

TASK 210: SUBSURFACE SITE INVESTIGATION

Interstate 84 Improvements Waterbury, Connecticut

Volume 1

ConnDOT Assignment No. 201-2161
ConnDOT Project No. 151-273

Prepared for:



State of Connecticut
Department of Transportation
Newington, Connecticut 06131

Prepared by:



Maguire Group Inc.
One Court Street
New Britain, Connecticut 06051

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TABLE OF CONTENTS

	<u>Page #</u>
1.0 INTRODUCTION	1
2.0 SITE DESCRIPTION	3
3.0 LOCAL ENVIRONMENT & RECEPTORS	3
3.1 Groundwater & Topography	3
3.2 Geology	23
4.0 SUBSURFACE INVESTIGATION	23
4.1 Geoprobe® Soil Borings & Soil Sample Analyses	24
4.2 Groundwater Sample Collection & Groundwater Analyses	25
4.3 Project Quality Assurance/Quality Control Practices	25
5.0 DISCUSSION OF SAMPLE RESULTS	26
5.1 Regulatory Criteria	26
5.2 Results of Soil Sample Analyses	28
5.3 Results of Groundwater Grab Sample Analyses	32
5.4 Quality Assurance/Quality Control Samples	33
6.0 DISCUSSION OF AFFECTED RESOURCES	33
6.1 Areas of Environmental Concern	33
6.2 Low-Level Areas of Environmental Concern	38
7.0 RECOMMENDATIONS	43
8.0 LIMITATIONS	44

Figures

Figure 1	Site Location Plan	2
ENV-1	Task 210 Project Area & Sampling Locations	4
ENV-2	Task 210 Project Area & Sampling Locations	5
ENV-3	Task 210 Project Area & Sampling Locations	6

TABLE OF CONTENTS (continued)

Page #

Figures

ENV-4	Task 210 Project Area & Sampling Locations	7
ENV-5	Task 210 Project Area & Sampling Locations	8
ENV-6	Task 210 Project Area & Sampling Locations	9
ENV-7	Task 210 Project Area & Sampling Locations	10
ENV-8	Task 210 Project Area & Sampling Locations	11
ENV-9	Task 210 Project Area & Sampling Locations	12
ENV-10	Task 210 Project Area & Sampling Locations	13
ENV-11	Task 210 Project Area & Sampling Locations	14
ENV-12	Task 210 Project Area & Sampling Locations	15
ENV-13	Task 210 Project Area & Sampling Locations	16
ENV-14	Task 210 Project Area & Sampling Locations	17
ENV-15	Task 210 Project Area & Sampling Locations	18
ENV-16	Task 210 Project Area & Sampling Locations	19
ENV-15	Task 210 Project Area & Sampling Locations	18
ENV-16	Task 210 Project Area & Sampling Locations	19
ENV-17	Task 210 Project Area & Sampling Locations	20
ENV-18	Task 210 Project Area & Sampling Locations	21

Tables

Table 1-1(a) to 1-1(o)	Results of Geoprobe Boring Soil Sample Analyses
Table 2-2	Results of Groundwater Grab Sample Analyses
Table 1(a) to 1(bb)	Results of Geoprobe Boring Soil Sample Analyses (2/02 Investigation)
Table 2(a) to 2(c)	Results of Hand Auger Soil Sample Analyses (2/02 Investigation)
Table 3(a) to 3(b)	Results of Sediment Grab Sample Analyses (2/02 Investigation)
Table 4	Results of Groundwater Grab Sample Analyses (2/02 Investigation)

Appendices

Appendix A	Boring Logs (Not Included)
Appendix B	Soil Sample Laboratory Reports
Appendix C	Groundwater Sample Laboratory Reports
Appendix D	QA/QC Sample Laboratory Reports

**TABLE 1-1(a): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-110 0.9-1.5m 3'-5' (GB)	GP-111 0.9-1.5m 3'-5' (GB)	GP-112 0.9-1.5m 3'-5' (GB)	GP-113 3.7-4.3m 12'-14' (GB)	CTDEP Pollutant Mobility Criteria GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
TPH – CT ETPH (ppm)	BDL	BDL	25	BDL	2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	BDL	BDL	BDL	BDL		
PAHs - EPA Method 8270 (ppm)	BDL	BDL	BDL	BDL		
Total RCRA 8 Metals (ppm)						
Barium	75.8	71.1	67.0	60.8		4,700/140,000 ppm
Chromium	12.8	13.4	12.3	13.5		100/100 ppm
Lead	8.63	14.0	10.6	9.78		500/1,000 ppm
SPLP RCRA 8 Metals (ppm)						
Barium	BDL	BDL	0.0147	BDL	10.0 ppm	

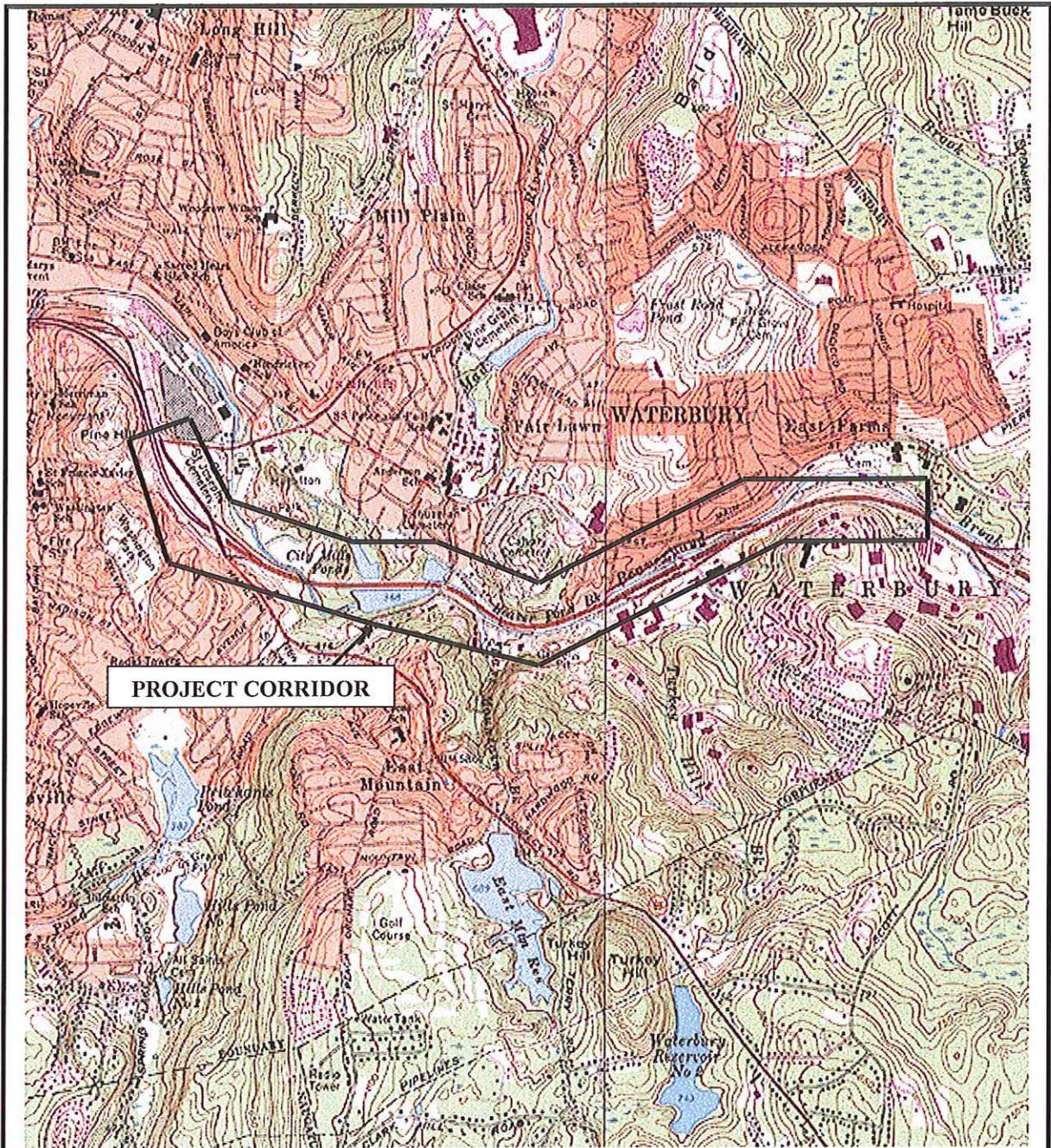
BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

1.0 INTRODUCTION

On behalf of the Connecticut Department of Transportation (ConnDOT), Maguire Group Inc. has conducted a Task 210 - Subsurface Site Investigation in association with the Realignment and Reconstruction of Interstate 84 in Waterbury, Connecticut. The proposed project will involve the widening of I-84 to consist of 3 meter (10 foot) wide outside shoulders and three, 3.6 meter (12 foot) travel lanes in each direction separated by a minimum 4.2 meter (14 foot) wide median; a shift in the I-84 alignment to the south between Interchanges 23 and 24 to eliminate a curve; the relocation of Reidville Drive to the south to accommodate the highway alignment shift; the construction of a service road south of and parallel to the relocated highway from the vicinity of Interchange 23; the elimination of the westbound exit ramp at Interchange 25 and westbound on-ramp at Interchange 24; the construction of a service road from the Scott Road/Plank Road East intersection to Harpers Ferry Road and the extension of Newington Avenue to intersect with the service road west of Scott Road; improvements to Harpers Ferry Road, Scott Road, Reidville Drive and East Main Street; and the construction of a noise barrier along I-84 eastbound to the west of Pierpont Road.

Based upon a review of the construction plans, it is anticipated that the project will involve rights-of-way taking, cut and fill activities, drainage structure improvements, and utility realignments. MGI previously completed a Task 210 – Subsurface Site Investigation on the project corridor in February 2002, in areas of anticipated construction and/or right-of-way activities for the I-84 project, adjacent to parcels that were identified as having a moderate or high risk designation in MGI's November, 1998 Task 110 – Corridor Land Use Evaluation report. This Task 210 - Subsurface Site Investigation was conducted in areas of the project corridor not previously investigated in February 2002, where geotechnical borings indicated the possible presence of subsurface contamination. In addition, Areas of Environmental Concern (AEOCs) previously identified in the February 2002 investigation were investigated further in order to attempt to more accurately define the limits of contamination both horizontally and vertically. This Task 210 report discusses the results of the additional investigation and redefines the AEOCs previously discussed in the MGI's February 2002 Task 210 report. Figure 1 depicts the project area.



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FIGURE 1 – SITE LOCATION PLAN

Interstate 84 Improvements

Waterbury, Connecticut

The purpose of the Task 210 - Subsurface Site Investigation was to verify the absence or presence and location of subsurface contamination, and to assess the potential pollutant impacts to be encountered during construction. It is anticipated that Task 310 Plans and Specifications will subsequently be prepared to assess construction related activities (i.e. proper storage, classification, transport and disposal of contaminated materials), in relationship to the environmental conditions prevalent within the project limits, as well as to specify remedial work to be included in the Contract Bid Documents.

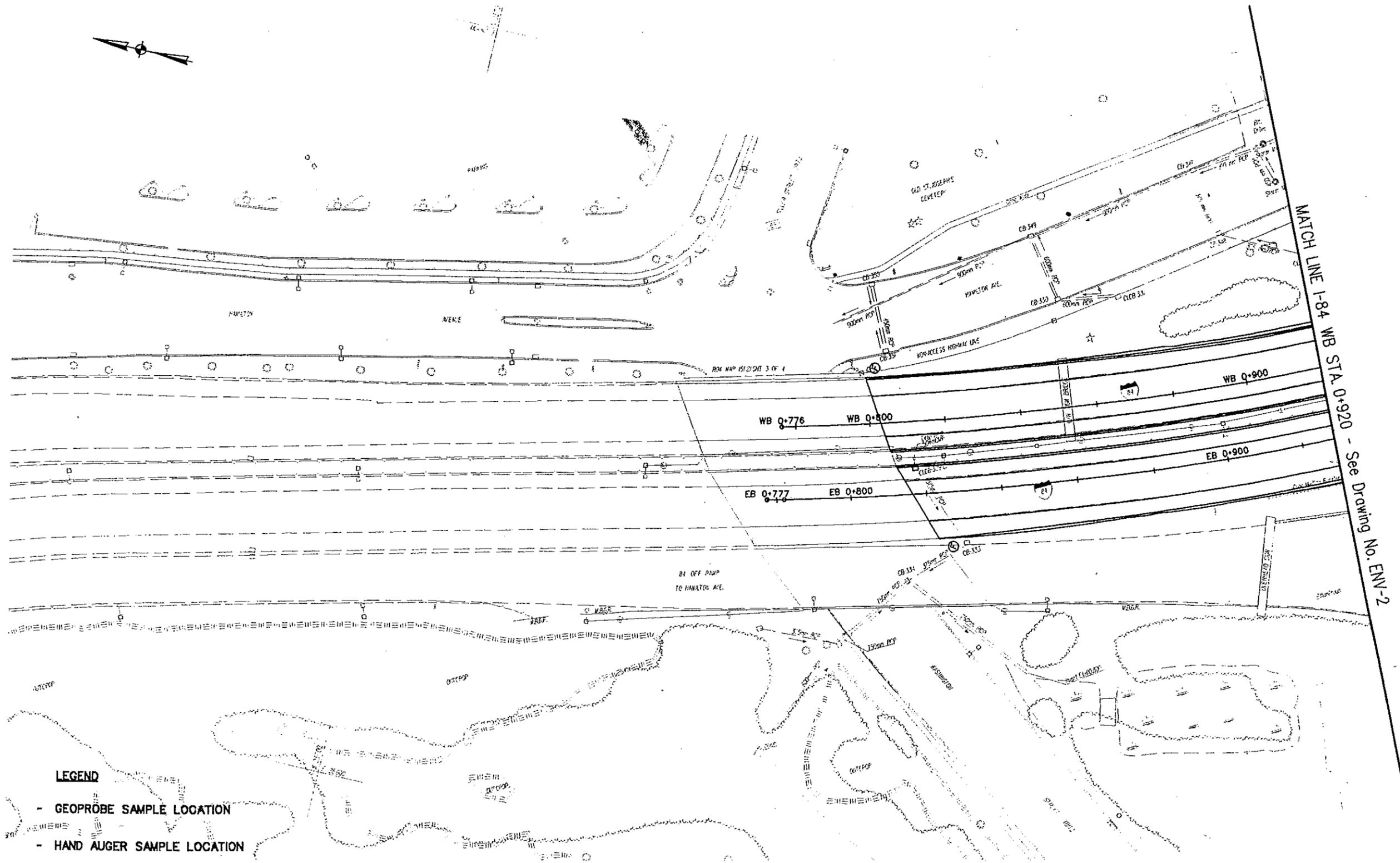
2.0 SITE DESCRIPTION

The Task 210 - Subsurface Site Investigation was conducted on State-owned and private land located adjacent to the Interstate 84 corridor, in areas of anticipated construction and/or right-of-way activities. The site area is depicted in Figures ENV-1 through ENV-18 – Task 210 Project Corridor & Sampling Locations.

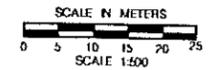
3.0 LOCAL ENVIRONMENT & RECEPTORS

3.1 Groundwater & Topography

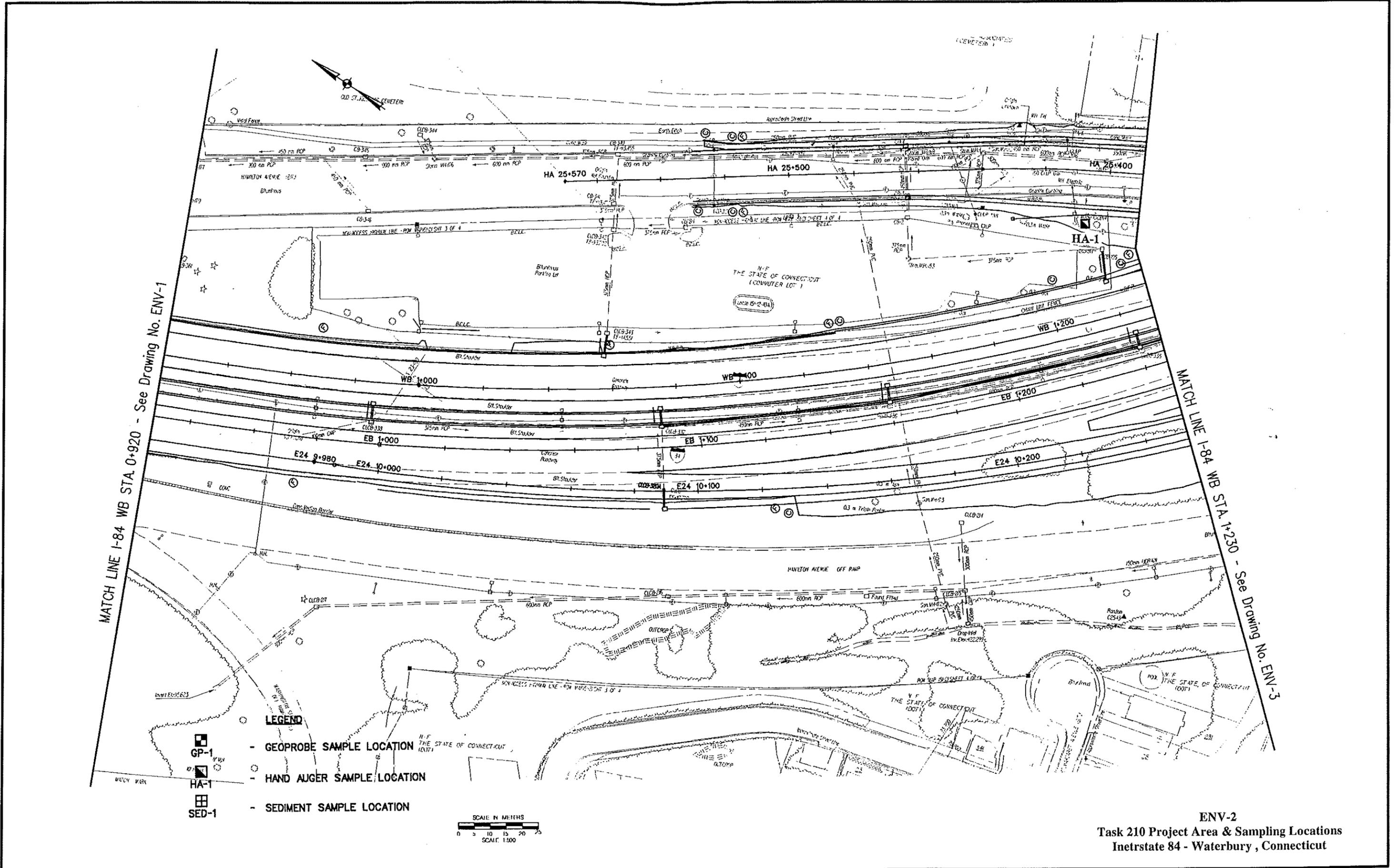
Groundwater quality in the vicinity of the project corridor has been classified by the CTDEP as shown on the “Map of Adopted Water Quality Classifications for the Hudson and Housatonic River Basins” (1985). In general, the groundwater classification for the portion of the project corridor situated to the north of I-84 is “GB”. Two areas to the south of I-84 have also been classified as “GB”, including the area west of the Reidville Drive/Scott Road intersection, and an area east of Guernsey Avenue along Captain Neville Drive. A “GB” classification indicates that the groundwater is within a highly urbanized area or an area of intense industrial activity, and where a public water supply is available. The groundwater is not considered suitable for direct human consumption without the need for treatment. The groundwater in the remainder of the



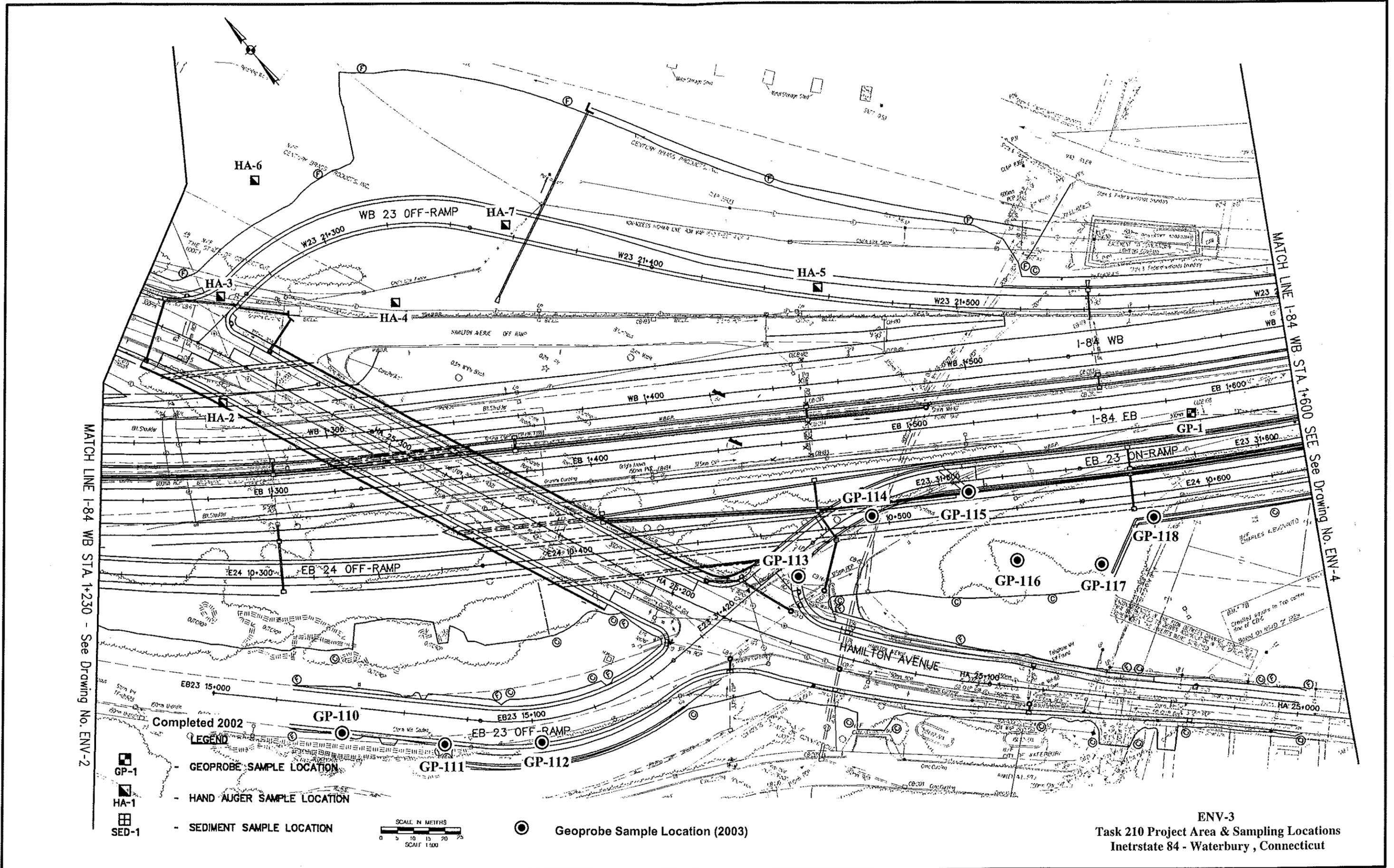
- LEGEND**
-  GP-1 - GEOPROBE SAMPLE LOCATION
 -  HA-1 - HAND AUGER SAMPLE LOCATION
 -  SED-1 - SEDIMENT SAMPLE LOCATION



ENV-1
Task 210 Project Area & Sampling Locations
Inetrstate 84 - Waterbury , Connecticut



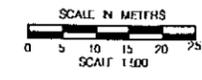
ENV-2
 Task 210 Project Area & Sampling Locations
 Interstate 84 - Waterbury, Connecticut



MATCH LINE I-84 WB STA 1+230 - See Drawing No. ENV-2

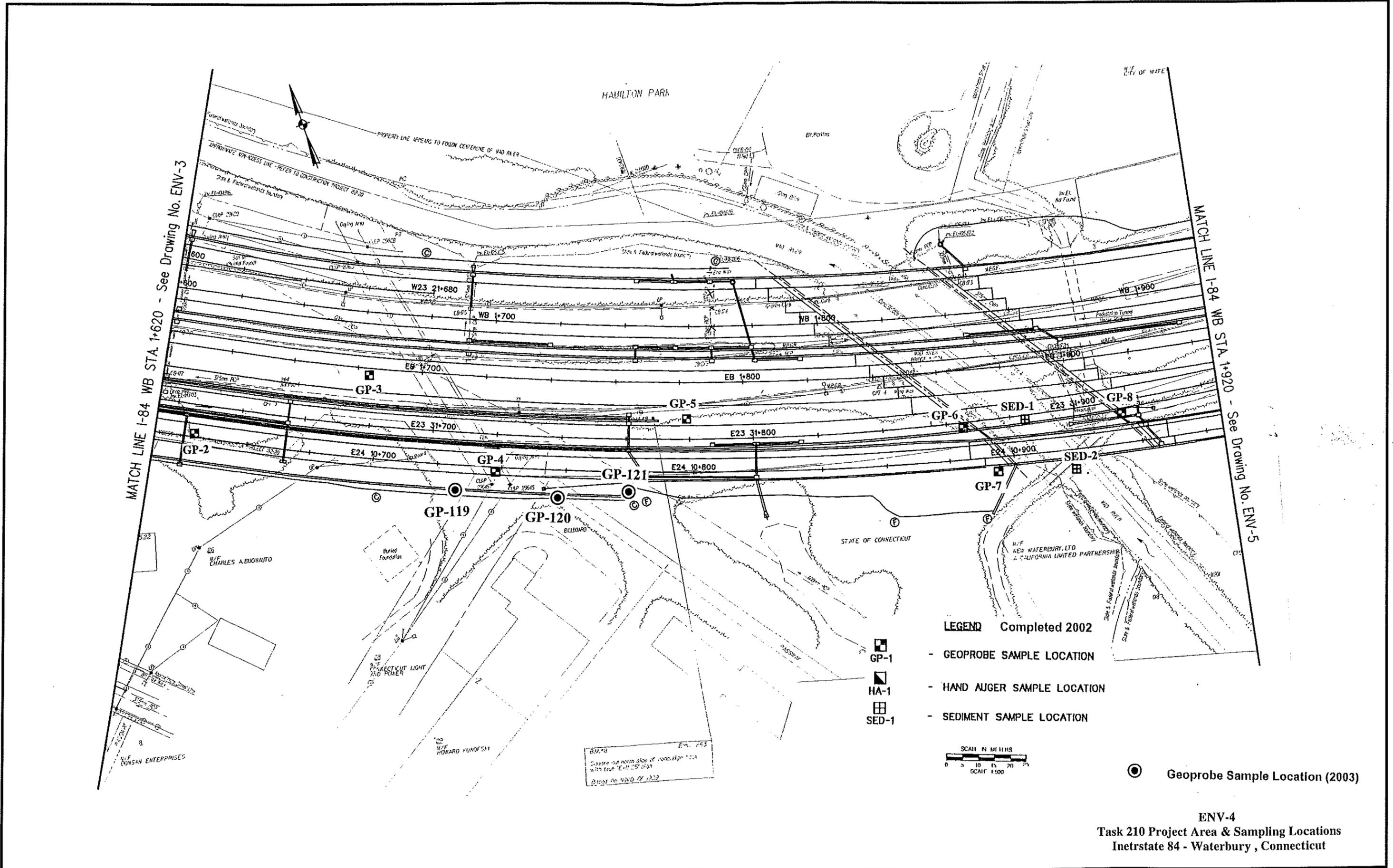
MATCH LINE I-84 WB STA 1+600 SEE See Drawing No. ENV-4

- LEGEND**
- GP-1 - GEOPROBE SAMPLE LOCATION
 - HA-1 - HAND AUGER SAMPLE LOCATION
 - SED-1 - SEDIMENT SAMPLE LOCATION

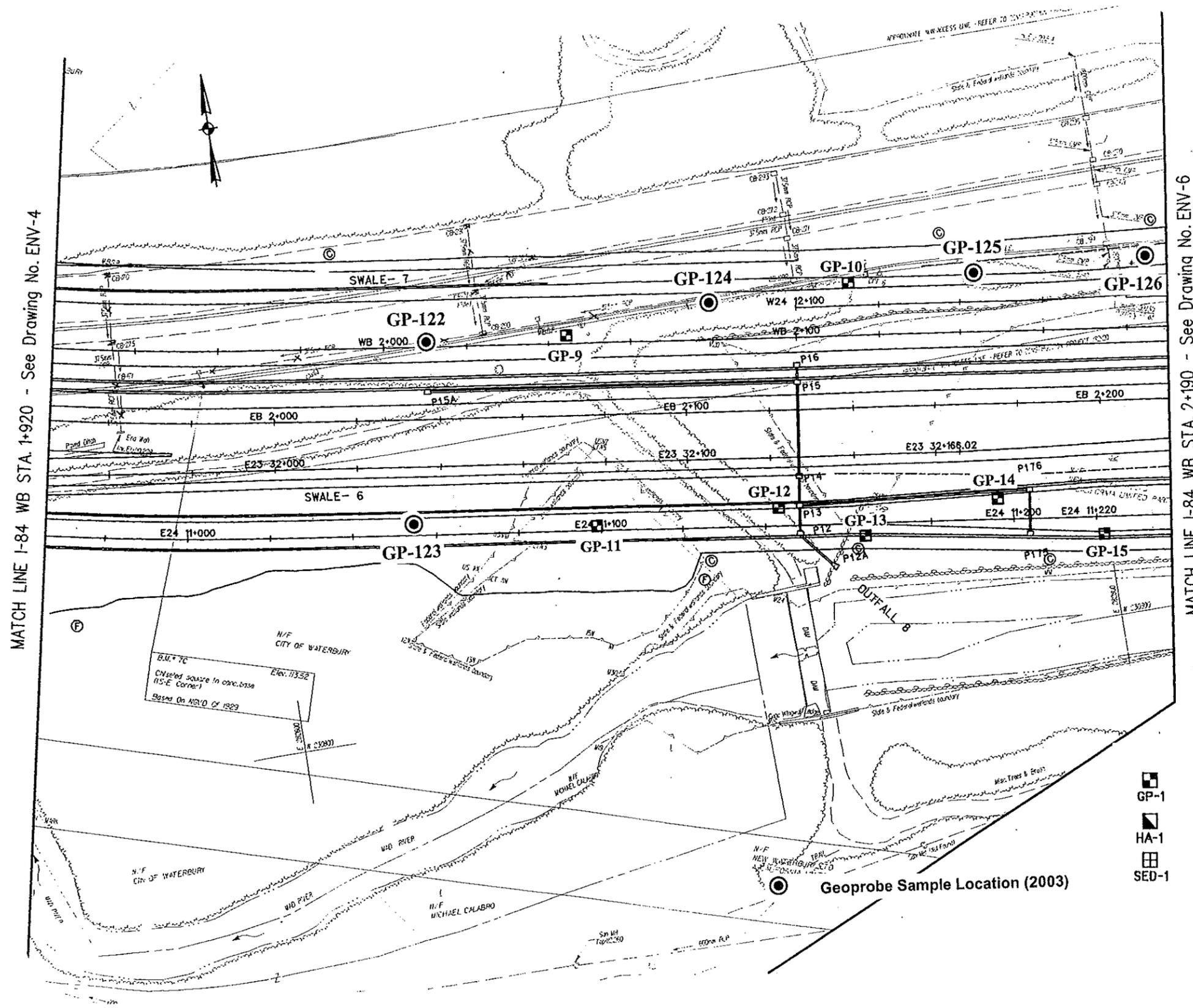


Geoprobe Sample Location (2003)

ENV-3
 Task 210 Project Area & Sampling Locations
 Interstate 84 - Waterbury, Connecticut



ENV-4
 Task 210 Project Area & Sampling Locations
 Inetrstate 84 - Waterbury , Connecticut



MATCH LINE I-84 WB STA. 1+920 - See Drawing No. ENV-4

MATCH LINE I-84 WB STA. 2+190 - See Drawing No. ENV-6

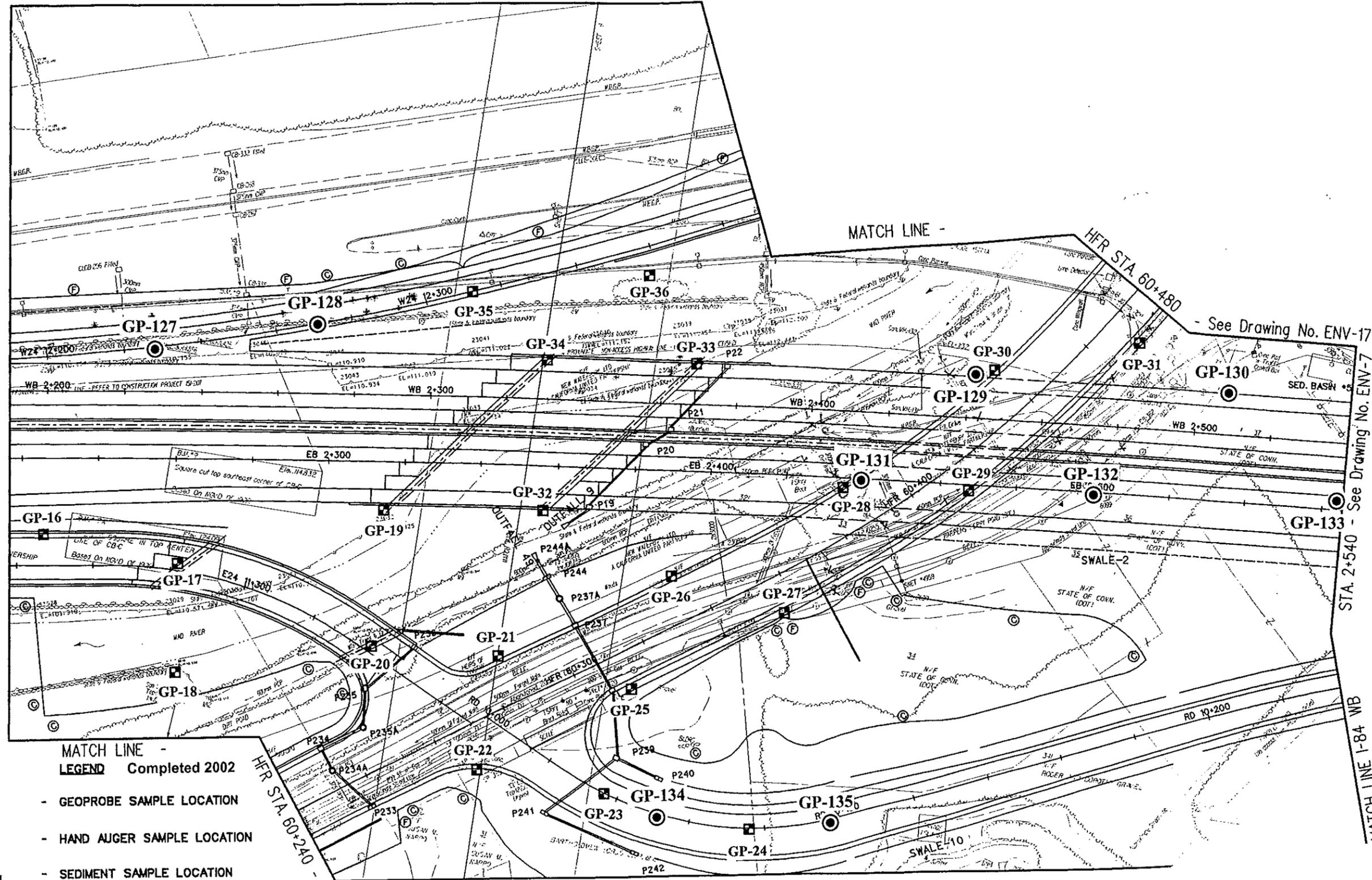
- LEGEND** Completed 2002
- GP-1 - GEOPROBE SAMPLE LOCATION
 - HA-1 - HAND AUGER SAMPLE LOCATION
 - SED-1 - SEDIMENT SAMPLE LOCATION



ENV-5
 Task 210 Project Area & Sampling Locations
 Inetrstate 84 - Waterbury , Connecticut



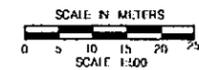
MATCH LINE I-84 WB STA. 2+190 - See Drawing No. ENV-5



- GP-1 - GEOPROBE SAMPLE LOCATION
- HA-1 - HAND AUGER SAMPLE LOCATION
- SED-1 - SEDIMENT SAMPLE LOCATION

MATCH LINE -
LEGEND Completed 2002

- GP-1 - GEOPROBE SAMPLE LOCATION
- HA-1 - HAND AUGER SAMPLE LOCATION
- SED-1 - SEDIMENT SAMPLE LOCATION



See Drawing No. ENV-16

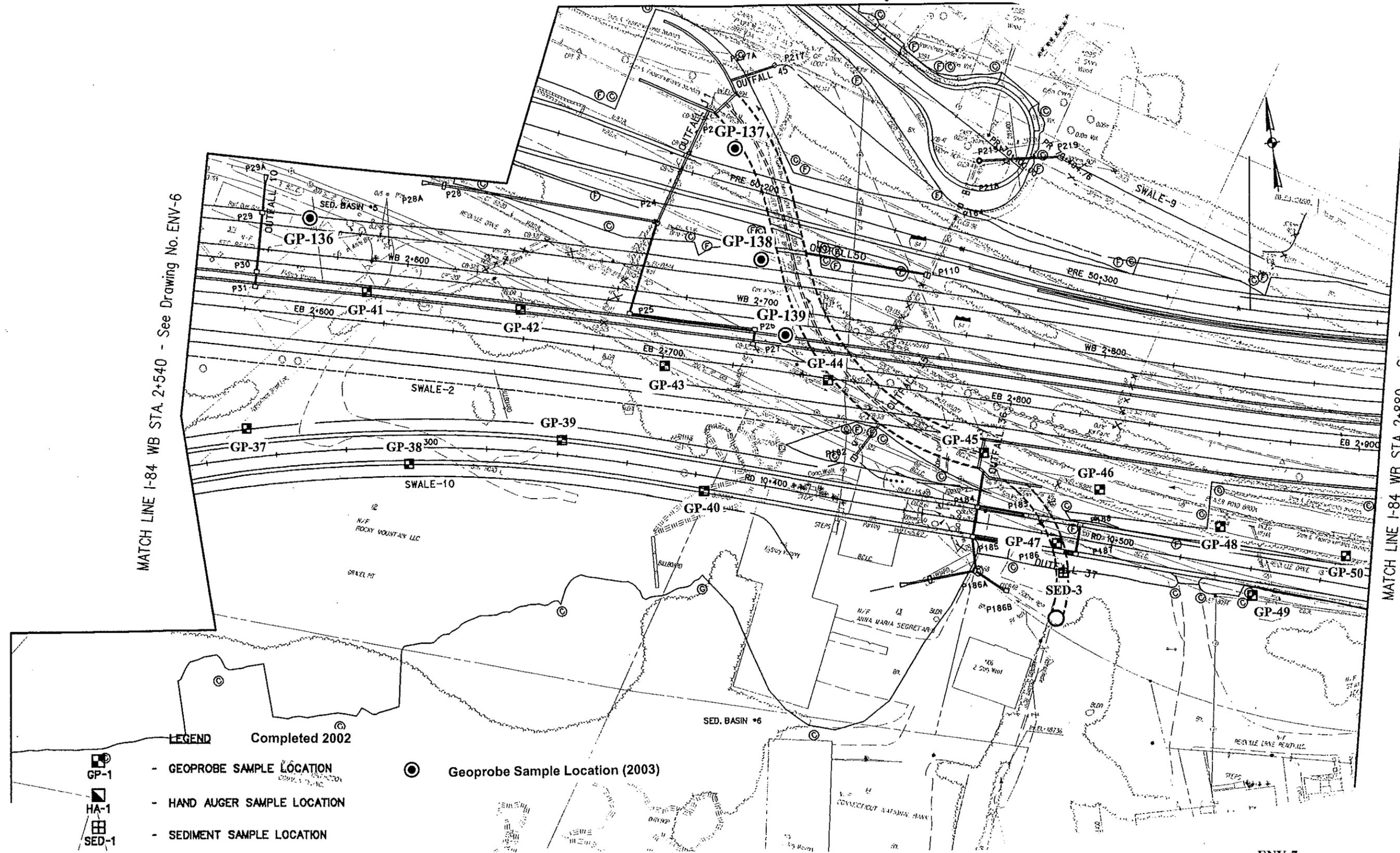
Geoprobe Sample Location (2003)

ENV-6
Task 210 Project Area & Sampling Locations
Inetrstate 84 - Waterbury , Connecticut

MATCH LINE - See Drawing No. ----

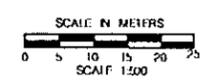
MATCH LINE I-84 WB STA. 2+540 - See Drawing No. ENV-6

MATCH LINE I-84 WB STA. 2+880 - See Drawing No. ENV-8

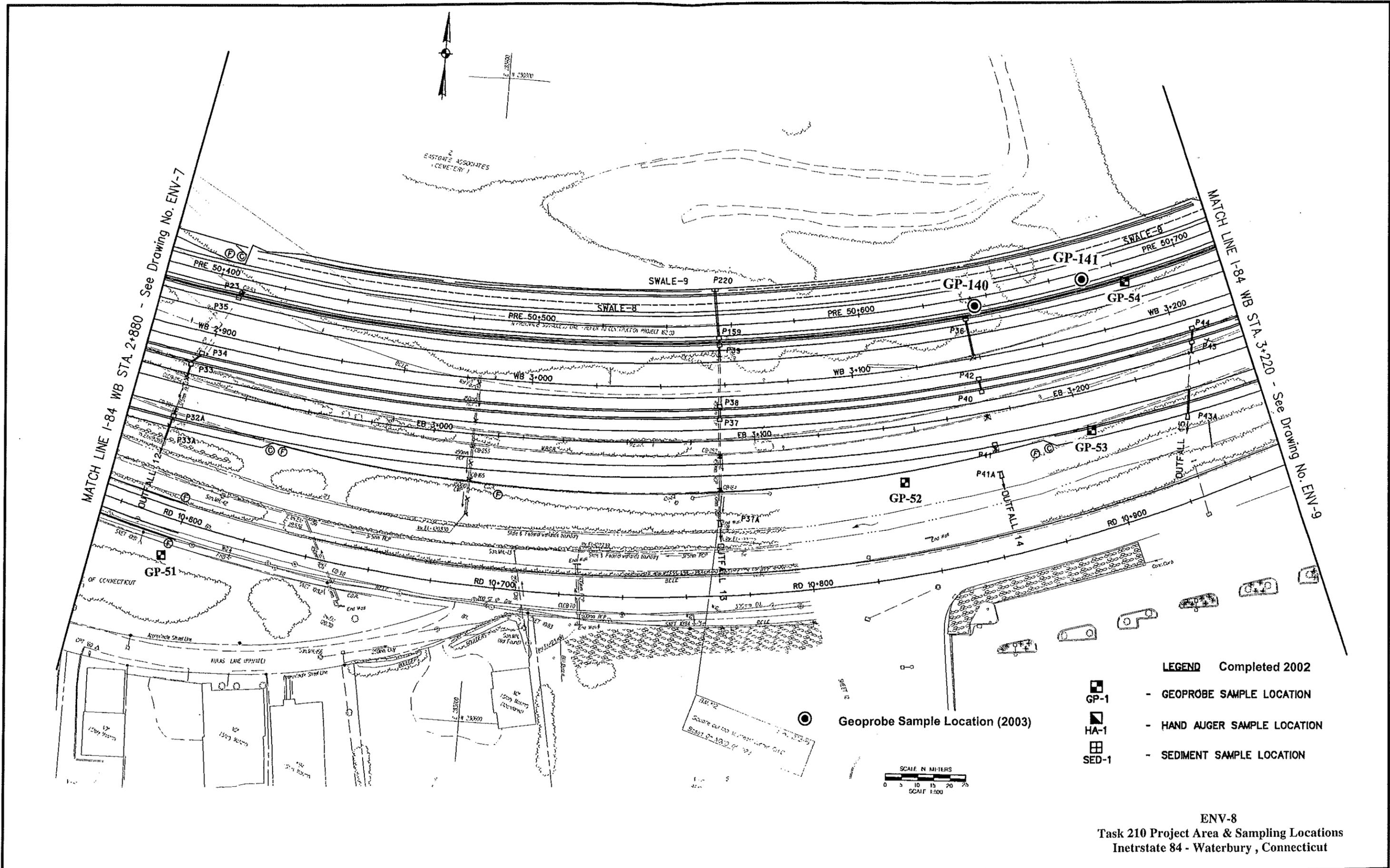


LEGEND Completed 2002

-  GP-1 - GEOPROBE SAMPLE LOCATION
-  HA-1 - HAND AUGER SAMPLE LOCATION
-  SED-1 - SEDIMENT SAMPLE LOCATION
-  Geoprobe Sample Location (2003)



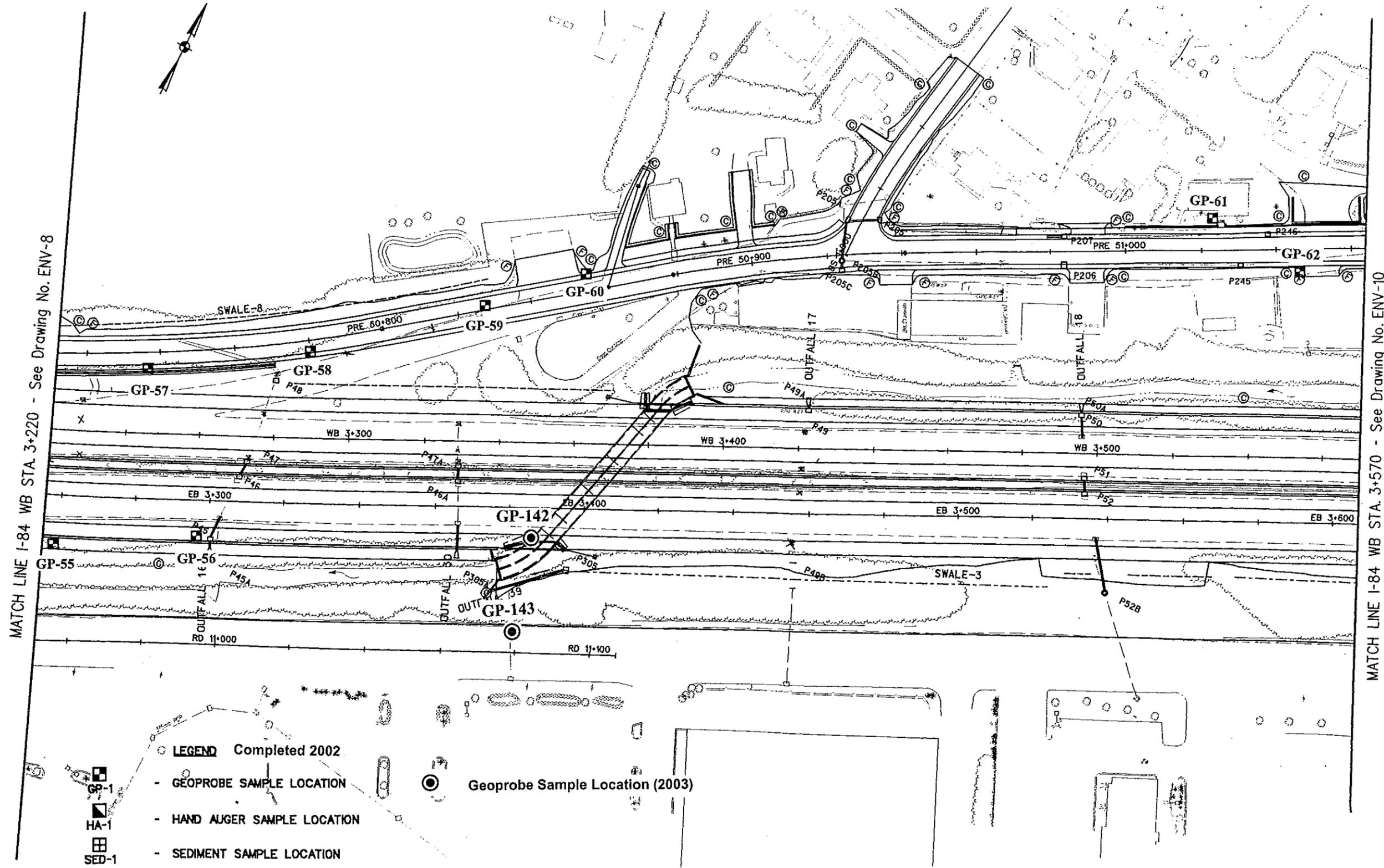
ENV-7
Task 210 Project Area & Sampling Locations
Inetrstate 84 - Waterbury , Connecticut



- LEGEND Completed 2002**
- GP-1 - GEOPROBE SAMPLE LOCATION
 - HA-1 - HAND AUGER SAMPLE LOCATION
 - SED-1 - SEDIMENT SAMPLE LOCATION

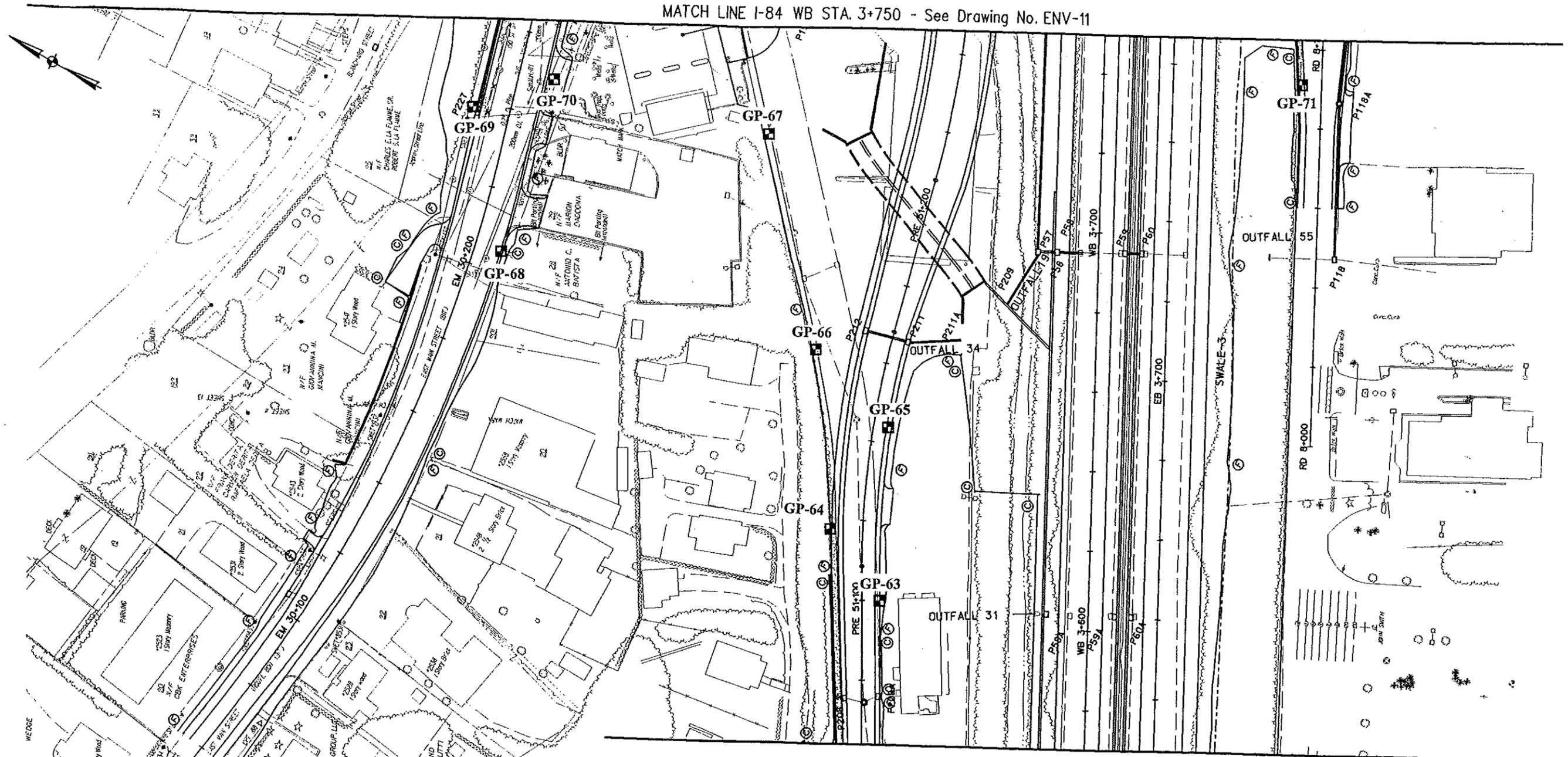
Geoprobe Sample Location (2003)

ENV-8
Task 210 Project Area & Sampling Locations
Inetrstate 84 - Waterbury , Connecticut



ENV-9
Task 210 Project Area & Sampling Locations
Inetrstate 84 - Waterbury , Connecticut

MATCH LINE I-84 WB STA. 3+750 - See Drawing No. ENV-11



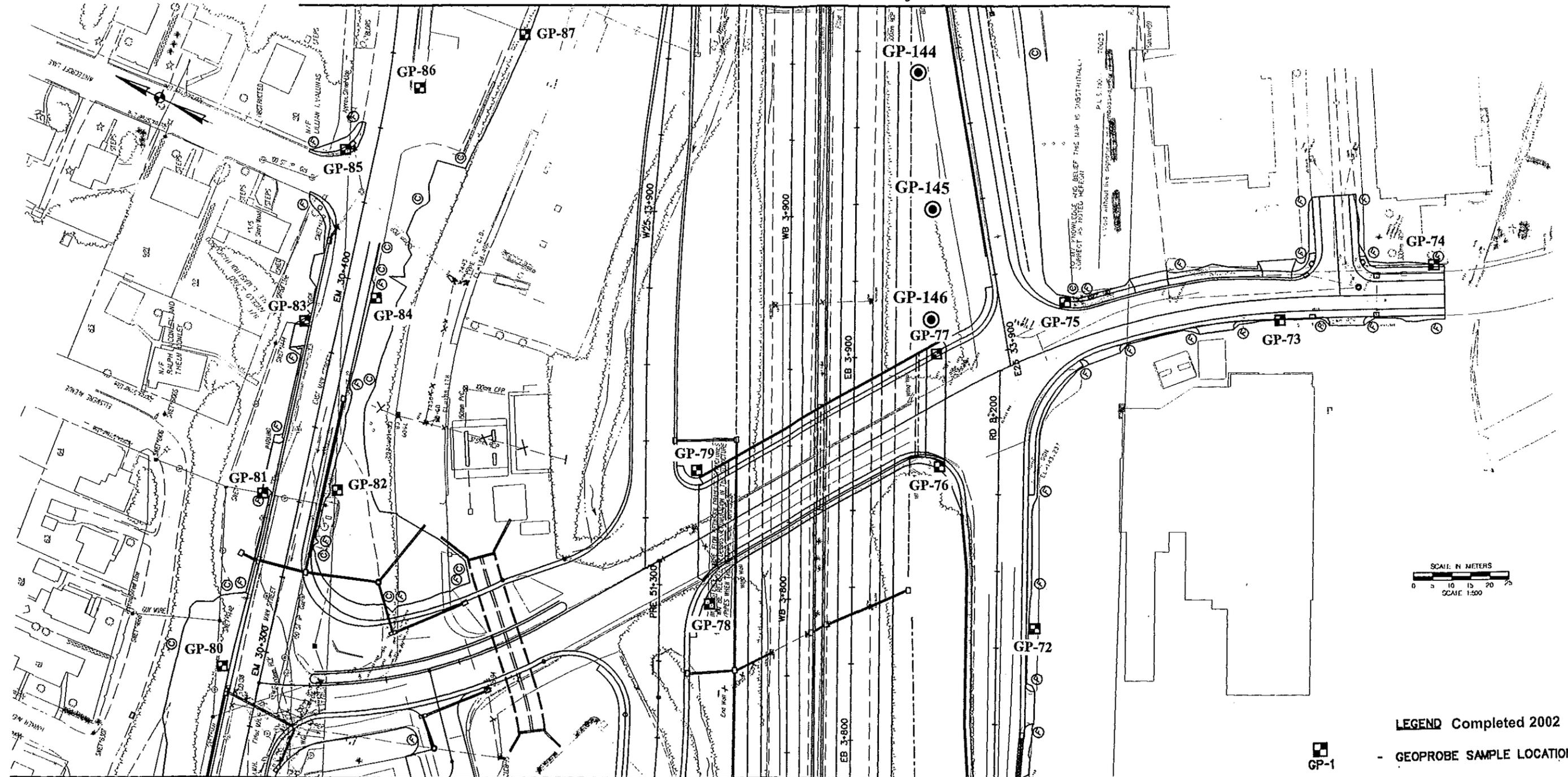
MATCH LINE I-84 WB STA. 3+570 - See Drawing No. ENV-9

- LEGEND** Completed 2002
-  GP-1 - GEOPROBE SAMPLE LOCATION
 -  HA-1 - HAND AUGER SAMPLE LOCATION
 -  SED-1 - SEDIMENT SAMPLE LOCATION



ENV-10
 Task 210 Project Area & Sampling Locations
 Inetrstate 84 - Waterbury , Connecticut

MATCH LINE I-84 WB STA. 3+950 - See Drawing No. 12

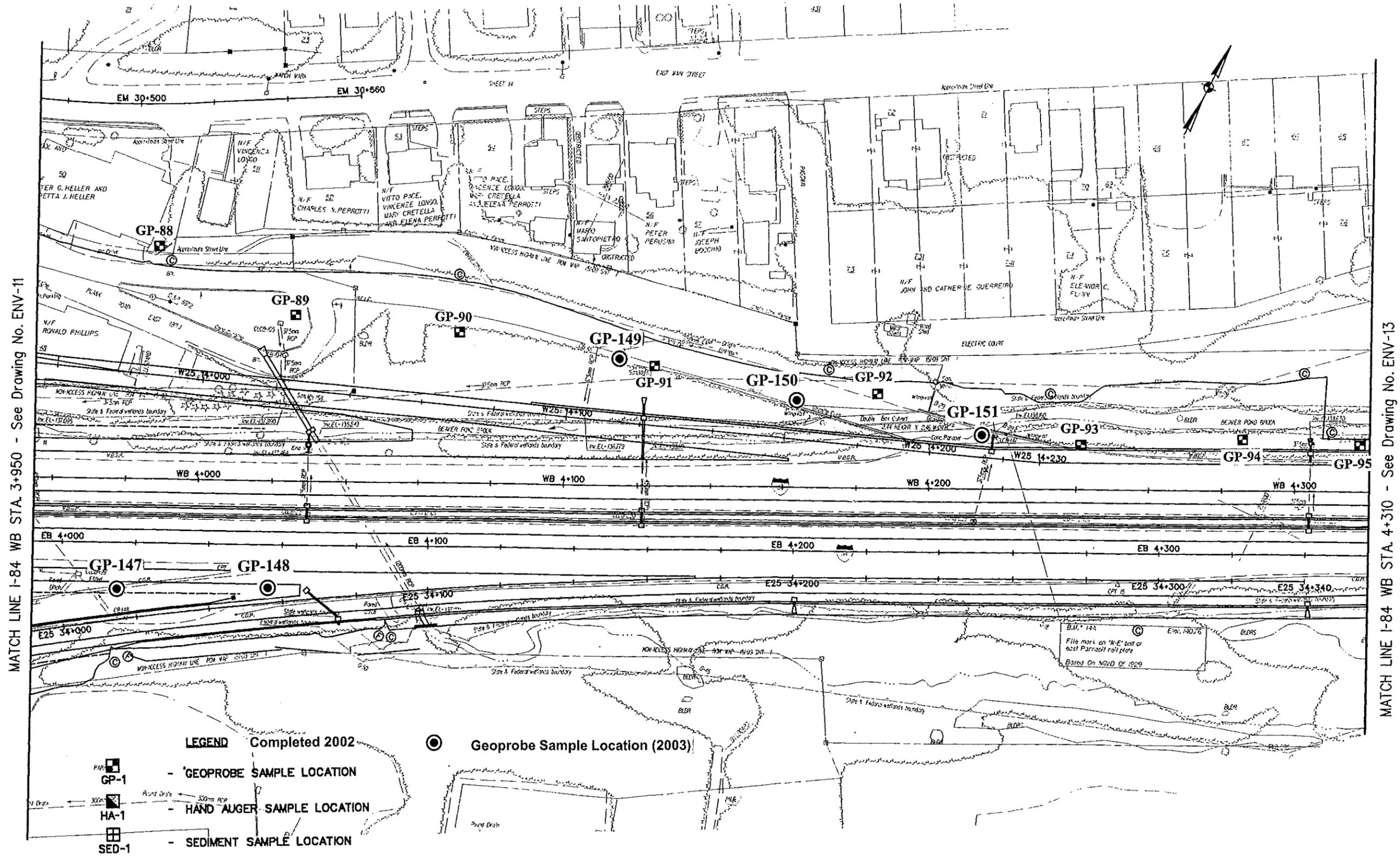


MATCH LINE I-84 WB STA. 3+750 - See Drawing No. _____

⊙ Geoprobe Sample Location (2003)

- LEGEND Completed 2002**
- GP-1 - GEOPROBE SAMPLE LOCATION
 - HA-1 - HAND AUGER SAMPLE LOCATION
 - SED-1 - SEDIMENT SAMPLE LOCATION

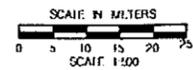
ENV-11
 Task 210 Project Area & Sampling Locations
 Inetrstate 84 - Waterbury , Connecticut



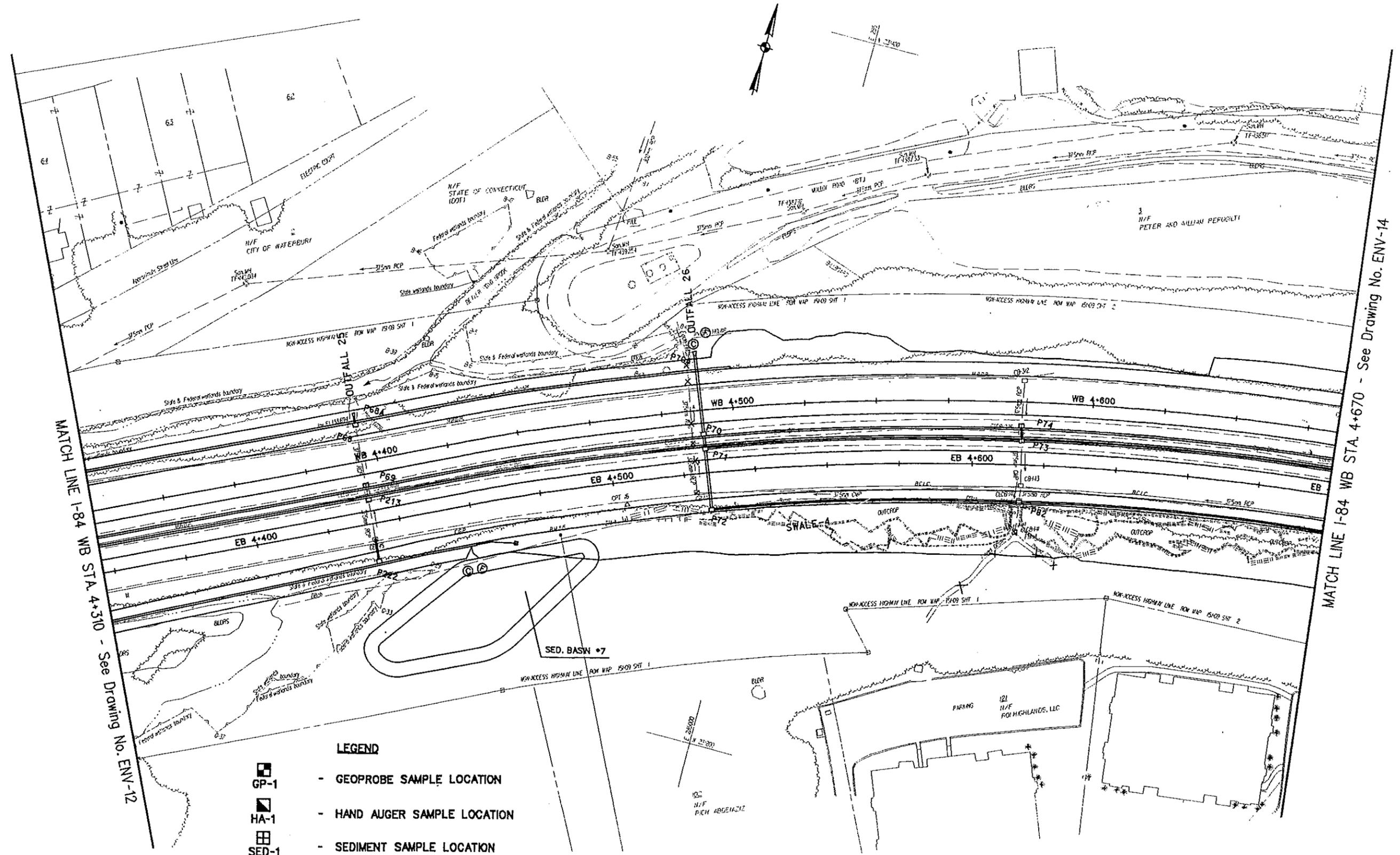
MATCH LINE I-84 WB STA. 3+950 - See Drawing No. ENV-11

MATCH LINE I-84 WB STA. 4+310 - See Drawing No. ENV-13

- LEGEND**
- Completed 2002
 - GP-1 - GEOPROBE SAMPLE LOCATION
 - HA-1 - HAND AUGER SAMPLE LOCATION
 - SED-1 - SEDIMENT SAMPLE LOCATION



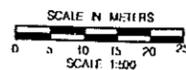
ENV-12
Task 210 Project Area & Sampling Locations
Inetrstate 84 - Waterbury, Connecticut



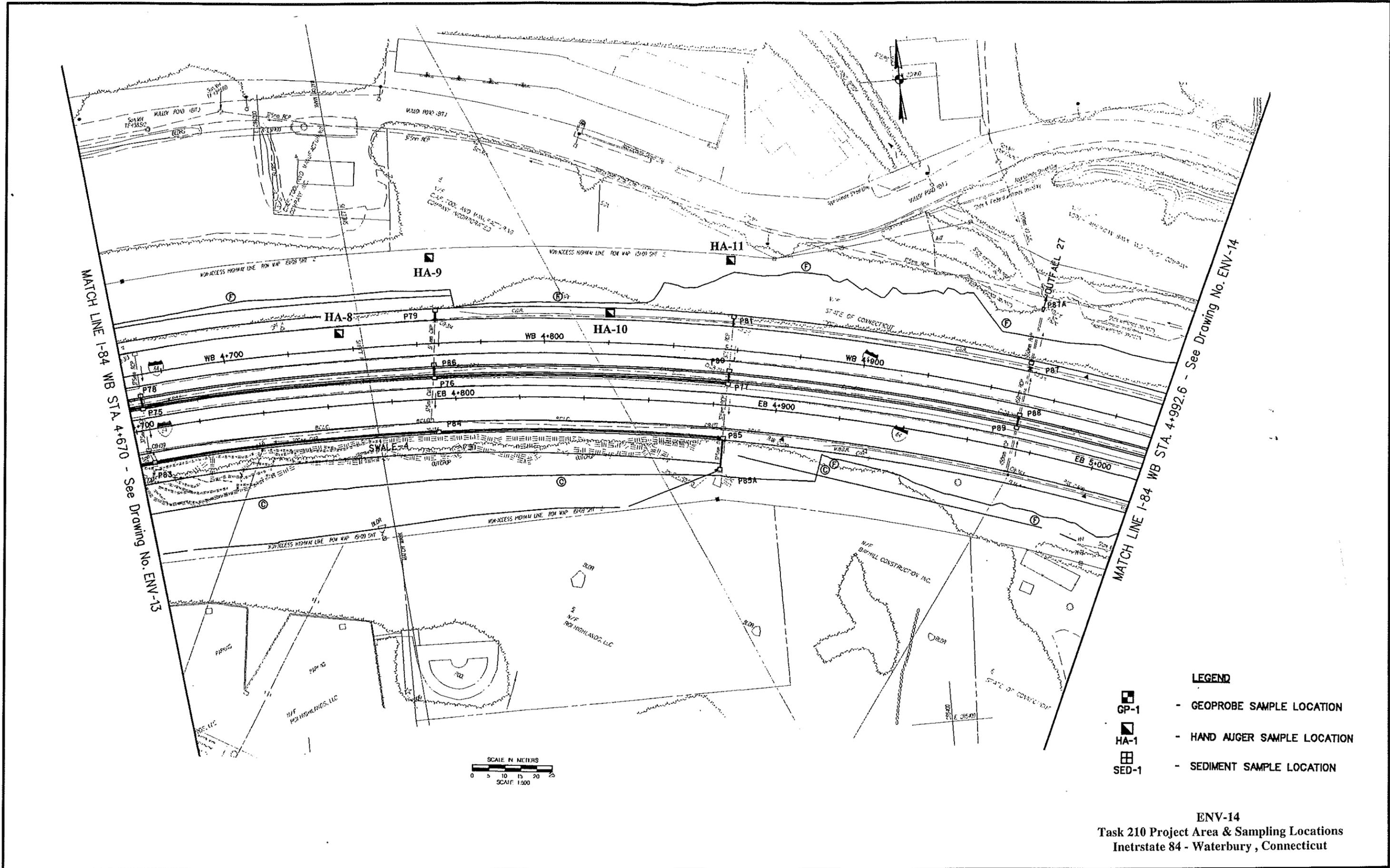
MATCH LINE I-84 WB STA. 4+310 - See Drawing No. ENV-12

MATCH LINE I-84 WB STA. 4+670 - See Drawing No. ENV-14

- LEGEND**
- GP-1 - GEOPROBE SAMPLE LOCATION
 - HA-1 - HAND AUGER SAMPLE LOCATION
 - SED-1 - SEDIMENT SAMPLE LOCATION



ENV-13
Task 210 Project Area & Sampling Locations
Inetrstate 84 - Waterbury , Connecticut

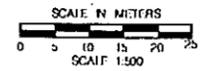
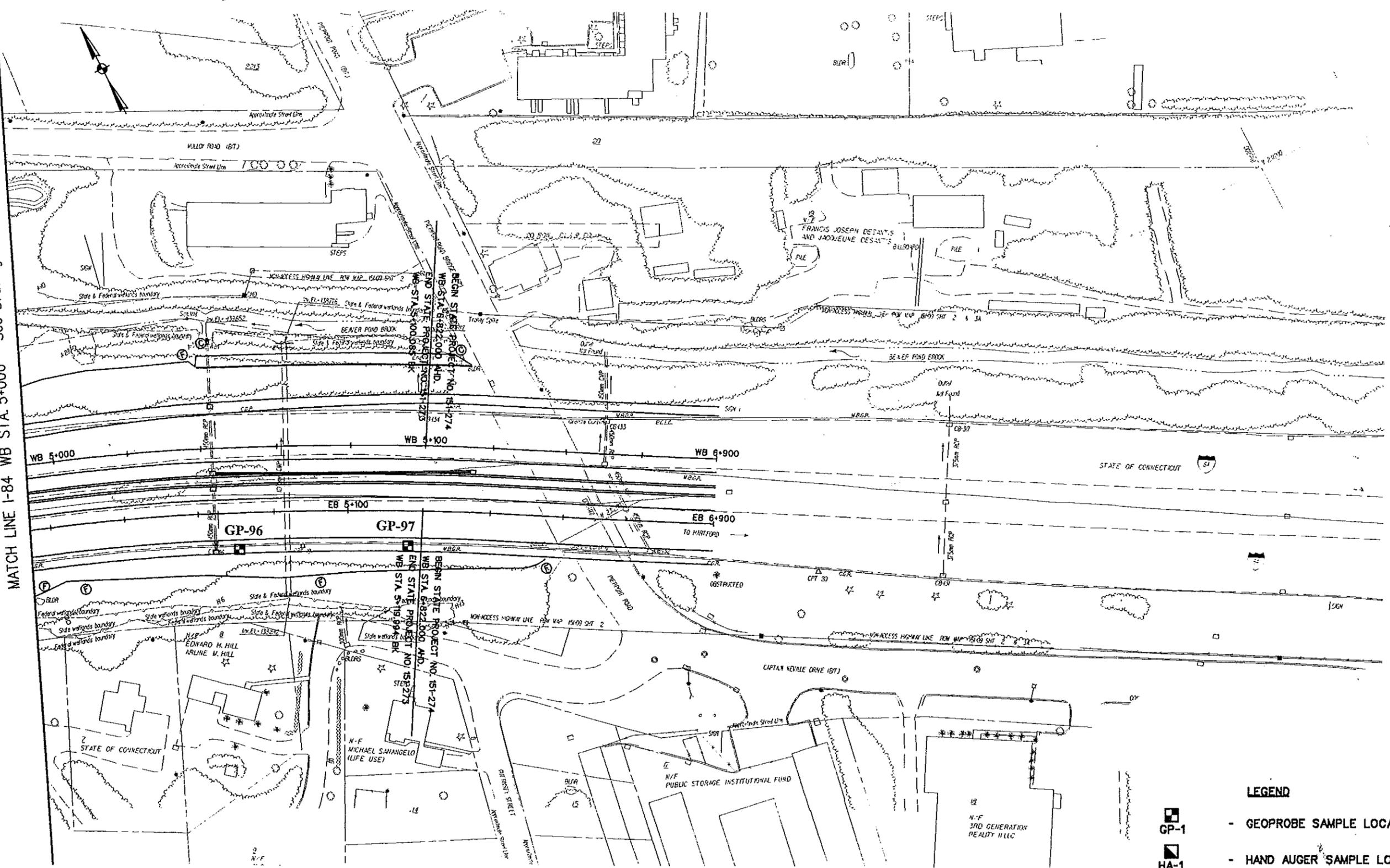


LEGEND

-  - GEOPROBE SAMPLE LOCATION
-  - HAND AUGER SAMPLE LOCATION
-  - SEDIMENT SAMPLE LOCATION

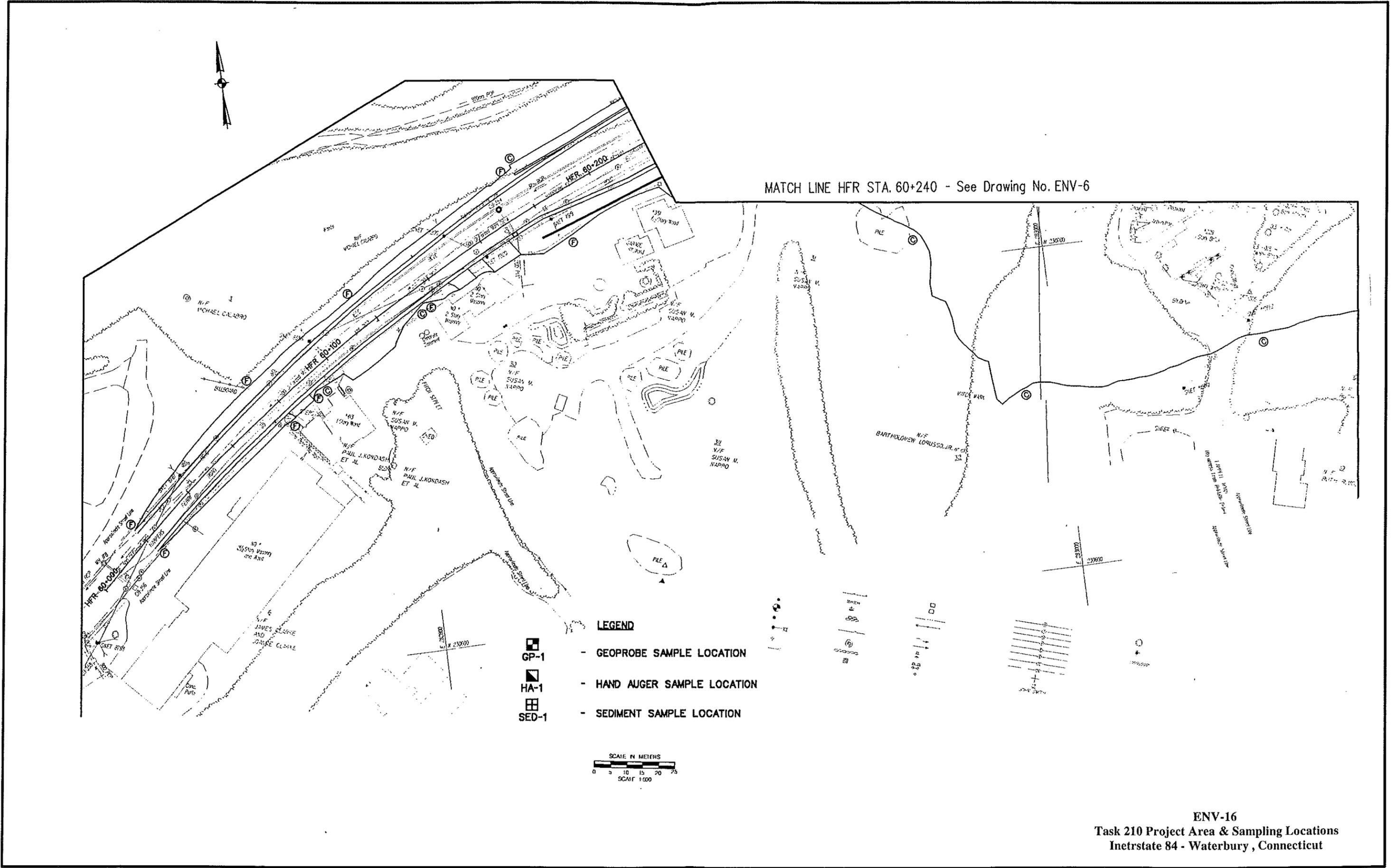
ENV-14
 Task 210 Project Area & Sampling Locations
 Inetrstate 84 - Waterbury , Connecticut

MATCH LINE I-84 WB STA. 5+000 - See Drawing No. ENV-14



- LEGEND**
- GP-1 - GEOPROBE SAMPLE LOCATION
 - HA-1 - HAND AUGER SAMPLE LOCATION
 - SED-1 - SEDIMENT SAMPLE LOCATION

ENV-15
Task 210 Project Area & Sampling Locations
Inetrstate 84 - Waterbury , Connecticut



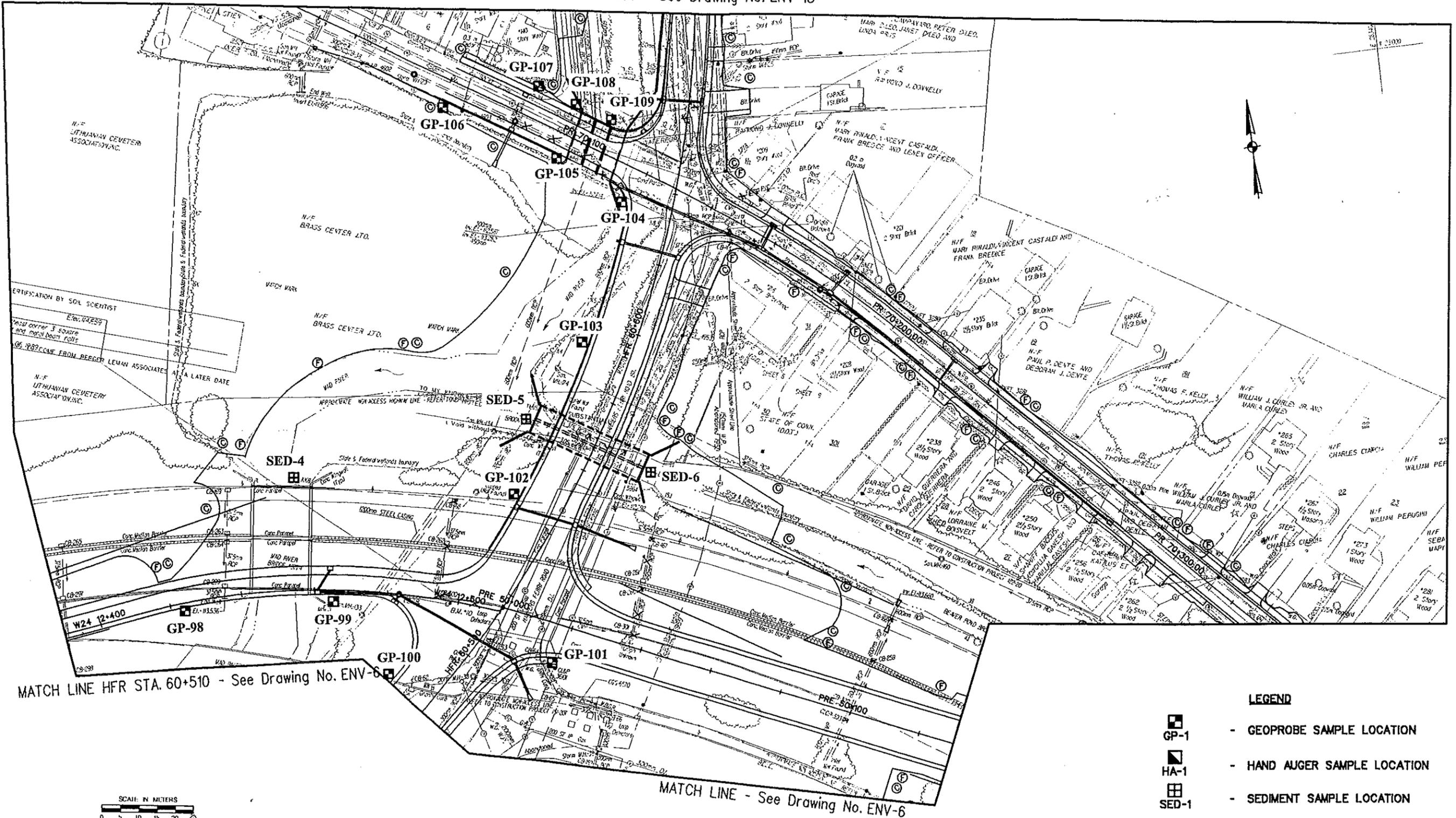
MATCH LINE HFR STA. 60+240 - See Drawing No. ENV-6

- LEGEND**
- GP-1 - GEOPROBE SAMPLE LOCATION
 - HA-1 - HAND AUGER SAMPLE LOCATION
 - SED-1 - SEDIMENT SAMPLE LOCATION

SCALE IN METERS
 0 5 10 15 20 25
 SCALE 1:500

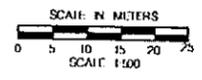
ENV-16
 Task 210 Project Area & Sampling Locations
 Interstate 84 - Waterbury, Connecticut

MATCH LINE HFR STA. 60+690 - See Drawing No. ENV-18



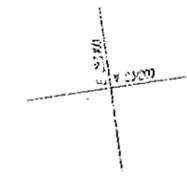
MATCH LINE HFR STA. 60+510 - See Drawing No. ENV-6

MATCH LINE - See Drawing No. ENV-6



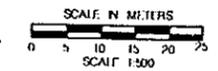
- LEGEND**
-  GP-1 - GEOPROBE SAMPLE LOCATION
 -  HA-1 - HAND AUGER SAMPLE LOCATION
 -  SED-1 - SEDIMENT SAMPLE LOCATION

ENV-17
Task 210 Project Area & Sampling Locations
Inetrstate 84 - Waterbury , Connecticut



- LEGEND**
- GEOPROBE SAMPLE LOCATION
 - HAND AUGER SAMPLE LOCATION
 - SEDIMENT SAMPLE LOCATION

B.V. A
 Square cut on the southwest corner C-B-C
 Based on the S of 309
 Elev. 114.576



MATCH LINE HFR STA. 60+690 - See Drawing No. ENV-17

ENV-18
 Task 210 Project Area & Sampling Locations
 Interstate 84 - Waterbury, Connecticut

project corridor is classified as “GA”. A “GA” groundwater classification indicates that the groundwater in the area may be within the influence of private and potential public water supply sources. The groundwater is considered suitable for direct human consumption without the need for treatment. Groundwater was encountered at 1.2 to 3 meters (4 to 10 feet) below grade in various borings advanced throughout the project corridor during the February 2002 and June 2003 investigations.

All of the properties within the project corridor are connected to the public water supply system. In addition, there is one public water supply source located within a 1,609 meter (1 mile) radius of the project area, according to the CTDEP Bulletin 4, “The Atlas of the Public Water Supply Sources and Drainage Basins of Connecticut,” June, 1982. The Waterbury Water Department’s East Mountain Reservoir is located approximately 1,372 meters (0.85 miles) to the south of Interstate 84 near Interchange 24.

Several surface water bodies are located within the project corridor. Turkey Hill Brook and East Mountain Brook are both designated as Class A surface water bodies by the CTDEP. The designated uses of Class A inland surface waters include potential drinking water supply; fish and wildlife habitat; recreational use; agricultural, industrial supply and other legitimate uses including navigation. The Mad River is designated a Class B surface water body. Class B surface water uses are similar to Class A with the exception of the use as a potential drinking water supply. The Beaverpond Brook is designated as Class B/A, which indicates that the water quality is not currently meeting Class A water quality criteria.

3.2 Geology

The United States Department of Agriculture Soil Conservation Service's *1980 Soils of Connecticut (Bulletin 787)* indicate that the soil in the project corridor is classified as the Charlton-Hollis Formation, which is described as well drained soil with a friable loamy substratum, and shallow soils over bedrock. The Bedrock Geological Map of Connecticut, compiled by John Rodgers in 1985, indicates that the bedrock unit underlying the eastern portion of the project area is the Taine Mountain Formation, which is a well-layered, gray, granofels. The remainder of the project corridor is underlain by the Waterbury Gneiss, which is a gray to dark-gray, fine to medium-grained schist and gneiss. Soils encountered during the February 2002 and June 2003 investigations consisted of brown to black silt and sand units with varying amounts of gravel and cobbles. In addition, intermittent layers of fill consisting of black ash, cinder, asphalt, concrete, and brick were encountered at varying depths in several of the borings. A dark gray, to gray micaceous gneiss/schist unit was encountered in numerous boring locations at depths ranging from 1.8 to 4.9 meters (6 to 16 feet) below the ground surface.

4.0 SUBSURFACE INVESTIGATION

Based upon the industrial and commercial nature of the properties surrounding the Interstate 84 corridor, a comprehensive sampling program was conducted in the Interstate 84 project corridor areas not previously investigated, where possible subsurface contamination was noted during the advancement of the geotechnical soil borings. In addition, the investigation area encompassed AOECs previously identified in an attempt to more accurately define the limits of contamination both horizontally and vertically. The following subsections detail the investigation.

4.1 Geoprobe® Soil Borings & Soil Sample Analyses

On May 16, 19, 22, and 27, 2003, forty-two (42) Geoprobe® soil borings (GP-110 to GP-151) were advanced in selected areas within the project corridor. The Geoprobe® borings were advanced by Logical Environmental Solutions, under the direction of MGI. The locations of the Geoprobe® soil borings are depicted on Figures ENV-3 to ENV-12 - Task 210 Project Area & Sampling Locations.

The Geoprobe® soil borings were advanced to various depths based upon location and continuous soil samples were collected utilizing a 1.2 meter (4-foot) long, 5 centimeter (2-inch) diameter Macro Core Sampler with dedicated acetate liners. The soil samples were visually inspected in the field for staining, and described as to physical characteristics and soil type. In addition, the soil samples were screened in the field for total volatile organic compounds utilizing a Photovac photoionization detector (PID). Soil boring logs were generated in the field by Maguire field personnel. The boring logs denote the types of soil encountered, the depth to groundwater and/or bedrock, the total depth reached in each boring, and the highest observed PID reading. Copies of the boring logs are included at the end of this report in Appendix A.

All soil samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) utilizing EPA Method 8270 and petroleum hydrocarbons utilizing the Connecticut ETPH method. Based upon the boring location, selected soil samples were also analyzed for volatile organic compounds (VOCs) utilizing EPA Method 8260 and total and SPLP RCRA 8 metals.

All Geoprobe® soil borings were back-filled and patched upon completion utilizing clean sand and/or hydrated bentonite. All down-hole sampling equipment was decontaminated in accordance with Maguire's April 2003 Task 210 Subsurface Site Investigation Work Plan.

4.2 Groundwater Sample Collection & Groundwater Analyses

Two (2) groundwater grab samples (GP-127 GW & GP-151 GW) were collected from the borings in which groundwater was encountered. The groundwater grab samples were collected by placing dedicated PVC screen and riser casing into the borehole. Dedicated polyethylene tubing was inserted into the casing and groundwater was drawn through the tubing using a low-flow peristaltic pump. The groundwater samples were placed in laboratory supplied glassware, and stored in an ice-filled cooler. The groundwater samples were analyzed at Spectrum Analytical for VOCs utilizing EPA Method 8260, TPH utilizing the Connecticut ETPH method, PAHs utilizing EPA Method 8270, and total RCRA 8 metals.

4.3 Project Quality Assurance/Quality Control Practices

To assess the collection of samples in the field in terms of the sampling techniques and decontamination procedures, quality control and quality assurance samples were collected on each day of sampling activities. Four (4) trip blanks were prepared by Spectrum Analytical and four (4) field blank water samples were collected during the field investigation. The field blank samples were prepared by pouring laboratory supplied de-ionized water through a macro core liner and cutting shoe, and collecting the resulting rinsate in appropriate sample containers. The trip blank and field blank samples were stored with the daily samples in the sample cooler until subsequent delivery to the laboratory for analysis. The field blanks were analyzed for the same parameters specified for the daily samples. The trip blanks were analyzed for VOCs.

All samples were stored in a manner that preserved the integrity of the sample chemistry. Samples intended for organic analyses were stored in an ice-filled cooler until delivery to the laboratory. Chain-of-Custody (COC) forms were filled out and accompanied all samples as a legal record of possession of the sample. The COC was initiated in the field and accompanied the containers during collection, transportation to the lab, analysis, and final disposal of the sample. All sampling equipment was either dedicated to a specific sample or was decontaminated prior to and between each use. Sampling equipment was not placed near solvents, gasoline, or materials that may have impacted the integrity of the samples.

5.0 DISCUSSION OF SAMPLE RESULTS

5.1 Regulatory Criteria

The CTDEP adopted Remediation Standard Regulations (Regulations of Connecticut State Agencies, Section 22a-133k-1 to 3 and 22a-133q-1) as of January 31, 1996. The Remediation Standard Regulations (RSRs) apply to any site undergoing voluntary remediation under Public Acts 95-183 or 95-190, a transfer of an “establishment” under Public Act 95-183, or any site as ordered by the CTDEP Commissioner. The Regulations also outline the processes for establishing alternative site-specific numerical standards for certain sites, upon approval by the CTDEP.

The RSRs criteria applicable to the soil and groundwater sampled during this investigation are summarized below. The application of these RSRs to the results of the laboratory analyses from this investigation is discussed in subsection 5.2 and 5.3 of this section.

Soils Criteria: The RSRs are organized into two sets of criteria: the Direct Exposure Criteria (DEC) and the Pollutant Mobility Criteria (PMC). The DEC and PMC are briefly explained in the following sub-sections, in relation to how they would be applicable to the types of analyses conducted on the soil samples collected for this investigation. Please refer to the RSRs for a complete explanation of the Regulations.

Direct Exposure Criteria

The purpose of the Direct Exposure Criteria (DEC) is to protect human health from risks associated with the direct contact with or ingestion of various common soil contaminants. The DEC are applicable to soil within approximately 4.6 meters (15 feet) of the ground surface. Concentrations of contaminants are evaluated based upon mass-based analyses and different criteria are established for residential and commercial/industrial properties. The use of the less stringent commercial/industrial standards requires the placement of a land use restriction on the property. The DEC is not applicable to inaccessible soils, including soil more than 1.2 meters (4

feet) below the ground surface, 0.6 meters (2 feet) below pavement greater than 7.6 centimeters (3 inches) thick, or below an existing building, provided that an Environmental Land Use Restriction (ELUR) is placed in effect for the property.

Pollutant Mobility Criteria

The purpose of the Pollutant Mobility Criteria (PMC) is to evaluate the potential for contaminants to leach from the soil in concentrations that may degrade groundwater quality. Different numerical criteria are established for GA and GAA groundwater areas, versus GB groundwater areas.

Groundwater Criteria. Contaminants in the groundwater are compared either to background quality or the Groundwater Protection Criteria (GWPC), the Volatilization Criteria, as well as the Surface Water Protection Criteria (SWPC). The GWPC, Volatilization Criteria, and SWPC are briefly explained in the following sub-sections, in relation to how they would be applicable to the types of analyses conducted on the soil samples collected for this investigation.

Groundwater Protection Criteria

The purpose of the Groundwater Protection Criteria is to protect the groundwater quality in areas that have the potential to use groundwater as a drinking water resource (GA & GAA groundwater classification areas).

Volatilization Criteria

The purpose of the Volatilization Criteria standard is to ensure that volatile organic compounds (VOCs) in groundwater do not pose an unacceptable risk to human health due to the inhalation of VOCs that may enter into a structure on the property. The Volatilization Criteria only apply when impacted groundwater is located within 4.6 meters (15 feet) of the ground surface or any structure. Different criteria exist for residential and commercial/industrial properties. The use of the less stringent commercial/industrial standards requires the placement of an ELUR on the property. Since groundwater was located within 4.6 meters (15 feet) of the ground surface, the Volatilization Criteria apply to this Site.

Surface Water Protection Criteria

The purpose of the Surface Water Protection Criteria (SWPC) standards are to ensure that groundwater discharging to a surface water body will not adversely effect surface water quality. Since several surface water bodies are situated within the project corridor, the SWPC apply to contaminants detected in the groundwater.

5.2 Results of Soil Sample Analyses

Soil samples collected during the advancement of the Geoprobe® borings were sent to Spectrum Analytical Laboratory for laboratory analyses. Summaries of the laboratory results from the Geoprobe® boring soil samples are presented in Tables 1-1(a) to 1-1(o), which are located at the end of this report, and copies of the soil sample analytical results are included in Appendix B. The following summarizes the results of the analyses conducted on the soil samples.

Varying concentrations of petroleum hydrocarbons (TPH) were detected in all of the borings from Below Detectable Limits (10 to 20 parts per million [ppm]) to 1,400 ppm. The following four soil samples contained TPH at concentrations that exceed the CTDEP Residential DEC of 500 ppm; GP-121, 5.8 to 6.4 meter/19' to 21' sample (650 ppm); GP-122, 0 to 1.2 meter/0' to 4' sample (640 ppm); GP-127, 0 to 1.2 meter/0'-4' sample (810 ppm); and GP-135, 1.2 to 2.4 meter/4' to 8' sample (1,400 ppm). The GP-135 boring is located in a GA groundwater area so the TPH concentration detected also exceeds the GA PMC of 500 ppm. No other sample contained TPH at a concentration that exceeds any applicable CTDEP RSR criteria.

Seven of the soil samples contained detectable concentrations of VOCs. The 2.4 to 3.7 meter/8' to 12' samples from borings GP-116, GP-117, and GP-118 contained the compounds benzene (0.0051 ppm), naphthalene (0.066 to 0.11 ppm), and tetrachloroethene (0.0157 to 0.074 ppm) at low concentrations. The 5.8 to 6.4 meter/19' to 21' samples from borings GP-119, GP-120, and GP-121 contained the compounds benzene (0.0134 to 0.084 ppm), 4-isopropyltoluene (0.0081 to 0.016 ppm), and naphthalene (0.014 to 0.04 ppm) at low concentrations. The 1.2 to 1.8 meter/4' to 6' sample from boring GP-139 contained the compound naphthalene (0.0063 ppm) at a low concentration. The concentrations detected in the seven samples do not exceed any applicable CTDEP RSR criteria.

Several polynuclear aromatic hydrocarbon (PAH) compounds were detected at varying total concentrations ranging from Below Detectable Limits to 65.5 ppm. Eleven (11) soil samples contained concentrations of PAHs that exceed applicable CTDEP RSR Criteria. The 2.4 to 3.7 meter (8 to 12 foot) soil sample from boring GP-117 contained the compounds benzo(a)anthracene (1.3 ppm), benzo(a)pyrene (1.7 ppm), benzo(b)fluoranthene (1.8 ppm), benzo(k)fluoranthene (1.2 ppm), chrysene (1.6 ppm), and indeno(1,2,3-cd)pyrene (1.2 ppm) at concentrations that exceed their respective GB PMC. The compounds benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were also detected at concentrations that exceed their respective Residential DEC. In addition, the compound benzo(a)pyrene was detected at a concentration that exceeds its Commercial/Industrial DEC.

The 2.4 to 3.7 meter (8 to 12 foot) soil sample from boring GP-118 contained the compounds benzo(a)anthracene (5.3 ppm), benzo(a)pyrene (5.6 ppm), benzo(b)fluoranthene (6.6 ppm), benzo(k)fluoranthene (3.8 ppm), chrysene (5.2 ppm), and indeno(1,2,3-cd)pyrene (3.4 ppm) at concentrations that exceed their respective GB PMC. The compounds benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were also detected at concentrations that exceed their respective Residential DEC. In addition, the compound benzo(a)pyrene was detected at a concentration that exceeds its Commercial/Industrial DEC.

The 5.8 to 6.4 meter (19 to 21 foot) soil sample from boring GP-119 contained the compounds benzo(a)anthracene (1.9 ppm), benzo(a)pyrene (1.9 ppm), benzo(b)fluoranthene (2.2 ppm), benzo(k)fluoranthene (1.3 ppm), chrysene (2.0 ppm), and indeno(1,2,3-cd)pyrene (1.4 ppm) at concentrations that exceed their respective GB PMC. The compounds benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were also detected at concentrations that exceed their respective Residential DEC. In addition, the compound benzo(a)pyrene was detected at a concentration that exceeds its Commercial/Industrial DEC.

The 5.8 to 6.4 meter (19 to 21 foot) soil sample from boring GP-120 contained the compounds benzo(a)anthracene (1.6 ppm), benzo(a)pyrene (2.1 ppm), benzo(b)fluoranthene (2.2 ppm), benzo(k)fluoranthene (1.3 ppm), chrysene (2.0 ppm), and indeno(1,2,3-cd)pyrene (1.4 ppm) at concentrations that exceed their respective GB PMC. The compounds benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were also detected at concentrations that exceed their respective Residential DEC. In addition, the compound benzo(a)pyrene was detected at a concentration that exceeds its Commercial/Industrial DEC.

The 5.8 to 6.4 meter (19 to 21 foot) soil sample from boring GP-121 contained the compounds benzo(a)anthracene (4.1 ppm), benzo(a)pyrene (4.3 ppm), benzo(b)fluoranthene (5.0 ppm), benzo(k)fluoranthene (3.2 ppm), chrysene (4.4 ppm), and indeno(1,2,3-cd)pyrene (3.3 ppm) at concentrations that exceed their respective GB PMC. The compounds benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were also detected at concentrations that exceed their respective Residential DEC. In addition, the compound benzo(a)pyrene was detected at a concentration that exceeds its Commercial/Industrial DEC.

The 0 to 1.2 meter (0 to 4 foot) soil sample from boring GP-122 contained the compounds benzo(a)pyrene (1.6 ppm), benzo(b)fluoranthene (2.0 ppm), benzo(k)fluoranthene (1.3 ppm), chrysene (1.7 ppm), and indeno(1,2,3-cd)pyrene (1.3 ppm) at concentrations that exceed their respective GB PMC. The compounds benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were also detected at concentrations that exceed their respective Residential DEC. In addition, the compound benzo(a)pyrene was detected at a concentration that exceeds its Commercial/Industrial DEC.

The 0 to 1.2 meter (0 to 4 foot) soil sample from boring GP-125 contained the compound benzo(a)pyrene (1.1 ppm) at a concentration that exceeds its GB PMC, Residential DEC, and Commercial/Industrial DEC.

The 0 to 1.2 meter (0 to 4 foot) soil sample from boring GP-126 contained the compounds benzo(a)pyrene (1.2 ppm) and benzo(b)fluoranthene (1.2 ppm) at concentrations that exceed their respective GB PMC and Residential DEC. In addition, the compound benzo(a)pyrene was detected at a concentration that exceeds its Commercial/Industrial DEC.

The 0 to 1.2 meter (0 to 4 foot) soil sample from boring GP-127 contained the compounds benzo(a)anthracene (1.3 ppm), benzo(a)pyrene (2.2 ppm), benzo(b)fluoranthene (2.2 ppm), benzo(k)fluoranthene (1.4 ppm), chrysene (2.0 ppm), and indeno(1,2,3-cd)pyrene (1.3 ppm) at concentrations that exceed their respective GB PMC. The compounds benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were also detected at concentrations that exceed their respective Residential DEC. In addition, the compound benzo(a)pyrene was detected at a concentration that exceeds its Commercial/Industrial DEC.

The 0 to 1.2 meter (0 to 4 foot) soil sample from boring GP-128 contained the compounds benzo(a)pyrene (1.2 ppm), benzo(b)fluoranthene (1.1 ppm), and chrysene (1.1 ppm) at concentrations that exceed their respective GB PMC. The compounds benzo(a)pyrene and benzo(b)fluoranthene were also detected at concentrations that exceed their respective Residential DEC. In addition, the compound benzo(a)pyrene was detected at a concentration that exceeds its Commercial/Industrial DEC.

The 1.2 to 2.4 meter (4 to 8 foot) soil sample from boring GP-135 contained the compounds benzo(a)anthracene (2.4 ppm), benzo(a)pyrene (3.8 ppm), benzo(b)fluoranthene (4.5 ppm), benzo(k)fluoranthene (3.0 ppm), chrysene (4.0 ppm), fluoranthene (9.1 ppm), indeno(1,2,3-cd)pyrene (2.2 ppm), phenanthrene (4.8 ppm), and pyrene (8.1 ppm) at concentrations that exceed their respective GA PMC. The compounds benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were also detected at concentrations that exceed their respective Residential DEC. In addition, the compound benzo(a)pyrene was detected at a concentration that exceeds its Commercial/Industrial DEC.

Total concentrations of the metals arsenic, barium, cadmium, chromium, lead, and mercury were detected at varying concentrations in the soil samples throughout the project corridor. The 2.4 to 3.7 meter/8' to 12' soil sample from boring GP-117 contained total lead (1,400 ppm) at a concentration that exceeds its Residential DEC of 500 ppm and Commercial/Industrial DEC of 1,000 ppm. No other metals were detected at concentrations that exceeded any applicable CTDEP RSR criteria.

Leachable barium, cadmium, chromium, lead, and mercury (via SPLP) were detected at varying concentrations throughout the project corridor. The 0 to 1.2 meter/0' to 4' sample from boring GP-147 contained leachable lead (0.0281 ppm) at a concentration that exceeds its GA PMC of 0.015 ppm. No other leachable metals were detected at concentrations that exceeded any applicable CTDEP RSR Criteria.

5.3 Results of Groundwater Grab Sample Analyses

The groundwater grab samples (GP-127 GW & GP-151 GW) collected during the advancement of the Geoprobe® borings were sent to Spectrum Analytical for laboratory analyses. Summaries of the laboratory results from the groundwater grab samples are presented in Table 2-2, which is located at the end of this report, and copies of the groundwater analytical results are included in Appendix C. The following summarizes the results of the analyses conducted on the groundwater grab samples.

The two groundwater samples did not contain detectable concentrations of TPH and PAHs. The GP-127 groundwater sample contained the VOCs methyl tertiary butyl ether (MTBE) (2.1 parts per billion [ppb]) and naphthalene (2.8 ppb). However, the concentration detected did not exceed any applicable CTDEP RSR criteria.

The groundwater samples contained total arsenic, barium, cadmium, chromium, lead, and mercury at varying total concentrations. The GP-127 groundwater sample contained the metals arsenic (0.0246 ppm), cadmium (0.0093 ppm), lead (0.807 ppm), and mercury (0.0062 ppm) at total concentrations that exceed their respective CTDEP SWPC. This sample was collected from a GB groundwater area so the CTDEP's GPC do not apply.

5.3 Quality Assurance/Quality Control Samples

The field blank (FB-1 to FB-4) samples were collected on each of the four sampling days. The field blank samples were analyzed for VOCs, TPH, PAHs, and total RCRA 8 metals. In addition, four trip blank samples (TB-1 to TB-4) provided by Spectrum Analytical Inc. were analyzed for VOCs. None of the field or trip blank samples contained detectable concentrations of contaminants. Copies of the analytical reports associated with the quality assurance/quality control samples are included in Appendix D.

6.0 DISCUSSION OF AFFECTED RESOURCES

6.1 Areas of Environmental Concern

Based upon the results of laboratory analyses performed on soil and groundwater samples for this Task 210 investigation, as well as the Task 210 investigation completed in February 2002, eleven (11) areas of environmental concern (AOEC) and one (1) groundwater AOEC have been identified where contaminants are present at concentrations that exceed applicable CTDEP RSR criteria. In addition, twenty-one (21) low-levels area of environmental concern (LLAOEC) have been identified, where contaminants in the soil were detected at concentrations below applicable

CTDEP RSR standards, but above laboratory detection limits. The locations of the AOECs and the LLAOECs within the project corridor are discussed in the following sections. Tables summarizing the results of the soil, sediment, and groundwater samples collected from the February 2002 investigation are included as Tables 1(a) to 1(bb), Tables 2(a) to 2(c), Tables 3(a) to 3(b), and Table 4 in the Tables section of this report.

AOEC #1: I-84 West, Exit 23 (Hamilton Avenue) Area: Samples HA-5, HA-6, & HA-7:

Analytical results from the soil samples collected from borings HA-5, HA-6, and HA-7 during the February 2002 Task 210 investigation indicate the presence of TPH and PAH contamination at slightly elevated concentrations in shallow soil ranging from 0 to 0.6 meters (0 to 2 feet) below grade. The contamination detected exceeds the GB PMC, Residential DEC, and Commercial/Industrial DEC. In addition, the samples also contain total cadmium, chromium, and lead at concentrations that exceed the Residential DEC and Commercial/Industrial DEC.

AOEC #2: I-84 East, Interchange 23 On-Ramp Area: Samples GP-117 & GP-118:

Analytical results from the soil samples collected from borings GP-117 and GP-118 during this Task 210 investigation indicate the presence of PAH contamination at slightly elevated concentrations in soil ranging from 2.4 to 3.7 meters (8 to 12 feet) below grade. The contamination detected exceeds the GB PMC, Residential DEC, and Commercial/Industrial DEC. In addition, the GP-117 sample also contains total lead at a concentration that exceeds the Residential DEC and Commercial/Industrial DEC.

AOEC #3: I-84 East, Between Interchange 23 & 24: Samples GP-119, GP-120 & GP-121:

Analytical results from the soil samples collected from borings GP-119, GP-120, and GP-121 during this Task 210 investigation indicate the presence of TPH and PAH contamination at slightly elevated concentrations in soil ranging from 5.8 to 6.4 meters (19 to 21 feet) below grade. The contamination detected exceeds the GB PMC, Residential DEC, and Commercial/Industrial DEC. Based upon the presence of fill containing ash and cinders observed during drilling activities beginning at 0.9 meters (3 feet), this AOEC will apply to soil greater than 0.9 meters (3 feet) below grade.

AOEC #4: I-84, Between Exits 23 & 24 (Former City Mill Ponds Area): Samples GP-7, GP-8, SED-1, & SED-2:

Analytical results from the soil samples collected from GP-7 and GP-8 during the February 2002 investigation indicate the presence of total lead contamination that slightly exceeds the Residential DEC. The lead contamination was detected at depths ranging from 0 to 1.2 meters (0 to 4 feet) below grade. In addition, the SED-1 and SED-2 sediment samples collected from the Mad River also indicated the presence of PAH contamination that exceeds the GB PMC, Residential DEC, and Commercial/Industrial DEC.

AOEC #5: I-84, Between Exits 23 & 24 (Former City Mill Ponds Area): Samples GP-9 to GP-19, GP-21, GP-32 to GP-36, GP-100, GP-122, GP-125 to GP-128, SED-4, SED-5 & SED-6:

Analytical results from the soil samples collected from sample borings GP-9 to GP-19, GP-21, GP-32 to GP-36, GP-100, GP-122, and GP-125 to GP-128 indicate the presence of PAH contamination at slightly elevated concentrations at depths ranging from 0 to 3.7 meters (0 to 12 feet) below grade. The contamination detected exceeds the GB PMC, Residential DEC, and Commercial/Industrial DEC. In addition, analytical results from the GP-9 to GP-19, GP-32 to GP-36, GP-122, and GP-127 soil samples indicate the presence of TPH contamination at slightly elevated concentrations at depths ranging from 0 to 3.7 meters (0 to 12 feet) below grade. The contamination detected exceeds the Residential DEC. The GP-33 soil sample also contained total chromium at a concentration that exceeds the Residential and Commercial/Industrial DEC, at a depth ranging from 0.6 to 1.2 meters (2 to 4 feet) below grade. In addition, the SED-4 and SED-5 sediment samples collected from the Beaverpond Brook also indicated the presence of PAH contamination that exceeds the GB PMC, Residential DEC, and Commercial/Industrial DEC. The SED-6 sediment sample collected from Beaverpond Brook also contained concentrations of TPH and PAHs, but at concentrations below CTDEP RSR criteria. The groundwater samples collected from borings GP-15 and GP-127 contained total arsenic, cadmium, chromium, lead, and mercury at concentrations that exceed the SWPC.

AOEC #6: 305 Harpers Ferry Road: Sample GP-135:

Analytical results from the soil sample collected from GP-135 indicate the presence of TPH and PAH contamination at elevated concentrations in shallow soil ranging from 1.2 to 2.4 meters (4 to 8 feet) below grade. The contamination detected exceeds the GA PMC, Residential DEC, and Commercial/Industrial DEC. In addition, the GP-135 sample also contained TPH at a concentration below CTDEP RSR standards, in the soil ranging from 2.4 to 3.7 meters (8 to 12 feet) below grade.

AOEC #7: Plank Road/Brookdale Lane Intersection Area: Sample GP-107:

Analytical results from the soil sample collected from boring GP-107 indicate the presence of PAH contamination at slightly elevated concentrations in shallow soil ranging from 0 to 0.6 meters (0 to 2 feet) below grade. The contamination detected exceeds the GB PMC, and Residential & Commercial/Industrial DEC.

AOEC #8: 30 Reidville Drive

Analytical results from the soil samples collected from the 30 Reidville Drive property for MGI's July 2001 Task 210 investigation indicate the presence of leachable lead contamination at slightly elevated concentrations in shallow soil ranging from 0 to 0.6 meters (0 to 2 feet) below grade. The contamination detected exceeds the GA PMC.

AOEC #9: Adjacent to 553 Plank Road East: Sample GP-61:

Analytical results from the soil sample collected from boring GP-61 indicates the presence of PAH contamination at slightly elevated concentrations in shallow soil ranging from 0.6 to 1.2 meters (2 to 4 feet) below grade. The contamination detected exceeds the GB PMC and Residential DEC.

AOEC #10: North Side of East Main Street Between #2547 and #2714 East Main Street:
Samples GP-69, GP-80, GP-81, GP-83, & GP-85:

Analytical results from the soil samples collected from borings GP-69, GP-80, GP-81, GP-83 & GP-85 indicate the presence of PAH contamination at slightly elevated concentrations in shallow soil ranging from 0 to 1.2 meters (0 to 4 feet) below grade. The contamination detected exceeds the GA PMC, Residential DEC, and Commercial/Industrial DEC. In addition, the GP-69 and GP-83 soil samples indicate the presence of leachable lead at slightly elevated concentrations that exceed the GA PMC in soils ranging from 0 to 1.2 meters (0 to 4 feet) below grade.

AOEC #11: I-84, Exit 25 (Plank Road East) Area and Scott Road Overpass: Samples GP-77,
GP-79, GP-90 & GP-147:

Analytical results from the soil samples collected from borings GP-77, GP-79, and GP-147 indicate the presence of leachable lead contamination at slightly elevated concentrations in shallow soil ranging from 0 to 1.2 meters (0 to 4 feet) below grade. The contamination detected exceeds the GA and GB PMC. In addition, the GP-90 sample indicates the presence of PAHs at slightly elevated concentrations in shallow soil ranging from 0 to 0.6 meters (0 to 2 feet) below grade. The contamination detected exceeds the GA PMC, and Residential & Commercial/Industrial DEC.

Groundwater AOEC

Analytical results from the groundwater samples collected from GP-15 and GP-127 indicate the presence of total arsenic, cadmium, chromium, lead, mercury, and possibly PAHs that exceed the SWPC. Therefore, all construction dewatering fluids generated within the portion of the project limits bounded by I-84 Eastbound Station 1 + 400 to 2 + 600, and Harpers Ferry Road Station 60 + 200 to 60 + 700 shall be considered contaminated and must be pumped to approved containers, and sampled prior to discharge.

Dewatering fluids generated within the remainder of the project limits shall be visually inspected for evidence of contamination, i.e. sheen, odor, etc., prior to discharge. If evidence of contamination is detected, the dewatering fluids shall be pumped to approved containers and sampled prior to discharge.

6.2 Low-Level Areas of Environmental Concern

LLAOEC #A: I-84 West, Exit 23 (Hamilton Avenue) Area: Sample HA-4:

Analytical results from the soil sample collected from boring HA-4 during the February 2002 Task 210 investigation indicate the presence of TPH at a concentration below CTDEP RSR standards. TPH was detected in the soil ranging from 0 to 0.6 meters (0 to 2 feet) below grade.

LLAOEC #B: I-84 East, Exit 23 Off-Ramp Area: Sample GP-112:

Analytical results from the soil sample collected from boring GP-112 indicate the presence of TPH at a concentration below CTDEP RSR standards. TPH was detected in the soil ranging from 0.9 to 1.5 meters (3 to 5 feet) below grade.

LLAOEC #C: I-84 East, Interchange 23 On-Ramp Area: Samples GP-114 & GP-116:

Analytical results from the soil samples collected from borings GP-114 and GP-116 indicate the presence of VOCs, TPH and PAHs at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 2.4 to 4.3 meters (8 to 14 feet) below grade.

LLAOEC #D: I-84 East, Interchange 23 On-Ramp Area: Sample GP-1:

Analytical results from the soil sample collected from boring GP-1 indicate the presence of TPH and PAHs at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 0.6 meters (0 to 2 feet) below grade.

LLAOEC #E: I-84, Between Exits 23 & 24 (Former City Mill Ponds Area): Samples GP-5 & GP-6:

Analytical results from the soil samples collected from borings GP-5 and GP-6 indicate the presence of TPH and PAHs at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 1.2 meters (0 to 4 feet) below grade.

LLAOEC #F: I-84, Between Exits 23 & 24 (Former City Mill Ponds Area): Sample GP-123:

Analytical results from the soil sample collected from boring GP-123 indicate the presence of TPH at a concentration below CTDEP RSR standards. TPH was detected in the soil ranging from 0 to 1.2 meters (0 to 4 feet) below grade.

LLAOEC #G: I-84, Adjacent to Harpers Ferry Road Pump Station & 305 Harpers Ferry Road: Samples GP-23, GP-24, GP-27 to GP-31, GP-99, GP-101, GP-129, GP-131, & GP-134:

Analytical results from the soil samples collected from borings GP-23, GP-24, GP-27 to GP-31, GP-99, GP-101, GP-129, GP-131 and GP-134 indicate the presence of TPH and PAHs at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 3.7 meters (0 to 12 feet) below grade.

LLAOEC #H: I-84, Harpers Ferry Road Area: Sample GP-98:

Analytical results from the soil sample collected from boring GP-98 indicate the presence of TPH and PAHs at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0.6 to 1.2 meters (2 to 4 feet) below grade.

LLAOEC #I: I-84, Harpers Ferry Road & Plank Road Area: Sample GP-103:

Analytical results from the soil sample collected from boring GP-103 indicate the presence of PAHs at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 0.6 meters (0 to 2 feet) below grade.

LLAOEC #J: Harpers Ferry Road & Plank Road Area: Samples GP-104, GP-105, GP-108, & GP-109:

Analytical results from the soil samples collected from borings GP-104, GP-105, GP-108 and GP-109 indicate the presence of PAHs and TPH at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 2.4 meters (0 to 8 feet) below grade.

LLAOEC #K: I-84, Interchange 24 Area: Samples GP-137, GP-138 & GP-139:

Analytical results from the soil samples collected from borings GP-137, GP-138, and GP-139 indicate the presence of PAHs and VOCs at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 1.2 to 1.8 meters (4 to 6 feet) below grade.

LLAOEC #L: I-84 East & Reidville Drive Area: Samples GP-46, GP-47 & GP-48:

Analytical results from the soil samples collected from borings GP-46, GP-47, and GP-48 indicate the presence of PAHs and TPH at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 1.2 meters (0 to 4 feet) below grade.

LLAOEC #M: Harpers Ferry Road Area: Sample GP-51:

Analytical results from the soil sample collected from boring GP-51 indicate the presence of TPH at a concentration below CTDEP RSR standards. TPH was detected in the soil ranging from 0 to 0.6 meters (0 to 2 feet) below grade.

LLAOEC #N: I-84 West, Interchange 25 Entrance Ramp & Plank Road East: Samples GP-54, GP-55 & GP-57:

Analytical results from the soil samples collected from borings GP-54, GP-55, and GP-57 indicate the presence of PAHs and TPH at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 1.2 meters (0 to 4 feet) below grade.

LLAOEC #O: I-84, Rediville Drive Area: Sample GP-143:

Analytical results from the soil sample collected from boring GP-143 indicate the presence of TPH at a concentration below CTDEP RSR standards. TPH was detected in the soil ranging from 0 to 0.6 meters (0 to 2 feet) below grade.

LLAOEC #P: Plank Road East Area: Samples GP-59 & GP-60:

Analytical results from the soil samples collected from borings GP-59 and GP-60 indicate the presence of PAHs and TPH at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 1.2 meters (0 to 4 feet) below grade.

LLAOEC #Q: Plank Road East, East Main Street, Scott Road & Reidville Drive Area: Samples GP-62 to GP-68, GP-70, GP-82, GP-84, & GP-86 to GP-89:

Analytical results from the soil samples collected from borings GP-62 to GP-68, GP-70, GP-82, GP-84, and GP-86 to GP-89 indicate the presence of PAHs and TPH at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 1.8 meters (0 to 6 feet) below grade.

LLAOEC #R: Scott Road & Reidville Drive Area: Samples GP-71 to GP-76 & GP-78:

Analytical results from the soil samples collected from borings GP-71 to GP-76, and GP-78 indicate the presence of PAHs and TPH at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 2.4 meters (0 to 8 feet) below grade.

LLAOEC #S: I-84 West, Exit 25 (Plank Road East) Area: Samples GP-91 to GP-95:

Analytical results from the soil samples collected from borings GP-91 to GP-95 indicate the presence of PAHs and TPH at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 1.2 meters (0 to 4 feet) below grade.

LLAOEC #T: I-84 West, Between Interchange 25 & 25A: Samples HA-9 & HA-10:

Analytical results from the soil samples collected from borings HA-9 and HA-10 indicate the presence of PAHs at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 0.6 meters (0 to 2 feet) below grade.

LLAOEC #U: I-84 East, Pierpont Road Underpass: Samples GP-96 & GP-97:

Analytical results from the soil samples collected from borings GP-96 and GP-97 indicate the presence of TPH and PAHs at concentrations below CTDEP RSR standards. The contaminants were detected in the soil ranging from 0 to 0.6 meters (0 to 2 feet) below grade.

7.0 RECOMMENDATIONS

The results of this Task 210 – Subsurface Site Investigation and the February 2002 Task 210 – Subsurface Site Investigation for the Interstate 84 Improvements in Waterbury, Connecticut indicate the presence of petroleum hydrocarbon (TPH), leachable lead, total cadmium, total chromium, total lead, and semi-volatile (PAH) contamination in soil ranging from 0 to 6.4 meters (0 to 21 feet) below grade, at concentrations that exceed the applicable RSR criteria. Sediment samples collected from various points along the Mad River and Beaver Pond Brook also indicate the presence of PAH contamination at concentrations that exceed applicable RSR criteria. In addition, results of groundwater samples collected indicate the presence of total arsenic, cadmium, chromium, lead, and mercury contamination that exceeds the applicable RSRs. Eleven (11) Areas of Environmental Concern (AOEC), one (1) groundwater AOEC, and twenty-one (21) Low-Level Areas of Environmental Concern (LLAOECs), and have been identified within the project corridor. Special considerations for treatment/disposal, dewatering activities, and worker health and safety must be given to these areas in order to ensure compliance with all local, State and Federal laws. Task 310 Plans and Specifications are therefore recommended for the areas of construction within the Areas of Environmental Concern and Low-Level Areas of Environmental Concern described in Section 6.0 above.

8.0 LIMITATIONS

All work product and reports provided by Maguire Group Inc. (MGI) in connection with the performance of this Task 210 - Subsurface Site Investigation are subject to the following limitations:

1. The observations described in this report were made under the conditions stated therein. The conclusions presented in the report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of described services provided to ConnDOT.
2. In preparing this report, MGI has relied on certain information provided by State and local officials and information and representations made by other parties referenced therein, and on information contained in the files of State and/or local agencies made available to MGI at the time of this investigation. To the extent that such files are missing, incomplete or not provided to MGI, MGI is not responsible. Although there may have been some degree of overlap in the information provided by these various sources, MGI did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this investigation.
3. The conclusions and recommendations contained in this report are based in part upon the data from subsurface explorations. The nature and extent of variations between these explorations may not become evident until further explorations are completed. If variations or other latent conditions become evident, it will be necessary to re-evaluate the conclusions and recommendations of this report.
4. The water level readings made for this investigation were made at the times and conditions stated on the boring logs. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, passage of time and other factors. Should additional data become available in the future, these data should be reviewed by MGI, and the conclusions and recommendations presented herein modified accordingly.

5. Where quantitative laboratory analyses have been conducted by an outside certified laboratory, MGI has relied upon the data provided, and has not conducted an independent evaluation of the reliability of these tests.
6. If the conclusions and recommendations contained in this report are based, in part, upon various types of chemical data then the conclusions and recommendations are contingent upon the validity of such data. These data have been reviewed and interpretations made in the report. It should be noted that variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional chemical data become available in the future, these data should be reviewed by MGI and the conclusions and recommendations presented herein modified accordingly.
7. Chemical analyses were performed for specific parameters during the course of this investigation, as described in the text. However, it should be noted that testing for all known chemical constituents was not performed. The conclusions and recommendations contained in this report are based only upon the chemical constituents for which testing was accomplished.

The following qualifications apply to the undersigned's opinion:

The activities described and opinions included herein are based on information gathered during this exploratory site investigation which was limited in scope in adherence to the terms of our agreement. The professional opinion provided herein is based on the information described in this report.

The information contained herein was prepared for the use of ConnDOT solely in conjunction with the task descriptions for this assignment. The conclusions and recommendations set forth in this report are based on site conditions at the time of the investigation. Future studies and findings could change the contents of this report. The professional opinions presented in this report have been developed by using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental engineering consultants practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional opinions included in this report.

Prepared by:

Approved by:

Reviewed by:

Cindy Knight
Logical Env. Solutions

David R. Stock, P.E.
Program Manager

Jane Witherell, P.E., L.E.P.
Principal Engineer

**TABLE 1-1(b): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-114 3.7-4.3m 12'-14' (GB)	GP-115 3.7-4.3m 12'-14' (GB)	GP-116 2.4-3.7m 8'-12' (GB)	GP-117 2.4-3.7m 8'-12' (GB)	CTDEP Pollutant Mobility Criteria GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:						
TPH – CT ETPH (ppm)	35	BDL	160	150	2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)						
Naphthalene	BDL	BDL	0.066	0.110	56 ppm	1,000/2,500 ppm
Tetrachloroethene	BDL	BDL	0.057	0.074	1 ppm	12/110 ppm
PAHs - EPA Method 8270 (ppm)						
Acenaphthylene	BDL	BDL	BDL	0.26	84 ppm	1,000/2,500 ppm
Anthracene	BDL	BDL	BDL	0.29	400 ppm	1,000/2,500 ppm
Benzo(a)anthracene	BDL	BDL	0.52	1.3	1 ppm	1/7.8 ppm
Benzo(a)pyrene	BDL	BDL	0.59	1.7	1 ppm	1/1 ppm
Benzo(b)fluoranthene	BDL	BDL	0.7	1.8	1 ppm	1/7.8 ppm
Benzo(k)fluoranthene	BDL	BDL	0.41	1.2	1 ppm	8.4/78 ppm
Benzo(g,h,i)perylene	BDL	BDL	0.36	1.4	42 ppm	1,000/2,500 ppm
Chrysene	BDL	BDL	0.71	1.6	1 ppm	84/780 ppm
Fluoranthene	BDL	BDL	0.99	2.2	56 ppm	1,000/2,500 ppm
Indeno(1,2,3-cd)pyrene	BDL	BDL	0.32	1.2	1 ppm	1/7.8 ppm
Phenanthrene	BDL	BDL	0.57	1.2	40 ppm	1,000/2,500 ppm
Pyrene	BDL	BDL	1.0	2.4	40 ppm	1,000/2,500 ppm
Total PAHs	BDL	BDL	6.17	16.55		
Total RCRA 8 Metals (ppm)						
Arsenic	BDL	BDL	4.65	6.68		10/10 ppm
Barium	57.6	50.8	84.8	171		4,700/140,000 ppm
Cadmium	BDL	BDL	1.68	1.47		34/1,000 ppm
Chromium	14.2	12.3	12.1	10.2		100/100 ppm
Lead	56.8	4.16	256	1,400		500/1,000 ppm
Mercury	BDL	BDL	0.292	0.627		20/610 ppm
SPLP RCRA 8 Metals (ppm)						
Barium	BDL	BDL	0.0203	0.0299	10.0 ppm	
Lead	BDL	BDL	0.0395	0.107	0.15 ppm	

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(c): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-118 2.4-3.7m 8'-12'	GP-119 5.8-6.4m 19'-21'	GP-120 5.8-6.4m 19'-21'	GP-121 5.8-6.4m 19'-21'	CTDEP Pollutant Mobility Criteria GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:	(GB)	(GB)	(GB)	(GB)		
TPH – CT ETPH (ppm)	230	430	180	650	2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)						
Benzene	0.0051	0.013	BDL	0.084	0.2 ppm	21/200 ppm
4-Isopropyltoluene	BDL	BDL	0.0081	0.016	41.8 ppm	500/1,000 ppm
Naphthalene	BDL	0.04	0.032	0.014	56 ppm	1,000/2,500 ppm
Tetrachloroethene	0.015	BDL	BDL	BDL	1 ppm	12/110 ppm
PAHs - EPA Method 8270 (ppm)						
Acenaphthene	0.31	BDL	BDL	0.4	84 ppm	1,000/2,500 ppm
Acenaphthylene	0.45	BDL	0.35	0.51	84 ppm	1,000/2,500 ppm
Anthracene	1.3	0.82	0.39	1.5	400 ppm	1,000/2,500 ppm
Benzo(a)anthracene	5.3	1.9	1.6	4.1	1 ppm	1/7.8 ppm
Benzo(a)pyrene	5.6	1.9	2.1	4.3	1 ppm	1/1 ppm
Benzo(b)fluoranthene	6.6	2.2	2.2	5.0	1 ppm	1/7.8 ppm
Benzo(k)fluoranthene	3.8	1.3	1.3	3.2	1 ppm	8.4/78 ppm
Benzo(g,h,i)perylene	4.1	1.6	1.5	3.8	42 ppm	1,000/2,500 ppm
Chrysene	5.2	2.0	2.0	4.4	1 ppm	84/780 ppm
Fluoranthene	11.0	4.2	3.3	9.2	56 ppm	1,000/2,500 ppm
Fluorene	0.34	BDL	BDL	0.61	56 ppm	1,000/2,500 ppm
Indeno(1,2,3-cd)pyrene	3.4	1.4	1.4	3.3	1 ppm	1/7.8 ppm
1-Methylnaphthalene	BDL	BDL	BDL	0.3	No Standard	No Standard
2-Methylnaphthalene	BDL	BDL	BDL	0.39	9.8 ppm	474/2,500 ppm
Naphthalene	BDL	BDL	BDL	0.77	56 ppm	1,000/2,500 ppm
Phenanthrene	7.1	4.3	1.5	8.1	40 ppm	1,000/2,500 ppm
Pyrene	11.0	4.4	3.5	9.5	40 ppm	1,000/2,500 ppm
Total PAHs	65.5	26.02	21.14	59.38		
Total RCRA 8 Metals (ppm)						
Arsenic	5.64	3.43	5.26	3.74		10/10 ppm
Barium	94.8	74.1	79.1	59.5		4,700/140,000 ppm
Cadmium	1.94	BDL	BDL	BDL		34/1,000 ppm
Chromium	10.4	11.3	20.7	12.8		100/100 ppm
Lead	362	60.4	61.0	59.0		500/1,000 ppm
Mercury	10.0	0.249	0.461	0.292		20/610 ppm
SPLP RCRA 8 Metals (ppm)						
Barium	0.0148	0.0156	0.0088	0.0069	10.0 ppm	
Lead	0.0177	BDL	BDL	BDL	0.15 ppm	
Mercury	0.002	BDL	BDL	BDL	0.02 ppm	

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(d): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-122 0-1.2m 0'-4' (GB)	GP-123 0-1.2m 0'-4' (GB)	GP-124 0-1.2m 0'-4' (GB)	GP-125 0-1.2m 0'-4' (GB)	CTDEP Pollutant Mobility Criteria GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:						
TPH – CT ETPH (ppm)	640	30	140	170	2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	BDL	BDL	BDL	BDL		
PAHs - EPA Method 8270 (ppm)						
Acenaphthylene	0.92	BDL	0.24	0.34	84 ppm	1,000/2,500 ppm
Anthracene	0.46	BDL	BDL	0.27	400 ppm	1,000/2,500 ppm
Benzo(a)anthracene	1.0	BDL	0.45	0.89	1 ppm	1/7.8 ppm
Benzo(a)pyrene	1.6	BDL	0.55	1.1	1 ppm	1/1 ppm
Benzo(b)fluoranthene	2.0	BDL	0.49	1.0	1 ppm	1/7.8 ppm
Benzo(k)fluoranthene	1.3	BDL	0.37	0.76	1 ppm	8.4/78 ppm
Benzo(g,h,i)perylene	1.4	BDL	0.4	0.61	42 ppm	1,000/2,500 ppm
Chrysene	1.7	BDL	0.48	1.0	1 ppm	84/780 ppm
Fluoranthene	3.2	BDL	0.99	2.0	56 ppm	1,000/2,500 ppm
Indeno(1,2,3-cd)pyrene	1.3	BDL	0.34	0.58	1 ppm	1/7.8 ppm
Phenanthrene	1.5	BDL	0.41	0.8	40 ppm	1,000/2,500 ppm
Pyrene	2.6	BDL	0.8	1.5	40 ppm	1,000/2,500 ppm
Total PAHs	18.98	BDL	5.52	10.85		
Total RCRA 8 Metals (ppm)						
Arsenic	5.37	5.17	BDL	BDL		10/10 ppm
Barium	116	40.3	51.5	35.5		4,700/140,000 ppm
Cadmium	2.35	BDL	BDL	BDL		34/1,000 ppm
Chromium	37.5	9.74	11.9	10.1		100/100 ppm
Lead	202	35.8	24.3	22.7		500/1,000 ppm
Mercury	0.366	BDL	BDL	BDL		20/610 ppm
SPLP RCRA 8 Metals (ppm)						
Barium	0.192	0.0056	0.0066	0.0082	10.0 ppm	
Cadmium	0.0111	BDL	BDL	BDL	0.05 ppm	
Chromium	0.0054	BDL	0.0058	BDL	0.5 ppm	
Lead	0.0107	BDL	BDL	BDL	0.15 ppm	

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(e): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-126 0-1.2m 0'-4'	GP-127 0-1.2m 0'-4'	GP-128 0-1.2m 0'-4'	GP-129 1.2-1.8m 4'-6'	CTDEP Pollutant Mobility Criteria GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:	(GB)	(GB)	(GB)	(GB)		
TPH – CT ETPH (ppm)	240	810	300	130	2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	BDL	BDL	BDL	NA		
PAHs - EPA Method 8270 (ppm)						
Acenaphthylene	0.44	0.81	0.46	BDL	84 ppm	1,000/2,500 ppm
Anthracene	0.26	0.5	0.3	BDL	400 ppm	1,000/2,500 ppm
Benzo(a)anthracene	0.72	1.3	0.8	0.2	1 ppm	1/7.8 ppm
Benzo(a)pyrene	1.2	2.2	1.2	0.28	1 ppm	1/1 ppm
Benzo(b)fluoranthene	1.2	2.2	1.1	0.26	1 ppm	1/7.8 ppm
Benzo(k)fluoranthene	0.86	1.4	0.77	BDL	1 ppm	8.4/78 ppm
Benzo(g,h,i)perylene	0.85	1.5	0.77	BDL	42 ppm	1,000/2,500 ppm
Chrysene	0.94	2.0	1.1	0.21	1 ppm	84/780 ppm
Fluoranthene	2.1	4.0	2.6	0.41	56 ppm	1,000/2,500 ppm
Indeno(1,2,3-cd)pyrene	0.8	1.3	0.67	BDL	1 ppm	1/7.8 ppm
Phenanthrene	0.98	1.5	1.4	BDL	40 ppm	1,000/2,500 ppm
Pyrene	1.6	3.2	2.0	0.37	40 ppm	1,000/2,500 ppm
Total PAHs	11.95	21.91	13.17	1.73		
Total RCRA 8 Metals (ppm)				NA		
Arsenic	4.34	7.93	BDL			10/10 ppm
Barium	80.2	145	53.9			4,700/140,000 ppm
Cadmium	1.42	12.0	2.07			34/1,000 ppm
Chromium	20.7	53.0	33.0			100/100 ppm
Lead	79.5	294	67.0			500/1,000 ppm
Mercury	0.21	1.01	BDL			20/610 ppm
SPLP RCRA 8 Metals (ppm)				NA		
Barium	0.0215	0.0403	BDL		10.0 ppm	
Chromium	0.0051	0.007	0.0057		0.5 ppm	
Lead	0.009	BDL	0.0212		0.15 ppm	

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

NA – Not Analyzed for this procedure

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(f): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-129 2.4-3.7m 8'-12'	GP-129 3.7-4.1m 12'-13.5'	GP-130 1.2-2.4m 4'-8'	GP-130 2.4-3.7m 8'-12'	CTDEP Pollutant Mobility Criteria GA/GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:	(GB)	(GB)	(GA)	(GA)		
TPH – CT ETPH (ppm)	130	BDL	BDL	BDL	500/2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	NA	NA	NA	NA		
PAHs - EPA Method 8270 (ppm)	BDL	BDL	BDL	BDL		
Total RCRA 8 Metals (ppm)	NA	NA	NA	NA		
SPLP RCRA 8 Metals (ppm)	NA	NA	NA	NA		

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

NA – Not Analyzed for this procedure

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(g): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-130 3.7-4.9m 12'-16' (GA)	GP-131 1.2-2.4m 4'-8' (GB)	GP-131 2.4-3.4m 8'-11' (GB)	GP-132 1.2-2.4m 4'-8' (GB)	CTDEP Pollutant Mobility Criteria GA/GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:						
TPH – CT ETPH (ppm)	BDL	110	BDL	BDL	500/2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	NA	NA	NA	NA		
PAHs - EPA Method 8270 (ppm)						
Benzo(a)anthracene	BDL	0.29	BDL	BDL	1/1 ppm	1/7.8 ppm
Benzo(a)pyrene	BDL	0.4	BDL	BDL	1/1 ppm	1/1 ppm
Benzo(b)fluoranthene	BDL	0.43	BDL	BDL	1/1 ppm	1/7.8 ppm
Benzo(k)fluoranthene	BDL	0.28	BDL	BDL	1/1 ppm	8.4/78 ppm
Chrysene	BDL	0.37	BDL	BDL	1/1 ppm	84/780 ppm
Fluoranthene	BDL	0.7	BDL	BDL	5.6/56 ppm	1,000/2,500 ppm
Phenanthrene	BDL	0.31	BDL	BDL	4.0/40 ppm	1,000/2,500 ppm
Pyrene	BDL	0.59	BDL	BDL	4.0/40 ppm	1,000/2,500 ppm
Total PAHs	BDL	3.37	BDL	BDL		
Total RCRA 8 Metals (ppm)	NA	NA	NA	NA		
SPLP RCRA 8 Metals (ppm)	NA	NA	NA	NA		

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

NA – Not Analyzed for this procedure

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(h): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-132 2.4-3.7m 8'-12' (GA)	GP-132 3.7-4.9m 12'-16' (GA)	GP-133 1.2-2.4m 4'-8' (GA)	GP-133 2.4-3.7m 8'-12' (GA)	CTDEP Pollutant Mobility Criteria GA Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:						
TPH – CT ETPH (ppm)	BDL	BDL	BDL	BDL	500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	NA	NA	NA	NA		
PAHs - EPA Method 8270 (ppm)	BDL	BDL	BDL	BDL		
Total RCRA 8 Metals (ppm)	NA	NA	NA	NA		
SPLP RCRA 8 Metals (ppm)	NA	NA	NA	NA		

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

NA – Not Analyzed for this procedure

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(i): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-133 3.7-4.9m 12'-16' (GA)	GP-134 1.2-1.8m 4'-6' (GA)	GP-135 1.2-2.4m 4'-8' (GA)	GP-135 2.4-3.7m 8'-12' (GA)	CTDEP Pollutant Mobility Criteria GA Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:						
TPH – CT ETPH (ppm)	BDL	110	1,400	270	500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	NA	NA	NA	NA		
PAHs - EPA Method 8270 (ppm)						
Acenaphthylene	BDL	BDL	1.5	BDL	8.4 ppm	1,000/2,500 ppm
Anthracene	BDL	BDL	0.95	BDL	40 ppm	1,000/2,500 ppm
Benzo(a)anthracene	BDL	BDL	2.4	BDL	1 ppm	1/7.8 ppm
Benzo(a)pyrene	BDL	BDL	3.8	BDL	1 ppm	1/1 ppm
Benzo(b)fluoranthene	BDL	BDL	4.5	BDL	1 ppm	1/7.8 ppm
Benzo(k)fluoranthene	BDL	BDL	3.0	BDL	1 ppm	8.4/78 ppm
Benzo(g,h,i)perylene	BDL	BDL	2.4	BDL	4.2 ppm	1,000/2,500 ppm
Chrysene	BDL	BDL	4.0	BDL	1 ppm	84/780 ppm
Fluoranthene	BDL	BDL	9.1	BDL	5.6 ppm	1,000/2,500 ppm
Fluorene	BDL	BDL	0.7	BDL	5.6 ppm	1,000/2,500 ppm
Indeno(1,2,3-cd)pyrene	BDL	BDL	2.2	BDL	1 ppm	1/7.8 ppm
Phenanthrene	BDL	BDL	4.8	BDL	4 ppm	1,000/2,500 ppm
Pyrene	BDL	BDL	8.1	BDL	4 ppm	1,000/2,500 ppm
Total PAHs	BDL	BDL	47.45	BDL		
Total RCRA 8 Metals (ppm)	NA	NA	NA	NA		
SPLP RCRA 8 Metals (ppm)	NA	NA	NA	NA		

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

NA – Not Analyzed for this procedure

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(j): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-135 3.7-4.9m 12'-16' (GA)	GP-136 1.2-2.4m 4'-8' (GA)	GP-137 1.2-1.8m 4'-6' (GB)	GP-138 1.2-1.8m 4'-6' (GB)	CTDEP Pollutant Mobility Criteria GA/GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:						
TPH – CT ETPH (ppm)	BDL	BDL	BDL	BDL	500/2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	NA	NA	BDL	BDL		
PAHs - EPA Method 8270 (ppm)						
Benzo(a)anthracene	BDL	BDL	0.24	0.25	1/1 ppm	1/7.8 ppm
Benzo(a)pyrene	BDL	BDL	0.23	BDL	1/1 ppm	1/1 ppm
Benzo(b)fluoranthene	BDL	BDL	0.34	0.32	1/1 ppm	1/7.8 ppm
Benzo(k)fluoranthene	BDL	BDL	0.23	BDL	1/1 ppm	8.4/78 ppm
Chrysene	BDL	BDL	0.38	0.5	1/1 ppm	84/780 ppm
Fluoranthene	BDL	BDL	0.59	0.88	5.6/56 ppm	1,000/2,500 ppm
Phenanthrene	BDL	BDL	0.46	0.29	4/40 ppm	1,000/2,500 ppm
Pyrene	BDL	BDL	0.63	0.82	4/40 ppm	1,000/2,500 ppm
Total PAHs	BDL	BDL	3.1	3.06		
Total RCRA 8 Metals (ppm)	NA	NA				
Arsenic			5.16	BDL		10/10 ppm
Barium			53.3	55.2		4,700/140,000 ppm
Chromium			7.41	11.2		100/100 ppm
Lead			109	44.4		500/1,000 ppm
Mercury			0.225	BDL		20/610 ppm
SPLP RCRA 8 Metals (ppm)	NA	NA				
Barium			0.013	0.0367	1/10.0 ppm	
Chromium			BDL	0.0063	0.05/0.5 ppm	
Lead			BDL	0.0281	0.015/0.15 ppm	

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

NA -- Not Analyzed for this procedure

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(k): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-139 1.2-1.8m 4'-6' (GB)	GP-140 1.2-2.4m 4'-8' (GB)	GP-140 2.4-3.7m 8'-12' (GB)	GP-140 3.7-4m 12'-13' (GB)	CTDEP Pollutant Mobility Criteria GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:						
TPH – CT ETPH (ppm)	BDL	BDL	BDL	BDL	2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)		NA	NA	NA		
Naphthalene	0.0063				56 ppm	1,000/2,500 ppm
PAHs - EPA Method 8270 (ppm)						
Fluoranthene	0.18	BDL	BDL	BDL	56 ppm	1,000/2,500 ppm
Phenanthrene	0.14	BDL	BDL	BDL	40 ppm	1,000/2,500 ppm
Pyrene	0.21	BDL	BDL	BDL	40 ppm	1,000/2,500 ppm
Total PAHs	0.53	BDL	BDL	BDL		
Total RCRA 8 Metals (ppm)		NA	NA	NA		
Arsenic	3.68					10/10 ppm
Barium	39.9					4,700/140,000 ppm
Chromium	6.01					100/100 ppm
Lead	147					500/1,000 ppm
SPLP RCRA 8 Metals (ppm)		NA	NA	NA		
Barium	0.019				10.0 ppm	
Lead	0.0502				0.15 ppm	

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

NA – Not Analyzed for this procedure

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(I): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-141 1.2-2.4m 4'-8'	GP-141 2.4-3.7m 8'-12'	GP-141 3.7-4m 12'-13'	GP-142 0-0.6m 0'-2'	CTDEP Pollutant Mobility Criteria GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:	(GB)	(GB)	(GB)	(GB)		
TPH – CT ETPH (ppm)	BDL	BDL	BDL	BDL	2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	NA	NA	NA	BDL		
PAHs - EPA Method 8270 (ppm)	BDL	BDL	BDL	BDL		
Total RCRA 8 Metals (ppm)	NA	NA	NA			
Barium				29.5		4,700/140,000 ppm
Chromium				10.6		100/100 ppm
Lead				10.0		500/1,000 ppm
SPLP RCRA 8 Metals (ppm)	NA	NA	NA			
Barium				0.0088	10.0 ppm	

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

NA – Not Analyzed for this procedure

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(m): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring ID.: Sample Depth:	GP-143 0-0.6m 0'-2' (GB)	GP-144 1.2-2.1m 4'-7' (GA)	GP-145 1.2-2.1m 4'-6' (GA)	GP-146 0-0.6m 0'-2' (GA)	CTDEP Pollutant Mobility Criteria GA/GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
Groundwater Classification:						
TPH – CT ETPH (ppm)	28	BDL	BDL	BDL	500/2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	BDL	BDL	BDL	BDL		
PAHs - EPA Method 8270 (ppm)	BDL	BDL	BDL	BDL		
Total RCRA 8 Metals (ppm)						
Barium	42.4	41.5	8.77	21.7		4,700/140,000 ppm
Chromium	9.51	7.53	2.89	8.09		100/100 ppm
Lead	64.4	2.66	BDL	16.1		500/1,000 ppm
SPLP RCRA 8 Metals (ppm)						
Barium	0.0139	BDL	BDL	BDL	10.0 ppm	

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(n): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.:	GP-147	GP-148	GP-149	GP-149	CTDEP Pollutant Mobility Criteria GA	CTDEP Direct Exposure Criteria
Sample Depth:	0-1.2m	0-1.2m	1.2-2.4m	2.4-2.74m	Groundwater Area	Residential/Commercial & Industrial
Groundwater Classification:	0'-4' (GA)	0'-4' (GA)	4'-8' (GA)	8'-9' (GA)		
TPH – CT ETPH (ppm)	BDL	BDL	BDL	BDL	500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	BDL	BDL	NA	NA		
PAHs - EPA Method 8270 (ppm)	BDL	BDL	BDL	BDL		
Total RCRA 8 Metals (ppm)			NA	NA		
Barium	42.8	34.9				4,700/140,000 ppm
Chromium	10.9	7.89				100/100 ppm
Lead	68.9	22.9				500/1,000 ppm
SPLP RCRA 8 Metals (ppm)			NA	NA		
Barium	0.012	BDL			1.0 ppm	
Chromium	0.0067	BDL			0.05 ppm	
Lead	<i>0.0281</i>	0.0133			0.015 ppm	

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

NA – Not Analyzed for this procedure

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 1-1(o): Results of Geoprobe Boring Soil Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Boring I.D.: Sample Depth:	GP-150 1.2-2.4m 4'-8' (GA)	GP-150 2.4-2.74m 8'-9' (GA)	GP-151 1.2-2.4m 4'-8' (GA)	GP-151 2.4-2.74m 8'-9' (GA)	CTDEP Pollutant Mobility Criteria GA/GB Groundwater Area	CTDEP Direct Exposure Criteria Residential/Commercial & Industrial
TPH – CT ETPH (ppm)	BDL	BDL	47	BDL	500/2,500 ppm	500/2,500 ppm
VOCs - EPA Method 8260 (ppm)	NA	NA	NA	NA		
PAHs - EPA Method 8270 (ppm)						
Fluoranthene	BDL	BDL	0.17	BDL	5.6/56 ppm	1,000/2,500 ppm
Pyrene	BDL	BDL	0.18	BDL	4/40 ppm	1,000/2,500 ppm
Total PAHs	BDL	BDL	0.35	BDL		
Total RCRA 8 Metals (ppm)	NA	NA	NA	NA		
SPLP RCRA 8 Metals (ppm)	NA	NA	NA	NA		

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

NA – Not Analyzed for this procedure

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.

**TABLE 2-2: Results of Groundwater Grab Sample Analyses
Interstate 84 Improvements – Additional Investigation 6/03
Waterbury, Connecticut**

Sample I.D.:	GP-127 GW	GP-151 GW	CTDEP Groundwater Protection Criteria (GA Only)	CTDEP Surface Water Protection Criteria	CTDEP Volatilization Criteria – Residential/Commercial & Industrial
Groundwater Classification:	(GB)	(GA)			
TPH – CT ETPH (ppm)	BDL	BDL		None Established	
VOCs – EPA Method 8260 (ppb)					
Methyl Tertiary Butyl Ether	2.1	BDL	100 ppb	None Established	50,000/50,000 ppb
Naphthalene	2.8	BDL	280 ppb	None Established	None Established
PAHs – EPA Method 8270 (ppb)	BDL	BDL			
Total RCRA 8 Metals – ppm					Not Applicable
Arsenic	<i>0.0246</i>	BDL	0.05 ppm	0.004 ppm	
Barium	0.94	0.0231	1.0 ppm	None Established	
Cadmium	<i>0.0093</i>	BDL	0.005 ppm	0.006 ppm	
Chromium	0.106	BDL	0.05 ppm	0.11 ppm	
Lead	<i>0.807</i>	BDL	0.015 ppm	0.013 ppm	
Mercury	<i>0.0062</i>	BDL	0.002 ppm	0.0004 ppm	

BDL – Below Detectable Limits (see laboratory reports for compound specific detection limits)

The compounds listed above are those that were detected - please see laboratory reports for full lists of compounds and their specific detection limits.