

CITY OF ELMIRA
FINAL SITE INVESTIGATION REPORT

FOR THE
FORMER AMERICAN LAFRANCE SITE
100 LAFRANCE STREET
ELMIRA, NEW YORK

MUNICIPAL ASSISTANCE BROWNFIELD PROGRAM

N Y S D E C
1996 CLEAN WATER / CLEAN AIR BOND ACT
ENVIRONMENTAL RESTORATION PROJECTS

SUBMITTED TO:

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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AND
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MUNICIPAL ASSISTANCE BROWNFIELD PROGRAM
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Addendum 1	May 1999
Addendum 2	December 1999

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ACRONYMS

ALF	American LaFrance Site
AOC	Area of Concern
C&D	Construction and Demolition Debris
DER	Division of Environmental Remediation
DLP	Duplicate Sample
ECD	Election Capture Detectors
EL	Elevation
EWB	Elmira Water Board
GC	Gas Chromatograph
GRAs	General Response Actions
GW	Groundwater
H	Surface Soil Sample Identification
KG	Kilogram
MG	Milligram
MGD	Million Gallons per Day
MW	Monitoring Wells
NYS	New York State
NYCRR	New York State Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
N ₂	Nitrogen Carrier Gas
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyls
PID	Photoionization Detector
PPM	Parts Per Million
QC	Quality Control

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ACRONYMS (Continued)

RA	Remedial Alternatives
RAA	Remedial Action Alternatives
RAO	Remedial Action Objectives
RAR	Remedial Alternatives Report
RSCO	Recommended Soil Cleanup Objectives
SAC	State Assistance Contract
SAMP	Sampling and Analytical Monitoring Plan
SCGs	Standards, Criteria and Guidance
SEQR	State Environmental Quality Review Act
SI	Site Investigation
SVOC	Semi-Volatile Organic Compounds
SVS	Soil Vapor Survey
TAGM	Technical Assistance Guidance Memorandum
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOGS	Technical and Operational Guidance Series
US	United States
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compounds

Executive Summary

This report details and summarizes the Site Investigation (SI) performed on the former American LaFrance site. A separate Remedial Alternatives Report (RAR) has been prepared for contaminants of concern which have been identified as part of the SI. This report has been prepared pursuant to the 1996 Clean Water/Clean Air Bond Act, Environmental Restoration Projects, Title 5 under NYSDEC State Assistance Contract (SAC) C300928 (Site No. B-00011-8).

The former American LaFrance fire truck manufacturing site is a 4.357 acre irregularly shaped parcel located on the west side of Erie Street at the northwest corner of Erie Street and Home Street in the City of Elmira, Chemung County, New York. The Owner of Record is the City of Elmira. This site is in an Economic Development Zone. Demolition of the manufacturing plant was completed in November of 1984. PCB contaminated soil was removed from the site during this demolition project. All aboveground buildings have been removed from the site.

The focus of this SI has been placed on site specific issues described in a December, 1996 Phase I Environmental Assessment report identifying potential subsurface discharges as the result of former industrial use of the site. The issues of concern include an underground fuel oil tank; possible floor drains discharging to on-site drywells; and suspected on-site deposition of industrial waste streams.

Since 81% of the subject site had been previously occupied by structures, potential subsurface discharges may have been the result of suspected floor drain or sump discharges to on-site drywells. In contrast, six sewer laterals on Erie Street have been identified indicating many or all discharges may have been to the municipal sewer which dates back to 1906.

Contaminants were analyzed for full or partial TCL analysis which was dependent upon actual field findings and screening. The contaminant levels detected in both soil and groundwater have been compared with TAGM 4046 Recommended Soil Cleanup Objectives (RSCO) and NYS Ambient Water Quality Standards.

The NYSDOH surface soil sample at location H2 shows levels of Mercury and Cadmium exceeding RSCO at a depth of zero to three inches. Arochlor 1260 was also detected at location H2 slightly exceeding the surface soil level established by the USEPA.

Comparison of site-wide Soil Vapor Survey (SVS) results versus location GW-4 results at depths of 4-8 and 8-12 feet show marginally elevated VOC levels at the aforementioned GW-4 depths. However, this does not appear to be a significant source of contamination as the soil and groundwater laboratory results do not support the SVS results for detected VOC's.

Generally, the SVS is a field screening tool utilized for gross delineation of SI efforts. The SVS has identified a random spatial occurrence of organics which have been identified in the subsurface soils occurring from the near surface to the Vadose Zone. Several contaminants in soil have been detected above site-wide levels in other isolated locations on the site. The data from the SVS is indicative of site-wide spatial distribution of low level VOC's detected in the subsurface soils lack vertical migration. The data would further suggest that VOC's do not persist in elevated quantities which is indicative of a typical 100-year old industrial site use with probable episodic surface spillage and lacking a significant continuing or remaining source of contamination.

Several SVOC's were detected in the Geoprobe Macro cores at a depth of approximately eleven feet in the Vadose Zone soils in concentrations above RSCO. Two SVOC's (2-Methylnaphthalene, Phenanthrene) were detected in one groundwater sample that exceeded groundwater or NYS Ambient Water Quality Standards. Twelve metals were also detected in groundwater above NYS Ambient Water Quality Standards.

Compounds Above Standards, Cleanup Objectives, or Guidance Values

Compound	Anomaly Test Pits	Soils 3 inches	Soils 1-7 feet	Soils 8 feet	Groundwater Samples
Metals					
Arsenic	✓				✓
Antimony					✓
Barium					✓
Cadmium					✓
Chromium	✓	✓	✓	✓	✓
Cobalt					✓
Lead					✓
Magnesium					✓
Mercury	✓	✓	✓	✓	
Vanadium					✓
PCBs					
PCB 1260		✓			
SVOCs					
Benzo(a) anthracene		✓			
Benzo(a)pyrene		✓			
Benzo(b)fluoranthene		✓			
Benzo(g,h,i)perlene		✓			
Benzo(k)fluoranthene		✓			
Chrysene	✓	✓	✓	✓	
Indeno(1,2,3-cd)pyrene		✓			
2-Methylnaphthalene	✓				✓
Naphthalene	✓				
Phenanthrene	✓				✓

The risk characterization is based on an exposure assessment and a toxicity assessment. For a contaminant to pose a significant risk to public health, it must exist in a significant enough concentration and have an exposure pathway.

The three areas of concern are surface soils, subsurface soils, and groundwater. The areas of concern are summarized below.

Areas of Concern

Contaminant Type	Surface Soils	Subsurface Soils	Groundwater
VOC's	□	◆	□
SVOC's	■	◆	◆
PCBs	■	□	□
Metals	■	◆	■

Key:

- - Not detected above guidance values or standards
- ◆ - Detected in one or more samples at concentrations above guidance values or standards, but not expected to present a risk to human health due to the absence of exposure pathways
- - Detected at concentrations above guidance values, standards, or background concentrations - may present an unacceptable risk to human health

The objective of site remediation is to lower or eliminate the potential risk to human health. Since groundwater is not being used on or near the site, the potential risk associated with low level residual contamination is minimal. The appropriate area of concern is the surface soil. Metals, pesticides, and SVOC's have been identified in the first six inches of soil. Possible exposure pathways could exist for the surface soil. The site is presently vacant. Placement of a barrier layer above the existing surface soils and the use of an air monitoring program during such remediation will eliminate any potential health risk posed by the site.

Groundwater occurs naturally at a depth of approximately eleven feet. It has been verified with the Elmira Water Board (EWB) that groundwater is not a source of drinking water in this area, although isolated private wells may exist in the City of Elmira as serviced by the EWB. The EWB Water Distribution System map (revised 1983) shows cross and downgradient service for 4,500 feet past the LaFrance site. There is also known to be a private industrial well located cross gradient at a Laundromat on Broadway and at the former Remington Rand facility. These wells are not downgradient of the site. Based on the groundwater gradient established during the SI, these wells do not present an exposure pathway.

Three EWB wells are located on Foster Island and two wells are located on Hudson Street. The five wells provide the City of Elmira and surrounding area with an average 3.7 million gallons per day (MGD). The Foster Island wells have been in use since 1991 and the Hudson Street wells have been in use since 1966 and 1972. According to the EWB, laboratory results have not detected any TCL contaminants during their period of operation. These production wells are 3,600 feet upgradient to the site and should not be impacted by the site.

The City of Elmira has proposed commercial or industrial development of the American LaFrance site. Hence, remedial action alternatives are based on commercial and industrial site use.

Pursuant to the State Assistance Contract (SAC), appropriate closure of the tar tank and impacted soils surrounding the tank will occur as part of the remediation.

The development of remedial action objectives (RAO's) consists of the following (developed by the US National Academy of Sciences):

1. Hazard Identification
2. Exposure Assessment
3. Toxicity Assessment
4. Risk Characterization

The identification, evaluation and screening of remedial alternatives for the subject site are to be found in the RAR.

1. Introduction

1.1 Purpose of Investigation

The purpose of this investigation is to determine if significant contaminants exist on the subject site from past use which could pose a risk to the environment and/or human health and safety, and to assess the significance of said risks if present, and to develop remedial alternatives to mitigate any risk so determined.

Site investigation objectives are to evaluate the human health and environmental risks and are designed to generate sufficient information to develop a Remedial Alternatives Report. This SI has provided sufficient information to fulfill the work plan objectives and to determine potential remedial alternatives.

NYS Groundwater and Ambient Water Quality Standards and TAGM 4046 have been utilized as guidance documents for comparative analysis of the organics and inorganics detected in TCL samples based on samples exhibiting odors, visible staining, elevated photoionization detector (PID) levels, and elevated gas chromatograph (GC) levels.

1.2 Site Background

1.2.1 Site Description

The American LaFrance Brownfield site is located within the City of Elmira, Chemung County, New York. The site includes the former American LaFrance Fire Engine Company (see **Figure 1**).

The facility property covers a 4.357-acre irregular shaped vacant parcel located on the west side of Erie Street in the City of Elmira, Chemung County, New York (see **Figure 2**). The Owner of Record is the City of Elmira. The site is located in an Economic Development Zone. Structures on the site have been demolished and the C & D materials removed from the location. The previous structures consisted of five former factory buildings and a smoke stack area. Paved corridors and staging areas separated the buildings on the site. Subsurface concrete machine foundations remain.

1.2.2 Site History

Various manufacturing buildings were ultimately abandoned by their owners and acquired by the City through tax foreclosure proceedings at this site that was home to the former American LaFrance Fire Engine Company since the turn of the century. The City acquired this site in the 1980's via a tax foreclosure proceeding. In 1984, the City demolished the site buildings. A Phase I environmental assessment was recently completed for the City which showed the need for a detailed Phase II assessment due to the presence of a former foundry area, painting areas, paint spray booths and machine shops. The Phase I assessment also showed the presence of liquid tar on the ground surface adjacent to the nearby Conrail property.

Former uses of the subject site relate to fire truck and fire extinguisher manufacturing with approximate dates of operation as follows:

1903	LaFrance Fire Engine Company
1925-1930	American LaFrance Fire Engine Company
1935-1950	American LaFrance and Foamite Company
1955-1960	American LaFrance Foamite Corporation
1965-1970	American LaFrance, a division of Sterling Precision Instruments
1975-1980	American LaFrance, a division of Automatic Sprinkler Corporation
1980	NYS Department of Transportation
1984	According to Steve Avery of the City of Elmira, a demolition permit was issued to L. M. Sessler on March 28, 1984. The completion date of record is November 1984.
1990	Vacant

The LaFrance Fire Engine Company occupied the site in 1903 according to the 1903 Sanborn map. A municipal sewer was not installed in the area until 1906. Therefore the original manufacturing facility initially was not, and may never have been, connected to the sewer.

1.2.3 Previous Investigations

The subject site had been the location of a fire truck manufacturing facility since the turn of the century. All phases of fire truck and extinguisher manufacturing took place on this site. Because of these various processes, the site is possibly contaminated with hazardous materials and petroleum-based products. There are no waste disposal records for the site to prove proper disposal of waste materials typically used in this type of industry, and considering their prevailing practices relative to industrial waste management, site contamination is possible.

A Phase I Environmental Site Assessment of the LaFrance site was completed in December 1996. The Phase I investigation has shown that the building structures occupied approximately 81 percent of the site. Former employees have also verified that a concrete slab floor existed within the structure. Therefore, areas serving as a conduit to the groundwater have been determined to be limited to the tar tank.

The Phase I suggested the following potential contaminants:

Chlorinated Solvents:	Machine shops were in use at this site. Chlorinated solvents were typically and extensively used as degreasers. Paint thinners would also have been extensively used in the paint shops.
Semivolatile Organics:	Fire trucks were undercoated at this facility. An undercoating is a petroleum-based product. Historical records also show the presence of a fuel oil tank on the site. The foundries, which operated on the site, would also have contributed phenolic compounds. A tar substance was observed on the ground surface during the Phase I site inspection.

Metals: Foundries, paint shops, paint spray booths and plating operation could have released heavy metals at the site.

PCB's: There is at least one documented PCB release at the site, which occurred in 1983. The release resulted from the unauthorized, unsupervised illegal "salvaging" of PCB containing transformers stationed on the roofs of many site buildings. A response action resulted, which was supervised by NYSDEC, with an established clean up level of 50 ppm for the areas known to be contaminated. However, due to the unsupervised nature of the salvaging operations, it was not certain that all areas possibly impacted by the known release were detected.

Sources at the City of Elmira recall approximately 250 cubic yards of contaminated soil material, was removed from the site for appropriate off-site disposal. The PCB clean-up area is shown in **Figure 5**.

It was recommended that limited discrete samples be obtained and analyzed to verify that all impacted areas have been addressed and that residual PCB levels are appropriate to future site uses.

1.3 Report Organization

This SI/RAR report has been prepared in accordance with the 1996 Clean Water/Clean Air Bond Act, Environmental Restoration Projects, Title 5, Appendix 1: Suggested SI and RA Report Format.

2. Study Area Investigation

2.1 Field Activities

2.1.1 Site Features

The ALF site is a former industrial manufacturing site. The structures occupied 81% of the subject site prior to demolition of said structures.

The ground surface is comprised of at-grade visibly clean fill and foundational remnants of previous buildings. Upland vegetation is present on the site. Scrap steel, steel pipe, and small saplings are present in an area near the railroad and tar pit area. Un-vegetated gravelly areas also exist in several locations. Tar is evident on the ground surface in the vicinity of the tar tank.

2.1.2 Contaminant Source Investigations

The contaminant source investigations included sampling of soil and groundwater at depths prescribed by actual field findings. The samples and locations have been summarized in **Table 1**.

2.1.2.1 Surface Soil Samples

Surface soil samples were collected at a depth of zero to three inches from select locations (see **Figure 3**). Sampling was conducted per NYSDOH requirements. **Table 2** summarizes the contaminants of interest.

2.1.2.2 Geophysical Survey

Electromagnetic survey methodology was used to measure ground conductivity. A geophysical survey was conducted over the entire property.

The geophysical survey identified 16 anomalies on the site, which are possibly indicative of potential underground storage tanks, foundations or other buried metals. The anomalies were surveyed for accurate location and test pits were subsequently performed at each anomaly location (see **Figure 4**).

2.1.2.2.1 Test Pits & Sampling

The City of Elmira provided excavation services. Test pits were excavated at anomaly locations “A” through “P” (see **Figure 4**) to determine the nature of the anomalies identified. Test pit characteristics have been recorded in the field logbook. Three samples were analyzed for specific TCL parameters based on field findings at anomalies B, H, and J.

At the recommendation of Mr. Manmohan Mehta, P.E., of the NYSDEC, a random test pit (Q-1) was also excavated on the site. Broken concrete floor and steel reinforcing bar was encountered at this location. The material encountered was consistent with that of the other test pits although it lacked the quantity of metallic objects in other test pits.

2.1.2.2.2 Tar Tank

Excavation in the tar tank area (see **Figure 4**) was conducted to determine the nature and extent of potential contamination from the tank. The estimated 12,000-gallon underground storage tank (UST) contains approximately 6,000 gallons of material resembling #6 fuel oil. The immediate surrounding soil is impacted with the same tar-like substance. The tar-like material was sampled and analyzed for TCLP and full TCL analyses and deemed to be non-hazardous.

2.1.2.3 Geoprobe Macro Cores Subsurface Soil

On-site Geoprobe macro cores were sampled in an approximate 100-foot grid together with off-site background locations (see **Figure 5**). Marcor Remediation provided the Geoprobe services. Soil samples were collected in four foot by two inch diameter polypropylene macro cores from the surface to a depth corresponding to groundwater (approximately 14 feet) at the rate of one sample per grid section (14 points) with four additional points placed at potential hot spots, namely paint shop

and spray booth areas, machine shop, and underground storage tank (UST-tar tank) area (see **Figure 4**). The potential constituents of concern were chlorinated solvents, metals, and PCB's. One discrete grab sample was obtained from each Geoprobe node location. Selection of the sample was based on visual staining, PID readings (see **Appendix E**), or on site GC data (see **Appendix D**). The samples were subsequently analyzed for the Target Compound List (TCL) per TAGM 4046 and listed in the Sampling and Analytical Monitoring Plan (SAMP), Appendix B, Table 2-1, Superfund TCL and Contract Required Quantitation Limit.

2.1.2.4 Geoprobe Macro Core Groundwater Samples

Five groundwater samples were obtained from select Geoprobe locations (see **Figure 5**) for TCL analysis. Groundwater samples were obtained utilizing a Masterflex L/S® sampling pump with dedicated C/Flex® tubing. Selection of the sample was based on visual staining, PID readings, or on site GC data. The samples were subsequently analyzed for the TCL per TAGM 4046.

2.1.2.5 Soil Vapor Survey (SVS)

A SVS has been performed to delineate the vertical extent of volatile organic compound contamination utilizing the Geoprobe macro cores. Additional samples were obtained at intervals based on visual staining and PID readings. Air samples have been analyzed at Fagan Engineers. This method is designed to provide real time results, which will guide the investigation to potential hot spots while mobilized in the field. GC use followed Division of Environmental Remediation (DER) QC Guidelines for GC Field Screening Methods.

2.1.3 Geological Investigations

Geological investigations have been limited to details of the surface topography and basic subsurface characterization of the soils.

Overburden is comprised of gravelly fill with construction and demolition debris. The subsurface soils in the macro cores are characterized by brown cobbly sandy gravel to groundwater. This soil is typical of Howard gravelly silt loam soil mapped by the USDA Soil Conservation Service in 1973.

2.1.4 PCB Sampling

In order to confirm that no significant residual PCB soil contamination remains on the site, a Geoprobe was utilized to obtain a macro core at the previous PCB cleanup area (see **Figure 5**). Four discrete soil samples were collected at depths of 0'-4', 4'-8', and 8'-12'. The samples were analyzed for PCB's (EPA 8082) utilizing the Geoprobe macro core method.

2.1.5 Groundwater Investigations

The Geoprobe groundwater locations and monitoring wells provided the basis for groundwater investigations.

Five on-site groundwater samples were obtained as part of the Geoprobe macro cores at GW-1, GW-2, GW-3, GW-4, and background location B-1 for TCL analysis. A clay lens was encountered at the proposed GW-5 groundwater sampling point. The clay extended to 22-feet, at which point the macro coring was terminated due to lack of groundwater. Background location B-1 was substituted for GW-5.

A preliminary groundwater gradient was established as a guide for monitoring well placement utilizing data from Geoprobe locations (see **Figure 6**).

2.1.6 Hydrogeologic Investigations

2.1.6.1 Monitoring Wells

The installation of one up-gradient and two down-gradient monitoring wells was performed by Marcor Remediation per the Groundwater Monitoring Well Construction and Abandonment requirements in accordance with 6NYCRR Part 360, subparagraphs 2.11(a)(8)(I), (ii) and (iii) (see **Figure 7**).

Information from the 1981 Potentiometric map by Allen, et. al., (see **Figure 8**) together with data collected in the field from five Geoprobe macro core bore holes was utilized to verify the Potentiometric contours and the groundwater gradient. The locations of these three groundwater monitoring wells are shown on **Figure 9**. The monitoring wells were constructed as follows:

<u>WELL #</u>	<u>DIAMETER</u>	<u>SCREEN DEPTH</u>	<u>DEPTH OF WELL</u>
MW-1	2 inch	10'-25'	25 feet.
MW-2	2 inch	5'-20'	20 feet.
MW-3	2 inch	5'-20'	20 feet.

2.1.6.2 Groundwater Gradient

The data gathered from three sources including 1) Geoprobe groundwater locations, 2) groundwater elevations at the three monitoring wells, and 3) groundwater elevations from three monitoring wells at the Chemung Foundry Brownfields site were utilized to determine the groundwater gradient for the site (see **Figure 10**). This data shows groundwater flowing in a northeasterly direction across the site.

2.1.7 Soil and Vadose Zone Investigations

2.1.7.1 Surface Soil Samples

Surface soil samples were collected at a depth of zero to three inches from select locations (see **Figure 3**). Sampling was conducted per NYSDOH requirements. Contaminants are summarized in **Table 2**.

2.1.7.2 Geophysical Survey Test Pits

The test pits performed as part of the geophysical survey to ascertain the nature of the anomalies detected are representative of gravelly fill material. Visibly stained soil was encountered at Anomalies B, C, J, and H and analyzed for TCL parameters based on actual field findings.

2.1.7.3 Soil Vapor Survey

A SVS has been conducted on soil obtained via the Geoprobe macro cores. Two grab samples were obtained from each four foot macro core for headspace analysis.

The GC was calibrated using Scotty TO-14 prepared calibration gas. The PID was calibrated to 1,2-Dibromoethane, and the electron capture detector (ECD) was calibrated to Carbon Tetrachloride.

2.1.8 Surface Water and Sediment Investigations

Storm water runoff is via surface conveyance and percolation. There was no accumulation of sediment on the site. The ground surface is compacted dense gravelly fill and foundational remnants of previous buildings. Hence, surface water/sediment sampling for this site was not applicable.

2.1.9 Human Population Surveys

The surrounding area is a homogeneous mix of single family residential and light manufacturing.

A restaurant and two single family residential dwellings are located across the street from the site. Light manufacturing dominates the immediate site vicinity to the north and south. The Norfolk Southern railroad adjoins the site to the west.

2.1.10 Ecological Investigations

A natural resources inventory has been performed on the subject site. There have been no threatened or endangered flora or fauna species identified on the site or adjoining properties. There were no sensitive environmental receptors identified on the subject site or adjoining properties.

2.2 Field Activity Documentation

Field logs contain a daily record of events, observations, and measurements during field activities. A field log notebook has been utilized in this investigation. Information pertinent to sampling activities has been recorded in the log.

3. Physical Characteristics of the Study Area

3.1 Field Activity Results

3.1.1 Surface Features

The ALF site is a former industrial manufacturing site. The structures occupied 81% of the subject site prior to demolition of said structures.

The ground surface is comprised of at-grade visibly clean fill and construction and demolition debris at the surface. Upland vegetation is present on the site. Scrap steel, steel pipe, and small saplings are present in an area near the railroad and tar pit area. Un-vegetated gravelly areas also exist in several locations. Tar is evident in a wooded area on the ground surface in the vicinity of the tar tank.

3.1.2 Surface Water Hydrology

Stormwater runoff is via surface conveyance and percolation. There was no accumulation of sediment on the site. The ground surface is compacted dense gravelly fill and foundational remnants of previous buildings.

3.1.3 Geology

All naturally occurring geological formations, which may have existed, have been eliminated from the site as the result of industrial development early in the 20th century.

Overburden is comprised of gravelly fill and foundational remnants of previous buildings. The subsurface soils are characterized by brown cobbly sandy gravel to groundwater. This soil is typical of Howard gravelly silt loam soil mapped by the USDA Soil Conservation Service in 1973.

3.1.4 Soils

According to the 1973 USDA Soil Conservation Service Soil Survey, Howard gravelly silt loam has been mapped at the site. "Howard soils consist of deep, well-drained and somewhat excessively drained, medium-textured soils that developed in stratified glacial outwash deposits of sand and gravel derived mainly from shale, sandstone, and limestone."

3.1.5 Hydrogeology

Groundwater elevation is estimated at EL 840 from the 1982 USGS Potentiometric Surface Map by Allen, et. al., labeled Geohydrology Of The Valley Fill Aquifer In The Elmira Area, Chemung County, New York. Surface elevation is approximately EL 850, which is taken from actual survey data. The 1969 USGS Elmira, NY Quadrangle has also been referred to for collaboration.

Three EWB wells are located on Foster Island and two wells are located on Hudson Street. The five wells provide the City of Elmira and surrounding area with an average 3.7 million gallons per day (MGD). The Foster Island wells have been in use since 1991 and the Hudson Street wells have been in use since 1966 and 1972. According to the EWB, laboratory results have not detected any TCL contaminants during their period of operation. These production wells are 3,600 feet upgradient to the site and should not be impacted by the site.

3.1.6 Demography and Land Use

The surrounding area is a homogeneous mix of single family residential and light manufacturing. A restaurant and two single family residential dwellings adjoin the site to the east across Erie Street. Light manufacturing dominates the immediate vicinity and adjoins the site to the north and south. The Norfolk Southern railroad adjoins the site to the west.

3.1.7 Ecology

A preliminary natural resources inventory has been performed on the subject site. There have been no threatened or endangered flora or fauna species identified on the site or adjoining properties. There were no sensitive environmental receptors identified on the subject site or adjoining properties. There were no tracks or other indicators in the vicinity of the surface tar, which would indicate that any mammals had been adversely affected by the tar.

4. Nature and Extent of Contamination

4.1 Results of SI

4.1.1 Sources

All sample locations are summarized in **Table 1**.

4.1.1.1 Surface Soil Samples

Surface soil samples were collected at a depth of zero to three inches from select locations (see **Figure 3**). Sampling was conducted per NYSDOH requirements with results presented in **Appendix A**. Laboratory results are summarized in **Table 2**.

Mercury levels exceeded RSCO at several locations including the off-site location H1. Location H2 shows elevated Mercury levels of 6.5 mg/kg.

Chromium was detected at 51.9 mg/kg at off-site location H1. This level exceeded the Chromium concentration detected in the on-site samples by approximately three times.

A Cadmium level of 0.99 mg/kg was detected in sample H2.

The following SVOC's were detected at or above RSCO at the indicated locations:

- H1: Benzo(a)anthracene, Indeno(1,2,3-cd)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Chrysene, Benzo(g,h,i)perylene
- H2: Benzo(a)anthracene, Anthracene, Benzo(b)fluoranthene, Chrysene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Benzo(g,h,i)perylene
- H3: None
- H4: Chrysene, Benzo(b)fluoranthene, Benzo(a)anthracene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Benzo(g,h,i)perylene

Arochlor 1260 was detected at 1.4 mg/ kg in location H2 and 0.44 mg/kg at location H4. The level of contamination at H2 is slightly above the USEPA 1.0 ppm maximum for surface soils.

The tar, which exists both above and below grade and is marbled in the soil was sampled for TCLP and full TCL analyses. Diesel-type constituents were detected in the sample. The sample passed the TCLP test and hence the tar is not considered hazardous.

4.1.1.2 Geophysical Survey Test Pits

The geophysical survey identified 16 anomalies on the subject site, which were indicative of potential underground storage tanks, foundations, or other buried metals (see **Appendix B**). The anomalies were surveyed for accurate location and test pits were subsequently performed at each anomaly location (see **Figure 4**).

Visibly stained material was sampled and analyzed for TCL analysis based on field findings (see **Appendix C**) at three locations (B, J, and H). The laboratory results of these samples are presented in **Table 3**.

Anomaly B exhibited a limited vein of sandy burnt appearance and visible staining at a depth of 19"-29". The following metals of interest were detected above RSCO's:

Arsenic	17.2 mg/l
Cadmium	4.32 mg/l
Copper	1160.0 mg/l
Lead	640.0 mg/l
Mercury	0.85 mg/l
Zinc	766.0 mg/l

A small amount of cinders and Copper-containing slag together with ash and brick was encountered at a depth of 14"-16" at Anomaly C. A sample was not obtained due to the small quantity of material encountered.

Anomaly H corresponds to the tar tank location. The tar/soil was sampled for TCLP and full TCL analysis. Copper and Zinc detected in the sample were slightly above RSCO's. SVOC's were also detected above RSCO's.

Gray ash was encountered at Anomaly J at a depth of 12"-36". This ash was sampled for TAL Metals. Arsenic, Copper, and Zinc detected in this sample were slightly above RSCO's.

An on-site random test pit (Q-1) was performed on a recommendation by Mr. Mehta of the NYSDEC. Broken concrete floor and steel reinforcing bar was encountered at this location. The material encountered was consistent with that of the other test pits although it lacked the quantity of metallic objects. No odors or visible staining was observed.

A portable photoionization detector (PID) did not detect volatile organic compounds above ambient levels in the samples.

Concrete foundations, scrap metal, concentrations of reinforcement bar, steel diamond plate, railroad tie plates, and machinery hold down plates were identified at the remaining anomaly locations.

4.1.1.3 Soil Vapor Survey (SVS)

Two separate chromatograms were prepared for each analysis, that is, the Photoionization Detector (PID) and the Electron Capture Detector (ECD) which detect their respective compounds (see **Appendix D**).

The SVS detected several volatile organic compounds (VOC's) in trace quantities at depths between 2-8 feet. The VOC's detected are below RSCO's.

VOC's above ambient levels were primarily detected in the eight to twelve foot depth macro cores, which exhibited odors or visible staining. This interval corresponds with the groundwater interface (Vadose) zone or capillary fringe. Elevated PID readings above ambient levels were detected at this interval as well and the material was sampled for TCL analysis.

Trace levels of 1,2-Dichlorodifluoroethane, 1,1-Dichloroethane, and Chloroethane have been detected with the GC-ECD in the Geoprobe macro core samples. However, the 1,2-Dichlorodifluoroethane peak corresponds with the injection peak, which occurs during injection of the sample, and is likely the result of said injection due to the short run time utilized during the SI.

Undifferentiated "peaks" occurring subsequent to all compounds eluting off the column at 12 to 16 minutes are the result of septa bleed at the higher temperature (during ramping). This has been verified with the manufacturer.

The following concentrations were detected:

<u>Location</u>	<u>Depth (in feet)</u>	<u>Compound</u>	<u>Concentration (in mg/l)</u>	<u>Detector/Run#</u>
G-2/G-2Dup	8-12	Styrene	12.646	PID/187
		o-Xylene	7.452	PID/188
		4-Methyltoluene	10.500	PID/188
G-8*	8-12	Chlorobenzene	2.022	PID/204
		Ethylbenzene	2.022	PID/204
		p-Xylene	1.159	PID/204
		Styrene	1.489	PID/204
		4-Methyltoluene	1.896	PID/204
G-9	0-4	1,2-Dichloroethane	6.595	ECD/205
	8-12	(see Appendix D)		PID/207
G-13**	8-12	(see Appendix D)		PID/220
GW-2	4-8	1,3-Dichlorobenzene	4.376	PID/226
G-12	0-4	4-Methyltoluene	5.951	PID/229
		1,3,5-Trimethylbenzene	5.951	PID/229
		1,3-Dichlorobenzene	4.725	PID/229
		Carbon Tetrachloride	3.097	ECD/229
		1,1,2,2-Tetrachloroethane	4.775	ECD/229
	4-8	1,2,4-Trimethylbenzene	3.879	PID/230
	8-12	1,2,4-Trimethylbenzene	2.286	PID/231
GW-5	4-8	1,3-Dichlorobenzene	6.923	PID/241
	8-12	1,3-Dichlorobenzene	6.787	PID/242
GW-4***	0-4	1,3-Dichlorobenzene	9.641	PID/243
	4-8	(see Appendix D)		PID/244
	8-12	(see Appendix D)		PID/245,246
G-7	0-4	Chlorobenzene	4.044	PID/265
GW-3	4-8	1,1,1-Trichloroethane	5.900	ECD/269
G-5	8-12	(see Appendix D)		PID/283
G-6	8-12	(see Appendix D)		PID/290
B-1	4-8	****		PID/302

* A dilution of 1.0ml headspace in 1000ml N₂ carrier gas due to elevated PID readings was prepared for sampling to minimize potential column damage.

** VOC concentrations above site-wide levels were detected at location G-13. However, the compounds were not duplicated in the laboratory sample analyzed. This location is downgradient to the tar tank.

*** Location GW-4 shows elevated VOC levels at the 4-8 foot and 8-12 foot intervals.

**** Location B-1 shows trace VOC levels at the 4-8 foot interval.

All Geoprobe macro core samples were screened with a PID equipped with a 10.2 eV lamp prior to sampling with the GC (see **Appendix E**).

The SVS results have been summarized in **Tables 4, 5, and 6**.

Comparison of site-wide Soil Vapor Survey (SVS) results versus location GW-4 results at depths of 4-8 and 8-12 feet show marginally elevated VOC levels at the aforementioned GW-4 depths. However, this does not appear to be a significant source of contamination as the soil and groundwater laboratory results do not support the SVS results for VOC's detected.

4.1.1.4 Geoprobe Macro Core Soils

Soils, which exhibited odors or visible staining from the surface to the depth of groundwater, were sampled for full TCL analysis (see **Appendix F**). Laboratory results are summarized in **Table 7**.

The metals and VOC's listed below were detected in the subsurface soils as follows:

<u>Location</u>	<u>Contaminant</u>	<u>Level Detected</u>	<u>Depth</u>
G-4	Cadmium	12.70 mg/l	2-4 feet
G-8	Mercury	0.22 mg/l	1-3 feet
G-3	Trichloroethene	68.00 µg/kg	6-7 feet
GW-3	Trichloroethene	1400.00 µg/kg	3.5-4 feet

SVOC's consistent with those detected at the tar tank were detected at levels above RSCO's in the subsurface soils at locations B-2, G-3 and G-4.

4.1.1.5 Geoprobe Macro Core Vadose Zone

Geoprobe Macro Cores locations at the Vadose Zone exhibiting odors or visible staining were sampled for full TCL analysis (see **Appendix G**). Laboratory results are summarized in **Table 8**. The samples exhibited a diesel petroleum odor characteristic of that encountered at the tar tank.

The laboratory results for location G-13 show SVOC compounds below RSCO. This is consistent with the tar tank compounds detected at the tar tank. Location G-13 is downgradient from the tar tank.

A Trichloroethene level of 910.0 mg/kg was detected at location G-7.

4.1.1.6 Tar Tank

Excavation in the tar tank area (see **Figure 5**) was conducted to determine the nature and extent of potential contamination from the tank. The estimated 12,000 gallon underground storage tank (UST) contains approximately 6,000 gallons of material

resembling #6 fuel oil. The immediately surrounding soil is impacted with the same tar-like substance.

The tar-like material was sampled and analyzed for TCLP and full TCL analyses. The lab results reflect diesel-type constituents. The material was determined to be non-hazardous by TCLP for disposal at a municipal solid waste landfill (see **Appendix H**).

The dominant threat to groundwater contamination has been determined to be from the underground storage tank (tar tank), which contains a diesel-based fuel oil (presumably #6 fuel oil) or semi-viscous tar compound.

4.1.2 Groundwater

Five on-site groundwater samples were obtained as part of the Geoprobe macro cores at GW-1, GW-2, GW-3, GW-4, and background location B-2 for TCL analysis. A clay lens was encountered at the proposed GW-5 groundwater sampling point. The clay extended to 22-feet, at which point the macro coring was terminated due to lack of groundwater. Background location B-2 was substituted for GW-5. The results of these groundwater samples are presented in **Appendix G**. The on-site Geoprobe groundwater laboratory results detected the following VOC's and SVOC's:

<u>Compound</u>	<u>GW Standard</u>	<u>W-ALFGW2-092299</u>	<u>W-ALFGW4-092399</u>
Acetone	50 µg/l	44.0 µg/l	-----
Carbon Disulfide	50 µg/l	-----	26.0 µg/l
2-Methylnaphthalene	50 µg/l	250.0 µg/l	-----
Phenanthrene	50 µg/l	160.0 µg/l	-----

Groundwater samples were also obtained from two on-site downgradient and one off-site upgradient monitoring wells constructed as part of the SI (see **Appendix I**).

The following VOC's were detected in the first sampling of the monitoring wells:

<u>Compound</u>	<u>GW Standard</u>	<u>MW-1</u>	<u>MW-2</u>	<u>MW-3</u>
Chloroform	7.0 µg/l	5.0 µg/l	-----	-----
Acetone	50.0 µg/l	-----	41.0 µg/l	-----

Iron, Manganese, Aluminum, and Sodium all exceeded NYS Ambient Water Quality Standards in the background well (MW-1). Therefore, these potential contaminants are ubiquitous in nature.

The number of exceedences for the remaining metals that were detected slightly above NYS Groundwater Standards is as follows (see Table 9):

<u>Metal</u>	<u>Number of Exceedences</u>
Antimony:	1
Arsenic:	2
Barium:	1
Chromium:	1
Cobalt:	3
Lead:	3
Magnesium:	4
Vanadium:	2

The exceedences for metals is low, infrequent, and random. The groundwater laboratory results for the cross gradient background monitoring well at the Chemung Foundry (MW-3) site also shows exceedences for Arsenic, Lead, and Vanadium.

There were no PCB's, Pesticides or Herbicides detected in the groundwater samples.

4.1.3 PCB Soil Samples

Soils sampled for the presence of PCB's did not detect the presence of PCB's at the previous PCB cleanup area (see **Appendix J**).

4.1.4 Surface Water and Sediments

Although no sediment deposits or staining beyond the surface tar area was observed on the site, stormwater runoff could act as a conduit for the surface migration of trace surface tar compounds if the tar tank were left in place.

4.1.5 Air

The compact surface soils and vegetation reduce the occurrence of airborne particulates. However, during heavy wind or during any ground intrusive activities on the site, loose surface soil particles could become airborne.

5. Contaminant Fate and Transport

5.1 Potential Routes of Migration

5.1.1 Groundwater

The tar tank appears to have impacted groundwater. Therefore, groundwater is a potential route of migration for the tar tank source of contamination.

Soil cores show the petroleum products to be migrating within the Vadose Zone in an east to west orientation. The petroleum is predominantly bound to the soil as can be seen visually.

This is substantiated by the laboratory results, which show similar SVOC contaminants in both Vadose Zone and groundwater. The low levels of contaminants observed from groundwater laboratory results confirm that the dissolved petroleum product is not significant.

The private wells of the former Remington Rand facility on South Main Street and the Laundromat on Broadway will not be impacted as both are located cross gradient to the site. Three EWB wells are located on Foster Island and two wells are located on Hudson Street. The five wells provide the City of Elmira and surrounding area with an average 3.7 million gallons per day (MGD) of potable water. The Foster Island wells have been in use since 1991 and the Hudson Street wells have been in use since 1966 and 1972. According to the EWB, laboratory results have not detected any TCL contaminants during their period of operation. These production wells are 3,600 feet upgradient to the site and should not be impacted by the site.

Comparison of site-wide Soil Vapor Survey (SVS) results versus location GW-4 results at depths of 4-8 and 8-12 feet show marginally elevated VOC levels at the aforementioned GW-4 depths. However, this does not appear to be a significant source of contamination or migration as the soil and groundwater laboratory results do not support the SVS results for VOC's detected.

Therefore, removal of the source of petroleum product from the ground in the vicinity of the tar tank will minimize continued migration of contaminants.

The metals that were detected in groundwater indicate both on and off-site trace metal concentrations. Slow, vertical migration of the low level metals could only occur over extended periods of time. Since metals are not readily soluble in water, said metals could only be slowly transported with groundwater over extended periods of time.

5.1.2 Soil

The trace levels of VOC's detected during the SVS indicate no elevated source of contamination in the subsurface soils, which would indicate a source of concentrated contaminants. VOC's are also lacking in the majority of soil and groundwater samples where historical visible contamination was evident.

Trichloroethene has been detected at three locations in trace quantities (68 µg/kg-1400.0 µg/kg) at random locations and depths on the site (see Table 7). Minimal detection of this compound does not indicate a significant source.

The SVS and laboratory results substantiate that VOC's and SVOC's are not migrating between the surface and groundwater. Therefore, there is no significant vapor transport via soil.

5.1.3 Air

Surface or subsurface airborne migration of particulates could occur as the result of heavy wind or during ground intrusive activities on the site.

5.2 Contaminant Persistence

Since the SVOC contaminants are tightly bound to the soil, SVOC contaminants are expected to persist at the Vadose Zone. Since the Vadose Zone soil is a dense gravelly silt, continued slow migration with dilution could occur. The low levels of contaminants observed from groundwater laboratory results confirms that the dissolved petroleum product is not significant and an increase in groundwater contaminant levels is unlikely. Natural attenuation of identified compounds is likely.

A disposal permit will be obtained from the Chemung County Landfill for the disposal of diesel fuel/tar contaminated soil. The City of Elmira will transport the contaminated soil to the landfill.

The tar tank, contents, and visibly stained soil will be excavated. The liquid tar will be solidified with soil in order to obtain 80% solids for disposal at the county landfill. The solidified tar, tar/soil, and UST will be subsequently disposed of at the Chemung County Landfill (See **Appendix K-Reserved**)*. The City of Elmira will utilize in-kind services where appropriate.

*To be completed in the future upon removal/certification of the UST and contaminated soil.

5.3 Contaminant Migration

5.3.1 Vadose Zone and Groundwater

The contaminants detected are tightly bound to the soil. Since the Vadose Zone soil is a dense gravelly silt, continued slow migration via groundwater as a conduit will occur with dilution over time.

Comparison of site-wide Soil Vapor Survey (SVS) results versus location GW-4 results at depths of 4-8 and 8-12 feet show marginally elevated VOC levels at the aforementioned GW-4 depths. However, this does not appear to be a significant source of contamination or migration, as the soil and groundwater laboratory results do not support the SVS results for VOC's detected.

The metals that were detected in groundwater indicate both on and off-site trace metal concentrations. Slow, vertical migration of the low level metals could only occur over extended periods of time. Since metals are not readily soluble in water, said metals could only be slowly transported with groundwater over extended periods of time.

The SVOC contaminants detected are not readily soluble in water. This is substantiated with the site specific groundwater laboratory results. The low levels of contaminants observed from groundwater laboratory results confirms that the dissolved petroleum product is not significant and future increase in groundwater contamination levels is unlikely. The low levels of SVOC's detected shows adsorption of SVOC's to the soil and slow migration of the tar tank residual SVOC's in the Vadose Zone.

5.3.2 Surface Soil

Migration of contaminants via surface soil is not likely based on surface soil samples and test pit data when compared to subsurface contaminants detected.

5.3.3 Subsurface Soil

The Geoprobe macro cores showed isolated veins of contaminants within the soil matrix. The SVS and laboratory analyses do not indicate the migration of contaminants from the soil to groundwater. Visual observations of soil cores verify isolated veins of visibly stained material showing no signs of vertical migration.

5.3.4 Air

The compact surface soils and vegetation reduce the occurrence of airborne particulates. However, during heavy wind or during ground intrusive activities on the site, loose surface soil particles may become airborne.

6. Baseline Risk Assessment

This section evaluates the present and potential future impacts on public health and the environment caused by contaminants found on the project site. The baseline risk assessment determines the risk to public health and the environment for the site with no remedial action.

This baseline is used to determine if and to what extent the site must be remediated. In this instance, remediation will be performed.

6.1 Public Health Evaluation

The public health evaluation provides an understanding of the nature and extent of contamination, exposure pathways, and the potential threat to public health and the environment from the project site. The risk assessment evaluates and interprets physical, chemical, demographic and geographic factors to characterize and assess the extent of potential harm, if any, to the public. The extent of potential threat to human health is a key factor in determining the level and type of remediation and management techniques necessary at the project site.

6.1.1 Exposure Assessment

The three exposure pathways are ingestion, inhalation, and dermal contact. Contaminants can be ingested by drinking contaminated groundwater, or from air born dust with contaminants adsorbed to the soil surface. VOC's can be inhaled from high concentrations of contaminants below the surface volatilizing, or from contaminants volatilizing from contaminated groundwater. Dermal contact with contaminants can occur with surface soil, and often present a higher risk to children. For a contaminate to pose a potential risk a present or future exposure pathway is required. The magnitude of the risk depends on duration of exposure, the type of media contaminated, and the concentration of the contaminant, among other factors.

The site is zoned I-A light industrial, and residential dwelling are not permitted on the site. The site is adjacent to several residential properties that may be effected by contaminants on the property. There is no present or future hunting or fishing possibilities on the site. Contaminants have been identified in the surface and subsurface soils, and in groundwater. Exposure pathways include ingestion of potable water, ingestion of soil and dust, and inhalation of contaminated air. The present and future risk from each of the exposure pathways must be investigated.

6.1.1.1 Ingestion of Potable Water

The property is located in the Elmira Water Boards service area, and has access to public water. The New York State Health Department will not allow a new water well to be drilled if the property is within 500 feet of a public water supply. The site does not have any existing potable wells, and health department requirements will not allow a new water well to be drilled. Therefore, ingestion of potable water is not a present or future exposure pathway.

This restriction will include industrial and commercial use of on-site groundwater to prevent potential dermal and inhalation exposure. A deed restriction will prohibit all use of on-site groundwater, potable or otherwise.

6.1.1.2 Ingestion of Soil and Dust

Presently, the ingestion of soil and dust is an exposure pathway, but is limited because of the lack of activity on the site. During site restoration, and future construction ingestion of soil and dust could be a major concern. A dust control plan with air monitoring will be implemented during any excavation or construction activities on the site. Future ingestion of soil and dust can be avoided by placing a protective barrier of soil, asphalt, or concrete on the site, and using deed restrictions to limit excavation on the site. Area's with high contaminant concentrations can be excavated and disposed of off site, and replaced with clean fill.

6.1.1.3 Inhalation of Contaminated Air

The inhalation of contaminated air includes inhalation of VOCs and SVOCs. Contaminants have not been identified in the air. Therefore, there is no present or future risk related to this exposure pathway. Furthermore, if the tar tank and surrounding contaminated soil is removed, along with other areas identified as having high concentrations of contaminants the source for air born contaminants can be eliminated.

6.1.2 Risk Characterization

The risk characterization is based on the exposure assessment, and the toxicity assessment. For a contaminant to pose a significant risk to public health, it must exist in significant concentration and have an exposure pathway. The three areas of concern are surface soils, subsurface soils, and groundwater. These areas of concern are summarized on the following page.

Areas of Concern

Contaminant Type	Surface Soils	Subsurface Soils	Groundwater
VOC's	□	◆	□
SVOC's	■	◆	◆
PCBs	■	□	□
Metals	■	◆	■

Key:

- - Not detected above guidance values or standards
- ◆ - Detected in one or more samples at concentrations above guidance values or standards, but not expected to present a risk to human health due to the absence of exposure pathways
- - Detected at concentrations above guidance values, standards, or background concentrations - may present an unacceptable risk to human health

The objective of site remediation is to lower or eliminate the potential risk to human health. Since groundwater is not being used on or near the site, the potential risk from groundwater contaminants, or subsurface soil contaminants leaching into the groundwater is very small. The biggest area of concern is the surface soil. Metals, PCB's, and SVOC's have been identified in the first six inches of soil. Exposure pathways exist for the surface soil. The site is presently vacant. The use of an air-monitoring program during remediation, and a barrier layer above the existing surface should eliminate any health risk posed by the site.

The potential for future exposures to subsurface soil is limited by the proposed use of the site and would be addressed with a Soils Management Plan during commercial/industrial development of the site.

A deed restriction would restrict, limit or control the future use of affected portions of the site land and groundwater resources, include a notification indicating the presence of soil contamination on the site, and provide integrity for other selected remedial actions.

7. Summary and Conclusions

7.1 Summary

7.1.1 Nature and Extent of Contamination

Contaminants were analyzed for full or partial TCL analysis which was dependent upon actual field findings and screening. The contaminant levels detected in both soil and groundwater have been compared with RSCO and NYS Ambient Water Quality Standards.

The surface soil sample at location H2 shows levels of Mercury and Cadmium exceeding RSCO at a depth of zero to three inches. Arochlor 1260 was also detected at location H2 slightly exceeding the surface soil level established by the USEPA

Comparison of site-wide Soil Vapor Survey (SVS) results versus location GW-4 results at depths of 4-8 and 8-12 feet show marginally elevated VOC levels at the aforementioned GW-4 depths. However, this does not appear to be a significant source of contamination or migration as the soil and groundwater laboratory results do not support the SVS results for VOC's detected.

Generally, the SVS is a field screening tool utilized for gross delineation of SI efforts. The SVS has identified a random spatial occurrence of organics which have been identified in the subsurface soils occurring from the near surface to the Vadose Zone. Several contaminants in soil have been detected above site-wide levels in other isolated locations on the site. The data from the SVS is indicative of site-wide spatial distribution of low level VOC's detected in the subsurface soils, which lack vertical migration. The data would further suggest that VOC's do not persist in elevated quantities which is indicative of a typical 100-year old industrial site use with probable episodic surface spillage and lacking a significant continuing or remaining source of contamination.

Several SVOC's were detected in the Geoprobe Macro cores at a depth of approximately eleven feet in the Vadose Zone soils in concentrations above RSCO at numerous locations over the site. Two SVOC's (2-Methylnaphthalene, Phenanthrene) were detected in one groundwater sample that exceeded groundwater and NYS Ambient Water Quality Standards. Twelve infrequent and randomly occurring metals, four of which were present in the background well, were detected in groundwater above NYS Ament Water Quality Standards.

The former fuel oil UST has been determined to be the SVOC contaminant source of groundwater plume migration.

7.1.2 Fate and Transport

Groundwater is not being used on or near the site. The objective of site remediation is to lower or eliminate the potential risk to human health. The potential risk from groundwater contaminants, or subsurface soil contaminants leaching into the groundwater is very small. The only area of potential concern is the surface soil. Metals, PCB's, and SVOC's have been identified in the first six inches of soil. Exposure pathways could exist for the surface soil. The site is presently vacant. Placement of a barrier layer above the existing surface soils and the use of an air monitoring program during such remediation, will eliminate any health risk posed by the site.

Vertical migration of surface and subsurface soil contaminants is not apparent when compared to Vadose Zone laboratory results. Slow migration of SVOC's in the Vadose Zone is evident in the downgradient laboratory samples. This migration is expected to continue over time.

Slow, vertical migration of the low level metals could occur only over extended periods of time. Since metals are not readily soluble in water, said metals could only be slowly transported with groundwater over extended periods of time. Due to the lack of downstream users, the low levels detected pose no serious risk and should not increase appreciably over extended periods of time.

Migration of limited VOC's in groundwater will continue and will likely dilute over time with the removal of the source (tar tank).

7.1.3 Risk Assessment

The baseline risk assessment of the subject property was performed using the standards and guidance values compiled in DEC TAGM 4046. A few SVOC's were identified by the laboratory report which are not identified in DEC TAGM 4046. The maximum individual level of 50 µg/l for individual SVOC's from Part B of DEC TAGM was used for these contaminants.

The objective of site remediation is to lower or eliminate the potential risk to human health. Since groundwater is not being used on or near the site, the potential risk from groundwater contaminants, or subsurface soil contaminants leaching into the groundwater is very small. The biggest area of concern is the surface soil. Metals, PCB's, and SVOC's have been identified in the first six inches of soil. Exposure pathways exist for the surface soil. The site is presently vacant. The use of an air monitoring program during remediation, and a barrier layer above the existing surface should eliminate any health risk posed by the site.

Due to the lack of downstream users, the low levels of metals detected in groundwater pose no serious risk and should not increase appreciably over extended periods of time.

7.2 Conclusions

7.2.1 Data Limitations and Recommendations for Future Work

This SI has provided for an appropriate inquiry based on the proposed intended use of the site. The data collected as part of the SI has presented a global overview of contaminants and sources. This SI represents appropriate inquiry to characterize recognized environmental conditions associated with the site. The data presented in this report is based on an applied use (the SI) of descriptive information pertaining to the property, records review, and information obtained from a site reconnaissance and interviews and all environmental data generated during the SI.

Comparison of site-wide Soil Vapor Survey (SVS) results versus location GW-4 results at depths of 4-8 and 8-12 feet show marginally elevated VOC levels at the aforementioned GW-4 depths. However, this does not appear to be a significant source of contamination as the soil and groundwater laboratory results do not support the SVS results for VOC's detected.

7.2.2 Recommended Remedial Action Objectives

7.2.2.1 Surface Soil

Metals

The Mercury, Chromium, and Cadmium levels represent total metals analysis. Metals are not readily dissolved in water. As the result of a significant rain event, elevated metals detected in the surface soil at specific locations on the site could migrate via sheet flow to other surficial areas on the site, or slowly migrate horizontally and be adsorbed by localized soil particles.

PCB,s

Arochlor 1260 was detected in trace quantities (1.4 mg/kg and 0.44 mg/kg) at two sample locations. There was no evidence of surface staining or contaminant migration patterns in the Geoprobe soil cores. As PCB's are not readily soluble in water, significant migration is not expected.

SVOC's

The SVOC's are expected to remain bound to the soil just below the surface. There was no evidence of surface staining or contaminant migration patterns in the Geoprobe soil cores. As the SVOC's are not readily soluble in water, significant migration is not expected.

The remedial objective for surface soil is to reduce or eliminate the conduit by which the contaminants which exceed TAGM 4046 levels may pose a threat to human health, animal life, and the environment. The conduit is the potential for subsurface migration of contaminants to groundwater.

7.2.2.2 Subsurface Soils

Metals

The levels of metals detected represent total metals analysis. Metals are not readily dissolved in water. Geoprobe macro cores exhibit compact dry soil horizons and show no visible contaminant migration patterns. There is no correlation of metals levels with respect to depth detected.

The compact soil conditions inhibit significant percolation of rainfall to the subsurface. Bands of contaminants were observed to be intact and did not exhibit visible signs of migration. Significant migration of contaminants is not expected.

VOC's

Trichloroethene was detected in trace quantities (68 µg/kg to 1400 µg/kg) at unrelated locations and depths. The Geoprobe macro cores exhibit compact dry soil horizons and show no visible contaminant migration patterns, bands of contaminants were observed to be intact and did not exhibit visible signs of migration, and Trichloroethene was not detected in groundwater. Significant migration of contaminants is not expected.

The SVS data does not support a significant source of Trichloroethene on the subject site.

SVOC's

The SVOC's are expected to remain bound to the soil just below the surface. There was no evidence of contaminant migration patterns in the Geoprobe soil cores. As the SVOC's are not readily soluble in water, significant migration is not expected.

The SVOC's are expected to remain in the areas detected and the subsurface contaminants show little indication of vertical migration as is confirmed by the SVS data.

The remedial objective for subsurface soil is to reduce or eliminate the conduit by which the contaminants which exceed TAGM 4046 levels may pose a threat to human health and the environment. The conduit is the potential for subsurface migration of contaminants to groundwater.

7.2.2.3 Groundwater

Metals

The exceedences for metals is low, infrequent, and random. The groundwater laboratory results for the cross gradient background monitoring well at the Chemung Foundry (MW-3) site also shows exceedences for Arsenic, Lead, and Vanadium.

VOC's

A Chloroform level of 5.0 µg/l was detected in upgradient MW-1, and an Acetone level of 41 µg/l was detected at MW-2 (both within groundwater standards). The Acetone is likely a laboratory error and Chloroform was not detected on-site.

SVOC's

The SVOC's detected in the Vadose Zone indicate migration with the groundwater gradient. The SVOC's detected in groundwater will migrate in groundwater and be naturally attenuated.

The remedial objective for groundwater is to reduce or eliminate the source of the contaminants, which exceed NYS Ambient Water Quality Standards that may pose a threat to human health and the environment.

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TABLES

TABLE 1**SAMPLE SUMMARY**

DATE	SAMPLE	LOCATION	MATRIX	OTHER
6-29-99	S-ALFH1-062999	H-1,OFF-SITE	SOIL	SURFACE
6-29-99	S-ALFH2-062999	H-2	SOIL	SURFACE
6-29-99	S-ALFH3-062999	H-3	SOIL	SURFACE
6-29-99	S-ALFH4-062999	H-4	SOIL	SURFACE
6-29-99	S-ALFDUP-062999	H-1	SOIL	SURFACE
8-03-99	S-ALFTP B-080399	ANOMOLY B	SOIL	TEST PIT: 19"-29"
8-09-99	S-ALFTPJ-080999	ANOMOLY J	SOIL	TEST PIT: 12"-36"
8-10-99	S-ALFTPH1-081099	ANOMOLY H	SOIL/TAR?	TEST PIT: 24"-42"
8-10-99	S-ALFTPH2-080999	ANOMOLY H	TAR?	TEST PIT: 24"-42"/TCLP
9-21-99	W-ALFGW1-092199	GW-1	G-WATER	10.5'
9-22-99	W-ALFGW2-092299	GW-2	G-WATER	11.0'
9-23-99	W-ALFGW4-092399	GW-4	G-WATER	11.0'
9-23-99	S-ALFGW1A-092399	GW-1	SOIL	10.5'
9-23-99	S-ALFG1A-092399	G-1	SOIL	11.5'
9-23-99	S-ALFG2A-092399	G-2	SOIL	11.5'
9-23-99	S-ALFG3A-092399	G-3	SOIL	6'-7'
9-23-99	S-ALFG8A-092399	G-8	SOIL	1'-3'
9-23-99	S-ALFG8B-092399	G-8	SOIL	12'
9-24-99	S-ALFGW2A-092499	GW-2	SOIL	8'-12'
9-24-99	S-ALFG13A-092499	G-13	SOIL	12'
9-24-99	S-ALFGW4-092499	GW-4	SOIL	12'
9-24-99	W-ALFGW3-092499	GW-3	G-WATER	10.9'
9-29-99	S-ALFG9-092999	G-9	SOIL	8'-12'

TABLE 1, cont.**SAMPLE SUMMARY**

10-4-99	W-ALFB2W-100499	B-2	G-WATER	11..5'
10-4-99	W-ALFGW1B1-100499	GW-1	G-WATER*	10.5'
10-4-99	W-ALFBFB-100499	FIELD BLANK	G-WATER	N/A
10-5-99	S-ALFG7-100599	G-7	SOIL	11'
10-5-99	S-ALFG5-100599	G-5	SOIL	11'-12'
10-5-99	S-ALFDUP-100599	G-7	SOIL	11'-12'
10-5-99	S-ALFG4A-100599	G-4	SOIL	2'-4'
10-5-99	S-ALFGW3A-100599	GW-3	SOIL	3.5'-4'
10-5-99	S-ALFB1-100599	B-1	SOIL	8'-12'
10-5-99	S-ALFB1MS-100599	B-1	SOIL	8'-12'
10-5-99	S-ALFB1MSD-100599	B-1	SOIL	8'-12'
10-5-99	S-ALFB2A-100599	B-2	SOIL	1'-2'
10-5-99	S-ALFB2B-100599	B-2	SOIL	10'-12'
10-5-99	S-ALFPCBA-100599	PCB	SOIL	0'-4'
10-5-99	S-ALFPCBB-100599	PCB	SOIL	4'-8'
10-5-99	S-ALFPCBC-100599	PCB	SOIL	8'-12'
10-7-99	W-ALGWDUP-100799	GW-1	G-WATER	10..5'
11-2-99	W-ALFMW1-110299	MW-1	G-WATER	11.35' (TO TOP OF PVC)
11-2-99	W-ALFMW3-110299	MW-3	G-WATER	8.37' (TO TOP OF PVC)
11-2-99	W-ALFMW3MS-110299	MW-3	G-WATER	8.37' (TO TOP OF PVC)
11-2-99	W-ALFMW3MSD-110299	MW-3	G-WATER	8.37' (TO TOP OF PVC)
11-2-99	W-ALFMW2-110299	MW-2	G-WATER	7.86' (TO TOP OF PVC)

* Resample of W-ALFGW1-092199 for EPA 8260 due to damage of sample by lab.

Table 2
Surface Soil Analyses

Compound	Eastern Background	NYSRSCO	H1	H2	H3	H4	DUP
Metals		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	33000.00	SB	6580	7860	12500	8530	6320
Antimony	N/A	SB	U	U	U	U	U
Arsenic	3-12	7.5	U	U	U	U	U
Barium	15-600	300	194	162	125	157	115
Beryllium	0-1.75	SB	0.481	0.544	0.706	0.601	0.451
Cadmium	0.1-1	1	3.15	399	0.929	1.36	U
Calcium	130-35000	SB	10200	21700	10100	10500	7540
Chromium	1.5-40	10	51.9	13.9	18.7	19.3	12.6
Cobalt	2.5-60	30	6.21	6.77	9.85	7.72	5.84
Copper	1-50	25	228	364	135	264	219
Iron	2000-550000	2000	21600	19800	30200	29000	16600
Lead		SB	570	265	88.9	221	190
Magnesium	100-5000	SB	3290	7190	3750	3860	2590
Manganese	50-5000	SB	469	597	659	557	432
Mercury	.001-.2	0.1	0.58	6.5	0.089	1.7	3.4
Nickel	0.5-25	13	28.8	25.5	30.3	23.1	18.9
Potassium	8500-43000	SB	892	1000	1410	1080	1000
Selenium	0.1-3.9	2	U	U	U	U	U
Silver	N/A	SB	U	U	U	U	U
Sodium	6000-8000	SB	200	63	52.5	103	51.8
Thallium	N/A	SB	U	U	U	U	U
Vanadium	1-300	150	15.8	15	20.6	19.4	12
Zinc	9-50	20	634	264	189	301	186
PCBs		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
PCB 1260		1	U	1.4	U	0.44	0.65
SVOCs		µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Fluorene		50000	U	290	U	U	U
Phenanthrene		50000	8900	3900	U	2900	2800
Anthracene		50000	2000	790	U	550	560
Carbazole		----	U	490	U	U	300
Fluoranthene		50000	19000	5400	3600	4000	3900
Pyrene		50000	25000	5800	3800	4200	3700
Butylbenzyl phthalate		50000	U	U	U	U	290
Benzo(a)anthracene		224	11000	2700	U	1900	2100
Chrysene		400	9100	2700	U	1900	2100
Bis-2-ethylhexyl phthalate		50000	2000	U	U	U	U
Benzo(b)fluoranthene		1100	14000	2900	U	2300	3100
Benzo(k)fluoranthene		1100	6300	1200	U	990	880
Benzo(a)pyrene		61	11000	2400	U	1800	2000
Indeno(1,2,3-cd)pyrene		3200	U	1400	U	990	1000
Benzo(g,h,i)perylene		50000	5300	1400	U	1000	740

Note: Items in bold are over the recommended soil cleanup objective, or the eastern background for metals.

Eastern background level has been used in lieu of the site background levels. The site background levels were actually higher in some compounds than actual site results, hence not being appropriate to use as a background level.

Table 3
Geophysical Anomaly Analyses

	Eastern Background	NYSRSCO	19" to 30" Depth S-ALFTPJ-080399	12" to 36" Depth S-ALFTPJ-080999	3' to 6" Depth S-ALFTPJ-081099
Compound	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	33000.00	SB	8850	2790	4300
Antimony	N/A	SB	13.4	U	7.21
Arsenic	3-12	7.5	17.2	13.6	U
Barium	15-600	300	234	65.2	90.3
Beryllium	0-1.75	SB	0.554	0.673	0.287
Cadmium	0.1-1	1	4.32	U	0.641
Calcium	130-35000	SB	26700	2890	12800
Chromium	1.5-40	10	21.8	8.18	9.51
Cobalt	2.5-60	30	9.11	4.27	3.26
Copper	1-50	25	1160	177	204
Iron	2000-550000	2000	30400	11000	18200
Lead		SB	640	117	150
Magnesium	100-5000	SB	3470	287	2500
Manganese	50-5000	SB	503	50.8	294
Mercury	.001-.2	0.1	0.85	0.16	0.071
Nickel	0.5-25	13	58.5	10.3	23
Potassium	8500-43000	SB	997	638	657
Selenium	0.1-3.9	2	U	U	U
Silver	N/A	SB	U	U	U
Sodium	6000-8000	SB	113	108	58.1
Thallium	N/A	SB	U	U	U
Vanadium	1-300	150	16.2	19	20.7
Zinc	9-50	20	766	57.2	177
Library Search Compounds	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
1,3,5 - Trimethylbenzene		U	U	1200	
1,2,4 - Trimethylbenzene		U	U	2400	
1,2,3 - Trimethylbenzene		U	U	2000	
n-Butylbenzene		U	U	1200	
Semi VOC's	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
2-Methylnaphthalene	36400	U	U	62000	
Benzo(a)anthracene	224	U	U	16000	
Benzo(a)pyrene	61	U	U	12000	
Chrysene	400	U	U	26000	
Fluorene	50000	U	U	11000	
Naphthalene	13000	U	U	15000	
Phenanthrene	50000	U	U	53000	
Pyrene	50000	U	U	46000	
Library Search Compounds	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4-Hydroxy-4-Methyl-2-Pentanone		U	U	U	
n-Butylbenzene		U	U	U	
n-Propylbenzene		U	U	U	
1-Methylnaphthalene		U	U	60000	
Di-n-butyl phthalate*		U	U	12000	

Note: Items in bold are over the recommended soil cleanup objective, or the eastern background for metals.

* - detected in method or trip blank

Eastern background level has been used in lieu of the site background levels. The site background levels were actually higher in some compounds than actual site results, hence not being appropriate to use as a background level.

Table 4
Soil Vapor Survey Results : 0' - 4'

	B1	B2	MIN	MAX	AVERAGE	COUNT	GW1	GW1	GW2	GW3	GW4	GW5	G1	G2	G3	G4	G5	G6	G7	G9	G9	G10	G12	G13
Compound	0-4	0-4					0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4
benzene			-----	-----	-----	-----																		
bromomethane			0.732	0.732	0.732	1										0.732								
chlorobenzene			0.121	4.044	1.746	4		0.282					0.121						4.044			2.535		
3-chloropropene			-----	-----	-----	-----																		
cis-1,2-dichloroethene			-----	-----	-----	-----																		
cis-1,3-dichloropropene			-----	-----	-----	-----																		
1,2-dibromoethane		0.149	0.021	0.646	0.334	4	0.614	0.056							0.021							0.646		
1,3-dichlorobenzene		2.246	0.196	9.641	1.901	15	2.162	0.665	1.026		9.641	4.725	0.559	0.701	0.614		0.445		1.695	0.231	0.293	0.196	4.725	0.838
1,4-dichlorobenzene			0.827	0.885	0.856	2	0.885					0.827												
1,1-dichloroethene			0.441	0.441	0.441	1										0.441								
ethylbenzene			0.033	2.535	0.754	5	0.799	0.282					0.121		0.033							2.535		
methylene chloride			0.203	1.927	1.143	5				1.927					0.878	1.673					0.203	1.035		
4-methyltoluene			0.106	5.951	2.171	7	1.393	0.275				5.951	0.197		0.106							1.324	5.951	
m-xylene			0.033	0.805	0.419	2	0.805								0.033									
o-xylene			0.103	1.711	0.616	5	0.774	0.312					0.178		0.103							1.711		
p-xylene		0.478	0.283	1.024	0.569	15	0.905	0.364	0.499		0.336	0.472	0.283	0.296	0.624	1.024	0.790		0.936	0.358	0.305	0.982		0.367
styrene	0.695	1.177	0.332	1.955	0.921	14	1.360	0.650	0.952	0.596		1.219	1.166	0.710		1.024	1.955	0.556		0.564	0.332	1.256		0.557
tetrachloroethene			0.020	0.031	0.026	2							0.031		0.020									
toluene			0.006	0.006	0.006	1									0.006									
trans-1,3-dichloropropene			0.006	0.006	0.006	1									0.006									
trichloroethene			0.660	0.660	0.660	1																0.660		
1,2,4-trimethylbenzene		1.414	0.221	3.323	0.990	15	3.323	0.603	1.365		0.532	1.913	0.946	0.767	0.886	0.846	0.356		1.622	0.221	0.273	0.368		0.829
1,3,5-trimethylbenzene			5.951	5.951	5.951	2						5.951										5.951		
vinyl chloride			-----	-----	-----	-----																		

Compound																								
carbon tetrachloride	0.518		0.297	3.097	1.929	3	2.394	0.297														3.097		
chloroethane			0.133	2.202	0.790	6				1.628			0.179		2.202		0.133				0.263	0.332		
chloromethane			3.598	7.594	5.596	2													3.598			7.594		
1,1-dichloroethane			0.153	0.236	0.190	3		0.181	0.236							0.153								
1,2-dichloroethane			6.595	6.595	6.595	1													6.595					
1,2-dichloropropane			-----	-----	-----	-----																		
1,2-dichlorotetrafluoroethane		0.012	0.008	3.097	0.397	13		0.011	0.010	0.398		3.097	0.008	0.034		0.404	0.009	0.062		0.060	0.223	0.310		0.537
1,1,1-trichloroethane			-----	-----	-----	-----																		
1,1,2,2-tetrachloroethane			4.775	4.775	4.775	2						4.775										4.775		
1,1,2-trichloro-1,2,2-trifluoroethane	0.004	0.018	0.024	0.118	0.075	8	0.118	0.092		0.024			0.078	0.054		0.027			0.093			0.116		

Note: Items in bold are over the recommended soil cleanup objective, or the eastern background for metals.

Table 5
Soil Vapor Survey Results : 4' - 8'

	B1	B2	MIN	MAX	AVERAGE	COUNT	GW1	GW2	GW3	GW4	GW5	G1	G2	G3	G4	G5	G6	G7	G9	G9	G10	G12	G13
Compound	4-8	4-8					4-8	4-8	4-8	4-8	4-8	4-8	4-8	4-8	4-8	4-8	4-8	4-8	4-8	4-8	4-8	4-8	4-8
benzene			3.443	3.443	3.443	1.000				3.443													
bromomethane			—	—	—	—																	
chlorobenzene			0.043	6.552	2.280	3.000	0.246			6.552				0.043									
3-chloropropene		0.289	1.855	1.855	1.855	1.000				1.855													
cis-1,2-dichloroethene		0.289	1.855	1.855	1.855	1.000				1.855													
cis-1,3-dichloropropene			2.181	2.181	2.181	1.000				2.181													
1,2-dibromoethane	0.340		0.052	19.966	6.718	3.000	0.135			19.966							0.052						
1,3-dichlorobenzene	1.157		0.123	6.923	1.796	9.000	1.739	4.376			6.923		0.428			0.702			0.123	0.165	1.052		0.658
1,4-dichlorobenzene			0.763	0.763	0.763	1.000	0.763																
1,1-dichloroethene			—	—	—	—																	
ethylbenzene			0.043	29.636	7.572	4.000	0.246			29.636				0.043							0.361		
methylene chloride			0.528	0.879	0.704	2.000			0.528					0.879									
m-xylene			0.022	58.883	29.453	2.000				58.883				0.022									
o-xylene	0.627		0.082	44.918	15.125	3.000	0.374			44.918				0.082									
p-xylene	0.622		0.052	13.834	1.499	13.000	0.347	0.610	1.650	13.834	0.052	0.362	0.274	0.684				0.672	0.187	0.311	0.331		0.176
styrene	1.106	0.785	0.262	2.062	0.939	13.000	1.753		2.062			0.613	0.515		0.612	1.959	0.927	0.622	0.262	0.405	0.557	1.504	0.414
tetrachloroethene			61.322	61.322	61.322	1.000				61.322													
toluene			11.267	11.267	11.267	1.000				11.267													
trans-1,3-dichloropropene	0.153	0.107	0.021	2.281	0.779	3.000	0.021			2.281										0.034			
trichloroethene			—	—	—	—																	
1,2,4-trimethylbenzene	1.185		0.059	3.879	1.023	12.000	2.280	1.169	0.560		0.278	0.563	0.562	0.565					0.059	0.187	1.395	3.879	0.774
1,3,5-trimethylbenzene	0.085		0.139	0.139	0.139	1.000											0.139						
vinyl chloride			0.506	0.506	0.506	1.000				0.506													

Compound																							
carbon tetrachloride	0.162		0.050	0.073	0.062	2.000								0.073			0.050						
chloroethane			0.113	0.818	0.310	5.000			0.364				0.116	0.818	0.113	0.138							
chloromethane			3.282	3.282	3.282	1.000					3.282												
1,1-dichloroethane			0.417	0.417	0.417	1.000			0.417														
1,2-dichloroethane			—	—	—	—																	
1,2-dichloropropane			0.271	0.271	0.271	1.000								0.271									
1,2-dichlorotetrafluoroethane	0.008	0.010	0.001	0.256	0.040	12.000	0.013	0.001	0.023	0.007			0.035	0.256	0.008		0.073		0.023	0.012	0.016		0.013
1,1,1-trichloroethane			5.900	9.738	7.819	2.000	9.738		5.900														
1,1,2,2-tetrachloroethane			—	—	—	—																	
1,1,2-trichloro-1,2,2-trifluoroethane	0.028	0.022	0.002	0.182	0.065	9.000	0.063	0.034			0.002		0.084	0.034			0.008		0.182	0.087	0.094		

Note: Items in bold are over the recommended soil cleanup objective, or the eastern background for metals.

Table 6
Soil Vapor Survey Results : 8' - 12'

	B1	B2	MIN	MAX	AVERAGE	COUNT	GW1*	GW2*	GW3	GW4	GW4*	GW5	G1*	G2	G2-DUP	G3	G4	G5	G6	G7*	G8*	G9	G10	G12	G13
Compound	8-12	8-12					8-12	8-12	8-12	8-12	8-12	8-12	4-12	8-12	8-12	8-12	8-12	8-12	8-12	8-12	8-12	8-12	8-12	8-12	8-12
benzene			0.651	10.331	5.491	2				10.331							0.651								
bromomethane			71.132	71.132	71.132	1																			71.132
chlorobenzene			2.952	2022.000	415.878	5				16.597					2.952						2022.000	12.761			25.082
3-chloropropene		0.110	0.072	1078.796	273.486	4				14.967				0.107	0.072										1078.796
cis-1,2-dichloroethene		0.110	0.072	152.089	30.631	5								0.107	0.072		0.504					0.383			152.089
cis-1,3-dichloropropene			4.363	131.000	67.682	2				4.363											131.000				
1,2-dibromoethane			0.062	706.000	105.187	7				18.821				0.708	0.627			3.722	0.062		706.000	6.371			
1,3-dichlorobenzene		0.899	0.390	4378.000	520.575	13	363.000	1170.000		14.958	4378.000	6.787	352.000	0.938	0.668	0.609					473.000	0.390	1.333		5.798
1,4-dichlorobenzene			925.000	925.000	925.000	1															925.000				
1,1-dichloroethene			0.316	34.150	17.233	2												0.316							34.150
ethylbenzene			0.542	2022.000	233.561	10	233.000			13.654				1.543	4.814	0.542		12.514	1.308		2022.000	12.761			33.470
methylene chloride			0.254	193.990	50.305	4				6.561							0.415	0.254							193.990
4-methyltoluene			7.695	1896.000	566.897	6	347.000				1121.000			7.695	10.500						1896.000	19.184			
m-xylene			8.369	60.891	34.565	3				34.435												8.369			60.891
o-xylene			5.555	216.000	43.727	7	216.000			8.854				5.555	7.452			24.167	18.616						25.447
p-xylene	0.468	0.241	0.242	1587.000	272.449	15	478.000	427.000		8.080	1587.000	0.242	374.000		5.461	0.367		5.192	4.771		1159.000	15.236	0.413	0.576	21.399
styrene		0.715	0.430	1679.000	360.342	13		847.000	1.025				618.000	12.646	3.105	0.430	0.622	8.564	12.832	1679.000	1489.000		0.500		11.726
tetrachloroethene			8.440	36.704	23.541	3				36.704												8.440			25.478
toluene			0.616	33.230	13.405	4				18.985								0.616				0.789			33.230
trans-1,3-dichloropropene			0.044	40.585	9.115	5				4.363				0.044				0.267				0.315			40.585
trichloroethene			27.200	27.200	27.200	1																			27.200
1,2,4-trimethylbenzene		0.772	0.316	908.000	228.161	13	245.000	908.000	0.534		279.000	0.316	690.000	4.169		0.551					828.000	0.682	1.117	2.286	6.439
1,3,5-trimethylbenzene			1.039	12.444	5.394	3												12.444	2.699						1.039
vinyl chloride			5.054	5.054	5.054	1																			5.054
Compound																									
carbon tetrachloride		1.755	1.014	1.014	1.014	1										1.014									
chloroethane		0.003	0.073	0.248	0.138	3										0.094	0.073	0.248							
chloromethane			-----	-----	-----	-----																			
1,1-dichloroethane			0.043	0.043	0.043	1													0.043						
1,2-dichloroethane			-----	-----	-----	-----																			
1,2-dichloropropane			-----	-----	-----	-----																			
1,2-dichlorotetrafluoroethane	0.004	0.021	0.003	8.000	1.463	9	8.000						5.000	0.011	0.011	0.087	0.017		0.003			0.022			0.020
1,1,1-trichloroethane			-----	-----	-----	-----																			
1,1,2,2-tetrachloroethane			-----	-----	-----	-----																			
1,1,2-trichloro-1,2,2-trifluoroethane	0.019	0.011	0.064	71.000	21.345	9	68.000						52.000	0.068		0.064	0.610				71.000	0.130	0.088		0.143

Note: Items in bold are over the recommended soil cleanup objective, or the eastern background for metals.
* - Sample Diluted 1:1000

Table 7
Geoprobe Macro Core Soils Analyses

Compound	Eastern Background	NYSRSCO	B2A 1-2 feet	G3A 6-7 feet	G8A 1-3 feet	G4A 2-4 feet	GW3A 3.5 - 4 feet
Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	33000	SB	8640	8560	9320	9470	1900
Antimony	N/A	SB	U	U	U	U	U
Arsenic	3-12	7.5	U	U	U	U	U
Barium	15-600	300	187	238	342	170	84.2
Beryllium	0-1.75	SB	0.504	0.55	0.542	0.528	0.598
Cadmium	0.1-1	1	U	U	U	12.7	U
Calcium	130-35000	SB	5680	8240	2590	1600	1980
Chromium	1.5-40	10	11.9	13.3	9.86	9.48	5.65
Cobalt	2.5-60	30	4.24	5.74	6.74	4.84	5.63
Copper	1-50	25	115	425	161	108	29.9
Iron	2000-550000	2000	18300	16300	21200	14800	13600
Lead		SB	110	65.1	244	16.9	169
Magnesium	100-5000	SB	1940	2500	2750	1890	262
Manganese	50-5000	SB	692	1200	581	275	59.5
Mercury	.001-.2	0.1	0.085	0.15	0.22	0.12	0.029
Nickel	0.5-25	13	13.7	25.9	19.2	13	11.2
Potassium	6500-43000	SB	825	927	831	798	263
Selenium	0.1-3.9	2	U	U	U	U	U
Silver	N/A	SB	U	U	U	U	U
Sodium	6000-8000	SB	196	103	92.2	122	89.1
Thallium	N/A	SB	U	U	U	U	U
Vanadium	1-300	150	15.3	11.8	15.9	10.7	9.76
Zinc	9-50	20	92.4	184	123	70	93.4
VOC's		µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Trichloroethene		700	U	68	U	U	1400
Semi VOC's		µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Anthracene		50000	U	470	U	310	U
Benzo(a)anthracene		224	1100	1300	U	920	U
Benzo(a)pyrene		61	1000	1400	U	820	U
Benzo(b)fluoranthene		1100	1700	1700	U	1300	U
Benzo(g,h,i)perylene		50000	470	810	U	460	U
Benzo(k)fluoranthene		1100	610	580	U	470	U
Chrysene		400	1100	1200	U	920	U
Fluoranthene		50000	2000	2100	U	1700	U
Indeno(1,2,3-cd)pyrene		3200	450	850	U	470	U
Phenanthrene		50000	1600	2000	U	1300	U
Pyrene		50000	2100	2300	U	1800	U
Library Search Compounds		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
4-Hydroxy-4-Methyl-2-Pentanone			400	U	U	U	860

Note: Items in bold are over the recommended soil cleanup objective, or the eastern background for metals.

Eastern background level has been used in lieu of the site background levels. The site background levels were actually higher in some compounds than actual site results, hence not being appropriate to use as a background level.

Table 8
Geoprobe Macro Core Vadose Zone Analyses

Eastern																
Compound	Background	NYSRSCO	B1	B2B	GW1A	G1A	G2A	G8B	GW2A	G13A	GW4	G9	G7	G5	DUP	
Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
Aluminum	33000	SB	4050	5700	5490	3800	6430	4830	5860	4090	5310	3600	5910	5690	7250	
Antimony	N/A	SB	U	U	U	U	U	U	U	U	U	5.63	10	U	U	
Arsenic	3-12	7.5	U	U	U	U	U	U	U	U	U	U	U	U	U	
Barium	15-600	300	52	38	60.7	33.6	61.1	49.7	43.9	54.8	42.4	61	46.4	60.8	53.4	
Beryllium	0-1.75	SB	U	U	0.292	U	0.261	U	0.308	0.269	0.26	U	0.246	U	0.241	
Cadmium	0.1-1	1	U	U	U	U	U	U	U	U	U	U	U	U	U	
Calcium	130-35000	SB	51500	84900	25500	59800	13600	43200	11300	98400	25500	37600	137900	47500	38800	
Chromium	1.5-40	10	7.28	7.71	11.1	9.02	12.6	13.4	8.54	8.46	7.58	6.68	7.53	8.3	9.57	
Cobalt	2.5-60	30	2.59	4.37	3.89	2.35	4.36	2.08	4.27	3.95	2.96	1.95	4.59	4.34	4.79	
Copper	1-50	25	17.9	18.9	22.8	18.2	47.8	19.1	20.8	29.7	25.8	15.2	26.4	23.3	19.8	
Iron	2000-550000	2000	10100	13000	13700	9470	15700	10500	14300	12000	12300	8970	13800	14100	15800	
Lead		SB	4.86	7.46	15.2	11.9	23.3	15.6	17.5	10.3	8.3	6.24	8.5	16.7	12.7	
Magnesium	100-5000	SB	14000	10900	12400	32500	7100	8740	7050	21800	7070	1900	7070	8600	13000	
Manganese	50-5000	SB	567	633	605	371	618	389	274	936	335	275	697	676	460	
Mercury	.001-2	0.1	U	0.036	0.017	U	0.1	0.015	0.028	U	U	0.018	U	U	U	
Nickel	0.5-25	13	9.75	13.2	12.8	9.58	16.5	9.38	14.9	14.9	12.9	7.95	14	13.1	15.5	
Potassium	8500-43000	SB	589	585	736	578	690	554	780	535	596	554	773	794	832	
Selenium	0.1-3.9	2	U	U	U	U	U	U	U	U	U	U	U	U	U	
Silver	N/A	SB	U	U	U	U	U	U	U	U	U	U	U	U	U	
Sodium	6000-8000	SB	80.1	93.7	123	161	147	123	107	161	103	99.7	116	86.6	94.2	
Thallium	N/A	SB	U	U	U	U	U	U	U	U	U	U	U	U	U	
Vanadium	1-300	150	6.97	8.11	9.69	8.6	10	7.66	9.98	7.03	8.15	6.55	8.21	8.49	9.97	
Zinc	9-50	20	47.1	51.6	90.6	35.2	92	38.1	77.2	38.6	51.9	39.5	48.8	64.3	56.6	
VOCs	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	
Trichloroethene	700	U	U	U	U	U	U	U	U	U	U	U	910	U	U	
SVOCs	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	
2-Methylnaphthalene	36400	U	230	U	U	U	U	380	460	1400	U	U	U	U	310	
Acenaphthene	50000	U	U	U	U	U	U	U	U	250	U	U	U	U	U	
Bis-2-ethylhexyl phthalate	50000	U	U	U	U	U	260	U	U	U	U	U	U	U	U	
Chrysene	400	U	U	U	U	U	U	U	U	330	U	U	U	U	U	
Fluorene	50000	U	U	U	U	U	U	U	U	260	U	U	U	U	U	
Phenanthrene	50000	U	U	U	U	U	U	240	U	1100	U	U	U	U	280	
Pyrene	50000	U	U	U	U	U	U	U	U	340	U	U	U	U	U	
Library Search Compounds	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	
4-Hydroxy-4-Methyl-2-Pentanone	1200	U	210	U	U	U	U	U	U	U	U	U	U	U	U	
n-Butylbenzene		U	U	U	U	U	U	U	U	820	U	U	U	U	U	
n-Propylbenzene		U	U	U	U	U	U	U	U	918	U	U	U	U	U	

Note: Items in bold are over the recommended soil cleanup objective, or the eastern background for metals.

Eastern background level has been used in lieu of the site background levels. The site background levels were actually higher in some compounds than actual site results, hence not being appropriate to use as a background level.

Table 9
Groundwater Samples

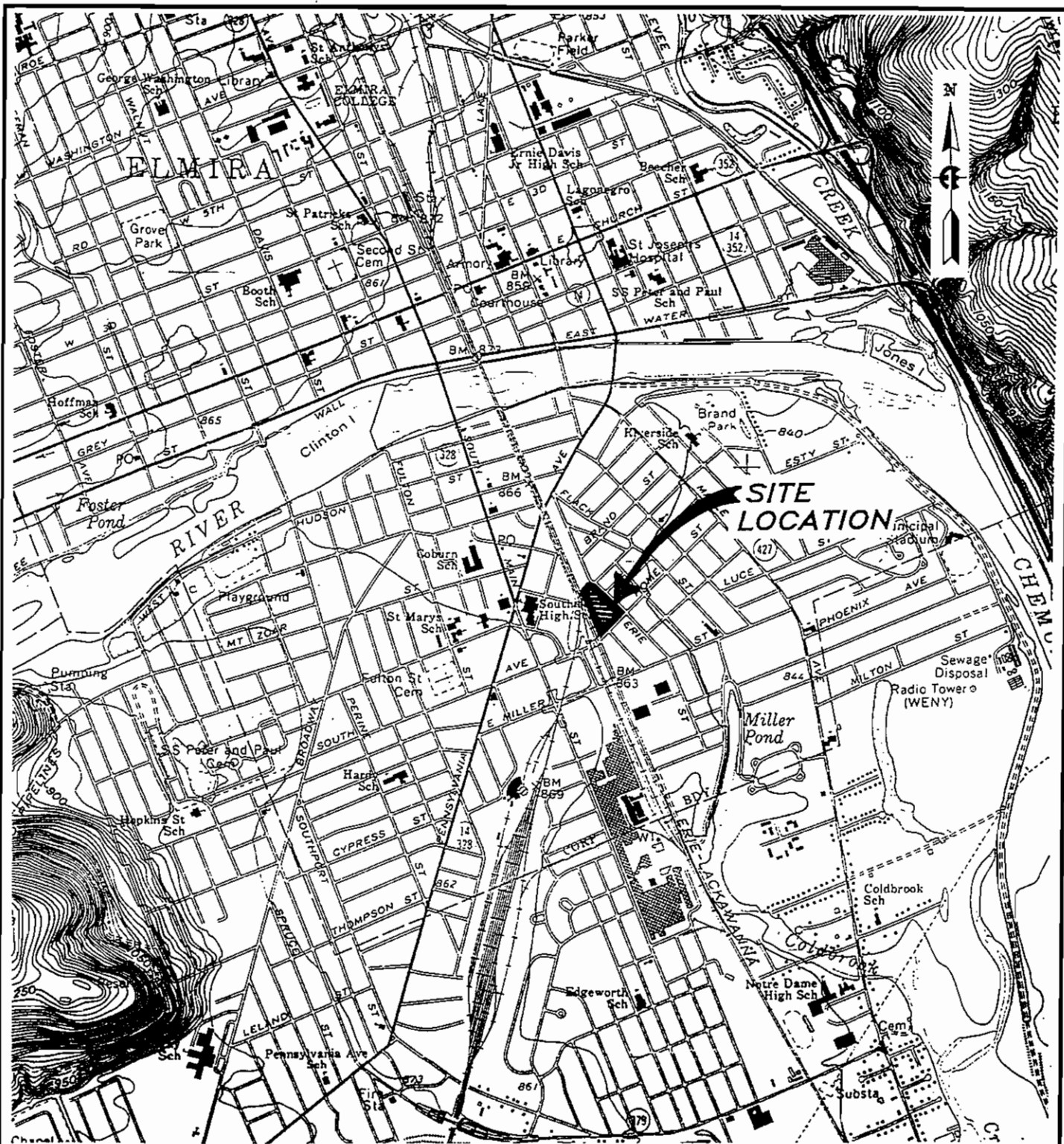
Compound	Range of Detection	Groundwater Standard	WATER CLASS	GW1	GW1B1	GW2	GW4	GW3	B2W	FB1	GWDUP	MW1	MW2	MW3
Metals	mg/l	mg/l	WATER CLASS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Aluminum	.406 - 53.3	0.1	A,A-S,AA,AA-S,B,C	1.64	N/A*	0.858	0.406	4.89	1.21	0.136	1.67	7.91	18	53.3
Antimony	u - 0.056	0.003	GA GUIDANCE VALUE	U	N/A*	0.056	U	U	U	U	U	U	U	U
Arsenic	u - 0.065	0.025	GA	0.004	N/A*	0.003	U	U	0.003	U	U	0.006	0.034	0.065
Barium	0.0167 - 1.17	1.0	GA	0.266	N/A*	0.329	0.235	0.192	0.128	0.076	0.0167	0.199	0.3	1.17
Beryllium	u - 0.003	0.003	GA GUIDANCE VALUE	U	N/A*	U	U	U	U	U	U	U	U	0.003
Cadmium	u	0.005	GA	U	N/A*	U	U	U	U	U	U	U	U	U
Calcium	93.5 - 191	----	NONE	258	N/A*	174	136	93.5	153	58.2	151	101	137	191
Chromium	0.01 - 0.057	0.05	GA	0.02	N/A*	U	U	0.023	U	U	U	0.01	0.027	0.057
Cobalt	u - 0.04	0.005	A,A-S,AA,AA-S,B,C	0.011	N/A*	U	U	U	U	U	U	U	0.018	0.04
Copper	u - .238	0.2	GA	0.036	N/A*	0.018	U	0.034	U	U	U	0.02	0.055	0.238
Iron**	1.31 - 104	0.3	GA	6.31	N/A*	5.89	2.75	10.8	4.85	1.33	1.31	15.8	36.9	104
Lead	u - 0.22	0.025	GA	0.012	N/A*	0.22	0.004	0.032	0.003	U	0.007	0.01	0.021	0.12
Magnesium	10.2 - 55.9	35	GA GUIDANCE VALUE	44.2	N/A*	38.9	26.5	19.3	28.2	10.2	29.8	26.4	41	55.9
Manganese**	0.019 - 7.12	0.3	GA	3.71	N/A*	3.53	1.68	0.721	1.27	0.019	1.55	0.759	2.06	7.12
Mercury	u - 0.0006	0.0007	GA	U	N/A*	U	U	U	0.0004	0.0003	U	U	U	0.0006
Nickel	u - 0.128	----	NONE	0.031	N/A*	0.018	U	0.012	U	U	U	U	0.042	0.128
Potassium	1.73 - 13.6	----	NONE	5.47	N/A*	5.75	8.72	4.19	5.69	1.73	4.99	6.4	8.78	13.6
Selenium	u	0.02	GA	U	N/A*	U	U	U	U	U	U	U	U	U
Silver	u	0.05	GA	U	N/A*	U	U	U	U	U	U	U	U	U
Sodium	21.5 - 85.2	20	GA	68.6	N/A*	73.3	59.9	51.5	66.7	21.5	30.5	85.2	59.7	56.4
Thallium	u	0.0005	GA GUIDANCE VALUE	U	N/A*	U	U	U	U	U	U	U	U	U
Vanadium	u - 0.079	0.014	A,A-S,AA,AA-S,B,C	0.012	N/A*	0.012	U	U	U	U	U	U	0.021	0.079
Zinc	u - 0.536	2.0	GA	0.095	N/A*	0.054	U	0.216	0.037	0.037	0.06	0.065	0.175	0.536
VOC's	ug/l	ug/l		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Acetone*	u - 44	50		N/A*	U	44	U	U	U	40	U	U	41	U
Carbon Disulfide	u - 26	50		N/A*	U	U	26	U	U	U	U	U	U	U
Chloroform	u - 5	7		N/A*	U	U	U	U	U	U	U	5	U	U
SVOC's	ug/l	ug/l		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
2-Methylnaphthalene	u - 250	50		N/A*	U	250	U	U	U	U	U	U	U	U
Phenanthrene	u - 160	50		N/A*	U	160	U	U	U	U	U	U	U	U

Note: Items in bold are over the recommended groundwater standard.

* - GW1 was resampled for VOC's and SVOC's

** Sum of Iron and Manganese Total < 0.5 ppm

FIGURES



**AMERICAN LAFRANCE
BROWNFIELDS SITE**

**FIGURE 1
LOCATION MAP**

SCALE: 1" = 2,000'

FORMER AMERICAN-LAFRANCE PROPERTY
TAX MAP # 99.12-2-1.1
ELMIRA, NEW YORK
AUGUST 2000

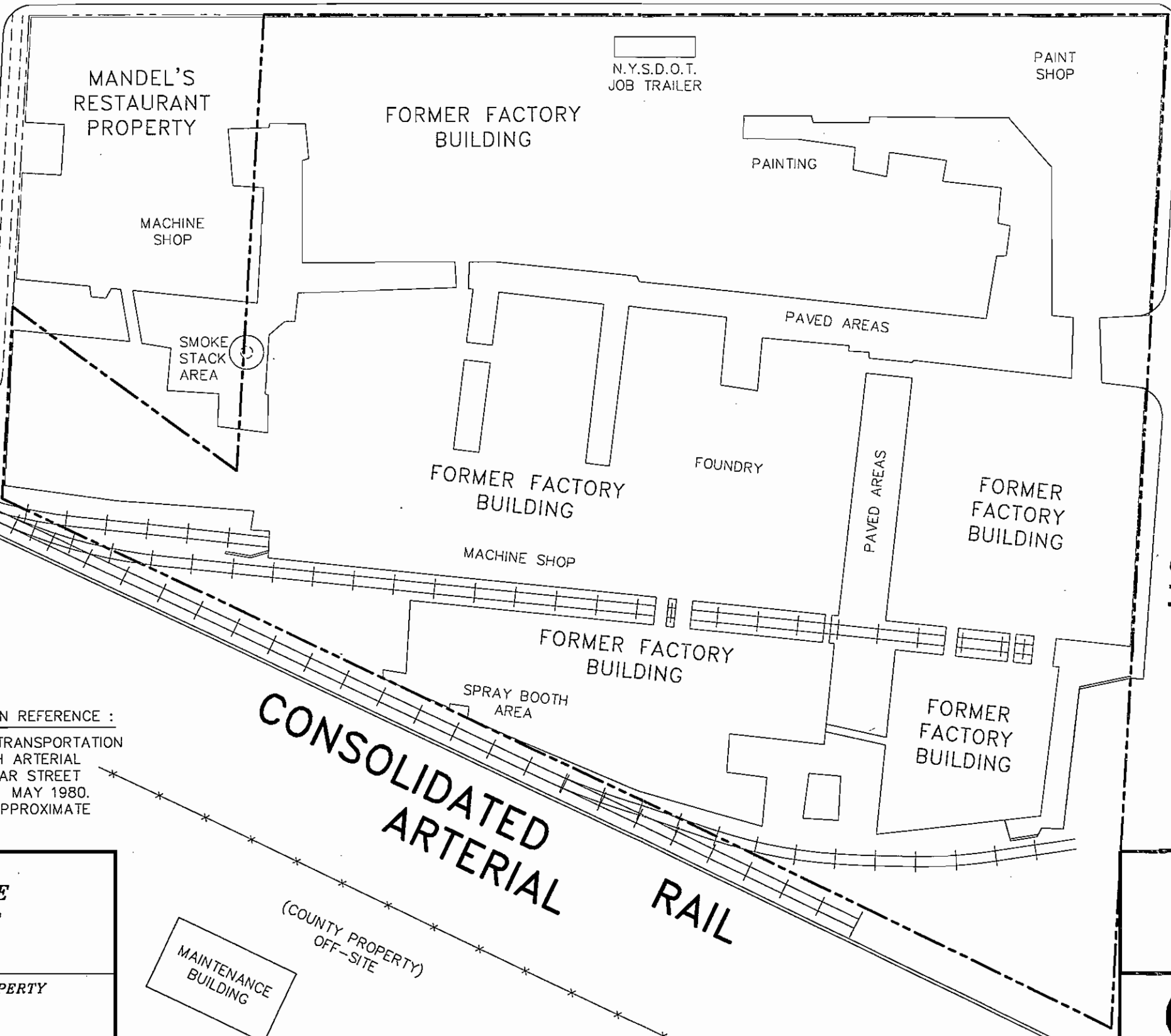


FAGAN ENGINEERS
Environmental Consultants
JOB # 97.150

E. LA FRANCE ST.

ERIE STREET

HOME STREET



FORMER FACTORY BUILDING LOCATION REFERENCE :
NEW YORK STATE DEPARTMENT OF TRANSPORTATION
CITY OF ELMIRA NORTH - SOUTH ARTERIAL
PENNSYLVANIA AVENUE TO CEDAR STREET
MAP # 2, SHEET 1. DATED : MAY 1980.
FORMER BUILDING LOCATIONS ARE APPROXIMATE
AS SITE IS CURRENTLY VACANT.

**AMERICAN LAFRANCE
BROWNFIELDS SITE**

FORMER AMERICAN-LAFRANCE PROPERTY
TAX MAP # 99.12-2-1.1
ELMIRA, NEW YORK
AUGUST 2000

**FIGURE 2
SITE MAP**

SCALE : 1"=60'



FAGAN ENGINEERS
Environmental Consultants
FILE: 7150-2 JOB # 97.150

E. LA FRANCE ST.

ERIE STREET

HOME STREET

MANDEL'S
RESTAURANT
PROPERTY

MACHINE
SHOP

SMOKE
STACK
AREA

FORMER FACTORY
BUILDING

N.Y.S.D.O.T.
JOB TRAILER

PAINT
SHOP

PAINTING

PAVED AREAS

FORMER FACTORY
BUILDING

FOUNDRY

FORMER
FACTORY
BUILDING

MACHINE SHOP

FORMER FACTORY
BUILDING

SPRAY BOOTH
AREA

FORMER
FACTORY
BUILDING

CONSOLIDATED
ARTERIAL
RAIL

(COUNTY PROPERTY)
OFF-SITE

FORMER FACTORY BUILDING LOCATION REFERENCE :
NEW YORK STATE DEPARTMENT OF TRANSPORTATION
CITY OF ELMIRA NORTH - SOUTH ARTERIAL
PENNSYLVANIA AVENUE TO CEDAR STREET
MAP # 2, SHEET 1. DATED : MAY 1980.
FORMER BUILDING LOCATIONS ARE APPROXIMATE
AS SITE IS CURRENTLY VACANT.

AMERICAN LAFRANCE
BROWNFIELDS SITE

FORMER AMERICAN-LAFRANCE PROPERTY
TAX MAP # 99.12-2-1.1
ELMIRA, NEW YORK
AUGUST 2000

LEGEND

(H) SURFACE SOIL SAMPLES, DOH (4)

+ GRID SPACING = 50'

--- PROPERTY BOUNDARY



FIGURE 3
SURFACE SOIL SAMPLE LOCATIONS

SCALE : 1"=60'



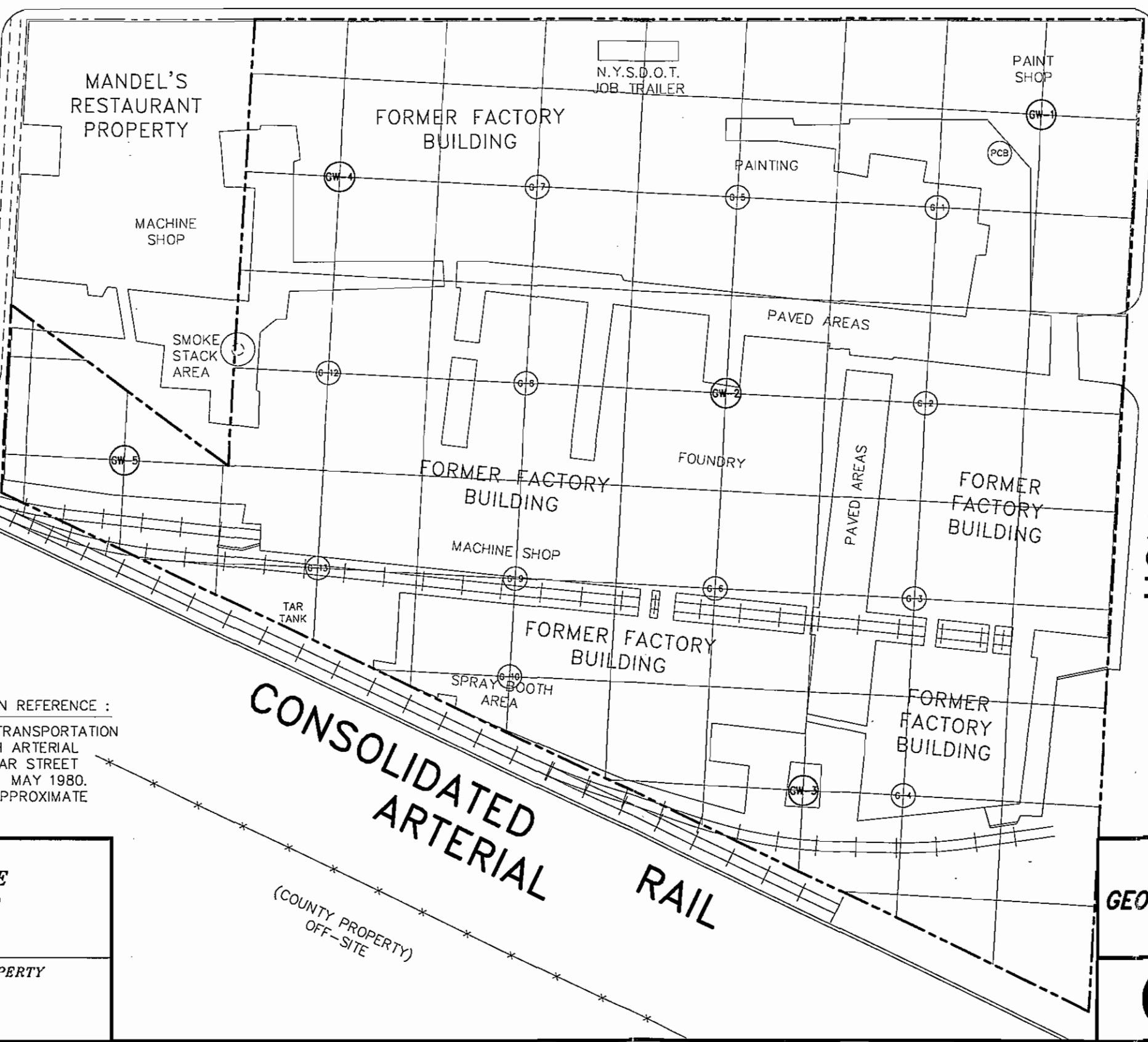
FAGAN ENGINEERS
Environmental Consultants
FILE: 7150-2H JOB # 97.150

E. LAFRANCE ST.

ERIE STREET

HOME STREET

CONSOLIDATED ARTERIAL RAIL



LEGEND

- (G-12) GEOPROBE LOCATIONS (18)
- (GW-5) GEOPROBE GROUNDWATER SAMPLE LOCATIONS (5)
- TAR TANK TEST AT TAR TANK (1)
- (B-82) GEOPROBE BACKGROUND LOCATIONS (2)
- (PCB) FORMER PCB CLEAN-UP AREA
- + GRID SPACING = 50'
- PROPERTY BOUNDARY

FORMER FACTORY BUILDING LOCATION REFERENCE :
NEW YORK STATE DEPARTMENT OF TRANSPORTATION
CITY OF ELMIRA NORTH - SOUTH ARTERIAL
PENNSYLVANIA AVENUE TO CEDAR STREET
MAP # 2, SHEET 1. DATED : MAY 1980.
FORMER BUILDING LOCATIONS ARE APPROXIMATE
AS SITE IS CURRENTLY VACANT.

AMERICAN LAFRANCE
BROWNFIELDS SITE

FORMER AMERICAN-LAFRANCE PROPERTY
TAX MAP # 99.12-2-1.1
ELMIRA, NEW YORK
AUGUST 2000

FIGURE 5
GEOPROBE MACRO CORE LOCATIONS
SCALE : 1"=60'

FE FAGAN ENGINEERS
Environmental Consultants
FILE: 7150-2GL JOB # 97.150

E. LAFRANCE ST.

ERIE STREET

HOME STREET

CONSOLIDATED ARTERIAL RAIL

MANDEL'S RESTAURANT PROPERTY

MACHINE SHOP

SMOKE STACK AREA

NO GW RECOVERY

FORMER FACTORY BUILDING

FORMER FACTORY BUILDING

MACHINE SHOP

FORMER FACTORY BUILDING

SPRAY BOOTH AREA

N.Y.S.D.O.T. JOB TRAILER

PAINTING

FOUNDRY

PAINT SHOP

FORMER FACTORY BUILDING

FORMER FACTORY BUILDING

MAINTENANCE BUILDING



(H-1) (G-11)

(GW-4)

838

(G-2)

(H-2)

(G-5)

838

(G-1)

837.8

838.2

PAVED AREAS

838.4

(GW-2)

(G-2)

838.6

838.8

839

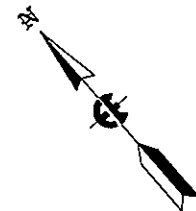
839.2

839.4

(GW-3)

(G-4)

(G/B1)



LEGEND

- (G-12) GEOPROBE LOCATIONS (18)
- (GW-5) GEOPROBE GROUNDWATER SAMPLE LOCATIONS (5)
- (H) SURFACE SOIL SAMPLES, DOH (4)
- (MW) MONITORING WELL LOCATIONS (3)
- TAR TANK TEST AT TAR TANK (1)
- (G-B2) GEOPROBE BACKGROUND LOCATIONS (2)
- + GRID SPACING = 50'
- PROPERTY BOUNDARY

FORMER FACTORY BUILDING LOCATION REFERENCE :
NEW YORK STATE DEPARTMENT OF TRANSPORTATION
CITY OF ELMIRA NORTH - SOUTH ARTERIAL
PENNSYLVANIA AVENUE TO CEDAR STREET
MAP # 2, SHEET 1. DATED : MAY 1980.
FORMER BUILDING LOCATIONS ARE APPROXIMATE
AS SITE IS CURRENTLY VACANT.

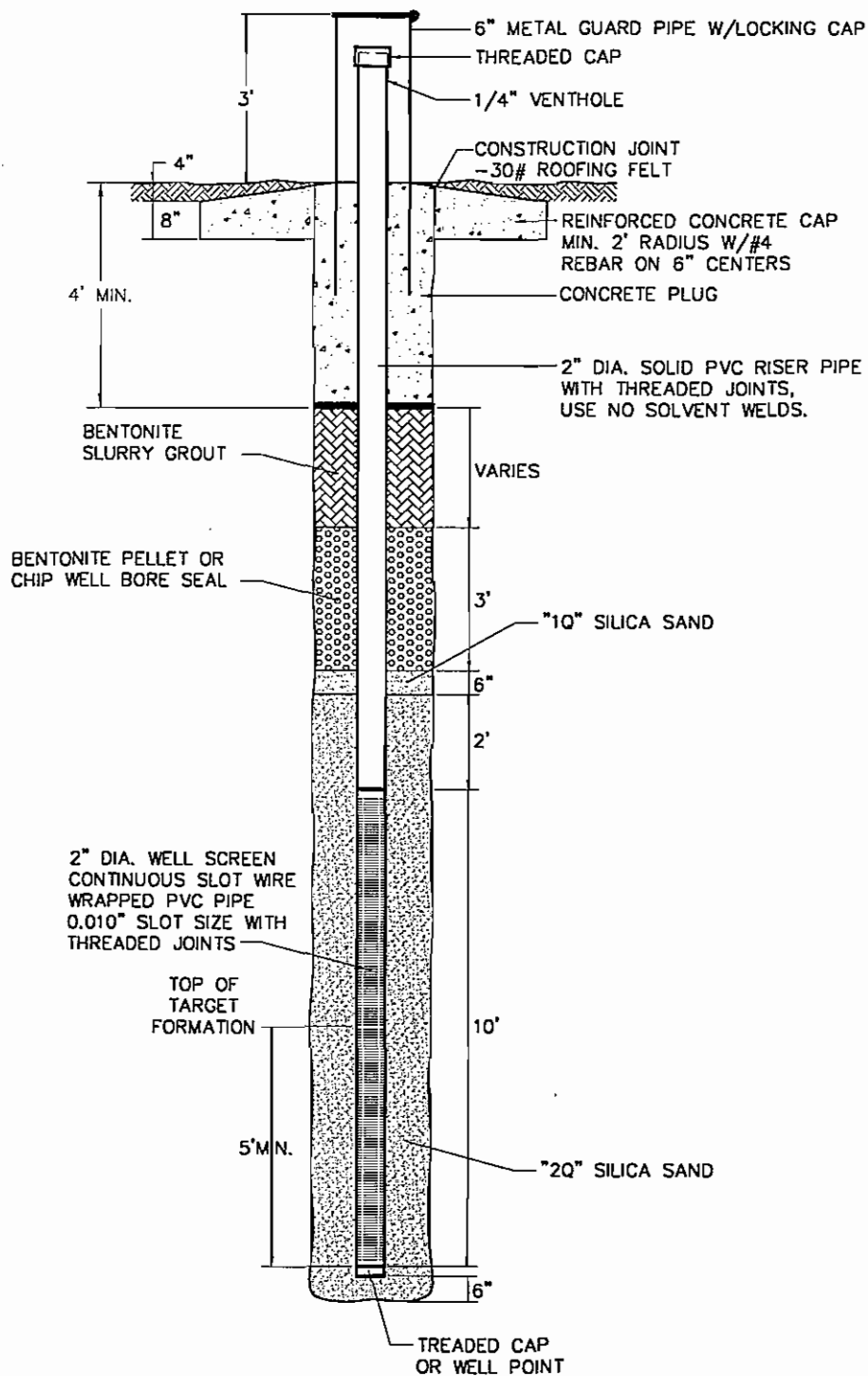
AMERICAN LAFRANCE
BROWNFIELDS SITE

FORMER AMERICAN-LAFRANCE PROPERTY
TAX MAP # 99.12-2-1.1
ELMIRA, NEW YORK
AUGUST 2000

FIGURE 6
ESTIMATED GROUNDWATER GRADIENT
FROM MACRO CORE POINTS

SCALE : 1"=60'

FE FAGAN ENGINEERS
Environmental Consultants
FILE: 7150-GW6 JOB # 97.150



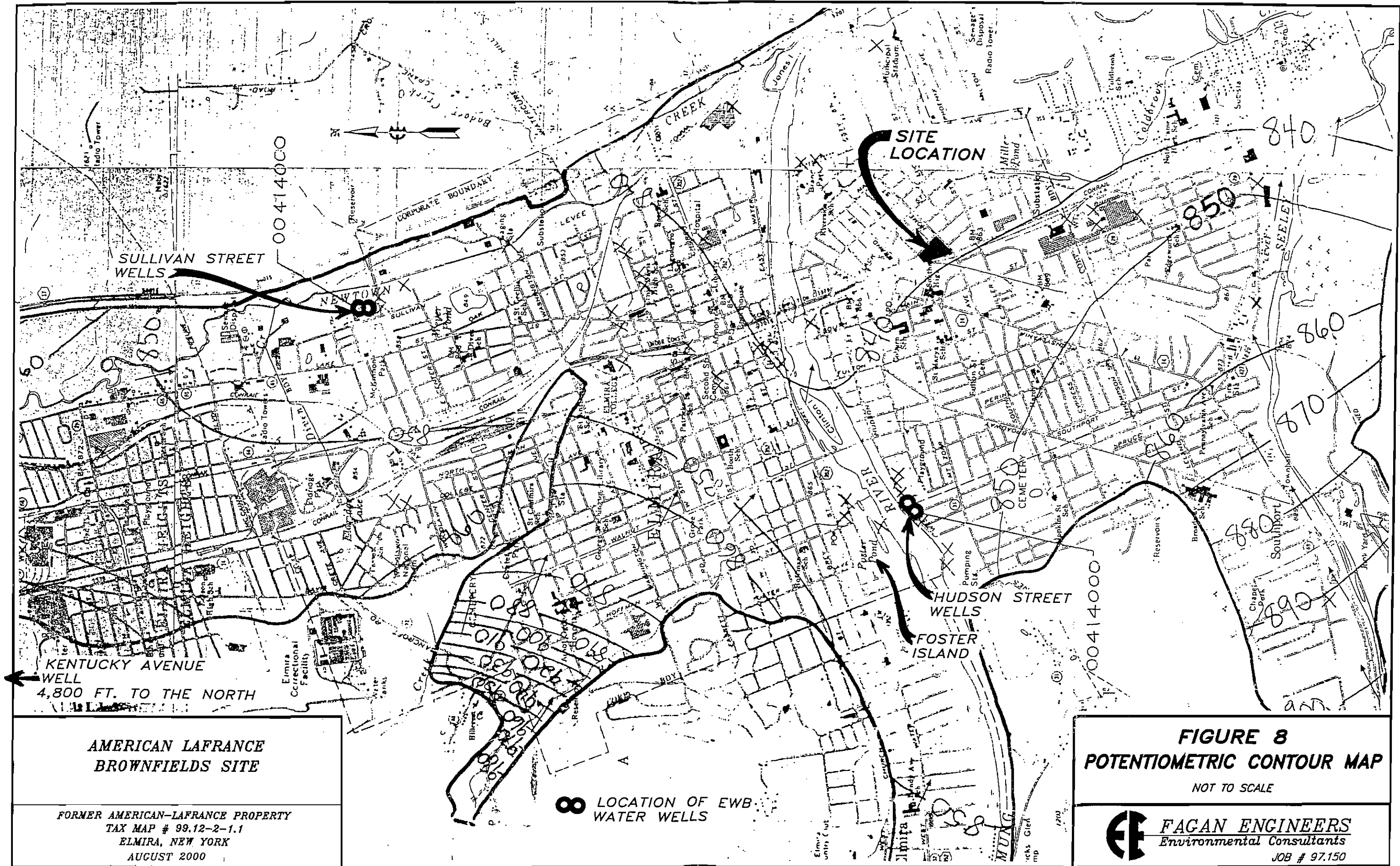
**AMERICAN LAFRANCE
 BROWNFIELDS SITE**

FORMER AMERICAN-LAFRANCE PROPERTY
 TAX MAP # 99.12-2-1.1
 ELMIRA, NEW YORK
 AUGUST 2000

**FIGURE 7
 MONITORING WELL
 CONSTRUCTION DIAGRAM
 NOT TO SCALE**



FAGAN ENGINEERS
 Environmental Consultants
 FILE : 7150-8MW JOB # 97.150



**AMERICAN LAFRANCE
BROWNFIELDS SITE**

FORMER AMERICAN-LAFRANCE PROPERTY
TAX MAP # 99.12-2-1.1
ELMIRA, NEW YORK
AUGUST 2000

**FIGURE 8
POTENTIOMETRIC CONTOUR MAP**

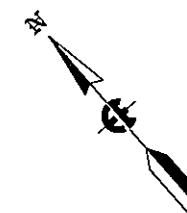
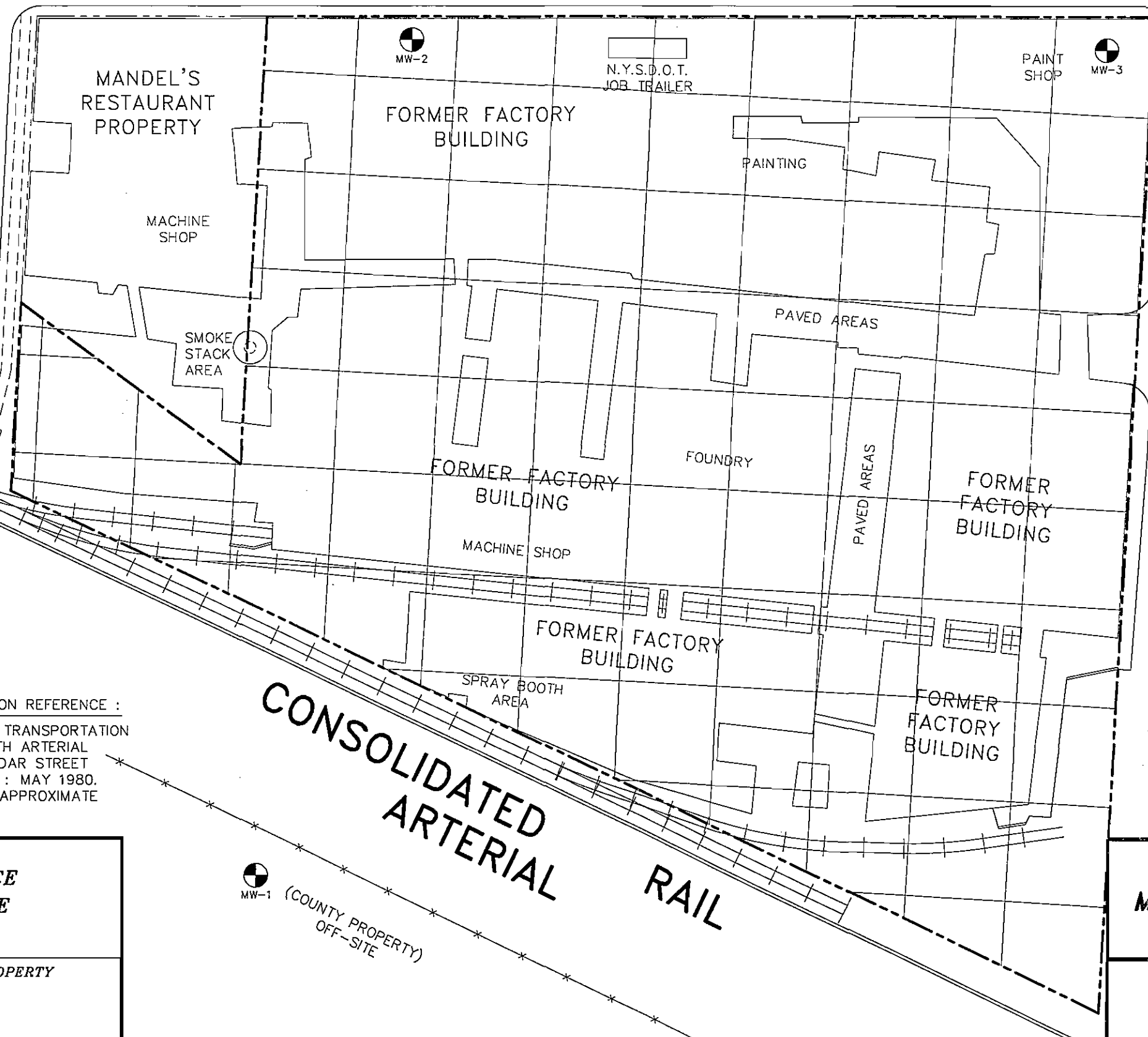
NOT TO SCALE

FAGAN ENGINEERS
Environmental Consultants
JOB # 97.150

E. LA FRANCE ST.

ERIE STREET

HOME STREET



LEGEND

MONITORING WELL LOCATIONS (3)

GRID SPACING = 50'

PROPERTY BOUNDARY

FORMER FACTORY BUILDING LOCATION REFERENCE :
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 PENNSYLVANIA AVENUE TO CEDAR STREET
 MAP # 2, SHEET 1. DATED : MAY 1980.
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**AMERICAN LAFRANCE
 BROWNFIELDS SITE**

FORMER AMERICAN-LAFRANCE PROPERTY
 TAX MAP # 99.12-2-1.1
 ELMIRA, NEW YORK
 AUGUST 2000

**FIGURE 9
 MONITORING WELL LOCATIONS**

SCALE : 1"=60'

FAFAGAN ENGINEERS
 Environmental Consultants
 FILE: 7150-2MW JOB # 97.150

