WORK PLAN
SUPPLEMENTAL TEST BORINGS
AND MONITORING WELL INSTALLATION

ANDERSON CLEANERS SITE
BROWNFIELD CLEANUP PROGRAM
NYSDEC CODE #C907027
5 HUNT ROAD
JAMESTOWN, NEW YORK

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Project No: 3563S-04

Date: February 2006

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FIGURES

1.0 INTRODUCTION

Anderson Cleaners is located at 5 Hunt Road in Jamestown, New York (Site). A project locus map is included as Figure 1. On September 9, 2004, Anderson Cleaners and the New York State Department of Environmental Conservation (NYSDEC) entered into a Brownfield Cleanup Agreement (BCA) and the NYSDEC assigned Brownfield Cleanup Program (BCP) ID #C907027 to the Site. As part of this BCA, a Remedial Investigation Work Plan for the Anderson Cleaners Site, 5 Hunt Road, Jamestown, New York, BCP #C907027 dated September 2004 (Remedial Investigation Work Plan) was developed and submitted to the NYSDEC. The Remedial Investigation Work Plan was approved by the NYSDEC and various activities described in this document were undertaken between September 2004 and September 2005. A draft Remedial Investigation/Alternatives Analysis Report (RI/AAR) for the Site was submitted to the NYSDEC in September 2005. This report presented the findings of studies completed at the Site and various remedial alternatives to address chlorinated volatile organic compounds (VOCs) identified in the soil and groundwater

This work plan describes the advancement of test borings and the installation of groundwater monitoring wells to be conducted at the Site. The activities described in this work plan will be used to supplement the data presented in the RI/AAR.

1.1 Site Description

The Site consists of approximately 2.4 acres of land located partially in the City of Jamestown and partially in the Town of Ellicott, New York. The first record of development on the Site was a building constructed and used as a towel factory in the 1930s. By the mid-1940s, Anderson Cleaners occupied the Site and operated a dry cleaning business. The building was expanded over the years. In 1985, a fire destroyed the northern and eastern portions (approximately 8,000 square feet) of the building. This fire did not directly impact the portion of the building that housed the dry cleaning operations although some equipment was damaged by the heat from the fire and an extensive amount of water used to extinguish the fire entered the dry cleaning portion of the building. Following the fire, reconstruction/remodeling operations were undertaken resulting in the current structure. The Site is currently improved by an approximate 11,400-square foot one-story brick and concrete block building. A Site Plan is presented as Figure 2.

1.2 Site History

Anderson personnel report that Stoddard Solvent was used for dry cleaning operations from approximately 1947 to 1978. This material was stored in two underground storage tanks (USTs), each with a capacity of approximately 1,100 gallons. These USTs were located in the area that is now underneath a portion of the building used for cold storage (refer to the Site Plan included as Figure 2). Representatives of Anderson Cleaners reported that these USTs were removed some time before the re-construction of the building in 1985. Available information indicates that the tanks were installed at the time

the south-central portion of the building was constructed (i.e., 1947). The use of Stoddard Solvent was discontinued in about 1978 when tetrachloroethene (also known as perchloroethene or PCE) was first used as the primary dry cleaning agent. In 2002, new dry cleaning equipment that used a hydrocarbon-based solvent, DF 2000, was installed and all use of PCE was discontinued.

1.3 Identified Contaminants of Concern

The contaminants of concern (COC) identified during previous studies are generally associated with dry cleaning products previously used at the Site (i.e., primarily chlorinated VOCs consisting of PCE and associated breakdown products). COC were not detected in test boring/monitoring well locations near the western property boundary of the Site (i.e., upgradient locations). The highest concentrations of COC in the soil and groundwater were detected in proximity of the Courtyard Area where a broken 6-inch diameter clay tile pipe was identified and in a test boring advanced on the east side of the Anderson Cleaners building. These locations have been identified as apparent source areas of the COC present at the Site. PCE and associated breakdown products present at the Site appear to have migrated laterally toward the east/southeast away from the apparent source area(s). Based on field observation/in-situ screening and analytical laboratory test results, a chlorinated solvent plume (i.e., as evidenced by PCE concentrations in excess of SCGs) extends east/southeast from the apparent source area in the Courtyard Area to, at least, monitoring well MW-06 (i.e., a distance of approximately 145 feet).

In an attempt to remove the soil containing the highest concentrations (i.e., soil in proximity to a broken section of the 6-inch clay tile pipe that extends the length of the Courtyard), a soil removal IRM was conducted in July 2005. Due to physical constraints (e.g., proximity to the adjacent building, artesian groundwater conditions, etc.) and a heavy rainfall that occurred during soil removal operations, soil impacted with COC remains in the Courtyard Area

1.4 January 12, 2006 Groundwater Sample Round

On January 12, 2006, DAY measured groundwater elevations and evaluated the presence of dense non-aqueous phase liquid (DNAPL) in all functioning monitoring wells at the Site. In addition, samples were collected from selected monitoring wells for testing of target compound list (TCL) VOCs. The monitoring wells sampled on January 12, 2006 included: PW-2, PW-3, MW-02, MW-03, MW-04, MW-05, MW-06, and MW-07. As shown on Figure 3, similar VOCs were detected in samples collected during the January 12, 2006 sample event to those found during previous sampling events, but the concentrations detected were lower than detected during the previous sampling events. In addition, DNAPL was not observed in any of the monitoring wells.

1.5 Objective

The objective of the activities described in this work plan is to advance test borings to evaluate preferential migration pathways, which will assist in the selection of possible off-site monitoring well locations. In addition, this work plan describes the installation and testing of a bedrock monitoring well to evaluate the VOC impact identified in an existing bedrock well (i.e., identified as BR-01). The data collected from these supplemental studies will be used to revise the draft RI/AAR.

2.0 SCOPE OF WORK

The activities to be performed under this work plan are described in the subsections presented below.

2.1 Test Borings

To evaluate subsurface conditions in downgradient locations and the areal extent of off-site impact, additional test borings will be advanced at the Site. The approximate locations of these test borings are presented on Figure 2. The actual locations of these test borings will depend on access requirements, buried utilities, etc. and the conditions encountered during the drilling of the test borings (e.g., test borings may be eliminated/re-positioned in the field in an attempt to define the extent of impact). Currently, test borings are planned in proximity to the storm and sanitary sewers within Huxley Street and Kenmore Avenue (utilities presented on Figure 4), to evaluate the possibility of preferential migration of VOCs along the sewer and/or associated bedding. In addition, test borings will be advanced in off-site downgradient positions (i.e., at varying distances form the Site) to assist in the selection of monitoring well locations intended to define the areal extent of VOC impact within the groundwater.

The test borings locations and/or number of test borings may be altered depending on field observations and findings of preceding test borings The NYSDEC will be consulted regarding proposed changes in the locations of the test borings (if appropriate).

2.1.1 Test Boring Procedures

The test borings will be advanced using vehicle mounted direct-push sampling equipment. It is anticipated that the boreholes will be advanced to equipment refusal (i.e., expected to occur at a depth of approximately 10 to 15 feet below the ground surface). However, selected borings may be terminated at shallower depths depending on the findings as the work is completed.

Consecutive samples will be collected in two or four feet long acetate liners as the test boring is advanced. Upon opening the liners the airspace above the sample will be screened with a photoionization detector (PID) equipped with a 10.6 eV lamp to determine if VOCs are present in the sample. The portion of the sample exhibiting the most obvious signs of contamination (i.e., elevated PID measurements, visual signs of staining, olfactory detection, etc.) will be retained for possible analytical laboratory testing, another portion of the sample will be placed in a sealed sample bag for subsequent PID headspace measurement.

An on-site geologist or technician will record pertinent information for each borehole onto boring logs. The recorded information will include:

- Date, borehole identification and project identification
- Name of individual developing the log

- Names of driller and assistant(s)
- Drill make and model, auger size
- Identification of alternative drilling methods used and justification thereof (e.g., use of hand operated Geoprobe equipment etc.)
- Depths recorded in feet and fractions thereof (tenths of feet) referenced to ground surface
- The length of the sample interval and the length of the sample recovered
- The depth of the first encountered water table, along with the method of determination, referenced to ground surface
- Drilling and borehole characteristics
- Sequential stratigraphic boundaries
- Initial PID screening results of direct push samples and/or PID screening of ambient headspace air above selected samples

A new acetate sampling liner will be used to collect each soil sample and this sample liner will be discarded following its use. The re-usable drilling equipment and sampling tools contacting the overburden will be decontaminated between test borings. The following decontamination procedures will be followed: (1) alconox (i.e., soap) and tap water wash (2) a rinse in tap water and (3) a final rinse with deionized water. Decontamination fluids will be collected filtered and passed through an activated carbon system. The water will then be discharged to the sanitary sewer system. The boreholes will be backfilled with soil sample cuttings and/or bentonite and the surface will be capped with asphalt patch or soil depending upon the location of the test boring.

2.1.2 Analytical Laboratory Testing

Selected samples collected from the test borings described above will be submitted for analytical laboratory testing. These samples will be tested for TCL VOCs via USEPA Method 8260. The number and location of samples submitted for testing will be determined based upon the conditions encountered during the advancement of the test borings.

2.2 Installation and Development of Shallow Groundwater Monitoring Wells

It is anticipated that up to two additional groundwater monitoring wells will be installed in off-site locations to evaluate the extent of VOC impact. The location of these wells will be determined following a review of the information collected during the advancement of the test borings described in Task 2.1. These additional groundwater monitoring wells will be "top of rock" monitoring wells constructed of 2-inch diameter PVC screens and risers (i.e., similar to the monitoring wells installed at the Site). Groundwater monitoring well installation and development methodologies will follow the procedures and specifications outlined in the Remedial Investigation Work Plan. Following installation, the ground surface and the top of casing elevations of the new monitoring wells will be measured and referenced to the same datum as the existing monitoring wells at the Site.

2.2.1 Hydraulic Conductivity Testing

Subsequent to development and a return to steady-state static water level conditions, in-situ hydraulic conductivity testing will be completed in the new groundwater monitoring wells. The hydraulic conductivity measured in the new monitoring wells will be compared to the existing monitoring wells. It is anticipated that this procedure will include the placement of a "Slug" into the well and its subsequent removal coupled with monitoring and recording of water level variations. The information collected will be imported into the SuperSlug computer model to derive hydraulic conductivity. In the event that a well recharges at a rate too high for slug testing, a pump test may be used to determine hydraulic conductivity of that location.

The slug and other reusable well sampling/monitoring equipment will be decontaminated prior to being used at each location by implementing the following procedures: 1) initial wash in tap water; 2) wash in mixture of tap water and alconox soap or equivalent; 3) double rinse with distilled or deionized water; and 4) air dry and/or dry with clean paper towel.

2.3 Installation and Development of a Bedrock Monitoring Well

A bedrock monitoring well (designated BR-02) will be installed near the eastern property line of the Site (refer to Figure 2). This well will be constructed similarly to existing bedrock well BR-01. As such, a drilling subcontractor will be retained to advance BR-02 using air rotary drilling techniques, whereby a boring will be advanced to a depth of approximately 30 feet below the ground surface (i.e., through the overburden and into the bedrock). Thereafter steel casing will be installed in the borehole and grouted in place. Approximately 48 hours after installation of the steel casing, the grout inside the casing will be reamed out and the boring will be advanced through the bedrock to a depth of about 45 feet (i.e., to intercept the zone of maximum VOC impact identified in existing bedrock well BR-01). The zone between about 30 feet below the ground surface and 45 feet below the ground surface will remain an open rock well. The top of the well will be fitted with a steel protective casing or curb box with locking caps that are cemented in place.

Approximately one week after the installation of BR-02, the well will be developed in preparation of sampling. The well development procedures will be similar to the methods described in the Remedial Investigation Work Plan. The water collected during development will be collected filtered and passed through an activated carbon system. The water will then be discharged to the sanitary sewer system.

Following installation, the ground surface and the top of casing elevation of BR-02 will be measured and referenced to the same datum as the existing monitoring wells at the Site.

2.4 Groundwater Sampling and Analytical Laboratory Testing

The shallow groundwater monitoring wells will be sampled using disposable bailers as described in the Remedial Investigation Work Plan. Bedrock well BR-02 will be sampled using either Diffusion Samplers (as described in the Remedial Investigation Work Plan) or a packer system to isolate zones within the bedrock and a pump to collect water samples for testing. The determination of the sampling method to be utilized to collect samples from BR-02 will be determined following the installation and development of the well.

The groundwater samples will be tested for TCL VOCs using ASP CLP Methods OLM04.2.

2.5 Report/Deliverables

A report of findings will be developed and submitted to the NYSDEC. This will include a narrative describing the work completed and include copies of test boring logs/well construction diagrams, development logs and hydraulic conductivity results. In addition, analytical laboratory test results will be submitted as they become available. The data collected as part of this studies described herein will ultimately be incorporated into the final RI/AAR.

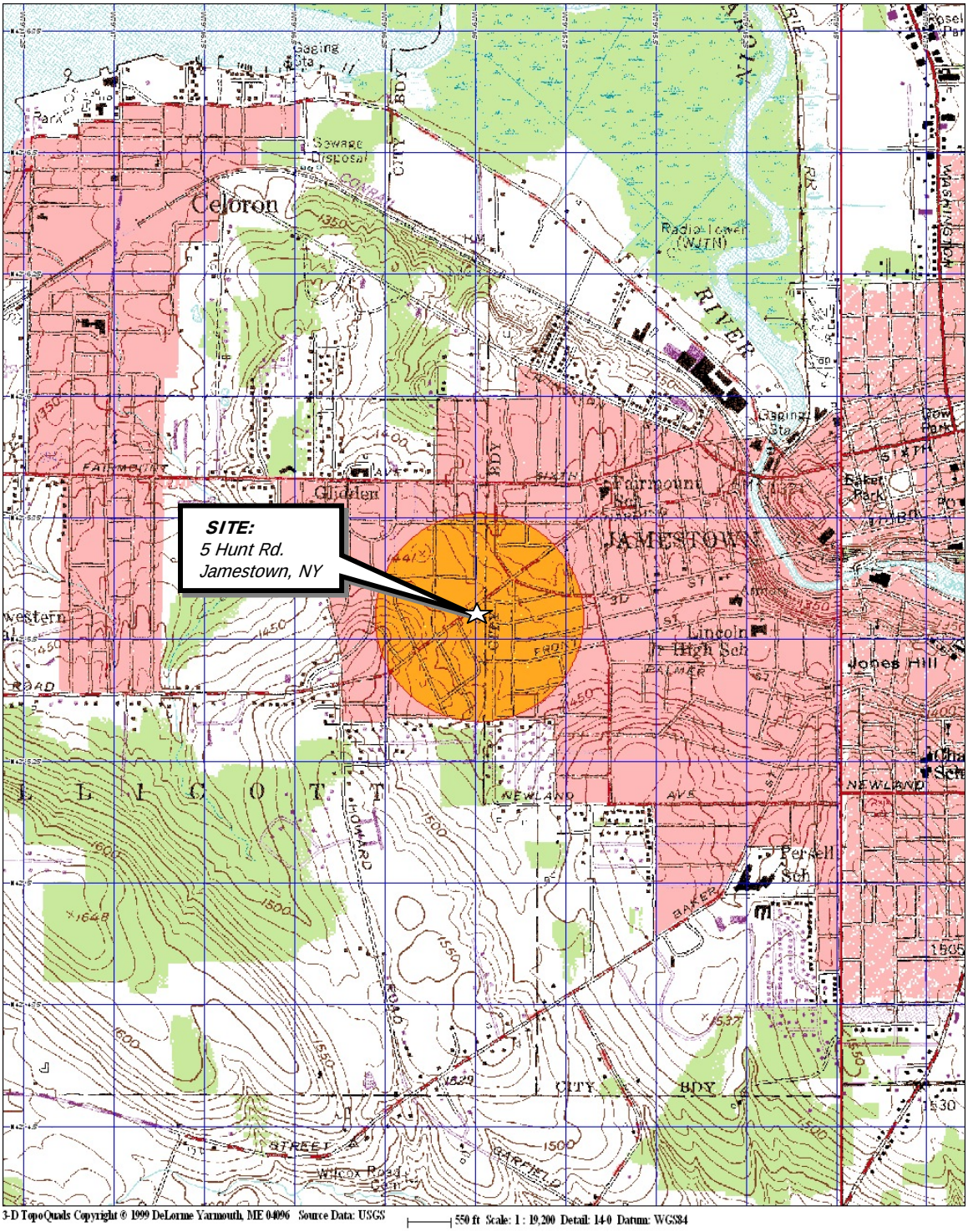
3.0 HEALTH AND SAFETY PLAN

The work described herein will be done in accordance to the procedures outlined in the Health and Safety Plan, which is included in Appendix G of the September 2004 Remedial Investigation Work Plan.

4.0 SCHEDULE

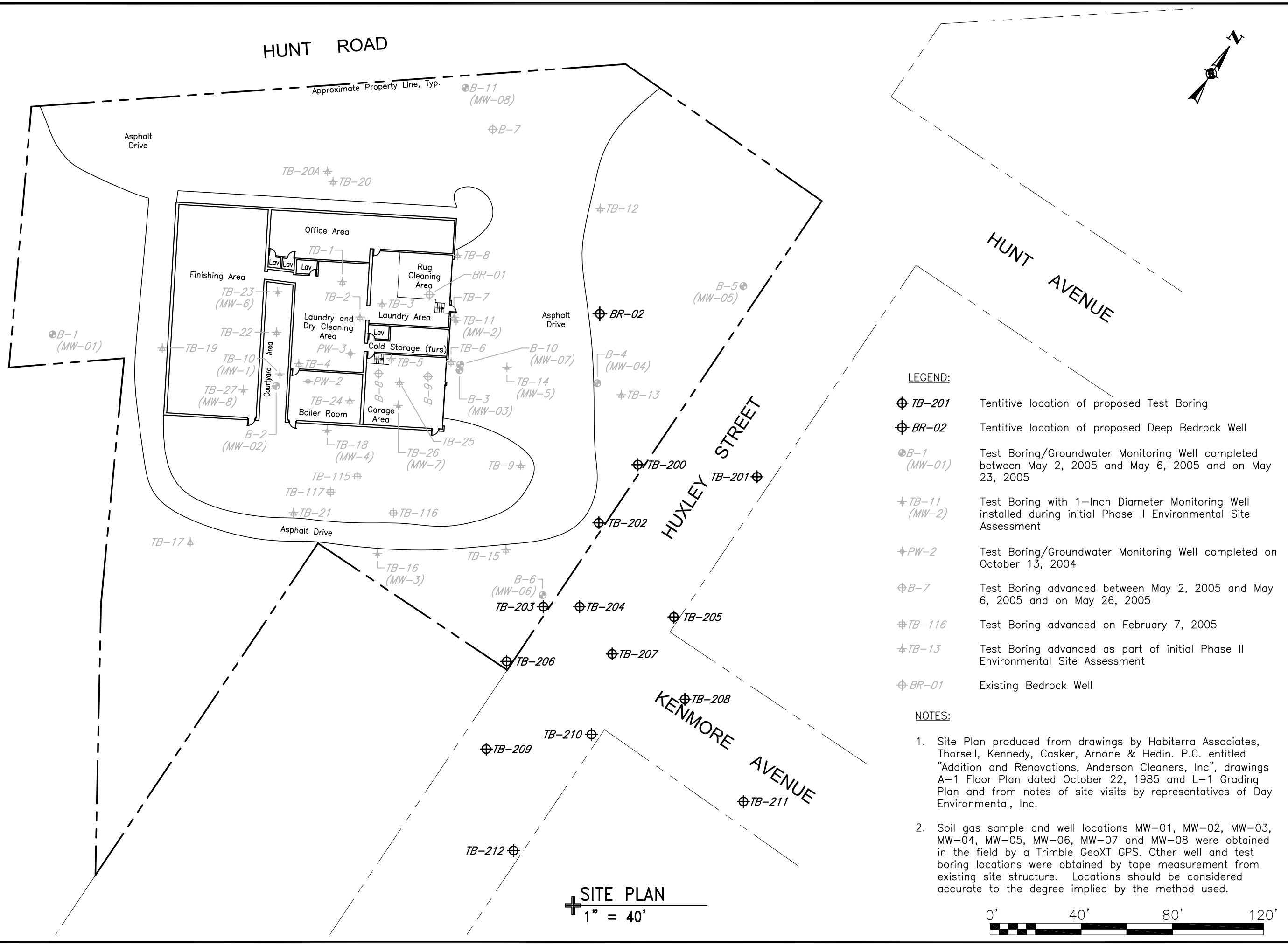
It is anticipated that the direct push test borings will be advanced approximately one week following the approval of this work plan by the NYSDEC. The installation and development of the additional monitoring wells will be completed within six weeks of the approval of the work plan by the NYSDEC. It is anticipated that test results for the initial round of samples collected from the new monitoring wells should be available within 9 to 10 weeks of the approval of the work plan by the NYSDEC.

FIGURES



Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad map Lakewood (NY) 1979 and Jamestown (NY) 1979. Site Lat/Long: N42°05.55'– W79°16.00'

DATE **08-30-2005** DRAWN BY **RJM** SCALE **1" = 2000'**	DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008	PROJECT TITLE **5 HUNT ROAD** **JAMESTOWN, NEW YORK** **REMEDIAL INVESTIGATION** **BCP #C907027** DRAWING TITLE **PROJECT LOCUS MAP**	PROJECT NO. **3563S-04** **FIGURE 1**



SITE PLAN
1" = 40'

LEGEND:

TB–201	Tentitive location of proposed Test Boring
BR–02	Tentitive location of proposed Deep Bedrock Well
B–1 (MW–01)	Test Boring/Groundwater Monitoring Well completed between May 2, 2005 and May 6, 2005 and on May 23, 2005
TB–11 (MW–2)	Test Boring with 1–Inch Diameter Monitoring Well installed during initial Phase II Environmental Site Assessment
PW–2	Test Boring/Groundwater Monitoring Well completed on October 13, 2004
B–7	Test Boring advanced between May 2, 2005 and May 6, 2005 and on May 26, 2005
TB–116	Test Boring advanced on February 7, 2005
TB–13	Test Boring advanced as part of initial Phase II Environmental Site Assessment
BR–01	Existing Bedrock Well

NOTES:

1. Site Plan produced from drawings by Habiterra Associates, Thorsell, Kennedy, Casker, Arnone & Hedin. P.C. entitled "Addition and Renovations, Anderson Cleaners, Inc", drawings A–1 Floor Plan dated October 22, 1985 and L–1 Grading Plan and from notes of site visits by representatives of Day Environmental, Inc.
2. Soil gas sample and well locations MW–01, MW–02, MW–03, MW–04, MW–05, MW–06, MW–07 and MW–08 were obtained in the field by a Trimble GeoXT GPS. Other well and test boring locations were obtained by tape measurement from existing site structure. Locations should be considered accurate to the degree implied by the method used.

0' 40' 80' 120'

PROJECT MANAGER	RLK
DRAWN BY	RJM
DATE	08-2005
DATE DRAWN	02-03-2006
SCALE	As Noted
DATE ISSUED	02-08-2006

day
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NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
5 HUNT ROAD
JAMESTOWN, NEW YORK

REMEDIAL INVESTIGATION - BCP #C907027

DRAWING TITLE
Site Plan with Subsurface Exploration Locations

PROJECT NO.
3563S-04

FIGURE 2

Ref1:
Ref2:
Ref3:
Ref4:
Ref5:
Ref6:

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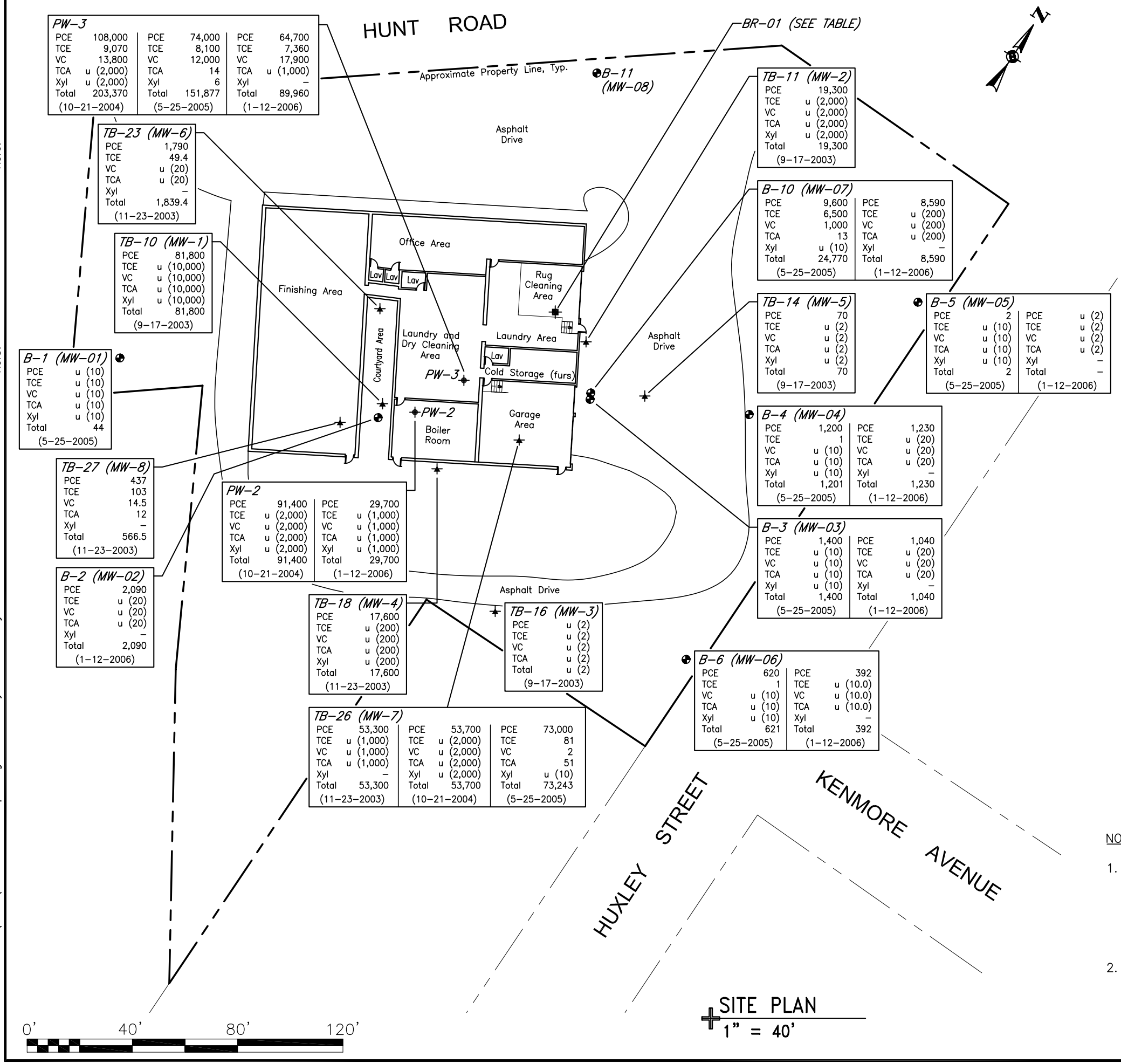

BR–01						
PCE	7,100	10,000	2,900	230	190	96
TCE	3,400	3,300	1,600	200	47	18
VC	260	280	150	21	17	3
TCA	u (10)	u (10)	u (10)	u (10)	u (10)	u (10)
Xyl	u (10)	u (10)	u (10)	u (10)	u (10)	u (10)
Total	12,516	15,342	5,590	882	756	150
Depth of Sample	31.1 – 32.6	41.7 – 43.2	54.7 – 56.2	67.7 – 69.2	80.7 – 82.2	93.7 – 95.2

LEGEND:

B–1 (MW–01)	Test Boring/Groundwater Monitoring Well completed between May 2, 2005 and May 6, 2005 and on May 23, 2005
TB–11 (MW–2)	Test Boring with 1–Inch Diameter Monitoring Well installed during initial Phase II Environmental Site Assessment
PW–2	Test Boring/Groundwater Monitoring Well completed on October 13, 2004
BR–01	Bedrock Well
PCE	Tetrachloroethene ug/L
TCE	Trichloroethene ug/L
VC	Vinyl Chloride
TCA	1,1,1–Trichloroethane ug/L
Xyl	Xylene ug/L
Total	Total VOCs and TICs
u	Constituent analyzed but not detected
–	Constituent not analyzed
(5–25–2005)	Date of sample

NOTES:

1. Site Plan produced from drawings by Habiterra Associates, Thorsell, Kennedy, Casker, Arnone & Hedin. P.C. entitled ”Addition and Renovations, Anderson Cleaners, Inc”, drawings A–1 Floor Plan dated October 22, 1985 and L–1 Grading Plan and from notes of site visits by representatives of Day Environmental, Inc.
2. Well locations MW–01, MW–02, MW–03, MW–04, MW–05, MW–06, MW–07 and MW–08 were obtained in the field by a Trimble GeoXT GPS. Other well and test boring locations were obtained by tape measurement from existing site structure. Locations should be considered accurate to the degree implied by the method used.

Ref4:
Ref5:
Ref6:

Ref1:
Ref2:
Ref3:

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Layout Name: Layout 1

Time Plotted: Wed Feb 8 13:35 2006
File Name: Brownfield\3563\40 ScaleWellSample.dwg

DATE	08-2005
PROJECT MANAGER	RLK
DRAWN BY	RJM
DATE DRAWN	02-03-2006
SCALE	As Noted
DATE ISSUED	02-08-2006

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

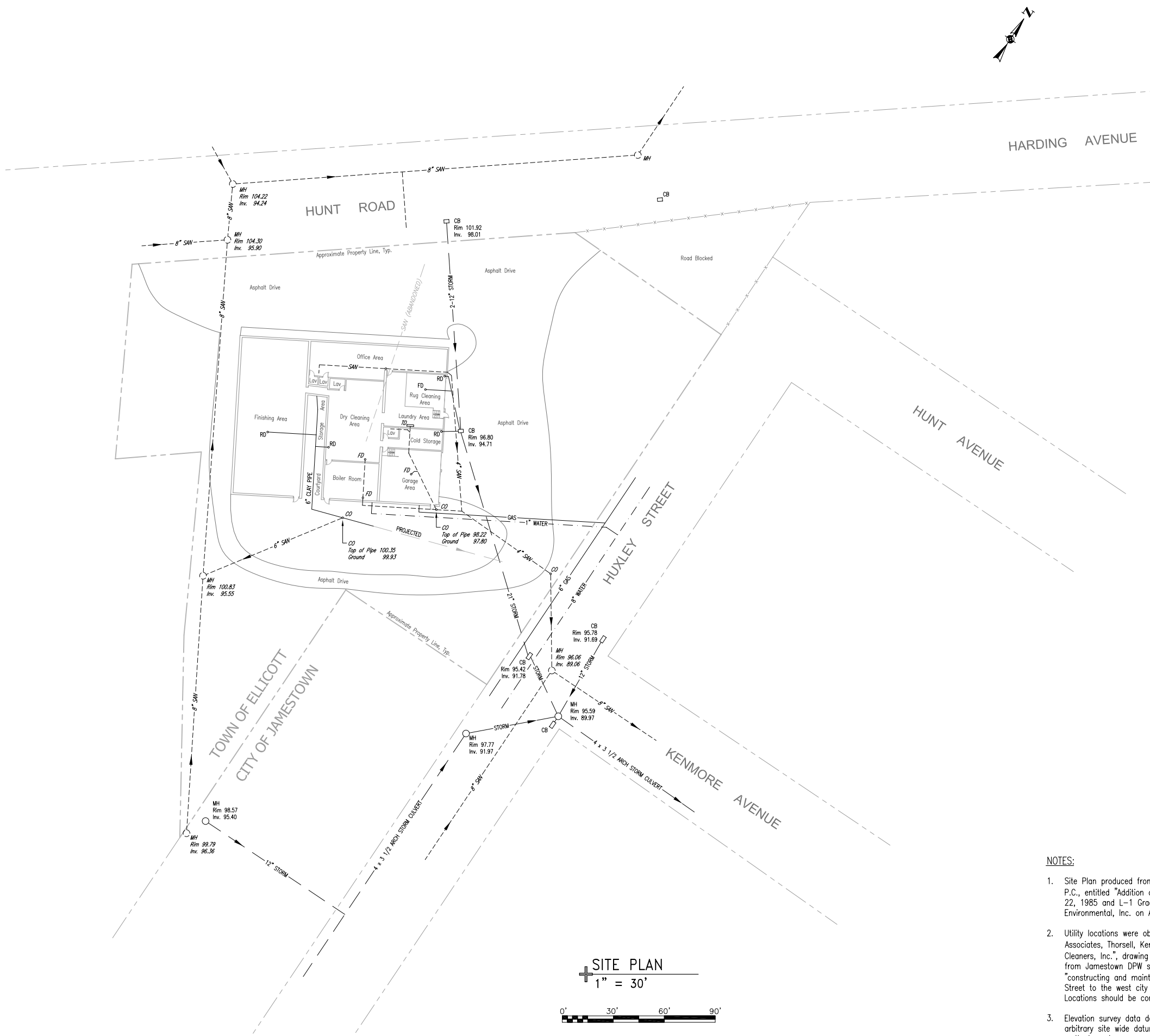
PROJECT TITLE
5 HUNT ROAD
JAMESTOWN, NEW YORK

REMEDIAL INVESTIGATION - BCP #C907027

DRAWING TITLE
Summary Of VOC Test Results: Groundwater Samples

PROJECT NO.
3563S-04

FIGURE 3



SITE PLAN
1" = 30'

0' 30' 60' 90'

LEGEND

6" GAS	Gas Line
8" SAN	Sanitary Sewer
12" STORM	Storm Sewer
8" WATER	Water Line
CB	Catch Basin
DI	Drop Inlet
FD	Floor Drain
MH	Manhole
Rim 100.83	Rim Elevation In Feet
Inv. 95.55	Invert Elevation In Feet
RD	Roof Drain
TD	Trench Drain

NOTES:

1. Site Plan produced from drawings by: Habiterra Associates, Thorsell, Kennedy, Casker, Arnone & Hedin P.C., entitled "Addition and Renovations, Anderson Cleaners, Inc.", drawing A–1 Floor Plan dated October 22, 1985 and L–1 Grading Plan, and from notes of a site visit by a representative of Day Environmental, Inc. on August 4, 2003.
2. Utility locations were obtained in the field by a Trimble GeoXT GPS, from drawings by: Habiterra Associates, Thorsell, Kennedy, Casker, Arnone & Hedin P.C., entitled "Addition and Renovations, Anderson Cleaners, Inc.", drawing A–1 Floor Plan dated October 22, 1985 and L–1 Grading Plan. A 1967 map from Jamestown DPW showing the proposed location of a permanent easment for the purpose of "constructing and maintaining a storm sewer from the existing catch basin on the west side of Huxley Street to the west city line, and from a 1951 DPW storm sewer field book number 438A page 107. Locations should be considered accurate to the degree implied by the method used.
3. Elevation survey data determined by Michael J. Rodgers, Land Surveyor, P.C. and referenced to an arbitrary site wide datum. Elevations should be considered accurate to the degree implied by the method used.

PROJECT MANAGER: RLK — DATE: 08-2005
DRAWN BY: RJM — DATE REVISED: 08-23-2005
CHECKED BY: NS — DATE: 09-01-2005
APPROVED BY: RLK — DATE:
SCALE: 1" = 30' — DATE ISSUED: 02-03-2006

DAY ENVIRONMENTAL, INC.
DRAWING ALTERATION

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED ARCHITECT, ENGINEER, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THIS LEGEND IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, OR LAND SURVEYOR SHALL AFFIX TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE AND THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

	DATE	BY
7		
6		
5		
4		
3		
2		
1		

REVISIONS

day
DAY ENVIRONMENTAL, INC.
ENGINEERING & CONSULTING
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE:
5 HUNT ROAD
JAMESTOWN, NEW YORK
REMEDIAL INVESTIGATION - BCP #C907029

DRAWING TITLE:
Underground Utility Locations

PROJECT NO.
3563S-04

FIGURE NO.
FIGURE 4

Reference Files Attached:

REF1:	REF6:
REF2:	REF7:
REF3:	REF8:
REF4:	REF9:
REF5:	REF10:

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