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Sterling Environmental Engineering, P.C.

September 18, 2012

Mr. William T. Ports, P.E.
Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7014

Subject: Former M. Argueso and Company, Inc.
Site #C360108
441 and 442 Waverly Avenue, Mamaroneck, NY
Alternatives Analysis
STERLING File #28012 (Task 650)

Dear Mr. Ports,

Enclosed please find one (1) hard copy of the Alternatives Analysis report for the subject property.

Please contact me should you have any questions.

Very truly yours,

STERLING ENVIRONMENTAL ENGINEERING, P.C.

Mark P. Millspaugh, P.E.
President
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MPM/bc
Email/First Class Mail
Enclosure

cc: T.J. Milo, New Waverly Avenue Associates, LLC (with enclosure)
Kevin Young, Young Sommer, LLC (with enclosure)
Nathan Walz, NYSDOH (with enclosure)

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Sterling Environmental Engineering, P.C.

FORMER M. ARGUESO AND CO., INC.
SITE NO. C360108
441 & 442 WAVERLY AVENUE
MAMARONECK, NEW YORK

ALTERNATIVES ANALYSIS

Prepared for:

New Waverly Avenue Associates, LLC
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Rye Brook, New York 10573

Prepared by:

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April 11, 2011
Revised September 18, 2012

"Serving our clients and the environment since 1993"

FORMER M. ARGUESO AND CO., INC.
SITE NO. C360108
441 & 442 WAVERLY AVENUE
MAMARONECK, NEW YORK

ALTERNATIVES ANALYSIS

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1.0 INTRODUCTION

The Brownfield Site Cleanup Agreement (BCA) between New Waverly Avenue Associates, LLC (Site Owner) and the New York State Department of Environmental Conservation (NYSDEC) was signed April 9, 2009 for the properties located at 441 and 442 Waverly Avenue, Town and Village of Mamaroneck, Westchester County, New York (Site). A Site Location Map is presented as Figure 1.

As part of the BCA, Remedial Investigations / Interim Remedial Measures (RI/IRMs) were conducted in August and September 2009, October 2010 and January 2012. The IRM/RI Report was submitted to the NYSDEC on September 11, 2012. The Alternatives Analysis is based on the findings and conclusions provided in the IRM/RI Report.

1.1 Historical Operations and Previous Investigations

441 Waverly Avenue was purchased in the 1960s by M. Argueso and Company, Inc. (Argueso), who constructed a one (1) story office building and storage/parking garage. Raw materials stored at 441 Waverly Avenue were used at the wax manufacturing facility located at 442 Waverly Avenue. Stored materials included virgin wax, recycled wax, additives and Tetrachloroethylene (PCE), which were stored in the below grade section of the storage/parking garage. Wax manufacturing operations ceased in the spring of 2005.

442 Waverly Avenue was a lumber planing mill in 1912. Subsequent uses include Mamaroneck Sash, Trim and Door, followed by the Mamaroneck Chemical Company. Argueso purchased 442 Waverly Avenue in the 1930s. Under Argueso's ownership, Site operations initially refined waxes and subsequently changed to manufacturing waxes for the investment casting industry.

A Phase II Site Investigation was conducted by GZA GeoEnvironmental, Inc. (GZA) in January and October 2005. Analytical results for groundwater reported concentrations of Volatile Organic Compounds (VOCs) and Naphthalene exceeding the applicable water quality standard for samples collected from the overburden aquifer. Analytical results for soil reported detectable concentrations of VOCs and Semi-Volatile Organic Compounds (SVOCs) that were less than the 6 NYCRR Part 375-6.8(b) Soil Cleanup Objectives (SCOs) for Restricted Commercial Use (Part 375 SCOs).

2.0 PREVIOUS SITE INVESTIGATIONS

A copy of the 2005 Phase I and Phase II Reports by GZA are provided as Appendix B in the IRM/RI Report.

2.1 Summary of Investigations

In December 2005, GZA completed Phase I and Phase II Environmental Site Assessment (ESA) Reports for the Site. The Phase II ESA Report includes the investigation of the following twelve (12) identified Areas of Concern (AOCs) and is based on the review of historic reports, the Phase I Site reconnaissance survey, and understanding of former Site operations:

- AOC 1 – Chlorinated Solvent Groundwater Plume
- AOC 2 – Former Mineral Spirits Underground Storage Tank (UST)
- AOC 3 – Former Fuel Oil USTs
- AOC 4 – Current Fuel Oil UST

- AOC 5 – Loading Docks
- AOC 6 – Former PCE Storage Area
- AOC 7 – Former Drum Storage in Concrete Paved Parking Area
- AOC 8 – Underground Settling Tanks and Floor Trench System
- AOC 9 – Below Grade Storage Area (north side of Waverly Avenue)
- AOC 10 – Oil/Water Separator and Associated Drywells
- AOC 11 – Drywell Unit
- AOC 12 – Former Aboveground Storage Tanks (ASTs)

Locations of the AOCs are provided in the 2005 Phase II Report provided as Appendix B in the IRM/RI Report.

2.2 2005 Analytical Results for Groundwater Samples

2.2.1 441 Waverly Avenue

Three (3) groundwater samples collected in January 2005 were analyzed for Volatile Organic Compounds (VOCs). Several chlorinated solvents were detected at concentrations above the 6 NYCRR Part 703.5 Water Quality Standards for Groundwater (Part 703.5) in samples collected from the deep overburden aquifer in the southwest corner of the property (B6-OW(D)). Chlorinated solvents were also detected at concentrations exceeding Part 703.5 standards for two (2) samples collected from the shallow overburden aquifer (B6-OWS and B9A-OW) at 441 Waverly Avenue during this round of sampling.

In October 2005, four (4) groundwater samples were collected from the deep and shallow overburden aquifers. One (1) shallow groundwater sample (GZ-21S) and one (1) deep groundwater sample (GZ-21D) were collected from the overburden aquifer beneath the asphalt paved driveway on the south side of the property. One (1) shallow (GZ-22S) and one (1) deep (GZ-22D) groundwater sample was also collected from the overburden aquifer in AOC 10. VOCs were reported at concentrations exceeding Part 703.5 for all four (4) sample locations.

2.2.2 442 Waverly Avenue

In January 2005, twelve (12) groundwater samples were collected from the overburden aquifer and analyzed for VOCs and Polycyclic Aromatic Hydrocarbons (PAHs). One (1) sample was collected from AOC 2 (VW-1), three (3) samples were collected downgradient of AOC 2 (VW-6, B101-OW, and B102-OW), two (2) samples were collected from AOC 3 (B5-OW and VW-3), one (1) sample was collected from AOC 4 (VW-4), one (1) sample was collected from AOC 5 (B2-OW), three (3) samples were collected downgradient of AOC 5 (B103-OW, VW-2, and VW-5), and one (1) sample was collected from AOC 6 and downgradient of AOC 8 (VW-7). According to the Phase II ESA Report, the groundwater elevations measured in 2005 indicate groundwater generally flows from west to east in the overburden aquifer. Concentrations of VOCs that exceed the Part 703.5 standards were detected in all of the groundwater samples. The PAH Naphthalene was detected at concentrations that exceed the Part 703.5 groundwater standard for the samples collected from B101-OW, VW-2, and VW-6.

In October 2005, three (3) groundwater samples were collected from the overburden aquifer. All of the samples were collected in or downgradient of AOC 5. Two (2) samples (GZ-23D and GZ-24D) were collected from the deep overburden aquifer and one (1) sample (GZ-25S) was collected from the shallow overburden aquifer. The samples were analyzed for VOCs. Chlorinated solvents were detected in all three (3) samples at concentrations exceeding Part 703.5 standards. The highest concentrations of chlorinated solvents, specifically Tetrachloroethylene (PCE) and Trichloroethylene (TCE), were detected

in the sample collected from GZ-23D at 22,000 ppb and 1,000 ppb, respectively.

2.3 2005 Analytical Results for Soil Samples

2.3.1 441 Waverly Avenue

Six (6) soil samples were collected on September 30 and October 3, 2005: one (1) soil sample (GZ-10) was collected from AOC 7 from a depth of 0.5 to 4 feet below ground surface (bgs). Three (3) soil samples (GZ-12 through GZ-14) were collected from 0.5 to 4 feet bgs and one (1) soil sample (GZ-11) was collected from 4 to 8 feet bgs in AOC 9. One (1) soil sample was collected from AOC 10 (GZ-8) from a depth of 8-12 feet bgs. The samples were analyzed for VOCs and Semi-Volatile Organic Compounds (SVOCs). Low levels of VOCs were detected in samples collected from GZ-8 at concentrations below the 6 NYCRR Subpart 375-6.8(b) Soil Cleanup Objectives (SCOs) for Restricted Commercial Use (Part 375 SCOs). SVOCs were detected at concentrations less than the Part 375 SCOs in samples collected from GZ-8 and GZ-14.

2.3.2 442 Waverly Avenue

Thirteen (13) soil samples were collected on September 29 and October 5, 2005: two (2) samples (GZ-2 and GZ-19) from AOC 3, two (2) samples (GZ-2 and GZ-3) from AOC 4, three (3) samples (GZ-4, GZ-5, and GZ-23D) from AOC 5, one (1) sample (GZ-6) from AOC 6, three (3) samples (GZ-7, GZ-16, and GZ-20) from AOC 8, and two (2) samples from AOC 12 (GZ-17 and GZ-18). The range of sample depths was 0.5 to 12 feet. All samples were analyzed for VOCs and all samples, except those collected from GZ-4, GZ-5, and GZ-23D, were analyzed for SVOCs. All VOCs and SVOCs reported at detectable concentrations are below Part 375 SCOs. Three (3) of the samples (GZ-16 through GZ-18) were analyzed for Total Metals. Metals were detected in all three (3) samples at concentrations below the Part 375 SCOs.

2.4 Soil Vapor Samples

Soil gas samples were collected from eight (8) locations at 442 Waverly Avenue on November 21 and November 22, 2005, downgradient of the asphalt paved loading dock area of AOC 5. VOCs related to petroleum and mineral spirits (Ethylbenzene and Xylenes) were detected in two (2) of the samples submitted for analysis (SG-3 and SG-4).

3.0 REMEDIAL INVESTIGATIONS SUMMARY

Remedial Investigations (RI) for the Site were conducted in August and September 2009, October 2010 and December 2011/January 2012. The 2009 RI includes the analyses of groundwater and soil boring samples. The 2010 RI includes the analysis of one (1) test pit sample. The 2012 RI include installing four (4) offsite deep overburden monitoring wells in December 2011 and a groundwater monitoring event in January 2012.

3.1 2009 Sampled Monitoring Wells

Groundwater samples were collected from the following monitoring wells on August 19 through August 21, 2009 as part of the RI of the overburden aquifer underlying the Site:

441 Waverly Avenue Monitoring Wells			
Screened Portion of Aquifer	**Screen Interval (ft)**	**Monitoring Well ID**	**Justification for Sampling**
Shallow (S)	6-16	B6-OW(S)	Upgradient well on Site property
Deep (D)	35-45	B6-OW(D)	Upgradient well on Site property
D	27-37	B9A-OW	Downgradient well on Site property
S	5-15	GZ-21S	Downgradient well on Site property
D	40-45	GZ-21D	Downgradient well on Site property
S	5-15	GZ-22S	In vicinity of oil/water separator tank and dry wells location
D	40-45	GZ-22D	In vicinity of oil/water separator tank and dry wells location

442 Waverly Avenue Monitoring Wells			
Screened Portion of Aquifer	**Screen Interval (ft)**	**Monitoring Well ID**	**Justification for Sampling**
D	10-17	B105-OW	Downgradient from 8,000-gallon UST
D	44.5-49.5	B5-OW	Upgradient from 8,000-gallon UST
S	5-15	VW-2	Downgradient from Former Mineral Spirits UST
S	5.5-15.15	VW-5	Upgradient from Former Mineral Spirits UST
D	40-45	GZ-23D	Upgradient from Former Mineral Spirits UST
D	10-30	GZ-24D	Upgradient from Former Mineral Spirits UST
S	5-15	GZ-25S	Upgradient from Former Mineral Spirits UST

Monitoring well locations are provided on Figures 2 and 3. The groundwater flow direction in the overburden aquifer is presented in Figure 4.

3.2 2009 Groundwater Analytical Results

Groundwater samples were submitted to Mitkem Laboratories in Warwick, Rhode Island, a division of Spectrum Analytical, Inc., by overnight delivery and were analyzed for VOCs by USEPA Method 8260C and Polycyclic Aromatic Hydrocarbons (PAHs) by USEPA Method 8270D.

The following monitoring well locations report VOCs at concentrations that exceed the applicable regulatory standard or guidance value for the 2009 event:

441 Waverly Avenue

- B6-OW(D): 1,2-Dichloroethane, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Tetrachloroethene, Trichloroethene
- B9A-OW: Benzene, 1,2-Dichloroethane, cis-1,2-Dichloroethene, Vinyl chloride

- GZ-21D: Benzene, 1,2-Dichloroethane, cis-1,2-Dichloroethene, Tetrachloroethene, Trichloroethene, trans-1,2-Dichloroethene, Vinyl chloride

- GZ-21S: Benzene, Hexachlorobutadiene, and tert-Butylbenzene

- GZ-22D: Benzene, Tetrachloroethene, cis-1,2-Dichloroethene, 1,2-Dichloroethane, Trichloroethene, and Methyl tert-butyl ether (MTBE)

- GZ-22S: cis-1,2-Dichloroethene, Tetrachloroethene, Trichloroethene, Vinyl chloride, and MTBE

442 Waverly Avenue

- GZ-23D: Benzene, 1,2-Dichloroethane, cis-1,2-Dichloroethene, 1,1-Dichloroethene, Tetrachloroethene, Trichloroethene

- GZ-24D: Benzene

- VW-2: n-Butylbenzene, sec-Butylbenzene, tert-Butylbenzene, n-Propylbenzene

- B5-OW: No reported exceedances. Duplicate sample from this location reports Vinyl Chloride exceedance

- VW-5: cis-1,2-Dichloroethene

SVOCs are reported at concentrations that do not exceed the regulatory standard or guidance values for all sample locations for the August 2009 monitoring event.

Figures 7 and 8 show groundwater exceedances of the regulatory standards or guidance values at the designated monitoring well sample locations for the August 2009 sampling event at 441 and 442 Waverly Avenue.

3.3 2009 and 2010 Soil Analytical Results

Soil boring and test pit locations were selected by Sterling Environmental Engineering, P.C. (STERLING) and the NYSDEC on September 2, 2009. Confirmatory soil boring samples were collected from the following locations on September 2, 2009 and the SW-Test-Pit sample was collected on October 7, 2010:

441 Waverly Avenue:

- One (1) soil sample (SB-06) in the vicinity of the oil/water separator tank and associated drywells.

442 Waverly Avenue:

- Two (2) soil samples (SB-01 and SB-02) in the vicinity of the former mineral spirits UST.
- Two (2) soil samples (SB-03 and SB-04) located adjacent to internal discharge pit.
- One (1) soil sample (SB-05) located adjacent to the catch basin near the northwest corner of the property.
- One (1) soil sample (SW-Test-Pit) located adjacent to the drain near the southern boundary of the

property.

Soil boring and test pit locations are presented on Figures 2 and 3.

Reported concentrations of VOCs and SVOCs for all soil boring and test pit samples do not exceed the Part 375 SCOs for Restricted Commercial Use.

Soil analytical results from 2009 and 2010 were also compared with the 6 NYCRR Part 375-6.8(b) Protection of Groundwater Soil Cleanup Objectives (GW SCOs). Four (4) VOCs reported for soil samples collected at several locations at 442 Waverly Avenue, as provided in the IRM/RI Report, are at concentrations that exceed the applicable GW SCOs. These are n-Butylbenzene, sec-Butylbenzene, n-Propylbenzene and Acetone. These parameters are also reported in groundwater samples collected in 2005 that exceed the applicable groundwater standard for several monitoring well samples and in one (1) well (VW-2) sampled in 2009 with the exception of Acetone.

Figures 9 and 10 show exceedances of the applicable GW SCOs for soils at the designated sample locations in the 2009 and 2010 sampling events at 441 and 442 Waverly Avenue.

3.4 2012 Groundwater Analytical Results

On January 10 and 11, 2012, offsite monitoring wells OSMW-1, OSMW-2, OSMW-3 and OSMW-4 and four (4) existing onsite deep monitoring wells GZ-21D, GZ-22D, GZ-23D and B6-OWD were sampled and analyzed for VOCs (see Figures 5 and 6 for groundwater sample locations and flow direction for the overburden aquifer). Figures 7 and 8 show groundwater exceedances of standards and guidance values for the 2012 monitoring event.

PCE and TCE are reported at concentrations of 4,300 ppb and 1,600 ppb, respectively, for the groundwater sample collected from monitoring well GZ-23D in the northwest corner at 442 Waverly Avenue. Offsite monitoring well OSMW-3 sample results report 760 ppb for PCE and 91 ppb for TCE. The OSMW-4 sample results report 790 ppb for PCE and 230 ppb for TCE. OSMW-1 and OSMW-2 sample results report no detections for PCE and TCE. Sample results for GZ-21D, GZ-22D and B6-OWD all have lower reported detections of chlorinated solvents than OSMW-3 and OSMW-4.

3.5 Exposure Assessment

The human health risk associated with VOCs depends on the potential for humans to be exposed to VOCs impacted media. Exposure can only occur when an exposure pathway exists.

There are two (2) affected media that represent potential exposure risks at the Site: 1) subsurface soil and 2) groundwater. Accordingly, there are few potential pathways or opportunities by which human exposure is possible. Potential exposure pathways are summarized in Table 1.

Exposure to soil and groundwater encountered in excavations is a potential exposure pathway. Groundwater, while known to contain VOCs at elevated concentrations at certain on-Site monitoring wells, is not used for drinking or any other purpose and the entire area is served by municipal water. As such, there is no potential for direct exposure to humans.

Onsite soil and groundwater are the only affected media included in the screening and evaluation of remedial alternatives. Two exposure pathways are identified in Table 1: 1) Ingestion, inhalation or dermal contact of contaminated soil, dust, soil vapors or groundwater by on-Site workers; and 2) Ingestion, inhalation, or dermal contact with contaminated soil, dust, soil vapors or groundwater by future

onsite construction workers during ground intrusive activities.

The potential for soil vapor intrusion will be evaluated should the onsite building become occupied and for any buildings developed on the site to determine the need, if any, for implementing actions to address exposures related to soil vapor intrusion.

4.0 REMEDIAL GOALS AND ACTION OBJECTIVES

The statutory or regulatory remedial action goals for remedial actions undertaken pursuant to NYSDEC Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10) are set forth in the applicable regulations for the New York State Brownfield Cleanup Program (BCP), as defined by ECL, Article 27, Title 14. According to DER-10, Remedial Action Objectives (RAOs) are specific objectives for the protection of public health and the environment. The RAOs are developed based on specific Standards, Criteria and Guidance (SCGs) to address contamination identified at the Site. The RAO for the Site focuses on petroleum and chlorinated solvent VOCs, the identified contaminants of concern. Further, Site use has consistently been industrial/heavy commercial, and this is considered in evaluating the predisposal condition.

RAOs reflect the results of the Remedial Investigation (RI) and applicable regulatory requirements and guidance, specifically the 6 NYCRR Part 375 Recommended Soil Cleanup Objectives.

4.1 Remedial Action Objectives

The remedial action objectives for the Site are as follows:

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 aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of groundwater contamination.

Soil:

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater 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 at a site.

4.2 Standards, Criteria, and Guidance (SCGs)

Applicable requirements are defined as cleanup standards or standards of control that specifically address a hazardous substance or contaminant detected at a New York State Brownfields site. The NYSDEC defines applicable requirements as all Standards, Criteria, and Guidance (SCGs) relevant to the Site remedial alternatives. *Relevant and Appropriate* requirements are Federal or State requirements, while not applicable, are appropriate for sites with problems sufficiently similar to those encountered at Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) sites.

In addition to SCGs, other Federal, State, and local criteria, advisories, or guidance may also apply to the conditions found at the Site, and are known as *To-Be-Considered* (TBC) items. TBCs are not legally binding, however may be useful for assessing Site risks and selecting Site cleanup goals.

Chemical-specific SCGs provide guidance on acceptable or permissible contaminant concentrations in soil and water and are provided in Table 2. There are no available air exposure limits for the identified contaminants of concern.

4.2.1 Chemical-Specific SCGs

New York State Groundwater Standards are identified by the NYSDEC in the Division of Water Technical and Operations Guidance Series (TOGS 1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. The authority for these values is derived from Article 17 of the Environmental Conservation Law and 6 NYCRR Parts 700-706, Water Quality Regulations. The standards are developed for protection of the best use of groundwater which is identified as a source for drinking water. Class GA waters are fresh groundwaters found in the saturated zone of unconsolidated deposits and bedrock. Class GA standards for the VOCs of concern are 5 ug/L for all six (6) parameters. In addition, Maximum Contaminant Levels (MCLs) are established by the New York State Department of Health (NYSDOH) for public drinking water supplies, and are published in the New York Code of Rules and Regulations (NYCRR) Title 10 Chapter I (State Sanitary Code) Subpart 5-1.

Tables 7 and 8 show analytical results for the groundwater samples compared to TOGS 1.1.1.

New York State Recommended Soil Cleanup Objectives are SCGs published in NYCRR Part 375-6.8(b) as specified in the NYSDEC Department of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation – May 2010 (DER-10).

4.2.2 Action-Specific SCGs and To Be Considered (TBC) Items

The Resource Conservation and Recovery Act (RCRA) and the ***New York State Hazardous Waste Regulations*** address the treatment and disposal methods of hazardous wastes. Wastes generated on the Site must be handled in accordance with the Federal hazardous waste regulations (40 CFR Part 260-268) promulgated under RCRA, as well as New York State Hazardous Waste Regulations (6 NYCRR Parts 370-376), if applicable. Disposal to permitted disposal facilities shall be in accordance with Federal and State land disposal restrictions. Determination of the presence and appropriate waste code for any hazardous wastes at the site will be made in accordance with 6 NYCRR Part 371 (Identification and Listing of Hazardous Wastes). If soils need to be removed from the site as hazardous, they will be assigned an appropriate waste classification based on the waste characterization analysis.

The Comprehensive Environmental Response, Compensation and Liability Act **(CERCLA),** specifically Section 121, Subsections 104 and 106, states the selected remedial alternative must attain a cleanup level that is protective of human health and the environment.

EPA Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA/540/G-89/004, OSWER Directive 9355.3-01, October 1988) establishes the methodology the Superfund program has for characterizing the nature and extent of the risks posed by uncontrolled hazardous wastes sites and for evaluating potential remedial options. This TBC applies if the Site becomes an USEPA Superfund-listed site.

4.2.3 Site Specific Action Levels

6 NYCRR Part 375 provides that future use of the property be considered in developing site specific action levels. The Site property is currently developed, with historical industrial/commercial uses. It is appropriate the remedial program incorporates the continuation of this use into the development of site specific cleanup values.

For the identified contaminants of concern, 6 NYCRR Part 375-6.8(b) provides the following Soil Cleanup Objectives (SCOs) for Restricted Commercial Use, Protection of Public Health and the Protection of Groundwater:

Parameter	6 NYCRR Part 375 Restricted Use Soil Cleanup Objectives (SCOs) (ppm)		NYS Class GA Groundwater Standard (ug/L)
	Protection of Public Health Commercial	Protection of Groundwater	
n-Butylbenzene	500	12	5
n-Propylbenzene	500	3.9	5
sec-Butylbenzene	500	11	5
tert-Butylbenzene	500	5.9	5
Trichloroethylene	200	0.47	5
Tetrachloroethylene	150	1.3	5

5.0 DEVELOPMENT AND ANALYSIS OF ALTERNATIVES

An initial screening is performed to develop a list of potentially applicable remedial technologies applicable to Site conditions, contaminants, and contaminated media. Applicable technologies undergo a detailed analysis of alternatives.

5.1 Identification & Screening of Technologies

The screening of technology types and process options is discussed below. This screening was based on the criteria of effectiveness for treating impacted soils and groundwater, and implementability.

5.1.1 Technologies Available

Technologies to remediate contaminants from soils and groundwater include institutional controls, capping, in-situ treatment, removal and disposal, and onsite treatment, and are described below.

Institutional Controls for addressing soil and groundwater contamination include use and deed restrictions to reduce the possibility of human contact with contaminants. The Site Management Plan will include signs placed on the site which will warn utility and construction workers of the contaminated soil and groundwater; periodic site inspection; periodic groundwater monitoring; and will provide for contacting the NYSDEC prior to ground-intrusive activities. An Environmental Easement will provide notice to prospective owners that certain uses and/or development of the site will be restricted without further remedial action, in the event the property is transferred in the future.

Capping of contaminated soils in place will minimize human contact through covering by asphalt paving. Pavement will divert precipitation away from the underlying contaminated area and minimize infiltration, reducing potential for contaminant leaching into groundwater. Collection of stormwater runoff and diverting to the municipal system will prevent infiltration of water into contaminated soil layers which could potentially release contaminants into the groundwater.

In-Situ Treatment technologies include biological, thermal, and physical/chemical treatment processes. Many of these processes are innovative technologies, with varying degrees of effectiveness.

Excavation, Removal & Disposal of contaminated soil above the water table with final disposal at a permitted facility can be accomplished with conventional construction equipment. The soil in identified Area of Concern at the settling tank excavation was previously removed to the top of the groundwater table which is approximately nine (9) feet below ground surface.

Onsite Treatment of contaminated soils and groundwater is sometimes employed, however is usually only economically feasible if large quantities of soil and groundwater require treatment.

5.2 Development of Remedial Alternatives

According to 6 NYCRR 375-3.8(f), alternatives to be evaluated for a Track 2 site (restricted use with generic soil cleanup objectives) must include an alternative that achieves unrestricted use and other alternatives for the proposed use of the Site.

In accordance with the Brownfield Site Cleanup Agreement, Section II, C, 1., and recognizing the IRM/RI Report concludes in-situ groundwater treatment is proposed in the area near monitoring well GZ-23D and the Site does not meet the requirements for Track 1 (unrestricted use), the following remedial alternatives were developed.

Alternative 1: Achieve Unrestricted Use – Soil Excavation and Offsite Disposal

In order to achieve the Unrestricted Soil Cleanup Objectives (SCOs) specified in 6 NYCRR 375-6.3, which will require no use restrictions on the Site for the protection of public health and the environment, including groundwater and ecological resources, the following alternative was developed:

> Excavation/Removal/Disposal of all soil that exceeds the 6 NYCRR Part 375 Unrestricted SCOs to a permitted disposal facility as shown on Figure 11.
>
> This alternative will consist of excavation to a depth of approximately nine (9) feet in all areas which exceed Unrestricted SCOs. Approximately 15,000 tons of soil will be removed, and clean backfill will be placed. Confirmatory soil samples will be collected from the bottom of the excavation prior to backfilling. Approximate costs for this alternative are $2.4 million, as shown on Table 3.

Alternative 2: In-Situ Treatment of Contaminated Soil and Groundwater

Alternative 2A: In-Situ Treatment of Contaminated Soil

This alternative consists of a bench-scale study to evaluate the effectiveness of the application of surfactant enhanced oxidation chemicals to contaminated soils in-situ. If demonstrated to be feasible, the area to be treated is shown on Figure 12. Confirmatory samples would be collected to determine compliance with the Restricted Use, Protection of Groundwater SCOs.

The approximate cost for this alternative is $446,000 with additional annual Operation and Maintenance (O&M) costs of approximately $121,000, as shown on Table 4.

Alternative 2B: In-Situ Treatment of Groundwater

This alternative will decrease the concentrations of chlorinated compounds in the area near GZ-22-D and GZ-23D by injecting a hydrogen release compound under pressure to degrade the chlorinated compounds over time into non-toxic compounds, such as ethene and ethane. The proposed in-situ treatment area is shown on Figure 12. The approximate costs for this alternative are $12,000 with additional annual O&M costs of approximately $121,000, as shown on Table 5.

Alternatives 2A and 2B will also include Institutional Controls consisting of an Environmental Easement and Site Management Plan (SMP). The SMP will include groundwater monitoring.

The potential for soil vapor intrusion will be evaluated for the occupied onsite building and for any buildings developed on the site to determine the need, if any, for implementing actions to address exposures related to soil vapor intrusion. A Work Plan for a Soil Vapor Intrusion (SVI) investigation following the Final NYSDOH "Guidance for Evaluating Soil Vapor Intrusion in the State of New York", dated October 2006, and DER-10 will be submitted to the NYSDEC prior to the investigation. A SVI investigation of the onsite building is expected to cost approximately $8,000.

Alternative 3: Capping: Asphalt Parking Area – Commercial Use

This alternative consists of placing a permanent paved cap over contaminated surface soil, and will include installation of a stormwater collection system. The extent of the proposed asphalt cap is shown on Figure 13. This alternative will also include Institutional Controls consisting of an Environmental Easement and SMP.

The potential for soil vapor intrusion will be evaluated for the occupied onsite building and for any buildings developed on the site, to determine the need, if any, for implementing actions to address exposures related to soil vapor intrusion.

The approximate capital costs for this alternative are $698,000 as shown on Table 6, with additional annual O&M costs of approximately $121,000.

6.0 DETAILED EVALUATION OF ALTERNATIVES

This section presents an evaluation of the remedial alternatives described in Section 5.2. The purpose of the evaluation is to identify the advantages and disadvantages of each alternative, as well as comparing the analysis results between the proposed alternatives. The criteria used to evaluate the alternatives are specified in 375-1.8(f) and DER-10 Section 4.2 as follows:

- Overall Protection of Public Health and the Environment
- Compliance with SCGs
- Long-Term Effectiveness and Permanence
- Reduction of Toxicity, Mobility or Volume of Contaminant through Treatment
- Short-Term Impacts and Effectiveness
- Implementability
- Cost-Effectiveness, Including Capitol Costs and Site Maintenance Plan Costs
- Community Acceptance
- Land Use

Community and State acceptance are also considered after public comments have been received for the Alternatives Analysis report and proposed Remedial Work Plan. The Decision Document (DD) for the Site will address community and State acceptance criteria.

6.1 Individual Analysis of Alternatives

6.1.1 Alternative 1: Achieve Unrestricted Use (Soil Excavation & Offsite Disposal)

Protection of Human Health and the Environment. Alternative 1 includes excavation and offsite disposal of contaminated soils. This alternative will remove the onsite impacted soils, eliminating further leaching of VOCs into groundwater, and will eliminate the potential health risk posed by human contact with contaminated soil. A drawback of excavation is the potential exposure of onsite workers and remediation personnel to VOCs via ingestion and inhalation of airborne dust during excavation, loading and offsite transport. Site access and egress are via Waverly Avenue, which passes through a developed commercial/residential area would potentially cause exposure of the local population from tracked soil and airborne emissions. Appropriate measures would be incorporated into any excavation/disposal work plan to prevent human exposure.

Compliance With SCGs. By removing contaminated soil from the site, Alternative 1 would achieve chemical-specific SCGs. Although some improvement in local groundwater quality may be expected under Alternative 1, Class GA groundwater standards probably will not be immediately achieved.

Long-Term Effectiveness and Permanence. Alternative 1 provides a high degree of effectiveness and permanence. Institutional and or engineering controls would not be required.

Reduction of Toxicity, Mobility, and Volume through Treatment. Alternative 1 will reduce the volume of contaminated soil by virtually 100% in those areas that are excavated. This will likely reduce the toxicity and volume of contaminants in groundwater and will reduce the volume of contaminants that may potentially discharge to off-site areas.

Short-Term Impacts and Effectiveness. Increased short term impacts include traffic, odors, and vapors from the soil excavation and offsite disposal. Alternative 1 will be immediately effective, in that the potential for human exposure to surface soil would be eliminated once the remediation is completed. Soil

excavation at the site during remediation has the potential to expose onsite workers and downwind community through the generation of contaminated dust and VOCs emission. Proper controls would be implemented, including a Community Air Monitoring Plan during the excavation phase to reduce the risk of exposure to contaminants. Excavation can be accomplished in a short timeframe compared to other alternatives. The excavation and removal of 15,000 tons of soil is estimated to require 20 workdays to complete.

Implementability. Excavation and backfilling are commonly applied technologies at hazardous waste sites and require workers to have appropriate training. All excavated soil must be disposed at a permitted facility. Depth to groundwater is approximately 9.0 feet below ground surface. The alternative should include dewatering and excavating below the groundwater. It is not feasible to excavate impacted soil below the groundwater table and therefore 100% removal of impacted soil may not be achieved. Institutional controls for groundwater use restrictions may be established by the owner in consultation with the NYSDEC. Long-term groundwater monitoring and sampling are also readily accomplished.

Cost. Estimated capital costs for Alternative 1 are $2,360,000 as shown in Table 3.

Community Acceptance. Excavation of soils impacted with VOCs may cause dust migration and odor issues. In addition, truck traffic will temporarily increase for hauling excavated soil. Community acceptance may be low based on site conditions during excavation.

Land Use. The current, intended and reasonably intended future use of the site and its surroundings is commercial. The proposed final site development is a paved parking area which is suitable for the existing commercial setting of the local area.

6.1.2 Alternative 2A: In-Situ Treatment of Contaminated Soil

Protection of Human Health and the Environment. This alternative will reduce further leaching of VOCs into groundwater, and will eliminate the potential health risk posed by human contact with contaminated soil.

Compliance With SCGs. As in-situ remediation techniques do not remove all VOCs from the soil, it is questionable whether Alternative 2A will achieve chemical-specific SCGs including 6 NYCRR 375 unrestricted soil cleanup objectives. However, the in-situ treatment would likely achieve the restricted commercial cleanup objectives. Although some improvement in local groundwater quality may be expected under Alternative 2A, Class GA groundwater standards will not be immediately achieved, but would be expected to be achieved over time.

Long-Term Effectiveness and Permanence. Long-term effectiveness and permanence for in-situ surfactant enhanced oxidation remediation techniques would require bench and pilot scale studies.

Reduction of Toxicity, Mobility, and Volume through Treatment. Alternative 2A will be designed to significantly reduce the mobility of contaminants in soil through in-situ treatment. This will likely reduce the toxicity and volume of contaminants in groundwater and will reduce the volume of contaminants that may eventually move in the groundwater.

Short-Term Impacts and Effectiveness. Alternative 2A will take at least one (1) month to be effective, possibly longer, to significantly reduce VOCs mobility in soil. Controls would be implemented during the in-situ system installation phase to reduce the risk of exposure.

Implementability. Because all in-situ methods are highly site-specific, bench or pilot scale tests would precede full-scale remediation. This will add additional time to the remediation of the Site while the bench scale and pilot studies are being performed. Institutional controls for groundwater use restrictions will be established. Long-term groundwater monitoring and sampling are also readily accomplished to monitor the results.

Cost. Estimated capitol costs for Alternative 2A are $446,000 with additional annual Operation and Maintenance (O&M) costs of approximately $7,000 ($121,000 for 25 years) as presented in Table 4. The total present worth cost for this alternative is $567,000.

Community Acceptance. This criterion is evaluated after the public review of the remedy selection process as part of the final selection of a remedy for a site.

Land Use. The proposed final site development is a paved parking area which is suitable for the existing commercial setting of the local area.

6.1.3 Alternative 2B: In-Situ Treatment of Contaminated Groundwater

Protection of Human Health and the Environment. This alternative will reduce the elevated concentrations of TCE and PCE in the groundwater near monitoring wells GZ-22D and GZ-23D, and will protect human health and the environment by reducing the concentrations of contaminants in groundwater.

Compliance With SCGs. In-situ remediation techniques will treat the groundwater, but generally do not remove all VOCs from the groundwater. The goal of Alternative 2B is to achieve the chemical-specific SCGs while recognizing groundwater monitoring will be performed. Improvement in local groundwater quality is expected under Alternative 2B.

Long-Term Effectiveness and Permanence. Long-term effectiveness and permanence for the proposed in-situ treatment has proven to be effective in reducing chlorinated compounds in groundwater.

Reduction of Toxicity, Mobility, and Volume through Treatment. Alternative 2B will be designed to significantly reduce the volume of contaminants in groundwater. This will likely reduce the toxicity and mobility of contaminants in groundwater, and will reduce the volume of contaminants through in-situ treatment.

Short-Term Impacts and Effectiveness. Alternative 2B will take one (1) to six (6) months to be effective, possibly longer, to significantly reduce VOC concentrations in groundwater. Exposure to groundwater and soils during remediation for onsite workers and the downwind community through the generation of contaminated dust and VOCs emission would be managed through proper monitoring and controls implemented during installation of additional monitoring wells, if needed.

Implementability. The proposed treatment involves injecting a Hydrogen Releasing Compound into the monitoring wells and has been implemented on other sites. Institutional controls in the form of an environmental easement, which includes groundwater use restrictions, will be established.

Cost. Estimated capitol costs for Alternative 2B are $12,114 with additional annual O&M costs of approximately $7,000 ($121,000 for 25 years) as presented in Table 5. The total present worth cost for this alternative is $133,000.

Community Acceptance. This criterion is evaluated after the public review of the remedy selection process as part of the final selection of a remedy for a site.

Land Use. The proposed final site development is a paved parking area which is suitable for the existing commercial setting of the local area.

6.1.4 Alternative 3: Capping Alternative – Asphalt Paved Parking Area, Commercial Use

Protection of Human Health and the Environment. Alternative 3 will eliminate direct exposure to public health and environment by placing a permanent paved cap over contaminated surface soil. The cap and stormwater collection system also is protective of groundwater by preventing stormwater from coming into contact with and/or mobilizing contaminants in the underlying impacted soil. Alternative 3 is further protective of human health through the use of groundwater use restrictions and an environmental easement to prevent human contact with contaminants that will remain in the Site soil and groundwater.

Compliance With SCGs. Chemical-specific SCGs for the soils at the Site, soil cleanup objectives for Part 375-6.8(b) restricted commercial use will be achieved, but protection of groundwater SCOs will not be achieved. The Class GA Groundwater Standards for some VOCs will not be achieved.

Long-Term Effectiveness and Permanence. Alternative 3 provides long-term effectiveness and permanence for the impacted soils. Institutional controls ensure that the capped area and drainage controls are properly maintained, and prevent future disturbance or construction within the capped area without soil management. The installation of a downgradient monitoring well, with routine monitoring, will provide groundwater quality data to determine if impacted groundwater is migrating offsite. Alternative 3 is not effective in the long-term in addressing the contaminated groundwater.

Reduction of Toxicity, Mobility and Volume through Treatment. Alternative 3 reduces the mobility of subsurface VOCs in the soils by preventing infiltration of surface runoff water into the sub-soil. This alternative will not reduce the toxicity and volume of contaminants because no treatment would be performed.

Short-Term Impacts and Effectiveness. In the short-term Alternative 3 will be effective, in that the potential for worker exposure to surface and sub-surface soil is eliminated. A Site Management Plan will be implemented during all future ground intrusive activities to reduce the risk of exposure to contaminants.

Implementability. Alternative 3 can be readily implemented. An environmental easement will be implemented by the owner and will include groundwater use restrictions as part of the institutional controls.

Cost. Estimated capital costs for Alternative 3 are $698,033 as presented in Table 6. Long-term monitoring and maintenance costs include pavement and stormwater collection system maintenance and groundwater monitoring, and are estimated to be $7,000 annually ($121,355 over a 25-year period). The total present worth cost for this alternative is $819,000.

Community Acceptance. This criterion is evaluated after the public review of the remedy selection process as part of the final selection of a remedy for a site.

Land Use. The proposed final site development is a paved parking area which is suitable for the existing commercial setting of the local area.

6.2 Comparative Analysis of Alternatives

In the previous section, each of the remedial alternatives is individually evaluated based upon DER-10 guidance with respect to nine (9) criteria. The comparative analysis is performed of each alternative to the other alternatives using the same criteria.

6.2.1 Protection of Human Health and the Environment

Alternative 1 provides the greatest protection of human health and environment, as workers and the downwind community will be protected from exposure to VOC contaminants and dust by the CAMP. Alternative 1 will provide the greatest long-term protection of human health and the environment. In comparison to Alternative 1, Alternatives 2 and 3 will also provide protection to the community by reducing the short-term impacts from the potential of exposure to contaminated soil and groundwater. In Alternative 3 the asphalt pavement and stormwater collection system minimizes surface water infiltration into the sub-surface and contacting contaminated soil thereby controlling the contaminant and protecting groundwater. The in-situ treatment in Alternative 2 for soil and groundwater will reduce the chlorinated compound concentrations in soil and groundwater, thereby protecting human health and the environment.

6.2.2 Compliance With SCGs

Alternative 3 will not result in compliance with chemical-specific SCGs for some New York State Protection of Groundwater soil cleanup objectives and some groundwater standards. Alternatives 1, 2A and 2B will result in greater compliance with SCGs as compared to Alternative 3, although some impacted soil will remain within the groundwater table.

6.2.3 Long-Term Effectiveness and Permanence

Removal of impacted soil in Alternative 1 provides the greatest long-term effectiveness and permanence. Alternative 2A (in-situ treatment of soil) will not reduce elevated concentrations of TCE and PCE reported in the vicinity of monitoring wells GZ-22D and GZ-23D. The long-term effectiveness and permanence of Alternative 2B (in-situ treatment of groundwater) will likely reduce elevated concentrations of TCE and PCE reported in the vicinity of monitoring wells GZ-22D and GZ-23D. Alternative 3 provides long-term effectiveness and permanence for the soil above the groundwater, but will not address the elevated groundwater concentrations of TCE and PCE. Maintenance of the paved asphalt and stormwater collection system is required by the SMP and would be effective in controlling potential onsite exposure pathways.

6.2.4 Reduction of Toxicity, Mobility and Volume Through Treatment

Alternative 1 reduces volume, toxicity and mobility of VOCs by eliminating the majority of the contaminated soil by excavation. Alternatives 2A and 2B would reduce the toxicity, mobility and volume by in-situ treatment. Alternative 3 does not reduce the volume or toxicity of impacted soil, however may reduce the mobility of soil contaminants by eliminating infiltration of runoff surface water.

6.2.5 Short-Term Impacts and Effectiveness

Increased short term impacts from Alternative 1 include traffic, odors, and vapors from the soil excavation and offsite disposal. Proper controls would be implemented, including a Community Air Monitoring Plan (CAMP) during the excavation phase to reduce the risk of exposure to contaminants. Alternative 1 will be immediately effective, in that the potential for human exposure to soil would be

eliminated once the remediation is completed. Excavation can be accomplished in a short timeframe compared to other alternatives. The excavation and removal of 15,000 tons of soil is estimated to require 20 workdays to complete.

Short term impacts from Alternatives 2A and 2B will be minimal, as the soil and/or groundwater will be treated in-situ and not disturbed. Controls would be implemented during the in-situ system installation phase to reduce the risk of exposure. Exposure to groundwater and soils during remediation for onsite workers and the downwind community through the generation of contaminated dust and VOCs emission would be managed through proper monitoring and controls implemented during installation of additional monitoring wells, if needed.

Alternative 2A will take at least one (1) month to be effective, possibly longer, to significantly reduce VOCs mobility in soil. Alternative 2B will take one (1) to six (6) months to be effective, possibly longer, to significantly reduce VOC concentrations in groundwater.

Short-term impacts from Alternative 3 will be minimal, as the soil and groundwater will not be disturbed. Impacts from construction of the paved cap and stormwater collection system may include nuisance conditions from construction traffic and noise. In the short-term Alternative 3 will be effective, in that the potential for worker exposure to surface and sub-surface soil is eliminated.

6.2.6 Implementability

All of the identified alternatives are technically and administratively implementable. By comparison, implementation of Alternative 1 is more complex; however it does rely on standard materials, techniques and equipment to complete the excavation. Alternatives 2A and 2B are proven effective methods which will reduce contamination in soil and chlorinated compounds in groundwater. Alternative 2A will require further pilot testing and therefore will be somewhat more difficult to implement technically. Alternative 2B will require administrative notification of the groundwater injections and is readily implementable. Alternative 3 is readily implementable.

6.2.7 Cost Effectiveness

This criterion is an evaluation of the overall cost effectiveness of an alternative or remedy. A remedy is cost effective if its costs are proportional to its overall effectiveness.

The following table compares the costs of the Alternatives:

Alternative	Capital Cost	Annual O&M	Total Present Worth
1 – Excavation & Off-Site Disposal	$2,360,000		$2,360,000
2A – In-Situ Soil Treatment	$ 446,000	$7,000	$567,000
2B – In-Situ Groundwater Treatment	$ 12,114	$7,000	$133,000
3 – Capping and Stormwater System	$ 698,000	$7,000	$819,000

While Alternative 1 provides the greatest long-term effectiveness and permanence, it is also the most expensive. Alternative 3 also provides long-term effectiveness and permanence, but will not address elevated soil and groundwater concentrations and is the second most expensive alternative. Alternative 2A, while addressing soil contamination, will not address groundwater contamination in the vicinity of monitoring wells GZ-22D and GZ-23D. The least expensive option is Alternative 2B, which will address groundwater contamination.

7.0 RECOMMENDED REMEDIAL ALTERNATIVE

Based on the Alternatives Analysis and intended use of the property, the recommended remedy for the Site includes low permeability capping by asphalt pavement (Alternative 3), including managing stormwater through a collection system and in-situ treatment of groundwater in the vicinity of monitoring wells GZ-22D and GZ-23D (Alternative 2B). These measures will minimize human exposure to soil, minimize migration of contaminants through infiltration of precipitation which may cause leaching of VOCs into groundwater and reduce chlorinated VOC concentrations in groundwater. The recommended remedy is readily implemented and will address the areas known to be contaminated with chlorinated VOCs. Groundwater monitoring will be performed.

Subsurface soils containing concentrations of VOCs above the groundwater SCOs will remain onsite. In addition to paving, an Environmental Easement will be employed to minimize future exposure. Periodic groundwater monitoring will be performed.

Alternatives 2B and 3 will improve groundwater quality over time by eliminating infiltration of stormwater runoff through VOC impacted soils and directly reducing chlorinated VOC concentrations through treatment. Adjacent areas are served by municipal water, and are not, therefore, exposed to any VOC impacted groundwater as a drinking water source.

While Alternative 3 effectively caps and immobilizes contaminated soil, a Site Management Plan (SMP) will be developed to control future ground intrusive activities at the site The SMP will include an Excavation Work Plan to be followed for any future site development. The SMP will also include a provision for evaluation of soil vapor intrusion for the onsite building and for any buildings developed on the site, and a provision for implementing actions recommended to address exposures related to soil vapor intrusion.

The institutional controls under Alternative 3 will permanently eliminate potential exposure to VOCs in onsite groundwater and soil and Alternative 2B will effectively reduce elevated chlorinated compound concentrations in the groundwater. For these reasons, Alternatives 2B and 3 are the preferred remedial options for the site.

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TABLES

TABLE 1

POTENTIAL EXPOSURE PATHWAYS
SITE NO. C360108
441 & 442 WAVERLY AVENUE

Potential Receptor	Exposure Route, Contaminated Media, and Point of Exposure	Pathway Selected for Evaluation (Yes/No)	Reason for Selection or Exclusion
Human	Ingestion of soils onsite.	No	Area is zoned commercial/industrial. Residential development will not occur. Site will be developed as a paved parking area. Future excavations, if any, will be controlled by an Environmental Easement and a Site Management Plan.
Human	Ingestion of soils offsite.	No	Area is zoned manufacturing in a 325 foot radius around Site. Residential development will not occur in adjacent properties.
Human	Ingestion of groundwater onsite.	No	Waverly Avenue and surrounding area are supplied by the Village of Mamaroneck Municipal Water System operated by Westchester Joint Water Works. Water source is NYC Watershed Catskill-Delaware System.
Human	Ingestion of groundwater offsite.	No	Nearby homes and businesses are supplied by municipal water system (see above). There are no users of offsite downgradient groundwater.
Biota	Groundwater discharging to surface water.	Yes	Groundwater in the overburden aquifer flows toward the Sheldrake River.
Onsite Workers	Ingestion of groundwater onsite.	No	Municipal water is supplied to the site.
Onsite Construction Workers	Ingestion, inhalation or dermal contact with soils, dust, soil vapors, or groundwater onsite during excavations.	Yes	Surface & subsurface soils and groundwater are contaminated with VOCs. Future construction onsite is possible, but is subject to an Environmental Easement and will need to be performed in accordance with the approved Site Management Plan.

TABLE 2

NEW YORK STATE STANDARDS, CRITERIA AND GUIDANCE (SCGs)
SOIL AND GROUNDWATER STANDARDS

SITE NO. C360108
441 & 442 WAVERLY AVENUE

Standard	N-Butylbenzene	Sec-Butylbenzene	Tert-Butylbenzene	N-Propylbenzene	Trichloroethene	Tetrachloroethene
NYS Groundwater Standard (Class GA) (ug/L)	5	5	5	5	5	5
6 NYCRR Part 375-6.8(b) Restricted Commercial Use Soil Cleanup Objectives (ppm)	500	500	500	500	200	150

TABLE 3

COST ESTIMATE - ALTERNATIVE 1
EXCAVATION & OFFSITE DISPOSAL
SITE NO. C360108
441 & 442 WAVERLY AVENUE

CAPITAL COSTS	UNIT COST	QUANTITY	COST
Direct:			
Excavation & Loading of Soil for Disposal	$31/ton	15,130	$469,030
Laboratory Fee for Soil Safe Facility Parameters	$17,650	Lump Sum	$17,650
Soil Disposal Fee (Transportation & Disposal)	$63/ton	15,130	$953,190
Clean Backfill	$15/ton	15,130	$226,950
Place, Grade and Compact Backfill	$6.67/ton	15,130	$100,917
		Direct Costs Subtotal:	**$1,767,737**
Indirect:			
Engineering and Design @ 8.5% Direct Capital Costs			$150,258
Construction Monitoring/Reporting @ 5% Direct Capital Costs			$88,387
Contingency @ 20% Direct Capital Costs			$353,547
		Indirect Costs Subtotal:	**$592,192**
		TOTAL CAPITAL COSTS:	**$2,359,929**

TABLE 4

COST ESTIMATE - ALTERNATIVE 2A
IN-SITU SOIL TREATMENT
SITE NO. C360108
441 & 442 WAVERLY AVENUE

CAPITAL COSTS	UNIT COST	QUANTITY	COST
Direct:			
Bench Scale Study	L.S.	$25,000	$25,000.00
Application of Surfactant Enhanced Oxidation Chemicals	L.S.	$160,800	$160,800.00
Confirmatory Sampling (6 NYCRR Part 375 VOCs)	$100/sample	33	$3,300.00
Total Injection Cost (includes 1 Veru Tek Employee, Chemically Compatible Pump(s), Direct Push Drill Rig and Operator, Shipping Cost & Laboratory Equipment)	L.S.	$145,000	$145,000.00
		Direct Costs Subtotal:	**$334,100.00**
Indirect:			
Engineering and Design @ 8.5% Direct Capital Costs			$28,400.00
Construction Monitoring/Reporting @ 5% Direct Capital Costs			$16,700.00
Contingency @ 20% Direct Capital Costs			$66,800.00
		Indirect Costs Subtotal:	**$111,900.00**
		TOTAL CAPITAL COSTS:	**$446,000.00**
Operation & Maintenance Costs:			
Install One (1) Deep Aquifer Monitoring Well and Conduct Initial Annual Monitoring Event.			$12,000 *
Present worth for annual monitoring ($7,000/event) at 4% inflation for 25 years.			$109,355
TOTAL ANNUAL O&M COST (for 25 Years):			$121,355

TABLE 5

COST ESTIMATE - ALTERNATIVE 2B
IN-SITU GROUNDWATER TREATMENT
SITE NO. C360108
441 & 442 WAVERLY AVENUE

CAPITAL COSTS	UNIT COST	QUANTITY	COST
Direct:			
Application of Hydrogen Releasing Compound (HRC)	$3,340/day	1 day	$3,340.00
Confirmatory Sampling (6 NYCRR Part 375 VOCs)- Eight (8) deep overburden monitoring wells	$6,755/event	1	$6,755.00
		Direct Costs Subtotal:	**$10,095.00**
Indirect:			
Contingency @ 20% Direct Capital Costs			$2,019.00
		Indirect Costs Subtotal:	$2,019.00
		TOTAL CAPITAL COSTS:	**$12,114.00**
Operation & Maintenance Costs:			
Install One (1) Deep Aquifer Monitoring Well and Conduct Initial Annual Monitoring Event.			$12,000*
Present worth for annual monitoring ($7,000/event) at 4% inflation for 25 years.			$109,355
TOTAL ANNUAL O&M COST (for 25 Years):			$121,355

TABLE 6

COST ESTIMATE - ALTERNATIVE 3
LOW PERMEABILITY CAPPING AND STORMWATER SYSTEM INSTALLATION
SITE NO. C360108
441 & 442 WAVERLY AVENUE

CAPITAL COSTS	UNIT COST	QUANTITY	UNITS	COST
Direct:				
Asphalt Paving	$4.32	28,000	Square Feet	$120,964
Grading, Subbase Preparation and Stormwater System Installation (catch basins, discharge pipes to Village storm sewer lines).	$14.35	28,000	Square Feet	$401,907
			SUBTOTAL DIRECT COSTS:	$522,871
Indirect:				
Engineering and Design @ 8.5% Capital Costs				$44,444
Construction Monitoring, Reporting @ 5% Capital Costs				$26,144
Contingency @ 20%				$104,574
			SUBTOTAL INDIRECT COSTS:	$175,162
			TOTAL CAPITAL COSTS:	**$698,033**
Operation & Maintenance Costs:				
Install One (1) Deep Aquifer Monitoring Well and Conduct Initial Annual Monitoring Event.			$12,000 *	
Present worth for annual monitoring ($7,000/event) at 4% inflation for 25 years.			$109,355	
TOTAL ANNUAL O&M COST (for 25 Years):			$121,355	

* Previously completed.

Table 7
Summary of Groundwater Analytical Data Results to Title 6 Part 703.5 Groundwater Standards and NYSDEC TOGS 1.1.1 Guidance Values
441 and 442 Waverly Avenue
Volatile Organic Compounds and Semi-Volatile Organic Compounds
Site #C360108

Location			441 Waverly Avenue									
Sample ID		Water Quality Standard*	B6OW-D		B6OW-S	B9A-OW	GZ-21D		GZ-21S	GZ-22D		GZ-22S
Unit		µg/L	µg/L		µg/L	µg/L	µg/L		µg/L	µg/L		µg/L
Sample Date			08/21/09	01/11/12	08/21/09	08/20/09	08/20/09	01/11/12	08/20/09	08/19/09	01/11/12	08/19/09
Parameter ***Volatile Organic Compounds:***	CAS#											
1,1-Dichloroethane	75-34-3	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	75-35-4	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichlorobenzene	87-61-6	5	NA	NA	NA	<5.0	<5.0	NA	1.1 J	<5.0	NA	<5.0
1,2,4-Trichlorobenzene	120-82-1	5	NA	NA	NA	<5.0	<5.0	NA	1 J	<5.0	NA	<5.0
1,2-Dichloroethane	107-06-2	0.6	**9.7**	<5.0	<5.0	**120**	**170** D	**5.3**	<5.0	**22**	**17**	<5.0
cis-1,2-Dichloroethene	156-59-2	5	**390** D	1.5 J	2 J	**19**	**270** D	**10**	<5.0	**8.4**	**6.5**	**23**
trans-1,2-Dichloroethene	156-60-5	5	**150**	<5.0	<5.0	<5.0	**6.6**	<5.0	<5.0	<5.0	1.3 J	<5.0
Acetone	67-64-1	50 GV	<50.0	<5.0	---	---	<50.0	<5.0	---	<50.0	<5.0	---
Benzene	71-43-2	1	<5.0	0.51 J	<5.0	**190** D	**61**	<5.0	**5.6**	**2.6** J	**1.3** J	<5.0
n-Butylbenzene	104-51-8	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	3.2 J	<5.0	<5.0	<5.0
sec-Butylbenzene	135-98-8	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	3.2 J	1.2 J	<5.0	<5.0
tert-Butylbenzene	98-06-6	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**6.6**	<5.0	<5.0	<5.0
Carbon disulfide	75-15-0	---	NA	NA	NA	<5.0	<5.0	NA	<5.0	<5.0	NA	<5.0
Ethylbenzene	100-41-4	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hexachlorobutadiene	87-68-3	0.5	NA	NA	NA	<5.0	<5.0	NA	**2** J	<5.0	NA	<5.0
Isopropylbenzene	98-82-8	5	NA	NA	NA	<5.0	<5.0	NA	<5.0	1.5 J	NA	<5.0
Methyl tert-butyl ether (MTBE)	1634-04-4	10 GV	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**14**	**31**	**17**
n-Propylbenzene	103-65-1	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	4.4 J	<5.0	1 J
Tetrachloroethene	127-18-4	5	**23**	**6.2**	2.6 J	<5.0	**41**	1.7 J	<5.0	**120**	**97**	**17**
Trichloroethene	79-01-6	5	**43**	2.1 J	1.6 J	<5.0	**33**	0.58 J	<5.0	**110**	**92**	**9.8**
Toluene	108-88-3	5	<5.0	<5.0	<5.0	1.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl chloride	75-01-4	2	<5.0	<5.0	<5.0	**67**	**4** J	<5.0	<5.0	<5.0	<5.0	**3.8** J
Semi-Volatile Organic Compounds:												
Napthalene	91-20-3	---	<10	NA	<10	<10	<10	NA	<10	<10	NA	<10

Notes:
BOLD value indicates the reported concentration is greater than the applicable water quality standard or guidance value.
* Groundwater Standards are obtained from Title 6 Part 703.5, and Guidance Values are obtained from NYSDEC TOGS (1.1.1) "Ambient Water Quality Standards and Guidance Values".
< Indicates the parameter was not detected at the laboratory detection limit shown.
NA Not Analyzed.
--- No standard or not applicable.

Laboratory Qualifiers:
D Indicates the undiluted analysis exceeded the equipment calibration range. The concentration shown is obtained from a diluted analysis.
J Indicates the concentration shown is an estimated value because the compound was detected below the reporting limit.

Table 8
Summary of Groundwater Analytical Data Results to Title 6 Part 703.5 Groundwater Standards and NYSDEC TOGS 1.1.1 Guidance Values
441 and 442 Waverly Avenue
Volatile Organic Compounds and Semi-Volatile Organic Compounds
Site #C360108

Location			442 Waverly Avenue							
Well ID		Water Quality Standard*	GZ-23D		GZ-24D	GZ-25S	VW-2	B5-OW [1]	VW-5	Dup [2]	Equip. Blank
Unit		µg/L	µg/L		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sample Date			08/20/09	01/11/12	08/20/09	08/20/09	08/21/09	08/21/09	08/21/09	08/21/09	08/21/09
Parameter											
Volatile Organic Compounds	CAS#										
1,1-Dichloroethane	75-34-3	5	<5.0	<5.0	2 J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	75-35-4	5	**5.5**	1.6 J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichlorobenzene	87-61-6	5	<5.0	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	5	<5.0	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	107-06-2	0.6	**13**	**9**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	156-59-2	5	**10**	**780** D	<5.0	1.6 J	<5.0	<5.0	**9.9**	<5.0	<5.0
trans-1,2-Dichloroethene	156-60-5	5	<5.0	**9.1**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Acetone	67-64-1	50 GV	<50.0	**200**	---	---	---	---	---	---	---
Benzene	71-43-2	1	**11**	**4** J	**13**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Butylbenzene	104-51-8	5	<5.0	<5.0	<5.0	<5.0	**41**	<5.0	<5.0	<5.0	<5.0
sec-Butylbenzene	135-98-8	5	<5.0	<5.0	<5.0	<5.0	**90**	<5.0	<5.0	<5.0	<5.0
tert-Butylbenzene	98-06-6	5	<5.0	<5.0	<5.0	<5.0	**33**	<5.0	<5.0	<5.0	<5.0
Carbon disulfide	75-15-0	---	<5.0		NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	100-41-4	5	<5.0	<5.0	<5.0	<5.0	1.9 J	<5.0	<5.0	<5.0	<5.0
Hexachlorobutadiene	87-68-3	0.5	<5.0	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	98-82-8	5	<5.0	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether (MTBE)	1634-04-4	10 GV	2.1 J	1.6 J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Propylbenzene	103-65-1	5	<5.0	<5.0	<5.0	<5.0	**280** D	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene	127-18-4	5	**9700** D	**4300** D	<5.0	<5.0	<5.0	<5.0	2.5 J	<5.0	<5.0
Trichloroethene	79-01-6	5	**450** DJ	**1600** D	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	108-88-3	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl chloride	75-01-4	2	<5.0	1.2 J	1.3 J	<5.0	<5.0	<5.0	<5.0	**19**	<5.0
Semi-Volatile Organic Compounds											
Napthalene	91-20-3	---	<10	NA	<10	<10	1.2 J	<10	<10	<10	<10

Notes:
BOLD value indicates the reported concentration is greater than the applicable water quality standard or guidance value.
* Groundwater Standards are obtained from Title 6 Part 703.5, and Guidance Values are obtained from NYSDEC TOGS (1.1.1) "Ambient Water Quality Standards and Guidance Values".
< Indicates the parameter was not detected at the laboratory detection limit shown.
NA Not Analyzed.
--- No standard or not applicable.
[1] Laboratory report and chain of custody identify this sample as VZ-3. Based on the depth of the monitoring well, the correct identification is B5-OW.
[2] Dup sample collected from monitoring well location B5-OW.

Laboratory Qualifiers:
D Indicates the undiluted analysis exceeded the equipment calibration range. The concentration shown is obtained from a diluted analysis.
J Indicates the concentration shown is an estimated value because the compound was detected below the reporting limit.

FIGURES

MAP REFERENCE:

PROPERTY LINE LOCATIONS FOR 441 AND 442 WAVERLY AVENUE ARE BASED ON THE FIGURE PROVIDED BY GEO ENVIRONMENTAL, INC. ENTITLED "FORMER ARGUESO FACILITY" DATED SEPTEMBER 16, 2005.

AERIAL PHOTOGRAPH PROVIDED BY NEW YORK STATE GIS, (2009).

LEGEND:

APPROXIMATE PROPERTY BOUNDARY

FIGURE 1

STERLING

Sterling Environmental Engineering, P.C.

24 Wade Road ♦ Latham, New York 12110

SITE LOCATION MAP

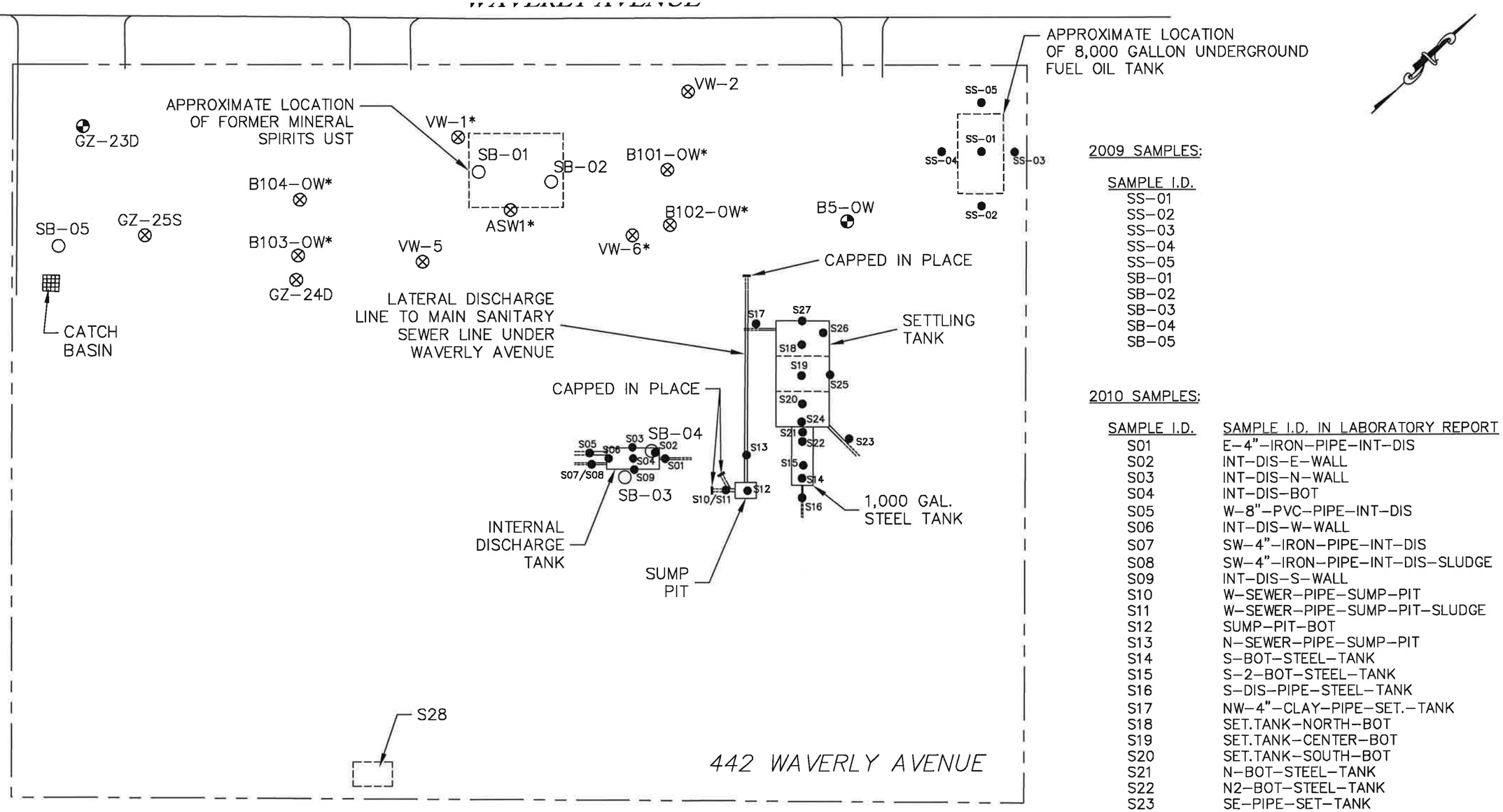
441–442 WAVERLY AVENUE

SITE #C360108

NEW WAVERLY AVENUE ASSOCIATES, LLC

V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	6/25/12	SCALE:	1"=200'	DWG. NO.	28012067	FIGURE	1



2009 SAMPLES:

SAMPLE I.D.
SS-01
SS-02
SS-03
SS-04
SS-05
SB-01
SB-02
SB-03
SB-04
SB-05

2010 SAMPLES:

SAMPLE I.D.	SAMPLE I.D. IN LABORATORY REPORT
S01	E-4"-IRON-PIPE-INT-DIS
S02	INT-DIS-E-WALL
S03	INT-DIS-N-WALL
S04	INT-DIS-BOT
S05	W-8"-PVC-PIPE-INT-DIS
S06	INT-DIS-W-WALL
S07	SW-4"-IRON-PIPE-INT-DIS
S08	SW-4"-IRON-PIPE-INT-DIS-SLUDGE
S09	INT-DIS-S-WALL
S10	W-SEWER-PIPE-SUMP-PIT
S11	W-SEWER-PIPE-SUMP-PIT-SLUDGE
S12	SUMP-PIT-BOT
S13	N-SEWER-PIPE-SUMP-PIT
S14	S-BOT-STEEL-TANK
S15	S-2-BOT-STEEL-TANK
S16	S-DIS-PIPE-STEEL-TANK
S17	NW-4"-CLAY-PIPE-SET.-TANK
S18	SET.TANK-NORTH-BOT
S19	SET.TANK-CENTER-BOT
S20	SET.TANK-SOUTH-BOT
S21	N-BOT-STEEL-TANK
S22	N2-BOT-STEEL-TANK
S23	SE-PIPE-SET-TANK
S24	SET.TANK-S-WALL
S25	SET.TANK-EAST-WALL
S26	SET.TANK-N-BOTTOM
S27	SET.TANK-NORTH-WALL
S28	SW-TEST-PIT

LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- MONITORING WELL SAMPLED IN 2009
- DECOMMISSIONED MONITORING WELL
- SOIL BORING
- SOIL SAMPLE LOCATION
- * NOT SAMPLED IN 2009

MAP REFERENCE:

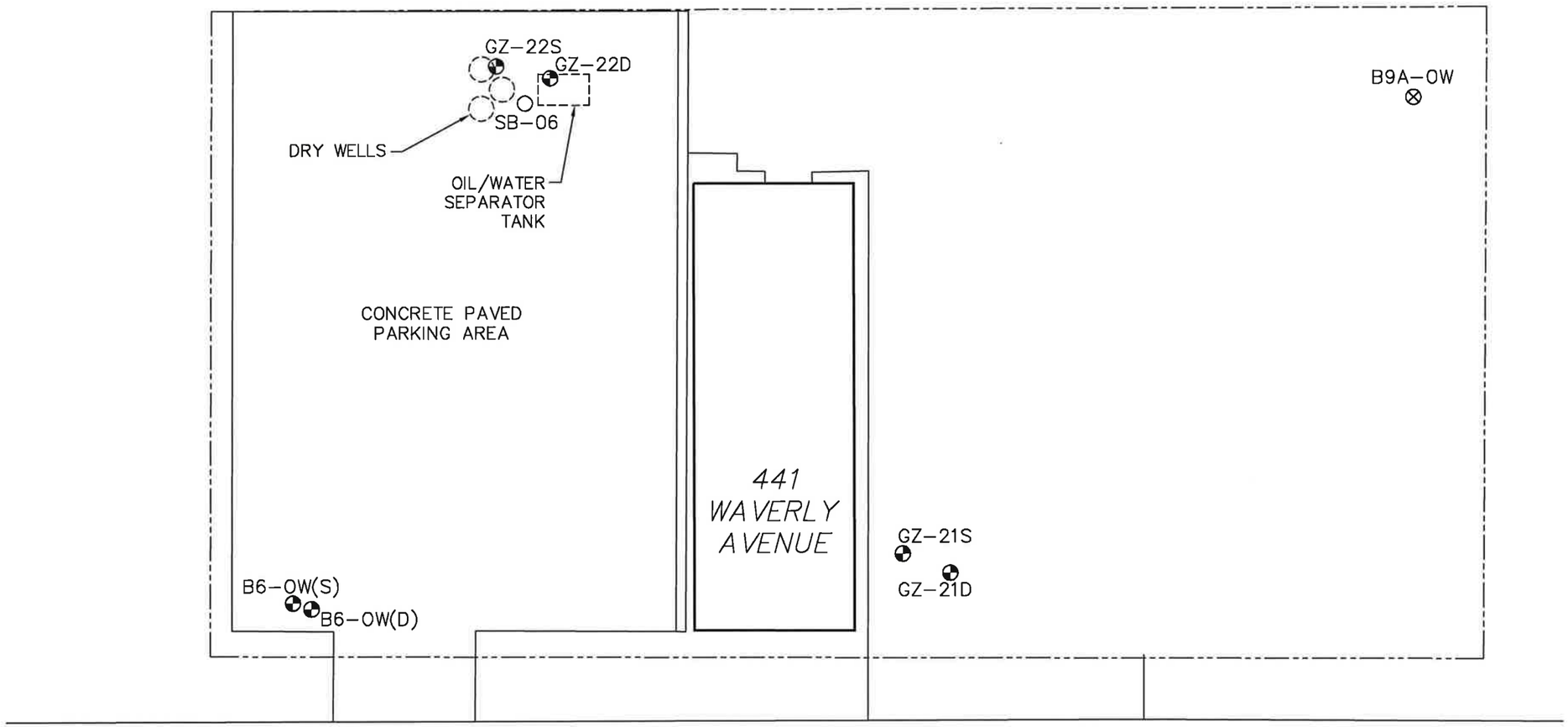
BASE MAP PROVIDED BY GZA ENVIRONMENTAL, INC. ENTITLED "SITE PLAN", DATED 9/16/2005.

FIGURE 2

STERLING
Sterling Environmental Engineering, P.C.
24 Wade Road • Latham, New York 12110

2009 AND 2010 SOIL AND GROUNDWATER SAMPLE LOCATIONS – 442 WAVERLY AVENUE
SITE# C360108
NEW WAVERLY AVENUE ASSOCIATES, LLC
V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	6/25/12	SCALE:	1" = 20'	DWG. NO.	28012068	FIGURE	2



LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- SOIL BORING

MAP REFERENCE:

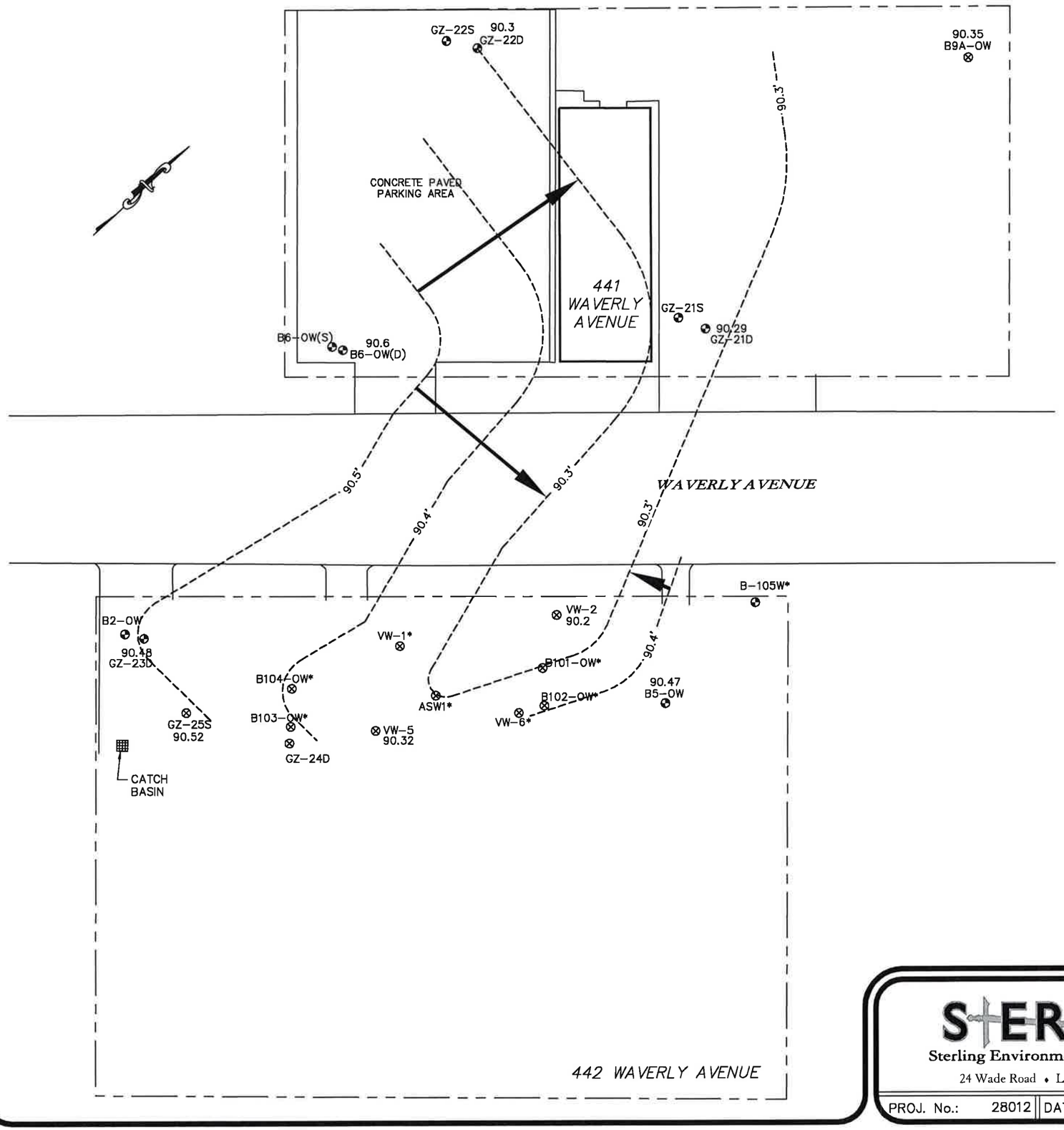
BASE MAP PROVIDED BY GZA ENVIRONMENTAL, INC.
ENTITLED "SITE PLAN", DATED 9/16/2005.

FIGURE 3

STERLING
Sterling Environmental Engineering, P.C.
24 Wade Road • Latham, New York 12110

2009 SOIL AND GROUNDWATER SAMPLE LOCATIONS – 441 WAVERLY AVENUE
SITE# C360108
NEW WAVERLY AVENUE ASSOCIATES, LLC
V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	6/25/12	SCALE:	1" = 20'	DWG. NO.	280169	FIGURE	3



LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- 90.29 — GROUNDWATER ELEVATION IN FEET
- MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- ----90.0---- GROUNDWATER ELEVATION CONTOUR
- INFERRED GROUNDWATER FLOW DIRECTION

NOTES:

* NOT SAMPLED IN 2009
GZ-24D ELEVATION NOT INCLUDED TO CREATE CONTOURS.

MAP REFERENCE:

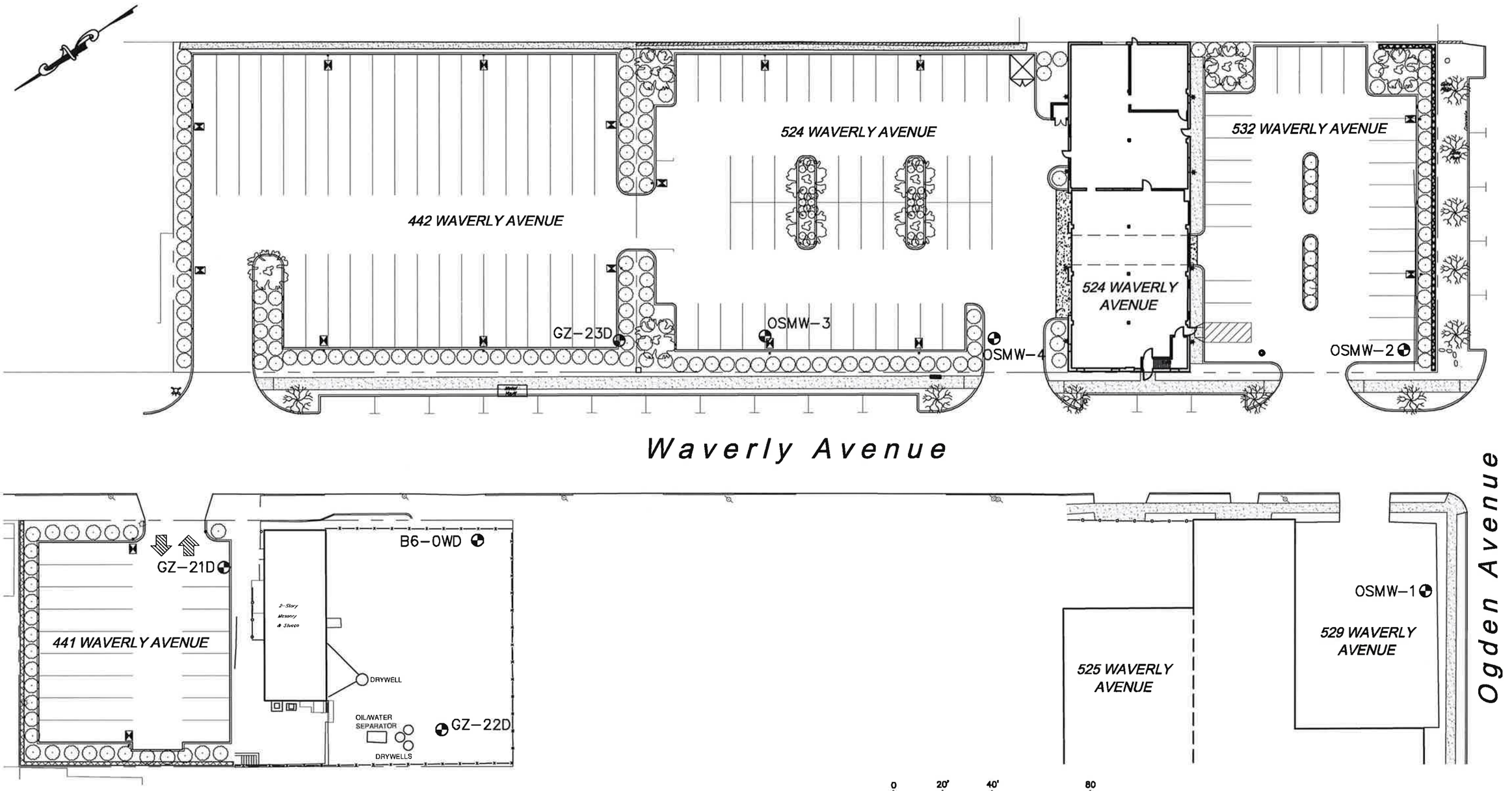
BASE MAP PROVIDED BY GZA ENVIRONMENTAL, INC. ENTITLED "SITE PLAN", DATED 9/16/2005.

FIGURE 4

STERLING
Sterling Environmental Engineering, P.C.
24 Wade Road • Latham, New York 12110

2009 OVERBURDEN AQUIFER GROUNDWATER ELEVATIONS – 441 & 442 WAVERLY AVENUE
SITE# C360108
NEW WAVERLY AVENUE ASSOCIATES, LLC
V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	6/25/12	SCALE:	1" = 30'	DWG. NO.	28012070	FIGURE	4



LEGEND:

- LIGHT POLE
- MONITORING WELL
- CONCRETE SIDEWALK
- PROPERTY BOUNDARY
- FENCE

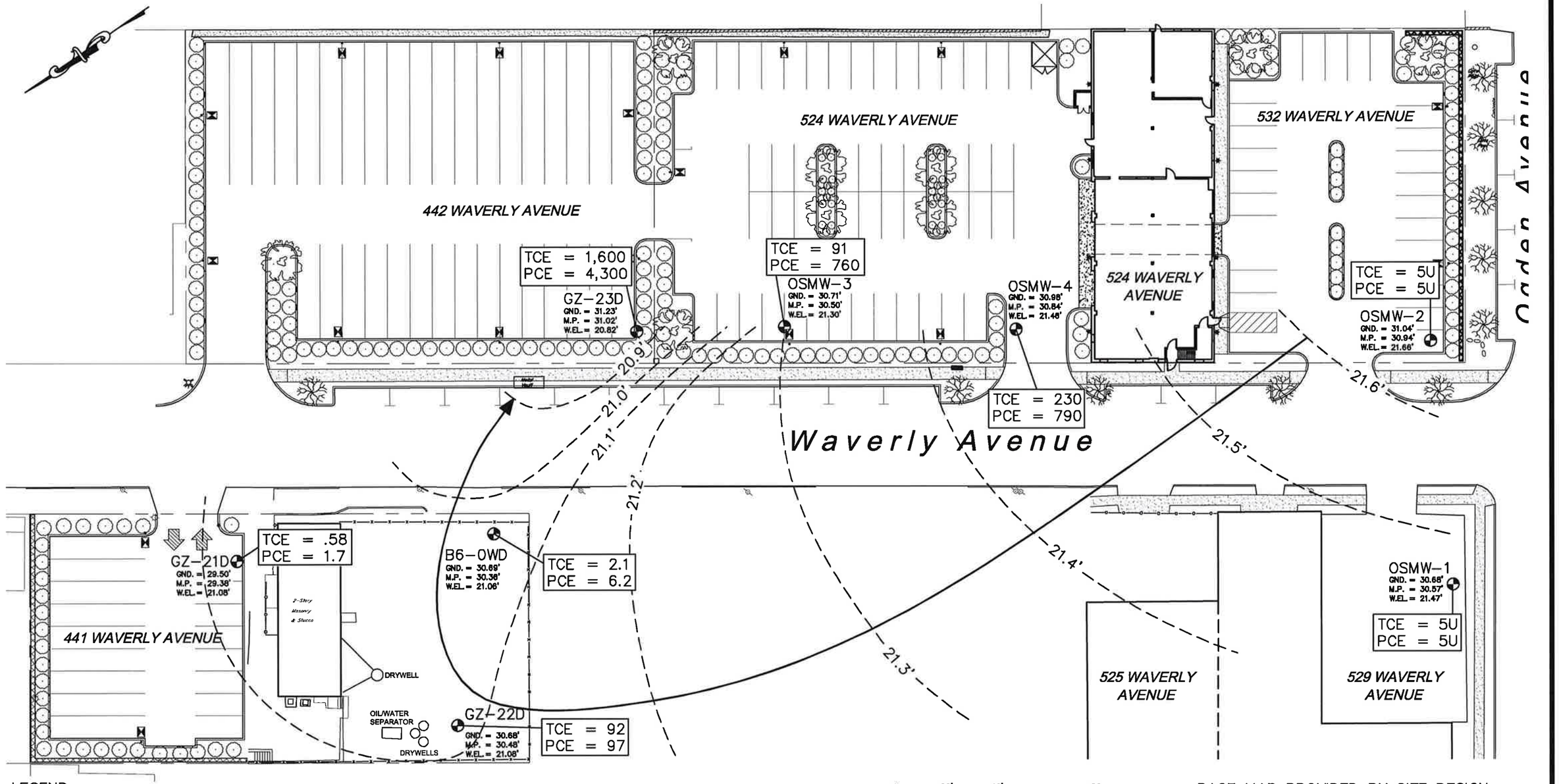
BASE MAP PROVIDED BY SITE DESIGN CONSULTANTS, DATED FEBRUARY 22, 2010.

FIGURE 5

STERLING
Sterling Environmental Engineering, P.C.
24 Wade Road • Latham, New York 12110

2012 GROUNDWATER SAMPLE LOCATIONS
SITE# C360108
NEW WAVERLY AVENUE ASSOCIATES, LLC
V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	6/25/12	SCALE:	1" = 40'	DWG. NO.	28012071	FIGURE	5



LEGEND:

- LIGHT POLE
- MW-1 MONITORING WELL (GND. = GROUND ELEVATION; M.P. = TOP OF WELL CASING; W.EL. = GROUNDWATER ELEVATION)
- 100' GROUNDWATER ELEVATION IN FEET
- INFERRED GROUNDWATER FLOW DIRECTION
- PROPERTY BOUNDARY

TCE = TRICHLOROETHENE IN ug/L

PCE = TETRACHLOROETHENE IN ug/L

U = PARAMETER NOT DETECTED AT LABORATORY DETECTION LIMIT SHOWN

0 20' 40' 80

1 inch = 40' ft.

BASE MAP PROVIDED BY SITE DESIGN CONSULTANTS, DATED FEBRUARY 22, 2010.

FIGURE 6

STERLING

Sterling Environmental Engineering, P.C.

24 Wade Road • Latham, New York 12110

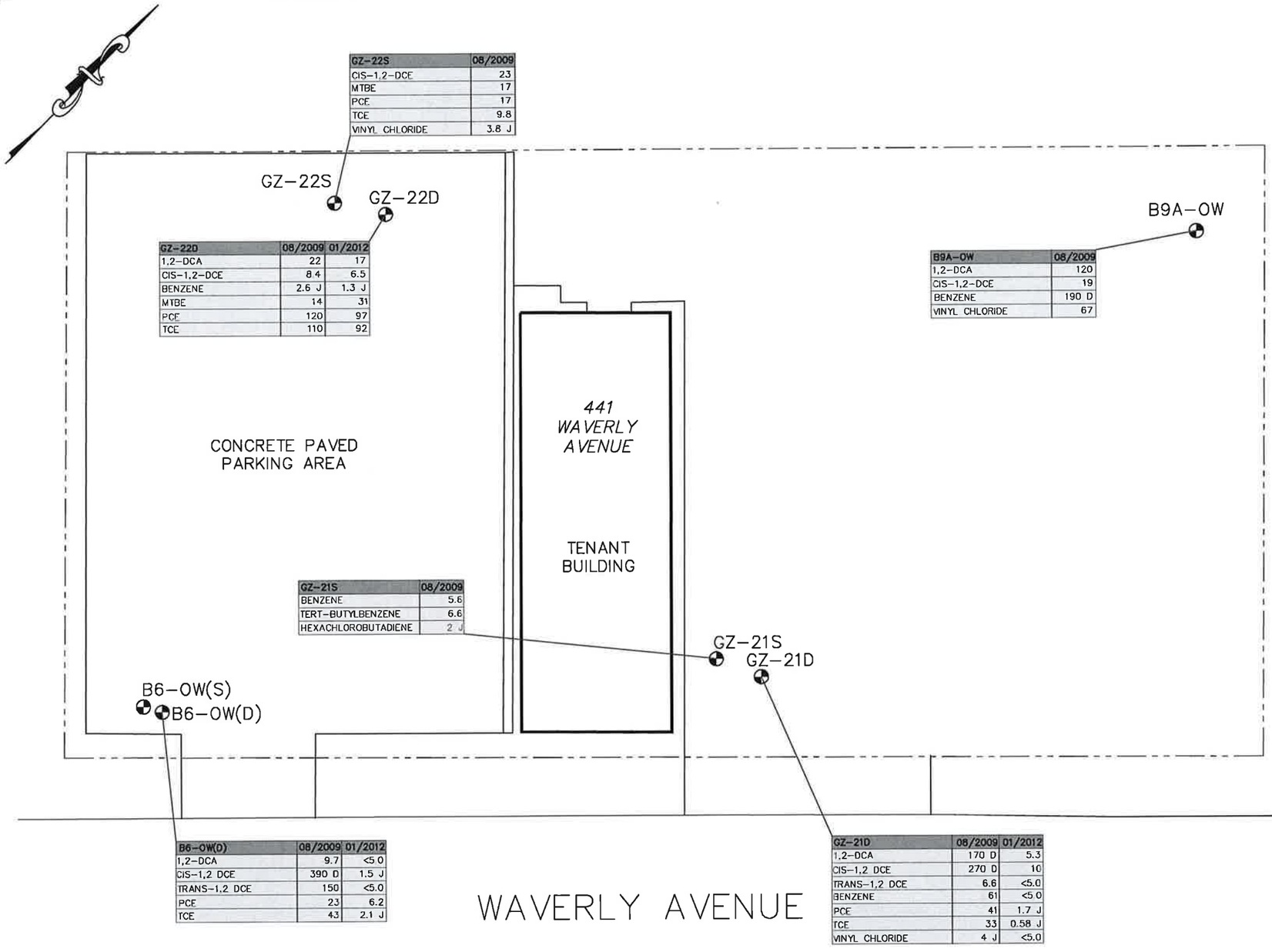
2012 OVERBURDEN AQUIFER GROUNDWATER ELEVATIONS

SITE# C360108

NEW WAVERLY AVENUE ASSOCIATES, LLC

V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	6/25/12	SCALE:	1" = 40'	DWG. NO.	28012072	FIGURE	6



GZ-22S	08/2009
CIS-1,2-DCE	23
MTBE	17
PCE	17
TCE	9.8
VINYL CHLORIDE	3.8 J

GZ-22D	08/2009	01/2012
1,2-DCA	22	17
CIS-1,2-DCE	8.4	6.5
BENZENE	2.6 J	1.3 J
MTBE	14	31
PCE	120	97
TCE	110	92

B9A-OW	08/2009
1,2-DCA	120
CIS-1,2-DCE	19
BENZENE	190 D
VINYL CHLORIDE	67

GZ-21S	08/2009
BENZENE	5.6
TERT-BUTYLBENZENE	6.6
HEXACHLOROBUTADIENE	2 J

B6-OW(D)	08/2009	01/2012
1,2-DCA	9.7	<5.0
CIS-1,2 DCE	390 D	1.5 J
TRANS-1,2 DCE	150	<5.0
PCE	23	6.2
TCE	43	2.1 J

GZ-21D	08/2009	01/2012
1,2-DCA	170 D	5.3
CIS-1,2 DCE	270 D	10
TRANS-1,2 DCE	6.6	<5.0
BENZENE	61	<5.0
PCE	41	1.7 J
TCE	33	0.58 J
VINYL CHLORIDE	4 J	<5.0

NYSDEC TOGS 1.1.1 AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES (JUNE 1998)	(ug/L)
1,1-DICHLOROETHENE (1,1-DCE)	5
1,2-DICHLOROETHANE (1,2-DCA)	0.6
CIS-1,2-DICHLOROETHENE (CIS-1,2-DCE)	5
TRANS-1,2-DICHLOROETHENE (TRANS-1,2-DCE)	5
ACETONE	50 GV
BENZENE	1
N-BUTYLBENZENE	5
SEC-BUTYLBENZENE	5
TERT-BUTYLBENZENE	5
HEXACHLOROBUTADIENE	0.5
METHYL TERT-BUTYL ETHER (MTBE)	10 GV
N-PROPYLBENZENE	5
TETRACHLOROETHENE (PCE)	5
TRICHLOROETHENE (TCE)	5
VINYL CHLORIDE	2

THE PARAMETERS LISTED FOR SAMPLE LOCATIONS HAVE REPORTED CONCENTRATIONS THAT EXCEED APPLICABLE WATER QUALITY STANDARDS OR GUIDANCE VALUES FOR ONE OR BOTH SAMPLING EVENTS.

SAMPLE ID	2009 SAMPLE DATE	2012 SAMPLE DATE
PARAMETER	REPORTED CONCENTRATION IN ug/L	REPORTED CONCENTRATION IN ug/L

THE FOLLOWING MONITORING WELLS WERE NOT SAMPLED DURING THE 2012 SAMPLING EVENT: B6OW-5, B9A-OW, GZ-21S, GZ-22S, GZ-24D, GZ-25S, VW-2, B5-OW, VW-5.

LABORATORY QUALIFIERS:

D INDICATES THE UNDILUTED ANALYSIS EXCEEDED THE EQUIPMENT CALIBRATION RANGE. THE CONCENTRATION SHOWN IS OBTAINED FROM A DILUTED ANALYSIS.

J INDICATES THE CONCENTRATION SHOWN IS ESTIMATED BECAUSE THE COMPOUND WAS DETECTED BELOW THE REPORTING LIMIT.

< INDICATES THE PARAMETER WAS NOT DETECTED AT THE LABORATORY LIMIT SHOWN.

KEY:

441 WAVERLY AVENUE BUILDING BOUNDARY

APPROXIMATE PROPERTY BOUNDARY

MONITORING WELL

VOCs VOLATILE ORGANIC COMPOUNDS

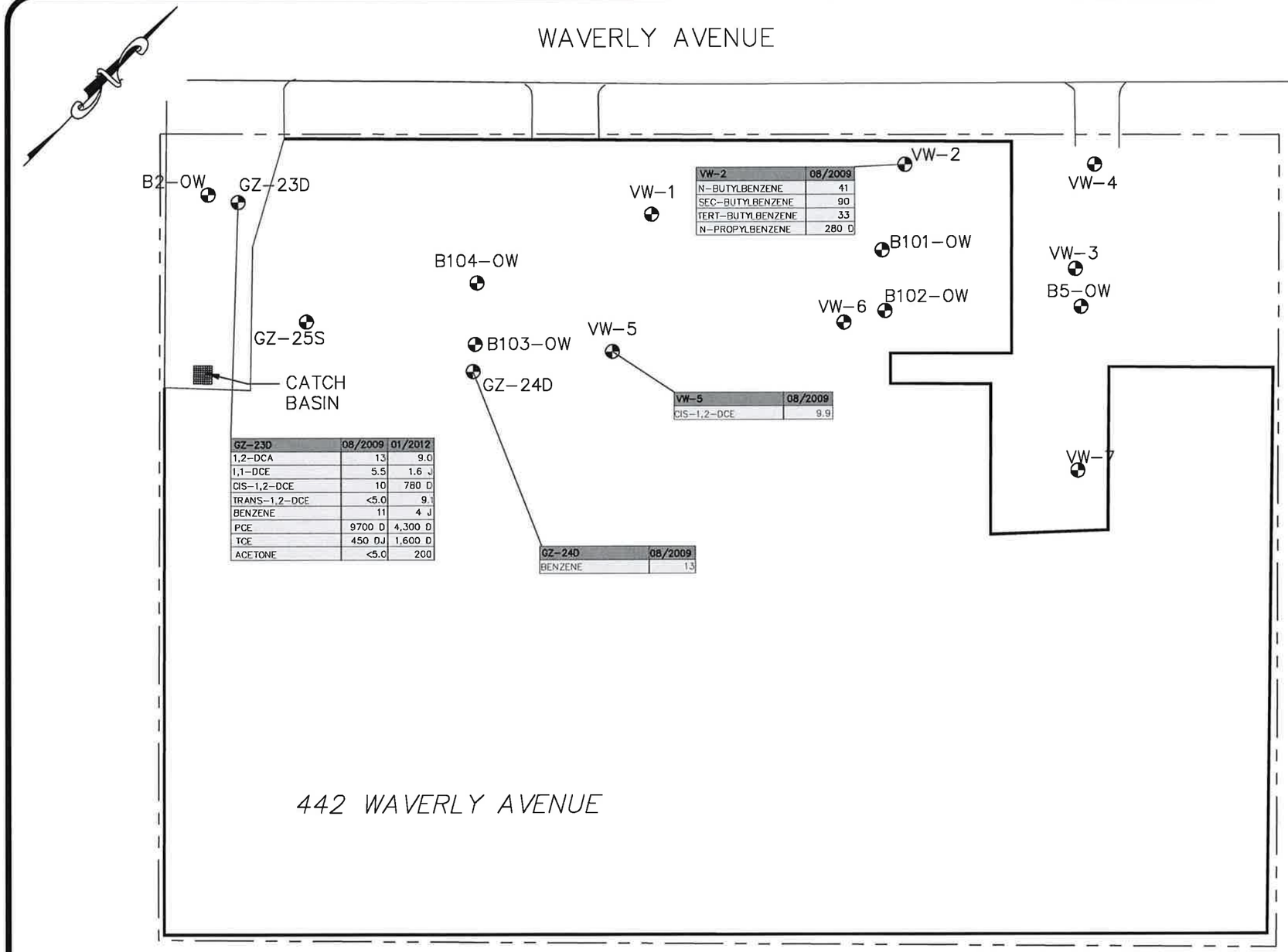
MAP REFERENCE:

BASE MAP PROVIDED BY GZA ENVIRONMENTAL, INC. ENTITLED "SITE PLAN" (9/16/05).

STERLING
Sterling Environmental Engineering, P.C.
24 Wade Road • Latham, New York 12110

VOCs REPORTED FOR GROUNDWATER LOCATIONS – 441 WAVERLY AVENUE
SITE# C360108
NEW WAVERLY AVENUE ASSOCIATES, LLC
V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	7/26/12	SCALE:	1" = 20'	DWG. NO.	28012073	FIGURE	7



VW–2	08/2009
N–BUTYLBENZENE	41
SEC–BUTYLBENZENE	90
TERT–BUTYLBENZENE	33
N–PROPYLBENZENE	280 D

VW–5	08/2009
CIS–1,2–DCE	9.9

GZ–23D	08/2009	01/2012
1,2–DCA	13	9.0
1,1–DCE	5.5	1.6 J
CIS–1,2–DCE	10	780 D
TRANS–1,2–DCE	<5.0	9.1
BENZENE	11	4 J
PCE	9700 D	4,300 D
TCE	450 DJ	1,600 D
ACETONE	<5.0	200

GZ–24D	08/2009
BENZENE	13

NYSDEC TOGS 1.1.1 AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES (JUNE 1998)	(ug/L)
1,1–DICHLOROETHENE (1,1–DCE)	5
1,2–DICHLOROETHANE (1,2–DCA)	0.6
CIS–1,2–DICHLOROETHENE (CIS–1,2–DCE)	5
TRANS–1,2–DICHLOROETHENE (TRANS–1,2–DCE)	5
ACETONE	50 GV
BENZENE	1
N–BUTYLBENZENE	5
SEC–BUTYLBENZENE	5
TERT–BUTYLBENZENE	5
HEXACHLOROBUTADIENE	0.5
METHYL TERT–BUTYL ETHER (MTBE)	10 GV
N–PROPYLBENZENE	5
TETRACHLOROETHENE (PCE)	5
TRICHLOROETHENE (TCE)	5
VINYL CHLORIDE	2

THE PARAMETERS LISTED FOR SAMPLE LOCATIONS HAVE REPORTED CONCENTRATIONS THAT EXCEED APPLICABLE WATER QUALITY STANDARDS OR GUIDANCE VALUES FOR ONE OR BOTH SAMPLING EVENTS.

GROUNDWATER DATA SUMMARY	
SAMPLE ID	SAMPLE DATE
PARAMETER	REPORTED CONCENTRATION IN ug/L

THE FOLLOWING MONITORING WELLS WERE NOT SAMPLED DURING THE 2012 SAMPLING EVENT: B60W–5, B9A–0W, GZ–21S, GZ–22S, GZ–24D, GZ–25S, VW–2, B5–0W, VW–5.

LABORATORY QUALIFIERS:

D INDICATES THE UNDILUTED ANALYSIS EXCEEDED THE EQUIPMENT CALIBRATION RANGE. THE CONCENTRATION SHOWN IS OBTAINED FROM A DILUTED ANALYSIS.

J INDICATES THE CONCENTRATION SHOWN IS ESTIMATED BECAUSE THE COMPOUND WAS DETECTED BELOW THE REPORTING LIMIT.

< INDICATES THE PARAMETER WAS NOT DETECTED AT THE LABORATORY LIMIT SHOWN.

KEY:

441 WAVERLY AVENUE BUILDING BOUNDARY

APPROXIMATE PROPERTY BOUNDARY

MONITORING WELL

VOCs VOLATILE ORGANIC COMPOUNDS

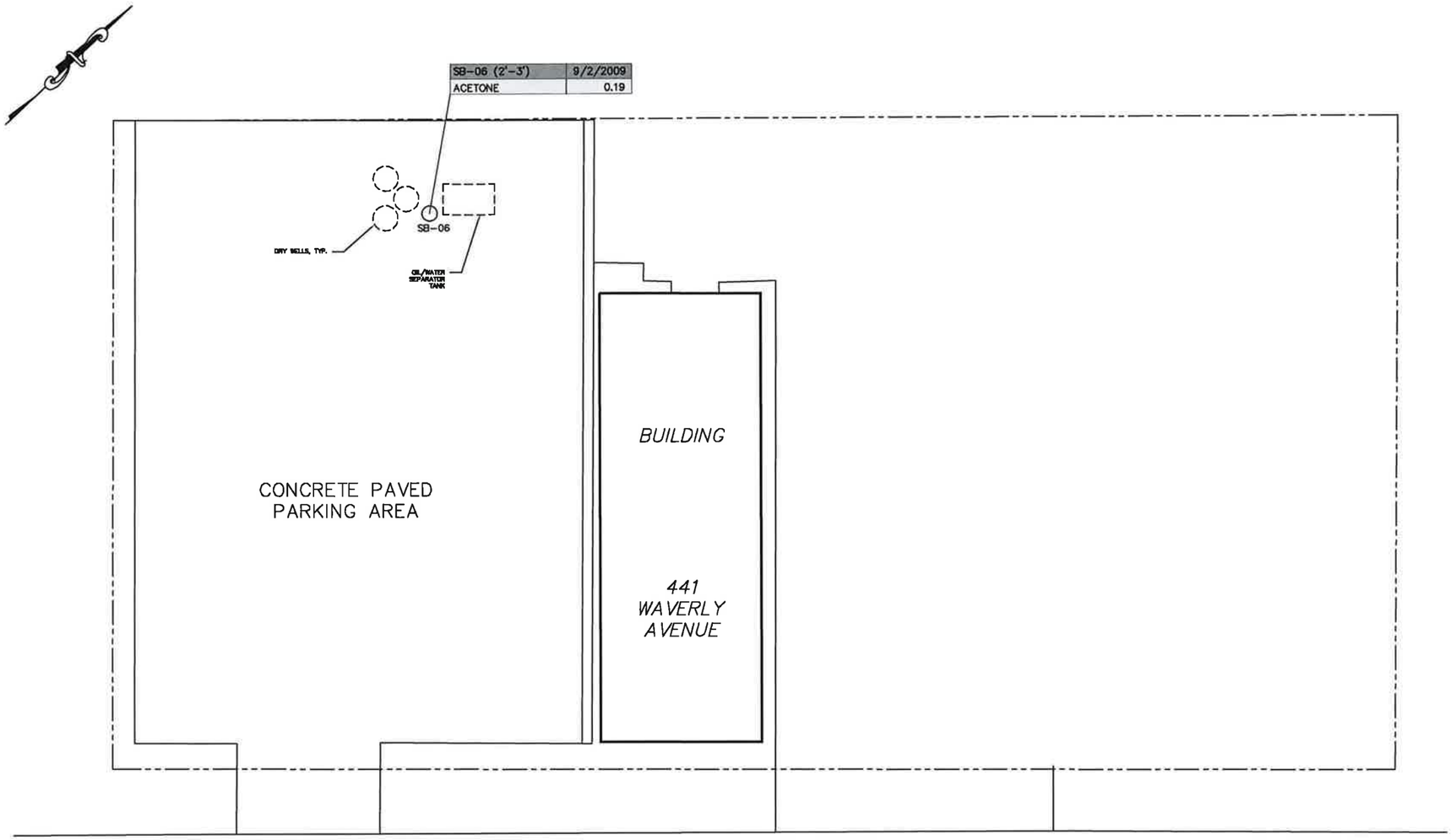
MAP REFERENCE:

BASE MAP PROVIDED BY GZA ENVIRONMENTAL, INC. ENTITLED "SITE PLAN" (9/16/05).

STERLING
Sterling Environmental Engineering, P.C.
24 Wade Road • Latham, New York 12110

VOCs REPORTED FOR GROUNDWATER LOCATIONS – 442 WAVERLY AVENUE
SITE# C360108
NEW WAVERLY AVENUE ASSOCIATES, LLC
V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	7/26/12	SCALE:	1" = 20'	DWG. NO.	28012074	FIGURE	8



6 NYCRR PART 375-6.8 (a) RESTRICTED USE SOIL CLEANUP OBJECTIVES (SCOs)	ug/L	
	COMMERCIAL	PROTECTION OF GROUNDWATER
ACETONE	500	0.05

THE PARAMETER LISTED FOR SAMPLE LOCATION HAS A REPORTED CONCENTRATION THAT EXCEEDS THE APPLICABLE PART 375-6.8 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES FOR COMMERCIAL OR PROTECTION OF GROUNDWATER VALUES FOR THE SAMPLING EVENT.

SAMPLE ID (DEPTH)	SAMPLE DATE
PARAMETER	REPORTED CONCENTRATION IN ug/L

SAMPLE I.D. / SAMPLE I.D. IN LABORATORY REPORT
SB-06 / SB-06

KEY:

441 WAVERLY AVENUE BUILDING BOUNDARY

APPROXIMATE PROPERTY BOUNDARY

SOIL BORING

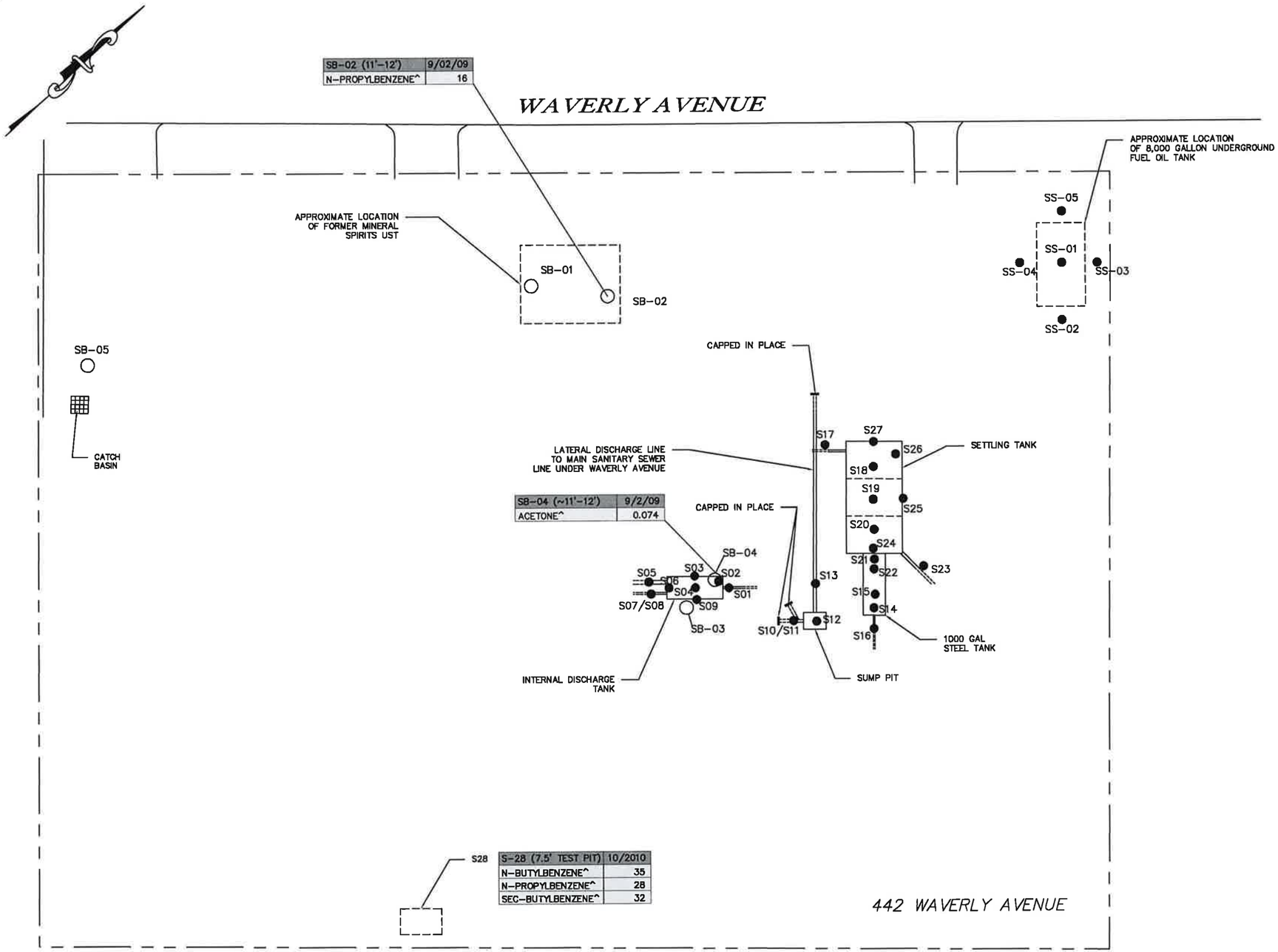
MAP REFERENCE:

BASE MAP PROVIDED BY GZA ENVIRONMENTAL, INC. ENTITLED "SITE PLAN" (9/16/05).

STERLING
Sterling Environmental Engineering, P.C.
24 Wade Road ♦ Latham, New York 12110

LOCATION OF REMAINING SOIL CONTAMINATION ABOVE PART 375 PROTECTION OF GROUNDWATER SCOs - 441 WAVERLY AVENUE
SITE# C360108
NEW WAVERLY AVENUE ASSOCIATES, LLC
V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	7/26/12	SCALE:	1" = 20'	DWG. NO.	28012075	FIGURE	9



6 NYCRR PART 375-6.8 (a) RESTRICTED USE SOIL CLEANUP OBJECTIVES (SCOs)	ug/L	
	COMMERCIAL	PROTECTION OF GROUNDWATER
ACETONE	500	0.05
N-BUTYLBENZENE	500	12
N-PROPYLBENZENE	500	3.9
SEC-BUTYLBENZENE	500	11

THE PARAMETER LISTED FOR SAMPLE LOCATION HAS A REPORTED CONCENTRATION THAT EXCEEDS THE APPLICABLE PART 375-6.8 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES FOR COMMERCIAL OR PROTECTION OF GROUNDWATER VALUES FOR THE SAMPLING EVENT.

SAMPLE ID (DEPTH)	SAMPLE DATE
PARAMETER	REPORTED CONCENTRATION IN ug/L

SAMPLE I.D.	SAMPLE I.D. IN LABORATORY REPORT
SB-02	SB-02
SB-04	SB-04
S28	SW-TEST-PIT

KEY:

- APPROXIMATE PROPERTY BOUNDARY
- ○ SOIL BORING
- ● SOIL SAMPLE LOCATION
- ^ 6 NYCRR SUBPART 375-6.8(b) PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVE.

MAP REFERENCE:

BASE MAP PROVIDED BY GZA ENVIRONMENTAL, INC. ENTITLED "SITE PLAN" (9/16/05).

STERLING
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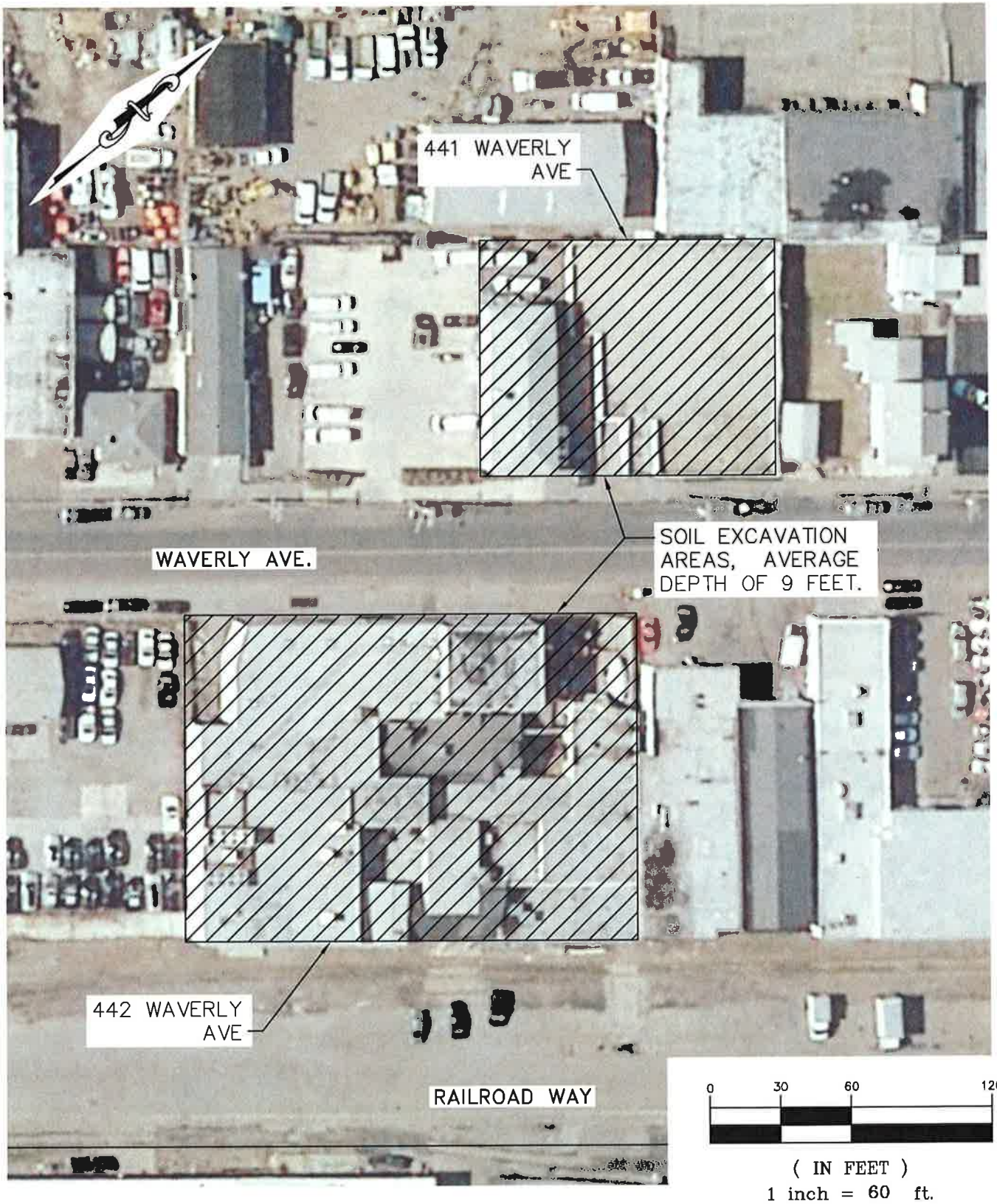
24 Wade Road • Latham, New York 12110

LOCATION OF REMAINING SOIL CONTAMINATION ABOVE PART 375 PROTECTION OF GROUNDWATER SCOs - 442 WAVERLY AVENUE
SITE# C360108
NEW WAVERLY AVENUE ASSOCIATES, LLC
V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	7/26/12	SCALE:	1" = 20'	DWG. NO.	28012076	FIGURE	10



MAP REFERENCE: AERIAL PHOTOGRAPH PROVIDED BY NEW YORK STATE GIS, (2009).

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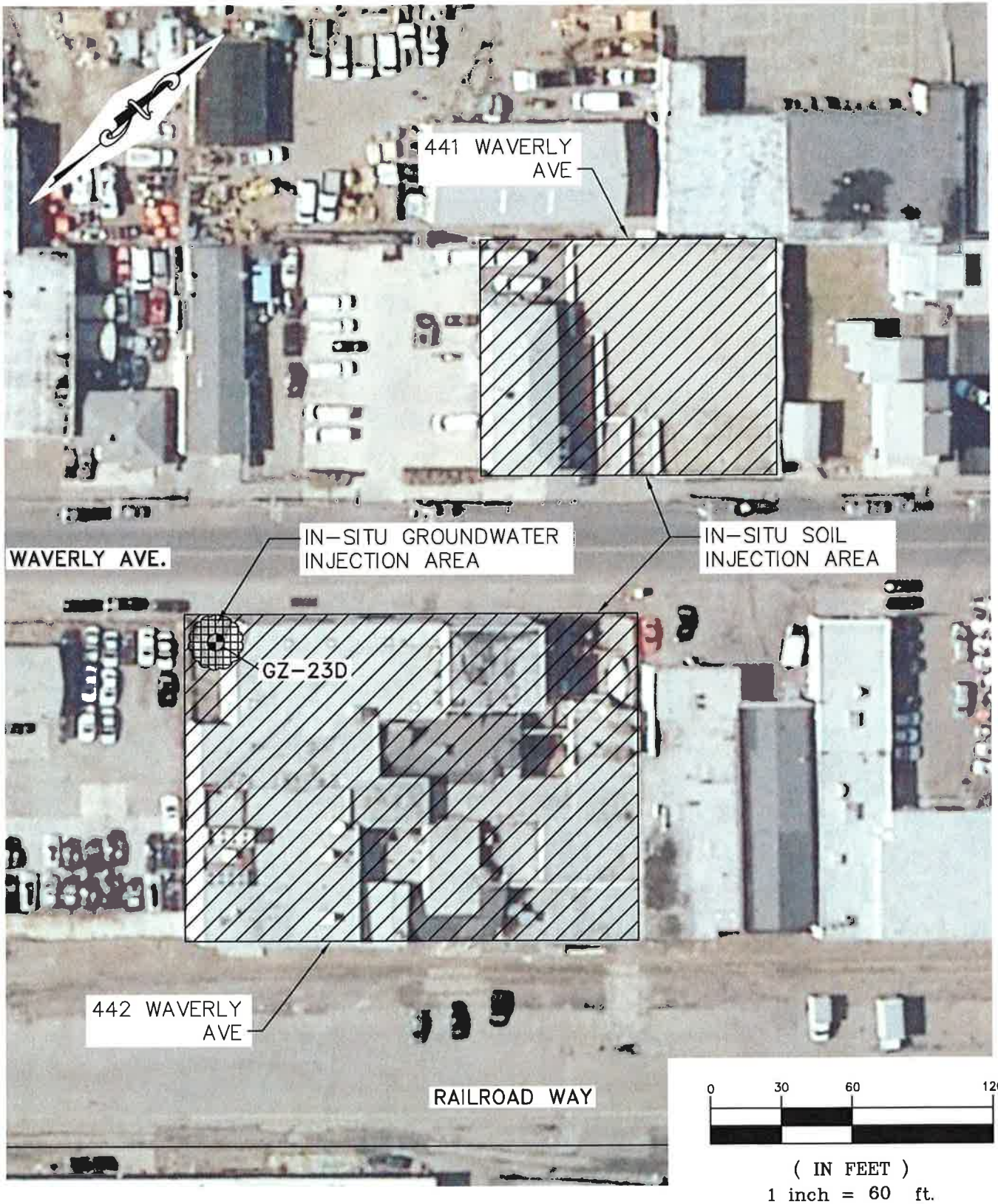
ALTERNATIVE 1: SOIL EXCAVATION AND OFFSITE DISPOSAL

SITE #C360108

NEW WAVERLY AVENUE ASSOCIATES, LLC

V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	7/2/12	SCALE:	1"=60'	DWG. NO.	28012077	FIGURE	11



MAP REFERENCE: AERIAL PHOTOGRAPH PROVIDED BY NEW YORK STATE GIS, (2009).

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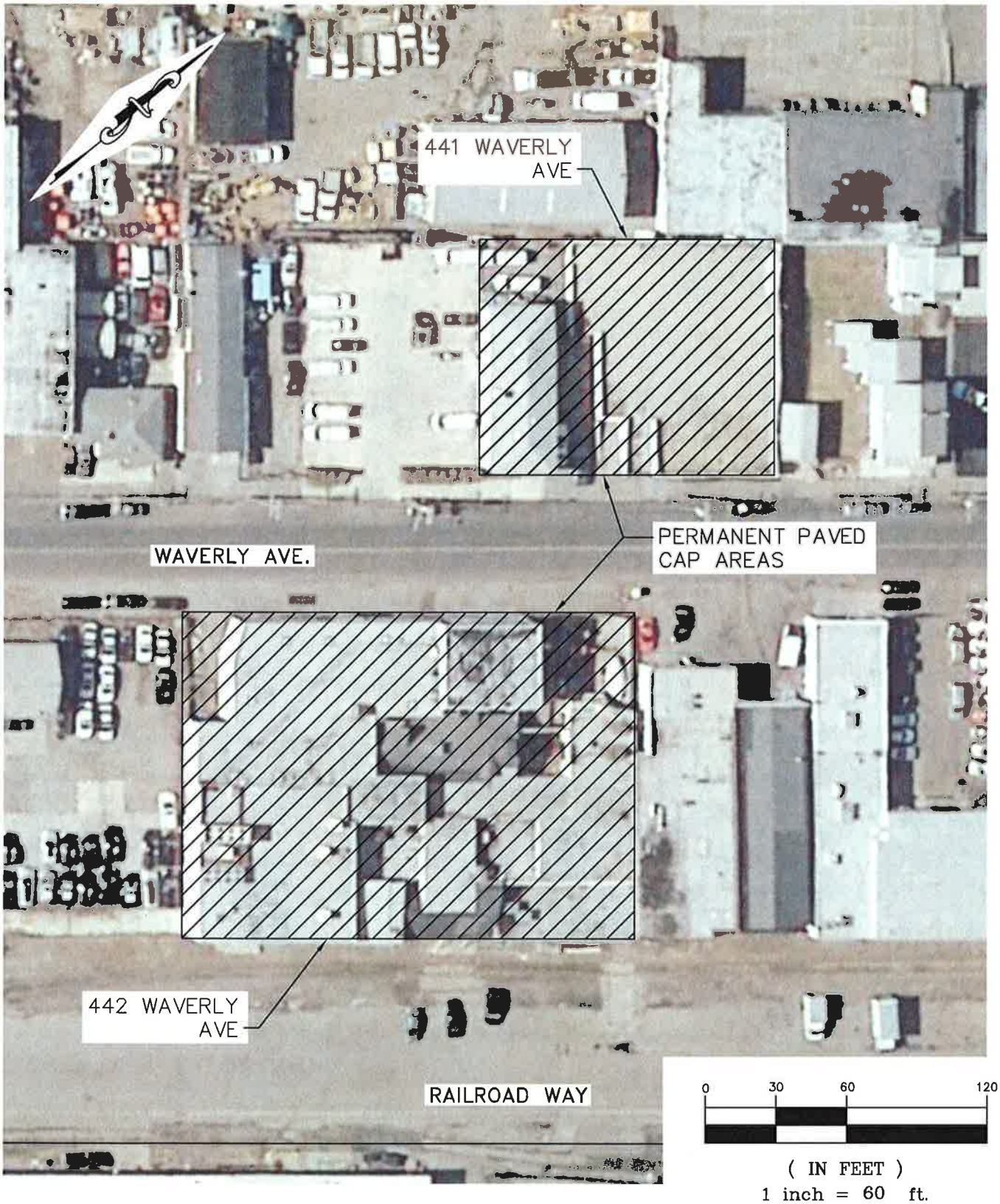
ALTERNATIVE 2 A&B: IN-SITU TREATMENT OF CONTAMINATED SOIL AND GROUNDWATER
SITE #C360108
NEW WAVERLY AVENUE ASSOCIATES, LLC
V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.:	28012	DATE:	7/2/12	SCALE:	1"=60'	DWG. NO.	28012078	FIGURE	12



MAP REFERENCE: AERIAL PHOTOGRAPH PROVIDED BY NEW YORK STATE GIS, (2009).

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Sterling Environmental Engineering, P.C.

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ALTERNATIVE 3:
CAPPING ASPHALT PARKING AREAS
SITE #C360108
NEW WAVERLY AVENUE ASSOCIATES, LLC
V/T OF MAMARONECK WESTCHESTER CO., N.Y.

PROJ. No.: 28012	DATE: 7/2/12	SCALE: 1"=60'	DWG. NO. 28012079	FIGURE 13