

2.0 Study Area Investigation

All sampling activities took place on the site from February 21 through December 22, 2000. This section describes the activities that occurred at each area that was investigated.

Figure 1.2-2 shows the location of the six areas of concern that were studied.

1. Former Tannery Building Area
2. Lagoon Area
3. Warehouse Area
4. Landfill Area
5. Hoosic River
6. Woods Road Waste Disposal Area

In addition, separate sampling activities took place in areas remote from the site for the purposes of evaluating background and “reference” conditions. A separate examination of off-site residential wells was also conducted to evaluate the ground water quality of private drinking water supply wells.

Two phases of investigation were conducted at the site during the period from March through December 2000. The first phase (described in the Site Management Plan, March 2000) included advancement of soil borings, installation of ground water monitoring wells, sampling and laboratory testing of soil, ground water, surface water and sediment, and ecological survey activities. Based on the findings of the first phase, a second phase of investigation was planned (described in Field Sampling Plan Addendum, August 2000) to delineate findings of the first phase. The second phase included construction of additional soil borings and ground water monitoring wells, installation of piezometers, excavation of test pits, and sampling of soil, ground water and floor drains.

Unless otherwise noted in this report, the Remedial Investigation methods and techniques, including the collection and analysis of samples and quality assurance and quality control procedures, were all in accordance with the recommendations and guidelines of the United States Environmental Protection Agency and the Vermont Agency of Natural Resources, as well as the various protocols submitted for lead regulatory agency approval, prior to and during the investigation.

2.1 Site Wide Activities

This section describes activities performed by M&E/TRC that are associated with the entire site and are not specifically related to any one particular area of concern.

2.1.1 Surveying

Hill Engineers of Dalton, Massachusetts (Hill), performed all topographic surveying activity. Due to the ongoing NTCRA being conducted in the Former Tannery Building Area and the Landfill Area, an initial topographic survey was not performed prior to field activities. TRC

determined that an existing 1995 site survey, prepared for EPA by TetraTech was sufficiently accurate for guiding the Remedial Investigation sampling activities. An electronic copy of the survey was obtained and used to overlay the locations of new sample points as they were collected.

Most of the new sampling locations were also surveyed by Hill. The test pit excavations in the Woods Road Waste Disposal Area were surveyed by TRC field staff, since these locations were soon to be excavated, and the test pit excavations in the Lagoon Area were not surveyed since their location could be accurately determined using the extensive network of nearby surveyed control points.

2.1.2 Laboratory Analysis

Several different laboratories conducted laboratory sample analysis of environmental samples collected during the Remedial Investigation. Some of the laboratory services were provided through EPA, under a separate contract (Routine Analytical Services, RAS) used to provide laboratory services for EPA fund-lead projects. For other laboratory analyses not provided under the EPA RAS contract, M&E prepared analysis specifications and procured laboratories, under a separate Delivery of Analytical Services work assignment from EPA.

2.1.3 Mobilization

TRC completed several activities in preparation for site sampling including the following.

- Subcontractor pre-bid meetings
- Field office trailer delivery, setup and utility connections
- Site reconnaissance for existing monitoring wells, outfalls, and other significant features
- Town/state file reviews of background information
- Clearing and grubbing of work areas
- Baseline site surveying
- Arrange for residential property access
- Mobilize field equipment
- Staking of lagoon reference grid
- Posting warning signs
- Wetland delineation and flagging
- Aerial photography of the site

At the conclusion of field activities, all equipment was removed from the site.

2.1.4 Wetland Delineation

During May 1 and 2, 2000, TRC conducted a United States Army Corps of Engineers (USACE) jurisdictional wetland boundary determination in order to define wetland resources present at the site. The wetland boundary determination was conducted in accordance with the Routine Determination Method presented in the USACE Wetlands Delineation Manual including clarifications and interpretations provided in a March 6, 1992 guidance memo.

The USACE manual specifies a three parameter approach to wetland boundary determination that involves the identification of the following: (1) evidence of wetland hydrology; (2) the presence of hydric soils; and (3) a predominance of hydrophytic vegetation as defined by the National Plant List Panel. Wetland indicators described in the manual for each of these three parameters were examined in the field to determine the presence/absence of wetland resource areas. If the area being investigated does not exhibit the markers of disturbance, then positive wetland indicators for each parameter must be present to conclude that the area is indeed a wetland. After a wetland area was identified, transects were established perpendicular to the wetland/upland boundary to firmly establish the boundary.

Due to the contaminated nature of lagoon sediments, hydric soil determinations were conducted on a limited basis and were restricted to the uppermost strata. Specifically, a 20-inch pit was excavated in Lagoon 4 fill material, at a location approximately 50 feet from Lagoon probe SBL-4-20; a 20-inch pit was excavated along the Hoosic River riparian fringe at a point downgradient of existing monitoring well MW-L-1; the upper eight inches of sediment was examined at the southernmost boundary of Lagoon 2; and lastly, a shallow 12-inch pit was excavated along the boundary of the landfill wetland between Phase I monitoring wells MW-103U and MW-103R.

Plant Community Assessment: In addition to the wetland boundary determination, the compositions of plants within the terrestrial and wetland communities were qualitatively assessed. Plant communities were defined by non-randomly selecting representative sample points within a given plant community, identifying each species to the genus level, and assigning dominant plant species. Each plant community was subsequently defined based on the dominant plant species and was assigned a modifier. Plant community type modifiers were assigned to reflect distinctions in hydrologic input, disturbance regime, and landscape position.

Wildlife Inventory: An informal and qualitative wildlife inventory was conducted on the Pownal Tannery property that involved recording and identifying all avifauna, mammals, amphibians and reptile species observed to the species level. In addition, plant community structures and locations (e.g., edge, forest, scrub-shrub, and meadow) were recorded at each observation point.

2.1.5 Ground Water Monitoring Well and Piezometer Installation

A total of 16 overburden ground water monitoring wells, four bedrock ground water monitoring wells, and eight piezometers were constructed during this Remedial Investigation. During the sampling program, the planned number of bedrock wells was reduced based on the finding that there was a thick (>40 feet) layer of clay between the overburden aquifer and bedrock. The number of overburden ground water monitoring wells was also reduced based on the discovery that many wells installed in previous investigations could be used for ground water sampling.

Table 2.1-1 presents the well construction details for both the previously existing ground water monitoring wells and the new wells and piezometers installed during the Remedial Investigation.

Appendix A presents the boring and monitoring well construction logs for each well.

Earth Exploration, Incorporated, of Hopkinton, Massachusetts carried out all drilling and well installation activity. Detailed discussions of how each well was installed are presented in the following sections grouped by study areas of concern.

2.2 Former Tannery Building Area Investigation

Figure 2.2-1 shows the location of the samples collected in the Former Tannery Building Area.

Prior to the beginning of the Remedial Investigation, the Tannery Building was decontaminated and demolished by the USACE. In addition, a large volume of soil was excavated from inside the building footprint, all known underground piping was removed, and several underground manways were filled and closed. Portions of the original building foundations remain underground in some places, and the entire site was regraded and finished with grass, crushed rock and stone. As a result of the USACE actions taken on this portion of the site, the focus of the subsequent Remedial Investigation was on the ground water quality, and the potential impacts of the site on the adjacent Hoosic River sediment and surface water.

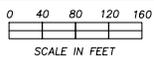
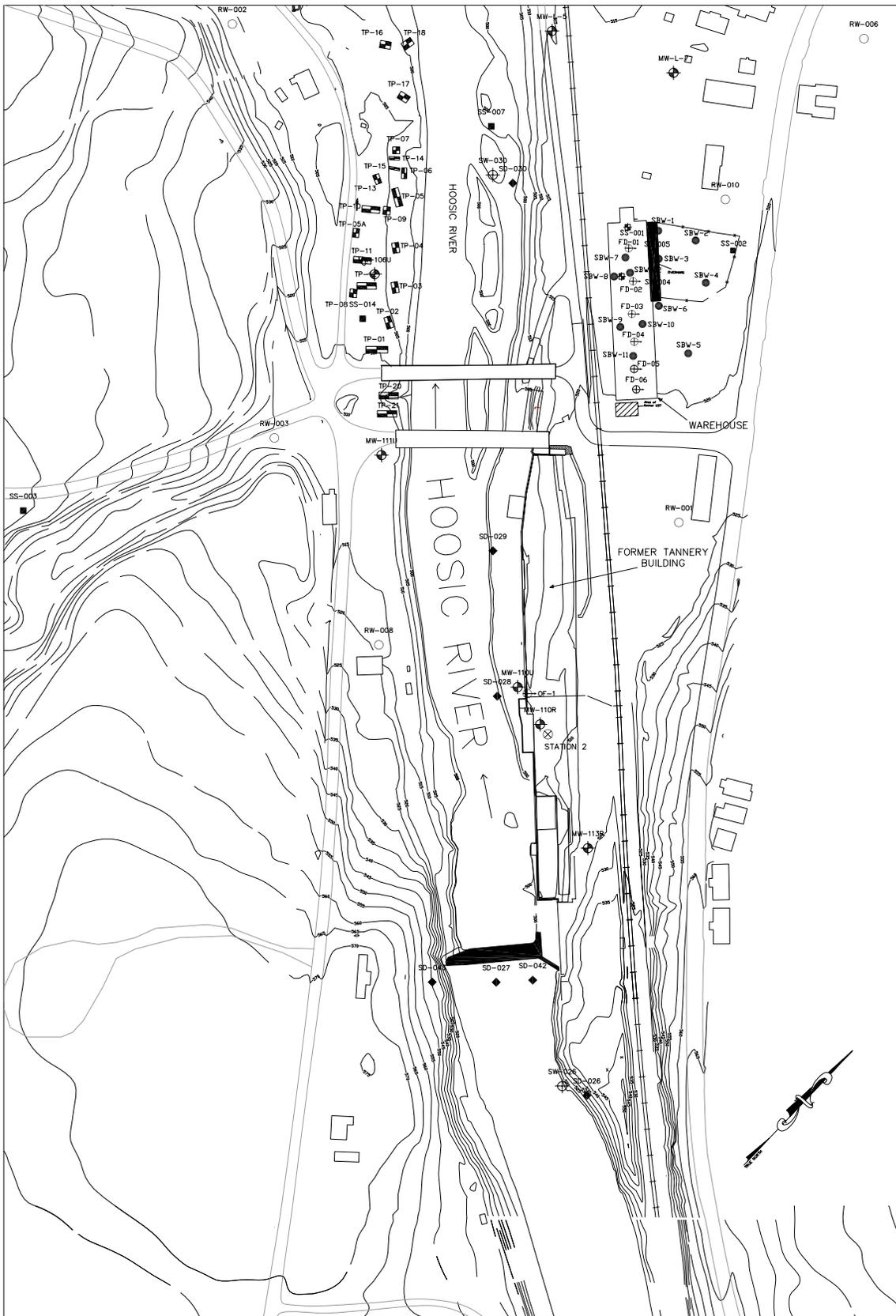
Table 2.1-1: Well Construction Details						
Well Identification	Total Depth	Depth to Top of Screen	Depth to Bottom of Screen	Formation Screened	Well Diameter	Reference Elevation (Top of PVC Well Casing)
MW-101U	96	7	17	Silty Sand	2-inch	563.83
MW-102U	151	21	31	Silty Sand	2-inch	580.79
MW-103U	25	15	25	Silty Sand	2-inch	560.45
MW-103R	117	97	117	Bedrock	2-inch	560.40
MW-104U	58	4	14	Silty Sand/Sand & Gravel	2-inch	501.64
MW-106U	151	8	18	Silty Sand/Sand & Gravel	2-inch	511.02
MW-107U	87	12	22	Silty Sand	2-inch	510.89
MW-107R	119	109	119	Bedrock	2-inch	509.61
MW-109U	121	12	22	Silty Sand	2-inch	514.01
MW-110U	10	3	10	Sand & Gravel	2-inch	506.39
MW-110R	31	17	27	Bedrock	2-inch	508.98
MW-111U	96	14	24	Sand & Gravel	2-inch	512.10
MW-112U	151	5	15	Sand & Gravel / Silt & Clay	2-inch	504.49
MW-113R	30	18	28	Bedrock	2-inch	523.30
MW-114U	40	18	28	Silty Sand/Sand & Gravel	2-inch	515.40
PZ1-02	12.5	10	13	Silty Sand/Sand & Gravel	1-inch	507.50
PZ2-03A	6	3	6	Sand & Gravel	1-inch	504.26
PZ2-03B	12	9	12	Silty Sand	1-inch	504.14

Table 2.1-1: Well Construction Details

Well Identification	Total Depth	Depth to Top of Screen	Depth to Bottom of Screen	Formation Screened	Well Diameter	Reference Elevation (Top of PVC Well Casing)
PZ3B-02A	8	5	8	Sand & Gravel	1-inch	512.47
PZ3B-02B	12	9	12	Silty Sand/Sand & Gravel	1-inch	512.40
PZ3B-02C	17	14	17	Silty Sand/Sand & Gravel	1-inch	512.34
PZ4-14A	8	5	8	Sand & Gravel	1-inch	502.78
PZ4-14B	14	11	14	Sand & Gravel	1-inch	502.80
PZ5-10	9	6	9	Silty Sand	1-inch	500.55
MW-B-7	10.7	5	10	Unknown	2-inch	537.54
MW-B-8	12.5	2	12	Unknown	2-inch	532.94
MW-B-9	31.8	21	31	Unknown	2-inch	585.00
MW-B-10	27.8	17	27	Unknown	2-inch	576.20
MW-L-1	16.4	6	16	Unknown	2-inch	541.63
MW-L-2	23.8	13	23	Unknown	2-inch	513.93
MW-L-3	22.7	12	22	Unknown	2-inch	511.34
MW-L-4	21.6	11	21	Unknown	2-inch	512.37
MW-L-5	27.5	17	27	Unknown	2-inch	517.04
MW-L-6	27.1	12	22	Unknown	2-inch	515.29
MW-L-7	21.4	11	21	Silty Sand	2-inch	517.99
MW-L-8	26.3	16	26	Unknown	2-inch	513.44
MW-L-9	17.3	7	17	Silty Sand	2-inch	511.49
MW-L-10	15.8	5	15	Silty Sand	2-inch	506.89
MW-L-11	14.5	3	13	Silty Sand	2-inch	503.06
MW-L-12	17	7	17	Silty Sand	2-inch	507.30
MW-L-13	17	7	17	Silty Sand	2-inch	514.99
MW-L-14	18	8	18	Silty Sand	2-inch	512.15

Note that wells and piezometers in bold were installed during the Remedial Investigation. All other wells were installed by others in previous investigations.

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LEGEND	
⊗ AIR SAMPLE LOCATION	○ RESIDENTIAL WELL SAMPLE LOCATION
⊕ 2" MONITORING WELL	◆ SEDIMENT SAMPLE LOCATION
● SOIL BORING LOCATION	■ TEST PIT LOCATION
■ SURFACE SOIL SAMPLE LOCATION	□ CULTURAL BORING LOCATION
⊕ SURFACE WATER SAMPLE LOCATION	— FENCE

TRC Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0220-01N93

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061

FIGURE 2.2-1
SAMPLE LOCATIONS
FORMER TANNERY
BUILDING AREA
POWNA TANNERY
POWNA, VERMONT

M&E Metcalf & Eddy

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2.2.1 Ground Water Investigation

The only known potential source of ground water contamination in the Former Tannery Building Area is an underground solvent tank that was discovered by the USACE during the NTCRA. The underground solvent storage tank together with all contaminated soil was removed by the USACE in October 2000. The tank was constructed of steel and had numerous holes when it was removed. The USACE observed evidence of a release in the rock and soil that were present beneath the former tank. The USACE also reported an area of oil stained soil with a “diesel” odor in the area between the Hoosic River and the location of the underground solvent storage tank.

TRC installed four ground water monitoring wells to evaluate whether this release impacted the ground water quality in the area.

MW-110U: On March 30, 2000 TRC installed ground water monitoring well MW-110U outside the west wall adjacent to the Hoosic River using the drive and wash method. Split-spoon samples were collected continuously from grade to a depth of 10 feet, where the weathered bedrock surface was encountered. Monitoring well MW-110U was installed with a screen set at a depth of 3 to 10 feet.

Based on field observations and screening for volatile organic vapors, soils from 6 to 9 feet appeared to be contaminated.

In order to assess the nature of the petroleum contamination observed during the installation of MW-110U, TRC returned to MW-110U on April 18, 2000, with a track-mounted (Geoprobe) sampling machine to collect a soil sample from this location by vibratory probe.

MW-110R: Monitoring well MW-110R located in the footprint of the former basement was installed using a track-mounted drill rig from April 10 through 13, 2000. The boring for this well was initiated through 1.5 feet of concrete at the ground surface and soil samples were collected continuously from 1.5 to 15.5 feet deep. TRC measured organic vapors by FID at a concentration of 100 ppmv in the drilling wash water as the boring was advanced through the overburden. The contaminated soil and drilling water were placed in 55-gallon drums.

A highly weathered bedrock surface was encountered at a depth of 12.5 feet. The boring was advanced into bedrock using four inch casing and the spin and wash method to a depth of 19 feet. A rollerbit was then used to drill ahead of the four inch casing to a depth of 64 feet, and monitoring well MW-110R was installed.

MW-111U: MW-111U was drilled and installed on April 5 and April 6, 2000. Split-spoon samples were collected continuously to a depth of 20 feet. Samples were then collected at ten-foot intervals from 20 feet to a maximum depth of 95.7 feet, where the bedrock surface was encountered. The boring was advanced by the drive and wash method, seating the drill casing into the upper portion of the cohesive clay strata at a depth of 29 feet. The boring was then advanced from 29 feet to 95.7 feet, without casing (drill and wash), using a rollerbit. The open

borehole was then backfilled with bentonite from 25 to 95.7 feet in depth, and monitoring well MW-111U was constructed with a screen set at a depth of 14 to 24 feet.

MW-113R: Monitoring well MW-113R was installed during Phase II.

Table 2.2-1 lists the ground water samples that were collected. Four ground water sampling events were conducted in the Former Tannery Building Area (May 2000, August 2000, October 2000, December 2000). Well MW-113R was only sampled in the last two events since it was not installed until Phase II.

Table 2.2-1: Ground Water Samples, Former Tannery Building Area								
Sample Location	Turbidity (NTU)	Date Collected	Analyses					
			VOC	SVOC	Metals/ Cyanide	Pesticide/ PCB	Dioxins	Hexavalent Chromium
MW-111U	4.2	5/11/00	X	X	X	X	X	X
MW-111U (duplicate)	4.2	5/11/00	X	X	X	X	X	X
MW-110R	24	5/12/00	X	X	X	X	X	X
MW-110U	5.01	5/16/00	X	X	X		X	X
MW-110R	55.1	8/1/00	X	X	X			
MW-111U	4.9	8/1/00	X	X	X			
MW-110U	3.7	8/8/00	X	X	X			
MW-111U	2.44	9/27/00	X	X	X			
MW-110U	4.9	10/2/00	X	X	X			
MW-110R	15	10/3/00	X	X	X			
MW-113R	5	10/4/00	X	X	X	X	X	X
MW-113R (duplicate)	5	10/4/00	X	X	X	X	X	X

2.2.2 Soil Investigation

Table 2.2-2 lists the soil samples that were obtained and submitted for laboratory analysis from the Former Tannery Building Area.

During installation of well MW-110U, field observations and field screening measurements indicated possible soil contamination from 6 to 9 feet deep. TRC returned to location MW-110U on April 18, 2000 with a track-mounted Geoprobe to collect a soil sample from this location.

Other soil samples from this area were obtained for geotechnical and fate and transport characterization.

Table 2.2-2: Soil Samples, Former Tannery Building Area								
Sample Location	Sample Depth (feet)	Unit Sampled	Date Collected	Analyses				
				VOC	SVOC	Metals/ Cyanide	TCO/TOC/ % Moisture	Grain Size/ Bulk Density
MW-110R	3-6	Sand & Gravel	4/18/00	X	X	X	X	X
MW-111U	2-5	Sand	4/5/00				X	X

2.2.3 Surface Water Investigation

Table 2.2-3 lists the surface water (outfall) sample collected by TRC from the Former Tannery Building Area.

During the NTCRA, the USACE installed five outfall pipes to provide an outlet for ground water that otherwise would be trapped behind underground foundation walls that remained after demolition. TRC obtained one water sample from one of the outfall pipes and submitted the sample for laboratory analysis.

Table 2.2-3: Surface Water Samples, Former Tannery Building Area								
Sample Location	Date Collected	Analyses						
		VOC	SVOC	Total Metals Cyanide	Filtered Metals	Dioxins	Pesticide /PCB	Hex. Chromium
<i>Tannery Outfall</i>								
OF-1	9/26/00	X	X	X			X	
OF-1 (duplicate)	9/26/00	X	X	X			X	

2.2.4 Sediment Investigation

Table 2.2-4 lists the sediment samples that were collected from the section of the Hoosic River adjacent to the Former Tannery Building Area.

Table 2.2-4: Sediment Samples, Former Tannery Building Area						
Sample Location	Date Collected	Water Depth (ft)	Analyses			
			SVOC/Pest/PCB	Metals/ Cyanide	TCO/TOC/ %Moisture VOC/Dioxin PCB Homologues	AVS/SEM Hexavalent Chromium
SD-028	5/22/00	1.5	X	X	X	
SD-029	5/22/00	2	X	X	X	X

2.2.5 Air Investigation

Table 2.2-5 lists the air sample that was collected from the Former Tannery Building Area.

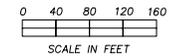
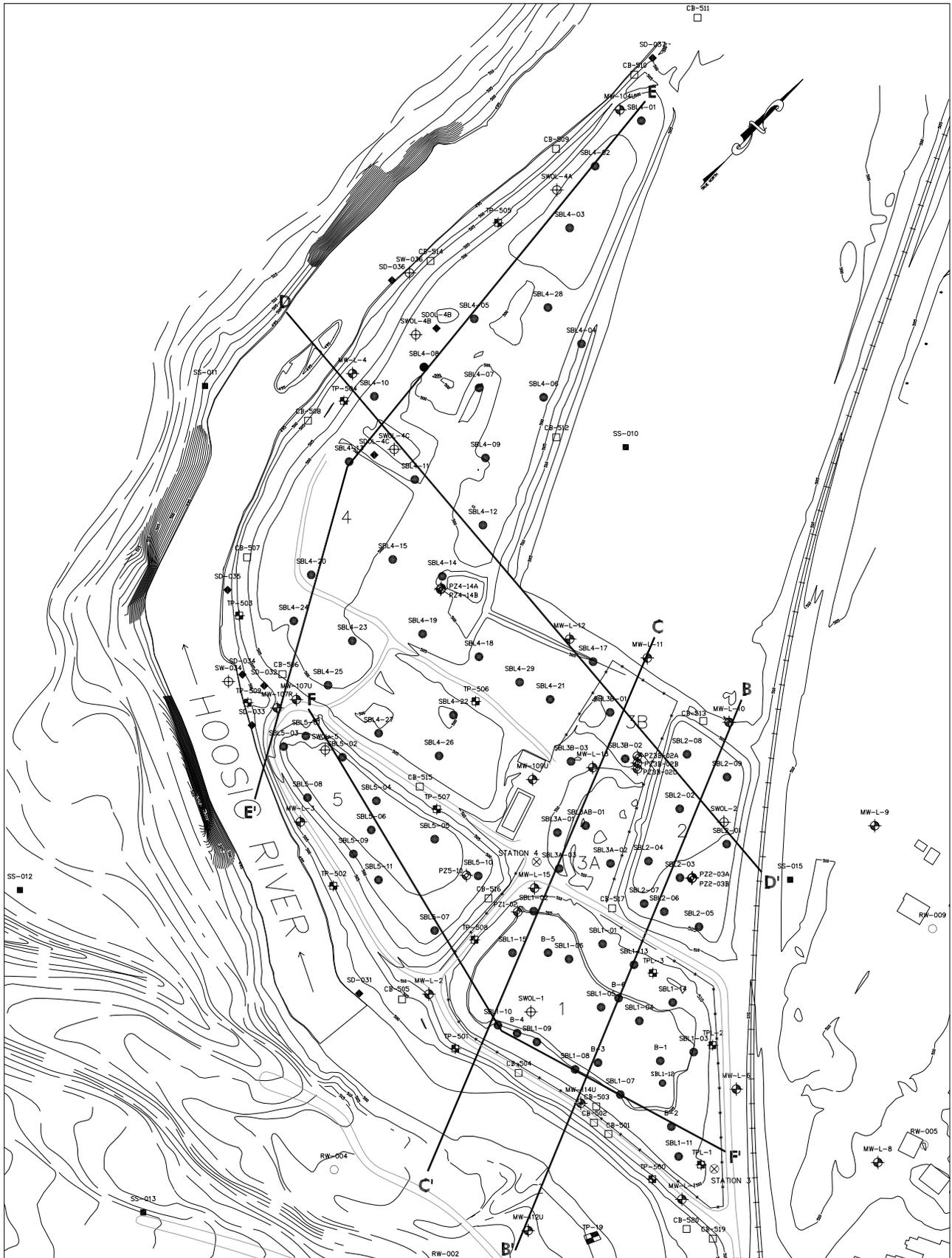
Table 2.2-5: Air Samples, Former Tannery Building Area			
Sample Location	Date Collected	Analyses (volume [m³])	
		Metals	SVOCs
Station 2	4/25/01	X (555)	X (96.19)

2.3 Lagoon Area Investigation

Figure 2.3-1 shows a map of sample locations in the Lagoon Area.

The focus of the Lagoon Area Investigation was to evaluate the extent, thickness, and chemical composition of the lagoon contents and the volume of waste in the Lagoons. Previous environmental investigations of the tannery indicated the presence of elevated chemical concentrations in the lagoons but no significant ground water contamination was ever reported. Nevertheless, a ground water investigation was included to determine if there were any ground water impacts.

Four of the five lagoons (1, 2, 4 and 5) have some standing water throughout the year, so surface water and sediment samples were obtained from the lagoons to evaluate human health and ecological risk. Surface water and sediment samples were also collected from the adjacent reach of the Hoosic River.



- LEGEND**
- ⊗ AIR SAMPLE LOCATION
 - ⊕ 2" MONITORING WELL
 - SOIL BORING LOCATION
 - SURFACE SOIL SAMPLE LOCATION
 - ⊕ SURFACE WATER SAMPLE LOCATION
 - RESIDENTIAL WELL SAMPLE LOCATION
 - ⊕ 0.5" PIEZOMETER
 - ◆ SEDIMENT SAMPLE LOCATION
 - ◆ TEST PIT LOCATION
 - CULTURAL BORING LOCATION
 - FENCE

TRC Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0220-01N93

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061

FIGURE 2.3-1
SAMPLE LOCATIONS
LAGOON AREA
POWNA TANNERY
POWNA, VERMONT

M&E Metcalf & Eddy

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2.3.1 Geophysical Investigation

Prior to intrusive testing in the Lagoon Area, a geophysical investigation was completed at the site to determine whether there were any buried metal objects such as drums or piping.

From March 8, through 10, 2000, Geophysical Applications Incorporated of Foxboro, Massachusetts performed a geophysical survey of the five lagoons using magnetometry, electromagnetic conductivity, and pipe locating methods. The survey was completed using a Geometrics model G-858 cesium-vapor magnetometer, an EM-31 electromagnetic metering system, and a Schönstadt GA-72CD pipe and cable locator.

2.3.2 Ground Water Investigation

One of the first tasks completed for the Remedial Investigation was to inspect each of the ground water monitoring wells that were installed during previous environmental investigations in the Lagoon Area. Many of the wells were found to be useable, so TRC redeveloped each well and used them to collect ground water samples for the Remedial Investigation.

Note that problems with high silt content and turbid water in the pre-existing ground water monitoring wells persisted throughout the sampling program. This is presumed to be due to problems with the original construction of the wells, incorporating screen slot sizes that were slightly too large and sand pack that was not fine enough. Early measurements of turbidity in these pre-existing wells led TRC to redesign the well construction specification for new wells, calling for finer sand pack and smaller well screen slot sizes.

TRC was generally unable to obtain ground water samples in most of the pre-existing ground water monitoring wells with turbidities below EPA's target level of 5 ntu. Nevertheless, based on the results of the first round of ground water sampling, each of these wells was included in the remaining sampling rounds since the slightly elevated turbidities did not appear to adversely affect the laboratory results.

Three new overburden ground water monitoring wells and one bedrock ground water monitoring well were added to the previously existing network of ground water monitoring wells. In addition, TRC installed eight piezometers to more fully evaluate the hydrogeology of the multiple shallow hydrostratigraphic layers that exist at the site.

MW-104U: Monitoring well MW-104U was drilled and installed from March 31 through April 4, 2000. The boring was advanced by the drive and wash method, soil samples were obtained continuously to a depth of 18 feet, where the surface of the clay strata was encountered. The boring was then advanced without casing from 18 feet to the bedrock surface at a depth of 57.5 feet, and soil samples were collected at ten-foot intervals. Following the completion of the boring at the bedrock surface the borehole was backfilled with bentonite from 14 to 57.5 feet, and MW-104U was constructed with a well screen set in the shallow overburden at 4 to 14 feet deep.

This drilling location proved difficult to access due to soft, muddy ground conditions within the Lagoon, and the isolation of the boring location from access roads by the Lagoon berms. Due to these conditions, the drilling contractor was required to utilize a track-mounted, all-terrain rig to drill at this location. While mobilizing to the site, the water supply/service truck became stuck in the muddy road within Lagoon 4. Therefore, in order to provide drilling water to the rig, the driller was required to set up a pump to feed water across a distance of approximately 500 feet into the boring location.

MW-107U: MW-107U was drilled and installed from March 28 through 30, 2000. Split-spoon samples were collected continuously from grade to a depth of 15 feet, and at ten-foot intervals from 15 feet to the rock surface.

The boring was advanced with the use of the drive and wash method, seating 6-inch casing into the upper portion of the clay strata, at a depth of 20 feet. The boring was then drilled without casing from 15 feet to the bedrock surface at 87 feet. EE backfilled the borehole with bentonite from 60 to 87 feet in order to seal off a zone of water loss at those depths, and to prevent the loss of grout to the formation. Above the bentonite, the borehole was filled from 30 to 60 feet with grout. Upon inspection the following morning, the top of the grout had subsided to a depth of 40 feet, indicating a loss to the formation. Additional bentonite was placed above the grout from 28 to 40 feet, and monitoring well MW-107U was installed with a screen at a depth of 12 to 22 feet.

B-107R: Boring B-107R was advanced from March 15 through March 21, 2000, as an attempt to install MW-107R. Drilling conditions prohibited the completion of the monitoring well installation (as described below) and the boring was terminated at a depth of 91 feet.

The ODEX air-rotary system was used to advance 5-inch casing to a total depth of 83 feet. As the air-hammer system drilled from 60 to 75 feet deep, air bubbles were observed emanating from the adjacent Hoosic River bank, indicating a possible air migration pathway from the boring. The approximate bedrock surface was encountered at 84 feet deep.

As the 5-inch casing was advanced, friction against the thick clay layer caused drilling to be very difficult. Immediately above the bedrock surface, the drillers encountered a zone including sand and gravel and heaving hydraulic conditions. Approximately 13 feet of sand, gravel, silt, and clay heaved into the drill casing. In attempting to clear the drill casing to continue drilling, the bottom 10 feet of drill casing broke off and was lost in the borehole at a depth of 80 to 90 feet. The boring was therefore abandoned. TRC returned to this location at a later date to install MW-107R in a separate boring.

MW-107R: Monitoring well MW-107R was installed from April 19 through 20, 2000. Since the shallow overburden (to 20 feet) was sampled and characterized during the advancement of the adjacent overburden well (MW-107U), only the deep overburden (20 to 86 feet) was sampled through this boring.

The spin/drive and wash method was used to install this monitoring well. Six-inch steel casing was advanced three feet into the clay to a depth of 20 feet. A 5-inch diameter rollerbit was used to advance the boring without casing through the clay. At 70 feet deep, the drillers encountered

an isolated zone where a significant loss of drilling water occurred. The rollerbit encountered the bedrock surface at a depth of 86 feet.

With the 6-inch casing seated in the clay, and the borehole open to the rock surface, 4-inch casing was advanced by the spin and wash method into the rock to a depth of 90 feet. In order to drill into the rock, a 3¼"-inch diameter rollerbit was used. The boring was drilled to a depth of 102 feet and 150 gallons of circulated drilling water was lost to the rock formation. Upon returning the following day, the borehole had caved-in up to a depth of 90. In order to continue drilling into the rock, the 4-inch casing was advanced by spin and wash to a depth of 100 feet. Significant drilling water loss (indicative of fractures or discontinuous rock) also occurred at depths of 106 to 107 feet, as the rollerbit was advanced beyond the casing. The boring was then advanced to 119 feet deep, approximately 33 feet into the bedrock, and a bedrock monitoring well (MW-107R) was constructed with a screen set at 109 to 119 feet deep.

MW-114U: After two separate attempts to obtain a non-turbid ground water sample from one of the previously existing ground water monitoring wells in the Lagoon Area, TRC installed a replacement well, MW-114U.

Table 2.3-1 lists the ground water samples that were collected from the Lagoon Area wells. A total of five rounds of ground water samples were collected.

Table 2.3-1: Ground Water Samples, Lagoon Area								
Sample Location	Turbidity (NTU)	Date Collected	Analyses					
			VOC	SVOC	Metals/ Cyanide	Pesticide/ PCB	Dioxins	Hexavalent Chromium
MW-B-7	3	3/30/00	X	X	X	X	X	X
MW-B-7 (duplicate)	3	3/30/00				X	X	
MW-L-3	1.2	3/23/00	X	X	X	X	X	X
MW-L-4	2.4	3/27/00	X	X	X	X	X	X
MW-L-5	10	3/24/00	X	X	X	X	X	X
MW-L-5 (duplicate)	10	3/24/00	X	X	X	X	X	X
MW-L-6	0.52	3/29/00	X	X	X	X	X	X
MW-L-7	4.2	3/27/00	X	X	X	X	X	X
MW-L-9	11	3/28/00	X	X	X	X	X	X
MW-L-10	12.4	3/28/00	X	X	X	X	X	X
MW-L-10 (duplicate)	12.4	3/28/00	X	X	X			X
MW-L-11	1.5	3/28/00	X	X	X	X	X	X

Table 2.3-1: Ground Water Samples, Lagoon Area

Sample Location	Turbidity (NTU)	Date Collected	Analyses					
			VOC	SVOC	Metals/ Cyanide	Pesticide/ PCB	Dioxins	Hexavalent Chromium
MW-104U	3	5/12/00	X	X	X	X	X	X
MW-107U	4.73	5/10/00	X	X	X	X	X	X
MW-107R	17	5/11/00	X	X	X	X	X	X
MW-109U	30	5/10/00	X	X	X	X	X	X
MW-B-7	2.9	8/7/00	X	X	X			
MW-L-3	2	8/1/00	X	X	X			
MW-L-4	4.3	8/8/00	X	X	X			
MW-L-5	1.7	8/3/00	X	X	X			
MW-L-6	1.2	8/1/00	X	X	X			
MW-L-7	80	8/2/00	X	X	X			
MW-L-9	5.3	8/3/00	X	X	X			
MW-L-10	4.8	8/3/00	X	X	X			
MW-L-10 (duplicate)	4.8	8/3/00	X	X	X			
MW-L-11	4.5	8/4/00	X	X	X			
MW-107U	4.8	8/1/00	X	X	X			
MW-107U (duplicate)	4.8	8/1/00	X	X	X			
MW-107R	4.8	8/1/00	X	X	X			
MW-109U	4.2	8/2/00	X	X	X			
MW-B-7	1.37	9/29/00	X	X	X			
MW-L-3	3.19	9/28/00	X	X	X			
MW-L-4	3.23	9/28/00	X	X	X			
MW-L-5	5.5	9/28/00	X	X	X			
MW-L-6	0.45	9/28/00	X	X	X			
MW-L-7	9.62	10/3/00	X	X	X			
MW-L-9	5.0	10/2/00	X	X	X			
MW-L-10	3.4	9/29/00	X	X	X			
MW-L-11	1.9	9/28/00	X	X	X			
MW-104U		8/2/00	X	X	X			
MW-114U		10/3/00		X	X			
MW-104U	4.9	9/28/00	X	X	X			

Table 2.3-1: Ground Water Samples, Lagoon Area								
Sample Location	Turbidity (NTU)	Date Collected	Analyses					
			VOC	SVOC	Metals/ Cyanide	Pesticide/ PCB	Dioxins	Hexavalent Chromium
MW-107U	2.07	10/2/00	X	X	X			
MW-107U (duplicate)	2.07	10/2/00	X	X	X			
MW-107R	10.62	9/28/00	X	X	X			
MW-109U	3.7	9/27/00	X	X	X			
MW-114U	3.98	10/4/00	X	X	X	X	X	X

2.3.3 Soil Investigation

Table 2.3-2 lists the soil samples obtained in the Lagoon Area. Seventy soil borings were advanced in the five lagoons.

Table 2.3-2: Soil Samples, Lagoon Area													
Sample Location	Sample Depth (feet) Unit Sampled		Date Collected	Analyses									
	Top	Bottom		VOC	SVOC	Metals/ Cyanide	Hexavalent Chromium	Pesticides/ PCBs	Dioxins	TCLP Metals/ Ignitability/ Corrosivity	TCLP SVOCs	TCLP/ Pesticides	Grain Size/ Bulk Density
SBL3B-01	0	0.5	3/27/00	X	X	X		X	X				
SBL3B-01	7	10	3/27/00	X	X	X		X					
SBL3B-02	0	0.5	3/27/00	X	X	X		X					
SBL3B-02	8	10	3/27/00	X	X	X		X					
SBL3B-02	26	28	3/27/00	X	X	X		X					
SBL3A-01	0	0.5	3/28/00	X	X	X		X				X	
SBL3A-01	6	8	3/28/00	X	X	X		X					
SBL3B-03	0	0.5	3/28/00	X	X	X		X	X				
SBL3B-03	14	16	3/28/00	X	X	X		X	X				
SBL3AB-01	0	0.5	3/28/00	X	X	X		X					
SBL3AB-01	10	13	3/28/00	X	X	X		X					
SBL3A-02	6	9	4/19/00	X	X	X		X	X				
SBL3A-03	5	7	4/19/00	X	X	X		X					
SBL3A-02	0	1	8/31/00						X				
SBL3A-02	6	8	8/31/00						X	X	X		
SBL3A-03	0	1	8/31/00						X				

Table 2.3-2: Soil Samples, Lagoon Area

Sample Location	Sample Depth (feet) Unit Sampled		Date Collected	Analyses									
	Top	Bottom		VOC	SVOC	Metals/ Cyanide	Hexavalent Chromium	Pesticides/ PCBs	Dioxins	TCLP Metals/ Ignitability/ Corrosivity	TCLP SVOCs	TCLP/ Pesticides	Grain Size/ Bulk Density
SBL3A-03	5	7	8/31/00				X			X	X	X	
SBL3AB-01	0	1	8/31/00						X				
SBL3AB-01	4	6	8/31/00							X	X	X	
SBL3B-01	0	1	8/30/00						X				
SBL3B-01	7	10	8/30/00				X			X	X	X	
SBL1-01	0	0.5	3/30/00	X	X	X		X					
SBL1-01	9	12	3/30/00	X	X	X		X					
SBL1-01	3	5	9/5/00		X	X		X		X	X	X	
SBL1-01	9	12	9/5/00				X			X	X	X	
SBL1-02	0	0.5	3/30/00	X	X	X		X	X				
SBL1-02	7	10	3/30/00	X	X	X		X					
SBL1-02	7	10	8/31/00				X			X	X	X	
SBL1-02	2	4	8/31/00		X	X		X		X	X	X	
SBL1-02 (duplicate)	2	4	8/31/00		X	X		X					
SBL1-03	0	0.5	3/30/00	X	X	X		X	X				
SBL1-03	4	7	3/30/00	X	X	X		X					
SBL1-03 (duplicate)	0	0.5	3/30/00	X	X	X		X	X				
SBL1-03	0	1	9/6/00	X					X				
SBL1-03 (duplicate)	4	7	9/6/00							X	X	X	
SBL1-03	4	7	9/6/00				X	X		X	X	X	
SBL1-04*	5	8	4/27/00	X	X	X		X	X				
SBL1-05*	5	8	4/27/00	X	X	X		X	X				
SBL1-07	4	7	4/20/00	X	X	X		X	X				
SBL1-08	2	4	4/20/00	X	X	X		X	X				
SBL1-08 (duplicate)	2	4	4/20/00	X	X	X		X					
SBL1-08	2	4	9/6/00	X			X	X		X	X	X	
SBL1-09	0	0.5	4/20/00						X				
SBL1-09	5	7	4/20/00	X	X	X		X					
SBL1-10	6	8	4/20/00	X	X	X		X					
SBL1-11	0	0.5	3/30/00	X	X	X		X					
SBL1-03	0	.5	4/21/00						X				
SBL1-03	0	.5	4/21/00						X				
SBL2-01	0	.5	4/21/00						X				
SBL2-06	0	.5	4/21/00						X				
SBL4-08	0	.5	4/21/00						X				
SBL4-09	0	.5	4/21/00						X				

Table 2.3-2: Soil Samples, Lagoon Area

Sample Location	Sample Depth (feet) Unit Sampled		Date Collected	Analyses									
	Top	Bottom		VOC	SVOC	Metals/ Cyanide	Hexavalent Chromium	Pesticides/ PCBs	Dioxins	TCLP Metals/ Ignitability/ Corrosivity	TCLP SVOCs	TCLP/ Pesticides	Grain Size/ Bulk Density
SBL4-16	0	.5	4/21/00						X				
SBL1-11	8	11	3/30/00	X	X	X		X					
SBL1-11	0	1	9/12/00						X				
SBL1-12 (duplicate)	5	8	9/06/00	X			X	X				X	
SBL1-12	0	1	9/06/00			X			X				
SBL1-12	5	8	9/06/00	X	X	X		X		X	X		
SBL1-13	6	8	9/1/00	X	X	X		X					
SBL1-14	8	11	9/5/00	X	X	X		X					
SBL1-15	8	10	9/6/00	X	X	X		X		X	X	X	
SBL2-01	0	0.5	3/29/00	X	X	X		X	X				
SBL2-01	2	4	3/29/00	X	X	X		X					
SBL2-02*	0	0.5	5/2/00	X	X	X		X	X				
SBL2-03	0	0.5	3/29/00	X	X	X		X					
SBL2-03	9	12	3/29/00	X	X	X		X	X				
SBL2-03	2	4	8/29/00							X	X	X	
SBL2-04*	0	0.5	5/2/00			X			X				
SBL2-05	0	0.5	3/29/00	X	X	X		X					
SBL2-05 (duplicate)	0	0.5	3/29/00	X	X	X		X					
SBL2-05	3	5	3/29/00	X	X	X		X					
SBL2-05	4	6	8/29/00				X			X	X	X	
SBL2-05 (duplicate)	4	6	8/29/00	X			X			X	X	X	
SBL2-06	0	0.5	3/29/00	X	X	X		X	X				
SBL2-06	6	8	3/29/00	X	X	X		X					
SBL2-06	13	16	3/29/00	X	X	X		X					
SBL2-07	0	0.5	3/29/00	X	X	X		X	X				
SBL2-07	11	14	3/29/00	X	X	X		X					X
SBL2-08	0	1	9/13/00						X				
SBL2-08	2	4	9/13/00							X	X	X	
SBL2-09	0	1	9/13/00						X				
SBL2-09	2	4	9/13/00							X	X	X	
SBL4-01	0	0.5	3/31/00	X	X	X		X					
SBL4-04	0	0.5	3/31/00	X	X	X		X					
SBL4-04 (duplicate)	0	0.5	3/31/00	X	X	X		X					
SBL4-05	0	0.5	3/23/00	X	X	X		X					X
SBL4-05	2	4	3/23/00	X	X	X		X					
SBL4-07	0	2	3/23/00	X	X	X		X					
SBL4-07	6	8	3/23/00	X	X	X		X					

Table 2.3-2: Soil Samples, Lagoon Area

Sample Location	Sample Depth (feet) Unit Sampled		Date Collected	Analyses									
	Top	Bottom		VOC	SVOC	Metals/ Cyanide	Hexavalent Chromium	Pesticides/ PCBs	Dioxins	TCLP Metals/ Ignitability/ Corrosivity	TCLP SVOCs	TCLP/ Pesticides	Grain Size/ Bulk Density
SBL4-08	2	4	3/23/00		X	X		X					
SBL4-08	0	0.6	3/23/00	X	X	X		X					
SBL4-08	2	4	8/28/00				X			X	X	X	
SBL1-08	0	.5	4/20/00						X				
SBL4-02	.5	1	5/2/00						X				
SBL4-08	4	6	3/23/00	X									
SBL4-09	0	0.5	3/23/00	X	X	X		X	X				
SBL4-09	2	4	3/23/00	X	X	X		X					
SBL4-10	0	0.5	3/22/00	X	X	X		X					
SBL4-10	2	4	3/22/00	X	X	X		X					
SBL4-11	0	0.5	3/22/00	X	X	X		X					
SBL4-11 (duplicate)	0	0.5	3/22/00	X	X	X		X					
SBL4-11	2	4	3/22/00	X	X	X		X					
SBL4-12	0	0.5	3/23/00	X	X	X		X					
SBL4-12	2	3	3/23/00	X	X	X		X					
SBL4-13	0	2	3/22/00	X	X	X		X					
SBL4-13	4	6	3/22/00	X	X	X		X					
SBL4-13	10	12	3/22/00	X	X	X		X					
SBL4-14	0	0.5	3/23/00	X	X	X		X					
SBL4-14	2	4	3/23/00	X	X	X		X					
SBL4-14	0	1	8/28/00						X				
SBL4-14	2	4	8/28/00				X			X	X	X	
SBL4-15	0	0.5	3/23/00	X	X	X		X					
SBL4-15	8	10	3/23/00	X	X	X		X					
SBL4-16	0	2	3/22/00	X	X	X		X					
SBL4-16	7	8	3/22/00	X	X	X		X	X				
SBL4-17	0	0.5	3/27/00	X	X	X		X					
SBL4-17	6	8	3/27/00	X	X	X		X					
SBL4-18	0	0.5	3/24/00	X	X	X		X	X				
SBL4-18	8	10	3/24/00	X	X	X		X					
SBL4-19	0	0.5	3/24/00	X	X	X		X					
SBL4-19 (duplicate)	0	0.5	3/24/00	X	X	X		X					
SBL4-19	2	4	3/24/00	X	X	X		X					
SBL4-20	0	2	3/22/00	X	X	X		X	X				
SBL4-21	0	0.5	3/24/00	X	X	X		X					
SBL4-21	6	8	3/24/00	X	X	X		X					
SBL4-21	6	8	8/30/00				X			X	X	X	
SBL4-22	0	1	3/20/00	X	X	X		X					
SBL4-22	3	5	3/20/00	X	X	X		X					

Table 2.3-2: Soil Samples, Lagoon Area

Sample Location	Sample Depth (feet) Unit Sampled		Date Collected	Analyses									
	Top	Bottom		VOC	SVOC	Metals/ Cyanide	Hexavalent Chromium	Pesticides/ PCBs	Dioxins	TCLP Metals/ Ignitability/ Corrosivity	TCLP SVOCs	TCLP/ Pesticides	Grain Size/ Bulk Density
SBL4-23	0	2	3/21/00	X	X	X		X					
SBL4-23	4	6	3/21/00	X	X	X		X					
SBL4-24	0	2	3/21/00	X	X	X		X					
SBL4-24	4	6	3/21/00	X	X	X		X					X
SBL4-24 (duplicate)	4	6	3/21/00	X	X	X		X					X
SBL4-24	0	1	8/28/00						X				
SBL4-26			8/28/00						X				
SBL4-13	4	6	3/23/00	X									
SBL4-16	10	12	3/22/00	X									
SBL4-24	4	6	8/28/00							X	X	X	
SBL4-25	0	2	3/21/00	X	X	X		X					
SBL4-25	4	6	3/21/00	X	X	X		X					
SBL4-26	0	2	3/21/00	X	X	X		X	X				
SBL4-26	4	6	3/21/00	X	X	X		X					X
SBL4-26	2	4	8/28/00								X	X	
SBL4-27	0	2	3/21/00	X	X	X		X					
SBL4-27	3	4	3/21/00	X	X	X		X					
SBL4-27	16	18	3/21/00	X	X	X		X					
SBL4-28	0	1	8/28/00		X	X		X	X				
SBL4-29	5	7	8/30/00		X	X		X					
SBL5-01*	0	0.5	4/28/00	X	X	X		X	X				
SBL5-02*	0.5	1	4/26/00	X	X	X		X	X				
SBL5-02 (duplicate)	0.5	1	4/26/00	X	X	X		X					
SBL5-03	3	4	4/28/00	X	X	X		X					
SBL5-04*	0.5	1	5/1/00	X	X	X		X					
SBL5-04* (duplicate)	0.5	1	5/1/00	X	X	X		X					
SBL5-05*	0.5	1	5/1/00	X	X	X		X					
SBL5-05	2	4	9/12/00				X			X	X	X	
SBL5-06*	0.5	1	5/1/00	X	X	X		X					
SBL5-07	0	0.5	4/28/00	X	X	X		X	X				
SBL5-07	2	4	8/29/00				X			X	X	X	
SBL5-07 (duplicate)	2	4	8/29/00				X						
SBL5-08	2	4	9/12/00		X	X				X	X	X	
SBL5-08	0	1	9/12/00						X				
SBL5-08 (duplicate)	0	1	9/12/00						X				
SBL5-09	0	1	8/29/00						X				

Table 2.3-2: Soil Samples, Lagoon Area

Sample Location	Sample Depth (feet) Unit Sampled		Date Collected	Analyses									
	Top	Bottom		VOC	SVOC	Metals/ Cyanide	Hexavalent Chromium	Pesticides/ PCBs	Dioxins	TCLP Metals/ Ignitability/ Corrosivity	TCLP SVOCs	TCLP/ Pesticides	Grain Size/ Bulk Density
SBL5-10	0	1	8/29/00						X				
SBL5-10 (duplicate)	0	1	8/29/00						X				
SBL5-10	2	4	8/29/00		X	X				X	X	X	
SBL5-10	10	12	9/12/00		X	X		X					
SBL5-11	0	1	9/12/00						X				
MW-104U	2	4	4/18/00										X**
MW-104U (duplicate)	2	4	4/18/00										X**
MW-107U	2	5	3/29/00										X**
SBL5-05 (duplicate)	0.5	1	5/1/00						X				
TP-501	0	1	11/14/2000	X	X	X		X					
TP-501	6	7	11/14/2000	X	X	X		X					
TP-502	0	1	11/14/2000	X	X	X		X					
TP-502	6	7	11/14/2000	X	X	X		X					
TP-503	0	1	11/14/2000	X	X	X		X					
TP-503	6	7	11/14/2000	X	X	X		X					
TP-504	0	1	11/14/2000	X	X	X		X					
TP-504	5	6	11/14/2000	X	X	X		X					
TP-505	0	1	11/14/2000	X	X	X		X					
TP-505	5	6	11/14/2000	X	X	X		X					
TP-506	0	1	11/14/2000	X	X	X		X					
TP-506	5	6	11/14/2000	X	X	X		X					
TP-507	0	1	11/14/2000	X	X	X		X					
TP-507	5	6	11/14/2000	X	X	X		X					
TP-508	0	1	11/14/2000	X	X	X		X					
TP-508	5	6	11/14/2000	X	X	X		X					
TP-500	0	1	11/14/2000	X	X	X		X					
TP-500	7	8	11/14/2000	X	X	X		X					

* Samples obtained under ponded water in Lagoons.

** Analysis included total combustible Organics, total organic carbon and percent moisture also

2.3.4 Surface Water Investigation

Table 2.3-3 lists the surface water samples obtained in the Lagoon Area.

Table 2.3-3: Surface Water Samples, Lagoon Area							
Sample Location	Date Collected	Laboratory Analyses					
		VOC	SVOC	Total Metals Cyanide	Filtered Metals	Dioxins	Hex. Chromium
Hoosic River							
SW-O34	5/18/00	X	X	X	X	X	X
SW-O34 (duplicate)	5/18/00	X	X	X	X	X	X
SW-O36	5/18/00	X	X	X	X	X	X
Lagoon 1							
SW-OL1	5/19/00	X	X	X	X	X	
Lagoon 2							
SW-OL2	5/19/00	X	X	X	X	X	
Lagoon 4							
SW-OL4A	5/19/00	X	X	X	X	X	
SW-OL4B	5/22/00	X	X	X	X	X	
SW-OL4C	5/22/00	X	X	X	X	X	
SW-OL4C	5/23/00	X	X				
Lagoon 5							
SW-OL5	5/19/00	X	X	X	X		

2.3.5 Sediment Investigation

Table 2.3-4 lists the sediment samples obtained in the Lagoon Area. Note that there are also eight soil borings that were advanced through ponded water, so the “surface soil” samples obtained from those locations are also considered to be sediment samples.

Table 2.3-4: Sediment Samples, Lagoon Area								
Sample Location	Date Collected	Water Depth (ft)	Laboratory Analyses					
			Hex. Chromium	Metals/ Cyanide	TCO/TOC/ % Moisture VOC/Dioxin PCB Homologues	Pesticides/ SVOC	AVS/SEM	SVOC/Pest/ PCB
Hoosic River								
SD-030	5/22/00	2	X	X	X		X	X

Table 2.3-4: Sediment Samples, Lagoon Area								
Sample Location	Date Collected	Water Depth (ft)	Laboratory Analyses					
			Hex. Chromium	Metals/ Cyanide	TCO/TOC/% Moisture VOC/Dioxin PCB Homologues	Pesticides/ SVOC	AVS/SEM	SVOC/Pest/ PCB
SD-031	5/22/00	2.5		X	X			X
SD-031 (duplicate)	5/22/00	2.5		X	X			X
SD-032	5/19/00	0		X	X			X
SD-032 (duplicate)	5/19/00	0	--	X	X		--	X
SD-033	5/19/00	2	--	X	X	--	--	X
SD-034	5/19/00	2	X	X	X	--	X	X
SD-035	5/18/00	2.5	X	X	X	--	X	X
SD-036	5/18/00	2.5	--	X	X	--	--	X
SD-037	5/18/00	2	X	X	X	X	--	
Lagoon 4								
SDOL-4B	5/22/00	2.5	X	X	X		--	X
SDOL-4C	5/22/00	3	X	X	X		--	X

2.3.6 Air Investigation

Table 2.3-5 lists the air samples that were collected from the Lagoon Area.

Table 2.3-5: Air Samples, Lagoon Area			
Sample Location	Date Collected	Analyses (volume [m ³])	
		Metals	SVOCs
Station 3	4/24/01	X (577)	
Station 3A	4/24/01		X (91.78)
Station 3B	4/24/01		X (92.16)
Station 4	4/24/01		X (94.21)
Station 4A	4/24/01	X (552)	
Station 4B	4/24/01	X (589)	

2.4 Landfill Area Investigation

Throughout the field activity associated with this Remedial Investigation, the USACE and EPA were completing closure of the landfill as part of the NTCRA. Consequently, the only recognized source of contamination in this area (the Landfill) was fully addressed and no further remedial investigative work was needed to characterize the contaminant source area.

However, the NTCRA did not address any potential ground water contamination issues, or concerns of possible impacts from landfill seeps or ground water discharge to the wetlands, streams and the Hoosic River located downhill and downgradient from the site.

The focus of the Landfill Area investigation was on ground water quality and potential sediment and surface water impacts.

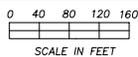
Figure 2.4-1 shows the location of samples collected in the Landfill Area.

2.4.1 Ground Water Investigation

Several wells were installed in the Landfill Area during previous environmental investigations. TRC determined that none of these wells were useable due to several factors including bent and broken well casing, excessive siltation, and other well damage that precluded sampling of the wells. TRC installed three new overburden wells and one bedrock well in the Lagoon Area.

Table 2.4-1 shows the ground water samples that were obtained in the Landfill Area. Four rounds of ground water samples were obtained from ground water monitoring wells in the Landfill Area.

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LEGEND

- ⊗ AIR SAMPLE LOCATION
- ⊕ 2" MONITORING WELL
- SOIL BORING LOCATION
- SURFACE SOIL SAMPLE LOCATION
- ⊕ SURFACE WATER SAMPLE LOCATION
- RESIDENTIAL WELL SAMPLE LOCATION
- ◆ SEDIMENT SAMPLE LOCATION
- ⊕ TEST PIT LOCATION
- CULTURAL BORING LOCATION



Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0220-01N93

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061

FIGURE 2.4-1
SAMPLING LOCATIONS
LANDFILL
POWNAI TANNERY
POWNAI, VERMONT



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Table 2.4-1: Ground Water Samples, Landfill Area								
Sample Location	Turbidity (NTU)	Date Collected	Laboratory Analyses					
			VOC	SVOC	Metals/ Cyanide	Pesticide/ PCB	Dioxins	Hexavalent Chromium
MW-101U		5/16/00	X	X	X		X	X
MW-102U	2.4	5/10/00	X	X	X	X	X	X
MW-102U (duplicate)	2.4	5/11/00					X	
MW-102U	2.4	5/11/00						X
MW-103U	3.3	5/10/00	X	X	X	X	X	X
MW-103U (duplicate)	3.3	5/12/00						X
MW-103U	3.3	5/11/00					X	
MW-103R	7.1	5/11/00	X	X	X	X	X	X
MW-101U	3.3	8/8/00	X	X	X			
MW-102U	5.86	7/31/00	X	X	X			
MW-103U	3.3	7/31/00	X	X	X			
MW-103R	19	7/31/00	X	X	X			
MW-B-7	2.9	8/7/00	X	X	X			
MW-101U	4.9	10/4/00	X	X	X			
MW-102U	4.94	9/27/00	X	X	X			
MW-103U	3.40	9/27/00	X	X	X			
MW-103U (duplicate)	3.40	9/27/00	X	X	X			
MW-103R	0.90	9/27/00	X	X	X			
MW-B-7	1.37	9/29/00	X	X	X			

MW-101U: TRC originally planned to install a bedrock well at this location, but due to the unanticipated depth of bedrock and the existence of a thick clay layer, created great difficulties with the initial drilling methods and equipment that were available at the beginning of the project. A pilot boring was advanced for installation of MW-101R from March 22 through 28, 2000 using air rotary methods. However this boring was ultimately abandoned and a bedrock

monitoring well was not constructed at this location.

Monitoring well MW-101U was installed on April 5 and April 6, 2000. Split-spoon samples were collected continuously to a depth of 15 feet, then at 10-foot intervals to the end of the boring. Four inch casing was advanced using the spin/drive and wash method into the underlying clay strata. However, this method was not practical for drilling through the underlying thick clay layer due to large amounts of friction that would be generated between the clay and the casing. The well was successfully advanced by setting an outer steel casing into the upper portion of the confining clay layer, then drilling through the clay using open hole drill and wash with a rollerbit. The cohesiveness of the clay allowed the borehole to remain open for long periods of time, and to the depth of bedrock, with minimal caving. Bedrock was encountered at 89 feet. The boring was backfilled with bentonite from 21 to 96 feet, and the monitoring well was constructed at a depth of 7 to 17 feet.

MW-102U: Monitoring well MW-102U was drilled and installed on April 10 and 11, 2000. The boring was advanced using the drive and wash method and 4-inch steel casing, continuously sampling from the surface to a depth of 14 feet. With the casing seated at 20 feet, the remainder of the boring was advanced with a roller bit (“open hole”) ahead of the casing, collecting split-spoon samples at ten-foot intervals from 14 feet to 145.5 feet. The boring was then advanced through weathered rock from 145.5 feet to 151 feet. The boring was filled from 33 to 151 feet with bentonite and a well was constructed from 21 to 31 feet deep.

MW-103U: Monitoring well MW-103U was drilled and installed on April 4, 2000. This boring was drilled with the use of the spin/drive and wash method, advancing 4-inch casing from grade to a total depth of 25 feet. Since the overburden characteristics were characterized during the adjacent MW-103R boring, soil samples were not collected during the installation of MW-103U.

MW-103R: This well was installed using the spin/drive and wash method from March 29 through April 5, 2000. A roller bit was used to confirm refusal on bedrock by drilling to a depth of 99 feet. The driller attempted to collect a core sample of bedrock, but could not successfully circulate any drilling water. In order to seal off the zone of rock where the water loss occurred, casing was re-advanced 5 feet and seated at a depth of 104 feet. A core sample of the rock was recovered from 104 to 105 feet deep. Limited water recovery prevented a complete 5-foot penetration of core, and the sample produced only 0.3 feet of recovered material. The core sample contained medium to coarse-sized, rounded gravel. The driller attempted to advance the boring to competent rock, but the boring was terminated at 115 feet after it was determined that core recovery would not be possible at this location.

Due to the fact the casing was “telescoped” into the hole, the final inner casing in the borehole was not wide enough to allow proper placement of a filter sand pack around the monitoring well. In order to allow bentonite to be packed around the well riser pipe without falling into the annulus around the well screen, a “chevron” gasket-style seal was used instead of bentonite. A 20-foot screen was installed at 97 to 117 feet, and the chevron seals were placed immediately below the bedrock surface at 93 to 96 feet.

2.4.2 Soil Investigation

Table 2.4-2 lists the soil samples collected from borings in the Lagoon Area. All of the samples were obtained for geotechnical and fate and transport parameter estimation.

Table 2.4-2: Soil Samples, Landfill Area				
Sample Location	Sample Depth (feet)	Unit Sampled	Date Collected	Laboratory Analyses
				TCO/TOC/ % Moisture Grain Size/Bulk Density
MW-101U	2-5	Sand & Gravel	4/5/00	X
MW-102U	2-4	Sand & Gravel	4/10/00	X
MW-103R	4-6	Sand	3/29/00	X

2.4.3 Surface Water Investigation

Table 2.4-3 lists the surface water samples that were collected from the Landfill Area. Surface water is present at the Landfill Area in three locations, all of which were sampled. There are several seeps that emanate on the steep slope below the landfill, there is surface water in the streams, ponds and wetlands below the landfill, and there is a perennial outlet for water to discharge from the wetland and pond to the Hoosic River.

Table 2.4-3: Surface Water Samples, Landfill Area							
Sample Location	Date Collected	Laboratory Analyses					
		VOC	SVOC	Total Metals Cyanide	Filtered Metals	Dioxins	Hex. Chromium
<i>Landfill Seeps</i>							
SW-011	5/31/00	X	X	X	X	X	
SW-012	5/31/00	X	X	X	X	X	
SW-013	5/31/00	X	X	X	X	X	
SW-021	5/31/00	X	X	X	X	X	
<i>Streams below Landfill</i>							
SW-008	5/24/00	X	X	X	X	X	
SW-009	5/24/00	X	X	X	X	X	
<i>Pond below Landfill</i>							
SW-020	5/24/00	X	X	X	X	X	X
SW-020	5/30/00						X

2.4.4 Sediment Investigation

Table 2.4-4 lists the sediment samples that were collected in the Landfill Area. Sediments were collected from the seep areas, the wetland, ponds, and the streams located below the landfill.

Table 2.4-4: Sediment Samples, Landfill Area								
Sample Location	Date Collected	Water Depth (ft)	Laboratory Analyses					
			Hex. Chromium	Metals/ Cyanide	TCO/TOC/% Moisture VOC/ Dioxin/PCB Homologues	Pesticides/ SVOC	AVS/SEM	SVOC/Pest/ PCB
Streams below Landfill								
SD-008	5/24/00	0.5		X	X			X
SD-009	5/24/00	0.5		X	X			X
SD-010	5/25/00	3		X	X			X
Landfill Seeps								
SD-011	5/26/00	0.1		X	X			X
SD-012	5/26/00	0.1		X	X			X
SD-013	5/31/00	0.1		X	X			X
Wetland below Landfill								
SD-014	5/25/00	0.1		X	X	X		
SD-015	5/25/00	0		X	X	X		
SD-016	5/25/00	0.1		X	X	X		
SD-017	5/24/00	0		X	X	X		
SD-017	5/210/00	0			X			
SD-018	5/24/00	0.1		X	X	X		
SD-018	5/23/00	0.1						X
Pond below Landfill								
SD-019	5/24/00	0.5		X	X	X		
SD-020	5/24/00	1.5	X	X	X		X	X
SD-021	5/26/00	0.1		X	X			X
SD-022	5/24/00	1.5		X	X			X
SD-023	5/23/00	1		X	X	X	X	
SD-024	5/23/00	0.5	X	X	X	X	X	
SD-024 (duplicate)	5/23/00	0.5	X	X	X	X	X	

2.4.5 Air Investigation

Table 2.4-5 lists the air samples that were collected from the Landfill Area.

Table 2.4-5: Air Samples, Landfill Area			
Sample Location	Date Collected	Analyses (volume [m³])	
		Metals	SVOCs
Station 5	4/23/01	X (596)	X (98.14)

2.5 Warehouse Area Investigation

The planned focus of the Warehouse Area investigation was on the area adjacent to the eastern side of the building where hides were reportedly stored and stacked. TRC initially programmed a surface soil sampling program in this area to evaluate potential soil contamination.

Based on Phase I findings, additional Phase II sampling was added to the Remedial Investigation to evaluate subsurface soil contamination in the area.

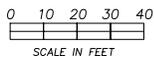
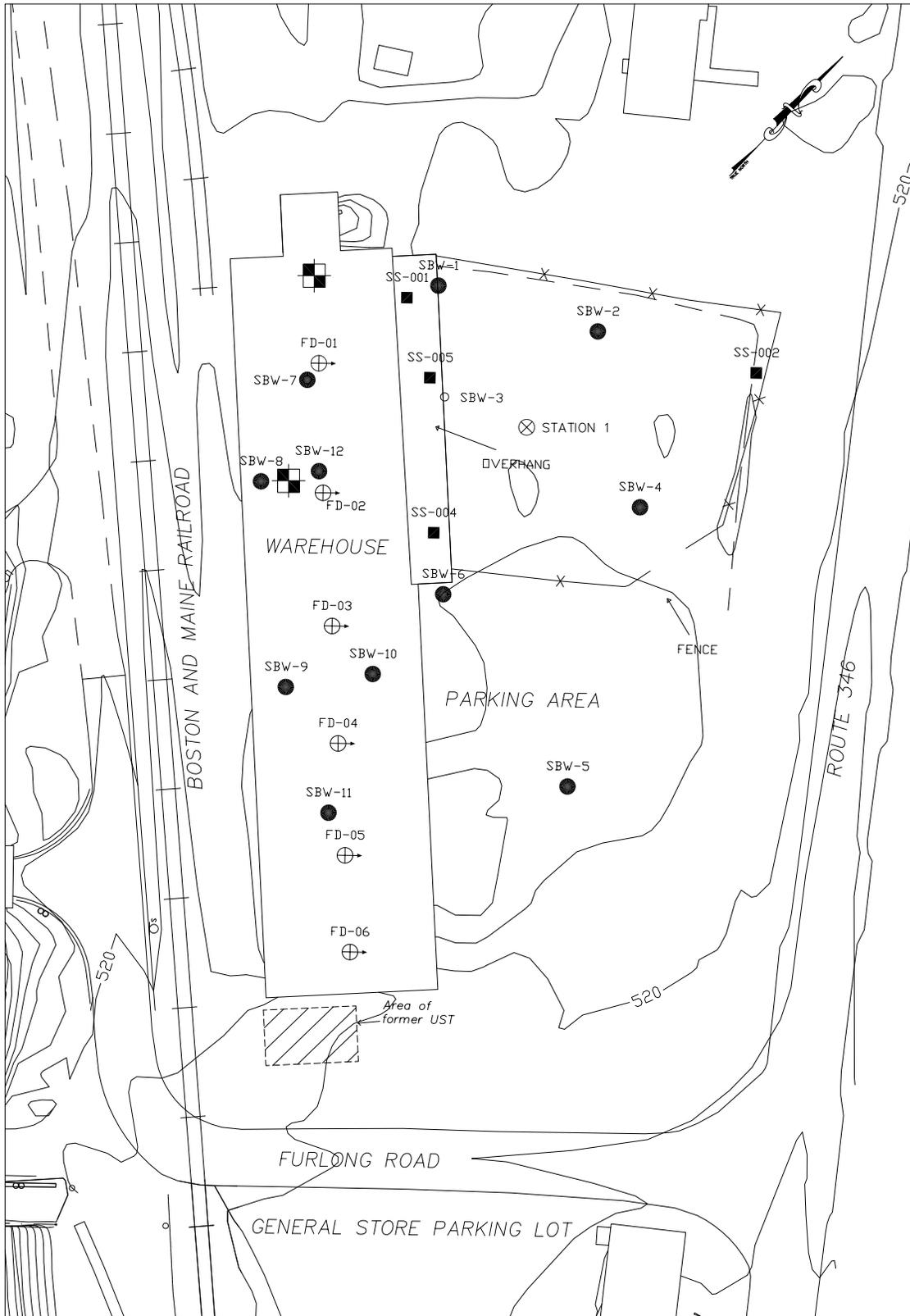
In addition, at the beginning of the Remedial Investigation, the warehouse building was over 75 percent full of wood chips making it impossible to inspect the floor for possible drains or other potential release points and pathways for contaminant migration. However, at the conclusion of Phase I field activities, the warehouse was empty, and TRC observed several manholes and pits that were filled with soil, sludge, and wood chips. TRC also noted overpacked drums in the warehouse and an accumulation of potentially asbestos containing materials. Concurrent with development of a plan to sample these manholes and pits, the USACE and EPA decided to incorporate decontamination and closure of the pits and drains, and removal of the drums and potential asbestos containing materials as part of the NTCRA.

TRC obtained only one sample from one floor drains in the warehouse, initially to assist the USACE and EPA in characterizing the material for disposal. Further sampling was completed by the USACE and EPA as part of the NTCRA.

TRC also advanced several soil borings through the floor of the warehouse to evaluate potential subsurface soil contamination.

Figure 2.5-1 shows the sample locations obtained in the Warehouse Area.

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LEGEND

- ⊕ FLOOR DRAIN
- ⊗ AIR SAMPLE LOCATION
- SOIL BORING LOCATION
- SURFACE SOIL SAMPLE LOCATION
- ⊠ TEST PIT
- X- FENCE



Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0220-01N93

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061

FIGURE 2.5-1
WAREHOUSE
SAMPLING LOCATIONS
POWNAI TANNERY
POWNAI, VERMONT



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2.5.1 Soil Investigation

Table 2.5-1 shows the soil samples that TRC collected in the Warehouse area. Surface and subsurface soils were collected outside of the warehouse and subsurface soils were obtained beneath the warehouse. In addition, one sample was obtained from one of the floor drains inside the warehouse.

Table 2.5-1: Soil Samples, Warehouse Area													
Sample Location	Sample Depth (feet) Unit Sampled		Date Collected	Laboratory Analyses									
	Top	Bottom		VOC	SVOC	Metals/ Cyanide	Hexavalent Chromium	Pesticides/ PCBs	Dioxins	TCLP Metals/ Ignitability/ Corrosivity	TCLP SVOCs	TCLP/ Pesticides	Grain Size/Bulk Density
<i>Outside Building Area</i>													
SS-001	0	0.5	4/5/00	X	X	X	X	X	X				
SS-002	0	0.5	4/5/00	X	X	X		X					
SS-004	0	0.5	4/5/00	X	X	X	X	X	X				
SS-004 (duplicate)	0	0.5	4/5/00	X	X	X	X	X	X				
SS-005	0	0.5	4/5/00	X	X	X	X	X	X				
SS-007	0	0.5	4/7/00	X	X	X		X					
SBW-1	2	4	8/29/00		X	X							
SBW-1	6	8	8/29/00		X	X							
SBW-2	0	0.5	8/29/00		X	X							
SBW-2	2	4	8/29/00		X	X							
SBW-2	6	8	8/29/00		X	X							
SBW-3	2	4	8/29/00		X	X							
SBW-3	6	8	8/29/00		X	X							
SBW-3 (duplicate)	0	0.5	8/29/00		X	X							
SBW-3	0	0.5	8/29/00		X	X							
SBW-4	2	4	8/29/00		X	X							
SBW-4	6	8	8/29/00		X	X							
SBW-5	0	0.5	8/29/00		X	X							
SBW-5	2	4	8/29/00		X	X							
SBW-5	6	8	8/29/00		X	X							
<i>Inside Warehouse</i>													
SBW-6	2	4	8/29/00		X	X							
SBW-6	6	8	8/29/00		X	X							
SBW-7	0	2	9/25/00	X	X	X	X						
SBW-7	4	5	9/25/00	X	X	X							
SBW-8	0	2	9/25/00	X	X	X	X						
SBW-8 (duplicate)	0	2	9/25/00	X	X	X							
SBW-8	4	5	9/25/00	X	X	X							

Table 2.5-1: Soil Samples, Warehouse Area													
Sample Location	Sample Depth (feet) Unit Sampled		Date Collected	Laboratory Analyses									
	Top	Bottom		VOC	SVOC	Metals/ Cyanide	Hexavalent Chromium	Pesticides/ PCBs	Dioxins	TCLP Metals/ Ignitability/ Corrosivity	TCLP SVOCs	TCLP/ Pesticides	Grain Size/Bulk Density
SBW-9	0	2	9/25/00	X	X	X	X						
SBW-9	4	6	9/25/00	X	X	X							
SBW-10	0	2	9/25/00	X	X	X	X						
SBW-10	4	5	9/25/00	X	X	X							
SBW-11	0	2	9/25/00	X	X	X	X						
SBW-11	3	4	9/25/00	X	X	X							
SBW-12	4	6	9/26/00	X	X	X	X						
Floor Drains													
FD-01			9/26/00	X	X	X	X	X	X	X	X	X	
FD-01 (duplicate)			9/26/00	X	X	X	X	X	X	X	X	X	

2.5.2 Surface Water Investigation

Table 2.5-2 lists the surface water samples collected from the Warehouse Area. The only sample obtained from this area was collected near the sewage outfall into the Hoosic River. This sewage outfall is connected to an underground pipe that connects to the household waste water systems of several homes located near the site on the east side of State Route 346. The exact location of the sewage drain pipe is not known, but based on the location of manholes in the Warehouse Area, it appears that the pipe runs under the area and north of the warehouse. In addition, based on an inspection by the USACE of underground pipes connected to the drains, the warehouse drainage system may also be connected to the sewage outfall.

Table 2.5-2: Surface Water Samples, Warehouse Area							
Sample Location	Date Collected	Laboratory Analyses					
		VOC	SVOC	Total Metals Cyanide	Filtered Metals	Dioxins	Hex. Chromium
Sewage Outfall							
SW-030	5/18/00	X	X	X	X	X	X

2.5.3 Air Investigation

Table 2.5-3 lists the air samples that were collected from the Warehouse Area.

Table 2.5-3: Air Samples, Warehouse Area			
Sample Location	Date Collected	Analyses (volume [m ³])	
		Metals	SVOCs
Station 1	4/25/01	X (562)	X (96.77)

2.6 Woods Road Waste Disposal Area Investigation

The Woods Road Waste Disposal Area was not originally recognized as a separate disposal area during the planning stages of the Remedial Investigation. One surface soil sample (SS-14) was originally proposed in this area to be used as a “background” sample, and a well was proposed to allow a limited investigation of the character of the material in the subsurface, since this area is on tannery property. However, during site reconnaissance, evidence of tannery waste was identified in the western Hoosic River bank, north of the bridge and TRC expanded the investigative program in Phase II to include test pit excavation.

After TRC excavated the test pits in this area and received the laboratory results, the USACE and EPA decided to remove the waste materials from the site as part of the NTCRA. Most of the samples collected by TRC in this area represent samples from material that is no longer present at the site.

Figure 2.6-1 shows the sample locations in the Woods Road Waste Disposal Area.

2.6.1 Ground Water Investigation

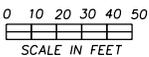
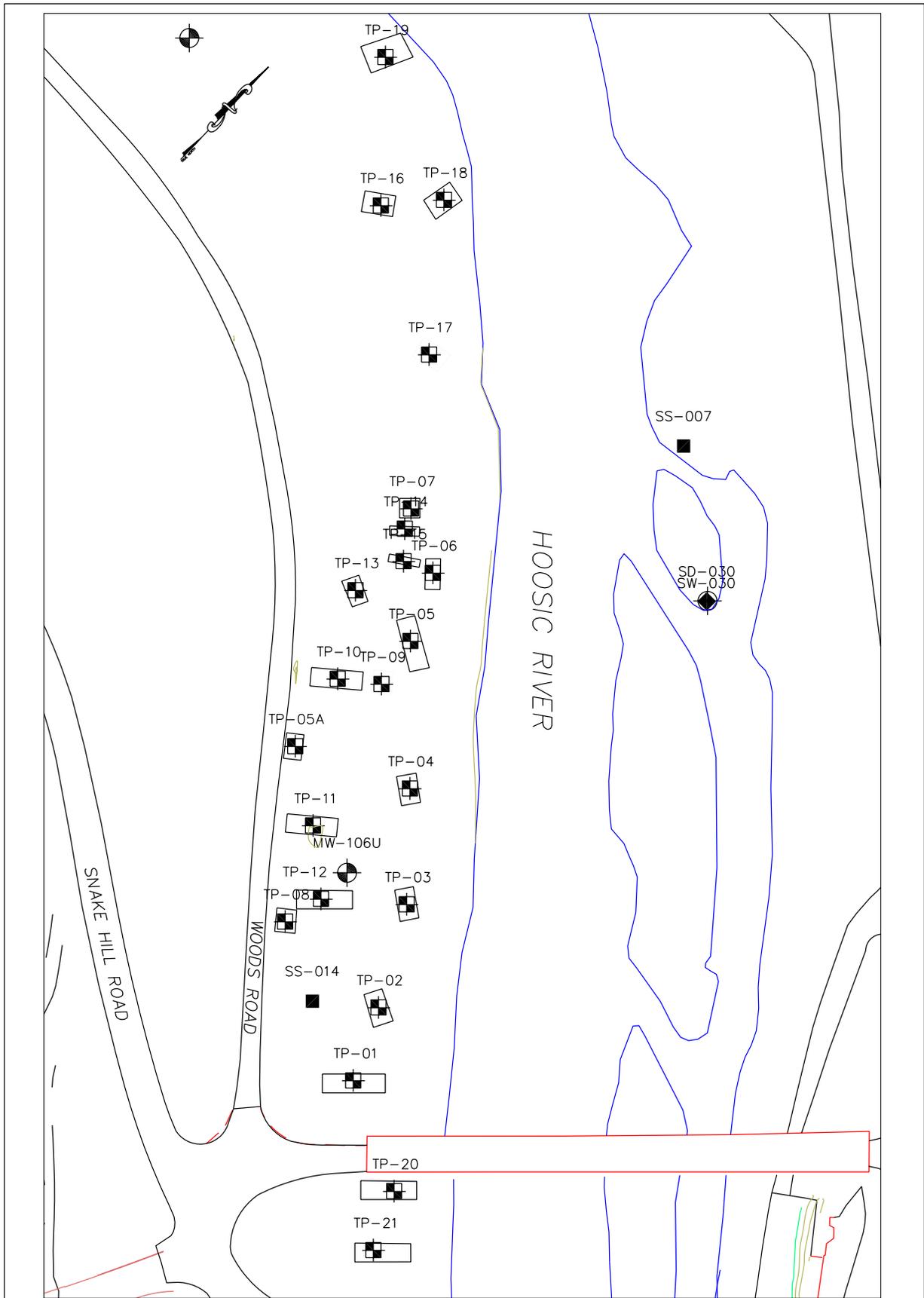
Two overburden wells were installed in this area to evaluate potential ground water impacts. There are also two wells that were used for tannery water supply. These wells were determined to be unusable for ground water sampling and site characterization.

Table 2.6-1 lists the ground water samples that were collected from the Woods Road Waste Disposal Area. Four rounds of ground water samples were collected.

MW-106U: This monitoring well was drilled and installed using the spin/drive and wash method on April 18 and 19, 2000. Split-spoon samples were collected continuously from the ground surface to a depth of 20 feet. Soil samples were then obtained at 10-foot intervals from 20 feet to refusal of the spoon sampler at a depth of 141 feet. Based on field observations of sample characteristics and drilling conditions, the bedrock surface appears to be 138 feet deep.

The boring was backfilled with bentonite chips from 20 to 29 feet. After the roller bit and drilling rods were removed from the ground, the open borehole caved in from 29 to 141 feet so it was not possible to fill the entire hole with bentonite. The well was installed from 8 to 18 feet.

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- LEGEND**
- TP-01 TEST PIT
 - 2" MONITORING WELL
 - SEDIMENT SAMPLE LOCATION
 - SURFACE WATER SAMPLE LOCATION
 - SURFACE SOIL SAMPLE LOCATION

	Booth Mills South Foot of John Street Lowell, MA 01852 978-970-5600	FIGURE 2.6-1 SAMPLE LOCATIONS WASTE DISPOSAL AREA POWNAL TANNERY POWNAL, VERMONT
	TRC PROJ. NO.: 02136-0220-01N93	
	EPA CONTRACT NO.: 68-W6-0042	
RAC SUBCONTRACTOR NO.: 107061		

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Table 2.6-1: Ground Water Samples, Woods Road Waste Disposal Area								
Sample Location	Turbidity (NTU)	Date Collected	Laboratory Analyses					
			VOC	SVOC	Metals/ Cyanide	Pesticide/ PCB	Dioxins	Hexavalent Chromium
MW-106U	4.25	5/11/00	X	X	X	X	X	X
MW-112U	1.98	5/11/00	X	X	X	X	X	X
MW-106U	5.0	8/2/00	X	X	X			
MW-112U	2.1	8/2/00	X	X	X			
MW-106U	3.5	9/27/00	X	X	X			
MW-112U	2.0	10/2/00	X	X	X			

MW-112U: This monitoring well was drilled and installed from April 12 through 18, 2000. The drive and wash method was used, and 4-inch steel casing was advanced into the underlying clay layer. The boring was drilled “open-hole” from 30 feet to the bedrock surface at 142 feet deep. The boring was then drilled 9 feet into the rock with a rollerbit to a maximum boring depth of 151 feet. Split-spoon samples were collected continuously from the ground to 16 feet deep, then at 10-foot intervals from 16 feet to the rock surface at 142 feet. The borehole was backfilled from a depth of 16 to 151 feet with bentonite chips, then a shallow overburden monitoring well was installed from 5 to 15 feet deep.

2.6.2 Soil Investigation

TRC collected soil samples from the two wells for geotechnical and fate and transport characterization. One surface soil sample was collected and 13 soil samples were collected from test pits in the area. Soil from 11 of the test pits was removed from the site during the NTCRA. Only the soil samples from test pits TP-20 and TP-21 remain at the site.

Table 2.6-2: Soil Samples, Woods Road Waste Disposal Area												
Sample Location	Sample Depth (feet) Unit Sampled		Date Collected	Laboratory Analyses								
	Top	Bottom		VOC	SVOC	Metals/ Cyanide	Hexavalent Chromium	Pesticides/ PCBs	Dioxins	TCLP Metals/ Ignitability/ Corrosivity	TCLP SVOCs	TCLP/ Pesticides
MW-106U	2	4	4/18/00									X
MW-112U	4	5	4/12/00									X

Table 2.6-2: Soil Samples, Woods Road Waste Disposal Area													
Sample Location	Sample Depth (feet) Unit Sampled		Date Collected	Laboratory Analyses									
	Top	Bottom		VOC	SVOC	Metals/ Cyanide	Hexavalent Chromium	Pesticides/ PCBs	Dioxins	TCLP Metals/ Ignitability/ Corrosivity	TCLP SVOCs	TCLP/ Pesticides	Grain Size/ Bulk Density
SS-14	0	0.5	4/6/00		X	X							
TP-01	6	7	9/7/00	X	X	X		X					
TP-01	7	8	9/7/00	X	X	X		X		X			
TP-01	0	0.5	9/7/00	X	X	X	X	X				X	
TP-01	6	6	9/7/00	X	X	X		X					
TP-02	3	4	9/13/00	X	X	X		X					
TP-03	6	7	9/7/00	X	X	X		X		X			
TP-01 (duplicate)	0	0.5	9/7/00	X	X	X		X					
TP-05A	4	4.5	9/7/00	X	X	X		X					
TP-05A	4	4.5	9/8/00	X									
TP-05	6	7	9/13/00		X			X					
TP-04	4	5	9/7/00	X	X	X		X		X			
TP-05	3	4	9/13/00	X	X	X		X		X			
TP-05	4	5	9/8/00	X	X	X		X					
TP-06	2	3	9/11/00	X	X	X		X		X			
TP-09	1	2	9/11/00	X	X	X		X		X			
TP-10	2	3	9/13/00	X	X	X		X		X			
TP-11	3	4	9/11/00	X	X	X		X		X			
TP-12	3	4	9/11/00	X	X	X		X					
TP-20	2	4	9/13/00	X	X	X		X					
TP-21	2	4	9/13/00	X	X	X		X					

2.7 Private Drinking Water Supply Well Investigation

TRC obtained two rounds of ground water samples from ten nearby private wells used for drinking water. Prior to selection of these wells, EPA sent a written request for access to 20 nearby residents, but only received positive responses from ten property owners.

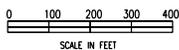
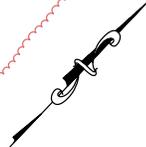
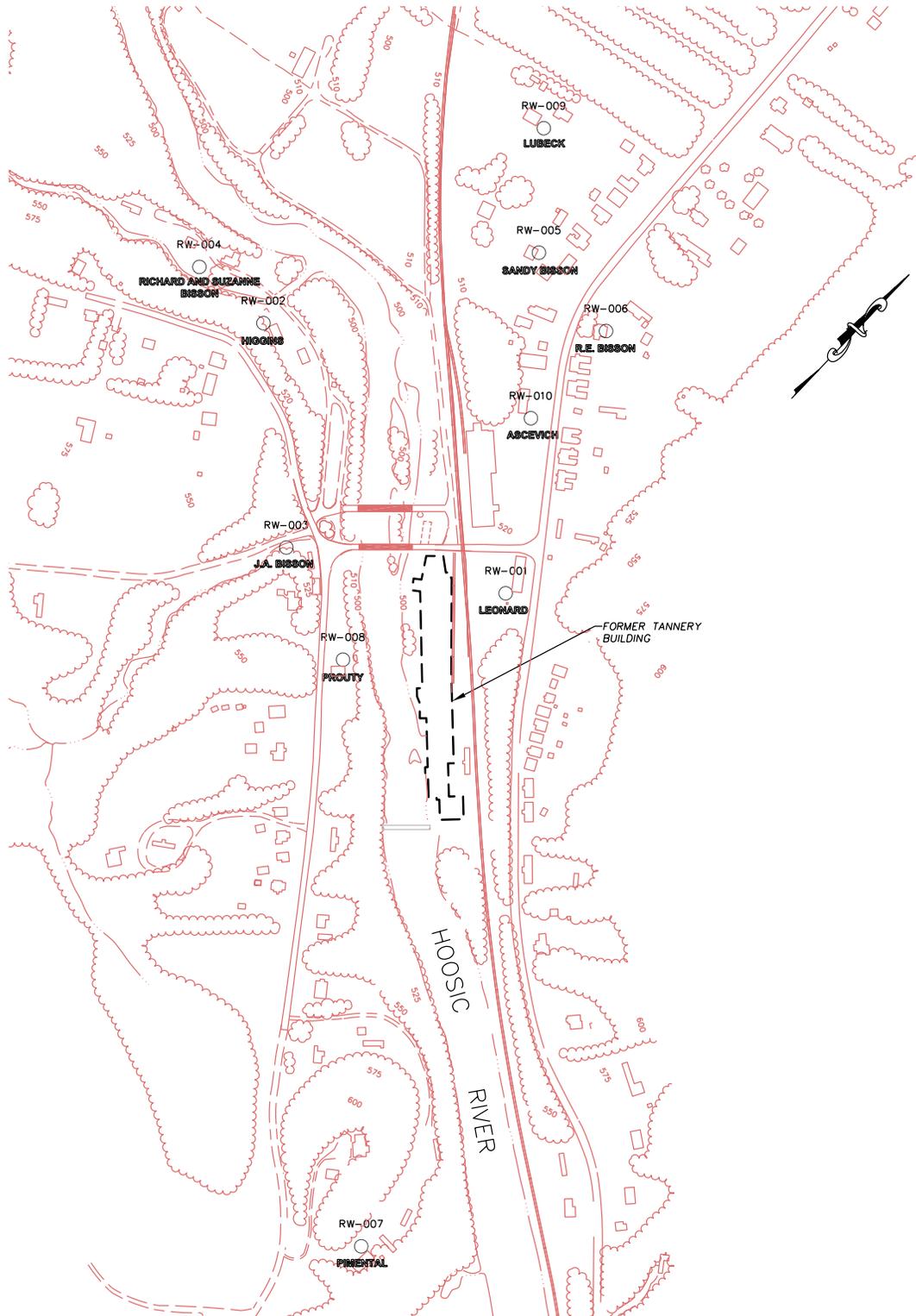
Table 2.7-1 lists the ground water samples collected from these private wells.

Figure 2.7-1 shows the location of the private wells that were sampled for the Remedial Investigation.

Table 2.7-1: Private Drinking Water Supply Well Samples

Resident	Sample ID	Date Collected	Turbidity	Well Depth (feet)	Laboratory Analyses					
					VOC	SVOC	Metals/ Cyanide	Pesticide/ PCB	Dioxins	Hexavalent Chromium
Leonard	RW-001	5/9/00	NR	21	X	X	X	X	X	X
Higgins	RW-002	5/9/00	NR	8	X	X	X	X	X	X
Higgins	RW-002 (duplicate)	5/9/00	NR	8	X	X	X	X	X	X
J.A. Bisson	RW-003	5/9/00	NR	20-30	X	X	X	X	X	X
Richard & Suzanne Bisson	RW-004	5/9/00	NR	90+	X	X	X	X	X	X
Sandy Bisson	RW-005	5/9/00	NR	25	X	X	X	X	X	X
R.E. Bisson	RW-006	5/9/00	NR	Unk	X	X	X	X	X	X
Pimental	RW-007	5/10/00	NR	225	X	X	X	X	X	X
Prouty	RW-008	5/10/00	NR	Unk.	X	X	X	X	X	X
Lubeck	RW-009	5/10/00	NR	Unk.	X	X	X	X	X	X
Ascevich	RW-010	5/10/00	NR	400	X	X	X	X	X	X
Leonard	RW-001	8/7/00	1.0	21	X	X	X			
Higgins	RW-002	8/7/00	0.7	8	X	X	X			
J.A. Bisson	RW-003	8/9/00	1.21	20-30	X	X	X			
Richard & Suzanne Bisson	RW-004	8/7/00	0.55	90+	X	X	X			
Richard & Suzanne Bisson	RW-004 (duplicate)	8/7/00	0.55	90+	X	X	X			
Sandy Bisson	RW-005	8/8/00	0.7	25	X	X	X			
R.E. Bisson	RW-006	8/9/00	1.41	Unk	X	X	X			
Pimental	RW-007	8/8/00	0.8	225	X	X	X			
Prouty	RW-008	8/8/00	1.0	Unk.	X	X	X			
Lubeck	RW-009	8/8/00	0.85	Unk.	X	X	X			
Ascevich	RW-010	8/8/00	4.7	400	X	X	X			
Prouty	RW-008	9/5/00		Unk	X					
Lubeck	RW-009	6/26/00		Unk	X	X				
Lubeck	RW-009 (duplicate)	6/26/00		Unk	X	X				

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LEGEND

- RW-001 PRIVATE DRINKING WATER SUPPLY WELL SAMPLING LOCATIONS
- WITH WELL OWNER

TRC	Boott Mills South Foot of John Street Lowell, MA 01852 978-970-5600
	TRC PROJ. NO.: 02136-0220-01N93
	EPA CONTRACT NO.: 68-W6-0042
	RAC SUBCONTRACTOR NO.: 107061

FIGURE 2.7-1
PRIVATE DRINKING
WATER SUPPLY WELL
SAMPLING LOCATIONS
POWNAI TANNERY
POWNAI, VERMONT

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2.8 Hoosic River Investigation

Additional surface water and sediment samples were obtained from the Hoosic River to characterize potential impacts to the Hoosic River from the site. These locations are not associated with any of the areas of concern at the site. All of the samples were obtained upstream or downstream of the site to determine the water quality above, adjacent, and below the site.

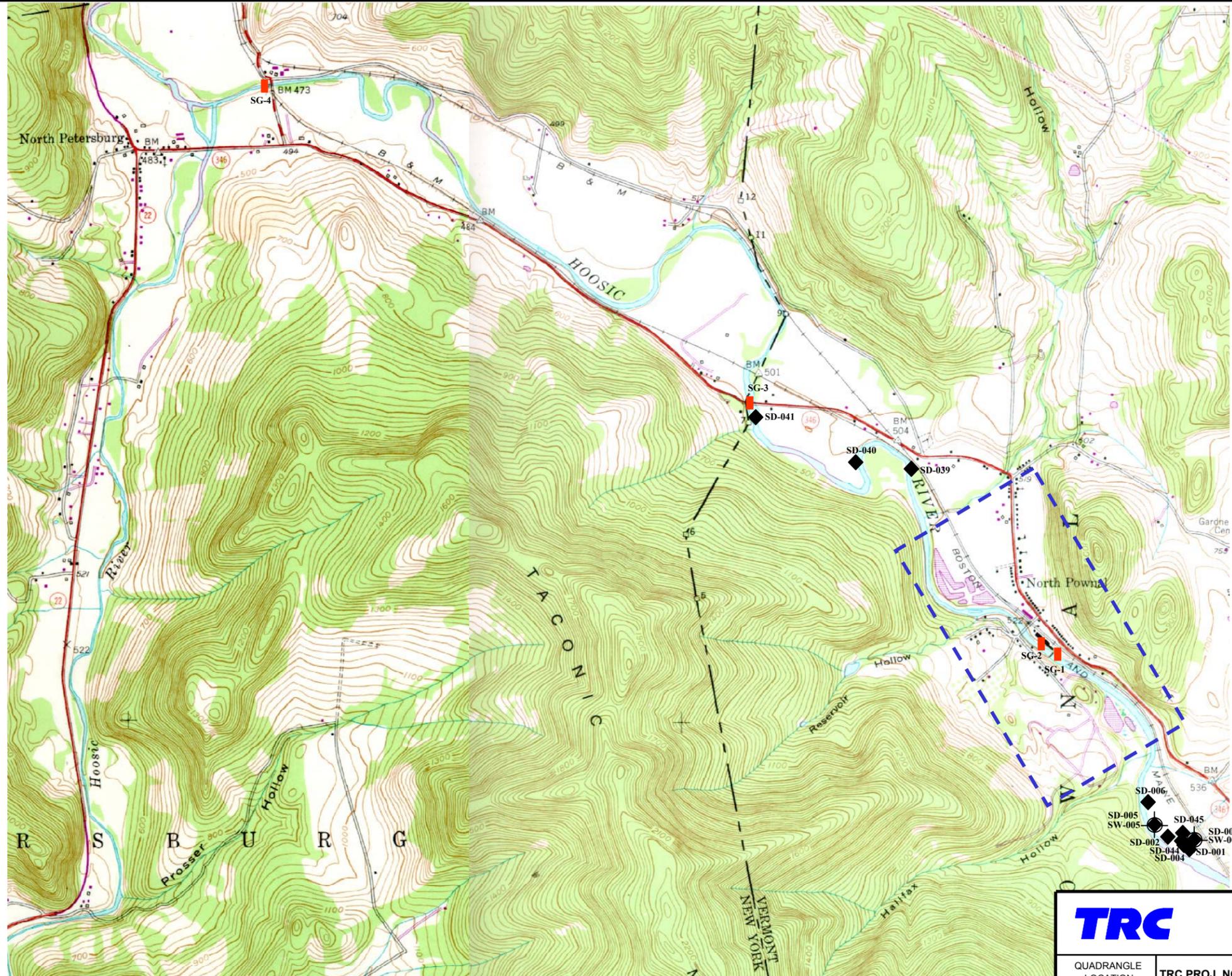
Figure 2.8-1 shows the location of the Hoosic River samples collected for the Remedial Investigation.

2.8.1 Sediment Investigation

Table 2.8-1 presents a list of sediment samples collected from the Hoosic River areas upstream and downstream of the tannery site.

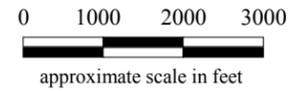
Table 2.8-1: Sediment Samples, Hoosic River Area								
Sample Location	Date Collected	Water Depth (ft)	Laboratory Analyses					
			Hex. Chromium	Metals/ Cyanide	TCO/TOC/% Moisture VOC/ Dioxin PCB Homo-logues	Pesticides/ SVOC	AVS/SEM	SVOC/Pest/PC B
SD-001	6/1/00	2.5		X	X			X
SD-002	6/1/00	2.5		X	X			X
SD-005	6/1/00	2.5		X	X			X
SD-006	5/25/00	2.5		X	X			X
SD-007	5/25/00	3		X	X			X
SD-010	5/25/00	3		X	X			X
SD-025	5/23/00	1.5		X	X			X
SD-026	5/23/00	3		X	X			X
SD-027	5/16/00	6	X	X	X	X	X	
SD-027 (duplicate)	5/16/00	6	X	X	X	X	X	
SD-028	5/22/00	1.5		X	X			X
SD-029	5/22/00	2	X	X	X		X	X
SD-038	5/18/00	2.5	X	X	X	X	X	
SD-039	5/17/00	2	X	X	X	X	X	
SD-040	5/17/00	3		X	X	X	X	
SD-041	5/17/00	1.5		X	X	X	X	
SD-042	5/23/00	2.5		X	X			X
SD-043	5/23/00	2		X	X	X		

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Legend

- ◆ Sediment Sample
- ⊕ Surface Water Sample
- Staff Gauge



BASE MAP IS A PORTION OF THE FOLLOWING 7.5' USGS TOPOGRAPHIC QUADRANGLE: NORTH POWNAL, VT-NY, 1954, PHOTOREVISED 1980

K:\GEOSCI\POWNA\GISKEY\TOPO_REV1

	Boott Mills South Foot of John Street Lowell, MA 0185 978-970-5600	<p>Figure 2.8-1 OFF-SITE SEDIMENT AND SURFACE WATER SAMPLING LOCATIONS POWNA TANNERY POWNA, VERMONT</p>
	TRC PROJ. NO.: 02136-0220-01N91	
	EPA CONTRACT NO.: 68-W6-0042	
QUADRANGLE LOCATION 	RAC SUBCONTRACTOR NO.: 107061	

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2.8.2 Surface Water Investigation

Table 2.8-2 lists the upstream and downstream surface water samples that were collected in the Hoosic River.

Table 2.8-2: Surface Water Samples, Hoosic River							
Sample Location	Date Collected	Laboratory Analyses					
		VOC	SVOC	Total Metals Cyanide	Filtered Metals	Dioxins	Hex. Chromium
<i>Upstream</i>							
SW-005	5/31/00	X	X	X	X	X	
SW-005 (duplicate)	5/31/00	X	X	X	X	X	
SW-026	5/23/00	X	X	X	X	X	
<i>Downstream</i>							
SW-034	5/18/00	X	X	X	X	X	X
SW-034 (duplicate)	5/18/00	X	X	X	X	X	X
SW-036	5/18/00	X	X	X	X	X	X
SW-038	5/18/00	X	X	X	X	X	
SW-050	6/2/00	X	X	X	X	X	

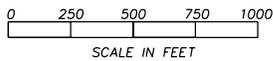
2.9 Background Investigation

2.9.1 Soil

Figure 2.9-1 shows the background soil sample locations collected by TRC from locations presumed to represent “background” or non-site related conditions. Each sample was collected from the upper 6 inches of soil.

Table 2.9-1 presents the laboratory analyses performed on the surface soil background samples.

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LEGEND

■ BACKGROUND SURFACE SOIL SAMPLE LOCATION



Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0220-01N93

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061

FIGURE 2.9-1
BACKGROUND SURFACE
SOIL SAMPLE LOCATIONS

POWNAL TANNERY
POWNA, VERMONT



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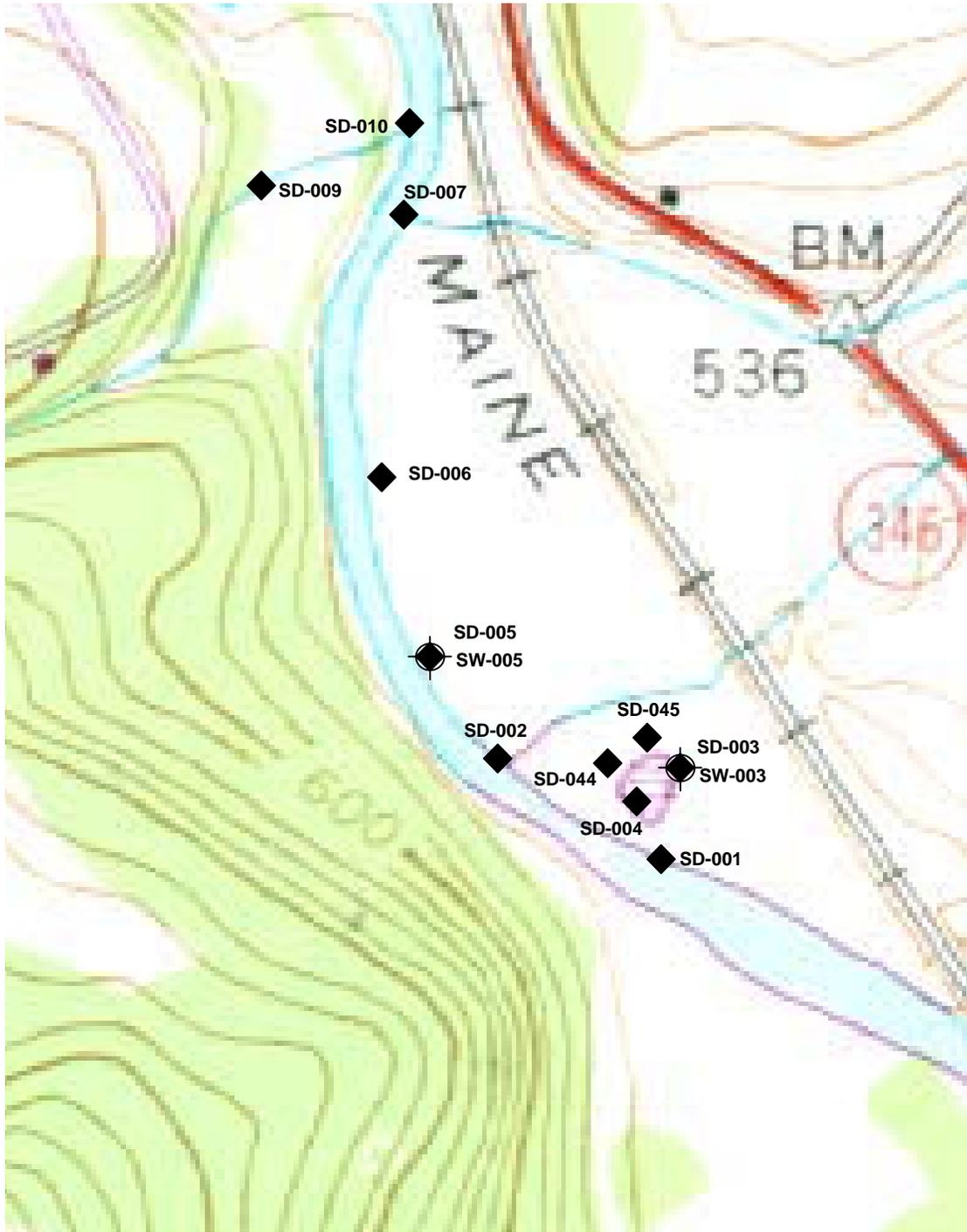
Table 2.9-1: Background Soil Samples						
Sample Location	Date Collected	Laboratory ID				
		VOC	SVOC/ Pesticide/PCB	Metals/ Cyanide	Dioxins	Hexavalent Chromium
SS-003	4/6/00	X	X	X		
SS-008	4/6/00	X	X	X		
SS-009	4/6/00	X	X	X		
SS-010	4/5/00	X	X	X		
SS-011	4/7/00	X	X	X		
SS-012	4/7/00	X	X	X	X	
SS-013	4/7/00	X	X	X	X	X
SS-015	4/5/00	X	X	X	X	

2.9.2 Surface Water and Sediment

Figure 2.9-2 shows the locations of the surface water and sediment reference samples collected for the Remedial Investigation. A reference area was selected for the pond and wet meadow communities present near the landfill. The reference pond is a small isolated pond located upstream of the study area. The reference pond lies within the 100-year floodplain of the Hoosic River. The wet meadow is present around the periphery of the reference pond and contains similar vegetation as the landfill wet meadow (i.e., it is dominated by reed canary-grass). Surface water depths within the pond range from several inches to over three feet. The source of water within the reference pond appears to be attributable to flooding events from the nearby Hoosic River as well as direct precipitation and surface water runoff from the adjacent wet meadow. No stream tributaries to the pond are present.

Reference riverine and stream communities were selected within areas of the Hoosic River and Halifax Hollow that are located upgradient of the landfill. These areas have not been affected by past operations at the Pownal Tannery (including the upgradient landfill).

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0 100 200 300 400 500
 approximate scale in feet



LEGEND

-  Sediment Sample Location
-  Sediment/Surface Water Sample Location



Boott Mills South
 Foot of John Street
 Lowell, MA 0185
 978-970-5600

QUADRANGLE
 LOCATION



TRC PROJ. NO.: 02136-0220-01N91

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061

Figure 2.9-2
REFERENCE SEDIMENT AND
SURFACE WATER
SAMPLING LOCATIONS
POWNA TANNERY
POWNA, VERMONT



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Table 2.9-2 list the analyses performed from the reference pond sample.

Table 2.9-2: Surface Water Samples, Reference Area							
Sample Location	Date Collected	Laboratory Analyses					
		Hex. Chromium	Filtered Metals	Total Metals Cyanide	Dioxins	SVOC	VOC
SW-003	6/1/00		X	X	X	X	X

Table 2.9-3 lists the sediment samples obtained from both the wetland and pond used for reference samples.

Table 2.9-3: Sediment Samples, Reference Area						
Sample Location	Date Collected	Water Depth (ft)	Laboratory Analyses			
			Metals/ Cyanide	TCO/TOC/% Moisture VOC/ Dioxin	SVOC/ Pest/PCB	PCB Homologues
Reference Pond						
SD-003	6/1/00	1	X	X	X	X
SD-004	6/1/00	1	X	X	X	X
SD-004 (duplicate)	6/1/00	1	X	X	X	X
Reference Wetland						
SD-044	6/1/00	0	X	X	X	X
SD-045	6/1/00	0	X	X	X	X

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