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GROUND WATER TESTING
AT
1 & 7 MAIN STREET
East Haddam, Connecticut

MAY 2006

Prepared for:

Town of East Haddam
East Haddam, Connecticut

Prepared by:

Shanahan Consulting
Farmington, Connecticut
Document No. 0609R01.WPD

SIGNATURE OF ASSESSOR

This assessment was performed by the individual whose signature appears below. Questions regarding this report should be directed to this person.

Edward W. [Ned] Shanahan, LEP
Senior Scientist

QUALIFICATIONS OF ASSESSOR

Edward W. Shanahan has over 28 years experience as an environmental consultant, including more than 20 years focusing on site assessments and related studies in Connecticut. Mr. Shanahan has evaluated environmental conditions on hundreds of properties, ranging from undeveloped lots to complex industrial facilities. For six years, he managed the completion of site assessments at Haley & Aldrich Inc. (1986-89) and Ground Water, Inc. (1989-92). In December 1992, he founded Shanahan Consulting, a firm specializing in site assessments and reviews of site assessments.

Mr. Shanahan received a Bachelor of Science degree with distinction in Civil & Environmental Engineering from Cornell University in 1973 and a Master of Science degree in Environmental Earth Sciences from Stanford University in 1974.

Mr. Shanahan is a Licensed Environmental Professional [LEP] in the State of Connecticut.

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I. SUMMARY

Our Ground Water Testing at 1 & 7 Main Street in East Haddam did not detect evidence of ground water degradation due to site activities. In particular, we did not detect volatile organic compounds, ETPH, or elevated concentrations of metals in low flow ground water samples collected on 29 March 2006.

In previous investigations of the site, soil contamination above applicable remediation criteria was encountered as follows: (1) a blue residue containing elevated levels of mercury and copper in shallow soils north of town hall, (2) a release of heating oil from an underground tank east of the garage building, (3) releases of gasoline from an underground tank and pump east of the garage building, and (4) arsenic-contaminated soils east of the garage.

Remedial actions performed on the site have included the removal of underground fuel tanks and the excavation and removal of approximately 367 tons of contaminated soils. An estimated 100 tons of buried soils contaminated with arsenic may remain in place in the area east of the garage building. The soils were not removed to avoid damaging an underground sanitary sewer line and because our soil tests suggested that the arsenic-contaminated soils did not pose a significant risk of ground water contamination.

II. BACKGROUND INFORMATION

A. Purpose

This Ground Water Testing report documents the sampling and analysis of ground water collected from nine monitor wells at 1 & 7 Main Street in East Haddam. The site was the subject of a March 2002 Phase I Environmental Site Assessment report and a June 2005 Phase II & Phase III Environmental Site Assessment and Remedial Actions report, both prepared by Shanahan Consulting.

B. Scope of Work

The following tasks were performed for this investigation:

1. The collection of ground water samples from nine monitor wells using low flow sampling procedures.

2. The preparation of an overburden ground water contour map.

3. Laboratory analyses of ground water samples for selected contaminants.

C. Site Description

The approximately 2.75-acre site consists of the following two adjoining properties: (1) 1 Main Street - a 1.56-acre property designated Lot 14 on Map 17 by the East Haddam assessor's office and (2) 7 Main Street - a 1.19-acre property designated as Lot 15 on Map 17.

Figure 1 shows the location of the site. A site plan is shown on Figure 2.

The site includes the following four buildings: (1) the former garage of the Town of East Haddam Department of Public Works [DPW] now largely vacant, (2) the "River House" office building (including offices of the Town of East Haddam), (3) the Connecticut Department of Transportation [DOT] generator house used in connection with their operation of a nearby drawbridge over the Connecticut River, and (4) the East Haddam town hall.

The one-story garage building was constructed in stages from circa 1911 to circa 1950 and was initially used by the DOT for operations related to the maintenance and repair of the nearby Connecticut River drawbridge. Beginning in 1973, the garage was used by the Town of East Haddam DPW for maintenance and storage operations. The DPW vacated the building in 2000. In late 2002, the northern portion of the garage building and an adjoining shed were torn down. A storage building and shed north of the town hall were torn down in late 2002.

The site appears to be an "establishment" under the Transfer Act (CGS 22a-134 through 134e) due to the disposal of a variety of wastes by the Town of East Haddam in January 2000.

Local ground water is classified "GB" (known or presumed to be degraded). In spite of the "GB" classification, the site uses a bedrock supply well located west of the garage building. Reportedly, site occupants use bottled water and do not consume the well water. Public water is not available in the site area and off-site properties generally use individual supply wells.

The monitor well network on site includes seven overburden wells (MW3, W1-W6) and two bedrock wells (MW1-MW2). The locations of the monitor wells are shown on Figure 3. Driller's logs and construction diagrams for the seven wells are presented in Appendix A.

Previous evaluations of the site had detected the following areas of contamination:

1. Shallow soils containing a blue residue with elevated levels of mercury and lead in an area behind (north of) town hall. The contaminated soils were excavated and removed.

2. A release of heating oil at a former underground tank behind (east of) the garage building. The tank and associated oily soils were excavated and removed from the site.

3. A release of gasoline at a former underground behind the garage building. We also observed shallow soils with petroleum odors at a fuel pump and at an aboveground heating oil tank, both located in the vicinity of the former tank. The gasoline tank was excavated and removed from the ground and a soil cleanup performed in the tank area to remove soils containing petroleum contaminants.

4. Soils containing arsenic in the area of the former underground gasoline tank behind the garage. A portion of the arsenic-contaminated soils were excavated and removed during the soil cleanup for the gasoline tank release. However, an estimated 100 tons of soils containing arsenic over the Direct Exposure Criteria of 10 mg/kg as set forth in the Remediation Standard Regulations of the Connecticut Department of Environmental Protection [DEP]. The arsenic-contaminated soils, which are located between depths of 3 and 6 feet below ground surface, did not appear to pose a significant risk of ground water contamination based on leachable arsenic analysis. An underground sanitary sewer line is located within the zone of suspected contamination, complicating any attempt to remove the soil at present.

Two other spills were noted as follows:

1. An apparent minor spill of petroleum product under the garage floor near a floor drain. Our soil tests did not detect contaminants over remediation criteria in the spill area.

2. A petroleum odor was noted in a soil sample collected in a pavement patch marking the location of a former underground gasoline tank and pump outside the southwestern corner of the garage. However, laboratory analysis of the odorous sample and of five other soil samples from the area did not detect contaminants over remediation criteria.

III. GROUND WATER FLOW EVALUATION

Elevation data for seven overburden and two bedrock monitor wells installed on site are tabulated below. The well elevations were surveyed relative to an arbitrary datum by Robert R. Weaver of East Haddam, Connecticut.

WELL CONSTRUCTION ELEVATION DATA (Feet)				
WELL	Type of Well	Elevation of Top of Metal Cover	Elevation of Top of PVC Casing	Total Depth of Well Below Top of PVC
MW1	Bedrock	38.58	38.14	47
MW2	Bedrock	33.88	33.50	29
MW3	Overburden	36.11	35.93	20
W1	Overburden	36.90	36.62	17
W2	Overburden	34.24	33.96	14
W3	Overburden	31.80	31.43	14
W4	Overburden	35.68	35.40	17.5
W5	Overburden	38.77	38.43	17.5
W6	Overburden	---	44.84	14.5

Note: Elevations refer to an assumed elevation of 35.00 feet at a nail near the southwest corner of the town garage building at 1 Main Street.

Ground water elevation data measured at the monitor wells on 28 March 2006 are tabulated below.

GROUND WATER ELEVATION DATA (Feet)			
WELL	Elevation of Top of PVC	Depth Below PVC	Elevation of Water Table
MW1	38.14	15.37	22.77
MW2	33.50	7.75	25.75
MW3	35.93	9.13	26.80
W1	36.62	6.08	30.54
W2	33.96	6.54	27.42
W3	31.43	5.70	25.73
W4	35.40	6.37	29.03
W5	38.43	7.72	30.71
W6	44.84	11.42	33.42

Note: Water levels measured by Ned Shanahan using a Waterra WS-100 water level sensor.

Figure 3 presents an overburden ground water contour map using the data from the seven overburden wells. The contour map indicates that overburden ground water on most of the site flows to the south. On the eastern edge of the site, overburden ground water appears to flow toward the south/southeast.

Overburden ground water was not encountered on the western part of the site where bedrock occurs at shallow depths. The lower elevation of the water table in bedrock well MW2 (25.75 feet) when compared with the adjacent overburden well W2 (27.42 feet) suggests that ground water flows downward (from the overburden into the bedrock) at this well pair.

IV. GROUND WATER SAMPLING AND ANALYSIS

A. Ground Water Sampling

On 29 March 2006, monitor wells MW1, MW2 , MW3, W1, W2, W3, W4, W5, and W6 were sampled by Ned Shanahan and Victoria Man based on low flow sampling procedures described by the Connecticut DEP in a 12 June 200 Draft Site Characterization Document.

Appendix B includes low flow sampling record logs for the well sampling work.

Petroleum odors or sheens were not observed in the ground water samples.

B. Results of Ground Water Tests

The ground water samples were analyzed at Spectrum Analytical , Inc. of Agawam, Massachusetts for volatile of organic compounds [VOCs] by EPA Method 524.2, for Extractable Total Petroleum Hydrocarbons [ETPH], and for total concentrations of 11 metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc).

The water samples were kept in ice in a cooler pending a pickup by the laboratory on the day after their collection.

The tables below summarize the results of laboratory analyses of the ground water samples and also present the results of previous ground water tests at site monitor wells. The prior tests did not involve low flow sampling procedures. Appendix B presents the laboratory data for the 29 March 2006 sample round.

GROUND WATER TEST DATA - BEDROCK MONITOR WELL MW1 Concentrations in ppb								
	SAMPLE DATES				GWPC	SWPC	VC	
	8-9-00	11-15-00	1-2-04	3-29-06			Resid.	Comm.
TPH	1800	---	---	---	500	None	NA	NA
ETPH	---	---	ND	ND	100	None	NA	NA
Toluene	5.5	---	ND	ND	1000	4,000,000	7100	41,000
Chloroform	2.0	---	ND	ND	6	14,100	26	62
Other VOCs	ND	---	ND	ND	Varies	Varies	Varies	Varies
Pesticides	---	ND	---	---	Varies	Varies	NA	NA
Total Arsenic	16	---	5	ND	50	4	NA	NA
Diss. Arsenic	---	---	ND	---	50	4	NA	NA
Total Barium	180	---	---	17.6	1000	None	NA	NA
Total Cadmium	ND	---	---	ND	5	6	NA	NA
Total Chromium	200	---	ND	ND	50	1200	NA	NA
Diss. Chromium	---	---	ND	---	50	1200	NA	NA
Total Copper	---	---	---	ND	1300	48	NA	NA
Total Lead	ND	---	22	ND	15	13	NA	NA
Diss. Lead	---	---	ND	---	15	13	NA	NA
Total Mercury	ND	---	---	ND	2	0.4	NA	NA
Total Nickel	---	---	---	5.8	100	880	NA	NA
Total Selenium	ND	---	---	ND	50	50	NA	NA
Total Silver	ND	---	---	ND	36	12	NA	NA
Total Zinc	---	---	---	7.8	5000	123	NA	NA

GROUND WATER TEST DATA - BEDROCK MONITOR WELL MW2
Concentrations in ppb

	SAMPLE DATES				GWPC	SWPC	VC	
	8-9-00	11-15-00	1-2-04	3-29-06			Resid.	Comm.
TPH	1400	---	---	---	500	None	NA	NA
ETPH	---	---	ND	ND	100	None	NA	NA
Chloroform	1.9	---	0.6	ND	6	14,100	26	62
Other VOCs	ND	---	ND	ND	Varies	Varies	Varies	Varies
Pesticides	---	ND	---	---	Varies	Varies	NA	NA
Total Arsenic	47	---	8	ND	50	4	NA	NA
Diss. Arsenic	---	---	ND	---	50	4	NA	NA
Total Barium	380	---	---	19.3	1000	None	NA	NA
Total Cadmium	ND	---	---	ND	5	6	NA	NA
Total Chromium	250	---	ND	ND	50	1200	NA	NA
Diss. Chromium	---	---	ND	---	50	1200	NA	NA
Total Copper	---	---	---	ND	1300	48	NA	NA
Total Lead	570	---	62	ND	15	13	NA	NA
Diss. Lead	---	---	6	---	15	13	NA	NA
Total Mercury	ND	---	---	ND	2	0.4	NA	NA
Total Nickel	---	---	---	7.0	100	880	NA	NA
Total Selenium	ND	---	---	ND	50	50	NA	NA
Total Silver	ND	---	---	ND	36	12	NA	NA
Total Zinc	---	---	---	8.8	5000	123	NA	NA

GROUND WATER TEST DATA - OVERBURDEN MONITOR WELL MW3 Concentrations in ppb								
	SAMPLE DATES				GWPC	SWPC	VC	
	8-9-00	11-15-00	1-2-04	3-29-06			Resid.	Comm.
TPH	ND	---	---	---	500	None	NA	NA
ETPH	---	---	ND	ND	100	None	NA	NA
VOCs	ND	---	ND	ND	Varies	Varies	Varies	Varies
Pesticides	---	ND	---	---	Varies	Varies	NA	NA
Total Arsenic	ND	---	---	ND	50	NA	NA	710
Total Barium	30	---	---	24.1	1000	None	NA	NA
Total Cadmium	ND	---	---	ND	5	NA	NA	NA
Total Chromium	ND	---	---	ND	50	NA	NA	NA
Total Copper	---	---	---	ND	1300	48	NA	NA
Total Lead	ND	---	---	ND	15	NA	NA	NA
Total Mercury	ND	---	---	ND	2	NA	NA	NA
Total Nickel	---	---	---	ND	100	880	NA	NA
Total Selenium	ND	---	---	ND	50	NA	NA	NA
Total Silver	ND	---	---	ND	36	NA	NA	NA
Total Zinc	---	---	---	13.2	5000	123	NA	NA

GROUND WATER TEST DATA - OVERBURDEN MONITOR WELLS W1 & W2 Concentrations in ppb								
	W1		W2		GWPC	SWPC	VC	
	1-2-04	3-29-06	1-2-04	3-29-06			Resid.	Comm.
ETPH	ND	ND	ND	ND	100	None	NA	NA
VOCs	ND	ND	ND	ND	Varies	Varies	Varies	Varies
Total Arsenic	10	ND	5	ND	50	5	NA	NA
Diss. Arsenic	ND	---	ND	---	50	4	NA	NA
Total Barium	---	7.6	---	12.2	1000	None	NA	NA
Total Cadmium	---	ND	---	ND	5	6	NA	NA
Total Chromium	ND	ND	ND	ND	50	4	NA	NA
Diss. Chromium	ND	---	ND	---	50	1200	NA	NA
Total Copper	---	ND	---	ND	1300	48	NA	NA
Total Lead	13	ND	25	ND	15	13	NA	NA
Diss. Lead	ND	---	ND	---	15	13	NA	NA
Total Mercury	---	ND	---	ND	2	0.4	NA	NA
Total Nickel	---	ND	---	ND	100	880	NA	NA
Total Selenium	---	ND	---	ND	50	50	NA	NA
Total Silver	---	ND	---	ND	36	12	NA	NA
Total Zinc	---	8.1	---	9.4	5000	123	NA	NA

GROUND WATER TEST DATA - OVERBURDEN MONITOR WELLS W3 & W4 Concentrations in ppb								
	W3		W4		GWPC	SWPC	VC	
	1-2-04	3-29-06	1-2-04	3-29-06			Resid.	Comm.
ETPH	ND	ND	ND	ND	100	None	NA	NA
VOCs	ND	ND	ND	ND	Varies	Varies	Varies	Varies
Total Arsenic	7	ND	22	ND	50	5	NA	NA
Diss. Arsenic	ND	---	ND	---	50	4	NA	NA
Total Barium	---	52.3	---	19.2	1000	None	NA	NA
Total Cadmium	---	ND	---	ND	5	6	NA	NA
Total Chromium	ND	ND	ND	ND	50	4	NA	NA
Diss. Chromium	ND	---	ND	---	50	1200	NA	NA
Total Copper	---	ND	---	ND	1300	48	NA	NA
Total Lead	17	ND	35	ND	15	13	NA	NA
Diss. Lead	ND	---	ND	---	15	13	NA	NA
Total Mercury	---	ND	---	ND	2	0.4	NA	NA
Total Nickel	---	ND	---	ND	100	880	NA	NA
Total Selenium	---	ND	---	ND	50	50	NA	NA
Total Silver	---	ND	---	ND	36	12	NA	NA
Total Zinc	---	7.2	---	6.6	5000	123	NA	NA

GROUND WATER TEST DATA - OVERBURDEN MONITOR WELLS W5 & W6 Concentrations in ppb						
	W5	W6	GWPC	SWPC	VC	
	3-29-06	3-29-06			Resid.	Comm.
ETPH	ND	ND	100	None	NA	NA
VOCs	ND	ND	Varies	Varies	Varies	Varies
Total Arsenic	ND	ND	50	5	NA	NA
Diss. Arsenic	---	---	50	4	NA	NA
Total Barium	92.8	ND	1000	None	NA	NA
Total Cadmium	ND	ND	5	6	NA	NA
Total Chromium	ND	ND	50	4	NA	NA
Diss. Chromium	---	---	50	1200	NA	NA
Total Copper	ND	ND	1300	48	NA	NA
Total Lead	ND	ND	15	13	NA	NA
Diss. Lead	---	---	15	13	NA	NA
Total Mercury	ND	ND	2	0.4	NA	NA
Total Nickel	ND	ND	100	880	NA	NA
Total Selenium	ND	ND	50	50	NA	NA
Total Silver	ND	ND	36	12	NA	NA
Total Zinc	7.0	8.5	5000	123	NA	NA

Notes for tables:

1. ND means not detected. — means sample not tested for this parameter. ETPH is Extractable Total Petroleum Hydrocarbons. VOCs is volatile organic compounds. NA means criteria not applicable to this parameter. None means no criteria established.
2. Samples from 8-9-00 and 11-15-00 collected by Land-Tech Consultants. Other samples collected by Shanahan Consulting.
3. Ground Water Protection Criteria [GWPC] and Surface Water Protection Criteria [SWPC] are taken from the Connecticut DEP Remediation Standard Regulations [C.G.S. Section 22a-133k]. Volatilization Criteria [VC] are taken from a March 2003 list of proposed criteria issued by the DEP. Ground Water Protection Criteria are shown in table despite "GB" classification of site due to local use of ground water in supply wells.
4. Test results exceeding remediation criteria have been highlighted with thick lines.

VOCs and ETPH were not detected in the 29 March 2006 ground water samples. The only detections in March 2006 involved the metals barium, nickel, and zinc at concentrations below remediation criteria. The metal detections appear to be due to natural occurrences. In conclusion, the recent ground water tests did not reveal evidence of impacts on ground water from contaminant releases reported on the site.

The March 2006 samples were collected by low flow sampling procedures and we believe that these data are more reliable than previous ground water data. The earlier ground water tests had reported TPH and some total metals at concentrations exceeding remediation criteria. However, ETPH is now considered a more reliable indicator of petroleum contamination than TPH and the earlier total metal detections involved samples that contained suspended sediment which may caused anomalously high metal detections.

V. CONCLUSIONS

We did not detect evidence of ground water contamination in our tests of ground water samples collected from nine monitor wells on the site on 29 March 2006. Low concentrations of barium, nickel, and zinc were detected in one or more ground water samples, but at concentrations that did not exceed DEP remediation criteria and which appear to reflect natural background levels. The March 2006 samples were collected using low flow sampling procedures and are considered more reliable than previous ground water monitoring data collected at the site.

Previous evaluations of the site had identified the following areas of contamination: (1) shallow soils containing a blue residue with elevated levels of mercury and lead north of the town hall - contaminated soils were excavated and removed, (2) a release of heating oil at a former underground tank east of the garage building- the tank and associated oily soils were excavated and removed, and (3) a release of gasoline at a former underground tank east of the garage building (including apparent petroleum spills at a nearby fuel pump and aboveground heating oil tank) - the gasoline tank and soils containing petroleum contamination were excavated and removed from the ground, and (4) soils containing arsenic in the area east of the garage - a portion of the arsenic-contaminated soils were excavated and removed, an estimated 100 tons of buried soils containing arsenic in excess of applicable remediation criteria were left in place to avoid damage to an underground sanitary sewer line and because the soils did not appear to pose a significant risk of ground water contamination.

Although local ground water is classified "GB" (degraded), the site and nearby properties use individual wells for supply purposes. We did not identify public drinking water supply wells within one mile of the site. The site is not included in Aquifer Protection Areas mapped by the DEP.

VI. LIMITATIONS

The conclusions provided in this report are based on the scope of work conducted and the sources of information used in the course of this investigation. If additional pertinent information becomes available, it should be provided to Shanahan Consulting so that we may alter this report as necessary.

The report was prepared to be used exclusively in the assessment of ground water conditions at monitor wells sampled on site and should not be used for any other purpose.

We cannot guarantee that the scope of work undertaken for this assessment will satisfy the Connecticut Department of Environmental Protection.

The work was undertaken in accordance with generally accepted environmental consulting practices. No other warranty, express or implied, is made.

SOURCES OF INFORMATION

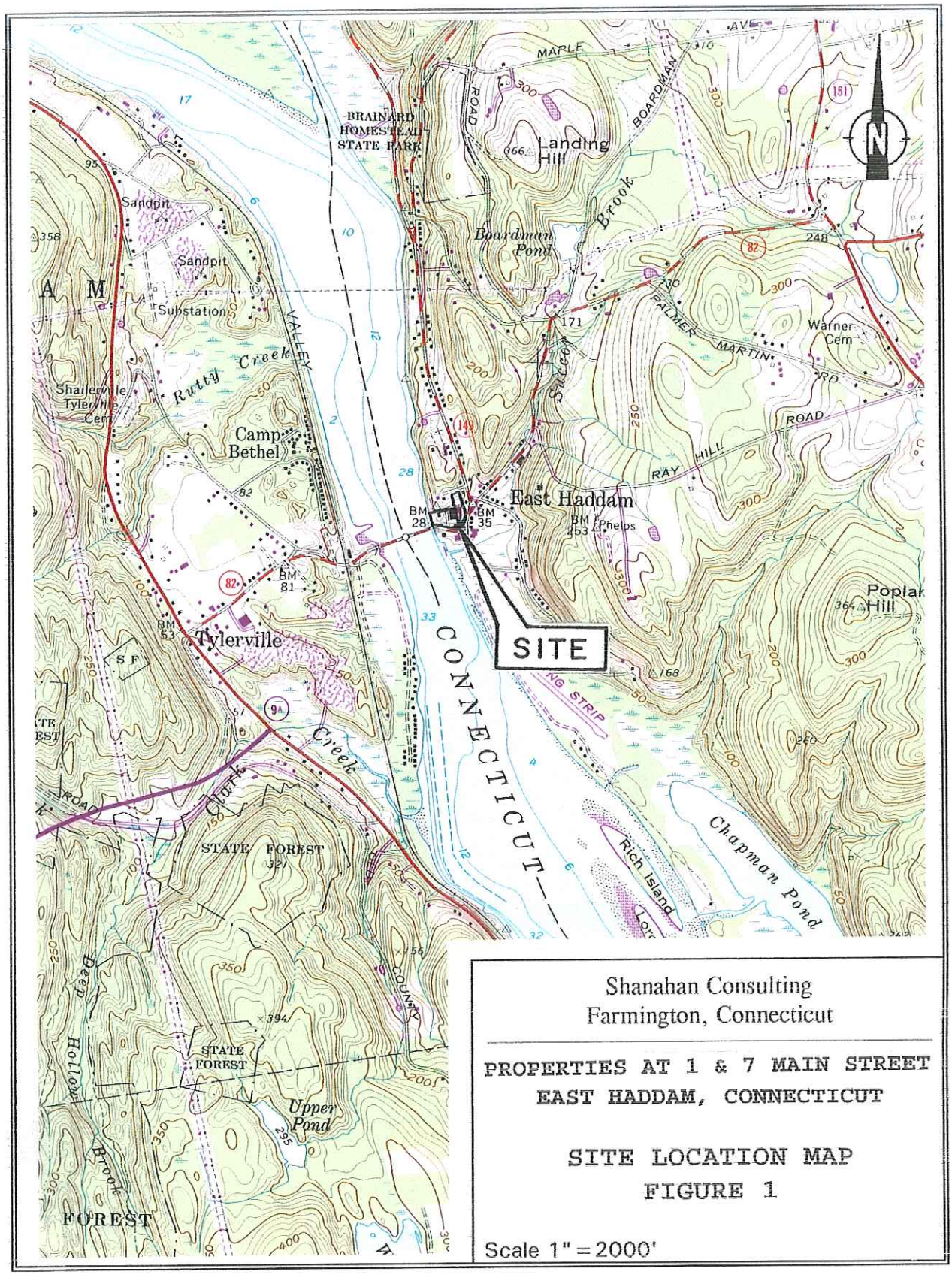
Connecticut Department of Environmental Protection, "Remediation Standard Regulations", Section 22a-133k, 30 January 1996.

Land-Tech Consultants, Inc., Draft Version of "Environmental Site Assessment of 1 & 7 Main Street, East Haddam, Connecticut", date 12-12-00, report provided by Mike Bartos of Land-Tech Consultants.

Shanahan Consulting, "Phase I Environmental Site Assessment of 1 & 7 Main Street, East Haddam, Connecticut", March 2002.

Shanahan Consulting, "Phase II & Phase III Environmental Site Assessment and Remedial Actions, Properties at 1 & 7 Main Street, East Haddam, Connecticut", June 2005.

FIGURES

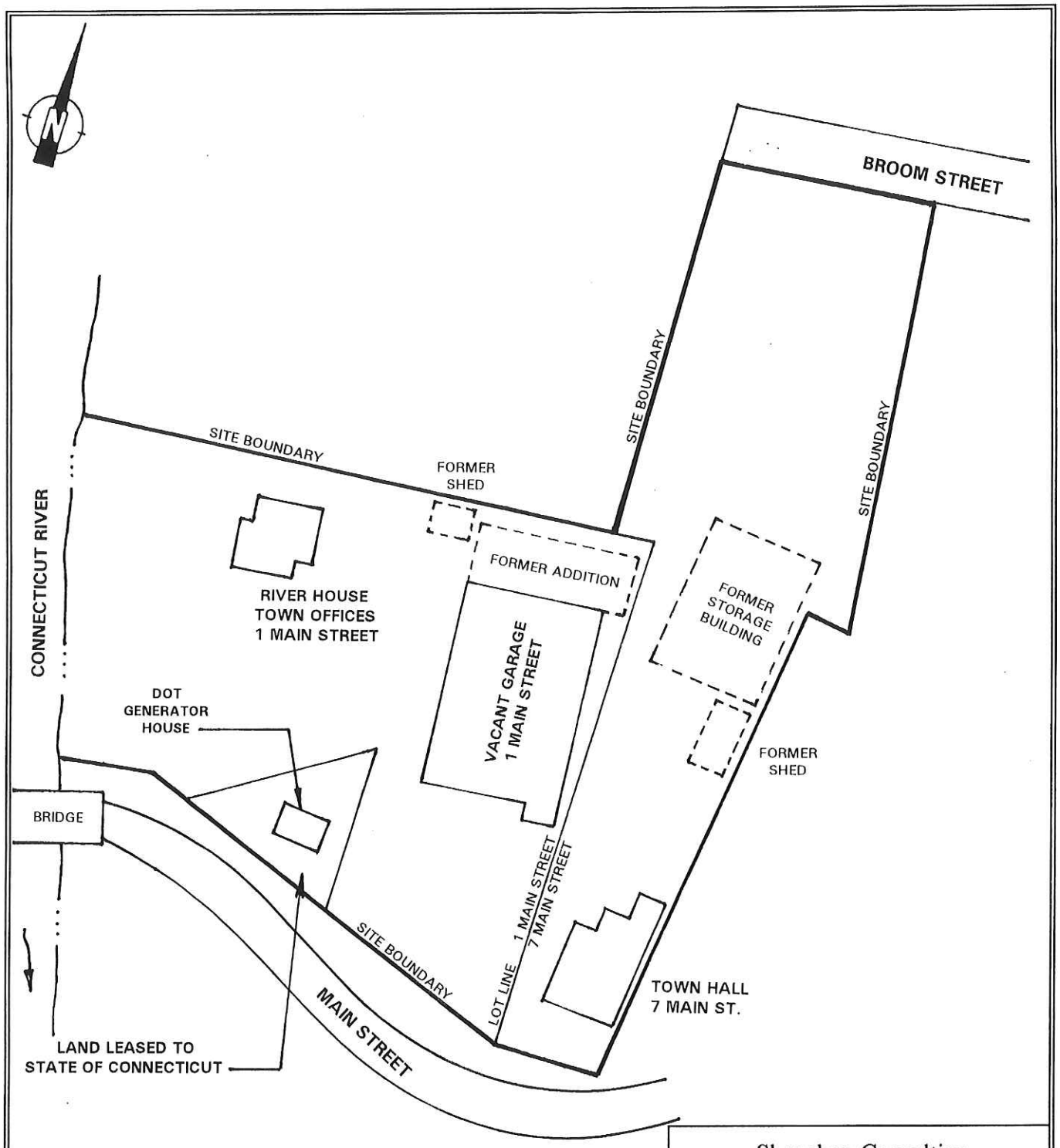


Shanahan Consulting
Farmington, Connecticut

PROPERTIES AT 1 & 7 MAIN STREET
EAST HADDAM, CONNECTICUT

SITE LOCATION MAP
FIGURE 1

Scale 1" = 2000'



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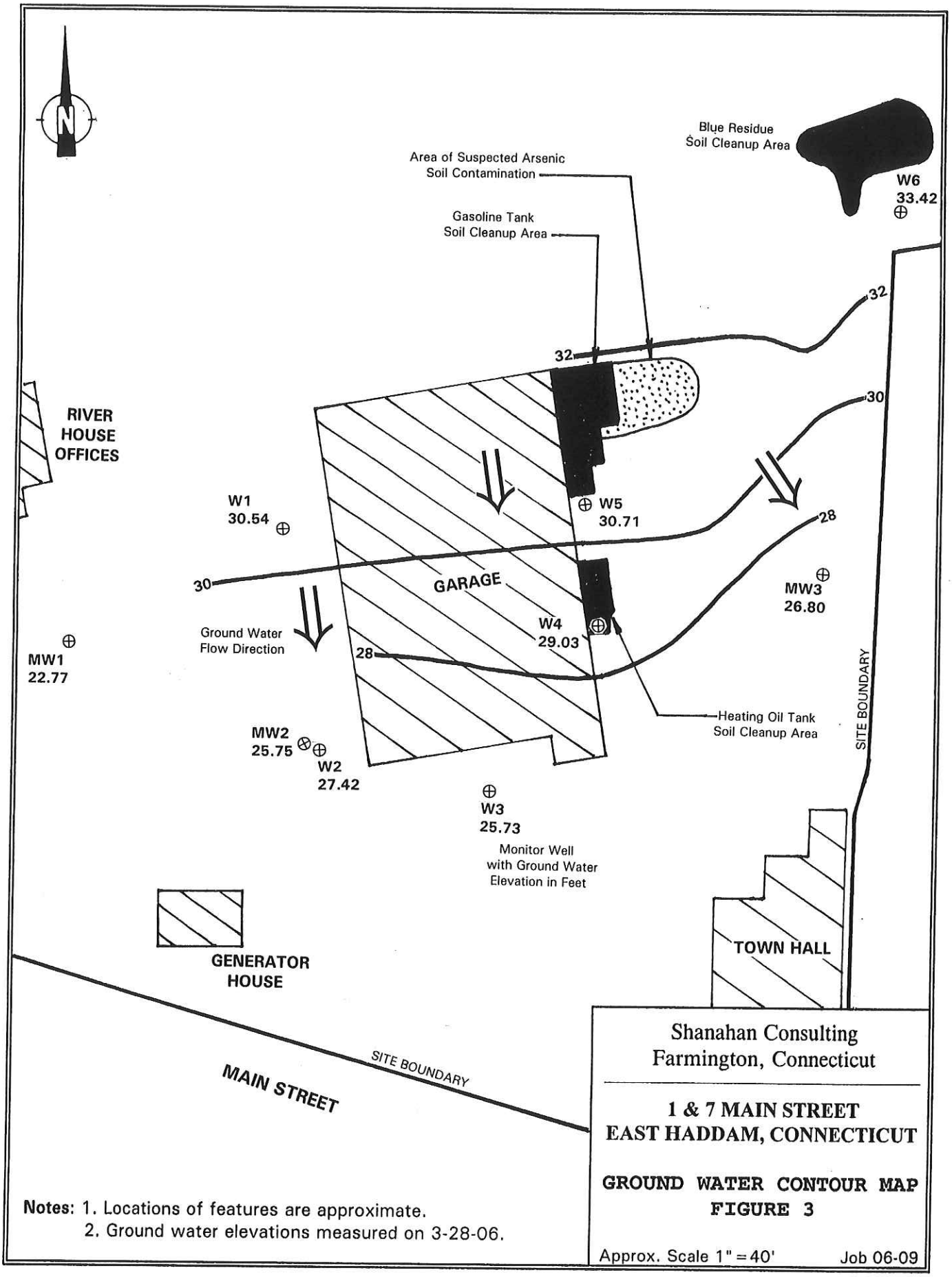
Farmington, Connecticut

1 & 7 MAIN STREET
EAST HADDAM, CONNECTICUT

SITE PLAN
FIGURE 2

Approx. Scale 1" = 80' Job 04-17

Notes: 1. Locations of features are approximate.
2. Based on 1988 plan by Richard Ziobron and 2000 map By URS Greiner Woodward Clyde.



Notes: 1. Locations of features are approximate.
2. Ground water elevations measured on 3-28-06.