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Aug 9 9 37 AM '99

WASTE MANAGEMENT
DIVISION

August 6, 1999

Mr. Chuck Schwer, Supervisor
Sites Management Section
Waste Management Division
103 South Main Street/West Office
Waterbury, Vermont 05671-0404

Re: AOT Railway Garage
Morrisville, Vermont
SMS Site #98-2566

Dear Chuck:

Please find enclosed a copy of our *Subsurface Investigation Report* for work completed at the above referenced site. The work was conducted in accordance with the February 17, 1999 work plan approved by the Sites Management Section (SMS). Site work focused on activities requested in your February 1, 1999 correspondence to Mr. Mike Morrissette.

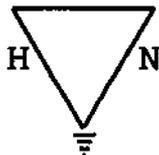
Do not hesitate to contact our office with any questions regarding the information presented.

Best regards,

Dori Barton
Project Manager

Enclosures

cc: Mike Morrissette (3 copies w/enclosures)
Alan McBean



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AOT RAILWAY GARAGE
Morrisville, Vermont

SUBSURFACE INVESTIGATION REPORT

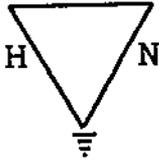
Prepared by:

Heindel and Noyes, Inc.

Prepared for:



August 6, 1999

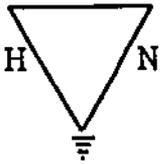


**AOT RAILWAY GARAGE
Morrisville, Vermont**

SUBSURFACE INVESTIGATION REPORT

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AOT RAILWAY GARAGE Morrisville, Vermont

SUBSURFACE INVESTIGATION REPORT

1.0 INTRODUCTION

This report documents environmental activities conducted by Heindel & Noyes (H&N) at the Agency of Transportation (AOT) Railway Garage, located in Morrisville, Vermont. These activities were performed in accordance with the February 17, 1999 work plan approved by the Sites Management Section (SMS). This report has been prepared by H&N on behalf of the AOT.

1.1 Purpose And Scope

The purpose of this investigation was to determine the extent and distribution of petroleum hydrocarbon contamination on the site. Prior research on the property identified the presence of underground piping, associated with an above ground storage tank used to contain diesel fuel, which had possibly been leaking. Also identified was a concrete bunker that had unintentionally received diesel fuel. The bunker was suspected of leaking as well. In connection with the subsurface investigation, H&N advanced soil borings, installed ground water monitor wells, conducted a sensitive receptor survey, and conducted ground water sampling.

This report summarizes the results of the subsurface investigation. Accordingly, this

report documents field activities, presents field and laboratory analytical results, and provides a discussion of all data obtained at the site to date.

2.0 SITE LOCATION

The AOT Railway Garage, formerly known as the Lamoille Valley Railroad Engine House, is located on Stafford Avenue, in Morrisville, Vermont. See attached Site Location Map in Appendix 1, page 1. The property is bounded to the north by S.T. Griswold and Company Inc. (property leased from Railway), to the south by Vermont Precision (open land), to the east by Manosh Propane, and to the west by forested land that leads to Lake Lamoille.

2.1 Site Description

The AOT came into possession of the Railway Garage in 1974. The facility was operated as a locomotive garage until approximately 1996. Several spurs from the railway enter the property from the west and lead to the former engine house. The former engine house is the only building on the site and is currently unoccupied. The building was previously used by the railway to service railroad vehicles. Inventory on the property

consists of metal parts, abandoned rail cars, stantions for the former diesel fuel AST, and the abandoned concrete bunker.

Most of the property is relatively flat, gently sloping to the west in the direction of Lake Lamoille.

Groundwater flows generally from the north or northeast to the south-southwest in the direction of Lake Lamoille. A ground water contour map constructed from water table elevation data confirms the direction of ground water flow on the site (Appendix 1, page 4).

3.0 PREVIOUS WORK CONDUCTED

A 1,000-gallon gasoline underground storage tank (UST) and associated piping was removed from the southeast exterior corner of the engine house on December 15, 1998. The tank pull was conducted by North Country Environmental Services. Tank pull records indicate that the tank and piping were approximately 20 years in age and in good condition. Soils from around the fill pipe, vent pipe, piping runs, dispenser island, and from the bed of the tank were screened with a PID and had levels of 0.0 ppm to 1.8 ppm. There was no evidence of significant petroleum contamination in the excavated soils, or evidence of a release from the UST. The approximate location of the former UST is included in the Site Map in Appendix 1, page 2.

Based on these findings, further investigation of the former UST was not determined necessary.

Two above ground storage tanks (ASTs), 275-gallon and 500-gallon, were cleaned and removed by North Country Environmental Services (NCES) on December 15, 1998.

NCES also conducted exploratory excavations of the underground piping associated with the AST system. NCES reported that due to the presence of elevated Total Organic Vapor levels (60-80 ppm) in the excavated soils, excavation activities were discontinued and a soil sample collected. The sample was analyzed for Volatile Organic Compounds (VOCs) via EPA Method 8260 and Total Petroleum Hydrocarbon (TPH) via EPA Method 8100 modified.

Laboratory results indicated concentrations of analytes above the detection limits for the analytical methods used. The limits of soil contamination were not defined.

Based on these findings, further investigation was determined necessary to define the extent of contamination associated with the underground piping for the AST system.

The contents of a 1,000 cubic foot, concrete bunker were pumped out by NCES on December 15, 1998. According to Mr. Mike Morrisette (Agency of Transportation), hundreds of gallons of diesel fuel had been accidentally discharged into the bunker within the last five years. The bunker was officially used for storage of sand. Approximately 2,250 gallons of fuel and water were pumped out in December 1998.

Based on the likelihood that the concrete bunker, not having been designed to store petroleum products, released diesel fuel to the subsurface environment, it was determined that further investigation was necessary.

The approximate area of excavation for the former UST, and the location of the former ASTs and associated piping, and the location of the concrete bunker are included on the Site Map in Appendix 1, page 2.

4.0 WORK COMPLETED BY HEINDEL & NOYES

4.1 AST Piping Removal

On May 6, 1999, Heindel & Noyes supervised the excavation and removal of the piping associated with the AST system by North Country Environmental Services.

During the excavation, soil samples were screened with an HNu Systems, Inc. Model PI 101 photoionization detector (PID) equipped with a 10.2 eV lamp. The PID was calibrated with a 100 ppm isobutylene span gas.

A backhoe was used to excavate soils and expose the underground piping. The piping system is located approximately 1.3 ft below ground surface (bgs) and consists of three lines. Two of the pipes run from the ASTs to the engine house, and the third line runs from the engine house to a pump station located to the south of the concrete bunker (adjacent to a railway spur).

All joints and junctures of the piping were visually inspected and soil samples collected from the wall of the excavation and from below the piping and screened with a PID. See photo log in Appendix 4.

Soils samples were collected and screened at seven locations within the excavation. TOC levels are summarized in the following table.

TOC Levels

Location	Side Wall (ppm)	Below Pipe (ppm)
SS#1	40	80
SS#2	13	100
SS#3	3	45
SS#4	14	10
SS#5	45	85
SS#6	--	11
SS#7	14	10

There was generally a strong odor of petroleum throughout the excavation area.

Soils were characterized as brown coarse and medium sands at SS#1, located approximately 5 ft from the standpipe adjacent to the stations. There was no visual evidence of releases from the piping at this location.

Soils sampled at SS#2, a juncture in the pipe, are characterized by brown coarse and medium sands. There is no visual evidence of releases, such as staining or free product, from the piping in this location.

Soil samples were collected at another pipe juncture at SS#3. Soils above the piping were characterized by brown coarse and medium sands. Soils below the piping were black medium sands. There was not visual evidence that the integrity of piping was compromised and that a release had occurred.

Soils at the juncture of the AST piping and the former engine house were stained from the ground surface to below the piping. Soils were characterized by coarse sands and gravel. The side walls of the engine house are stained black and suggest that possible surface spills occurred at the building. Historic railway practices may have included depositing waste fuel at this location (adjacent to the door). It is possible that the piping provided a preferential pathway for contamination originating from the engine house.

Soils at SS#5, SS#6 and SS#7 had the same general characteristics of coarse and medium sands with some gravel above the piping. Black/brown medium sands were observed below the piping at SS#5. Inspection of pipe

junctures and fittings did not indicate that the piping was leaking.

NCES cleaned the piping prior to removal. Approximately 42 gallons of liquid was pumped from the pipes. During the removal activity, approximately 1-2 gallons of product was spilled from the piping at SS#4 where the piping was cut at the building. Absorbent socks were applied immediately and a suction pump was used to suck up remaining liquid. Approximately 2-3 yard of contaminated soil was removed from the area and deposited on plastic near the concrete bunker. Soils were collected and screened from a depth of 4.5ft bgs. PID levels were elevated to 24 ppm, but consistent with readings in this area prior to the spill. It was determined that no residual contamination from the minor spill was left on the site.

Piping was removed and disposed of by NCES. Approximately 250 linear feet of piping was removed from the site.

4.2 Soil Boring/ Monitoring Well Installation

On May 6-7, 1999, a total of 21 soil borings were advanced and 5 subsequently configured with monitoring wells to evaluate hydrogeologic conditions, soil, and ground water quality. Soil borings were advanced using the macro core system by Specialty Drilling, Inc., (Burlington, Vermont) under the supervision of H&N personnel. The boring program focused on identifying the extent of petroleum contamination on the site.

Probing samples collected from the macro core were descriptively logged and screened for volatile organic compounds. Specialty Drilling's drilling logs are included in Appendix , pages 1-21.

Water table monitor wells were constructed of 2-inch (i.d.) PVC casing with flush-threaded joints and factory-slotted, 10-foot screened sections (0.010 inch). Screened sections were covered with filter sock and packed with drill cuttings. All monitor wells were finished with a bentonite surface seal. Each of the wells were finished with with PVC stick-up.

4.3 Soil Screening

During the soil-boring program, discrete interval soil samples were screened with an HNu Systems, Inc. Model PI 101 photoionization detector (PID) equipped with a 10.2 eV lamp. The PID was calibrated each day with a 100 ppm isobutylene span gas. Soil samples were placed in zip-lock plastic bags and permitted to equilibrate for a minimum of 15 minutes prior to head space screening. Headspace screening results are included on soil boring logs (Appendix 3, pages 1-21). Results are further discussed in Section 5.2.1.

4.4 Ground Water and Surface Water Sampling

Newly installed monitoring wells were developed on May 7, 1999 and purged on May 11, 1999 prior to sampling. Ground water samples were collected from the newly installed monitoring wells. Samples were obtained with a dedicated bailer. All samples were preserved with hydrochloric acid and ice, and submitted to Endyne, Inc. for EPA method 8021B.

4.5 Monitoring Well Survey

Newly installed monitoring well locations and top of casing (TOC) elevations were surveyed by Heindel & Noyes on May 11, 1999.

Water level measurements were obtained from all monitoring wells on May 11, 1999, prior to ground water sampling. Ground water elevations were calculated by subtracting the measured water levels from the surveyed TOC elevations. A water table elevation contour map was subsequently constructed (Appendix 1, page 4). The monitoring well elevation data are presented in tabular form in Appendix 1, page 3. A discussion of ground water elevation data is presented in Section 5.2.2.

4.6 Sensitive Receptor Survey

Contamination associated with the AOT Railway Garage could potentially impact human and environmental receptors. As a consequence, H&N performed a sensitive receptor survey with particular emphasis on the basements of the onsite and neighboring buildings, and the environment. The results of the receptor survey are presented in section 5.3.

5.0 INVESTIGATION RESULTS

5.1 Stratigraphy/Hydrogeology

The soil boring program concentrated on determining the degree and extent of petroleum contaminated soils and the impact to groundwater at the site. The investigation focused on the area where the former above ground storage tank had been located and where the concrete bunker is still located. Four soil borings were advanced in the area upgradient from the bunker and former tank (SB-1, SB-2, SB-16, and MW-3). Based on the soil boring logs generated during the drilling program, the stratigraphy of upgradient area generally consists of 12" of fill material (sands and gravel), overlying a 2' to 4' layer of native material (red/brown medium and coarse sands), overlying a 4' to 8' layer of coarse sand and gravel. A

confining layer of clay was encountered at 12' bgs. Bedrock was not encountered to depth of 12' bgs. Soils were generally saturated at approximately 8' to 10' bgs.

The remaining soil borings were advanced downgradient of the bunker and former tank. Based on the soil logs generated during the drilling program, the stratigraphy of the downgradient area consists of 2' to 4' of brown fine and medium sands coarse sands overlying a 4' to 8' layer of coarse sands and gravel. A confining clay layer was encountered at 12' bgs. Bedrock was not encountered during the drilling program. Soils were saturated at approximately 8.0' bgs.

As discussed in Section 4.4, groundwater elevations were calculated from monitoring well water level measurements taken on May 11, 1999 (Appendix 1, page 3). The water table elevation contour map confirms that shallow groundwater flow at the site is to the southwest towards Lake Lamoille (Appendix 1, page 4). The horizontal hydraulic gradient averages approximately 0.0012 feet/foot (MW-5 to MW-4) along the northeast/southwest extent of the property towards the Lake.

5.2 Analytical Results

5.2.1 Soil Screening

During the soil-boring program, continuous interval soil samples (generally 2-foot sections) were screened with an HNu Systems, Inc. Model PI 101 photoionization detector (PID) equipped with a 10.2 eV lamp. The PID was calibrated with a 100 ppm isobutylene span gas. Headspace screening results are included on soil boring logs (Appendix 3, pages 1-21) and in the following tables.

PID Soil Screening Test Results

	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	SB-7	SB-8	SB-9	SB-10	SB-11
Depth (ft bgs)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)
0-4'	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	1.0	12.0
4-8'	0.0	2.0	3.0	80.0	0.0	0.0	0.0	65.0	0.0	0.8	40.0
8-12'	10.0	0.0	62 ¹ /0.0 ²	NA	NA	0.0	NA	—	NA	1.3	40.0

¹Soils screened from top 12'.

²Soils screened from bottom 36"

	SB-12	SB-13	SB-14	SB-15	SB-16	MW-1	MW-2	MW-3	MW-4	MW-5
Depth (ft bgs)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)
0-4'	1.8	1.6	22.0	0.0	3.2	NIR	NIR	NA	NA	NA
4-8'	34.0	2.0	78	72	90	NIR	NIR	NA	NIR ⁵	NIR ⁶
8-12'	20.0	1.6/0.8 ¹	.6/1.8 ²	70/8 ³	NA	NIR	NIR	24/3 ⁴	NA	NA

¹ Soils screened from 0-21', and then from bottom.

² Soils screened from 0'-4", and from 24"-48"

³ Soils screened from 0-20", and then from bottom.

⁴ Tailings screened from 10' to 12'.

⁵ Tailings screened at 4'.

⁶ Tailings screened from 8' to 10'

The soil screening program was used to delineate the extent of the contaminant plume during the field investigation. Monitor wells were advanced in 5 of the 21 boring locations. PID levels from soil borings are used in combination with ground water analysis to define the boundaries of the contaminant plume discussed in Section 6.0.

5.2.2. Ground Water

The results of the May 11, 1999 groundwater analyses (EPA Method 8021b) are summarized in tabular form and included in Appendix 1, page 5. During the recent sampling event, groundwater concentrations exceeded either the VT Enforcement Standard (VTES) or the VT Health Advisory (VTHA) for one or more compounds in

monitoring wells MW-2, MW-3, MW-4 and MW-5.

- Monitoring well MW-2 had naphthalene (184 ug/l), 1,3,5- trimethylbenzene (25 ug/l) and 1,2,4-trimethylbenzene (117 ug/l) in excess of the VTES and VTHA.
- Monitoring well MW-3 had naphthalene (22 ug/l), 1,3,5- trimethylbenzene (10 ug/l) and 1,2,4-trimethylbenzene (16 ug/l) in excess of the VTES and VTHA.
- Monitoring well MW-4 had naphthalene (96 ug/l), 1,3,5- trimethylbenzene (20 ug/l) and 1,2,4-trimethylbenzene (83 ug/l) in excess of the VTES and VTHA.
- Monitoring well MW-5 had benzene (20 ug/l), naphthalene (578 ug/l), 1,3,5-

trimethylbenzene (68 ug/l) and 1,2,4-trimethylbenzene (334 ug/l) in excess of the VTES and VTHA.

Laboratory analytical reports are presented in Appendix 2, pages 1-5.

Volatile organic compounds (via EPA 8021b) were not detected in downgradient monitor well MW-1. Monitor wells MW-2, MW-3, and MW-4 show elevated levels of trimethylbenzenes and naphthalene, indicating that the residual contamination likely originated from the former diesel fuel AST or concrete bunker (underground storage vessel for diesel fuel). Total BTEX, and trimethylbenzene dissolved plume isopleth maps were constructed and are included in Appendix 1, pages 5-6.

Each of the dissolved plume isopleth maps shows a contaminant plume with highest magnitude (BTEX 354 ug/l and trimethylbenzenes 912 ug/l) concentrated about the source area associated with the bunker and former AST (MW-5). There is a significant decrease in dissolved phase contamination as the plume migrates toward MW-4 (BTEX <119 ug/l, trimethylbenzenes 179 ug/l).

5.3 Sensitive Receptor Survey

Contamination associated with the AOT Railway Garage could potentially impact human and environmental receptors. As a consequence, H&N performed a sensitive receptor survey on May 11, 1999, with particular emphasis on the basements of the neighboring buildings, and the environment. The results of the receptor survey are presented below.

5.3.1 Human Receptors

Humans can be exposed to contaminants through three major pathways, ingestion, inhalation, and dermal contact.

Ingestion

Exposure through ingestion occurs by the consumption of contaminated foodstuffs or drinking water. The AOT Railway Garage is serviced by public water, with no private water supply wells located on the property.

According to the Morrisville Water and Light Department, area businesses (including S.T. Griswold & Company Inc.) use public water supplies near the AOT Railway Garage. There are no known private water supply wells in the vicinity of the property. Exposure through ingestion is not likely to be a threat to human health.

Dermal Contact

The dermal contact pathway involves exposure by physical contact with contaminated soil, surface water, or groundwater, with subsequent absorption of contaminants through the skin. During the soil borings for additional characterization, maximum PID readings (30-90 ppm) were encountered at depths of 4'-8' below ground surface (bgs). The risk for dermal contact with contaminated soil is considered to be negligible.

Lake Lamoille is located approximately 650 feet to the southwest of the property. A surficial reconnaissance of the embankment that leads down to the Lake was conducted during which a groundwater seep was observed. There were no sheens or odors detected in the ground water discharge area.

Visual analysis of the seep water and sediments indicates that the contaminant plume on the site has not adversely affected the water quality of the Lake and does not likely pose a threat to human health.

Due to the absence of private supply wells in the surrounding area, groundwater contact is not considered a potential risk to human health.

Inhalation

In order to evaluate the potential inhalation exposure, neighboring buildings were visited. As determined through the use of a PID, no inhalation pathways were identified.

S.T. Griswold and Company, Inc.

The building associated with this neighboring business is on a cement slab, with no basement. S.T. Griswold and Company, Inc. leases this property from the Railway.

There are no other businesses or residences in the vicinity of the subject property.

5.3.2 Environmental Receptors

Lake Lamoille is located approximately 650 feet southwest of the subject property. There is no evidence that the contaminant plume on the subject property has adversely affected the water quality of the Lake. There were no sheens or odors observed on the near shore waters of the Lake downgradient from the site.

The known environmental receptors in the area are the groundwater, the soil in contact with groundwater, the soil in the area of the bunker and former AST locations, and Lake Lamoille.

6.0 CONCLUSIONS AND RECOMMENDATIONS

H&N has completed an investigation of the AOT Railway Garage in Morrisville, Vermont. These activities included onsite monitoring well installation, soil screening, groundwater sampling from newly installed wells, monitoring well survey, and a sensitive receptor survey. Based on the data collected during this investigation, several conclusions have been made. These are as follows:

- Shallow groundwater flow has been confirmed to be southwest, towards Lake Lamoille.
- Headspace PID soil screening results (3 ppm to 85 ppm) from within the excavation area of the piping for the former 250-500 gallon waste oil AST indicate the presence of residual soil contamination.
- Approximately 42 gallons of liquid was pumped from the relict piping indicating that there were no leaks or spills in the lines.
- Soils at the juncture of the AST piping and the former engine house were stained from the ground surface to below the piping. Historic practices of disposing of waste oil on the ground surface (adjacent to a doorway) are likely responsible for the contamination present.
- The relict AST piping likely provided a preferential pathway for contamination originating from the engine house. Removal of the piping eliminates this pathway.
- Headspace PID soil screening results immediately downgradient of the former

diesel AST and the bunker at the drilling location MW-5 and from the downgradient drilling locations SB-3 and SB-8 indicate the presence of residual soil contamination.

- Headspace PID soil screening results upgradient (northeast direction) of the former diesel AST and concrete bunker at the drilling locations SB-1 and SB-2 indicate low levels of residual contamination (0-10ppm) at a depth of 12' bgs. Contamination at these locations is not likely associated with the former AST or bunker.
- Groundwater laboratory analysis for MW-5 compliment the results of the soil screening. With the exception of toluene, concentrations of all BTEX compounds, trimethylbenzenes, and naphthalene were elevated above detection limits. Toluene was found in only low levels in MW-5, <20 ppm.
- Groundwater concentrations exceeded either the VT Enforcement Standard (VTES) or the VT Health Advisory (VTHA) for one or more compounds in onsite monitoring wells MW-2, MW-3, MW-4, and MW-5.
- The sources of the BTEX, naphthalene and total trimethylbenzene contamination has been identified as the former 250-500 gallon diesel AST and/or the concrete bunker. There is no detailed history of use for these source areas.
- The highest contaminant concentrations (<354 ppb BTEX, 402 ppb total trimethylbenzenes, 578 ppb naphthalene) were detected in MW-5 located just downgradient of the former AST and existing concrete bunker. The relatively

low BTEX, high total trimethylbenzenes and elevated naphthalene concentrations are consistent with diesel fuel contamination.

- The contaminant plume has migrated south from the source area as evidenced by elevated levels of VOCs in MW-2 and MW-4, particularly 1,2,4-trimethylbenzene (117 ppb and 83 ppb, respectively).
- Elevated contaminant concentrations in groundwater (total trimethylbenzenes and naphthalene) and in soils (PID levels 3.2 ppm to 90 ppm) in upgradient monitor well MW-3 and soil boring SS16 are indicative of residual contamination. Given the low BTEX concentrations, it is unlikely that the source of this contamination is the former 1,000-gallon gasoline UST, removed in 1998. Historic railroad practices, including miscellaneous uses of waste oil, is the most likely source of the contamination.
- The southern (downgradient) boundary of the dissolved-phase hydrocarbon plume(s) has not been delineated with the current array of monitor wells. The plume does not likely extend north (upgradient) of MW-5. The west boundary of the plume has been delineated at MW-10. The eastern boundary of the contaminant plume has not been determined with the current array of monitor wells. The vertical extent of contamination has been roughly defined between 4' and 12' within and downgradient of the source area (MW-5).
- A groundwater seep was observed on the embankment leading to Lake Lamoille. There were no sheens or odors detected in the ground water discharge area. Visual analysis of the seep water and sediments

indicates that the contaminant plume on the site has not adversely affected the water quality of the Lake and does not likely pose a threat to human health.

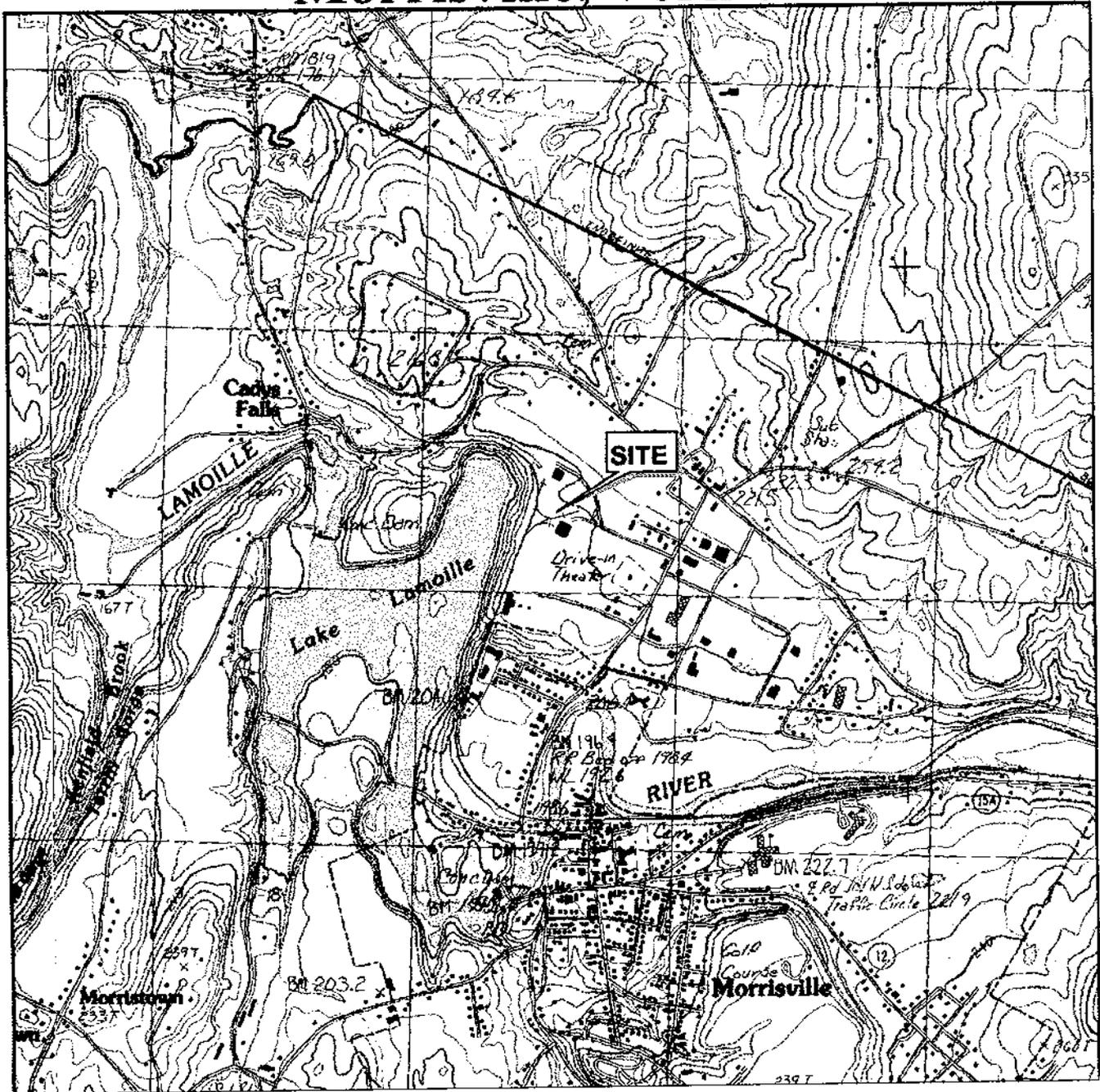
- There are no private water supply wells in the vicinity of the property. There is not likely a potential risk to public health or the environment offsite.

Based on the above conclusions, H&N recommends the following:

- Collect and analyze groundwater discharge from the seep location on the embankment leading to Lake Lamoille. Samples should be analyzed for VOCs via EPA Method 8260.

- Conduct an additional monitoring in the summer 1999, and collect ground water samples from all newly installed monitor wells (five wells). Monitor well MW-3 shall serve as an upgradient compliance point and monitor well MW-4 as the downgradient compliance point. Samples should be analyzed for VOCs via EPA Method 8260. Samples should also be analyzed via EPA Method TPH 8015 DRO with a fuel ID.
- Screen contaminated soils (2-3 yards from spill area and 20 yards of diesel saturated sand from within concrete bunker) stockpiled on plastic adjacent to the concrete bunker with a PID.
- Based on the results of the summer 1999 monitoring event, make recommendations for future site management.

Site Location Map AOT Railway Garage Morrisville, Vermont



2000 0 2000 Feet



INFORMATION &
VISUALIZATION
SERVICES

P.O. Box 64708 • Burlington, Vermont • 05406-4708 • Tel: (802) 886-6477 • Fax: (802) 886-1014

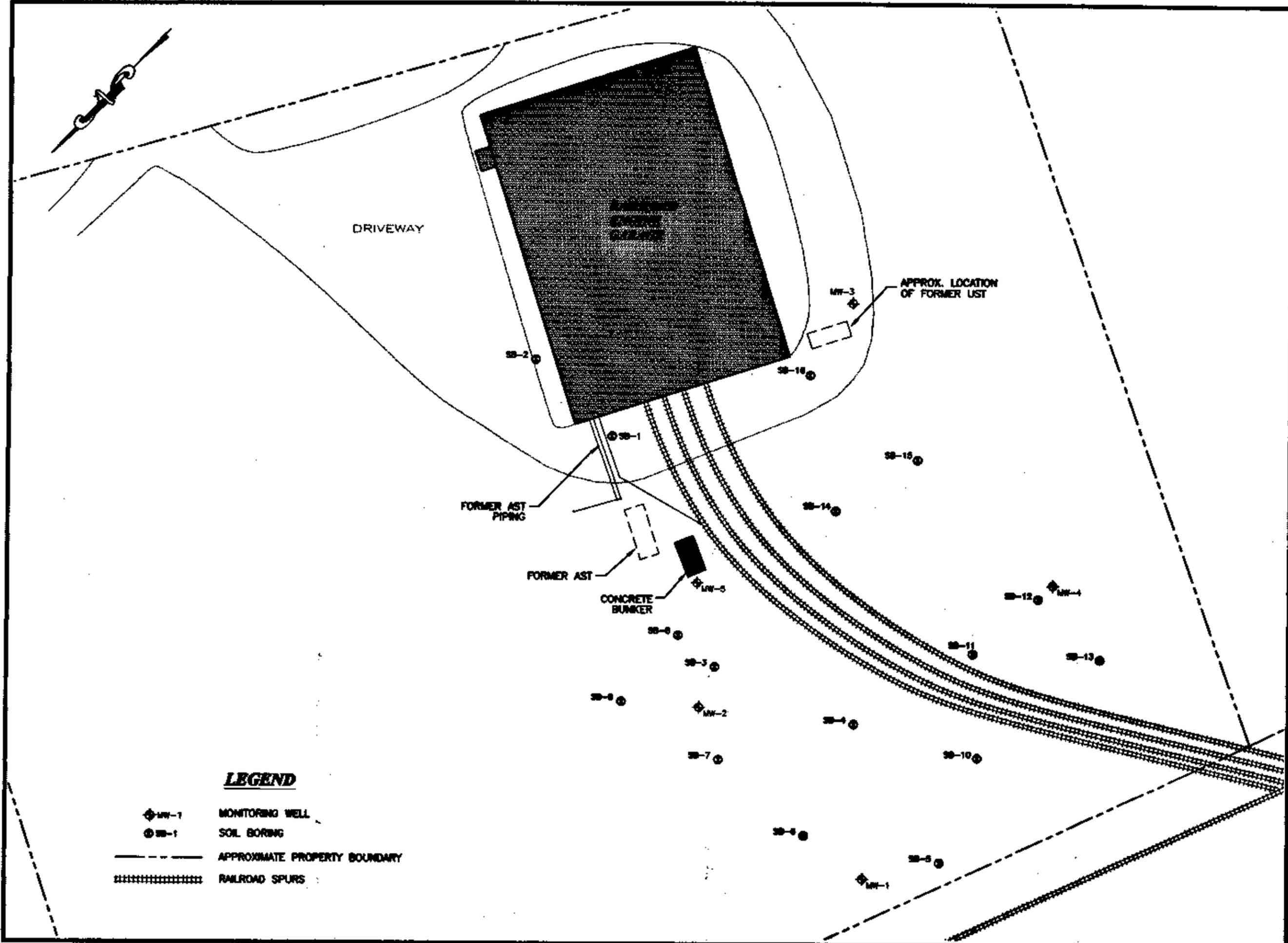
TABLE 1
WATER TABLE ELEVATIONS
May 11, 1999
AOT Railway Garage
Morrisville, Vermont

Monitoring Well	TOC Elevation (ft)	Depth to Groundwater (ft btc)	Water Table Elevation (ft)
MW-1	98.86	8.85	90.01
MW-2	103.24	11.60	91.64
MW-3	101.02	9.48	91.54
MW-4	99.96	10.15	89.81
MW-5	103.01	10.77	92.24

Notes:

TOC = Top of casing

btc = below top of casing



LEGEND

- ◆ MW-1 MONITORING WELL
- SB-1 SOIL BORING
- - - - - APPROXIMATE PROPERTY BOUNDARY
- ||||| RAILROAD SPURS

Heindel and Noyes

- Hydrogeology • Ecology •
- Environmental Engineering •

CONSULTING ENGINEERS AND PLANNERS
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Prepared by:
Information & Visualization Services

DATE: JULY 18, 1999
PROJECT NO: 99022
DRAWN BY: S. Smith
PROJ. MGR: S. Barton
APPROVED: J. Noyes
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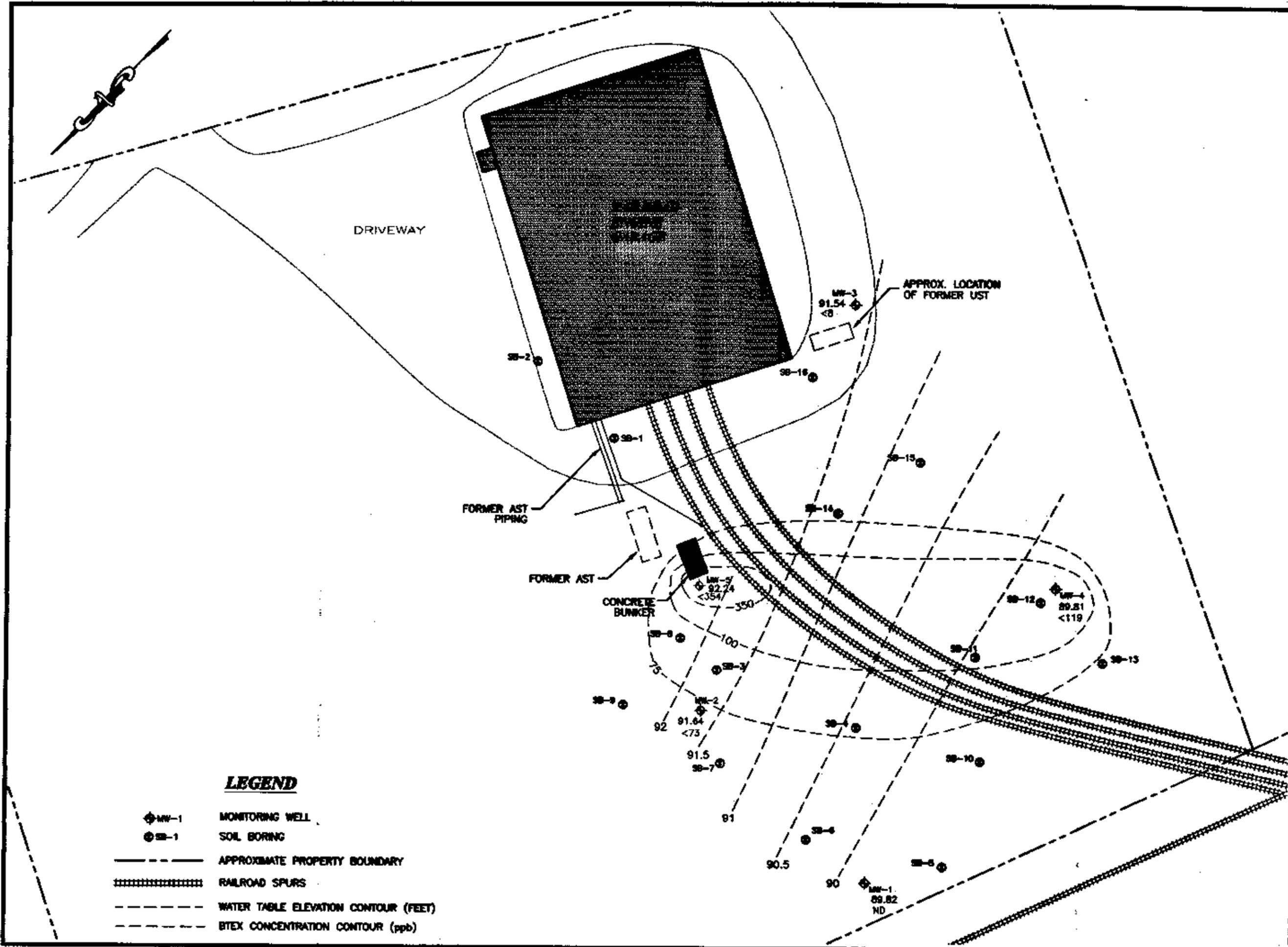
AOT Morrisville	VERMONT
MORRISVILLE,	SITE PLAN
SCALE: 1" = 50'	FILE: CHAOTMORRISITEPLAN

WATER QUALITY DATA
Agency of Transportation
Morrisville, Vermont

Well	Compound	VGES	5/11/99
MW-01	Benzene	5	ND / < 1
	Toluene	1000	ND / < 1
	Ethylbenzene	700	ND / < 1
	Xylenes	10000	ND / < 1
	Total BTEX	--	ND / < 4
	1,3,5-Trimethylbenzene	4	ND / < 1
	1,2,4-Trimethylbenzene	5	ND / < 1
	Naphthalene	20	ND / < 1
	MTBE	40	ND / < 1
MW-02	Benzene	5	ND / < 1
	Toluene	1000	ND / < 1
	Ethylbenzene	700	34
	Xylenes	10000	37
	Total BTEX	--	< 73
	1,3,5-Trimethylbenzene	4	25
	1,2,4-Trimethylbenzene	5	117
	Naphthalene	20	184
	MTBE	40	ND / < 10
MW-03	Benzene	5	ND / < 2
	Toluene	1000	ND / < 2
	Ethylbenzene	700	ND / < 2
	Xylenes	10000	ND / < 2
	Total BTEX	--	ND / < 8
	1,3,5-Trimethylbenzene	4	10
	1,2,4-Trimethylbenzene	5	16
	Naphthalene	20	22
	MTBE	40	ND / < 2
MW-04	Benzene	5	ND / < 2
	Toluene	1000	7
	Ethylbenzene	700	24
	Xylenes	10000	86
	Total BTEX	--	< 119
	1,3,5-Trimethylbenzene	4	20
	1,2,4-Trimethylbenzene	5	83
	Naphthalene	20	96
	MTBE	40	ND / < 2
MW-05	Benzene	5	20
	Toluene	1000	ND / < 20
	Ethylbenzene	700	74
	Xylenes	10000	240
	Total BTEX	--	< 354
	1,3,5-Trimethylbenzene	4	68
	1,2,4-Trimethylbenzene	5	334
	Naphthalene	20	678
	MTBE	40	ND / < 20

ND = Not Detected
 Bold, Shaded = Exceeds Vermont Groundwater Enforcement Standard (VGES)

u:\projects\act\morrisville\wqdata.xls



LEGEND

- ◆ MW-1 MONITORING WELL
- SB-1 SOIL BORING
- - - - - APPROXIMATE PROPERTY BOUNDARY
- ||||| RAILROAD SPURS
- - - - - WATER TABLE ELEVATION CONTOUR (FEET)
- - - - - BTEX CONCENTRATION CONTOUR (ppb)

Heindel and Noyes

- Hydrogeology • Ecology •
- Environmental Engineering •

CONSULTING ENGINEERS AND SCIENTISTS
P.O. BOX 8478
SURLINGTON, VERMONT 05488-4788

Prepared by:
Information & Visualization Services

DATE: JULY 16, 1999
PROJECT NO. 90022
DRAWN BY: S. Smith
PROJ. MGR: S. Barton
APPROVED: J. Noyes
<input type="checkbox"/> DRAFT <input type="checkbox"/> FINAL

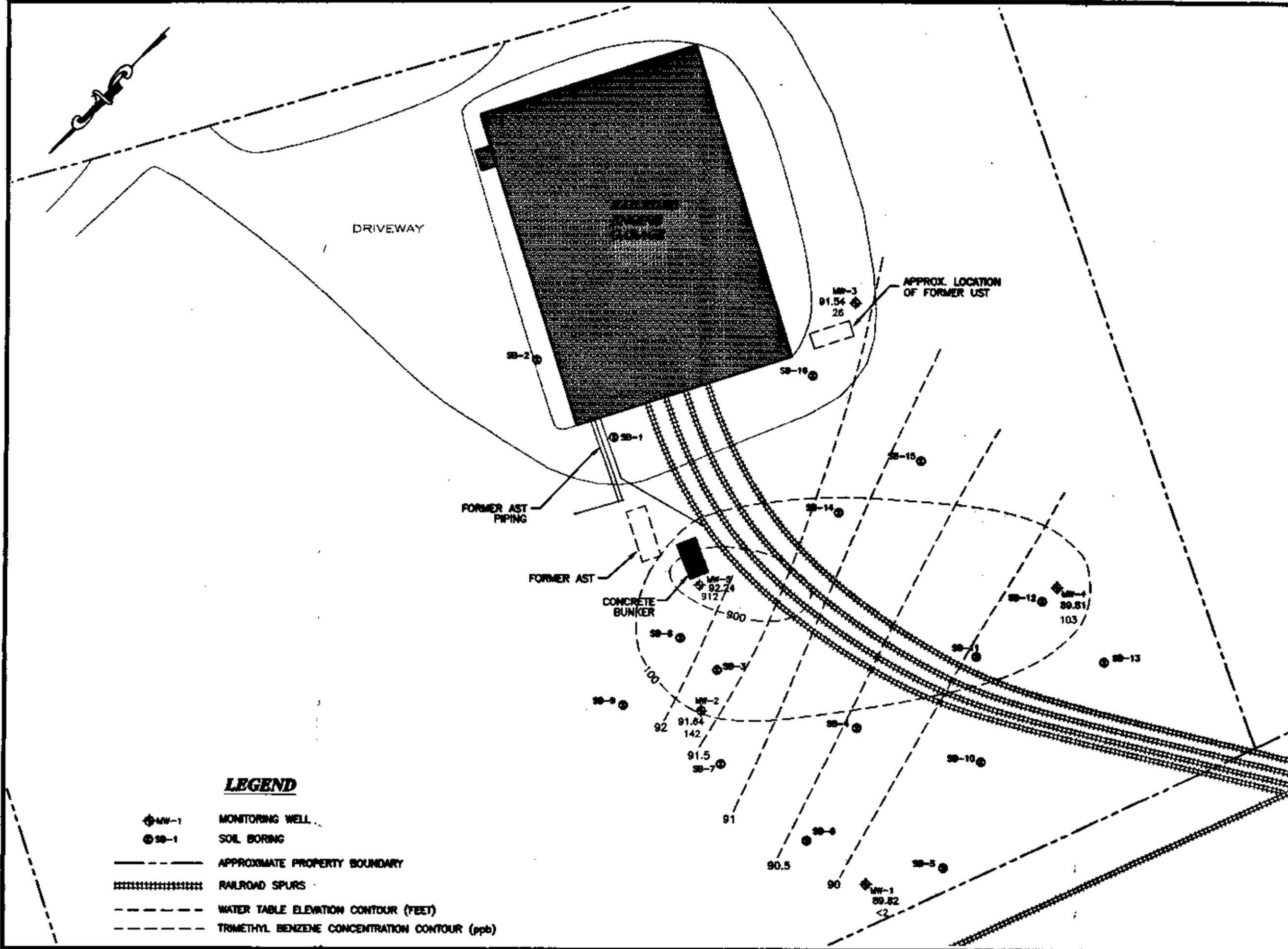
AOT Morrisville

MORRISVILLE, VERMONT

WATER TABLE AND BTEX CONCENTRATION CONTOUR MAP - 5/11/99

SCALE: 1" = 50'

FILE: C:\AOT\MORRIS\SITEPLAN



LEGEND

- ◆ MW-1 MONITORING WELL
- SB-1 SOIL BORING
- APPROXIMATE PROPERTY BOUNDARY
- ||||| RAILROAD SPURS
- - - - - WATER TABLE ELEVATION CONTOUR (FEET)
- - - - - TRIMETHYL BENZENE CONCENTRATION CONTOUR (ppb)

Helndel and Noyes

- Hydrogeology • Ecology •
- Environmental Engineering •

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Prepared By:
 Information & Visualization Services

DATE: JULY 16, 1999
PROJECT NO. 00022
DRAWN BY: D. Smith
PROJ. MGR: D. Barton
APPROVED: J. Noyes
<input type="checkbox"/> DRAFT <input type="checkbox"/> FINAL

AOT Morrisville

MORRISVILLE, VERMONT

WATER TABLE AND TOTAL TRIMETHYL BENZENE CONCENTRATION CONTOUR MAP - 5/11/99

SCALE: 1" = 60'

FILE: C:\AOTMORRIS\STEPAN

5/17/99

Department of Environmental Conservation Laboratory
Modified Method 8021 - Petroleum in Water

GJD

Lab Id: 38888 Report To: Heindel & Noyes
Location: AOT MO MW 2

Phone: 658-0820
Program: 41 2566

Date Collected: 5/11/1999
Chain of Custody? Yes

Notes:

Date Analyzed: 5/12/1999 Over hold? No Dilution: 10

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Methyl-t-butylether	10	N.D.				
Benzene	10	N.D.				
Toluene	10	N.D.				
Ethylbenzene	10	34				
Total Xylenes	10	37				
1,3,5-Trimethylbenzene	10	25				
1,2,4-Trimethylbenzene	10	117				
Naphthalene	10	184				
Total Volatile Hydrocarbons	1000	2110	E			

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

α,α,α -Trifluorotoluene 106% 4-Bromofluorobenzene . 109%

Notes: No second column confirmation used.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

5/17/99

Department of Environmental Conservation Laboratory
Modified Method 8021 - Petroleum in Water

GJD

Lab Id: 38889 Report To: Heindel & Noyes
Location: AOT MO MW 3

Phone: 658-0820 Date Collected: 5/11/1999
Program: 41 2566 Chain of Custody? Yes

Notes:

Date Analyzed: 5/12/1999 Over hold? No Dilution: 2

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Methyl-t-butylether	2	N.D.				
Benzene	2	N.D.				
Toluene	2	N.D.				
Ethylbenzene	2	N.D.				
Total Xylenes	2	N.D.				
1,3,5-Trimethylbenzene	2	10				
1,2,4-Trimethylbenzene	2	16				
Naphthalene	2	22				
Total Volatile Hydrocarbons	200	828	E			

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

γ , α , α -Trifluorotoluene 104% 4-Bromofluorobenzene . 107%

Notes: No second column confirmation used.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

5/17/99

Department of Environmental Conservation Laboratory
Modified Method 8021 - Petroleum in Water

GJD

Lab Id: 38890 Report To: Heindel & Noyes
Location: AOT MO MW 4

Phone: 658-0820 Date Collected: 5/11/1999
Program: 41 2566 Chain of Custody? Yes

Notes:

Date Analyzed: 5/12/1999 Over hold? No Dilution: 2

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Methyl-t-butylether	2	N.D.				
Benzene	2	N.D.				
Toluene	2	7				
Ethylbenzene	2	24				
Total Xylenes	2	86				
1,3,5-Trimethylbenzene	2	20				
1,2,4-Trimethylbenzene	2	83				
Naphthalene	2	96				
Total Volatile Hydrocarbons	200	1500	E			

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

α,α,α -Trifluorotoluene 106% 4-Bromofluorobenzene . 107%

Notes: No second column confirmation used.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

5/17/99

Department of Environmental Conservation Laboratory
Modified Method 8021 - Petroleum in Water

GJD

Lab Id: 38891 Report To: Heindel & Noyes
Location: AOT MO MW 5

Phone: 658-0820
Program: 41 2566

Date Collected: 5/11/1999
Chain of Custody? Yes

Notes:

Date Analyzed: 5/13/1999 Over hold? No Dilution: 20

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Methyl-t-butylether	20	N.D.				
Benzene	20	20				
Toluene	20	N.D.				
Ethylbenzene	20	74				
Total Xylenes	20	240				
1,3,5-Trimethylbenzene	20	68				
1,2,4-Trimethylbenzene	20	334				
Naphthalene	20	578				
Total Volatile Hydrocarbons	2000	14300	E			

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Wagner, Heindel and Noyes, Inc.

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

α,α,α -Trifluorotoluene 105% 4-Bromofluorobenzene . 109%

Notes: No second column confirmation used.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

5/17/99

Department of Environmental Conservation Laboratory
Modified Method 8021 - Petroleum in Water

GJD

Lab Id: 38887 Report To: Heindel & Noyes
Location: AOT MO MW 1

Phone: 658-0820 Date Collected: 5/11/1999
Program: 41 2566 Chain of Custody? Yes

Notes:

Date Analyzed: 5/13/1999 Over hold? No Dilution: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Methyl-t-butylether	1	N.D.				
Benzene	1	N.D.				
Toluene	1	N.D.				
Ethylbenzene	1	N.D.				
Total Xylenes	1	N.D.				
1,3,5-Trimethylbenzene	1	N.D.				
1,2,4-Trimethylbenzene	1	N.D.				
Naphthalene	1	N.D.				
Total Volatile Hydrocarbons	100	98	E			

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

α,α,α-Trifluorotoluene 104% 4-Bromofluorobenzene . 107%

Notes: No second column confirmation used.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

SOIL BORING LOG

	P.O. Box 64709, Burlington, Vermont 05406-4709 Tel: 802-658-0820 Fax: 802-860-1014	Project Name: AOT Morrisville Project Location: Morrisville, Vermont Boring Number: 13 Sheet 1 of 1 SDI Project Number: 99911					
Boring Location: SB-11 Foreman: Chris Aldrich H&N Staff: Chris Aldrich and Dori Barton		Date Started: 5/6/99 Date Completed: 5/6/99					
Sampling Method: Split Spoon _____ Direct Push _____ Other _____ Size: _____ Hammer: _____ Fall: _____		Groundwater Readings Date _____ Depth _____ Casing _____ Stabil. _____ Time _____					
Sample		Sample Description	Strata Change & General Description	Field Testing PID	Equipment or Well Installed		
No.	Recovery	Depth	Blows				
1	38"	0-4'	D.P.	14" topsoil and B horizon 5" gray gravel 2" red/brown fine sand, then gray coarse sand and gravel.	Dry Dry	12 ppm	None
2	6"	4-8'	D.P.	3" rock in tip; core barrel head driven up into barrel. Head and barrel shot.	Moist	40 ppm	
3	30"	8-12'	D.P.	Sheens and odors, gray coarse sand and gravel.	Saturated	40 ppm	
Proportions Used Trace: 0 to 10% Little: 10 to 20% Some: 20 to 35% And: 35 to 50%		Penetration Resistance 140 lb. wt falling 30" on 2" O.D. Sampler Cohesive Density 0-4 Very Loose 5-9 Loose 10-29 Med. Dense 30-49 Dense 50+ Very Dense		Cohesive Consistency 0-2 Very Soft 3-4 Soft 5-8 M/Stiff 9-15 Stiff 16-30 Very Stiff 31+ Hard		Well Construction Details 2" PVC Screen (.020): Sand: 2" PVC Riser: Concrete: Plug/Cap: Bentonite chips: Filter Sock: Well Guard:	

NIR = NO INSTRUMENT RESPONSE



Photo #1: Former location of ASTs and concrete bunker in the foreground; former engine house in the background.



Photo #2: SS #1: Excavation of AST piping at stick up. No staining of soils evident.

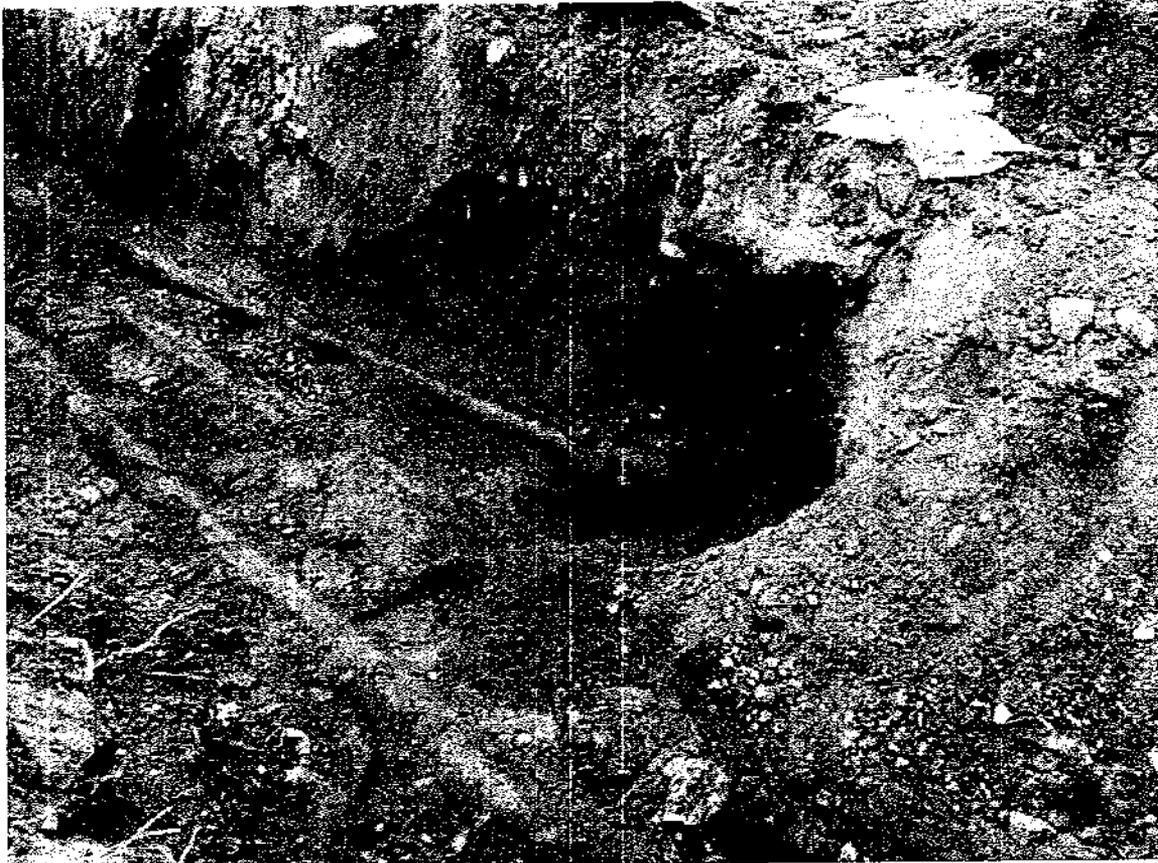


Photo #3: SS #2: Juncture of piping. No staining of soils evident.



Photo #4: SS #: Black sandy soils below piping.

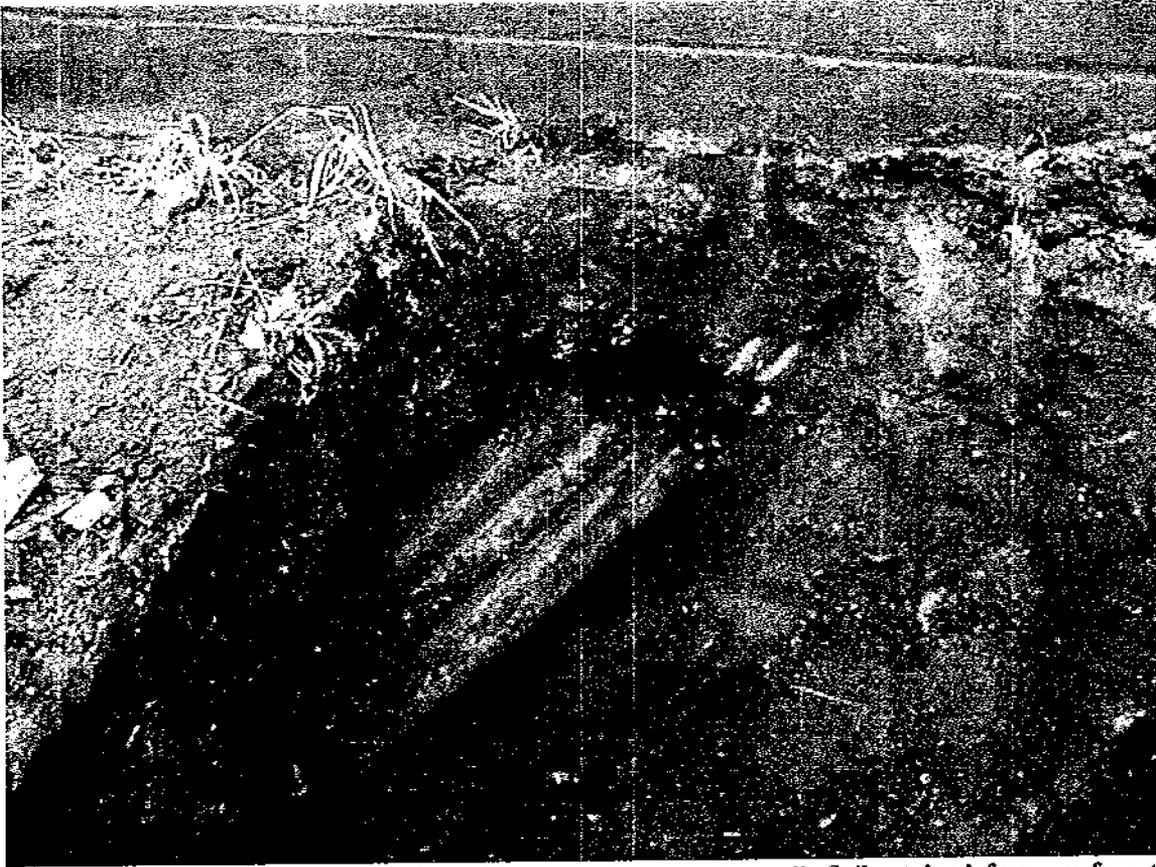


Photo #5: SS #4: Juncture of piping with engine house outer wall. Soils stained from surface to subsurface below piping.



Photo #6: Engine house outer wall, note black staining.

AOT Railway Garage - Morrisville, Vermont 1996 Orthophotography Base



1997 Morristown Parcels

375 0 375 Feet



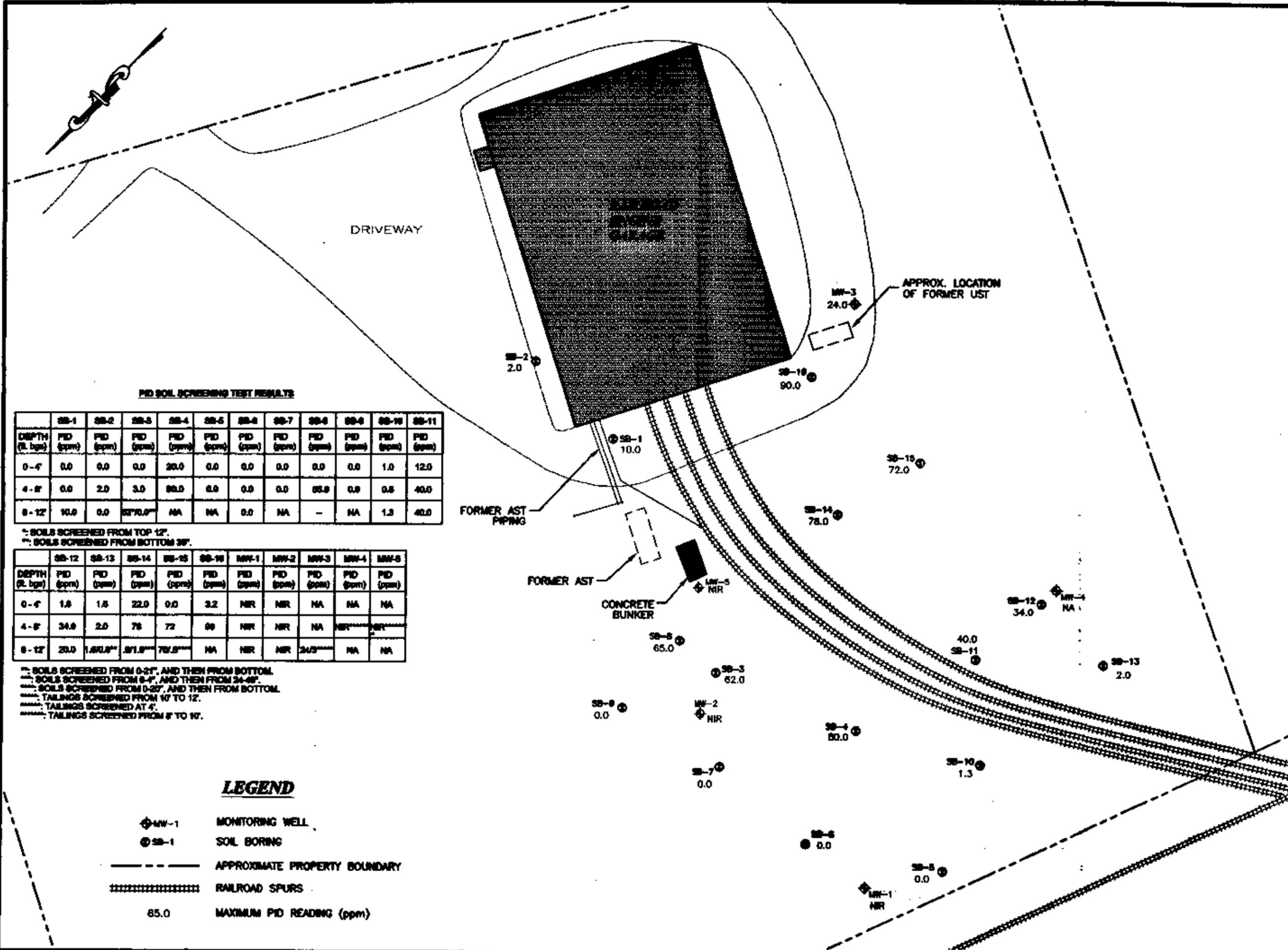
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PID SOIL SCREENING TEST RESULTS

	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	SB-7	SB-8	SB-9	SB-10	SB-11
DEPTH (ft. bgs)	PID (ppm)										
0-4'	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	1.0	12.0
4-8'	0.0	2.0	3.0	88.0	0.0	0.0	0.0	65.0	0.0	0.8	40.0
8-12'	10.0	0.0	270.0*	NA	NA	0.0	NA	-	NA	1.3	40.0

* SOILS SCREENED FROM TOP 12".
 ** SOILS SCREENED FROM BOTTOM 36".

	SB-12	SB-13	SB-14	SB-15	SB-16	MW-1	MW-2	MW-3	MW-4	MW-5
DEPTH (ft. bgs)	PID (ppm)									
0-4'	1.8	1.8	22.0	0.0	3.2	NIR	NIR	NA	NA	NA
4-8'	34.0	2.0	76	72	98	NIR	NIR	NA	NIR	NIR
8-12'	20.0	1,800.0**	871.0**	781.0**	NA	NIR	NIR	24.0**	NA	NA

* SOILS SCREENED FROM 0-24", AND THEN FROM BOTTOM.
 ** SOILS SCREENED FROM 8-4", AND THEN FROM 24-48".
 *** SOILS SCREENED FROM 0-24", AND THEN FROM BOTTOM.
 **** TAILINGS SCREENED FROM 10" TO 12".
 ***** TAILINGS SCREENED AT 4".
 ***** TAILINGS SCREENED FROM 8" TO 10".

LEGEND

- ◆ MW-1 MONITORING WELL
- SB-1 SOIL BORING
- - - - - APPROXIMATE PROPERTY BOUNDARY
- ||||| RAILROAD SPURS
- 65.0 MAXIMUM PID READING (ppm)

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 • Environmental Engineering •
 CONSULTING SCIENTISTS AND ENGINEERS
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 Prepared By:
 Information & Visualization Services

DATE: JULY 20, 1999
 PROJECT NO. 99022
 DRAWN BY: S. Smith
 PROJ. MGR: S. Barton
 APPROVED: J. Noyes
 DRAFT FINAL

AOT Morrisville
 MORRISVILLE, VERMONT
 PID READINGS (ppm) - 5/5/99
 SCALE: 1" = 50'
 FILE: C:\AOTMORRIS\SITEPLAN