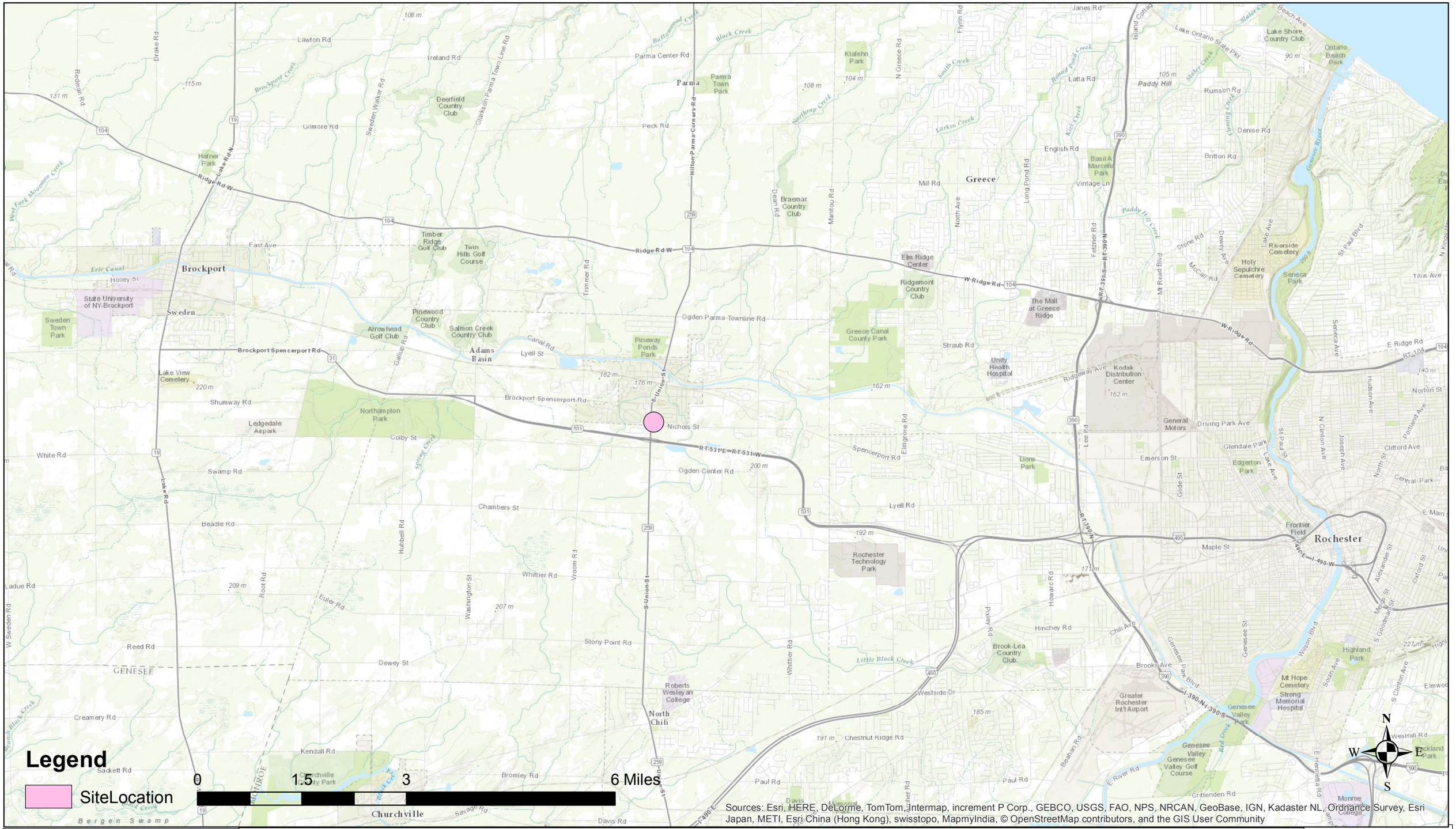
Units - mg/l Bold/highlighted cell – exceedance of criteria

Qualifiers -
NA - criteria or standard not available
B – also detected in associated method blank
J – estimated value; ND – not detected
R - rejected
NDJ – not detected, estimated reporting limit

NJ – positive identification of tentatively identified compound, estimated value

P – greater than 40% difference between primary and confirmation analyses
F - MS/MSD recovery exceeds the control limits
Criteria – Groundwater –

Part 703: Surface Water and Groundwater Quality Standards (Class GA)

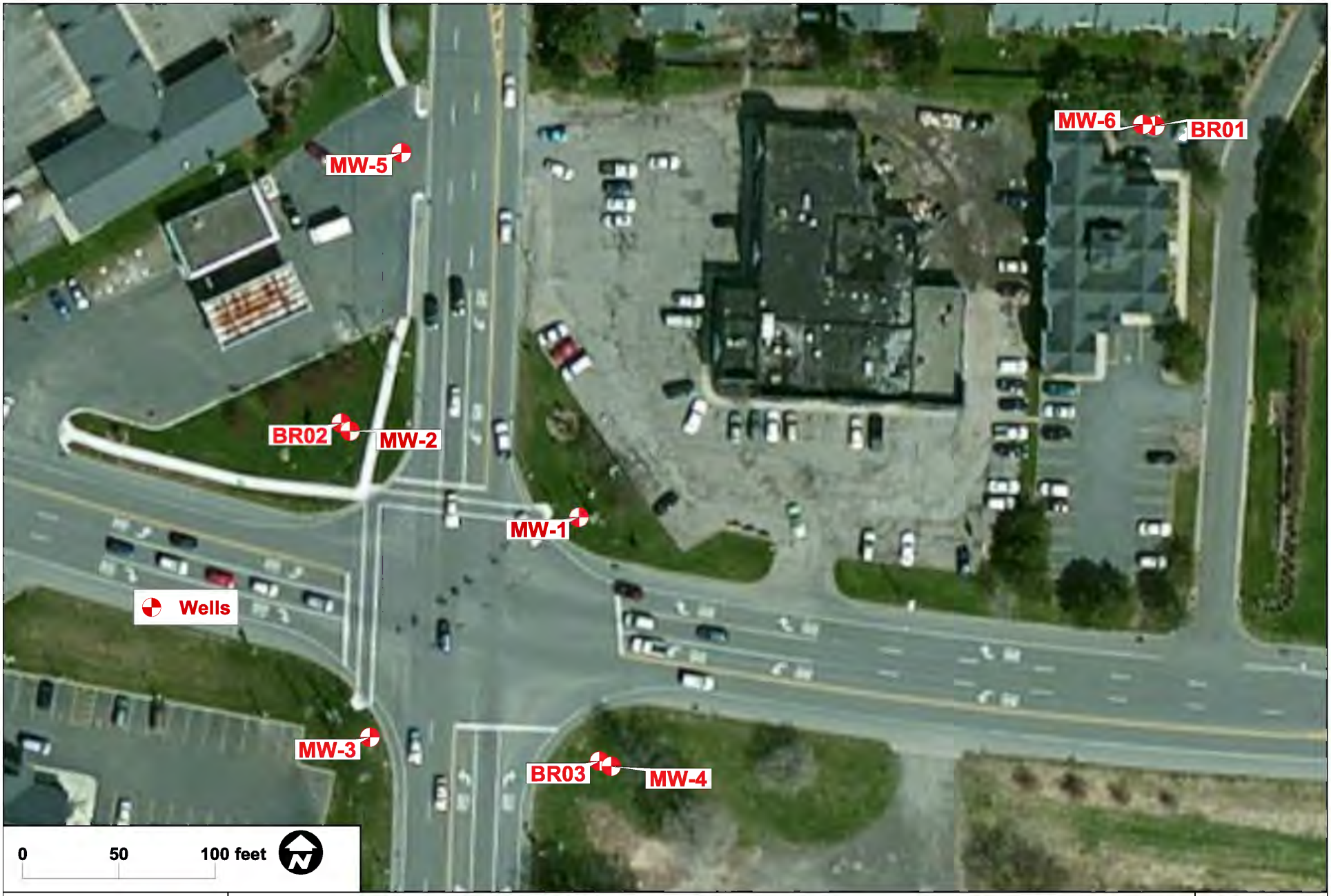


500 South Union Street - Off-Site RI/FS NYSDEC Site # C828153A

Spencerport, Monroe County, New York

Date: 07/07/2015

Figure: 1



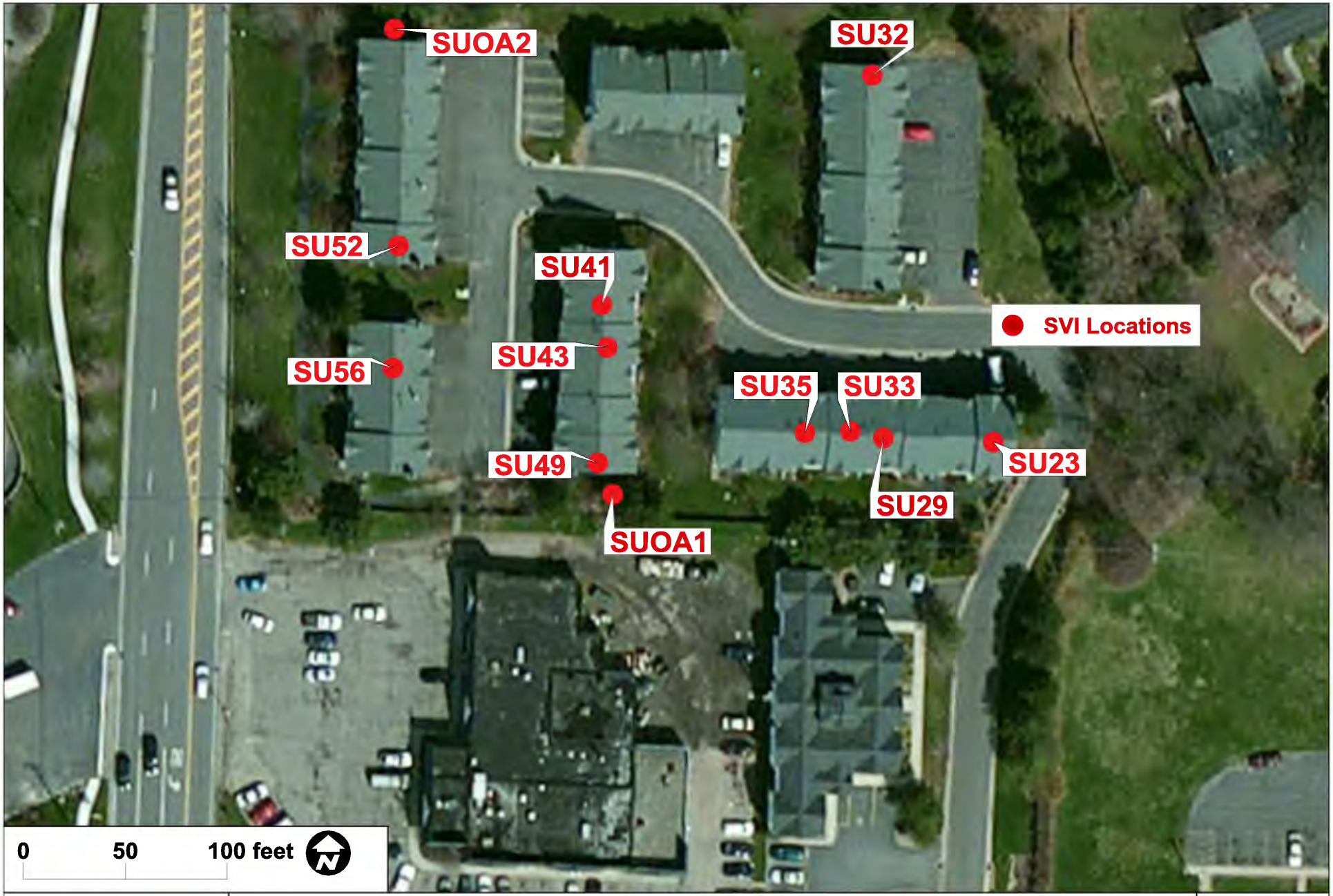
Groundwater and Soil Sampling Locations

500 South Union Street - Off-Site RI/FS NYSDEC Site # C828153A

Spencerport, Monroe County, New York

DATE 07/16/2015

FIGURE 2



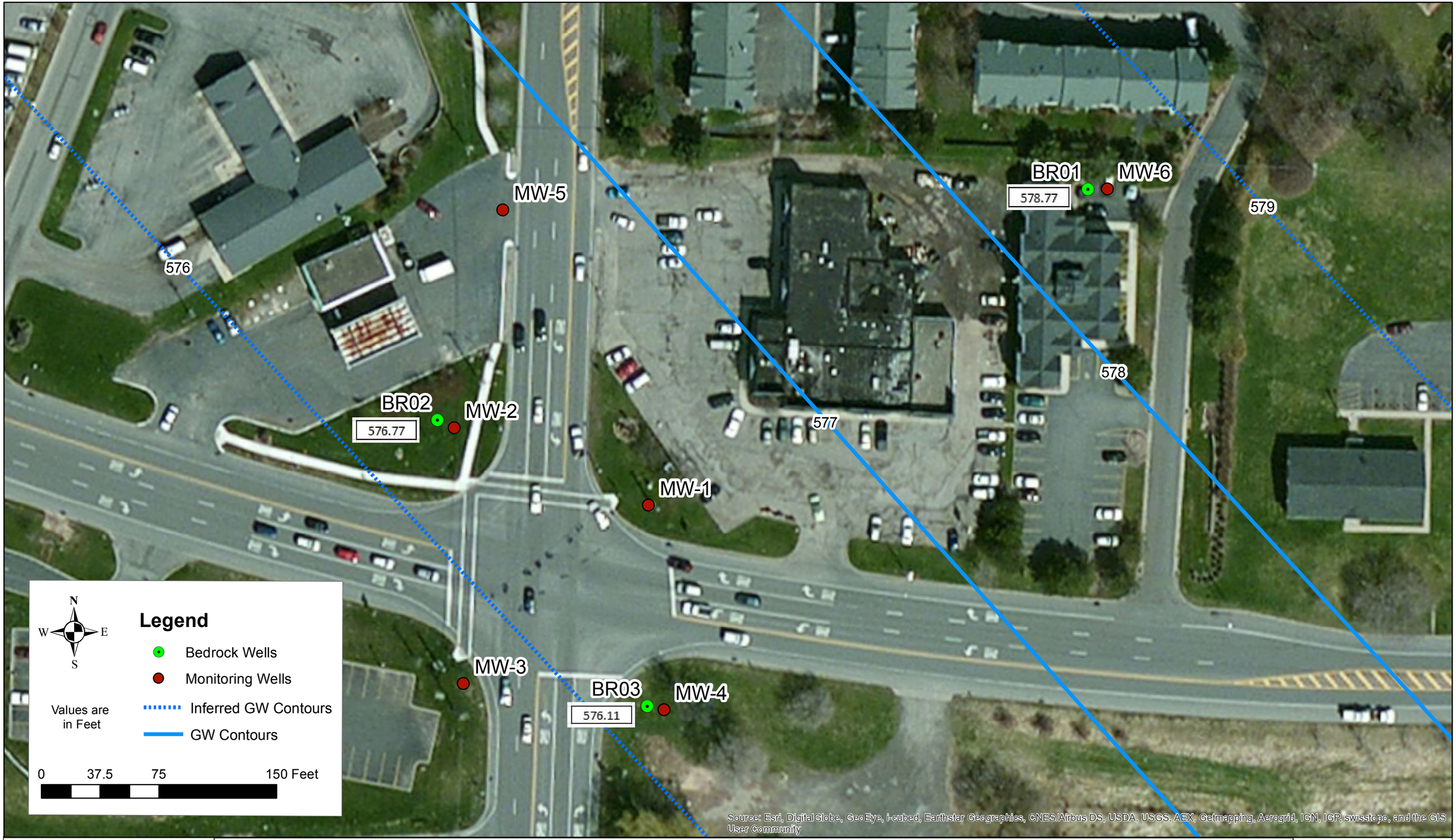
SVI Sampling Locations

500 South Union Street - Off-Site RI/FS NYSDEC Site # C828153A

Spencerport, Monroe County, New York

DATE 07/16/2015

FIGURE 6

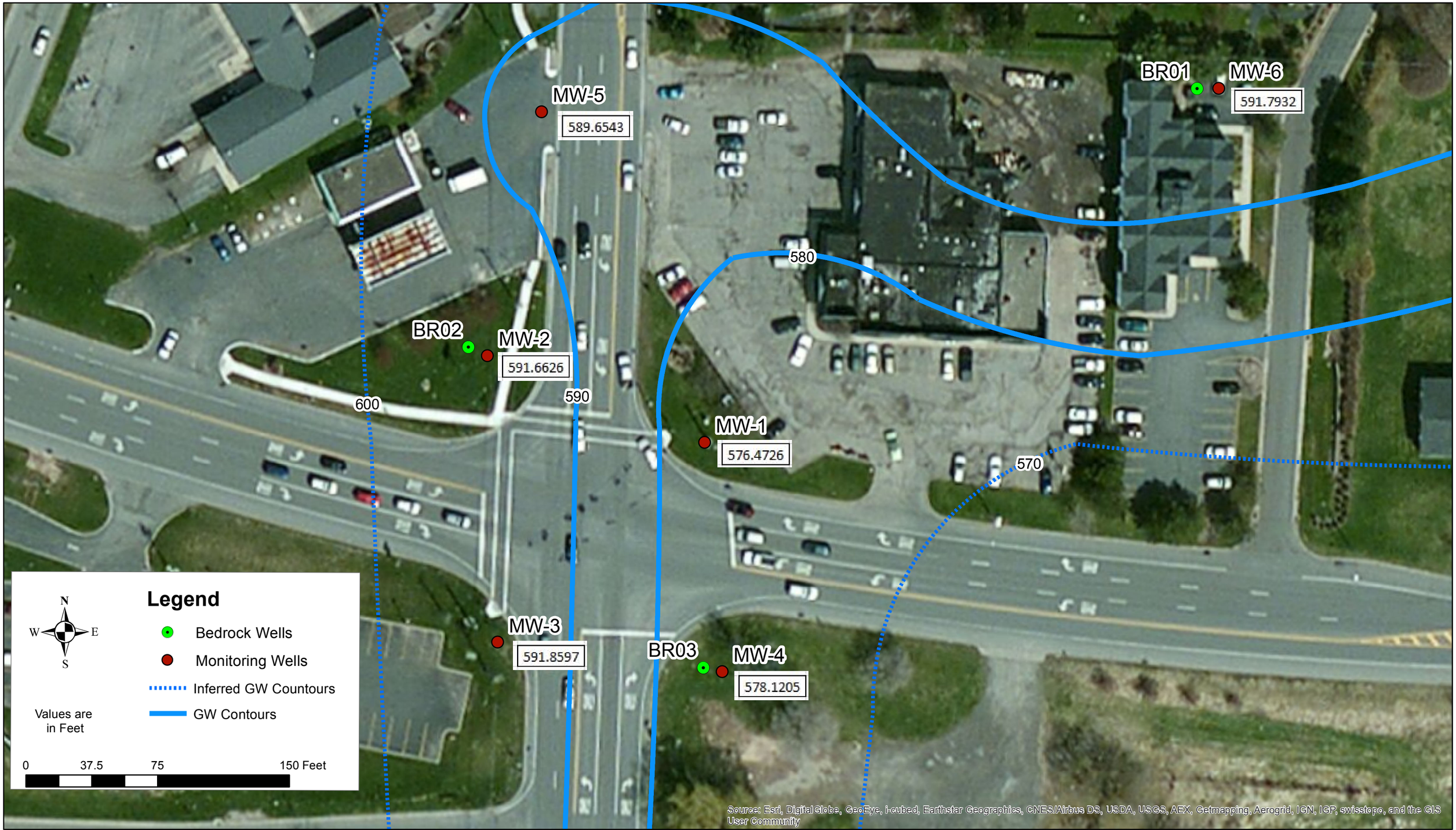


Groundwater Contours - Bedrock Wells - March 2015

500 South Union Street - Off-Site RI/FS NYSDEC Site # C828153A
Spencerport, Monroe County, New York

Date: 07/16/2015

Figure: 4



Groundwater Contours - Overburden Wells - March 2015

500 South Union Street - Off-Site RI/FS NYSDEC Site # C828153A
Spencerport, Monroe County, New York

Date: 07/16/2015

Figure: 5

SUOA2

SUOA1

SU32

	SU32-IA-121013 (0.0) 12/2013	SU32-SS-121013 (0.0) 12/2013
BENZENE (µg/m3)	0.71J	
TRICHLOROETHYLENE (TCE) (µg/m3)		2.1
CYCLOHEXANE (µg/m3)	1.7J	

SU41

	SU41-IA-121013 (0.0) 12/2013	SU41-SS-121013 (0.0) 12/2013
BENZENE (µg/m3)	1.9J	
ETHYLBENZENE (µg/m3)		3.5

SU52

	SU52-IA-12913 (0.0) 12/2013	SU52-SS-12913 (0.0) 12/2013
TOLUENE (µg/m3)		10J
TRICHLOROETHYLENE (TCE) (µg/m3)	0.21J	0.54J

SU43

	SU43-IA-121013 (0.0) 12/2013	SU43-SS-121013 (0.0) 12/2013
BENZENE (µg/m3)	0.77	
TOLUENE (µg/m3)	1.9J	19
CYCLOHEXANE (µg/m3)		14

SU33

	SU33-IA-120913 (0.0) 12/2013	SU33-SS2-12913 (0.0) 12/2013
CHLOROFORM (µg/m3)	0.45	
BENZENE (µg/m3)		2.6
CIS-1,2-DICHLOROETHYLENE (µg/m3)	0.32	
TETRACHLOROETHYLENE(PCE) (µg/m3)		5.4J
CYCLOHEXANE (µg/m3)	0.69	

SU56

	SU56-IA-12913 (0.0) 12/2013	SU56-SS-12913 (0.0) 12/2013
BENZENE (µg/m3)		15
TOLUENE (µg/m3)		48
TETRACHLOROETHYLENE(PCE) (µg/m3)	0.54	

SU29

	SU29-IA-121013 (0.0) 12/2013	SU29-SS-121013 (0.0) 12/2013	SU29-SS2-121013 (0.0) 12/2013
CHLOROFORM (µg/m3)			3.9
ETHYLBENZENE (µg/m3)	1.8		3.9
CIS-1,2-DICHLOROETHYLENE (µg/m3)		3.2	
TETRACHLOROETHYLENE(PCE) (µg/m3)		8.3	8
TRICHLOROETHYLENE (TCE) (µg/m3)	0.21		
CYCLOHEXANE (µg/m3)	0.92E		6.9

SU49

	SU49-IA-121013 (0.0) 12/2013	SU49-SS-121013 (0.0) 12/2013
TETRACHLOROETHYLENE(PCE) (µg/m3)	0.54	
TRICHLOROETHYLENE (TCE) (µg/m3)		2.1
TERT-BUTYL METHYL ETHER (µg/m3)		5.8

SU35

	SU35-SS-121013 (0.0) 12/2013
BENZENE (µg/m3)	5.9J
CIS-1,2-DICHLOROETHYLENE (µg/m3)	3.2J

SU23

	SU23-IA-121013 (0.0) 12/2013	SU23-SS-121013 (0.0) 12/2013
BENZENE (µg/m3)	0.69	
TOLUENE (µg/m3)	3.2	
ETHYLBENZENE (µg/m3)	0.92	
CYCLOHEXANE (µg/m3)		6.9

Locations without result box were all non-detections
Blank cells represent non-detections

Units µg/m3

1000J Represents exceedence of DOH criteria

0 75 150 feet

N

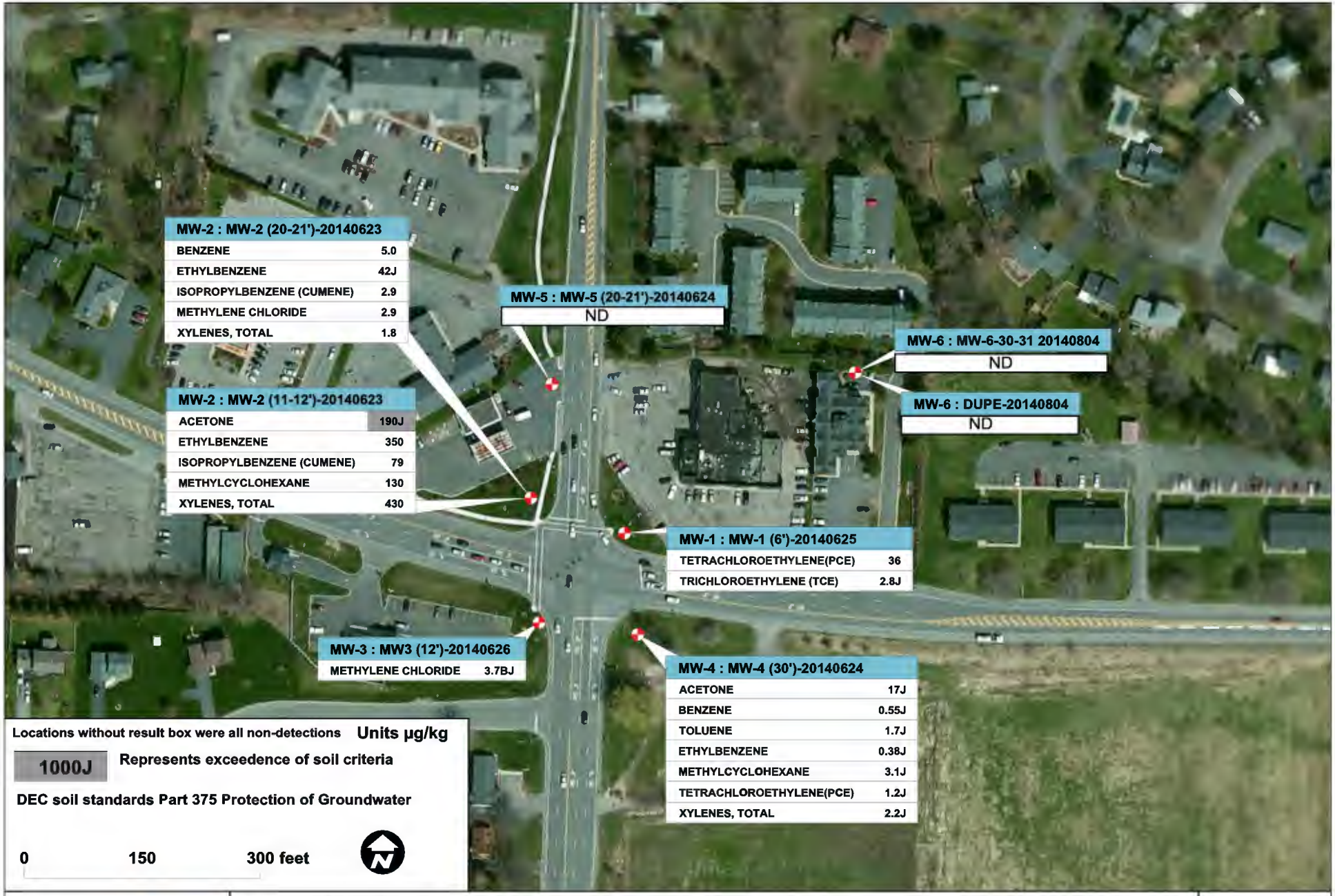
SVI Sampling Event December 2013

500 South Union Street - Off-Site RI/FS NYSDEC Site # C828153A

Spencerport, Monroe County, New York

DATE 07/16/2015

FIGURE 6



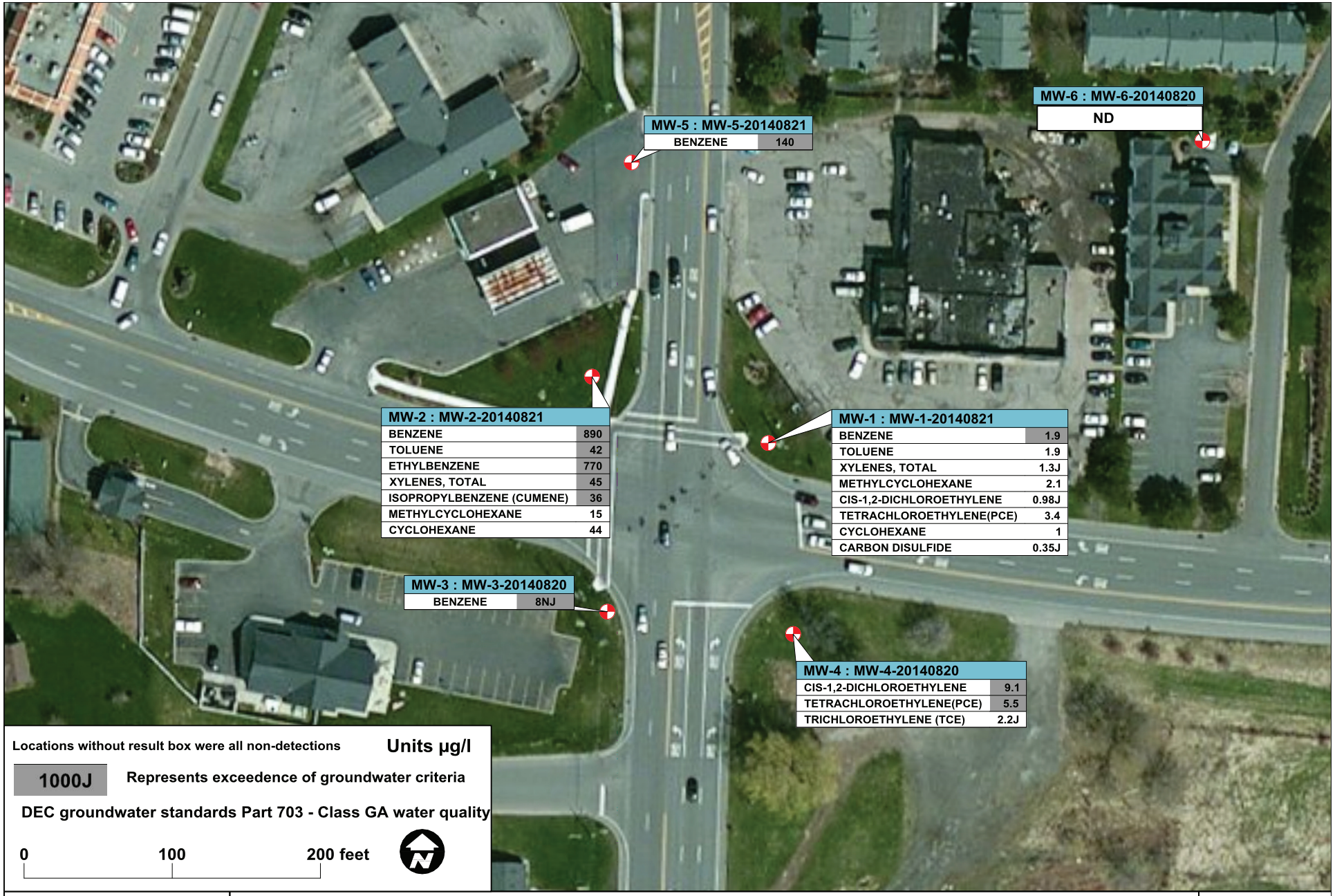
Soil Sampling Results - June - August 2014

500 South Union Street - Off-Site RI/FS NYSDEC Site # C828153A

Spencerport, Monroe County, New York

DATE 07/16/2015

FIGURE 7



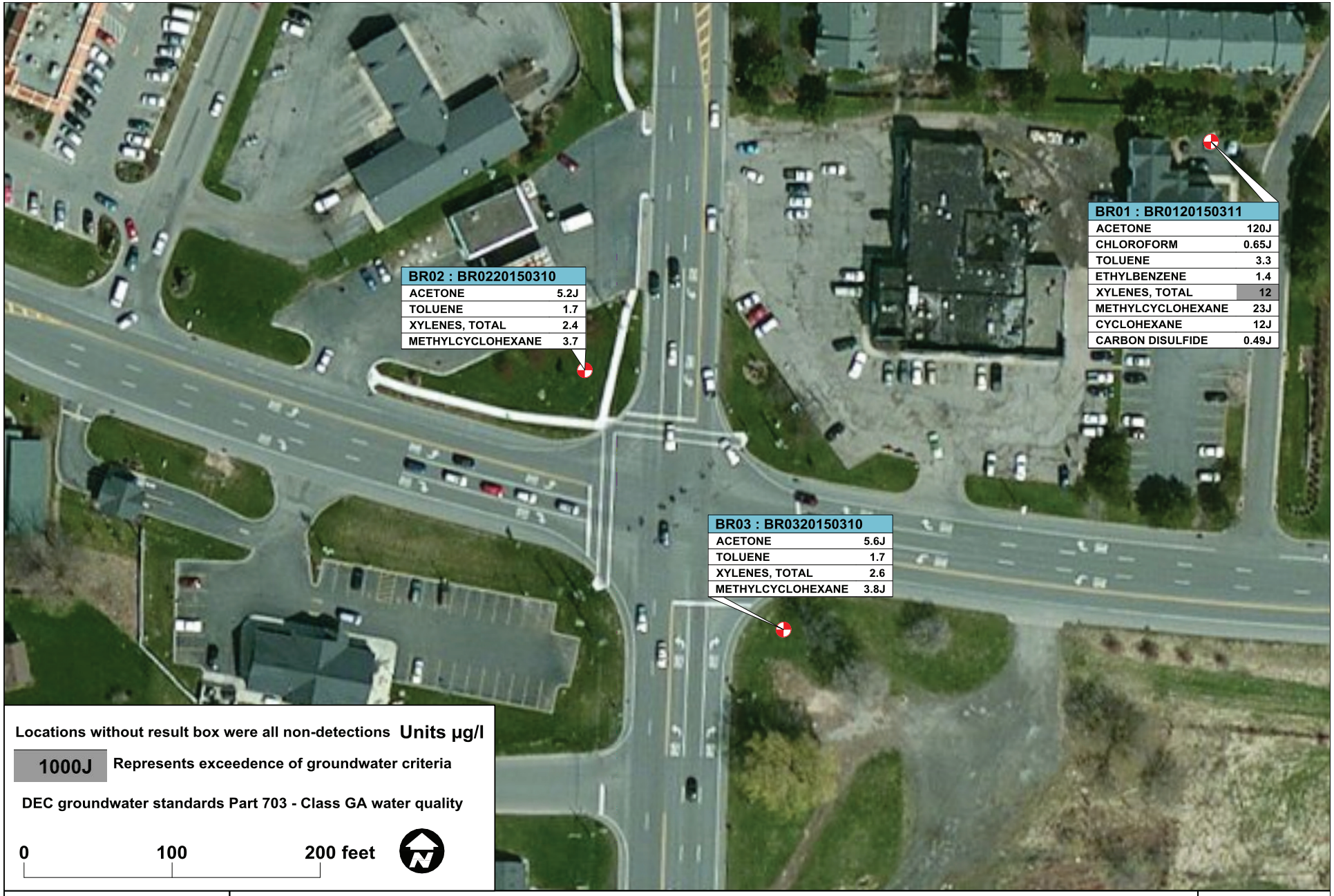
Overburden Monitoring Well Groundwater Sampling Results - August 2014

500 South Union Street - Off Site RI/FS - NYSDEC Site # C828153A

Spencerport, Monroe County, New York

DATE 07/07/2015

FIGURE 8



Bedrock Well Sampling Results - March 2015

500 South Union Street - Off Site RI/FS - NYSDEC Site # C828153A

Spencerport, Monroe County, New York

DATE 07/07/2015

FIGURE 9