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NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Solid & Hazardous Materials

STATEMENT OF BASIS

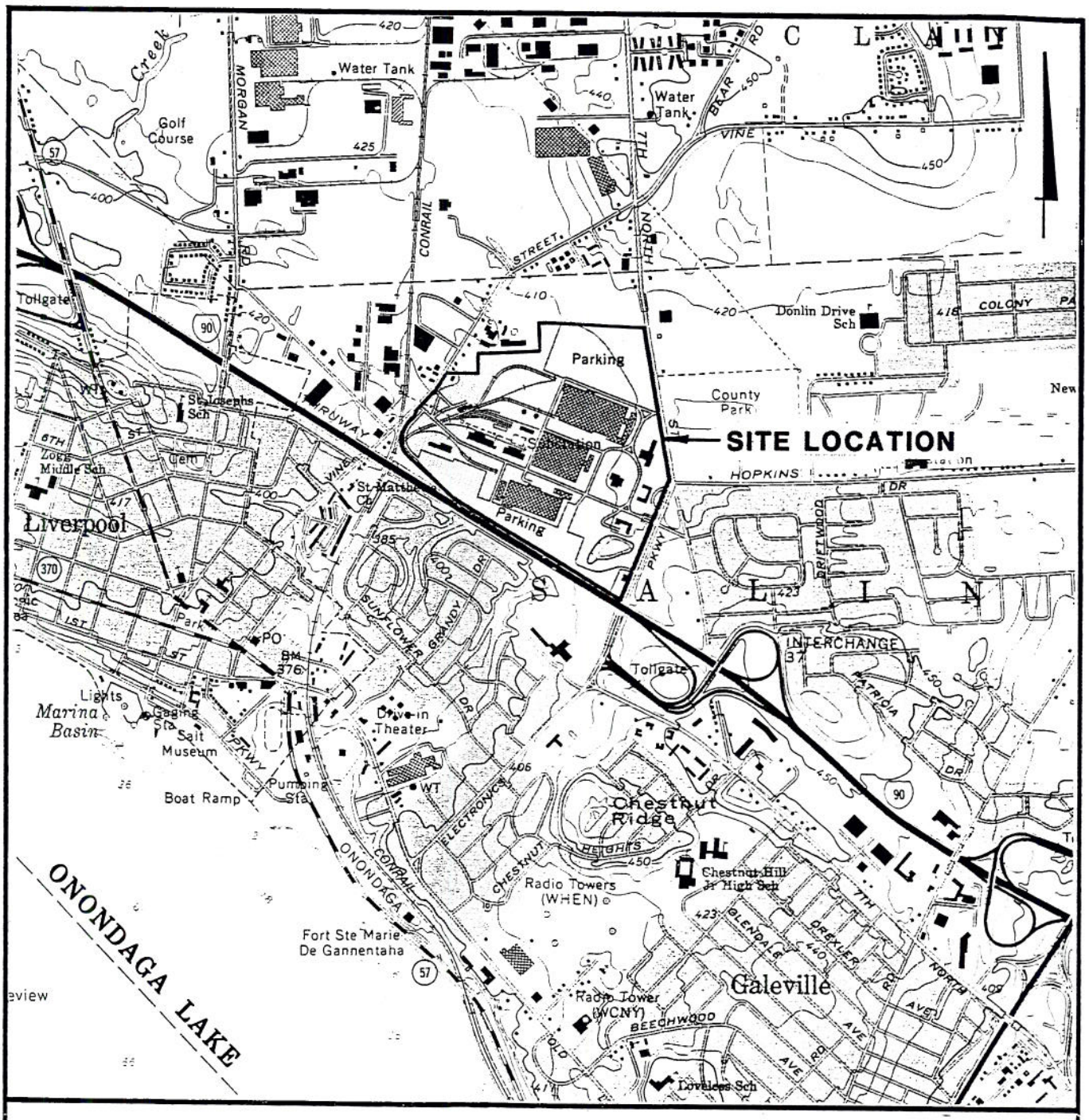
FOR

LOCKHEED MARTIN CORPORATION

Electronics Park Facility
Town of Salina, Onondaga County
New York

USEPA ID No.: NYD059385120

January 1997



ELECTRONICS PARK FACILITY
SYRACUSE, NEW YORK

SITE LOCATION MAP

SCALE:

2000' 0 2000'

SOURCE: USGS 7 1/2 MINUTE TOPOGRAPHIC QUADRANGLE:
SYRACUSE WEST, NY, 1978

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

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NEW YORK STATE
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TOWN OF SALINA, ONONDAGA COUNTY
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INTRODUCTION

The purpose of this Statement of Basis is to provide a meaningful opportunity for the public to be informed of and to participate in cleanup decisions that affect them and their communities. Public input on proposed facility-specific corrective action decisions will be finalized through issuance of a RCRA Order on Consent to Lockheed Martin Corporation. The Order on Consent will be the mechanism used to implement the final remedial program.

SCOPE OF DOCUMENT

This document:

- Describes the contamination found at the Electronics Park (EP) facility and in the West Branch of Bloody Brook immediately south of the New York State (NYS) Thruway;
- Describes the remedial goals for contamination clean up at the EP facility and West Branch of Bloody Brook;
- Identifies the proposed corrective action remedies that may be used for cleaning up impacted media;
- Provides a brief overview of the regulatory requirements, site history and site investigations which were conducted at the EP Facility and the Middle and West Branches of Bloody Brook; and
- Solicits public review and comment on the proposed remedies.

PUBLIC COMMENT OPPORTUNITY

It should be noted that the New York State Department of Environmental Conservation (Department) has only selected proposed remedies. Changes to the proposed remedies, or the selection of an alternative remedies may be made if public comments or additional data indicate that such changes would result in a more appropriate solution. The Department will select final remedies for the EP facility and the West Branch of Bloody Brook only after the public comment period has ended and the comments have been reviewed and considered.

We stress the importance of public comment, and encourage input on all alternatives, including options not previously studied. The Department will choose, or modify the final remedy for the EP facility and the West Branch of Bloody Brook after the public comment period has ended and the comments have been reviewed and considered. The Department has set a public comment period from **January 1, 1997 to February 3, 1997.** See the "Public Notice" or "Fact Sheet" for further details on the public comment period, scheduled public meeting and on how to provide comments. (Also see page 21).

Document Availability

This document summarizes information that can be found in greater detail in the administrative record for the facility. Many reports, including investigative, groundwater and pilot study reports were utilized to support the basis of the proposed remedy. Each report is referenced in the appropriate sections of this Statement of Basis (SB), and is available for review. The Department encourages the public to review these documents in order to gain a more comprehensive understanding of the nature and extent of contamination at the EP facility and the West Branch of Bloody Brook and apply that to the corrective remedies proposed for clean up.

Copies of the Reports, Fact Sheet and Public Notice are available for inspection at the:

Dept. of Environmental Conservation
Region 7 Offices
615 Erie Boulevard West
Syracuse, New York 13204-2400
Contact Person: Leland Flocke
Telephone: 315/426-7551

and

Dept. of Environmental. Conservation
Bureau of Hazardous Waste Facilities
50 Wolf Road - Room 460
Albany, New York 12233-7252
Contact Person: Timothy DiGiulio
Telephone: 518/457-9253

Lockheed Martin Corporation
Bldg. EP-7, MD 48
P.O. Box 4840
Syracuse, NY 13221-4840
Contact person: Robert Maciel
Telephone: 315/456-1714

Liverpool Public Library
310 Tulip Street
Liverpool, NY 13088
Contact person: Elaine Lyon
Telephone: 315/457-0310

BACKGROUND

Regulatory Overview

RCRA corrective action requires owners or operators of hazardous waste treatment, storage, and disposal facilities to clean up impacted media (i.e., surface water, groundwater, soil and sediment) that has resulted from any past waste management practices at the facility. The EP facility, formerly owned by General Electric Company, was utilized for the storage of hazardous waste subject to Hazardous Waste Regulations 6NYCRR Parts 370.

After public review and comment, the Department will enter into an Order on Consent with Lockheed Martin. Pursuant to the authority under "Environmental Conservation Law, Article 27, Title 9 and §71-2727(3), the clean up activities will begin or continue as outlined in the Order on Consent and its attachments.

Site History

The Lockheed Martin EP facility is located on Electronics Parkway in the Town of Salina, New York. The EP facility was constructed in the mid-1940's by the General Electric (GE) Company. The ownership was transferred by GE to Martin Marietta Corporation in April 1993. In March 1995, Marin Marietta merged with Lockheed Corporation. As a result, the Martin Marietta Corporation (MMC) became a wholly-owned subsidiary of Lockheed Martin Corporation, but MMC continued to own and operate the EP Facility. Effective January 1996, MMC merged into Lockheed Martin Corporation and MMC ceased to exist. In September 1996, ownership of the EP facility was transferred to the Empire State Development Corporation; however, Lockheed Martin is responsible for completing the necessary corrective actions and for addressing impacted media associated with EP facility operations.

In the past, various electronic components were manufactured at the EP facility. These included television picture tubes, semi-conductors, transmitters and receivers, and specialty products. Presently, sonar and radar systems are manufactured at the facility.

IMPACTED MEDIA at the EP FACILITY and in the WEST BRANCH OF BLOODY BROOK

As a result of past manufacturing and operations, a variety of chemicals used at the EP facility have impacted soils, sediment and groundwater. These include volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), heavy metals, and hazardous constituents found in petroleum based products (BTEX). Below is a summary of the locations and type of contaminants found at the EP facility.

Table 1

AREAS IMPACTED at the EP FACILITY

Location	Type of Impacts found	Media Impacted
Groundwater	VOCs (including trichloroethene, 1,2,dichloroethene, and vinyl chloride). Groundwater entering the Building 10 basement sump is also contaminated with low levels of PCB's.	Groundwater
Former Gasoline Storage Area	Petroleum based compounds (benzene, toluene, ethylbenzene, and xylene)	Soil & Groundwater
Former Drum Storage Area	VOCs and Petroleum based compounds	Soils
Storm Sewers	VOCs	Groundwater & Surface Water

Investigations conducted by the Department and Lockheed Martin identified the presence of polychlorinated biphenyls (PCBs) and cadmium in sediments in the West Branch of Bloody Brook immediately south of the NYS Thruway. Below is a summary of the location and type of contaminants found in the West Branch of Bloody Brook.

Table 2

AREAS IMPACTED in the WEST BRANCH OF BLOODY BROOK

Location	Type of Impacts Found	Media Impacted
West Branch of Bloody Brook	Cadmium, PCBs	Stream Sediments

GOALS OF THE CORRECTIVE ACTION REMEDIES

The goal of a corrective measure is the protection of human health and the environment. Specific clean up goals have been established for each environmental media (soil, sediment and groundwater). The goals are outlined below in Table 3:

Table 3

REMEDIAL GOALS
FOR SOIL, SEDIMENT, AND GROUNDWATER

Location	Goal and Type of Remediation to be Performed
EP Storm Sewers	**Prevent the off-site discharge of VOC-impacted groundwater.** Repair and replacement of EP storm sewers to eliminate the infiltration of VOC-impacted Groundwater will continue (as-needed) to prevent the discharge of VOC-impacted groundwater.
Groundwater	**Clean up and prevent the off-site migration of VOC-impacted groundwater.** Continue to pump contaminated groundwater and treat it through existing EP facility treatment units.
Former EP Gasoline Storage Area	**Clean up VOC-impacted soils at the Former EP Gasoline Storage Tank Area.** Soils will be treated to remove VOCs to an acceptable action level.
Former EP Drum Storage Area	**Clean up VOC-impacted soils at the Former EP Drum Storage Area.** Soils will be treated to remove VOCs to an acceptable action level.
West Branch of Bloody Brook	**Clean an impacted section of Bloody Brook.** PCB- and cadmium-impacted sediment found in a 750-foot segment of the West Branch of Bloody Brook will be removed and disposed off-site.

RCRA FACILITY INVESTIGATION

To determine the corrective actions necessary at the EP facility, Lockheed Martin initiated a series of voluntary investigations to identify the impacts from hazardous waste or constituents. Extensive soil and groundwater investigations were conducted to evaluate all Solid Waste Management Units (SWMUs) and process areas at the EP facility. In addition a sediment sampling program was conducted in both the Middle and West Branches of Bloody Brook at locations upstream and downstream of the facility and

within the facility boundaries. The purpose of these investigations was to determine the presence, nature, rate, and extent of releases of contamination at the EP facility and in Bloody Brook. Once enough data was gathered to define the extent of any impacts at the EP facility so that corrective measure alternatives could be chosen, RCRA Facility Investigation (RFI) Reports were completed, summarizing this information. With respect to Bloody Brook, a separate technical evaluation was completed. This information was used to help make the final recommendations for corrective measures at the EP facility and Bloody Brook. The following gives a summary of previous investigations and the results of those investigations:

EP Facility Investigations

Lockheed Martin has voluntarily undertaken a series of soil and groundwater investigations at and near the EP facility. A Phase I groundwater investigation was conducted to evaluate groundwater conditions near Building EP-7A. The findings of this investigation are presented in the "Phase I Ground-Water Investigation Report" prepared by Malcolm Pirnie, Inc., dated September 1990. A Phase II groundwater investigation was conducted to evaluate the foundation drain and sump systems throughout the facility. A "Phase II Ground-Water Investigation Report", dated August 1991, summarizing the findings of this investigation was prepared by Law Environmental. A Phase III investigation was conducted by Blasland, Bouck & Lee, Inc. (BB&L) in 1992. This investigation included the evaluation of the physical, chemical, and hydraulic characteristics of the overburden groundwater system at the facility. The results of the Phase III investigation are presented in the "Phase III Ground-Water Investigation Report", dated April 1993, and the "Supplemental Phase III Ground-Water Investigation Report", dated October 1993.

Several additional groundwater-related investigations were conducted by BB&L from 1992 to 1994. The results of these investigations are documented in the following reports: "Storm Sewer Action Plan", dated October 1992; "Storm Sewer Investigations", dated December 1992; "West Electronics Park Ground-Water Investigation Report", dated February 1994; the "Supplemental West Electronics Park Ground-Water Investigation Report", dated September 1994; and "Additional Ground-Water Investigation Report, Building EP-5", dated November 1996. These reports are collectively referred to as the 'previously referenced reports' in subsequent sections of this Statement of Basis (SB). Lockheed Martin is continuing to monitor site-wide groundwater quality on a periodic basis through a sampling and analysis program conducted at select monitoring wells and sumps.

The investigations identified above have provided a hydrogeologic database consisting of soil gas, subsurface geologic, groundwater hydraulic and groundwater quality data, as well as information pertaining to the hydraulic influence of building sumps and subsurface utilities at the EP facility.

Site Geology

Based on the results of the investigations listed above, the general stratigraphy beneath the site is interpreted as consisting of the following geologic units (in descending order from ground surface):

- A heterogeneous upper overburden unit composed primarily of brown silt, sand, and gravel;
- Greenish-gray shaley/silty till;
- Brown silty to clayey till; and
- Gray to green Vernon Shale bedrock.

The site geology is detailed in the previously referenced reports.

Site Hydrogeology

Groundwater investigations at the site have generated data on the upper silt, sand, and gravel overburden unit of the site as well as the underlying Vernon Shale bedrock.

In general, the overburden groundwater flow system at the site is comprised primarily of the silt, sand and gravel unit underlain by a till unit. Owing to its density, fine grain size, and compact nature, the till unit acts as a hydraulic confining unit between the silt, sand and gravel unit, and the underlying bedrock formation.

Overburden groundwater elevation data obtained from the existing groundwater monitoring network (including monitoring wells, piezometers and sumps) demonstrates that groundwater underlying the central portion of the site converges upon the upper/lower sump located in Building EP-7. This hydraulic control, evidenced by a continuous groundwater depression centered near the upper/lower sump, is attributed to the active pumping (at approximately 30-50 gallons per minute) from the sump. Water pumped from the upper/lower sump, as well as other building sumps, is combined and treated in the Long Term Treatment System (discussed below).

Groundwater elevation data indicates that the hydraulic control of the sump network influences overburden groundwater flow throughout interior areas of the site, including the Former Gasoline Storage Tank Area, and the Storm Sewers. Overburden groundwater is not present in the western portion of the site known as the Former Drum Storage Area. **(See Figure 1 - Groundwater Elevation Contours)**.

Bedrock monitoring wells installed along the southern and western boundaries of EP indicate that the top of the Vernon Shale is highly fractured but has a relatively low permeability.

The site hydrogeology is detailed in the previously referenced reports. Variations to the general site hydrogeology may be encountered in each area of the site; pertinent hydrogeologic variations will be described in subsequent sections.

Site Chemical Characterization

Groundwater

Previous investigations have identified VOCs, including trichloroethylene (TCE) and potential degradation products (1,2-dichloroethene [1,2-DCE] and vinyl chloride [VC]) in water samples collected from the building sumps and storm sewers at the site and in overburden groundwater samples obtained from the monitoring wells located within the site boundaries. Other VOCs, including petroleum-related compounds (benzene, toluene, ethylbenzene, and xylenes, collectively referred to as BTEX), were detected in groundwater near the former location of two underground storage tanks used for gasoline and diesel fuel storage near EP-9 (known as the Former Gasoline Storage Tank Area). Based on analytical data obtained from monitoring wells installed at the perimeter of the site, the Department believes that VOC-impacted groundwater has not migrated off-site.

Semi-volatile organic compounds (SVOCs) have been detected in the overburden groundwater at monitoring wells located near Building EP-15 and EP-9, and at an upgradient monitoring well location at the eastern perimeter of the facility. No organochlorine pesticides have been detected in the groundwater at the facility. PCBs have been detected at two monitoring wells located near Buildings EP-15 and EP-5; the PCBs were identified in unfiltered water samples and may be related to PCB-impacted soils.

Groundwater samples obtained from the bedrock formation contained no VOCs (except for common laboratory contamination), SVOCs, pesticides or PCBs. No dissolved inorganics were present at concentrations exceeding Department Class GA standards. The bedrock groundwater analytical results support the interpretation that VOC impacts to groundwater are limited to the overburden (primarily the silt, sand and gravel unit above the till) groundwater system within the site perimeter.

The groundwater chemical characterization for each SWMU is described in detail in the previously-referenced reports and is described further in subsequent sections of this SB.

Soils

Previous investigations have identified chlorinated solvents (i.e., TCE, 1,2-DCE, tetrachloroethene [PCE] and 1,2-dichlorobenzene) and BTEX compounds in soil samples collected from the Former Drum Storage Area. Petroleum-related BTEX compounds were also detected in the unsaturated soil zone near the gasoline storage tank area. No SVOCs, pesticides or PCBs were identified in the site soils. In addition, there is no evidence of elevated concentrations of inorganics in the site soils.
The soil chemical characterization for each of the SWMU is described in detail in the previously-referenced reports and is described further below.

SWMU-Specific Existing Conditions

Site-Wide Groundwater

Lockheed Martin's voluntary investigations have identified specific areas of the EP facility which have been impacted by past activities; these areas are addressed as part of this SB. As described above, overburden groundwater present in select areas (including the Former Gasoline Storage Tank Area, the Storm Sewers and the sump network) within the site boundaries is impacted by VOCs, and is hydraulically connected and controlled by the continuous pumping of water from the existing network of building sumps **(See Figure 2- Volatile Organic Compounds at Building Sumps)**. The water pumped from these sumps is treated in the existing Long Term Treatment System and discharged to the storm sewer (described below), under the terms of a State Pollutant Discharge Elimination System (SPDES) permit.

Since the VOC-impacted, overburden groundwater in the areas listed above is hydraulically linked, the overburden groundwater (and the areas through which it passes) receives consideration in this SB under the heading of "Site-Wide Groundwater".

VOC impacts to Site-Wide Groundwater at EP have been associated with three discrete areas of the facility: the Building Sumps/Long-Term Treatment System; the Storm Sewers; and the Gasoline Storage Tank Area. As a result of these identified VOC impacts to groundwater, Lockheed Martin has undertaken a series of voluntary remedial measures which address impacted groundwater capture and control. As a result of these actions, contaminated groundwater has been contained within the facility boundary. **(See Figure 3 - Volatile Organic Compounds at Monitoring Wells).**

Storm Sewers

An on-site network of storm sewers exists at Electronics Park which discharges to the Middle and West Branches of Bloody Brook, both of which are Class C streams. Currently, surface water discharges to the storm sewers are regulated under the terms of SPDES Permit No. NYD002101.

Sampling and analysis of dry weather flows within the storm sewers at Electronics Park identified specific sections which were being impacted by the infiltration of VOC contaminated groundwater. The storm sewer sampling program identified four sections of pipeline that were being impacted by VOC-contaminated groundwater. These sections included:

1. An 18-inch diameter section located north of Building EP-10;
2. A 36-inch diameter section located west of Building EP-7;
3. A 27-inch diameter section located east of Building EP-6; and
4. Two 36-inch diameter sections and one 48-inch diameter section located west of Building EP-15 (West Branch of Bloody Brook).

As a result of these identified VOC impacts to the storm sewers, Lockheed Martin has undertaken a series of voluntary remedial measures which address impacted groundwater infiltration and discharge. In addition, Lockheed Martin is required to routinely monitor the storm sewer network to ensure that surface-water discharges from the facility meet applicable New York State surface-water quality standards, State Pollution Discharge Elimination System (SPDES) discharge limitations, and Department guidance levels.

Former Gasoline Storage Tank Area

Previous investigations conducted at the EP site have included investigatory work related to the Gasoline Storage Tank Area. Specifically, the Phase III Ground-Water Investigation (BB&L, April 1993) and the Supplemental Phase III Ground-Water Investigation (BB&L, February 1994) included soil and groundwater investigations in this area.

Two 4,000-gallon underground storage tanks (USTs), located near Building EP-9, were used for bulk storage of petroleum products, specifically gasoline and diesel fuel. These tanks were taken out of service in August 1996 and abandoned in-place through the removal of product and filling with concrete. As detailed below, subsurface investigations conducted in and around this area have revealed the presence of petroleum-related VOCs, including BTEX in soils and groundwater, due to past leakage from the piping associated with the gasoline storage tank. Upon discovery of the leakage, this piping was repaired during retrofitting activities conducted pursuant to Department petroleum bulk storage regulations (6NYCRR Part 613). Furthermore, approximately 260 cubic yards of soil, visually impacted or

containing petroleum odors, was excavated and disposed of at an off-site location. The excavated area was lined with plastic and backfilled.

Former Drum Storage Area

Based on a review of historical documents, a former drum storage area was identified near the former location of Buildings EP-11 and EP-12 (demolished in 1988). Reportedly, chemical wastes, including spent halogenated and non-halogenated solvents, were stored in steel, 55-gallon drums which were placed in paved and/or gravel areas. No drums or waste materials are currently stored and no remedial measures are currently underway in this area. Based on data obtained from previous soil boring investigations (see below), overburden groundwater does not occur in the Former Drum Storage Area. The results of completed investigations in this area are summarized below.

Previous investigations (BB&L, February 1994) undertaken in the Former Drum Storage Area revealed the presence of VOCs in unsaturated soils near the existing ground surface. To further characterize the nature of VOC contamination, 32 soil borings were completed in the area as part of the Supplemental West Electronic Park Ground-Water Investigation (BB&L, September 1994).

VOCs detected in the soil samples include chlorinated solvents [TCE, 1,2-DCE, PCE, and 1,2-dichlorobenzene] as well as non-chlorinated hydrocarbons (BTEX). The identified VOCs are compatible with the reported contents of the drums formerly stored at the EP-11/EP-12 area (GE, 1987). VOCs were detected above the Department-issued Technical Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Objectives (TAGM No. 4046) cleanup objectives only in shallow samples obtained within 4 feet of ground surface.

The soil samples obtained at borings performed on the margins of the 50-foot by 50-foot sampling grid, as well as the four borings performed along the roadway south of the Former Drum Storage Area, contained either low concentrations or no detectable VOCs.

The analysis of VOC concentrations in these soil samples allows horizontal and vertical delineation of the zone of impacted soils within the Former Drum Storage Area. Two limited areas of soil were delineated with VOC concentrations equal to or above the TAGM soil cleanup objectives.

Bloody Brook Investigations

As part of an ongoing study, the Department sampled the tributaries to Onondaga Lake, including Bloody Brook, in 1994 and 1995. In certain areas of the stream, the water quality and wildlife were affected at some metals and PCBs.

Based on Departments findings and in consideration of the pending real-estate transfer of the EP facility, Lockheed Martin elected to collect and analyze surface water and sediment samples from within the Middle and West Branches of Bloody Brook at select locations. The objective of this initial investigation (the Phase I investigation) was to provide data that could be used to assess the presence or absence of PCBs, cadmium, copper or mercury in surface water and sediments. The results of this investigation indicated the presence of PCBs, cadmium, copper and mercury in sediments collected from the Middle and West Branches of Bloody Brook; no surface-water impacts were identified. Based on the results of the Phase I investigation, Department and the New York State Department of Health (NYSDOH) requested that Lockheed Martin conduct additional sampling and analysis (the Phase II investigation) to assess the extent of PCBs, cadmium, copper and mercury in sediments.
(See Figure 4 - Bloody Brook Sediment Sampling Cadmium and PCBs)

The sampling data show that elevated concentrations of cadmium are in the sediments of the West Branch of Bloody Brook. The samples from the segment of the West Branch of Bloody Brook immediately downstream of the Thruway contain the most elevated concentrations of cadmium. The investigation has also shown the presence of trace levels of copper, mercury and PCBs in sediment samples from the stream and these levels do not pose a human health concern.

INTERIM CORRECTIVE MEASURES (ICM)

If at any time during the RCRA Facility Investigation, it becomes apparent that corrective actions should be taken to immediately address the spread of contamination, interim corrective measures must be taken. The design emphasis is to construct an ICM as close to a permanent system or final remedy as possible. Based on the results of previous investigations, Lockheed Martin has voluntarily implemented several interim corrective measures at the EP facility, with oversight and approval from the Department. The Department has determined that the ICMs have been effective in containing contaminated groundwater within the facility boundary. Eventually, through continued operations of the groundwater collection and treatment system, the contaminated groundwater will be cleaned up. Therefore, the Department believes that these measures could serve as the final remedial measures for the EP facility. In addition, the Department has determined that the corrective measure planned for the West Branch of Bloody Brook will minimize the impact of contamination to the environment in a way that is protective to human health and the environment and therefore believes these measures may constitute the final

remedial measure for the West Branch of Bloody Brook. A long term monitoring program for both the Bloody Brook and the EP facility will be implemented to ensure that these measures are effective.

Groundwater Pump &Treatment

A series of foundation drains and sumps exist throughout the EP facility. The purpose of these drains and sumps is to collect and control groundwater in and around subgrade structures (primarily utility tunnels and basements) at the facility. Originally, groundwater collected in these sumps was discharged to the storm or sanitary sewer systems. Based on these findings, Lockheed Martin designed and constructed the Long-Term Treatment System which is intended to collect and treat groundwater from those building sumps found to be impacted by VOCs. The Long-Term Treatment System consists of duplex pumping systems installed in the following building sumps **(See Figure 2)**:

- EP-5 Office Sump;
- EP-5 Artesian Well Sump (including artesian well flow);
- EP-6 Office Sump;
- EP-6 Basement Sump; and
- EP-7 Upper/Lower Sump.

The pumping systems serving these sumps discharge into a dedicated piping system which conveys water to Building EP-10. Located within Building EP-10 is a series of automatic valves and piping which control the flow of water into a pair of air stripper towers. These air stripper towers each had an initial hydraulic capacity of 250 gallons per minute (gpm), which was anticipated to provide sufficient capacity to treat all water with 100 percent redundancy. It has been observed, however, that flows do increase substantially during periods of high groundwater conditions (springtime). Based on these observations, a booster pump system has been installed to increase the flow capacity into the air stripper towers, and modifications to the air stripper towers have been completed to increase the capacity of each tower to 400 gpm. These modifications provide additional capacity for high flow conditions as well as the addition of other water sources while continuing to provide full 100 percent redundant capacity.

Ongoing monitoring has indicated that the Long-Term Treatment System is effective in capturing and controlling VOC-impacted groundwater occurring within the overburden in the central portion of the EP facility. Furthermore, the Long-Term Treatment System seems to be effectively controlling VOC-impacted groundwater within the facility boundaries, thus preventing off-site migration.

Lockheed Martin has developed and instituted a periodic groundwater quality and

elevation monitoring program to ensure continued hydraulic control and treatment of VOC-impacted groundwater from the Gasoline Storage Tank Area and other EP areas. The most recent groundwater elevation data (measured in December 1996) obtained by this program supports previous conclusions that the site-wide groundwater is being hydraulically controlled by the upper/lower sump located in Building EP-7 and that impacted groundwater has not migrated off-site.

Soil Vapor Extraction and Bioventing

Since the soil and groundwater impacts in the EP Gasoline Storage Tank Area were defined, MMC with the concurrence of the Department completed a focussed CMS which evaluated potential area-specific corrective measures. This results of this focussed study are presented in the Department-approved Technical Memorandum, Gasoline Storage Tank Area, Corrective Measures Study (BB&L, August 1994). This document made the following recommendations regarding corrective measures to be taken for the Gasoline Storage Tank Area:

- Continued use of the long-term treatment system to provide control and treatment of VOC-impacted groundwater; and

- In-situ bioremediation of impacted area soils.

In response to the Department's approval of the recommended corrective measures, Martin Marietta conducted bioventing bench-scale and pilot studies in support of the final design of the soil remedy. The results of these studies are presented in the Department-approved Bioventing System Gasoline Storage Tank Area Pilot Study and Implementation Report (Report) (BB&L, December 1994). The Implementation Report also provides a preliminary description of the bioventing system configuration proposed for the Gasoline Storage Tank Area. The Bioventing System was constructed in August 1995 and commenced operation in October 1995. The system is currently under an ongoing operation and maintenance program.

Corrective measures for the EP Former Drum Storage Area were evaluated in the Corrective Measures Study ([CMS] discussed below). The CMS recommended in-situ soil vapor extraction to address soil impacts identified in the Former Drum Storage Area. The recommended alternative was approved by the Department in April 1995. In response to the Department's approval, Lockheed Martin prepared a final design of the in-situ soil vapor extraction system, which has been approved by the Department. The in-situ vapor extraction system is scheduled for installation and start-up in January 1997.

Clean up of soil contamination in these areas will remove potential sources of groundwater contamination and should expedite restoration of site groundwater.

Storm Sewer Repair/Replacement

As a result of these previous investigations which identified the infiltration of VOC-impacted groundwater into select storm sewers, MMC initiated action to eliminate the infiltration into the following sections (collectively referred to in this SB as the 'Storm Sewers' in order to distinguish them from the entire storm sewer system):

1. An 18-inch diameter section located north of Building EP-10;
2. A 36-inch diameter section located west of Building EP-7;
3. A 27-inch diameter section located east of Building EP-6; and
4. Two 36-inch diameter sections and one 48-inch diameter section located west of Building EP-15 (West Branch of Bloody Brook).

For the first three Storm Sewer sections identified above, MMC installed a resin-impregnated liner system (Insituform). Due to additional infiltration identified in late 1995, the 36-inch diameter section located west of Building EP-7 and the 27-inch diameter section located east of Building EP-6 were replaced. An additional section of reinforced concrete sewer present east of Building EP-6 and the sewer present north of Building EP-7 were removed and replaced with HDPE. Also a groundwater collection trench was installed adjacent to a section of the HDPE sewer installed east of Building EP-6 and adjacent to a section of the sewer installed north of Building EP-7, to collect VOC-impacted groundwater in that area in order to reduce potential storm sewer infiltration; collected groundwater is pumped to the Long-Term Treatment System. Additional activities undertaken by MMC in these Storm Sewers include manhole improvements and/or rerouting of lateral connections.

With respect to the triple-barrel Storm Sewer section which conveys the West Branch of Bloody Brook, NYSDEC approved a design submittal which resulted in the installation of a high density polyethylene (HDPE) liner inside of each the three reinforced concrete pipes (RCP). The approximate length of the lined sections is 225 feet, extending from a chamber located beneath Building EP-15 to a downstream chamber located east of Building EP-15. To accommodate the liner pipe, a smaller diameter HDPE pipe was installed in each RCP: a 30-inch HDPE pipe was installed in the 36-inch RCP sections; and a 42-inch HDPE pipe was installed in the 48-inch RCP section. Due to the reduced frictional losses associated with HDPE pipe, no loss in hydraulic capacity occurred due to the smaller diameter pipes.

The HDPE pipes were installed by constructing a continuous 225-foot length of HDPE pipe by fusion welding the required number of sections. This continuous length of HDPE pipe was then pushed into the existing RCP sections through an insertion pit and into an exposed portion of the RCP. The HDPE pipe conveys the existing flow while providing an effective barrier against infiltration of VOC-contaminated groundwater.

Groundwater infiltration through the RCP portion of the sewer is controlled through a collection system which uses the annulus which exists between the existing RCP and the HDPE pipe. The annulus is backfilled with pea gravel which collects and conveys the groundwater infiltrating into the RCP sections; the pea gravel also secures the HDPE pipe within the RCP. A grout plug installed in the annulus at each end of the lined sections maintains the pea gravel in place and serves as a hydraulic barrier to contain groundwater which infiltrates into the RCP. Drain pipes installed through the downstream grout plug are connected to a pumping station, which pumps the groundwater drained from the annulus into a double-containment force main and then to the existing Long-Term Treatment System located at Building EP-10. To accommodate the addition of flows from this and other potential water systems, the existing Long-Term Treatment System was modified to increase treatment capacity as previously discussed.

The groundwater capture, pump and treat system installed within the Storm Sewer section beneath Building EP-15 is operating as designed. Ongoing monitoring at the SPDES outfall indicates that the Storm Sewer lining project has been successful in eliminating the infiltration of VOC-impacted groundwater into the remediated sewer sections.

West Branch of Bloody Brook Sediment Removal

Lockheed Martin's Phase I and Phase II investigations of Bloody Brook have identified the presence of cadmium and PCBs in sediment within the West Branch. The section of the West Branch from the south side of the New York State Thruway to the upstream extent of the drainage improvement project completed by Onondaga County Department of Drainage and Sanitation has been identified as containing the highest concentrations of cadmium and PCBs. This section is approximately 750 feet long, the stream bed in this area averages approximately 6 feet wide. The sediment in this section is primarily non-cohesive sand and gravel which overlie a dense clay within the stream bed.

Lockheed Martin proposes to remove the sediment within the stream bed from this section of the West Branch and transport the sediments off-site for disposal. In addition, an approximately 6 foot square 200 foot long concrete culvert conveys the West Branch beneath the NYS Thruway will be cleaned out. Although sediments present within the culvert have not been sampled and analyzed and may not contain PCBs or cadmium, the sediments present in the concrete culvert will also be removed for off-site disposal.

A long term monitoring program for Bloody Brook will be implemented to ensure that these measures are effective.

CORRECTIVE MEASURES STUDY

With the completion of the previous investigations at the EP facility, Lockheed Martin voluntarily developed a Final CMS Report (March 1995). The CMS presents an evaluation of corrective measures for impacted media at the EP facility identified through previous investigations.

The CMS included: the identification, development and screening of corrective measures technologies; a detailed evaluation of corrective measures alternatives; and justification of the recommended corrective measures. Presented below is a summary of findings presented in the CMS.

Groundwater corrective measures were evaluated in consideration of the interim corrective measures which were constructed and operating at the facility, including the Building Sumps/Long-Term Treatment System and the storm sewer rehabilitations. As presented in the CMS, these ICMs were proven effective in controlling and treating the VOC-impacted groundwater. The CMS recommended that the ICMs be considered the final corrective measure for the site-wide groundwater. The construction and operation of the Building Sumps/Long-Term Treatment System and the storm sewer rehabilitations area discussed above. Additional modifications to these systems will be made on an as-needed bases to control the off-site migration and discharge of VOC-impacted groundwater.

Several corrective measures were evaluated to address the soil impacts identified in the Former Gasoline Storage Area and the Former Drum Storage Area. The alternatives included: in-situ and ex-situ vapor extraction; ex-situ air stripping; thermal treatment; landfilling; and in-situ and ex-situ bioremediation. The corrective measures alternatives were evaluated based on technical, environmental human health, institutional and environmental criteria. Based on this evaluation in-situ bioremediation was selected as the preferred corrective measure for the Former Gasoline Storage Tank Area and in-situ vapor extraction was selected as the preferred corrective measure for the Former Drum Storage Area.

In-situ bioremediation involves the use of indigenous bacteria to biodegrade VOCs in unsaturated soils. The technology involves enhancing the natural biodegradation process by injecting nutrients and oxygen into the subsurface. Under favorable conditions, which are developed through the injection of nutrients and oxygen, microorganisms are known to degrade BTEX compounds. Microorganisms are capable of completely degrading organics compounds into water and carbon dioxide. As presented in the CMS, bioremediation is expected to reduce or eliminate the presence of VOCs in the unsaturated soils.

In-situ soil vapor extraction involves the use of vapor extraction technology to remove VOCs from the soil. The components of the system include a gas extraction system,

header piping, and a vacuum blower. The blower is connected via a piping network to a series of extraction wells installed in the VOC-impacted soil. The system operates by applying a vacuum to the wells, which creates a negative pressure gradient within the soils. The negative pressure causes the VOCs to desorb from the soil and migrate to the extraction wells. The VOCs are then extracted from the subsurface, treated (if needed) and discharged. As presented in the CMS, soil vapor extraction is expected to reduce or eliminate the presence of VOCs in the unsaturated soils.

PROPOSED FINAL REMEDY

Based on the information summarized above and detailed in the previously referenced reports and based on the successful operation of the various ICMs, the following Final Remedy is proposed for the EP facility:

Site-Wide Groundwater: Continuation of the groundwater pump and treat using the existing sump network and Long-Term Treatment System. This remedy is expected to control the off-site migration and reduce the volume of VOC-impacted groundwater. This remedy is considered protective of human health and the environment.

Former Gasoline Storage Tank Area: Continuation of in-situ bioremediation of unsaturated soils. VOC-impacted groundwater in this area is considered as part of site-wide groundwater. This remedy is expected to reduce or eliminate the presence of VOCs in the unsaturated soils. This remedy is considered protective of human health and the environment.

Former Drum Storage Area: In-situ soil vapor extraction of the unsaturated soils. No groundwater is present in this area. This remedy is expected to reduce or eliminate the presence of VOCs in the unsaturated soils. This remedy is considered protective of human health and the environment.

Storm Sewers: Continue the storm sewer maintenance program which has been incorporated to eliminate the infiltration of VOC-impacted groundwater. This remedy is considered protective of human health and the environment.

Based on the information summarized above and detailed in the Bloody Brook technical evaluation, the following Final Remedy is proposed for Bloody Brook:

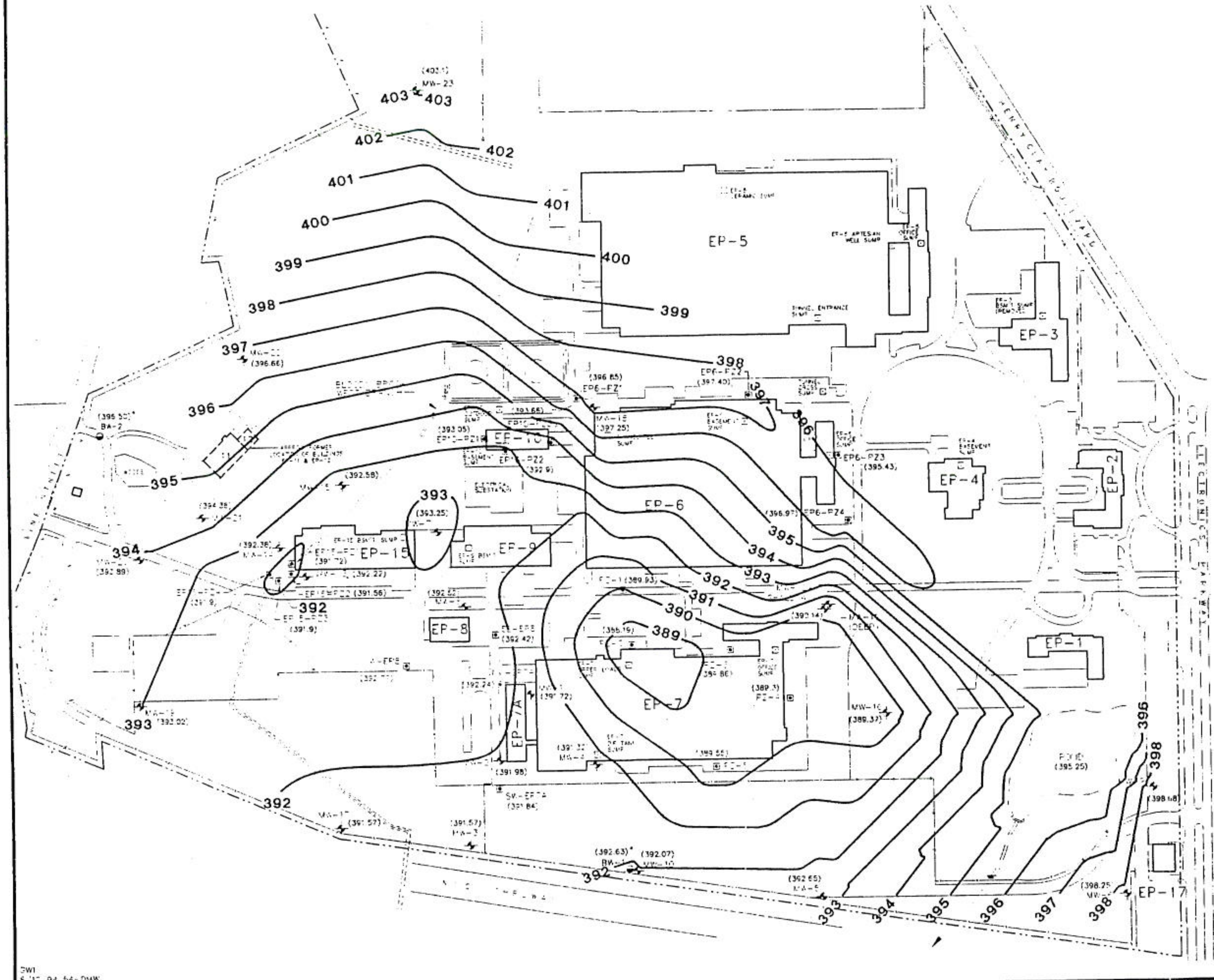
Bloody Brook:	Remove cadmium-impacted sediments present in a section of the West Branch of Bloody Brook which extends from the south side of the NYS Thruway to the upstream extent of the County's stream improvement project. Removed sediments will be transported off-site for disposal. This remedy is considered protective of human health and the environment.

PUBLIC PARTICIPATION

WRITTEN COMMENTS

How To Provide Your Comments: All comments will be considered in making the final decision for remedies that will address the contamination at Electronics Park and in the West Branch of Bloody Brook. Upon approval of the final remedies, a response to any comments submitted will be issued which will identify any changes from the proposed version and will describe and respond to the issues raised. A notice of the decision will be sent to each person who submits written comments or who requests such notice.

Comments must be sent to the Department's Region 7 Office, 615 Erie Boulevard West, Syracuse, NY 13204-2400 (contact person: Mr. Leland Flocke phone #(315) 426-7400). In lieu of, or in addition to the submission of written comments, any interested person may request a public hearing. Any request for a public hearing, must be in writing and must state the nature of the issues proposed to be raised in the hearing. All comments must be submitted in writing no later than **February 3, 1997**.



LEGEND

⊡	BUILDING SUMP
—·—·—	APPROXIMATE PROPERTY LINE
———	FENCE
MW-1	OVERBURDEN MONITORING WELL
BW-2	BEDROCK MONITORING WELL
PZ-1	OVERBURDEN PIEZOMETER
(392.38)	GROUND-WATER ELEVATION IN FEET
(396.50)*	BEDROCK GROUND-WATER ELEVATION (DATA NOT USED IN CONTOURING)
393 ———	GROUND-WATER ELEVATION CONTOUR IN FEET

150' 0 150' 300'

APPROXIMATE SCALE

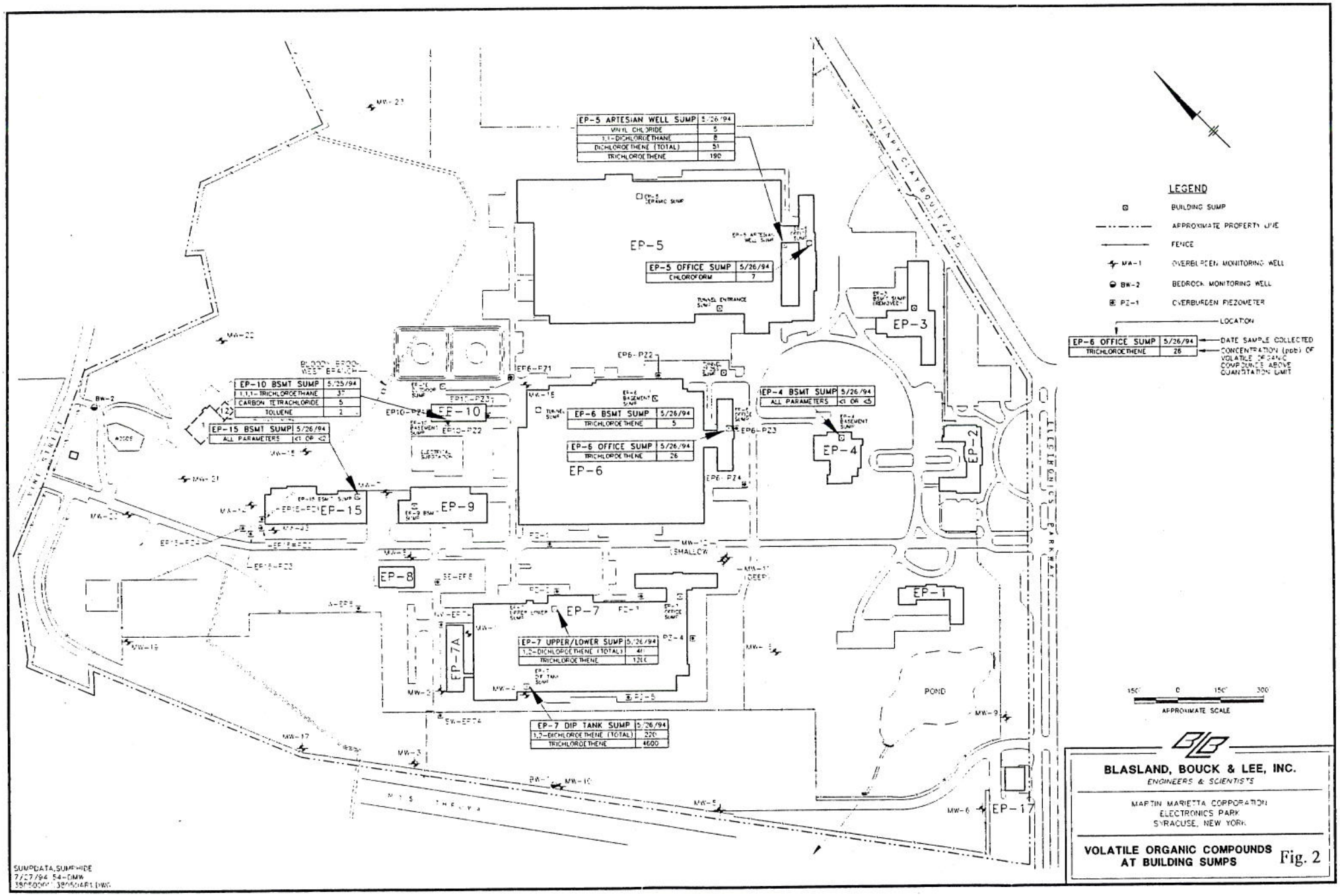
BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

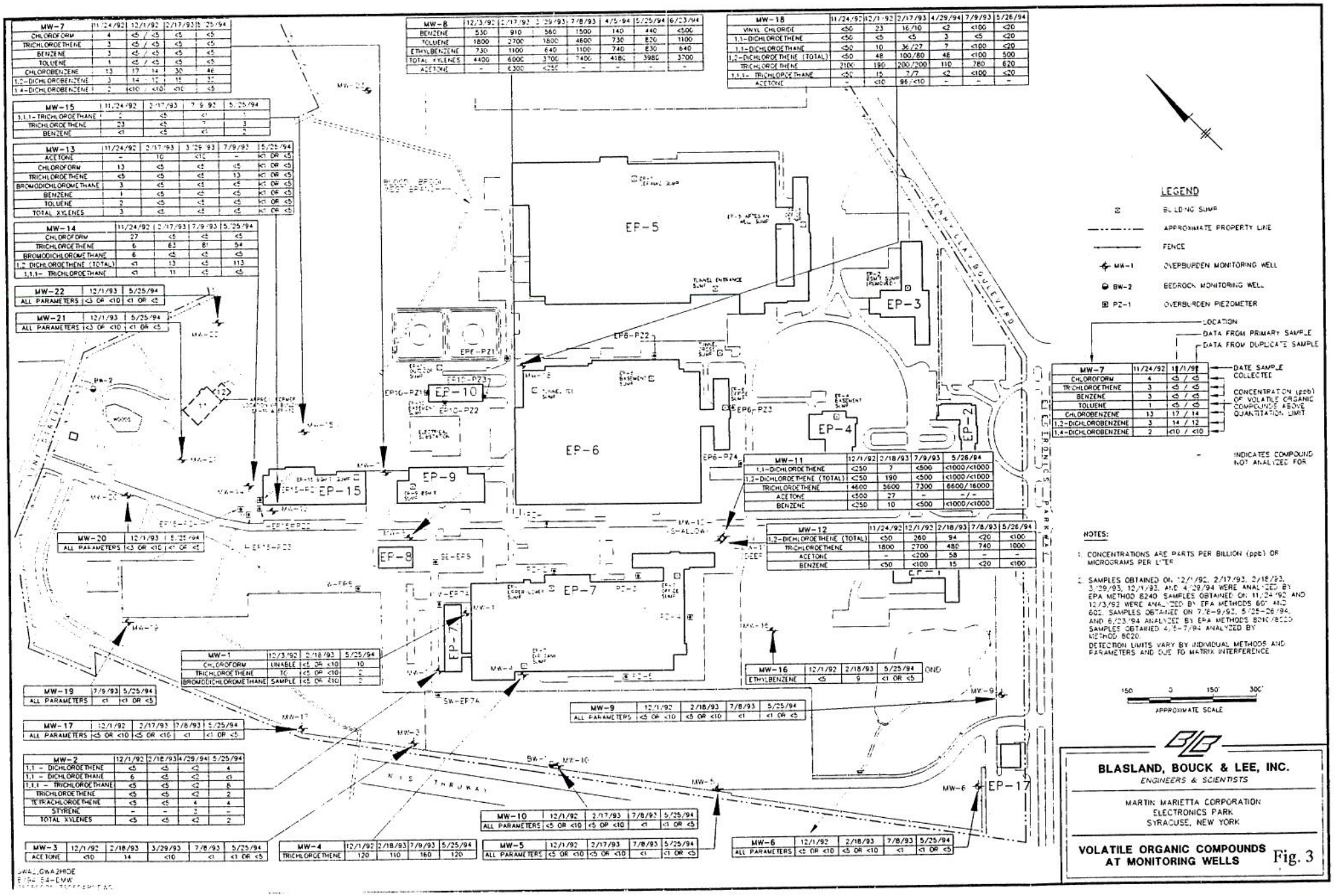
MARTIN MARIETTA CORPORATION
ELECTRONICS PARK
SYRACUSE, NEW YORK

GROUND-WATER ELEVATION CONTOURS AUGUST 8, 1994

Fig. 1

DWI
8/12/94 54-DMW
38050001/38050G05.DWG


EP-5 ARTESIAN WELL SUMP 5/26/94
VINYL CHLORIDE 5
1,1-DICHLOROETHANE 8
DICHLOROETHENE (TOTAL) 51
TRICHLOROETHENE 190
EP-5 OFFICE SUMP 5/26/94
CHLOROFORM 7
EP-10 BSMT SUMP 5/25/94
1,1,1-TRICHLOROETHANE 37
CARBON TETRACHLORIDE 5
TOLUENE 2
EP-15 BSMT SUMP 5/26/94
ALL PARAMETERS <1 OR <2
EP-6 BSMT SUMP 5/26/94
TRICHLOROETHENE 5
EP-6 OFFICE SUMP 5/26/94
TRICHLOROETHENE 26
EP-4 BSMT SUMP 5/26/94
ALL PARAMETERS <1 OR <5
EP-7 UPPER/LOWER SUMP 5/26/94
1,2-DICHLOROETHENE (TOTAL) 41
TRICHLOROETHENE 120
EP-7 DIP TANK SUMP 5/26/94
1,2-DICHLOROETHENE (TOTAL) 220
TRICHLOROETHENE 4600
EP-5
EP-6
EP-10
EP-15
EP-9
EP-8
EP-7
EP-7A
EP-4
EP-3
EP-2
EP-1
EP-17
POND
LEGEND
BUILDING SUMP
APPROXIMATE PROPERTY LINE
FENCE
MW-1 OVERBURDEN MONITORING WELL
BW-2 BEDROCK MONITORING WELL
PZ-1 OVERBURDEN PIEZOMETER
LOCATION
DATE SAMPLE COLLECTED
CONCENTRATION (ppb) OF VOLATILE ORGANIC COMPOUNDS ABOVE QUANTITATION LIMIT
APPROXIMATE SCALE
BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS
MARTIN MARIETTA CORPORATION
ELECTRONICS PARK
SYRACUSE, NEW YORK
VOLATILE ORGANIC COMPOUNDS AT BUILDING SUMPS
Fig. 2



MW-7	11/24/92	12/1/92	12/17/93	5/25/94
CHLOROFORM	4	<5 / <5	<5	<5
TRICHLOROETHENE	3	<5 / <5	<5	<5
BENZENE	3	<5 / <5	<5	<5
TOLUENE	1	<5 / <5	<5	<5
CHLOROBENZENE	13	17 / 14	30	46
1,2-DICHLOROBENZENE	3	14 / 12	15	37
1,4-DICHLOROBENZENE	2	<10 / <10	<10	<5

MW-8	12/3/92	2/17/93	3/29/93	7/8/93	4/5/94	5/25/94	6/23/94
BENZENE	530	910	560	1500	140	440	<500
TOLUENE	1800	2700	1800	4600	730	820	1100
ETHYLBENZENE	730	1100	640	1100	740	830	640
TOTAL XYLENES	4400	6000	3700	7400	4180	3980	3700
ACETONE	-	6300	<250	-	-	-	-

MW-18	11/24/92	12/1/92	2/17/93	4/29/94	7/9/93	5/26/94
VINYL CHLORIDE	<50	23	16/10	<2	<100	<20
1,1-DICHLOROETHENE	<50	<5	<5	3	<5	<20
1,1-DICHLOROETHANE	<50	10	36/27	7	<100	<20
1,2-DICHLOROETHENE (TOTAL)	<50	48	100/80	48	<100	500
TRICHLOROETHENE	2100	190	200/200	110	280	620
1,1,1- TRICHLOROETHANE	<50	15	7/7	<2	<100	<20
ACETONE	-	<10	96/<10	-	-	-

MW-15	11/24/92	2/17/93	7/9/92	5/25/94
1,1,1-TRICHLOROETHANE	2	<5	<1	1
TRICHLOROETHENE	23	<5	7	3
BENZENE	<1	<5	<1	2

MW-13	11/24/92	2/17/93	3/29/93	7/9/93	5/25/94
ACETONE	-	10	<10	-	<1 OR <5
CHLOROFORM	13	<5	<5	<5	<1 OR <5
TRICHLOROETHENE	<5	<5	<5	13	<1 OR <5
BROMODICHLOROMETHANE	3	<5	<5	<5	<1 OR <5
BENZENE	1	<5	<5	<5	<1 OR <5
TOLUENE	2	<5	<5	<5	<1 OR <5
TOTAL XYLENES	3	<5	<5	<5	<1 OR <5

MW-14	11/24/92	2/17/93	7/9/93	5/25/94
CHLOROFORM	27	<5	<5	<5
TRICHLOROETHENE	6	63	81	54
BROMODICHLOROMETHANE	6	<5	<5	<5
1,2-DICHLOROETHENE (TOTAL)	<1	13	<5	113
1,1,1- TRICHLOROETHANE	<1	11	<5	<5

MW-22	12/1/93	5/25/94
ALL PARAMETERS	<3 OR <10	<1 OR <5

MW-21	12/1/93	5/25/94
ALL PARAMETERS	<3 OR <10	<1 OR <5

MW-11	12/1/92	2/18/93	7/9/93	5/26/94
1,1-DICHLOROETHENE	<250	7	<500	<1000/<1000
1,2-DICHLOROETHENE (TOTAL)	<250	190	<500	<1000/<1000
TRICHLOROETHENE	4600	5600	7300	6600/16000
ACETONE	<500	27	-	-/-
BENZENE	<250	10	<500	<1000/<1000

MW-12	11/24/92	12/1/92	2/18/93	7/8/93	5/26/94
1,2-DICHLOROETHENE (TOTAL)	<50	260	94	<20	<100
TRICHLOROETHENE	1800	2700	480	740	1000
ACETONE	-	<200	58	-	-
BENZENE	<50	<100	15	<20	<100

MW-20	12/1/93	5/25/94
ALL PARAMETERS	<3 OR <10	<1 OR <5

MW-1	12/3/92	2/18/93	5/25/94
CHLOROFORM	UNABLE	<5 OR <10	10
TRICHLOROETHENE	TO	<5 OR <10	2
BROMODICHLOROMETHANE	SAMPLE	<5 OR <10	2

MW-16	12/1/92	2/18/93	5/25/94
ETHYLBENZENE	<5	9	<1 OR <5

MW-19	7/9/93	5/25/94
ALL PARAMETERS	<1	<1 OR <5

MW-9	12/1/92	2/18/93	7/8/93	5/25/94
ALL PARAMETERS	<5 OR <10	<5 OR <10	<1	<1 OR <5

MW-17	12/1/92	2/17/93	7/8/93	5/25/94
ALL PARAMETERS	<5 OR <10	<5 OR <10	<1	<1 OR <5

MW-2	12/1/92	2/18/93	4/29/94	5/25/94
1,1 - DICHLOROETHENE	<5	<5	<2	4
1,1 - DICHLOROETHANE	6	<5	<2	<1
1,1,1 - TRICHLOROETHANE	<5	<5	<2	8
TRICHLOROETHENE	<5	<5	<2	2
TETRACHLOROETHENE	<5	<5	4	4
STYRENE	-	-	3	-
TOTAL XYLENES	<5	<5	<2	2

MW-10	12/1/92	2/17/93	7/8/93	5/25/94
ALL PARAMETERS	<5 OR <10	<5 OR <10	<1	<1 OR <5

MW-3	12/1/92	2/18/93	3/29/93	7/8/93	5/25/94
ACETONE	<10	14	<10	<1	<1 OR <5

MW-4	12/1/92	2/18/93	7/9/93	5/25/94
TRICHLOROETHENE	120	110	160	120

MW-5	12/1/92	2/17/93	7/8/93	5/25/94
ALL PARAMETERS	<5 OR <10	<5 OR <10	<1	<1 OR <5

MW-6	12/1/92	2/18/93	7/8/93	5/25/94
ALL PARAMETERS	<5 OR <10	<5 OR <10	<1	<1 OR <5

SWALL, GWA2HDE
EPA: 54-CMW

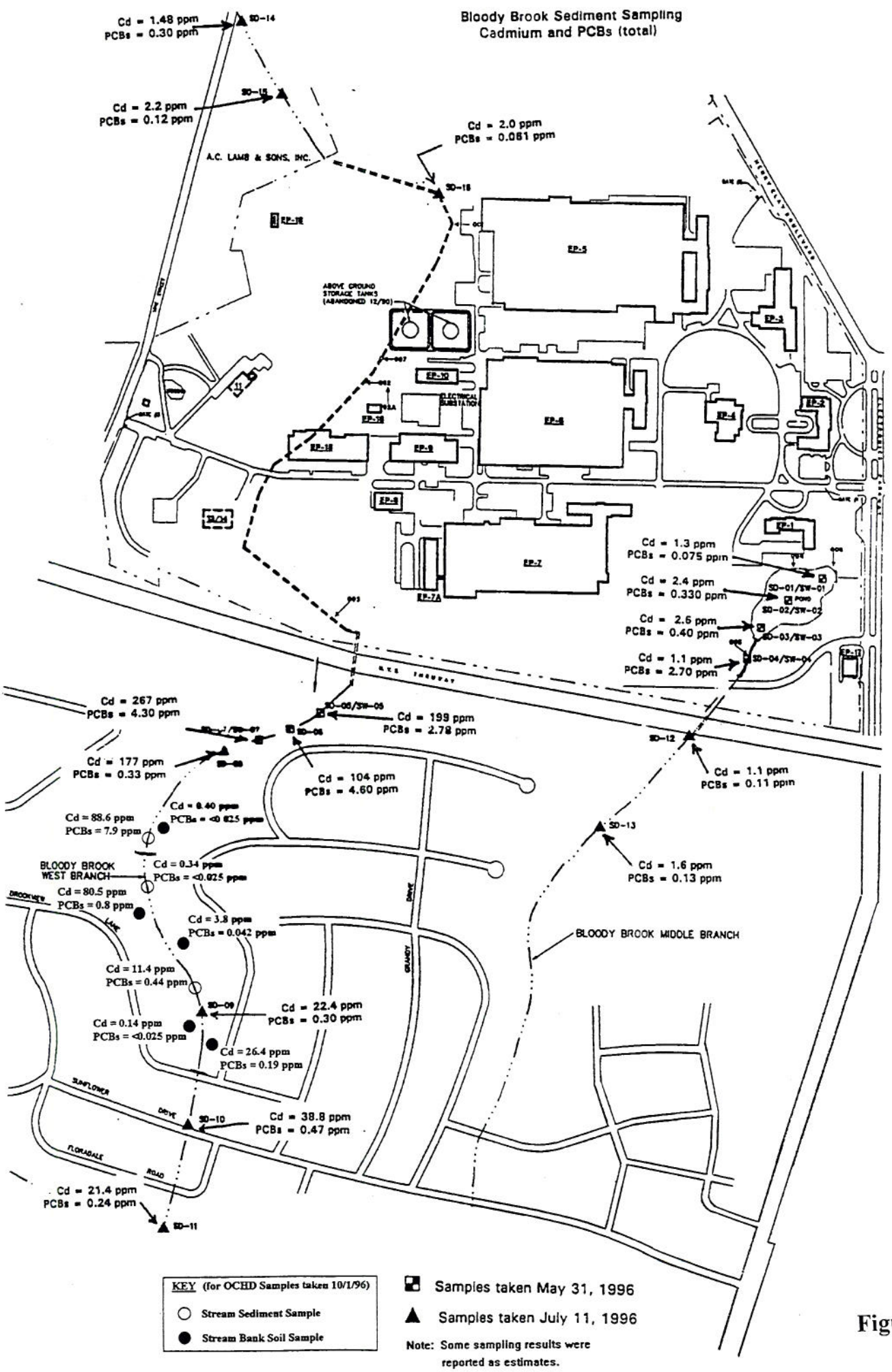

Bloody Brook Sediment Sampling
Cadmium and PCBs (total)
Cd = 1.48 ppm
PCBs = 0.30 ppm
SD-14
Cd = 2.2 ppm
PCBs = 0.12 ppm
SD-15
Cd = 2.0 ppm
PCBs = 0.061 ppm
SD-16
A.C. LAMB & SONS, INC.
ABOVE GROUND STORAGE TANKS (ABANDONED 12/90)
ELECTRICAL SUBSTATION
EP-5
EP-6
EP-7
EP-7A
EP-8
EP-9
EP-10
EP-11
EP-12
EP-13
EP-14
EP-15
EP-16
EP-17
EP-1
EP-2
EP-3
EP-4
Cd = 1.3 ppm
PCBs = 0.075 ppm
Cd = 2.4 ppm
PCBs = 0.330 ppm
SD-01/SW-01
POND
SD-02/SW-02
Cd = 2.6 ppm
PCBs = 0.40 ppm
SD-03/SW-03
Cd = 1.1 ppm
PCBs = 2.70 ppm
SD-04/SW-04
Cd = 267 ppm
PCBs = 4.30 ppm
SD-05/SW-05
Cd = 199 ppm
PCBs = 2.78 ppm
SD-06
Cd = 177 ppm
PCBs = 0.33 ppm
Cd = 104 ppm
PCBs = 4.60 ppm
SD-12
Cd = 1.1 ppm
PCBs = 0.11 ppm
Cd = 88.6 ppm
PCBs = 7.9 ppm
SD-13
Cd = 1.6 ppm
PCBs = 0.13 ppm
BLOODY BROOK WEST BRANCH
Cd = 0.34 ppm
PCBs = <0.025 ppm
Cd = 80.5 ppm
PCBs = 0.8 ppm
Cd = 3.8 ppm
PCBs = 0.042 ppm
BLOODY BROOK MIDDLE BRANCH
Cd = 11.4 ppm
PCBs = 0.44 ppm
SD-09
Cd = 22.4 ppm
PCBs = 0.30 ppm
Cd = 0.14 ppm
PCBs = <0.025 ppm
Cd = 26.4 ppm
PCBs = 0.19 ppm
SD-10
Cd = 38.8 ppm
PCBs = 0.47 ppm
Cd = 21.4 ppm
PCBs = 0.24 ppm
SD-11
KEY (for OCHD Samples taken 10/1/96)
Stream Sediment Sample
Stream Bank Soil Sample
Samples taken May 31, 1996
Samples taken July 11, 1996
Note: Some sampling results were reported as estimates.

Figure 4