REMEDIAL INVESTIGATION REPORT
STUART-OLVER-HOLTZ SITE
HENRIETTA, NEW YORK

NYSDEC SITE NO. 8-28-079

Volume 1 of 2

PREPARED FOR:
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1.00 INTRODUCTION

This report presents the results of the Remedial Investigation (RI) completed by GZA GeoEnvironmental of New York (GZA) during the period from August 1994 through November 1995 at the Stuart-Olver-Holtz (SOH) site. The site is listed on the New York State Department of Environmental Conservation (NYSDEC) Registry of Inactive Hazardous Waste Sites in New York State as a Class 2 Designation Site #8-28-079. The RI was completed on behalf of the NYSDEC under Superfund Standby Contract Work Assignment #D003060-7 to TAMS Consultants, Inc. (TAMS) of Clifton Park, New York. The RI was completed by GZA as a subconsultant to TAMS.

The study and this report were completed in general accordance with the NYSDEC Division of Hazardous Waste Remediation Technical and Administrative Guidance Memorandum (TAGM) "Guidelines for Remedial Investigations/Feasibility Studies" (TAGM 4025 Guidance, dated March 31, 1989), the Field Activity Plan (FAP) dated August 29, 1994, and the Project Management Plan dated August 29, 1994. These plans were prepared by TAMS with assistance from GZA and were reviewed and accepted by NYSDEC.

Interpretations presented within this report are based primarily on the investigations described herein. Previous investigations completed by others at the SOH site and adjacent properties have been reviewed. Applicable data from these reports has been included in sections of this report.

1.10 REPORT ORGANIZATION

The text of this report is divided into seven sections. Immediately following the text are the references, tables, figures and appendices. A brief summary of each report section is provided below.

Section 1.00 Introduction: The purpose of the RI report, the site background including site description, site history and previous relevant studies, scope of work and report organization are discussed.

Section 2.00 Site Investigations: The field work completed and data collection methods used to install test borings, construct monitoring wells, collect samples and obtain field information are summarized.

Section 3.00 Physical Characteristics of the Site: This Section presents and interprets the various data collected and evaluates site conditions (i.e., hydrogeology, geology, hydrology, etc.).

Section 4.00 Nature and Extent of Contamination: The types of chemicals detected in the various environmental media are discussed. The Section is divided into source areas, groundwater, surface water and sediments.

Section 5.00 Contaminant Fate and Transport: An evaluation of potential migration pathways and contaminant persistence is presented.

Section 6.00 Qualitative Risk Assessment: This Section presents the results of a general human health and environmental impact assessment completed at the site. The assessment includes an estimation of exposure point concentrations and a comparison of this data with established and published standards and guidance values including: Applicable or Relevant Requirements (ARARs), and New York State Standards as well as Federal requirements.

Section 7.00 Summary and Conclusions: This Section summarizes the results of the RI.

1.20 BACKGROUND

1.21 Site Description

The approximately 3.8 acre site is located at 39 Commerce Drive, in a mixed commercial-industrial area of the Town of Henrietta, Monroe County, New York (Figure No. 1 - Locus Plan). A single story building with a footprint of approximately 64,000 square feet is located along the eastern property line of the site. The remaining site area consists primarily of parking lots/driveways, grass covered areas, and weed/scrub/brush covered areas. A south flowing vegetated drainage swale is located along the west property boundary.

The site is bound to the east by Oregano's Restaurant, the Patton Professional Center and Leichtner Studios, Inc.; to the south by Ruby-Gordon, Inc.; to the west by the Marketplace Chrysler Plymouth (drainage swale) and Pullman Manufacturing; and the north by Commerce Drive and a variety of commercial properties, including a former Town of Henrietta Fire Station (Figure No. 2 - Existing Conditions Plan).

The SOH site is located within the Red Creek drainage basin. Red Creek is located about ½-mile north and east of the site (Figure No. 1) and generally flows in a northwesterly direction. The northwestern corner of the site is located within the 100 year floodplain of Red Creek. This creek discharges into the Erie Canal about 2-miles north of the site.

1.22 Site History

The site history was assessed based on GZA's review of available information that included: aerial photographs; site facility plans; NYSDEC documents; Monroe County Health Department documents; and available correspondence.

Available aerial photographs from 1951, 1961, 1970, 1976, 1988, and 1993 obtained from the Monroe County Environmental Management Council, indicate that over this time period, the site and surrounding properties generally progressed from a rural farmland area (pre-1961) to a commercial area in the early 1960's. This has further progressed to the current commercial/industrial setting.

Stuart-Olver-Holtz owned and operated a metal finishing facility on the site from its initial construction, around 1962 until approximately 1987. SOH subsequent to about 1987 leased the site to Metalade, Inc., which currently operates the facility as a metal finishing facility.

Initial commercial development at surrounding areas adjacent to the site began during the late 1950's and was observed in the 1961 aerial photos. The SOH site was reportedly vacant until construction of the original SOH building around 1962. SOH operated a metal finishing facility on the site from around 1962 until approximately 1987 . During that time period, several building additions were constructed. Around 1987, SOH ceased operation of the facility, but retained ownership of the site and buildings. SOH filed for bankruptcy protection in 1986. Beginning in approximately 1987, SOH leased the site and use of the buildings to Metalade, Inc., which continues to operate a metal finishing business at the site.

A major fire occurred at the SOH facility in December of 1974. The fire resulted in substantial damage to the building and a chemical spill. The NYSDEC Spill Response Form (Spill No. 7481220) indicates a spill of 855 gallons including: chromic acid, nickel chloride, nickel sulfate, paint strippers and alkali detergent. The Monroe County Health Department issued a Water Quality Accident Fact Sheet documenting the spill of at least 440 gallons of various chemicals including mostly acids into Red Creek. The Monroe County Health Department also documented the spill with the sampling and analyses of seven surface water samples from SOH. On-site pooled water as a result of fire fighting, was reportedly contaminated with nickel, chromium, detergents and acid. Chemicals lost in the fire are reported to include one 55-gallon drum of a 15 percent nickel chloride/nickel sulfate solution, and an unknown quantity of paint strippers and alkali detergents. A review of NYSDEC documents indicates that an unknown quantity of trichloroethene (TCE) was also lost in the fire. Subsequent demolition of the fire-damaged sections of the building included site grading that possibly contained contaminated soils. Some of the building debris from the fire was moved towards the western boundary of the site. The subsequent disposition of these materials is unknown.

The fire damaged portion of the facility was rebuilt and later expanded southward as indicated in the 1976 aerial photograph. Additional site improvements such as a paved parking lot in the western portion of the site were also observed in the aerial photographs. A second addition was reportedly constructed in 1979 along the west side of the facility.

During 1976, an Industrial Waste Project Review was conducted for SOH by the Pfaulder Company of Rochester, New York. This document discussed site manufacturing processes, waste sources and presented general methods to treat waste streams so that process discharges meet Monroe County Sewer Use Codes. The waste sources and/or waste producing operations identified at the SOH site include:

- plating operations that produced fluctuations in the copper (Cu), nickel (Ni), chromium (Cr), cyanide (Cn), lead (Pb), cadmium (Cd), silver (Ag) and tin (Sn), content and pH of wastewater discharge;

- phosphating lines that produced zinc (Zn) and iron (Fe) phosphates;

- paint stripping;

- selenium (Se) stripping; and

- sanitary waste.

Other reported site events that occurred from the period of 1977 to approximately 1987, include several documented spills or environmental compliance violations including the lack of plans, training, insufficient records and improper storage of containers (content of containers was not reported).

Available correspondence and reports made available to GZA indicate that operations at the SOH facility included metal finishing as the primary industrial function. The metal finishing processes included: plating, painting, polishing and buffing. NYSDEC records also indicate the use of degreaser units which initially used trichloroethene as the degreasing agent. Written, specific documentation of materials used at the facility is generally not available. However, the following materials were reportedly used, generated and/or stored at the facility:

- various metal plating solutions (copper, nickel, chromium, cyanide, tin, lead, cadmium, and silver);

- various acids;

- various paint stripping solutions;

- phosphating solutions (zinc and iron); and

- selenium stripping solutions.

Chemical and plating wastes were typically accumulated and stored on-site outdoors on the ground surface in unlabeled 55-gallon drums. Aerial photographs and site photographs confirm the outdoor storage of the drums. Site inspections by the Henrietta Fire Marshall and the NYSDEC have documented the presence (storage) of many 55-gallon drum containers. The inspection reports state that several of the drums were leaking and many did not appear to be labeled. Some of the drums were labeled "MEK" or "corrosive."

1.23 Previous Studies

Four studies have been completed and reports have been prepared at or near the SOH site that describe subsurface and environmental conditions. A summary of each report is presented below.

1) "Site Assessment for Stuart-Olver-Holtz", prepared by Lozier Architects/Engineers, February 1987 (Reference No. 1)

Lozier Architects/Engineers (Lozier) conducted a site assessment for SOH which included installation of three monitoring wells (MW-2, MW-3, and MW-5) and two test borings (B-1 and B-4). The depths of the wells and borings ranged from 19 feet to 33 feet below ground surface (Figure No. 3 - Exploration and Cross Section Location Map). The subsurface logs are presented in Appendix A - Subsurface Exploration Logs. Drilling was completed within the overburden. Bedrock drilling was not conducted as part of the investigation. A generalized stratigraphic profile reported by Lozier for the SOH site includes the following:

Depth	Soil Characteristics
0-5 feet	Sandy clay or silty clay (fill)
5-15 feet	Glaciolacustrine clay (low permeability)
15-20 feet	Sand, gravel and silt (reportedly outwash, high permeability)
20-33 feet	Dense glacial till (low permeability)

Lozier reported that a perched water table exists in the upper 5 feet and that a separate water bearing unit exists in the underlying outwash material. Lozier also believed that another separate water bearing unit existed at the till-bedrock interface, although no borings were drilled to the top of rock nor were bedrock monitoring wells installed at this interface. Lozier estimated that the glaciolacustrine clay and the dense glacial till soils act as aquitards between the three water bearing units.

Lozier installed three groundwater monitoring wells; MW-2, MW-3, and MW-5, with their screened zones placed in the overburden. In-situ hydraulic conductivity data were not provided for these wells. Lozier stated that overburden groundwater at the site generally flows from southeast to northwest. Lozier also used two existing interior wells named 1 and 2 to interpret groundwater flow. These wells, now identified as SOH IW-1R and SOH-IW-2R within the RI Report, are located within the eastern side of the SOH building. These wells were also used to interpret groundwater flow direction by Lozier. Lozier estimated that these wells were screened at a depth of 40 feet or more below the building floor slab. (Note: subsurface logs for these wells were not apparently available to Lozier and were not available to GZA during this study).

Groundwater samples were obtained by Lozier from monitoring wells MW-2, MW-3, MW-5 and also from the two existing SOH water supply wells (1 and 2). Groundwater sampling and analytical testing conducted by Lozier indicated that volatile organic compounds (VOCs) were present in MW-2 and MW-3 along the south edge of the site (only low concentrations of chloroform were detected in MW-5). VOCs were also measured in water samples collected from wells located inside the building. The contaminants detected in the groundwater include methylene chloride (<1 to 45.5 parts per billion, ppb); 1,1-dichloroethane (1,1 DCA) (<1 to 177 ppb); chloroform (<1 to 3.2 ppb); 1,1,1-trichloroethane (1,1,1, TCA) (<1 to 364 ppb); trichloroethene (<1 to 4,550 ppb); and tetrachloroethene (<3 to 24.1 ppb). Generally, the highest VOC contaminant concentrations were detected in MW-2 and the existing wells 1 and 2 within the building.

Analysis was also performed on selected soil samples collected from the three well boreholes (MW-2, MW-3, and MW-5) and from each of the test borings (B1 and B4). Metals detected in these samples included chromium, cobalt (Co), nickel, lead, zinc, silver, copper, arsenic (As) and Cyanide. VOCs detected included methylene chloride, trichloroethene, dibromochloromethane, 1,1,1-trichloroethane (1,1,1-TCA), cis-1,3-dichloropropene, and 1,1,2-trichloroethane.

2) "Phase I Environmental Audit for 50 Commerce Drive", prepared by Larsen Engineers, October 1992 (Reference No. 2)

Larsen Engineers (Larsen) conducted a Phase I Environmental Audit in October 1992 of an approximately 0.6 acre parcel at 50 Commerce Drive, owned by the Henrietta Fire District. The property is located on the north side of Commerce Drive about 50 feet west of the Cook Drive and Commerce Drive intersection. The south property line of this parcel is located about 50 feet north of the SOH property.

Larsen reviewed historic aerial photographs from 1951, 1961, 1970, 1976 and 1988 and reported that the fire house property and surrounding land was used primarily as farmland at least until 1961. By 1970, the surrounding land use was predominantly industrial and commercial. By 1988, the majority of industrial and commercial development of Commerce Drive had been completed. The 1988 aerial photograph revealed a barrel storage area in the parking area south of Metalade (the SOH property).

Larsen filed Freedom of Information Law (FOIL) requests with the Monroe County Department of Health (MCDOH) and NYSDEC to review files from the SOH site. Selected information that Larsen obtained through the FOIL investigation is summarized below:

- On October 14, 1981, NYSDEC received a complaint from MCDOH regarding the presence of leaking chemical drums stored at the SOH site. Labels present on the drums indicated the presence of corrosive materials and methyl ethyl ketone (2-butanone).

- The MCDOH wrote to NYSDEC on the investigation of a spill at SOH on November 11, 1983. MCDOH noted that the town storm sewer in front of the SOH plant must be replaced due to acid corrosion from repeated chemical spills.

- The Henrietta Fire District complained to the MCDOH about a spill of zinc chloride into the town's storm sewer on January 21, 1986 at the SOH site. Reportedly, 1500 gallons of plating solution leaked from a broken pipe fitting. An unknown quantity of material leaked to the floor and loading dock area and the parking lot.

3) "Phase II Environmental Assessment for 50 Commerce Drive", prepared by Larsen Engineers, December 1992 (Reference No. 3)

The scope of Larsen's Phase II Environmental Assessment included:

- Completing one test boring to 30 feet at the southern corner of the property located along the north side of Commerce Drive for the purpose of observing subsurface soil samples and collecting a sample of water from the hole prior to backfilling it; and

- Collecting three surface soil samples: one sample beneath a utility pole upon which electrical transformers were monitored at the east side of the property; and two samples from the drainage ditch at the north side of the property.

The subsurface stratigraphy reported by Larsen at the Fire Station indicated about 4 feet of gravelly fill overlying stiff, reddish, lacustrine clay. The lacustrine clay extends to a depth of about 18 feet and overlies dense glacial till that extended to the bottom of the borehole (30 feet). Larsen noted the presence of perched water in the upper 4 feet of fill but did not report any significant water bearing unit below this depth. Larsen collected a sample of water that accumulated within the augers at a depth of 30 feet. The groundwater was analyzed by Upstate Laboratories, Inc. for VOCs and was found to contain acetone (130 ppb), 2-butanone (52 ppb), benzene (6 ppb) and toluene (5 ppb).

The soil sample taken beneath the utility pole was analyzed by Upstate Laboratories, Inc. for Polychlorinated Biphenyl (PCB) compounds and the laboratory analytical results did not indicate PCB concentrations at or above 2 mg/kg. The two soil samples collected in the drainage ditch along the northern boundary of the Fire Station were analyzed for total petroleum hydrocarbons (TPH). The TPH concentrations were 260 mg/kg and 28 mg/kg with the higher concentration occurring in the upgradient (eastern) location.

4) "Soil and Groundwater Sampling Report for the Hazardous Waste Investigation of New York Route 15 West Henrietta Road SH 62 Town of Henrietta Monroe County" Prepared by URS Consultants, Inc.; April 1994. (Reference No. 4)

This study was conducted to evaluate the soil and groundwater in the Cook Drive connector sewer study area along portions of Cook Drive, Commerce Drive and Route 15 (West Henrietta Road). The study concluded that "The soil sampling conducted at the Cook Drive connector study area did not show significant concentrations of volatile organic compounds at any depth." All concentrations are well below NYSDEC guidance values for cleanup objectives at inactive hazardous waste disposal sites.

The report indicates that:

> "Trichloroethene and 1,1-dichoroethene (a degradation product of trichoroethene) were detected below practical quantitation limits on the NYSDOT ROW at the Metalade facility and directly adjacent to the facility. Acetone and toluene are widely distributed across the study area. Acetone concentrations are highest in borings along W. Henrietta Road. However, the differences in concentrations across the study area for acetone and toluene are not significant enough to establish a pattern. Both compounds have common industrial and laboratory uses, while toluene is also a fuel component."

The report further indicates that:

> "The groundwater in the Cook Drive connector study area did not contain volatile organic compounds except near the Metalade facility. However, compounds found at this location were not similar to those found on the Metalade property during previous investigations. Four

of the five compounds detected are below NYSDEC groundwater standards. Xylene was found above groundwater standards and may be an indication of petroleum contamination from a nearby or former underground storage tank, but the actual source is unknown."

5) "Report on Hydrogeologic Investigations, Ruby Gordon Property", Prepared by H&A of New York, October 1991 (Reference No. 5)

H&A of New York conducted a hydrogeologic investigation of the Ruby-Gordon property in October 1991. The Ruby-Gordon property is located at 3737 West Henrietta Road, immediately south of the SOH property (Figure No. 2). The hydrogeologic investigation was conducted to determine whether VOCs detected by sampling performed on May 30, 1990 in Ruby Gordon's warehouse foundation sumps may be originating from the SOH property.

H&A's investigation involved the placement of well points driven horizontally through the Ruby-Gordon warehouse basement walls. It was reported that due to access constraints, typical vertical well installations could not be used. Three such well points were installed along the north wall facing the SOH site and, single well points were placed along the east and south walls. The horizontal well points were installed below an expected perched water table elevation and above the basement sump elevation.

The analytical laboratory analytical results by RECRA Environmental, Inc. of water collected from the well points in February and April 1991 indicated elevated concentrations of 1,1,1-trichloroethane (1,1,1 TCA) (6 to 36,000 ppb); trichloroethene (32 to 13,000 ppb); 1-1-dichloroethane (1,1 DCA) (0.61 to 15,000 ppb); and tetrachloroethene (36 to 13,000 ppb). Potential breakdown products of trichloroethene, tetrachloroethylene, cis-1,2-dichloroethene (0.8 to 7 ppb), were also detected in these samples. In addition, smaller amounts of methylene chloride and 1,1-dichloroethene were detected in each of the samples. H&A reported that the analytical results indicated that the elevated VOCs were more pronounced along the north wall adjoining the SOH property.

H&A reported that the laboratory analytical results of groundwater collected from these Ruby-Gordon foundation sumps indicated the presence of elevated VOCs at each sump location. While it is reported that the sumps are interconnected by an underdrain system, H&A reported that higher VOC concentrations were detected in the two sumps closest to the SOH property.

6) "Phase I Environmental Assessment Report 3711 West Henrietta Road, Henrietta, New York" Prepared by Erdman, Anthony and Associates, Inc., November 1992. (Reference No. 6)

This report presented the results of a Phase I environmental assessment and also a summary of a Phase II investigation which was conducted by Erdman, Anthony concurrently with the Phase I study. The Phase II investigation included: conducting a soil gas survey for VOCs in the subsurface, obtaining shallow soil samples for laboratory analysis, installation of three (3) groundwater monitoring wells, and obtaining groundwater samples for laboratory analysis. The following information was summarized for the parcel at 3711 West Henrietta Road, which is adjacent to, and southeast of the SOH site.

- Soil gas survey detected low levels of petroleum hydrocarbons. Halogenated compounds were not detected.

- Halogenated solvents of the type reportedly used at the NYSDEC Inactive Hazardous Waste Site (SOH) were not detected in the soil samples or in the groundwater samples from the subject parcel (3711 West Henrietta Road).

The Erdman Anthony report concludes that: "Based on the results of the Phase II Investigation, it does not appear that the NYSDEC Inactive Hazardous Waste Disposal site (SOH) is impacting the subject parcel at the present time." The report further states that "No contamination was detected in groundwater samples, and no contamination was detected in the soil sample closest to the drum storage area."

1.30 PURPOSE

The purpose of this RI is to confirm the presence of, and to the extent practical, delineate the lateral and vertical extent of contamination in order to establish a baseline for the selection and design of an appropriate remedial response. The basic elements that have been used to gain an understanding of the environmental condition of various site media during this RI investigation include the: completion of test pits, and test borings; the installation of groundwater monitoring wells; water level elevation observations; and sampling and analytical testing of collected samples.

1.40 RI SCOPE OF WORK

The objective of the RI was to: further define the site subsurface and hydrogeologic conditions; assess the vertical and horizontal extent of contamination at the site; assess the contaminant source(s); identify contaminants and their potential migration pathways; complete a baseline qualitative risk assessment; and identify site-specific standards, criteria and guidelines related to remedial work.

To accomplish the above-stated objective, the following tasks, as described in later sections of this RI report and the site FAP, were completed:

- coordinated work and discussed project and details with TAMS and NYSDEC;
- research the historical information;
- previously installed monitoring well assessment;
- geophysical survey;
- soil vapor survey;
- gas chromatograph soil and water screening;
- test borings;
- installation of overburden wells;
- installation of rock monitoring wells;
- hydraulic conductivity testing;
- groundwater sampling;
- test pit excavations;
- drainage ditch surface water sampling;
- surface soil and sediment sampling;
- sump sampling;
- mapping the site;
- groundwater well user survey;
- groundwater level measurements;
- fish and wildlife impact analysis,
- baseline qualitative health risk assessment;
- QA/QC review and data evaluation;
- identification of NYS standards, criteria and guidelines; and
- preparation of this report.

The Remedial Investigation study and report were completed in general accordance with:

- The scope of work described in the "Project Management Plan, Stuart-Olver-Holtz, Site No. 8-28-079" dated August 29, 1994, as amended;

- Procedures recommended in the NYSDEC Division of Hazardous Waste Remediation, TAGM 4025 Guidance, "Guidelines for Remedial Investigation/Feasibility Studies" dated March 1989; and

- NYSDEC Division of Hazardous Waste Remediation TAGM 4030 Guidance, "Selection of Remedial Actions at Inactive Hazardous Waste Sites" as revised May 1990.

The scope of work for the SOH site was prepared by TAMS with assistance from GZA and submitted to NYSDEC for review and approval. The scope of work was subsequently finalized and issued as part of the Project Management Plan dated August 29, 1994. The Project Management Plan incorporates by reference the following additional work plan documents:

- "Field Activity Plan, Stuart-Olver-Holtz, Site No. 8-28-079" dated August 29, 1994;
- "Quality Assurance Project Plan, Stuart-Olver-Holtz, Site No. 8-28-079" dated August 29, 1994;
- "Health and Safety Plan, Stuart-Olver-Holtz, Site No. 8-28-079" dated August 29, 1994; and
- "Citizen Participation Plan, Stuart-Olver-Holtz, Site No. 8-28-079" dated August 29, 1994.

During the course of the work, several amendments to the scope of work for the RI and FS were made after review and approval by NYSDEC. The revisions to the scope of work are described in the following documents:

- Revised the drilling procedures for the top-of-bedrock monitoring wells by GZA letter dated October 25, 1994;
- Revised the Quality Assurance Project Plan by TAMS memorandum dated June 13, 1995;
- Revised the Field Activity Plan by GZA letter dated June 16, 1995;
- Revised the Health and Safety plan by GZA letter dated June 16, 1995;
- Made contract modifications for off-site investigation work as described in Contract Amendment No. 1 prepared by TAMS dated July 12, 1995; and
- Established sampling locations and analytical parameters for the second groundwater sample round by GZA letter dated September 20, 1995.

2.00 FIELD EXPLORATIONS

Field explorations were completed at SOH in general accordance with the site Field Activities Plan to evaluate surface and subsurface environmental conditions and to provide data pertaining to the extent of contamination. A description of the field explorations conducted during this RI is presented in this Section.

2.10 GEOPHYSICAL SURVEY

Hager-Richter GeoScience, Inc. (HRG) of Salem, New Hampshire was retained by TAMS to assess the presence or absence of shallow subsurface metallic materials (e.g., buried drums, tanks, etc.) using a terrain conductivity survey which utilizes electromagnetic induction. The terrain conductivity meter which utilizes electromagnetic (EM) induction, is generally sensitive to the presence of highly conductive materials. The survey was completed over the open area of the site (i.e., areas not covered by the building) on September 14, 1994 to assist in identifying potential buried metal objects. The location of apparent anomalies were used to help finalize test pit locations.

A terrain conductivity meter (Geonics Model EM31-DL) in the vertical dipole mode was calibrated to read apparent ground conductivity directly in millimnos per meter. The nominal depth of earth sampled by the EM31-DL is about 10 feet in the horizontal dipole mode and 20 feet in the vertical dipole mode, according to the information provided by the manufacturer. The terrain conductivity survey was completed in areas unoccupied by the facility building, along survey lines spaced about 12.5 feet apart. We understand that this spacing typically provides relatively continuous coverage. Interferences potentially caused by underground utilities were compared to utility schematics. Survey lines were measured off of a site grid established by Om P. Popli, P.E., L.S., P.C. (Popli), a licensed land surveyor. Figure No. 4 - Soil Vapor Survey Results presents sample locations for the soil vapor survey. A summary of the geophysical findings are presented in Appendix B - Geophysical Report.

Based on the terrain conductivity survey at the Stuart-Olver-Holtz site in Henrietta, New York, HRG concluded the following:

1. "Unidentified subsurface metal objects are likely present in several locations in the southeastern portion of the survey area."

2. "Three possible utilities were located within the survey area."

3. "For portions of this Site, the presence or absence of buried metal objects cannot be determined due to anomalies caused by surface objects."

Surface objects present at the edges of the area of the building, such as dumpsters, cars, and the building walls, interfered with the effects of the electromagnetic current during the survey. Thus, the presence or absence of buried metal objects could not be determined in the vicinity of these objects.

Three areas of anomalous values could not be attributed to surface metal objects, and such anomalies were interpreted by HRG to be caused by buried metal objects, as shown in Figure No. 4 of the HRG report. The most prominent such anomaly is centered at (I+10, 3+10). The identity of the buried metal objects (i.e., whether the objects are drums or tanks) could not be made on the basis of the geophysical data alone. These areas were subsequently investigated with test pit explorations (Section 2.40).

Three possible underground utilities were also detected within the area of the terrain conductivity survey. The first is apparently located along the boundary of Commerce Drive and the site. The second utility appears to extend from the anomaly centered at (I+10,3+10) to the north edge of the site. The third utility appears to be located in the northeastern corner of the site, and extends from the building to Commerce Drive. The utility types and depth could not be determined by HRG's geophysical survey.

2.20 SOIL VAPOR STUDY

2.21 Field Procedures

Soil vapor samples were collected from across the site and screened in the field for VOCs that were selected based on historical analytical results. This work was done between September 22, 1994 and October 18, 1994. The soil vapor samples were generally collected on a 50 foot grid over the site (not including the areas occupied by structures), established by Popli. GZA measured additional soil vapor sample locations, not directly on the survey grid, using a 100-foot tape and referenced those measurement to existing site features or existing grid points. Typically, the samples were collected at a depth of about 4 feet below the ground surface.

The soil vapor samples were collected by driving a galvanized ¼-inch inside diameter (I.D.) steel probe with a removable tip to the desired depth with a slide hammer. The probe was then pulled back slightly (0.1 to 0.3 feet) and a bentonite (clay) paste was placed around the probe at the ground surface to seal it. New HDPE tubing, that was pre-purged with hydrocarbon free (zero grade) air prior to use, was inserted to the bottom of the probe and sealed in place using a compression-type fitting located at the top of the probe.

Once the probe was in place, the soil vapor sample was pulled up the tubing through a sample syringe septum port using an air pump. The discharge from the air pump was connected to a HNu PI 101 Organic Vapor Meter equipped with a 10.2 eV bulb and calibrated to a benzene standard of 54 ppm in air. At the point of maximum response on the organic vapor meter, a sample of soil vapor was withdrawn using a gas-tight syringe from the syringe septum port. The soil vapor sample was then injected directly into the gas chromatograph (GC).

GZA attempted to collect soil vapor samples at 65 locations. GZA was unable to collect soil vapor at six of the 65 locations. Of those six locations, water was encountered at the sampling depth at 5 locations (K 3+00, J 3+00, I 3+00, I 3+50 and G 3+00), and soil vapor could not be obtained in the sampling probe from one location (I 4+00).

The soil vapor samples from 59 locations were analyzed in the field by GZA with a portable GC (Photovac Model 10S50 equipped with a 20 foot long CPSIL 4 CB capillary column enclosed in an isothermal oven) for the following target compounds: 1,1-Dichloroethene; 1,1-Dichloroethane; 2-Butanone (MEK); 1,2-Dichloroethane (1,2 DCA); 1,1,1-Trichloroethane (1,1,1 TCA); trichloroethene; Tetrachloroethane (PCE) and Total Xylene. A summary of the soil vapor survey results are presented in Table No. 1 - Summary of Soil Vapor Results. The total VOCs detected at each soil vapor sample location are presented in Figure No. 4.

2.22 Quality Control/Quality Assurance Screening

In addition to the soil vapor sample screening, the following quality control/quality assurance screening was conducted. This testing is described in the following sections.

2.22.1 Standards and Calibrations

Standard gas samples for the target compounds listed above were prepared in the field and screened at a frequency of at least twice per day (typically at the start and end of each work day). Compound response factors and relative elution times were determined from these standards and used to tentatively identify and estimate compound concentrations in the soil vapor samples.

2.22.2 Blank Samples

Air blanks were collected from the soil vapor probe/sampling system at least daily during sampling. The blank sample was collected in the same way as the soil vapor samples (through the probe and sampling system) with the exception that the probe was placed on the ground surface (not driven in the ground) and ambient air was collected for screening (not soil vapor). If target compounds were detected at significant levels in this blank, the system was cleaned and then re-sampled as needed until screening indicated it was clean. In addition to the blank previously described, syringe air blanks were screened between samples with detectible levels of target compounds. Similar to the system blanks, if target compounds were detected at significant levels in the syringe blank, the syringe was cleaned and retested until screening indicated it was clean.

2.22.3 Spike Samples

Spike samples were prepared in the field by GZA in Tedlar bags. The spikes were prepared using detectable levels of standard compounds in air at a rate of one per 20 samples collected. The bag was attached to the soil vapor probe/collection system assembly, and a sample was collected and screened in the same way as the standards. The results of this screening were used to evaluate potential system losses. No significant system losses were encountered during the soil vapor investigation.

2.22.4 Duplicate Samples

Duplicate samples were screened at a rate of one per 20 soil vapor samples. This was done by making two injections of a soil vapor sample. No duplicate sample varied in target compound concentrations more than 20 percent (as required by the project quality control/quality assurance plan).

2.23 Laboratory Analysis

GZA sent seven duplicate samples of soil vapor from selected locations to H2M Laboratories Inc. for volatile organic compound analysis. The locations were selected to provide a range of compounds and concentrations detected. Duplicate sample analysis was done to confirm soil vapor screening compound identification and relative concentrations. Samples were collected in 500 ml glass bulbs (stopcock at each end with side-port septum for gas withdrawal via a syringe) connected between the soil vapor probe tubing and the air pump. The bulbs were shipped (overnight) using chain of custody procedures and analyzed by the laboratory the next day. The soil vapor duplicate results are included in Table No. 1.

2.30 TEST BORING/MONITORING WELL INSTALLATION

2.31 General

TAMS contracted with Nothnagle Drilling Company (NDC) to conduct test borings and install groundwater monitoring wells at SOH. Test borings and monitoring wells were completed at SOH in order to evaluate the geologic and groundwater flow conditions within the overburden and the top-of-bedrock. Additionally, monitoring wells were installed to collect representative groundwater samples for subsequent analytical testing. The test borings and monitoring well installations were generally completed in accordance with the Field Activities Plan dated August 29, 1994 and a letter dated October 25, 1994 to the NYSDEC, which modified the construction of the monitoring wells installed into the top-of-bedrock.

A GZA representative was on-site to monitor the drilling operations, collect and screen soil samples, ship selected soils off-site for laboratory analysis, and to log the subsurface stratigraphy based on samples collected. The representative also monitored the driller's breathing zone and other health and safety requirements (including Community Air Monitoring) as detailed in the Health and Safety Plan (HASP).

The work was completed during a two-phase drilling and well construction program. Phase I work was done to obtain information regarding the groundwater flow and contaminant conditions within the overburden and the top-of-bedrock. Phase II work was completed to obtain supplemental information regarding the groundwater and contaminant conditions within the overburden in the off-site area adjacent to the southwest corner of the SOH site near the Ruby-Gordon basement. A summary of the soil boring program is presented in Table No. 2 - Summary of Soil Boring Installations.

The Phase I program began on October 3 and was completed on December 6, 1994. Fifteen test borings (SB-1 through SB-15) were made and an additional 12 boreholes were advanced to install seven overburden monitoring wells (OW-1S through OW-7S), and five top of bedrock monitoring wells (OW-1R through OW-4R, and OW-7R) during this period. The Phase II drilling and well construction program occurred between June 19 and June 27, 1995. The Phase II program included two soil test borings (SB-16 and SB-17) and an additional four boreholes were made to install overburden monitoring wells (OW-8S through OW-11S) during this period. The locations of the 17 RI test borings and 11 RI overburden monitoring wells, and five RI top of bedrock monitoring wells are shown on Figure No. 3.

Test borings and monitoring wells were completed using conventional rotary drilling techniques. Three drill rig types, a Central Mining Equipment (CME) model CME-75, GUS PECH -750C and a Brainard Kilman (BK-81) were employed at the site at various times. Additional support equipment included a 500-gallon water tank-mounted on a stake bed trailer, a 1 ton support truck, a temporary decontamination pad, and tools for the drilling operations.

During the subsurface exploration program field activities, care was taken to reduce the potential for cross contamination between soil deposits. The drill rig, tools, augers, etc. were decontaminated between sampling events and borings. The tools were decontaminated between explorations at an on-site temporary decontamination pad constructed in an area acceptable to the NYSDEC. Decontamination was completed using steam cleaning or high pressure wash, manual wash with nonphosphate detergent and potable water followed by a potable water rinse (three times) or second steam cleaning. Split spoons were cleaned during drilling in a similar manner, followed by distilled/deionized water rinse. Equipment was similarly cleaned prior to leaving the site.

Water for steam cleaning was obtained from a Town of Henrietta water hydrant, located across Commerce Drive north of SOH. Typically, the wash water from the steam cleaning process collected on the decontamination pad and was then collected and placed in clean 55-gallon drums. Soil cuttings from the explorations were collected and placed in 55-gallon drums with appropriate labels.

2.32 Test Boring Procedures

Seventeen test borings were completed during the Phase I and II field work. SB-1 through SB-11 and SB-13 through SB-15 were completed on-site at the locations shown on Figure No. 2 which provided stratigraphic information at the site. A drill rig was used to advance 2¼-inch or 4¼-inch I.D. hollow stem augers and continuous split spoon samples were collected ahead of the augers in general accordance with ASTM 1586. Auger spoil was collected and placed in 55-gallon drums. Initially, four of the borings (SB-3, SB-7, SB-12 and SB-13) were advanced to the top of bedrock. These borings were drilled in representative areas of the site to provide information on deeper overburden conditions (Figure No. 3). The deeper borings suggested the more permeable overburden soils are present within 30 feet of the ground surface. The remaining 11 soil borings were extended to depths of about 30 feet to further assess the nature and extent of the more permeable overburden soils. In addition, the 11 shallow borings were advanced until the field photoionization detector (PID) readings indicated that VOCs were not detected during screening of the split spoon soil samples.

Test borings SB-12, SB-16 and SB-17 were completed to obtain supplemental data regarding subsurface conditions in the vicinity of the Ruby-Gordon basement area. Soil borings SB-16 and SB-17 were drilled south of the SOH site in the vicinity of the Ruby-Gordon basement. SB-16 and SB-17 were advanced with 4¼-inch hollow stem augers through the upper overburden and terminated approximately 5 to 10 feet into the lower till unit.

Soil samples were collected from the borings to assess the nature and extent of the contamination at the site. Selected soil samples from the borings were placed into laboratory-clean jars, for analysis. The remaining samples were placed into clean driller's jars with notations on the lid, regarding the boring number, sample depth, sample number, depth of sample, blow per 6 inches and length of samples recovered in the spoon. Deviations from ASTM 1586 (larger split spoon, different hammer, etc.) were also noted on the jar. If no sample was recovered, a jar was marked with the same information as above plus the words "No Recovery." Upon completion, the borings were tremie grouted to the ground surface with a cement-bentonite grout.

The headspace above each of the collected soil samples collected was screened for VOCs with an organic vapor meter [HNu model PI-101 equipped with a 10.2 electron volt (eV) bulb]. Prior to use, the meter was calibrated using an isobutylene gas standard obtained from the manufacturer. The headspace screening was done after allowing the samples to equilibrate to room temperature (approximately 70°F). Test samples were collected by piercing the lid of the sample jar and withdrawing 30 cubic centimeters (cc) of headspace gas with a gas-tight syringe. The headspace gas was then injected directly into the organic vapor meter, and the highest reading was recorded. A syringe blank was run between each sample to check that the syringe was free of residual VOCs. The headspace screening of sample concentrations of VOCs may not be indicative of the soil concentration of VOCs. The results of the soil sample headspace screening are presented on the boring logs contained in Appendix A.

The headspace of 106 soil samples was analyzed using the GC for the presence of the same target compounds screened for during the soil vapor investigation. Of the 106 samples analyzed, 48 samples were from monitoring well borings (OW series) and 58 samples were from soil borings (SB series).

Based on the results of visual observation, field screening and GC testing, 30 samples (plus two matrix spikes and two matrix spike duplicates) were selected for laboratory analysis of target compound list (TCL) plus 30 parameters.

2.32.1 Geotechnical Laboratory Testing

Additionally, relatively uncontaminated soil samples, based on field PID screening, were selected and analyzed in the GZA geotechnical soils laboratory to obtain information regarding the physical properties of the soils. The testing included moisture content determinations (22 samples), grain size distribution (28 samples), Atterberg limits (5 samples), and organic content determination (2 samples). Additional information on sample collection, handling and analysis is presented in the QAPP. The results of the geotechnical laboratory testing are presented in Appendix C - Geotechnical Laboratory Data.

2.33 Overburden Monitoring Well Installation Procedures

Eleven (11) overburden monitoring wells (OW-1S through OW-11S) were installed within the overburden at the site at the locations shown on Figure No. 3 [note: the

"S" after the well number designation indicates overburden well]. The wells provided a means to sample groundwater, monitor water levels, and conduct field permeability tests (slug tests).

At single overburden well locations, the well screen interval was installed in the zone with the highest apparent VOC concentration based on field PID screening of split spoon soil samples. If VOCs were not detected, the monitoring well screen interval was installed within the deepest sand stratum encountered in the test boring (well borehole).

The well screen intervals of overburden wells installed at well cluster locations (one overburden well and one top-of-rock well) was generally based on the results of PID screening and subsurface conditions encountered in the adjacent top-of-bedrock test boring (well borehole). The results of the PID screening and well installation details are presented on the test boring logs included in Appendix A.

The purpose of off-site overburden wells OW-8S, OW-10S and OW-11S was to obtain data regarding subsurface conditions in the vicinity of the Ruby-Gordon basement area, as well as groundwater levels, flow directions and groundwater quality. The screened interval was located in apparent contaminated zones in the upper till based on the results of PID screening of split spoon samples in the field. Monitoring well OW-9S is located off-site to the west of the north-south oriented drainage swale. This overburden well was located to assist in assessing subsurface conditions west of the drainage swale. The off-site monitoring well locations are shown on Figure No. 3.

Off-site overburden monitoring wells OW-8S, OW-10S and OW-11S were constructed in accordance with the protocols in the Field Activities Plan and the modifications detailed in the letter dated March 30, 1995 to the NYSDEC, which allow for well screen lengths of 5 or 10 feet installed as appropriate, depending on the estimated thickness of the sand stratum encountered at these well locations. The sand strata in the upper glacial fill were screened because they appeared to be more permeable zones within the upper till. Soil samples collected during drilling were screened in the field with the PID. Samples were additionally analyzed on the GC for the same parameters as that indicated in the test borings as discussed in Section 2.31. Screening and GC methodologies are detailed in the QAPP.

The monitoring wells at locations OW-1S through OW-8S were installed utilizing 6¼ I.D. hollow stem augers. At the desired depth, the well installations were completed with a combination of 4-inch I.D. type 304 Schedule 10 stainless steel continuous slot screen and 4-inch diameter carbon steel riser pipe. The 5 or 10-foot stainless steel well screen is equipped with a bottom sump to collect sediments below the well screen.

The carbon steel riser was welded to the screen and extended to the ground surface. The annulus around the screen and approximately 2 feet above the screen was surrounded with a sand pack designed to limit fines from entering the well (based on the results of the grain size analysis). Approximately 2 feet of bentonite seal separates the sand pack from the cement-bentonite grout, which extends to the ground surface. The wells were completed with either a flush-mounted steel roadway box (with lock) or stick up locking protective casing in a concrete surface seal sloped to allow for drainage from the well. Details are presented in Table No. 3 - Summary of Overburden Monitoring Well Installation Details.

Off-site monitoring wells OW-9S, OW-10S, and OW-11s were installed utilizing 4¼-inch hollow stem augers. At the desired depth, the wells were completed with a combination of 2-inch I.D. Schedule 40 polyvinyl chloride (PVC) riser pipe and 2-inch I.D. 10 continuous slot screen. The 5-foot PVC well screen was equipped with a bottom sump to collect sediments below the screen. [Note: the appropriate slot size was based on material grain size from samples collected during the test boring subtask (in general accordance with ASTM 5092)].

The materials used in the well installation were stockpiled in the on-site storage area for use as necessary. Well materials were brought to the site clean and in like-new condition and kept clean and in satisfactory condition throughout the duration of the contract. The cement, sand, bentonite, etc., were covered with tarps to reduce the potential for contact with rain or on-site contamination. The well casing and screen were kept in a clean condition throughout monitoring well installation. To this end, the appropriate lengths of screen and riser were decontaminated immediately before installation in accordance with the procedure outlined in Section 2.32. Following decontamination, the well supplies were wrapped in clean plastic sheeting and transported to the well location. During handling of the cleaned well materials, the drillers were required to wear clean gloves and used appropriate measures to reduce the potential for cross-contamination. The drill rig, augers, tools and split spoons were decontaminated as was described in Section 2.3.

Upon completion of monitoring well installation, the monitoring wells were developed by removing water from the well, see Appendix D - Well Development Logs. Physical parameters (pH, temperature, specific conductance and turbidity) were monitored as water was removed, see Appendix E - Groundwater Sampling Parameter Summary. The well was considered developed when these parameters stabilized in subsequent well volumes. Following the first groundwater sampling event (Section 2.7), a field permeability test conducted in each well and the hydraulic conductivity for the well was calculated using procedures described by Bouwer and Rice (1976). The hydraulic conductivity analytical results are presented in Appendix F - Hydraulic Conductivity Testing Results.

2.34 Top-of-Bedrock Monitoring Wells

Five (5) top-of-bedrock groundwater monitoring wells (OW-1R through OW-4R and OW-7R) were installed within the top-of-bedrock which, at the site, consists of severely weathered shale of the Vernon Formation. The locations of the top-of-bedrock wells are shown on Figure No. 3. [Note: the "R" designation indicates top-of-bedrock monitoring wells]. The top-of-bedrock consists of a zone of weathered bedrock. The description of this portion of bedrock is discussed in Section 3.52. The wells allowed for sampling of the groundwater within the top-of-bedrock zone and provided information regarding top-of-bedrock groundwater levels and a means to conduct field permeability tests. The top-of-bedrock wells were generally placed adjacent to overburden wells such that the groundwater level measurements would provide information on the vertical gradient of groundwater at these well clusters (one top-of-bedrock well and one overburden well) OW-1, OW-2, OW-3, OW-4, and OW-7.

The following well installation procedures were used for the top-of-bedrock monitoring wells (OW-1R through OW-4R and OW-7R):

- A test boring was made into the overburden soils and at least 2 feet into the lower till (Section 3.51.3), as determined by density, using 2¼-inch to 4¼-inch hollow stem auger casing. Continuous split spoon sampling and PID screening was conducted over the depth of the boring;

- The smaller hollow stem auger drill string was removed and the borehole was reamed to the same depth using 10¼-inch hollow stem augers;

- An 8-inch diameter steel casing was installed inside the 10¼-inch hollow stem augers to the same depth as the 10¼-inch hollow stem augers;

- A cement/bentonite grout was placed using a modified Haleburton method by pulling back the 8-inch casing slightly and injecting the grout under pressure down the 8-inch casing. The grout flowed out the bottom of the 8-inch casing and around the outside of the 8-inch casing up to within 3 feet of the ground surface as the 10¼-inch augers were withdrawn. After the outside of the 8-inch casing was grouted in place, the grout was displaced from the inside of the 8-inch casing using water, leaving at least a 2-foot thick plug of grout in the bottom of the 8-inch casing;

- The cement/bentonite grout plug was allowed to cure for a minimum of 24 hours;

- The borehole was advanced through the cement/bentonite plug and through the lower till to the top-of-bedrock using 2¾-inch hollow stem augers (approximately 7-inch outside diameter). Continuous split spoon sampling and PID screening was conducted during drilling through the till;

- The 2¾-inch hollow stem auger drill string was removed and temporary 6-inch diameter steel casing was inserted inside the 8-inch casing to the top-of-bedrock;

- A sample of the top-of-bedrock was obtained in OW-1R utilizing a Hx-sized rock core barrel. Split spoon sampling was utilized to sample the severely weathered bedrock in the other borings;

- The rock socket was reamed with a roller bit to provide a nominal 6-inch diameter hole to the same depth that the core barrel or split spoon was advanced; and

- The quartz sand filter pack and 4-inch diameter monitoring well stainless steel screen and steel riser were placed in the borehole while removing the temporary 6-inch casing.

As noted, a rock core sample was recovered from OW-1R using an Hx-sized rock core barrel. The recovered core was observed and the characteristics such as sample recovery, rock quality designation (RQD), the frequency and locations of fractures and the weathering of the fractures computed in accordance with standard ASTM procedures, where appropriate. The observed and computed characteristics were recorded on the subsurface exploration logs. The recovered core was placed in a wooden box that was labeled with the date, project number, rock recovery, the top and bottom depth of the run and the RQD.

The well was completed with a protective locking stick-up casing and a concrete surface seal. Decontamination and material handling procedures were similar to those described in Section 2.30.

To expedite well development and to allow rapid evaluation of top-of-bedrock groundwater quality, the top-of-bedrock monitoring wells were developed by the drillers to remove water and fines by over pumping with a submersible pump. The pump was decontaminated between well locations. Physical parameters (pH, temperature and specific conductance) were monitored (Appendix E) as water was removed and the well was considered developed when these parameters stabilized in subsequent well volumes (Appendix D). Development water was placed in 55-gallon drums for subsequent disposal by others. Following sampling, (Section 2.7), the hydraulic conductivity of well was calculated from field permeability analytical results (Section 2.52). The installation details are presented in Table No. 4 - Summary of Top of Bedrock Monitoring Well Installation Details.

2.40 TEST PIT EXPLORATIONS

Six (6) test pits were excavated at the SOH site on November 3, 1994. Three (3) pits were excavated in the vicinity of anomalies noted during the geophysical survey (TP-1, TP-2 and TP-3), and two (2) test pits (TP-4 and TP-5) were excavated in the berm next to the swale on the west side of the site and one test pit (TP-6) was excavated along the south property line near Ruby Gordon. The test pit locations are shown on Figure No. 3. The backhoe bucket and dipper arm were steam cleaned prior to the start of work and between each test pit.

TAMS retained the services of NDC to complete the test pit excavations. NDC used a TCB Model 1400B backhoe to complete the work.

GZA was present during the excavation of test pits to observe the subsurface conditions, to collect samples, to check air monitoring measurements and to prepare test pit logs. Test pit logs prepared by GZA are included in Appendix A.

The test pit excavations ranged in depth from about 3.5 to 8 feet below ground surface. Various fill material (metal, charred wood, plastic, glass etc.) was encountered at TP-1, TP-2, TP-3, TP-4 and TP-6. The fill depth, ranged from approximately 3 to 4.5 feet below the ground surface. Natural soils were encountered below the fill. Test pit excavations were terminated at the depth were natural in-situ soils were encountered.

Soil samples were collected from the side walls and bottom of each test pit using the backhoe bucket and a precleaned stainless steel spoon. A small amount of soil was placed directly into a laboratory jar for TCL laboratory (volatiles) testing. The remaining soil was placed in a precleaned stainless steel pan, mixed and placed in laboratory supplied jars for TCL semi-volatile, PCB/pesticides and metals laboratory testing.

2.50 WATER LEVEL MEASUREMENTS

Water level monitoring and field permeability tests were conducted during this RI. The methods and procedures for obtaining water level measurements are described in the following subsections.

2.51 Water Level Measurements

Water levels were measured within the newly installed wells, existing wells, SOH interior wells and Ruby-Gordon basement sumps. The depth of water was measured from a reference elevation of which was surveyed as part of the study. An electronic water level indicator was used to measure water levels from the established reference elevation.

Water levels in the monitoring wells were measured seven times over a period of 16 months. Water level measurements and calculated groundwater elevations are presented in Table No. 5 - Summary of Groundwater Elevations for Monitoring Wells.

In addition to the water level measurements made in the installed wells, the surface water elevation of the drainage swale to the west of the SOH property was measured. This was done to assist in assessing the potential for hydraulic interaction between the creek and the overburden groundwater. The elevation of the surface water was estimated using a lock level and an adjacent surveyed bench mark (catch basin rim) located in the swale. The approximate elevation of the surface water is shown on Figure No. 2 (near SW-2). Surface water elevations are also summarized on Table No. 5. Water level measurements were also observed in the Ruby-Gordon basement sumps. The basement finished floor slab elevation (521.77 feet as reported by Popli) was used as the reference elevation. The water elevations for the basement sumps are also presented in Table No. 5.

2.52 Hydraulic Conductivity Testing

Subsequent to well development, the hydraulic conductivity of each monitoring well was calculated using rising and falling head field permeability test methods. This variable head technique involves increasing the head within the well by lowering a displacement "slug" into the water. The displaced volume of the slug results in a nearly "instantaneous" rise in head within the well, and the subsequent fall of the water level is then monitored. As the water level reaches pre-test levels, the slug is then removed and the rise of water within the well is monitored in a similar fashion.

The water levels within the wells were monitored using an electronic water level indicator and a stopwatch to record head changes with time. The data collected from the field permeability tests were used to calculate the hydraulic conductivity by methods presented by Bouwer and Rice (1976). Analytical results are presented in Appendix F - Hydraulic Conductivity Testing Results and summarized in Table No. 6 - Summary of Hydraulic Conductivity Test Results.

2.60 HEALTH AND SAFETY MONITORING

A site-specific HASP was prepared by TAMS for the field activities at SOH. The site safety officer or field representative provided the health and safety oversight during field activities. The health and safety monitoring equipment were maintained each day according to the Health and Safety Plan.

The field work was generally performed in Level D protection (i.e., hard hats, steel toe work boots, work clothing, etc.), augmented with overboots, protective waterproof gloves and Tyvek coveralls, if required. Test pits were excavated in Level C protection.

Three separate types of air monitoring were conducted during the field work: direct reading/environmental monitoring, personal exposure monitoring and community air monitoring. Environmental monitoring was conducted within the exclusion zone and if needed at the exclusion zone perimeter. Community air monitoring was done at upwind and downwind locations as determined by the use of wind socks (Section 2.63). Additional details regarding the air monitoring are summarized in the following Section.

2.61 Environmental Monitoring

The environmental monitoring was required to determine the airborne concentrations of the representative compounds and the corresponding response actions for the site personnel. The environmental monitoring was according to the procedures detailed in the Field Activities Plan.

Monitoring was conducted with the specified instruments at a frequency necessary to adequately characterize airborne contamination levels for each area and each representative task conducted in each area of the site. Initial monitoring was more frequent and was either continuous or at intervals of once every 15 minutes as directed by the Site Safety Officer (SSO). Monitoring was conducted in close proximity to source materials (auger spoils, excavated soils, etc.) during all intrusive activities described in the HASP. If instruments indicated the presence of target compounds in source materials, the general breathing zone in the exclusion zone was then monitored to determine appropriate response actions in accordance with the action levels specified in this Section.

Field monitoring equipment calibration was performed in accordance with the manufacturer's instructions. Field checks using the appropriate reference standards were made on site at a frequency of at least twice per shift (pre- and post-sampling). A daily log of instrument readings, as well as field reference checks and calibration information was maintained.

2.61.1 Total Volatiles

A PID equipped with a 10.2 eV lamp calibrated with isobutylene and referenced to benzene in air, was used to monitor the breathing zone of workers performing investigative activities to assess the potential presence of organic vapors. Additional compound specific monitoring/sampling was conducted using calorimetric indicator tubes. Response actions were not necessary during work at the SOH site as a result of monitoring for total volatiles.

2.61.2 Hydrogen Cyanide (HCN) Monitoring

A Direct reading hydrogen cyanide (HCN) monitor was used within the exclusion zone during drilling and excavation. The detection of any HCN during these operations would have required immediate work stoppage, evacuation of workers to the upwind location and immediate notification of the GZA Corporate Health and Safety Officer. HCN was not detected at the test pit excavation exploration locations or during drilling at the SOH site.

2.61.3 Combustible Gas Indicator

Periodic monitoring with a combustible gas indicator (CGI), calibrated using pentane as a reference standard, was used within each active exclusion zone, within the adjacent contaminant reduction zone (CRZ), and the support zone. If excessive organic vapors or free product would have been encountered, CGI monitoring would have been continuous within each active exclusion zone. Excessive organic vapors, for the purposes of initiating the use of a CGI, were defined as sustained readings (i.e., continuous for five minutes) at or above 25 units, or as an instantaneous reading at or above 150 units on the PID. No excessive organic vapors or free product was encountered at the exploration locations or during drilling at the SOH site.

There was no entry into any on-site excavations made during this RI. Elevated combustible gas levels were not encountered at exploration locations during drilling at SOH.

2.61.4 Respirable Dust (PM_{10}) Dust Monitors

A direct-reading Miniram meter was used as a supplement to visual observations to monitor for dust at both upwind and downwind locations as specified. The Miniram monitors dust using infrared electromagnetic radiation to sense airborne particles. The Miniram was factory calibrated to respond only to dust <10 microns in diameter. Readings were compared to the 150 $\mu g/m^3$ National Ambient Air Quality Standard (NAAQS) for airborne dust (less than 10 micron particle size). No exceedances for respirable dust were recorded during work at the SOH site.

2.62 Personal Exposure Monitoring

According to OSHA 1910.120, personal exposure monitoring for the purpose of determining individual time-weighted average exposures is required only during site clean-up or other remedial activities. The activities included in the site-specific HASP were completed prior to actual site remediation. Therefore, determinations regarding individual exposure potentials were based on the work area monitoring described above. Separate personal air sampling was not conducted.

2.63 Community Air Monitoring

In accordance with the Community Air Monitoring guidance, prepared by the New York State Department of Health (NYSDOH) and provided by the NYSDEC, real-time community air monitoring for volatile compounds and particulate levels was required at the perimeter of the work area during some planned activities. This air monitoring was conducted in addition to the environmental air monitoring of the work area as described in Section 2.61. These instrument readings were recorded by GZA during the field activities.

2.63.1 Non-Intrusive Activities

Non-intrusive project activities conducted at the site included: land surveying; geophysical (electromagnetic) survey; groundwater sampling; and water level measurements. These activities did not require community air monitoring.

2.63.2 Intrusive Activities

During intrusive activities, VOCs were monitored at the upwind and downwind perimeter of the work area on a continuous basis. This monitoring was accomplished using an organic vapor meter (equipped with an 11.7 eV bulb) capable of continuous unattended data recording for up to 8 hours. Wind direction was determined through the use of a wind sock. VOC monitoring was also completed in the work area, as described above. [Note: background levels of ambient air at the site may exceed 0 ppm. Background levels were recorded each day according to the HASP].

Particulates were also monitored at upwind, downwind and within the work area on a continuous basis. A dust monitor capable of continuous unattended data recording for up to 8 hours was used.

2.63.3 Vapor Emission Response Plan

The SOH Health and Safety Plan provides the details of the Vapor Emission Response Plan. It was not necessary to activate the Vapor Emission Response Plan and the Major Vapor Emission Response Plan during this phase of work. Since the Vapor

Emission Response Plan and the Major Vapor Emission Response Plan were not activated during the first phase of work, the Community Air Monitoring Program was modified as stated in a letter from GZA to the NYSDEC dated June 16, 1995 for the supplemental work activities. The Community Air Monitoring Program was modified for both non-intrusive and intrusive activities.

2.70 ENVIRONMENTAL SAMPLING

Samples of surface soil, subsurface soil, surface water sediments, surface water, water and sediments from on-site sump and catch basins, groundwater and basement sump water were collected during the field program. The proposed sample locations were presented to the NYSDEC prior to sampling, within the work plan (Reference 1) and addenda. The collected samples were submitted for testing to Laboratory Resources, Inc., the analytical laboratory.

A general description of the various type of media sampled and analyzed is provided below with sample series designations. The samples were analyzed for TCL for the analytes presented in Table No. 7 - Target Compound List for ASP93. A summary of the samples collected is presented in Table No. 8 - Summary of Environmental Samples. Sample type and identification information is summarized below.

- Surface Soil (SS series) - Surface soil samples were collected in October 1994 from locations on the site and from off-site locations.
- Subsurface Soil Samples (SB series) - Subsurface Soil samples were collected from October to December 1994 and in June 1995. These samples include subsurface soil samples collected in conjunction with the test boring, monitoring well installation and test pit explorations.
- Surface Water Sediments (SED series) - Surface water sediments were collected in October 1994 from locations along the drainage swale located on the western property line of the SOH site.
- Surface Water (SW series) - Surface water samples were collected in October 1994 from locations along the drainage swale located on the western property line of the SOH site.

▪	On-Site Sump and Catch Basins (NSM series) -	Aqueous and sediment samples were collected in October 1994 from on-site sump and catch basin locations.
▪	Groundwater (GW series) -	Water samples were collected during two sampling rounds in July and October of 1995 from selected monitoring wells.
▪	Basement (building) Sump Water (Sump 1, Sump 2, Sump 3) -	Water was collected from basement sumps located within the Ruby-Gordon building in October 1994 and October 1995.

Sampling procedures, specific to the various media that was sampled, are discussed in Sections 2.71 through 2.77. The analytical laboratory test results for each media are also discussed in Sections 2.71 through 2.77 and the laboratory test results are included in Appendix G - Analytical Results.

Several operations (i.e., equipment cleaning,container labeling, cooler sealing and chain of custody) were consistent throughout the project. These procedures are described below.

Sampling equipment was cleaned following the procedures outlined in the QAPP. Decontamination of field equipment was performed in the field at the on-site contamination pad and/or in the GZA equipment storage area, as appropriate. Groundwater sampling equipment was brought to the site and dedicated throughout the sample round. Separate bailers were dedicated to each well and used throughout the sampling event. Pre-cleaned sampling containers were furnished by Laboratory Resources, Inc.

Coolers and sample containers were also furnished by Laboratory Resources, Inc. Coolers containing appropriate sample containers were transported to the field based upon the sampling scheduled for each day. Each cooler contained a trip blank prepared by the analytical laboratory.

Sample jars were labeled with the location, designation and date sampled. Other information regarding each sample, such as field analytical results, sample depth (if appropriate), a visual description of the material, date and time of sampling, weather conditions and the individual completing the sample were recorded on a field data form.

Upon completion, samples were placed in the coolers and chain-of-custody forms were completed. Coolers remained in GZA's custody until they were received by the shipper.

Quality control samples collected during environmental sampling included the trip blanks (two sample jars per shipment), duplicate samples, matrix spike/matrix spike duplicate (MS/MSD) samples and equipment blank samples. Duplicate and MS/MSD samples were prepared by collecting additional sample volume at a particular sample location and placing the samples in containers provided by the contract laboratory; Laboratory Resources, Inc. These samples were handled in the same manner as other test samples. The sample location for duplicate samples was not provided to Laboratory Resources, Inc. as this was a blind quality control measure.

Equipment blanks were prepared to test the potential of cross contamination from sampling equipment. Sampling equipment was first cleaned as described above. Water, provided by Laboratory Resources, Inc., was then poured over the sampling equipment and into sample jars. Equipment blank samples then accompanied other samples through the shipment and analytical laboratory testing process.

2.71 Surface Soil Sampling

Six (6) surface soil samples (SS-1 through SS-6) were proposed for sampling at the site (Figure No. 3). The surface soils were collected with a hand trowel from the surface to a depth of about 0-2 inches below the ground over a circular area about 6 to 12 inches in diameter. This procedure was also used for soil samples SED-1 and SED-4 as noted in Section 2.72. Therefore, eight (8) surface soil samples were collected and analyzed for TCL plus 30 parameters. Two surface soil samples (SS-5 and SS-6) locations are located off-site and were collected as background surface soil samples. The surface soil results are presented in Table No. 9 - Summary of Surface Soil Sample Analytical Test Results.

2.72 Subsurface Soil Sampling

Thirty-Two (32) subsurface soil samples were collected during the RI. Twenty-Six (26) subsurface soil samples were collected during the test borings and monitoring well installations. Six (6) subsurface soil samples were collected from the test pits. See Figure No. 3 for sample locations.

The subsurface soil samples (26) collected during the test boring and monitoring well installations were collected from split spoon samples recovered during the subsurface explorations. The test pit soil samples (6) were collected by collecting a composite sample from the floor and walls of each test pit. The subsurface soil samples were collected and analyzed for TCL plus 30 parameters. The analytical results are presented in Table No. 10 - Summary of Subsurface Soil Sample Analytical Test Results.

2.73 Surface Water Sediments

Originally, four (4) surface water sediment samples (SED-1 through SED-4) were proposed for sampling during the RI (Figure No. 3). Samples SED-1 (upstream), SED-2 (midstream), and SED-3 (downstream) were collected from the drainage swale running north-south immediately to the west of the SOH property line. Sample SED-4 was collected from the drainage swale area located near the SOH and Ruby-Gordon property line. A Ruby-Gordon roof drain discharges into the swale at the SED-4 sampling location. The samples collected at the SED-1 and SED-4 locations are more properly identified as surface soil samples as no standing water was observed in the drainage feature when the samples were collected. These samples were collected following the methods described in Section 2.74.

Therefore, two (2) surface water sediment samples SED-2 and SED-3 were collected using a stainless steel auger advanced to a depth of approximately 6 inches. The equipment used was decontaminated in accordance with the QAPP. The two sediment samples (plus one matrix spike and one matrix spike duplicate) were collected and analyzed for TCL plus 30 parameters. The analytical results are presented in Table No. 11 - Summary of Surface Water Sediment Sample Analytical Test Results.

2.74 Surface Water

Three surface water samples (SW-1 through SW-3) were collected from the drainage swale located along the west side of the site (Figure No. 3). The surface water samples were collected by dipping the sample bottles directly into the water. The drainage swale surface water samples were collected and analyzed for TCL plus 30 parameters. Sample SW-2 is located at the SED-2 location and just downstream of the SOH site. Sample SW-3 is located at the SED-3 location where the Ruby-Gordon basement sumps previously discharged prior to 1994. Sample SW-1 is located further downstream to provide information of conditions further downstream in the east-west section of the drainage swale off-site. Visual surface water flow was not observed at the time the samples were collected. Therefore, it is noted that the analytical results may not be consistent with previous results which may have been obtained during various flow conditions. The surface water analytical results are presented in Table No. 12 - Summary of Surface Water Sample Analytical Test Results.

2.75 On-Site Sump and Catch Basins

Four (4) on-site sump and catch basin samples (NSM-1 through NSM-4) were collected from the on-site sumps and catch basins. NSM-1 (catch basin) and NSM-4 (sump) were aqueous (liquid) samples. NSM-2 (catch basin) and NSM-3 (catch basin) were soil/sediment samples. The on-site sump and catch basin water/sediment sampling methods were dependent on the volume of water present. Samples NSM-1 and NSM-4 were obtained by lowering a HDPE jar on cotton string to collect an aqueous sample. Samples NSM-2 and NSM-3 were obtained from the soil core of a stainless steel auger at a depth of approximately 6 inches. The equipment used to collect the samples was decontaminated in accordance with the QAPP.

The on-site sump and catch basin water/sediment samples (Figure No. 3) were collected and analyzed for TCL plus 30 parameters. The analytical results are presented in Table No. 13a - Summary of On-Site Sump and Catch Basin Water Sample Analytical Test Results and Table No. 13b - Summary of On-Site Sump and Catch Basin Soil Sample Analytical Test Results, respectively.

2.76 Groundwater Sampling

Two (2) sampling rounds were completed and the analytical results were submitted for data validation review as part of the RI to assess groundwater conditions on the site. The first round was completed between July 5 and July 13, 1995, and included collecting groundwater samples from the newly installed and existing monitoring wells (on-site and off-site), and SOH interior wells. Duplicate samples were collected from well OW-5S (SOH-1-DUP1) and well OW-7R (SOH-1-DUP2). MS/MSD samples were collected from well OW-2R and well OW-4S. An equipment blank was also collected on July 10, 1995. The first round of samples was analyzed for TCL plus 30 parameters. The analytical results are presented in Table No. 14a - Summary of Round 1 Overburden Groundwater Sample Analytical Test Results and in Table No. 14b - Summary of Round 1 Top of Bedrock Groundwater Sample Analytical Test Results.

The second groundwater sampling round was completed between October 2 and October 6, 1995 and included collecting groundwater samples from the newly installed and existing monitoring wells (on-site and off-site), the SOH interior wells, and the Ruby-Gordon basement sumps. Duplicate samples were collected from well OW-8S (SOH-2-DUP1) and well OW-7R (SOH-2-DUP2). MS/MSD samples were also collected during this round of sampling. Equipment blanks were collected on October 3 and 5, 1995 and a trip blank was provided for each sampling shipment.

The second round of groundwater samples was analyzed for Volatile Organic Compounds, RCRA-8 Metals plus zinc, copper and nickel. In addition, samples from wells OW-7R and OW-7S were analyzed for Semi-Volatile Organic Compounds. The reduced parameter sampling program was developed by TAMS/GZA and NYSDEC for this sampling round based upon a review of the results of the first round analytical data. The analytical results are presented in Table No. 14c - Summary of Round 2 Overburden Groundwater Sample Analytical Test Results and in Table No. 14d - Summary of Round 2 Top of Bedrock Groundwater Sample Analytical Test Results.

Pre-sampling activities included measuring the static water level and well depth to the nearest 0.01-foot with an electronic water level indicator from the reference elevation point established on the top of the monitoring well riser pipe. A check for light non-aqueous phase liquids (LNAPL) and dense non-aqueous phase liquids (DNAPL) was performed with a translucent bailer. DNAPLs and LNAPLs were not detected during the sampling events. The well water volume was calculated and the well subsequently purged by bailing or pumping until at least three well water volumes were removed or until the well was dry. The purge water was collected in 55-gallon drums for storage on-site. Following purging, the water level was allowed to recover to within 10 percent of its static level prior to sample collection. However, wells that recovered slowly or did not return to within 10 percent of their static level during the same day were still sampled that day to obtain a representative VOC sample.

Bailers dedicated to each monitoring well were used to collect samples for analytical testing. Samples were placed in appropriate sample containers provided by the analytical laboratory, and placed in coolers containing ice. Measurements of pH, temperature, turbidity and specific conductivity were made. Sampling information and field sampling parameters were recorded on a standard groundwater sampling record that was prepared and maintained by GZA.

2.77 Ruby-Gordon Basement Sumps

Three (3) off-site Ruby-Gordon basement sump water samples (Sump-1 through Sump-3) were collected with a dedicated bailer on a cotton string (Figure No. 3). For the October 1994 event the Ruby-Gordon samples were analyzed for TCL plus 30 parameters. During sampling round 2, the Ruby-Gordon sump water samples were analyzed for the VOCs and RCRA-8 metals plus zinc, copper and nickel. The analytical results are presented in Table No. 14e - Summary of October 1994 Ruby Gordon Sump Sample Analytical Test Results and Table No. 14f - Summary of October 1995 Ruby Gordon Sump Sample Analytical Test Results.

2.80 EXISTING MONITORING WELL ASSESSMENT

The overburden monitoring wells (Section 2.32) were initially located based on the assumption that existing on-site wells were functional and useable for this project. In order to confirm this, a monitoring well assessment was conducted for the existing wells that included inspection, development, field permeability testing, and repair, if appropriate. The existing wells are designated as follows:

Original Well Designation (Installation by and Date)	Current Well Designation (Figure No. 3)	Location /Property
MW-2, MW-3 and MW-5 (Lozier 1987)	Same as Original Name	On-Site/SOH
MW-2 (Erdman, Anthony & Associates 1993)	OW-LS	Off-Site/Leichtner Studio
B101-OW (H&A of New York 1992)	Same as Original Name	Off-Site Marketplace Chrysler
Well 1 (SOH Interior Wells 1962 ±)	SOH-IW-1R	On-Site/SOH (inside building)
Well 2 (SOH Interior Wells 1962 ±)	SOH-IW-2R	On-Site/SOH (inside building)

Based on field observations, it was determined that the SOH interior wells, SOH-IW-1R and SOH-IW-2R would be sampled as part of the groundwater monitoring program. These wells were not developed or field permeability tested due to downhole pump equipment which could not be removed. Based on conversations with the Metalade Plant Manager, Mr. Dick Galliotti, it is understood that wells SOH-IW-1R and SOH-IW-2R were apparently water supply wells for non-contact cooling water in the facility. Logs were not available for these wells.

The assessment of the remaining existing wells (MW-2, MW-3, MW-5, B101-OW and OW-LS) initially included opening the protective casing, monitoring air directly at the top of the well with a PID, and assessing the construction materials and surface seals. The wells were observed for evidence of tampering or the presence of foreign materials. The depth of the existing well was measured and compared to the depths indicated on the boring log for each well. The existing wells with the exception of SOH-IW-1R and SOH-2W-2R were redeveloped to remove accumulated sediment by bailing and pumping. The hydraulic conductivity was calculated after conducting field permeability tests and compared to the hydraulic conductivities calculated for the newly installed wells to assess whether the existing well appears to be functioning properly.

Based on the results of the existing well assessment, it was GZA's opinion that wells MW-2, MW-5, B101-OW and OW-LS (MW-2) are generally suitable for water level monitoring, groundwater sampling and hydrogeologic testing. GZA also concluded that surface water may have been introduced into MW-3, based on the condition of the flush mounted protective casing which was not capped or locked. However, due to the well location, it was, in consultation with NYSDEC, decided that the well would be sampled and that the results would be representative such that they could be used during this study.

2.90 SUPPLY WELL INVENTORY

GZA conducted a water supply well survey on September 16, 19, and 22, 1994 in general accordance with the Field Activities Plan. The purpose of the survey was to determine if water supply wells are in use at properties within a ½-mile radius of 39 Commerce Drive.

At least one attempt was made to contact each property owner or structure occupant within the above-mentioned search area using a door to door (property by property) survey. At the request of GZA, the MCDOH reviewed their records for any water supply wells within the search area.

GZA's survey and information provided by MCDOH did not reveal the presence of active water supply wells within a ½-mile radius of 39 Commerce Drive based on the references and information reviewed during this project. It is noted that the area surrounding the site is serviced by public water.

3.00 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

The following sections discuss surface features, meteorology, surface water hydrology, regional and site geology, regional and site hydrogeology, land use and habitat assessment.

3.10 SURFACE FEATURES

The ground surface elevation at the site varies between the approximate elevations of 524 and 535 feet, based on the National Geodetic Vertical Datum (NGVD). The overall site ground surface generally slopes to the northwest at an approximate 2 percent slope. An approximate 20 foot wide strip along the south property line slopes to the south towards the Ruby Gordon facility at a 15 to 20 percent slope.

The existing building is approximately 64,000 square feet and reportedly consists of a slab-on-grade with concrete block walls and a flat roof. The paved parking areas and driveways are located west of the building and, generally slope to catch basins throughout the site. Grass areas are relatively level and are located at the northwest portion of the site. A weed/scrub/brush area is located adjacent to the drainage swale along the west property line.

3.20 METEOROLOGY

The climate in the vicinity of the site and Monroe County is typified by moderately warm summers, and cold snowy winters. Monroe County is bound to the north by Lake Ontario. The lake has a moderating effect on the temperature, typically reducing the cooling that occurs at night during the winter months.

Data regarding the average monthly temperature, average monthly precipitation and average annual precipitation for Monroe County are summarized in Table No. 15 - Average Temperature and Precipitation. The overall recording period for these averages is the past 30 years. The meteorology data was obtained from the Northeast Regional Climate Center, Cornell University.

3.30 SURFACE WATER HYDROLOGY

The surface features that affect surface water hydrology at the site include: the paved parking lot; the drainage area between the SOH site and the Ruby Gordon facility; and the drainage swale along the west property line of the site.

The storm water from the parking lot, which also includes some run-off from the building's roof, is generally collected in catch basins located throughout the paved portion of the site. The collected storm water is conveyed to a storm sewer located along Commerce Drive.

Surface drainage in the area between the SOH site and the Ruby Gordon facility is generally westerly until the northwest corner of the Ruby-Gordon building where it turns to the south. Surface water runoff is collected in a catch basin located at the west end of the Ruby Gordon building at the loading dock area. It is GZA's understanding that the water collected in this catch basin is then transferred into Sump #2 within the Ruby Gordon building.

The drainage swale along the west property line, reportedly owned by Mr. Dennis Petrisak, begins at Commerce Drive and runs to the south, extending slightly south of the Ruby Gordon facility. The surface drainage swale then turns to the west where it combines with a tributary of Red Creek. Red Creek, which is discussed in Section 3.91, discharges into the Erie Canal. It is noted that the slope of the swale adjacent to the site is quite flat, and that flows in the swale occur primarily during rainfall events and during periods of snow melt.

3.40 REGIONAL GEOLOGY

The site is located in the Erie-Ontario lowlands physiographic province. Repeated glaciation processes have resulted in a series of glacial deposits of pleistocene age. Published geologic information indicates that the overburden deposits generally consist of dense glacial till mantles over the bedrock formations throughout most of the region. Coarse-grained (sand and gravel) undifferentiated outwash deposits generally overlie the till deposit. These outwash deposits may be stratified in the form of kames or deltas as a result of channel filling. Several paleo-drainage channels have been filled in the region and often consist of fluvial silts and sands. Most of these deposits were overlaid by the deposition of lacustrine silt and clay as glacial lakes covered the region (Fairchild, H.C. 1932), (Reference No. 7).

The bedrock in this region consists of flat-lying sedimentary rock of middle paleozoic age. These sedimentary formations are generally undeformed except for imposition of a regional southward dip which averages about 60 feet per mile, with local variations. The bedrock formations include sandstone, shale, limestone, and dolomite. The SOH site is underlain by the Vernon Formation. This formation consists of interbedded gray, green and red shales with a regional dip of approximately 40 feet per mile to the south. This formation can be divided into three zones based on the relative degree of weathering in the formation (Fisher, D.W. 1957) (Reference No. 8). The different zones into which the Vernon Formation has been divided (from top to bottom) include a residual soil zone, a weathered rock zone, and a competent rock zone.

3.50 SITE GEOLOGY

Geologic conditions at the site were investigated during this RI and during previous site investigations conducted by Lozier Architects and Engineers, Inc. (1987) and adjacent off-site investigations conducted by Erdman Anthony Associates (1992), Larsen Engineers (1992), URS Engineers (1994), and Haley & Aldrich of New York (H&A) (1991). The site geology is based on data from test borings, monitoring well installation, test pits, the geophysical study, geotechnical testing and observations completed as part of these investigations. In addition, subsurface data from test boring logs and well completion details were reviewed from the previous investigations described in Section 1.12. Copies of the previous investigations are not included with this text. However, geologic information and data has been reviewed and incorporated herein, where applicable. A summary of the subsurface test borings and well installation details, that includes wells installed during previous investigations, is presented in Table Nos. 2 and 3. Generalized subsurface cross sections (Figure No. 5 - Subsurface Cross Sections A-A' and B-B'; and Figure No. 6 - Subsurface Cross Sections C-C' and D-D') have been developed based on the subsurface data presented in the summary tables an shown on the subsurface exploration logs.

3.51 Overburden

The general overburden deposits encountered with depth at the site are: fill, lacustrine, and glacial till. The glacial till deposit consists of an upper till and a lower till based on physical characteristics. The following subsections describe the physical characteristics of the overburden deposits encountered at the site.

3.51.1 Fill Deposit

The fill deposit was generally encountered at the ground surface at each of the subsurface explorations and, where encountered, ranged in thickness from 1.0 foot at monitoring well location OW-5S to 15.3 feet at test boring location SB-17. The average thickness of the fill deposit, where encountered at the site, is approximately 4.8 feet.

The composition of the fill deposit varies depending on location. However, it is generally comprised of loose to medium dense, brown, fine to coarse sand, some clayey silt, trace gravel, with occasional pieces of wood, fabric and metal debris. In addition to the sandy fill deposit, a thin, approximately 6-inch layer of topsoil was encountered at the SB-12 and SB-13 locations.

3.51.2 Lacustrine Deposit

The lacustrine deposit generally underlies the fill deposit at the site and, where encountered, ranges in thickness from 1.5 feet at test boring location SB-7 to 17.4 feet at monitoring well location OW-3S. The average thickness of the lacustrine deposit, where encountered at the site, is approximately 7.4 feet. This deposit generally increases in thickness from the southern area of the site towards the northwest portion of the site where the lacustrine deposit was observed to be the thickest at the OW-3 well cluster location. The lacustrine deposit at the OW-3 well cluster, based on visual classification, appears to contain a higher percentage of clay when compared to the lacustrine deposit observed at other areas of the site. The lacustrine deposit (based on visual classification), generally varies between a brown, silty clay, with a trace of fine to coarse sand and a trace of fine gravel; to a brown, clay and silt, with little fine to medium sand. Based on standard penetration analytical results in the borings, its consistency is generally described as stiff to soft.

3.51.3 Glacial Till

The glacial till deposit generally underlies the lacustrine deposit across the site, and is the prevalent (encountered more frequently and with greater thickness) overburden deposit at the site. This deposit is described as an upper till and a lower till based on physical description and density relationships.

The upper till, at the exploration locations, ranges in thickness from 4.0 feet at locations OW-11S and SB-17 to 28.0 feet at the SB-6 test boring location. The average thickness of the upper till is approximately 14 feet. The upper till, based on visual classification, generally varies between a dense, brown fine to coarse sand, some silt, some fine to coarse gravel to medium dense, brown fine to coarse sand, some clayey silt, and some gravel. Generally, glacial till deposits are highly variable in soil grain size distribution (composition) and zones of soil material coarser or finer than the majority of the surrounding deposits are not uncommon. The upper till also contains sand strata which range in thickness from approximately 2 feet to greater than 10 feet. The sand strata are visually classified as brown, fine to medium sand, trace coarse sand, trace silt; to brown, fine to medium sand, little coarse sand. The sand strata were encountered in several test borings at various depths but appear to be discontinuous with respect to horizontal distribution. When present, the sand strata provide zones of higher permeability which may allow for greater lateral groundwater flow. The upper till is continuous across the site and also appears to be the primary water bearing unit within the overburden deposits at the site.

The lower glacial till overlies the bedrock across the site and, at the exploration locations, ranges in thickness from 4.0 feet at the SB-12 location to 21.2 feet at the OW-4R location. The average thickness of the lower till, where encountered at the site, was approximately 14 feet. This deposit is characterized by Standard Penetration Test values (N-values) exceeding 100 blows per 6 inches for several consecutive feet. The deposit is generally described as dense, brown or gray, fine to coarse sand, some clayey silt, trace gravel; to dense, gray, fine to coarse sand and clayey silt, trace fine gravel, based on visual classification and laboratory grain-size analysis (Appendix C). Sand strata were not encountered in the lower till, however, occasional fine to medium sand seams were encountered. The lower till contains a greater percentage of silt and clay based on laboratory grain size analysis and the relative density is greater than the overlying upper till. Therefore, it is anticipated that the permeability of the lower till based on density, grain size, and Atterberg limit laboratory analytical results is likely to be one or two orders of magnitude less than the permeability of the upper till.

3.52 Top of Bedrock

The top of the bedrock below the lower till consists of severely weathered shale of the Vernon Formation. In the site area, the Vernon Formation generally consists of decomposed and discontinuous fragments of shale, filled with minor quantities of clayey silt. Fracturing in the top of rock zone is generally considered to be moderate to extensive, which typically results in a permeability higher than the permeability of the overlying glacial till based on a comparison of top of bedrock hydraulic conductivity values and overburden hydraulic conductivity values (Table No. 6).

3.60 REGIONAL HYDROGEOLOGY

The present regional hydrogeologic features are, in part, the result of glacial ice sheets which advanced southward from the Ontario Basin and deposited dense lodgement till overlying the bedrock surface. Preglacial lakes developed as the ice sheets receded to the north. Several glacial melt water channels formed during glacial retreat and impacted the regional hydrogeologic features. The paleo-stream and river channels were subsequently filled with sand and gravel sediments which comprise the present outwash and fluvial deposits of the region. These deposits were overlain by the deposition of lacustrine silt and clay as glacial lakes covered the region.

Groundwater is present in the overburden soil deposits and bedrock formations. The predominate regional groundwater flow in both the overburden and bedrock is generally to the north-northwest towards the Genesee River and Lake Ontario.

3.70 SITE HYDROGEOLOGY

The overburden groundwater and top of bedrock groundwater appear to occur under semi-confined conditions at the site. A semi-confined or leaky aquifer is generally defined as a completely saturated aquifer (water bearing unit) which is bounded above by a semi-pervious layer and below by a layer that is either impervious or semi-pervious. A semi-pervious layer is defined as a layer which has a low, but measurable permeability.

The site hydrogeologic overburden groundwater conditions are apparently represented by semi-confined conditions. At the site, the water bearing overburden unit is represented by the (saturated) upper glacial till. The upper glacial till is generally bounded above by the lacustrine (clay and silt) deposit over most of the site, which appears to be acting as a semi-pervious layer (low permeability) and below by the lower glacial till which apparently provides a semi-pervious layer across the top of bedrock (Figure Nos. 5 and 6). However, unconfined overburden groundwater conditions may exist at the site at areas where the thickness of the overlying lacustrine deposit is absent or too thin to provide a semi-pervious layer. Therefore, areas of unconfined overburden groundwater conditions may exist adjacent to buildings or underground utilities where construction activities disturbed or removed the lacustrine (clay and silt) deposit. The subsurface cross-sections (Figure Nos. 5 and 6) generally present the distribution of overburden deposits and relative thickness, site wide, in addition to groundwater piezometric elevations.

The hydrogeologic condition of the top of bedrock groundwater at the site is also apparently represented by semi-confined conditions. The top of bedrock is a water bearing section comprised of severely weathered shale of the Vernon Formation. This water bearing section of the Vernon Formation is bounded above by the semi-pervious (low permeability) lower glacial till. Although not encountered as part of the RI study it is believed that the unit is bounded and at some point below by a semi-pervious layer of bedrock. The piezometric surface elevation of the top of bedrock groundwater is located above the lower till (semi-pervious layer) which suggests a semi-confined condition of the top of bedrock groundwater (Figure Nos. 5 and 6).

The primary hydraulic properties used to describe hydrogeologic conditions at the site include hydraulic conductivity, porosity, and effective porosity. These properties, along with hydraulic gradient calculations, are used to estimate groundwater flow directions and velocities. Hydraulic conductivity is a measure of the ability of a soil or rock deposit to transmit water and porosity is a measure of the void space within the deposit. The effective porosity is a measure of the void space within the deposit which is able to transmit groundwater.

Field permeability tests (in-situ hydraulic conductivity tests) were conducted in monitoring wells screened in the overburden deposits and in the top of bedrock. The hydraulic conductivity analytical results from wells screened in the upper glacial deposits and at the top of bedrock were estimated based on in-situ variable head testing (i.e. falling and rising head tests). The results of the hydraulic conductivity testing (Bouwer and Rice, 1976) (Reference No. 9) are summarized in Table No. 6.

In addition, groundwater elevation data, obtained from routine water level measurements taken at the site, and geotechnical laboratory analytical results (Appendix C) for grain size analysis and moisture content results were used to further develop and present the site hydrogeologic relationships.

3.71 Hydraulic Conductivity and Soil Porosity Results

The movement of groundwater is controlled predominantly by the hydraulic conductivity of the geologic media that accommodate groundwater flow. Estimated hydraulic conductivity values were calculated from field permeability test data. These tests were conducted in the on-site and off-site groundwater monitoring wells. The estimated hydraulic conductivity values provide data to assist in the understanding of groundwater movement at the site, and to assist in the identification of preferential flow zones. The hydraulic conductivity analytical results are presented in Table No. 6. Hydraulic conductivity testing results and calculations are presented in Appendix F.

The porosity of saturated soils was estimated based upon moisture content analytical results completed during laboratory testing and an estimated soil unit weight that was based on soil type and standard penetration analytical results. A specific gravity of 2.7 was selected based on published values for this type of soil and used in this estimate (Reference No. 10). The calculated porosity of the upper glacial till ranged from approximately 0.14 to 0.22, with an average value of 0.20. The estimated porosity of the lower glacial till ranged from approximately 0.15 to 0.30, with an average value of 0.19. The estimated value for the effective porosity would likely be approximately 0.19 and 0.18, respectively, based on consideration of capillary forces acting on the interstices of the soil (void spaces). An estimated effective porosity value of 0.24 was selected for the top of weathered bedrock as discussed in Section 3.73.

3.72 Overburden Groundwater Flow Patterns and Velocities

Overburden groundwater contour maps representing low groundwater elevations (Figure No. 7 - Overburden Groundwater Contour Map, August 24, 1995) and high groundwater elevations (Figure No. 8 - Overburden Groundwater Contour Map, October 23, 1995), as recorded during this study period, were prepared based on the water elevations measured in the monitoring wells on August 24, 1995 and October 23, 1995, respectively. The hydraulic gradient conditions at these times with the overburden average (mean) hydraulic conductivity (from rising head tests) value and the effective porosity of site soils were used in calculating the overburden flow velocities.

The general site overburden groundwater flow direction representing low site groundwater elevation (Figure No. 7) is to the north and northwest as is the case during periods of high site groundwater elevation over the majority of the site (Figure No. 8). However, during periods of high groundwater, a southwesterly groundwater flow direction is indicated in the vicinity of the southern part of the SOH property line, as well as a southeasterly component of flow towards the southwest corner of the Ruby-Gordon basement (Figure No. 8). These flow components appear to exist when the three Ruby-Gordon basement sumps are pumping. The data indicate that the pumps are operational when the water levels in the sumps rise above approximately elevation 521 feet. The result of the basement sumps pumping creates localized gradient changes adjacent to the perimeter of the basement that subsequently influences localized flow direction as illustrated in Figure No. 8 - Overburden Groundwater Contour Map, October 23, 1995. It is noted that the pumping from Ruby-Gordon sumps appears to have a more limited impact, if any, on flow directions during dry or low flow conditions (Figure No. 7).

The calculated horizontal hydraulic gradient at the site, between OW-LS (upgradient) to OW-5S (downgradient) is 0.034 ft./ft. based on the August 24, 1995 groundwater elevations (low conditions) and is 0.036 ft./ft. based on the October 23, 1995 groundwater elevations (high conditions). This indicates that the gradients are relatively constant between the low and high groundwater elevations (conditions) measured at the site during the study.

However, the horizontal hydraulic gradients calculated for the vicinity of the southern portion of the site adjacent to the off-site Ruby-Gordon basement area indicate steeper gradients during periods of high groundwater elevation. The calculated horizontal hydraulic gradient between MW-3 (on-site) to sump #3 (off-site Ruby-Gordon basement sump) during October 23, 1995 (higher groundwater elevation) is 0.068 ft./ft. as compared to 0.026 ft./ft. on August 24, 1995 (low groundwater elevation).

The overburden groundwater flow velocities were also calculated for the August 24, 1995 and the October 23, 1995 groundwater elevations. The overburden groundwater flow velocity from upgradient well OW-LS to OW-5S downgradient well based on the August and October elevations was calculated to be approximately 390 feet per year and approximately 400 feet per year, respectively.

The overburden flow velocities were again calculated based on the August and October groundwater elevations in the vicinity of the SOH southern property line near the Ruby-Gordon basement. The overburden groundwater flow velocity from MW-3 (upgradient) to the sump #3 (downgradient) located off-site in the Ruby-Gordon basement floor based on the August and October elevations was calculated to be approximately 300 feet per year and approximately 765 feet per year, respectively.

3.73 Top of Bedrock Groundwater Flow Patterns and Velocities

Groundwater contour maps representing low piezometric water levels (Figure No. 9 - Top of Bedrock Potentiometric Contour Map, August 24, 1995) and high piezometric water levels (Figure No. 10 - Top of Bedrock Potentiometric Contour Map, October 23, 1995) were prepared based on the water levels measured in the monitoring wells installed into the top of bedrock zone on August 24, 1995 and October 23, 1995, respectively. The site top of bedrock groundwater flow direction (upper zone of bedrock) representing both the low site water levels (Figure No. 9) and high site water levels (Figure No. 10) is generally towards the northwest.

The calculated horizontal hydraulic gradient at the site, measured between OW-2R (upgradient) to OW-3R (downgradient) is 0.0017 ft./ft. based on the August 24, 1995 groundwater elevations and is 0.0023 ft./ft. based on the October 23, 1995 groundwater elevations. This indicates that the gradients are relatively constant between the low and high conditions measured at the site.

The average (mean) hydraulic conductivity value (from rising head tests) and a selected representative effective porosity of 0.24 was used in calculating the top of bedrock groundwater flow velocities. The top of bedrock groundwater flow velocities were calculated for both the August 24, 1995 (Figure No. 9) and the October 23, 1995 groundwater elevations (Figure No. 10). The top of bedrock calculated flow velocity from upgradient well OW-2R to downgradient well OW-3R based on the August and October water elevations in the wells is approximately 25 feet per year and 35 feet per year, respectively.

3.80 LAND USE AND DEMOGRAPHY

The SOH site is located within the Town of Henrietta, New York, approximately four miles south of the City of Rochester in the County of Monroe. The Town is bounded by the Towns of Brighton to the north, Pittsford to the east, Rush to the south and Chili to the west. The Locus Plan (Figure No. 1) shows the approximate location of the SOH site within the Town of Henrietta.

The SOH site is located in a commercial/industrial area adjacent to West Henrietta Road NYS Route 15, one of the principal north-south travel routes through the town and the Genesee Valley region. The site is located in an industrial zone, according to the Town zoning map. In general, road frontage along West Henrietta Road and Jefferson Road in the site vicinity is zoned Commercial B-1. The industrial zone is a block of land adjacent to these commercial zones which extends west to Johns Road and south to the residential neighborhoods near Bailey Road. The site is not located within a designated County agricultural district.

The project site is located in an area which has undergone several decades of steady growth and development, primarily commercial in nature. Such development is concentrated around the intersection of West Henrietta Road and Jefferson Road. Marketplace Mall and Southtown Plaza are within ½-mile of the site. The presence of these shopping areas and adjacent plazas have resulted in this area becoming one of the major shopping destinations of southern Monroe County and surrounding counties. Several railroad spurs are also located in the area and provide railroad service to the area.

The 1990 Census data indicates that the population of the Town of Henrietta grew 0.67% in the 1980's from 36,134 in 1980 to 36,376 in 1990. More significant growth occurred in the 1960's (185 percent) and 1970's (9 percent).

3.90 HABITAT ASSESSMENT

3.91 Site Description

The evaluation of fish and wildlife concerns was conducted in accordance with NYSDEC's guidance document "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA), October, 1994." Field visits associated with the site description were completed in September and October of 1995.

Topographic and Covertype Maps have been prepared for the project site and surroundings. The area shown on Figure No. 11 - Area Topographic Map encompasses a 2-mile radius around the site and identifies documented fish and wildlife resources. Streams and wetlands are the primary resource areas that are present near the site. Drainage patterns are also shown on the topographic map. The area shown on Figure No. 12 - Cover Type Map encompasses a ½-mile radius and shows land use and vegetative covertypes including wetlands. These resources are discussed in the following sections.

3.92 Description of Fish and Wildlife Resources

3.92.1 Fish and Wildlife Resources and Covertypes

The NYSDEC and the USFWS provided information for the SOH site regarding significant habitats, rare and threatened or endangered species, wetlands, and streams. The 2-mile radius shown on the Topographic Map was submitted for their review.

Information from the USFWS indicate that Federally listed or proposed endangered or threatened species currently do not exist in the project area. However, occasional transient species may pass through the site. The National Wetland Inventory (NWI) maps were referenced for information on federally regulated wetlands in the vicinity (Section 3.95).

The response from NYSDEC Division of Fish and Wildlife indicated that no rare, threatened, or endangered plants or animals are known in this area. In addition, significant habitats as defined by the NYS Natural Heritage Program have not been identified in this area. State-regulated freshwater wetlands which are mapped in the 2-mile radius area include: BR-12, BR-2, BR-5, HR-22, HR-21, HR-17, and HR-20 (Figure No. 11). As shown on the Topographic Map, two of these wetlands (HR-17 and HR-21) are located within a ½-mile of the site. These wetlands are designated Class II wetlands with the exceptions of BR-5, BR-12, and HR-17 which are Class I wetlands.

The site is located in the Red Creek watershed. Red Creek, identified by NYSDEC as Stream # Ont-117-14, begins several miles southeast of the site and flows generally in a northerly direction until just east of the site near Marketplace Mall. At this location the stream bends and flows to the west for approximately 1-mile and crosses the area just north of Commerce Drive. Once again, the stream flows in a northerly direction until it discharges into the Erie Canal near the Genesee River in the vicinity of Genesee Valley Park.

Red Creek is a Class C stream in the area of the project site. The lower portion of Red Creek (from the Crittenden Road bridge to the mouth at Genesee River) is a Class B stream. Information from NYSDEC Fisheries unit indicates that the majority of Red Creek is a warm water, minnow stream. Other fishery resources were not noted for Red Creek, except that larger warm water fish may be entering the lower end of Red Creek near its outlet into the Erie Canal. A review of NYSDEC fish kill records indicated that fish kills have not been recorded for Red Creek since records were initiated in the 1930's.

As stated previously, the site is located in a commercial/industrial area which has experienced significant commercial growth in recent years. However, undeveloped areas are located north, south and east of the site (Figure No. 2). Visual observation of these areas reveal the presence of intermixed woodland, wetland and old field areas. The woodlands consist primarily of deciduous tree species such as cottonwood, willow, ash, and maple. Oaks and aspen are also found in the open area to the north of the site. The wooded areas vary in age, with more mature woodland found to the north of the site. Cattails and other vegetation were observed in the wetland areas.

The SOH site is located on Commerce Drive among other industrial, warehouse, or wholesale businesses. The building is surrounded primarily by pavement, parking areas and buildings with the exception of a small drainage swale located to the west (Figure No. 2). The swale continues behind the adjacent building to the south (Ruby-Gordon), and then bends to the west until it meets a tributary of Red Creek identified by NYSDEC as Stream # Ont-117-14-2-1. This tributary stream is an unprotected Class C stream.

Stream # Ont-117-14-2-1 flows to the west in a channelized bed adjacent to a railroad track which parallels Commerce Drive. Apartment complexes are located to the south of the stream. After approximately ½-mile, this stream joins a larger tributary to Red Creek, Stream # Ont-117-14-2, which bends sharply to the north and eventually empties into Red Creek west of Southtown Plaza.

Vegetation present along the drainage swale immediately west of the SOH building includes scattered box elder, cottonwood, willow and maple trees. Goldenrod, ragweed, thistle, aster and native grasses were observed in the thick growth around the trees. Where standing water is present within the drainage swale, cattails predominate with willows found adjacent to and within the drainage swale. Some rubbish and construction debris was also observed in this area.

As the swale continues behind Ruby Gordon and towards the west, a predominance of willow trees are mixed with maple and cottonwood. Grape vines are visible growing on some trees, and goldenrod, aster, thistle and a mixture of grasses were observed in the ground cover and scrub surrounding the trees. Cattails are the predominate species of vegetation in the standing water which is present in the drainage swale to the area where it joins the tributary to Red Creek Ont-117-14-2-1 west of Ruby-Gordon. South of the drainage swale is a small depression filled with cattails and surrounded by willow trees and grass vegetation.

Predominant tree species along Red Creek tributary Ont-117-14-2-1 between the apartment complexes and the railroad tracks are maple, willow and ash. Cottonwood, mulberry, and sumac are also prevalent in several locations. Grape vines and poison ivy grow abundantly on some trees. A mixture of grasses and wildflowers were observed, including: cattail, touch-me-not, aster, queen anne's lace, thistle, smartweed, goldenrod, and ragweed.

There is little vegetation in the stream course which is generally level and shallow (water depth estimated to be approximately 6 inches) with a mud substrate. At the time of the site visit, the stream appeared stagnant with low flow and little evidence of healthy stream biota. Some small minnows were observed, but few aquatic invertebrates were readily apparent in the stream. Toads were observed in the grassy vegetation surrounding small side drainages feeding the stream. Rubbish was widely scattered throughout the stream course including old tires, wood pallets, cement block, and other miscellaneous materials.

South of the channelized stream course are large lawn areas and a playground area associated with the apartment buildings. Large maple, willow and ash trees were present and give the area a park-like appearance. At approximately ½-mile from the project site the lawn area gives way to a denser, wooded thicket and large willows are present.

3.92.2 Fauna Expected in Each Covertype and Aquatic Habitat

As stated previously, rare, threatened or endangered species or significant habitats have not been identified by State and Federal agencies in the vicinity of the project site. The significant commercial/industrial development in the area, in addition to the railways and heavily travelled highways, have resulted in fragmented habitat areas which do not support large populations of wildlife.

It would be expected that the drainage swale and open area near the project site would support typical woodland species of upstate New York and species which have adapted to living near man-made environments. The wooded areas and wetlands likely support deer, rabbits, raccoons, woodchuck, gray squirrel, mice and other rodents. Toads may live near the stream. Woodchucks, snails, garter snakes, ribbon snakes, and grasshoppers have been observed around the SOH building and along the drainage swale to the west.

It is unlikely that significant fish species would be found in the drainage swale given its shallow depth and low flow. The drainage swale eventually flows into Red Creek, which is a warm water minnow stream.

3.92.3 Observations of Stress Potentially Related to Site Contaminants

A field visit to observe the vegetated areas at the SOH site did not reveal the presence of visually contaminated areas. Stained soils, exposed waste, leachate seeps or altered biota were not apparent. The vegetation present was thick and overgrown as would be expected for such an unmaintained peripheral area. Debris was observed within the brush including: a rusted 55-gallon drum, a mattress bedspring, construction debris, cans, bottles, and other trash. Sanitary sewer manholes were observed above grade within the swale.

As stated previously, a review of NYSDEC fish kill records indicated that fish kills have not been recorded for Red Creek since records were initiated in the 1930's.

3.93 Value of Fish and Wildlife Resources

3.93.1 Value of Habitat to Associated Fauna

The habitat within ½-mile of the site is fragmented by heavily travelled commercial highways, the railroad, and commercial and industrial development. Such vehicle and pedestrian traffic, railroads, parking lots, shopping plazas and industrial zones create significant barriers to wildlife movement. The net result is isolated wooded and wetland areas which generally cannot and do not support large populations of species. Available habitat, food supply, breeding, nesting and roosting areas are limited within these isolated areas. Therefore, population and diversity of species is limited and species which are adapted to living near man-made environments are most likely to be found.

In summary, the habitat near the project site is not unique and generally supports species common to the area. These areas likely represent oases of habitat for such species which would allow for their continued survival around this commercial/industrial area.

3.93.2 Value of Resources to Humans

The fish and wildlife resources near the site primarily provide the opportunity for viewing wildlife and the knowledge that some wildlife is present around a busy commercial area. Recreational activities such as hunting and fishing are not available in areas near the site given its developed nature. Red Creek discharges into the Erie Canal near the Genesee River in the vicinity of Genesee Valley Park. This discharge area is located outside the 2-mile radius around the site. Canoe rentals are available in the park for use on the Genesee River, Erie Canal and on the lower portion of Red Creek. Other recreational activities available in the park include hiking, biking, picnicking, golf, playground activities, etc.

3.94 Applicable Fish and Wildlife Regulatory Criteria

Criteria applicable to the remediation of fish and wildlife resources are discussed in Section 6.3 of this document which contains Step II of the Fish and Wildlife Impact Analysis.

3.95 Floodplains and Wetlands

According to the Town of Henrietta tax records, the project site is located within a 100-year floodplain for the tributary to Red Creek. These records are based on the Flood Insurance Rate Map (FIRM) prepared for the Town of Henrietta by the Federal Emergency Management Agency (FEMA). According to the FIRM map, the boundary of the 100-year floodplain (AE Zone) extends onto the northwest corner of the SOH property. For this reason, the Town classifies the entire property within the floodplain. The boundary of the 100-year floodplain (AE zone) encompasses much of Commerce Drive and the area to the north extending to Jefferson Road. However, most of the road frontage along West Henrietta Road in the vicinity of the site is located in Zone X, outside of the 100-year floodplain. The FIRM map indicates that the majority of the SOH site falls outside the floodplain boundary, with the exception of the extreme northwestern portion of the site that contains the swale.

The NYSDEC Freshwater Wetland Maps indicates that the SOH site is not included in a designated wetland area. Two wetlands are within ½-mile upstream from the site including: HR-17, a Class I wetland on Red Creek as it passes east of the site, and HR-21, a Class II wetland on Red Creek as it passes north of the site. Within a 2-mile radius of the site, other State-regulated wetlands include BR-4, BR-2, BR-5, HR-22, and HR-20 (Figure No. 11). These wetlands are designated Class II wetlands with the exception of BR-5, and BR-12 which are Class I.

According to the NWI maps, federally protected wetlands are not located on the project site and are not located within ½-mile to the south and west of the site. In the undeveloped area north of Commerce Drive, three palustrine wetlands (emergent, open water and forested) are indicated, and palustrine open water, forested, and shrub/scrub/emergent wetlands are shown to the east along Red Creek. In addition, a palustrine shrub/scrub/emergent wetland is shown within ½-mile southeast of the project site.

4.00 NATURE AND EXTENT OF CONTAMINATION

This Section discusses the nature and extent of contamination observed at the SOH site. The Section primarily addresses and presents the analytical results of chemical compounds and metals historically used during the industrial processes or documented spills at the SOH Site. Other chemical compounds were detected in the various media sampled at the site and the analytical results are presented in Appendix G - Analytical results.

Within the text below, the chemical compound type and ranges of concentrations from laboratory analytical results is provided with a numerical value, data qualifier, and appropriate units. Data qualifiers are identified and presented in Appendix G. Laboratory Resources, Inc. of Teterboro, New Jersey provided the analytical laboratory services for this project. ChemWorld Environmental, Inc. of Lockville, Maryland and Environmental Quality Associates, Inc. of Middletown, New York provided independent data validation services for this project.

Contract required quantitation limits (CRQL) are the values that the analytical laboratory must be able to detect for a particular analyte as shown in Table No. 8. Data qualifier definitions, as defined by Laboratory Resources, Inc., are included in Appendix G.

4.10 CONTAMINANT TYPES

In general, chemical compounds that have similar chemical structures generally tend to exhibit similar chemical and physical behavior in the environment. The physical and chemical properties, such as density, water solubility, vapor pressure, Henry's Law Constant, organic carbon partition coefficient and log octonol/water partition coefficient are defined for pure compounds under laboratory conditions. These properties, in conjunction with field data, are used to provide an indication of how a given class of chemicals would generally be expected to behave in the environment. Chemical compounds detected in each identified environmental media are presented in Table Nos. 10 through 14b. Brief narratives summarizing anticipated behavior and commonly associated uses of the chemical classes found at the SOH site are included on Table No. 16 - Summary of Exposure Pathways Considered. These classes are not however, discussed in the following text. The validated laboratory analytical results are summarized in Appendix G.

Discussions of laboratory analytical results for various environmental sample media are presented by the chemical classes which represent those used typically in the metal finishing industry, as appropriate, in subsections 4.3 through 4.9. However, other chemical classes such as phthalates, phenols, PCBs, and some semi volatile compounds were detected in the various media at the SOH site.

4.20 SOURCE AREAS

As discussed in Section 1.11, operations at the SOH facility reportedly included metal finishing and plating. Available information suggests that liquid chemical wastes may have, at various times, been stored in above ground tanks and 55 gallon drums. Drum storage areas as previously described, were reportedly located along the western and southern property lines of the site based on a 1976 aerial photograph and site documents. Documented surface spills have occurred on the site including spills that resulted from the fire at the facility in December of 1974 (Section 1.1). In addition, site construction activities during building additions and clearing of facility debris after the site fire may have moved potentially contaminated materials and/or soils from their original locations to other site locations, particularly along the western property line. In addition, water utilized in controlling the fire may have inadvertently contributed to the dispersion of chemical compounds at the SOH site.

Another potential source area may include the interior (water supply) wells located inside the SOH building. These wells were apparently utilized for non-contact cooling water. However, due to their construction and location, they may also be potential source areas where introduction of chemical compounds (contaminants) may have inadvertently occurred. Chemical compounds may have entered the water supply wells by surface spillage on the floors. Additionally, the building area itself may be a potential source area due to interior underground dry crock(s), concrete vaults, sumps, cracks in the flooring, and waste lines that were located in and below the concrete flooring.

4.30 SUBSURFACE SOIL EXPLORATION ANALYTICAL RESULTS

Forty-one (41) subsurface soil samples were selected from the soil samples collected during the RI. Thirty-five (35) subsurface soil samples were collected from the split spoon samples collected during the test boring and monitoring well installations. Six (6) subsurface soil samples were collected from the test pit explorations (Figure No. 3). The subsurface soil analytical results are presented in Appendix G.

4.31 Volatile Organic Compounds

The analysis for VOCs was run on 34 subsurface soil samples recovered from various boring and test pit locations. The validated laboratory analytical results are presented in Appendix G.

4.31.1 Halogenated Aliphatic Hydrocarbons

Halogenated Aliphatic Hydrocarbons were detected above the contract limits at 20 of 34 soil samples (14 of 24 site locations) at the site. Some of the more frequently detected compounds include trichloroethene; 1,1,1-Trichloroethane (1,1,1 TCA); 1,2-Dichloroethene (1,2 DCE [Total]); Tetrachloroethene (PCE); 1,1-Dichloroethane (1,1 DCA); and Methylene Chloride (MC). Concentrations for these compounds ranged as follows:

Compound	Range/Location
TCE	3J ppb (SB-8, 8-10 feet) to 1500 ppb (OW-7S, 28-30 feet)
1,1,1 TCA	2J ppb (SB-8, 8-10 feet) to 210 ppb (OW-7S, 8-10 feet)
1,2 DCE (Total)	5J ppb (SB-8, 8-10 feet) to 910J ppb (OW-6S, 20-22 feet)
PCE	4J ppb (OW-7S, 8-10 feet) to 280J ppb (OW-6S, 20-22 feet)
1,1 DCA	2J ppb (OW-8S, 6-12 feet) to 22 ppb (OW-7S, 8-10 feet)
Chloroform	5J ppb (TP-1) to 6J ppb (TP-3)
MC	5J ppb (OW-6S, 10-12 feet and OW-7R, 40-42 feet) to 270J ppb (OW-2S, 34-36 feet).

The spatial distribution of detectable Halogenated Aliphatic compounds in the subsurface soil samples indicates that these compounds are generally found in soil samples along the southern property line (in the vicinity of the former drum storage area), at the southwest corner of the site, and also adjacent to the west side of the SOH building (Figure No. 13 - Frequently Detected Halogenated Aliphatic Hydrocarbons in Subsurface Soils).

4.31.2 Aromatic Hydrocarbons

Coal tar-derived solvents are called aromatics, a name derived from aroma, meaning pleasant odor. This classification has served to characterize coal tar hydrocarbon solvents. Aromatic Hydrocarbons were detected above the contract limits in 4 of 34 soil samples (4 of 24 site locations) at the site. The compounds detected are Benzene, Ethylbenzene, Toluene and Xylene.

Compound	Range/Location
Benzene	110J ppb (OW-4R, 42-44 feet)
Ethyl Benzene	7J ppb (OW-4R, 42-44 feet)
Xylene	2J ppb (TP-2), 11 ppb (OW-4R, 42-44 feet), and 360J ppb (OW-2S, 34-36 feet)
Toluene	4J ppb (OW-7S, 8-10 feet), 21 ppb (OW-4R, 42-44 feet) and 600J ppb (OW-2S, 34-36 feet).

The spatial distribution of the Aromatic Hydrocarbons in the subsurface soil samples indicates that these compounds generally appear to be present in soils at the southwest and southeast corners of the site. However, these compounds were also detected in TP-2, located in the northwest section of the site and in OW-7S that is located at the center of the site. However, the concentrations from samples at these locations were lower when compared to concentrations from subsurface soil samples recovered from the southwest and southeast corners of the site.

4.31.3 Halogenated Aromatic Hydrocarbons

Halogenated Aromatic Hydrocarbons were detected above the contract limits in 2 of 34 subsurface soil samples (2 of 24 site locations) at the site. Chlorobenzene was detected in the sample from TP-1 at a concentration of 4J ppb and in the sample from TP-2 at a concentration of 3J ppb. Apparent spatial distribution trends were not identified in the subsurface soil samples for Halogenated Aromatic Hydrocarbons.

4.32 Semi Volatile Organic Compounds

The analyses for semi-volatile organic compounds were performed on 35 of the 41 subsurface soil samples that were collected concurrently with the volatile organic compound samples.

4.32.1 Polynuclear Aromatic Hydrocarbons (PAH)

Twelve (12) Polynuclear Aromatic Hydrocarbons (PAH) were detected above the contract limits in 9 of 35 subsurface soil samples (12 of 24 site locations) at the site. Some of the compounds detected in the subsurface soil samples are: Benzo (a) Anthracene, Chrysene, Benzo (a) Pyrene and Dibenz (a,h) Anthracene. Concentrations of these compounds ranged as follows:

Compound	Range/Location
Benzo (a) Anthracene	85J ppb (OW-6S, 10-12 feet) to 280J ppb (OW-6S, 2-4 feet)
Chrysene	20J ppb (OW-2S, 34-36 feet) to 440 ppb (OW-6S, 2-4 feet)
Benzo (a) Pyrene	29J ppb (TP-6) to 360 ppb (SB-4, 0-2 feet)
Dibenz (a,h) Anthracene	23J ppb (OW-6S, 10-12 feet) to 72J ppb (OW-6S, 2-4 feet)

The spatial distribution of the above polynuclear aromatic hydrocarbons in the subsurface soil samples indicates that these compounds appear to be present along the southeastern property line and in the northeastern area of the site. However, the concentrations in samples from the northeastern area are low when compared to those detected in samples from southeastern property line.

4.32.2 Metals & Cyanide

The analyses for metals were conducted on 34 of the 41 subsurface soil samples that were collected. Metals were detected above the contract limits in 34 of 34 subsurface soil samples (24 of 24 site locations) collected during the RI. Some of the more frequently detected metals include: zinc, lead, nickel, copper, chromium, and cadmium. These metals are also commonly used at metal finishing facilities and some of these metals were identified in spill events at the SOH site. Cyanide was detected above the contract limits in 1 of 34 subsurface soil samples (1 of 24 site locations). Cyanide was detected in subsurface soil sample OW-6S, 0-2 feet at a concentration of 1.6 ppm. Concentrations of the frequently detected metals ranged as follows:

Metal	Range/Location
zinc	16.9 ppm (OW-1R, 22-23 feet) to 143 ppm (OW-6S, 10-12 feet)
lead	2 ppm (SB-17, 16-18 feet) to 57.6 ppm (SB-4, 0-2 feet)
nickel	3.1 ppm (SB-17, 16-18 feet) to 106 ppm (SB-4, 0-2 feet)
copper	3.3 ppm (OW-4R, 42-44 feet) to 30.8 ppm (SB-4, 0-2 feet)
chromium	2.8 ppm (OW-1R, 22-23 feet) to 30.3 ppm (OW-4S, 8-10 feet)
cadmium	0.7 ppm (TP-6) to 1.7 ppm (TP-3) and;
cyanide	1.6 ppm (OW-6S, 0-2 feet).

The spatial distribution of metals indicates that they are generally present throughout the subsurface soils on the site.

4.40 SURFACE WATER SEDIMENT ANALYTICAL RESULTS

Two (2) surface water sediment samples were collected during the RI as shown on Figure No. 3. Sediment samples SED-2 and SED-3 were collected at corresponding surface water sample locations SW-2 and SW-3 which are located in the western swale. Samples identified as SED-1 and SED-4 are more properly classified as surface soil samples and will be discussed in Section 4.60. Table No. 11 presents the analytical results for sediment samples SED-2 and SED-3. The analytical results for the renamed surface soils samples SED-1 and SED-4 are presented in Table No. 13.

4.41 Volatile Organic Compounds

4.41.1 Halogenated Aliphatic Hydrocarbons

Halogenated Aliphatic Hydrocarbons were detected above the contract limits at 2 of 2 surface water sediment samples (2 of 2 site locations) at the site. Some of the more frequently detected compounds include 1,1,1-Trichloroethane (TCA); Tetrachloroethene (PCE); MC and 1,1-Dichloroethane (1,1-DCA). TCA was detected in SED-3 at 7J ppb. PCE was detected in SED-3 at 3J ppb. MC was detected at 3J ppb in SED-3 and 7J ppb in SED-2. In SED-3; 1,1-DCA was detected at 6J ppb.

The spatial distribution of these compounds in the surface water sediment samples indicates that Halogenated Aliphatic Hydrocarbons are generally present in the surface water sediment samples collected from the surface water swale located between the site and Pullman Manufacturing and in the drainage pathway located between the site and Ruby Gordon.

4.41.2 Aromatic Hydrocarbons

Aromatic Hydrocarbons were not detected above the contract limits in the surface water sediment samples at the site.

4.41.3 Halogenated Aromatic Hydrocarbons

Halogenated Aromatic Hydrocarbons were not detected above the contract limits in the surface water sediment samples at the site.

4.42 Semi Volatile Organic Compounds

4.42.1 Polynuclear Aromatic Hydrocarbons

Polynuclear Aromatic Hydrocarbons were detected above the contract limits in both surface water sediment samples taken from the drainage swale located west of the western property line of SOH (2 of 2 site locations). Frequently detected PAH compounds include Benzo (a) Anthracene, Chrysene, Benzo (a) Pyrene and Dibenz (a,h) Anthracene. Concentrations of these compounds ranged as follows:

Compound	Range/Location
Benzo (a) Anthracene	260J ppb (SED-2) to 15000D ppb (SED-3)
Chrysene	450J ppb (SED-2) to 18000 ppb (SED-3)
Benzo (a) Pyrene	750 ppb (SED-2) to 17000D ppb (SED-3)
Dibenz (a,h) Anthracene	140J ppb (SED-2) to 6900 ppb (SED-3)

4.43 Metals & Cyanide

Metals were detected above the contract limits in both surface water sediment samples collected during the RI (2 of 2 site locations). Some of the more frequently detected metals include: zinc, lead, nickel, copper, chromium, and cadmium. Cyanide was not detected above the contract limits in the surface water sediment samples. Concentrations of the frequently detected metals are as follows:

Metal	Range/Location
zinc	442 ppm (SED-2) to 844 ppm (SED-3)
lead	41.2 ppm (SED-2) to 61.5 ppm (SED-3)
nickel	11.2 ppm (SED-3) to 26.2 ppm (SED-2)
copper	17.1 ppm (SED-2) to 68.9 ppm (SED-3)
chromium	14.1 ppm (SED-3) to 35.5 ppm (SED-2)
cadmium	1.6 ppm (SED-3) and;
cyanide	not detected

The spatial distribution of metals indicates that metals are generally present in the surface water sediments samples collected at the site.

4.50 SURFACE WATER ANALYTICAL RESULTS

Three (3) off-site surface water samples SW-1, SW-2, and SW-3 were collected during the RI as shown on Figure No. 3. Sample SW-1 was collected from the western off-site drainage swale were the swale turns to the west and is considered downgradient of the SOH site. Samples SW-2 and SW-3 were collected from the western swale near surface sediment samples locations SED-2 and SED-3, respectively (Figure No. 3). These samples were collected within the limits of the drainage swale (off-site) adjacent to the west side of the SOH property line (Figure No. 3). Surface water analytical results are presented in Table No. 12.

4.51 Volatile Organic Compounds

4.51.1 Halogenated Aliphatic Hydrocarbons

Halogenated Aliphatic Hydrocarbons were not detected above the contract limits in the surface water samples.

4.51.2 Aromatic Hydrocarbons

Aromatic Hydrocarbons were not detected above the contract limits in the surface water samples.

4.51.3 Halogenated Aromatic Hydrocarbons

Halogenated Aromatic Hydrocarbons were not detected above the contract limits in the surface water samples.

4.52 Semi Volatile Organic Compounds

4.52.1 Polynuclear Aromatic Hydrocarbons

PAHs were detected above the contract limits at 1 of 3 surface water sample locations at the off-site drainage swale. The compounds detected were Fluoranthene and Pyrene. Fluoranthene was detected in SW-1 at 1J ppb. Pyrene was detected in SW-1 at 1J ppb. Apparent trends in the spatial distribution of Polynuclear Aromatic Hydrocarbons in the surface water samples was not apparent in the off-site drainage swale based on the analytical results.

4.53 Metals & Cyanide

Metals were detected above the contract limits in 3 of 3 off-site surface water samples (3 of 3 site locations) collected during the RI. Some of the more frequently detected metals include: zinc, lead, copper, and chromium. Cyanide was not detected in these samples. The concentrations of these metals ranged as follows:

Metal	Range/Location
zinc	30.6 ppb (SW-1) to 80.1 ppb (SW-2)
lead	7.4 ppb (SW-1) to 8.2 ppb (SW-3)
copper	2.8 ppb (SW-2) to 4.1 ppb (SW-3)
chromium	2.2 ppb (SW-3)
cyanide	not detected

The spatial distribution of metals indicates that metals are generally present in the surface water samples that were collected from the adjacent, off-site drainage swale along the west side of the SOH site.

4.60 SURFACE SOIL ANALYTICAL RESULTS

Eight (8) surface soil samples were collected during the RI at the approximate locations shown on Figure No. 3. These samples were collected from depths which ranged from 0.0 feet to 0.5 feet Surface soil samples SS-1, SS-2 and SS-3 were collected to evaluate spills which may have impacted the surface soils at the SOH site. Surface soil samples SS-4, SS-5 and SS-6 were collected off-site to represent background concentrations. Surface soil samples SED-1 (located in the off-site drainage swale) and SED-4 were collected from proposed sediment sampling locations (Figure No. 3). The results of the surface soil analytical laboratory analytical results are presented in Table No. 9.

4.61 Volatile Organic Compounds

4.61.1 Halogenated Aliphatic Hydrocarbons

One (1) Halogenated Aliphatic Hydrocarbon was detected above the contract limits in 4 of 8 surface soil sample locations at the site. Methylene Chloride was detected in sample SS-1 at a concentration of 9J,N ppb, sample SS-3 at a concentration of 30 ppb, sample SED-1 at a concentration of 9J ppb and sample SED-4 at a concentration of 7J ppb. It was not possible to identify an apparent trend in the spatial distribution of Halogenated Aliphatic Hydrocarbons in the surface soil samples at the site based on the analytical results.

4.61.2 Aromatic Hydrocarbons

One (1) Aromatic Hydrocarbon was detected above the contract limits in 1 of 8 surface soil sample locations at the site. The compound detected was Toluene in sample SS-1 at a concentration of 4J ppb.

4.61.3 Halogenated Aromatic Hydrocarbons

One (1) Halogenated Aromatic Hydrocarbon was detected above the contract limits in 3 of 8 surface soil sample locations at the site. The compound detected was Chlorobenzene in sample SS-1 at a concentration of 25 ppb, sample SS-6 at a concentration of 4J ppb and in sample SED-4 at a concentration of 1J ppb. It was not possible to identify an apparent trend in the spatial distribution of Halogenated Aliphatic Hydrocarbons in the surface soil samples at the site based on the analytical results.

4.62 Semi Volatile Organic Compounds

4.62.1 Polynuclear Aromatic Hydrocarbons

PAHs were detected above the contract limits in 8 of 8 surface soil sample locations at the site. Some of the frequently detected compounds include Benzo (a) Anthracene, Chrysene, Benzo (a) Pyrene and Dibenz (a,h) Anthracene. The concentration of these compounds ranged as follows:

Compound	Range/Location
Benzo (a) Anthracene	49J ppb (SED-1) to 54000D ppb (SS-1)
Chrysene	86J ppb (SED-1) to 79000D ppb (SS-1)
Benzo (a) Pyrene	64J ppb (SED-1) to 58000D ppb (SS-1)
Dibenz (a,h) Anthracene	180J ppb (SED-4) to 18000JD ppb (SS-1)

PAHs appeared to be distributed generally in the surface soil samples collected and analyzed throughout the site.

4.63 Metals & Cyanide

Metals were detected above the contract limits in 8 of 8 surface soil samples collected during the RI. Some of the more frequently detected metals include: zinc, lead, nickel, copper, chromium, and cadmium. Cyanide was detected in 3 of 8 surface soil samples above the contract limits. Cyanide was detected in sample SS-2 at a concentration of 2.3 ppm; sample SS-3 at a concentration of 40.5 ppm and sample SS-5 at a concentration of 1.3 ppm. Concentrations of other frequently detected metals are as follows:

Metal	Range/Location
zinc	45.6 ppm (SED-1) to 2280 ppm (SS-3)
lead	15.8 ppm (SED-4) to 529 ppm (SS-3)
nickel	11.4 ppm (SS-6) to 5850 ppm (SS-3)
copper	14.2 ppm (SED-1) to 4710 ppm (SS-3)
chromium	13.8 ppm (SS-6) to 1570 ppm (SS-2)
cadmium	0.85 ppm (SED-4) to 84.9 ppm (SS-3) and;
cyanide	1.3 ppm (SS-5) to 40.5 ppm (SS-3).

The spatial distribution of metals indicates that metals are generally present throughout the surface soil samples collected and analyzed from the site.

4.70 ON-SITE SUMP AND CATCH BASIN ANALYTICAL RESULTS

Four (4) on-site sump and catch basin samples were collected during the RI at the approximate locations shown on Figure No. 3. On-site sump and catch basin samples NSM-1 (catch basin) and NSM-4 (sump) were aqueous. Samples NSM-2 (catch basin) and NSM-3 (catch basin) consist of soil and sediment. The results of the analytical laboratory testing are presented in Table Nos. 13a and 13b.

4.71 Volatile Organic Compounds

4.71.1 Halogenated Aliphatic Hydrocarbons

Halogenated Aliphatic Hydrocarbons were detected above the contract limits at 3 of 4 on-site sump and catch basin samples (3 of 4 site locations) at the site. Some of the more frequently detected compounds include trichloroethene, 1,1,1-Trichloroethane (1,1,1 TCA), 1,2-Dichloroethene (1,2 DCE(Total)), Tetrachloroethene (PCE), and 1,1-Dichloroethane (1,1 DCA).

Compound	Range/Location
1,2 DCE (Total)	17000J (NSM-2)
1,1 DCA	25000J ppb (NSM-2), 72000E ppb (NSM-4)
PCE	350J ppb (NSM-3), 91000J ppb (NSM-2)
TCE	8900J ppb (NSM-2)
1,1,1 TCA	6500J ppb (NSM-4), 8300 ppb (NSM-3) and 2000000D ppb (NSM-2).

Review of the spatial distribution of detectable Halogenated Aliphatic Hydrocarbons indicates that the catch-basins and/or sump samples along the north and east walls of the SOH building generally contained Halogenated Aliphatic Hydrocarbons.

4.71.2 Aromatic Hydrocarbons

Aromatic Hydrocarbons were detected above the contract limits in 3 of 4 on-site sump and catch basin samples (3 of 4 site locations) at the site. The compounds detected were:

Compound	Range/Location
Toluene	580J ppb (NSM-3), 5800J,N ppb (NSM-4), 110000J ppb (NSM-2)
Xylene	490J ppb (NSM-3), 15000N ppb (NSM-4), 46000JD ppb (NSM-2)
Ethylbenzene	2700J,N ppb (NSM-4), 9200J ppb (NSM-2).

Review of the spatial distribution of detectable Aromatic Hydrocarbons indicates that the catch-basins and or sump samples along the north and east walls of the SOH building generally contain Aromatic Hydrocarbons.

4.71.3 Halogenated Aromatic Hydrocarbons

One (1) Halogenated Aromatic Hydrocarbon was detected above the contract limits in 1 of 4 on-site sump and catch basin samples at the site. The compound detected was Chlorobenzene in sample NSM-2 at 8600 ppb. Apparent trends in the spatial distribution of Polynuclear Aromatic Hydrocarbons in the on-site sump and catch basin water samples was not apparent based on the analytical results.

4.72. Semi Volatile Organic Compounds

4.72.1 Polynuclear Aromatic Hydrocarbons

PAHs were detected above the contract limits in 3 of 4 on-site sump and catch basin samples (3 of 4 site locations). Seventeen (17) compounds were detected in the on-site sump and catch basin samples. The prevailing compounds include Benzo (a)

Anthracene, Chrysene, Benzo (a) Pyrene and Dibenz (a,h) Anthracene. Concentrations for these compounds ranged as follows:

Compound	Range/Location
Benzo (a) Anthracene	1J ppb (NSM-1) to 5100JD ppb (NSM-2)
Chrysene	3J ppb (NSM-1) to 21000 ppb (NSM-2)
Benzo (a) Pyrene	3J ppb (NSM-1) to 4200JD ppb (NSM-2)
Dibenz (a,h) Anthracene	750 ppb (NSM-3) to 3100 ppb (NSM-2)

Polynuclear Aromatic Hydrocarbons appeared to be generally found in on-site sump and catch basin samples NSM-1, NSM-2 and NSM-3 based on the analytical results. Review of the spatial distribution of detectable Polynuclear Aromatic Hydrocarbons indicated that the catchbasins and or sump samples along the south and west walls of the SOH building generally contain Polynuclear Aromatic Hydrocarbons.

4.73 Metals & Cyanide

Metals were detected above the contract limits in 4 of 4 on-site sump and catch basin samples (4 of 4 site locations) collected during the RI. Some of the more frequently detected metals include: zinc, lad, nickel, copper, chromium, and cadmium. Cyanide was detected above the contract limits in 1 of 4 on-site sump and catch basin samples. Concentrations of the frequently detected compounds are as follows:

Metal	Range/Location
Zinc	
aqueous	7610 ppb (NSM-1) to 63500 ppb (NSM-4)
sediment	256 ppm (NSM-3) to 2210 ppm (NSM-2)
lead	
aqueous	457 ppb (NSM-1) to 696 ppb (NSM-4)
sediment	253 ppm (NSM-2) to 381 ppm (NSM-3)
nickel	
aqueous	840 ppb (NSM-1) to 56700 ppb (NSM-4)
sediment	233 ppm (NSM-3) to 983 ppm (NSM-2)
Copper	
aqueous	261 ppb (NSM-1) to 3580 ppb (NSM-4)
sediment	90.8 ppm (NSM-3) to 355 ppm (NSM-2)
Chromium	
aqueous	454 ppb (NSM-1) to 4940 ppb (NSM-4)
sediment	165 ppm (NSM-3) to 714 ppm (NSM-2)
Cadmium	
aqueous	34.7 ppb (NSM-1) to 4430 ppb (NSM-4)
sediment	4.2 ppm (NSM-3) to 63.3 ppm (NSM-2)
Cyanide	
aqueous	30 ppb (NSM-1)
sediment	not detected

The spatial distribution of metals indicates that metals are generally found in on-site sump and catch basin samples collected and analyzed. Cyanide appears to be limited to sample NSM-1 collected from within the catch basin.

4.80 OVERBURDEN GROUNDWATER ANALYTICAL RESULTS

The concentrations of compounds in these samples represent groundwater quality in the overburden groundwater at the site. Overburden groundwater samples were collected from 16 locations as shown on Figure No. 3. The samples were collected during two sampling events and have been distinguished as Round 1 (July 1995) and Round 2 (October 1995). The results of the independent validated analytical laboratory analytical results are presented in Table Nos. 14a and 14c.

4.81 Volatile Organic Compounds

4.81.1 Halogenated Aliphatic Hydrocarbons

Halogenated Aliphatic Hydrocarbons were detected at 13 of 16 overburden groundwater sample locations at the site. Some of the more frequently detected compounds include Vinyl Chloride (VC), trichloroethene, 1,2-Dichloroethene (1,2 DCE(Total)), 1,1,1-Trichloroethane (1,1,1 TCA), 1,1-Dichloroethane (1,1 DCA), 1,1-Dichloroethene (1,1 DCE), Tetrachloroethene (PCE), and MC. Concentrations of the frequently detected compounds are as follows:

Compound	Range/Location/Round
VC	2.7J ppb (OW-11S/Round 1) to 11000D ppb (MW-5/Round 1)
TCE	1.4J ppb (OW-8S/Round 1) to 140000D ppb (OW-7S/Round 1 and 2)
1,2 DCE (Total)	2.9J ppb (OW-8S/Round 1) to 10000JD ppb (MW-2/Round 1)
1,1,1 TCA	3.1J ppb (OW-8S/Round 1) to 24000D ppb (OW-6S/Round 1)
1,1 DCA	8.6J ppb (OW-11S/Round 1) to 10000D ppb (MW-2/Round 1)
1,1 DCE	3.6J ppb (OW-8S/Round 2) to 900JD ppb (OW-6S/Round 1)
PCE	3.3J ppb (OW-8S/Round 1) to 8800D ppb (MW-5/Round 1)
MC	3.9J ppb (MW-3 Round 2) to 350J ppb (MW-2 Round 2)

The spatial distribution of frequently detected Halogenated Aliphatic Hydrocarbons indicates that these compounds are generally distributed throughout the overburden groundwater samples, as shown on Figure No. 14 - Groundwater Frequently Detected Halogenated Aliphatic Hydrocarbons. Halogenated Aliphatic Hydrocarbons were not detected in overburden groundwater monitoring well samples OW-2S, OW-9S, and OW-LS.

The locations are shown on Figure No. 14 and are summarized below:

- Monitoring well OW-2S at the southeast corner of the site;
- Monitoring well OW-9S located at the Pullman Manufacturing property west of the west swale; and
- Monitoring well OW-LS Leichtner Studio property east of the east wall of the SOH building.

4.81.2 Aromatic Hydrocarbons

Aromatic Hydrocarbons were not detected above the contract limits in the overburden groundwater samples.

4.81.3 Halogenated Aromatic Hydrocarbons

Halogenated Aromatic Hydrocarbons were not detected above the contract limits in the overburden groundwater samples.

4.82 Semi Volatile Organic Compounds

Round 1 overburden groundwater samples were analyzed for Semi Volatile Organic Compounds. After a review of the Round 1 data, OW-7S was the only well sampled for semi-VOCs in Round 2.

4.82.1 Polynuclear Aromatic Hydrocarbons

PAHs were not detected above the contract limits for Round 1 or Round 2 in the overburden groundwater samples.

4.83 Metals & Cyanide

Metals were detected in 16 of 16 overburden groundwater samples collected during the RI in Round 1 and Round 2. Some of the more frequently detected metals include zinc, lead, nickel, copper, chromium and cadmium. Concentrations of the more frequently detected metals ranged as follows:

Metal	Range/Location/Round
zinc	9.6B ppb (OW-6S/Round 2) to 169J ppb (OW-10S/Round 1)
lead	1.2BJ ppb (OW-3S/Round 2) to 61.8S ppb (OW-LS/Round 2)
nickel	15.6B ppb (MW-5/Round 1) to 169 ppb (OW-5S/Round 1)
copper	2.6B ppb (B101-OW/Round 1) to 56.9 ppb (OW-10S/Round 1)
chromium	2.0B ppb (OW-7S/Round 2) to 39.1 ppb (OW-5S/Round 1)
cadmium	2.0B ppb (OW-1S/Round 2) to 5.5 ppb (OW-7S/Round 1)
cyanide	11.3NJ ppb (OW-2S/Round 1) to 11.5NJ ppb (OW-1S/Round 1)

The spatial distribution of the metals zinc, lead, nickel, copper, chromium, and cadmium indicates that these metals appear to be generally found in the overburden groundwater from site monitoring wells as shown on Figure No. 15 - Groundwater Frequently Detected Metals. Cadmium appears to be generally found in groundwater from overburden monitoring well samples located in the south central portion of the site. Mercury (Hg) was detected in the groundwater sample from monitoring well OW-11S which is located southwest of the Ruby-Gordon building.

4.90 BEDROCK GROUNDWATER ANALYTICAL RESULTS

Groundwater samples were collected from the five wells installed within the top of Bedrock (Figure No. 3). The existing SOH interior bedrock wells are discussed in Section 4.10. The results of the analytical laboratory testing are presented in Appendix I.

4.91 Volatile Organic Compounds

4.91.1 Halogenated Aliphatic Hydrocarbons

Halogenated Aliphatic Hydrocarbons were detected at 5 of 5 bedrock groundwater samples (5 of 5 site locations) at the site. Some of the more frequently detected compounds include trichloroethene, 1,2-Dichloroethene (1,2 DCE(Total)), 1,1,1-Trichloroethane (1,1,1 TCA), 1,1-Dichloroethane (1,1 DCA), 1,1-Dichloroethene (1,1 DCE), Tetrachloroethene (PCE), and Methylene Chloride (MC) and Vinyl Chloride (VC). Concentrations of these compounds ranged as follows:

Compound	Range/Location/Round
TCE	1.5J ppb (OW-2R/Round 2) to 10,000D ppb (OW-7R/Round 1)
1,2 DCE(Total)	3.8J ppb (OW-2R/Round 1) to 9000D ppb (OW-7R/Round 1)
1,1,1 TCA	110 ppb (OW-7R/Round 2) to 170J,D ppb (OW-7R/Round 1)
1,1 DCA	1.5J ppb (OW-2R/Round 2) to 5900D ppb (OW-7R/Round 1)
1,1 DCE	130 ppb (OW-7R/Round 2) to 250JD ppb (OW-7R/Round 1)
PCE	4J ppb (OW-7R/Round 2) to 66J,D ppb (OW-7R/Round 1)
MC	7J ppb (OW-3R/Round 2) to 5500 BD ppb (OW-7R/Round 1)
VC	24 ppb (OW-7R/Round 2)

The spatial distribution of frequently detected Halogenated Aliphatic Hydrocarbons in the bedrock groundwater samples (Figure No. 14) indicates that these compounds generally appear to be detected in groundwater samples from monitoring wells located in the center and western portions of the site based on the analytical results. Detectable concentrations of these compounds were also found in groundwater samples from monitoring wells OW-1R, OW-2R, OW-3R and OW-4R around the perimeter of the site. However, the noted concentrations at monitoring wells OW-1R, OW-2R, OW-3R and OW-4R were lower than the results for samples collected from the monitoring wells located in the center of the site.

4.91.2 Aromatic Hydrocarbons

Aromatic Hydrocarbons were not detected above the contract limits for groundwater samples analyzed in Round 1 from monitoring wells installed in bedrock. Aromatic Hydrocarbons were detected in 1 of 5 of the groundwater samples collected from monitoring wells installed bedrock in Round 2. The compounds detected were Benzene, Ethylbenzene, Xylenes (Total) and Toluene. Benzene was detected in OW-7R at a concentration of 3J ppb. Ethylbenzene was detected in the groundwater sample from monitoring well OW-7R at a concentration of 2J ppb. Xylenes (Total) were detected in the groundwater sample from monitoring well OW-7R at a concentration of 9J ppb. Toluene was detected in the groundwater sample from monitoring well OW-7R at a concentration of 8J ppb.

The spatial distribution of frequently detected Aromatic Hydrocarbons in the bedrock groundwater samples indicates that these compounds generally appear to be located in the monitoring wells located near the center of the site based on the analytical results.

4.91.3 Halogenated Aromatic Hydrocarbons

Halogenated Aromatic Hydrocarbons were not detected above the contract limits for Round 1 or Round 2 in the bedrock groundwater samples.

4.92 Semi Volatile Organic Compounds

Round 1 bedrock groundwater samples were analyzed for Semi Volatile Organic compounds. Groundwater samples from monitoring wells OW-7S and OW-7R were the only semi-volatile groundwater samples collected during the Round 2 event based on a review of the Round 1 analytical results.

4.92.1 Polynuclear Aromatic Hydrocarbons

PAHs were not detected above the contract limits for in the bedrock groundwater samples.

4.93 Metals & Cyanide

Metals were detected in 5 of 5 top of bedrock groundwater samples collected during the RI. Some of the more frequently detected metals include: zinc, lead, nickel, copper, chromium and cyanide. Cyanide was not detected above the contract limits in the 5 top of bedrock groundwater samples. Cyanide was not analyzed for in Round 2 based on a review of the analytical data from Round 1. The bedrock groundwater analytical results are presented in Appendix G. Concentrations of frequently detected metals ranged as follows:

Metal	Range/Location/Round
zinc	20.7 ppb (OW-4R/Round 2) to 46.3 ppb (OW-7R/Round 2)
lead	2.2BNJ ppb (OW-2R/Round 1) to 9.3NJ ppb (OW-1R/Round 2)
nickel	19.5B ppb (OW-1R/Round 2) to 66.3 ppb (OW-7R/Round 1)
copper	4.5B ppb (OW-4R/Round 2) to 65.9 ppb (OW-3R/Round 1)
chromium	2.5B ppb (OW-4R/Round 2) to 44.7 ppb (OW-2R/Round 1)
cadmium	2.7BJ ppb (OW-1R/Round 1) to 3.3BJ ppb (OW-2R/Round 2)
cyanide	no detection

The spatial distribution of frequently detected metals in the bedrock indicates that the metals are generally detected in the groundwater from bedrock well samples throughout the site (Figure No. 15).

4.100 SOH INTERIOR BEDROCK WELLS GROUNDWATER ANALYTICAL RESULTS

The two (2) bedrock wells located in the interior SOH building were sampled during the RI (Figure No. 3). These interior wells (SOH-IW-1R and SOH-IW-2R) were reportedly used in the past as cooling water supply wells for the facility processes at the site. However, based on conversations with Mr. Dick Galliotti, Plant Manager for Metalade, Inc., it is his understanding that these wells have not been used since 1992. These wells contain fixed downhole pump equipment and discharge lines that were present and intact when the wells were purged and sampled. It is reported that the pump and discharge lines are wedged or stuck in well SOH-IW-2R, such that they cannot be readily removed, and thus, this well is not operational. It is noted that SOH-IW-1R is still operable, although it is not used. The results of the analytical laboratory results are presented in Appendix G.

4.101 Volatile Organic Compounds

4.101.1 Halogenated Aliphatic Hydrocarbons

Halogenated Aliphatic Hydrocarbons were detected at both interior bedrock well groundwater sample locations at the site (Rounds 1 and 2). Some of the more frequently detected compounds (Figure No. 14) include: VC; trichloroethene; 1,2-DCE (Total); 1,1-DCA; 1,1-DCE; and 1,1,1-TCA. Concentrations of the above compounds are as follows:

Compound	Range/Location/Round
VC	8.8J ppb (IW-2R/Round 2) to 110D ppb (IW-1R/Round 1)
TCE	19 ppb (IW-2R/Round 2) to 150 ppb (IW-1R/Round 2)
1,2 DCE(Total)	280D ppb (IW-2R/Round 2) to 6700D ppb (IW--2R/Round 1)
1,1 DCA	21J,D ppb (IW-1R/Round 1) to 96J ppb (IW-1R/Round 2)
1,1 DCE	5J ppb (IW-2R/Round 2)
1,1,1 TCA	110 ppb (IW-2R/Round 2)

The spatial distribution of Halogenated Aliphatic Hydrocarbons detected in two rounds of laboratory analytical results indicates that the compounds present in these wells are generally the same suite of chlorinated compounds detected in the top of bedrock monitoring wells at the SOH site.

4.101.2 Aromatic Hydrocarbons

Aromatic Hydrocarbons were not detected above the contract limits for Round 1 in the interior well groundwater samples. The compound Toluene was detected in sample IW-2R at a concentration of 1.5J ppb for Round 2.

4.101.3 Halogenated Aromatic Hydrocarbons

Halogenated Aromatic Hydrocarbons were not detected above the contract limits for Round 1 and Round 2 in the interior bedrock well groundwater samples.

4.102 Semi Volatile Organic Compounds

Semi Volatile Aromatic Hydrocarbons were not detected above the contract limits for Round 1 in the interior bedrock well groundwater samples. Semi Volatile Organic Compounds were not analyzed for in Round 2 for the interior wells based on a review of the Round 1 analytical data.

4.103 Metals & Cyanide

Metals were detected in 2 of 2 interior bedrock well groundwater samples (2 of 2 site locations) collected during the RI. Some of the more frequently detected metals (Figure No. 15) include: zinc, lead, nickel, copper, chromium, and cadmium. Cyanide was detected in 1 of 2 interior bedrock well groundwater samples above the contract limits. Cyanide was detected in the groundwater sample from well SOH-IW-1R at a concentration of 16.6 ppb. Cyanide was not analyzed in Round 2 for the interior wells based on a review of the Round 1 analytical data.

Metal	Range/Location/Round
zinc	955 ppb (IW-2R/Round 2) to 4280 ppb (IW-1R/Round 2)
lead	35.4SNJ ppb (IW-2R/Round 1) to 78.1NJ ppb (IW-1R/Round 1)
nickel	1270 ppb (IW-1R/Round 1) to 7770 ppb (IW-2R/Round 1)
copper	280 ppb (IW-2R/Round 1) to 708 ppb (IW-1R/Round 2)
chromium	110 ppb (IW-2R/Round 1) to 4380 ppb (IW-1R/Round 2)
cadmium	51.4 ppb (IW-2R/Round 1) to 797 ppb (IW-1R/Round 2)
cyanide	No detection

The metals detected in the groundwater from interior bedrock well samples are generally similar to the metals detected in the top of bedrock wells and also detected in the overburden monitoring wells at the site.

4.200 RUBY-GORDON BASEMENT SUMP ANALYTICAL RESULTS

Groundwater samples were collected from the three (3) Ruby-Gordon basement sumps (Figure No. 3). These samples were collected on October 27, 1994 during Round 1 and on October 5, 1995 during the Round 2 groundwater sampling event. The analytical laboratory results are presented in Appendix G.

4.201 Volatile Organic Compounds

4.201.1 Halogenated Aliphatic Hydrocarbons

Halogenated Aliphatic Hydrocarbons were detected at 3 of 3 Ruby-Gordon groundwater basement sump sample locations at the site. Some of the more frequently detected compounds include: trichloroethene; 1,1,1-TCA; 1,2-DCE (Total); PCE; 1,1 DCA; MC; and VC. Concentrations of the above compounds ranged as follows:

Compound	Range/Location/Round
TCE	4.4J ppb (Sump-1/Round 2) to 550D ppb (Sump-2/Event 1)
1,1,1 TCA	15 ppb (Sump-1/Round 2) to 3200D ppb (Sump-2/Round 2)
1,2 DCE (Total)	5.2J ppb (Sump-1/Round 2) to 760D ppb (Sump-2/Round 2)
PCE	36J ppb (Sump-1/Event 1) to 180 ppb (Sump-2/Round 2)
1,1 DCA	26 ppb (Sump-1/Round 2) to 750D ppb (Sump-2/Round 2)
MC	4J ppb (Sump-1/Round 2) to 120J ppb (Sump-2/Round 2)
VC	15J ppb (Sump-3/Round 2) to 30 ppb (Sump-2/Round 2)

Detectable Halogenated Aliphatic compounds in the Ruby-Gordon groundwater basement sump samples generally include the same suite of compounds detected in the overburden groundwater well samples on the SOH site.

4.201.2 Aromatic Hydrocarbons

Aromatic Hydrocarbons were not detected in the groundwater basement sump samples above the contract limits for samples collected during an October 27, 1994 sampling event. Xylenes (Total) were detected in groundwater from the basement sample from Sump-1 at a concentration of 1.6J ppb as indicated by the Round 2 analytical results.

4.201.3 Halogenated Aromatic Hydrocarbons

Halogenated Aromatic Hydrocarbons were not detected in groundwater samples from the Ruby-Gordon basement sump samples above the contract limits based on the analytical October 27,1994 analytical results. Samples collected from the sumps during the Round 2 sampling event were not analyzed for Halogenated Aliphatic Hydrocarbons, based on a review of the previous analytical data.

4.202 Semi Volatile Organic Compounds

Semi-volatile organic compounds were analyzed for in the October 27, 1994 sampling event for the Ruby-Gordon sumps. After review of this data, the Ruby-Gordon sumps were not sampled for semi-volatile organic compounds in the October 1995 sampling event.

4.202.1 Polynuclear Aromatic Hydrocarbons

PAHs were detected in 1 of 3 Ruby-Gordon basement sump sample locations that are off-site. Twelve (12) compounds were detected, and some of the frequently detected compounds include: Benzo (a) Anthracene, Chrysene, Benzo (a) Pyrene and Dibenz (a,h) Anthracene. The concentration of Benzo (a) Anthracene in SUMP-2 was 3J ppb. The concentration of Chrysene in SUMP-2 was 4J ppb. The concentration of Benzo (a) Pyrene in SUMP-2 was 4J ppb. The concentration of Dibenz (a,h) Anthracene was 1J ppb in SUMP-2.

These PAH compounds detected in the groundwater from Ruby-Gordon basement Sump-2 include the same suite of compounds detected in subsurface soil samples recovered from OW-6S (0-2 feet, 2-4 feet and 10-12 feet). PAHs were not detected above the contract limits for Round 1 or Round 2 in the overburden groundwater samples.

4.203 Metals & Cyanide

Metals were detected in 3 of 3 Ruby-Gordon groundwater basement sump samples collected during the October 27, 1994 sampling round. Some of the frequently detected metals include zinc, lead, nickel, copper and chromium. Cyanide was not detected above the contract limits in the Ruby-Gordon basement sump samples.

Metals were not analyzed for in Round 2 based on a review of the October 27, 1994 analytical data. Concentrations of these compounds ranged as follows:

Metal	Range/Location
zinc	31.1 ppb (Sump-1) to 89 ppb (Sump-2)
lead	1.5NBJ ppb (Sump-1 and Sump-3) to 19.6J ppb (Sump-2)
nickel	13.2B ppb (Sump 3)
copper	5.1B ppb (Sump-1) to 59.4 ppb (Sump-3)
chromium	2.6B ppb (Sump-3) to 4.4B ppb (Sump-2)
cyanide	No detection

Review of the Ruby-Gordon basement sump samples analytical results indicates that metals are generally found in the Ruby-Gordon basement sump samples and they contain metals that were detected in the overburden and top of bedrock groundwater samples from wells at the SOH site.

5.00 CONTAMINANT FATE AND TRANSPORT

This Section discusses the mechanisms which may result in migration of contaminants at the site and the chemical behavioral characteristics of the compounds detected, including persistence of these chemical substances. This information is compared with the site specific data and observations to assist in determining the extent of migration that has occurred. The following Section is based on the understanding that current site environmental conditions are related to the historical site industrial processes, potential source areas, documented chemical spills (releases), site groundwater flow, underground utilities, and residual contaminants at the site.

Potential site source areas may be characterized as former drum storage areas and site spill locations, including potential source areas that may have resulted from a fire at the facility. Site construction activities during building additions and clearing debris after the facility fire may have moved affected materials or soils from their original source locations to other areas on-site. In addition, potential source areas may physically overlap due to the relatively small site size (3.8 acres).

5.10 POTENTIAL ROUTES OF MIGRATION

Natural mechanisms that may result in contaminant migration include: infiltration of surface water, groundwater migration, migration of possible DNAPL, surface water run-off, erosion and volatilization. Other physical (non-natural) migration mechanisms may include: on-site movement of site materials or soils during construction activities and migration pathways in and along underground utilities such as sanitary and storm sewers. The environmental impact resulting from these mechanisms may vary by source area location, type, and the specific site surface and subsurface conditions. Each of the identified potential routes of migration will be discussed below.

Infiltration of surface water (precipitation run-off) would be expected in areas at the site which are not covered by the limits of the facility building or the paved parking areas where the concrete slabs or pavement is not cracked. Surface water infiltration may cause water soluble compounds present in the unsaturated zone of the overburden soils to migrate vertically downward towards the groundwater table. In addition, infiltration recharges the groundwater, which may increase hydraulic gradients and subsequently, enhance migration via groundwater flow.

Groundwater migration at the site would be expected to provide both vertical and horizontal migration. Site contaminants may migrate with horizontal flow direction. Vertical migration of contaminants may leach into the saturated overburden from the overlying unsaturated zone of the overburden due to direct infiltration. Groundwater migration may provide a migration mechanism for horizontal migration of contaminants that are water soluble and that have lesser adsorbing characteristics at the site. Vertical overburden groundwater migration is likely to be relatively less significant due to the lower glacial till which acts as an acquitard and underlies the upper water bearing glacial till.

The potential for vertical migration was also noted at the site based on water level measurements made in the monitoring wells. A generally downward vertical gradient in the overburden groundwater was calculated based on a comparison of water level elevations measured, at five well clusters, in the overburden monitoring wells to water levels measured in the top of bedrock wells. The vertical gradient may allow contaminants to migrate from the overburden groundwater to the underlying bedrock groundwater system. However, the lower glacial till is generally composed of dense fine grained soils. The permeability of the lower till is generally less than the permeability of the overlying upper till and the underlying top of bedrock. Thus, the lower glacial till may act as an acquitard that would impede vertical contaminant migration.

It should be noted that, based on water level measurements made during this study, an upward vertical gradient was present at the OW-3R well cluster that is located near the northwest corner of the site. The apparent upward gradient at this location suggests movement of top of bedrock groundwater into the overlying overburden groundwater due to the semi-confined condition of the underlying bedrock aquifer.

DNAPL was not observed in the media sampled at the site during this RI. However, trichloroehtene concentrations in the groundwater in monitoring well OW-7S, are within 5% of the solubility for that compound. At the noted levels, DNAPL could potentially occur at the site. However, since DNAPL was not observed or encountered in the monitoring wells at the times and under the conditions at which the monitoring wells were checked or sampled during this investigation, and there is no information from the previous on-site or off-site investigations that suggests the physical presence of DNAPL at the site, the migration of DNAPL will not be further discussed in this report.

Surface water run-off may be a site mechanism that may or may have provided a means for lateral migration of site contaminants over the ground surface. Surface water run-off at the site occurs primarily during precipitation events or snow melting periods and therefore, an intermittent process. The surface water run-off generally occurs as a sheet flow over the ground surface and as channelized flow within the off-site drainage swale along the western property line and along the north side of Ruby-Gordon building which slopes towards the swale.

The erosion process results in the entrainment of soil particles within the surface water run-off (flow). These particles remain suspended in turbulent flows and subsequently settle in more stable areas such as the drainage swale along the western property line and at various storm water, sump, and catch basins at both on-site and off-site locations. Since the ground surface at the site is relatively level, the impact of erosion due to surface water run-off would be expected to occur primarily during and immediately after precipitation events or snow melting periods. Therefore, surface erosion is also an intermittent process at the site.

Volatilization appears to be a potential transport mechanism at the site. Volatile organic compounds present in the non-saturated zone above the water table (Vadose Zone) may migrate laterally within this zone or vertically with potential discharge to ground surface or to buildings or other structures. VOCs were detected in the SOH site soils during the RI soil vapor field survey.

An additional migration pathway at the site may include movement or regrading of site debris and soils. The physical movement of soils likely occurred during the various facility additions and site improvements. Two additions to the building have been constructed since the original construction in 1962. In addition, removal and on-site stockpiles of facility debris from the building fire occurred in conjunction with partial demolition of the building after the fire in December of 1974. Potentially contaminated materials may have been moved from their original locations and may have contained residual contaminants. Burned debris were encountered during excavation of the test pit TP-1 at the site.

The sewer systems at and around the site generally consists of shallow storm water sewers and a sanitary sewer system. The approximate locations of the sewer systems, as identified and located by Popli, are shown on Figure No. 2. The sewer systems may provide preferred localized pathways for contaminants and may serve as a collection area for potentially contaminated surface water, sediments, and or groundwater, which may subsequently leak down gradient from the sewer invert. The bedding of the sewer invert may also act as a localized pathway for groundwater migration. It is reported that sections of these sewers in the site vicinity have been upgraded and or repaired over the last 20 years.

As previously noted, portions of the sewer system in the site vicinity were repaired/altered during 1994/1995 as part of Cook Drive reconstruction. An environmental evaluation was completed by URS Consultants in conjunction with the construction project. The results of the environmental evaluation were summarized in Section 1.20.

5.20 CONTAMINANT PERSISTENCE AND BEHAVIORAL CHARACTERISTICS

Numerous classes of chemical compounds were detected in the identified environmental media at the site. In general, chemical compounds within a given chemical class will behave similarly in the environment. However, significant differences in behavior of chemical compounds may be observed within a chemical class. Their behavior is dependent on their physical and chemical properties as well as environmental conditions, such as the presence of bacteria, pH variations, and Eh conditions. The following discussion is based on published information on the chemical classes and specific chemical compounds encountered at the site and is summarized in Table No. 17 - Overview of Properties of Chemicals Detected at Stuart-Olver-Holtz.

5.21 VOLATILE ORGANIC COMPOUNDS (VOC)

5.21.1 Halogenated Aliphatic Hydrocarbons

Halogenated aliphatic hydrocarbons are commonly used as industrial solvents. Due to their moderate water solubility and moderate adsorption characteristics, these compounds may leach from soils and enter the groundwater in the environment. Since volatilization is a migration mechanism in media exposed to air, VOC's would not be stable in the soil's Vadose Zone or in surface waters. In the environment, degradation of several chemical compounds in this class results in numerous transformation chemical compounds which may not have been originally released to the environment (e.g.; trichloroethene breaks down to trans and cis 1,2-DCE and eventually transforms to vinyl chloride).

5.21.2 Aromatic Hydrocarbons

Aromatic hydrocarbons (e.g.; benzene, ethybenzene, toluene, xylenes) do not typically break down (transform) into other chemical compounds nor are they especially persistent in the environment. Volatilization is a significant transport mechanism in media exposed to the oxygen (air), especially for the unsubstituted benzene ring. These chemical compounds have moderate adsorption tendencies.

5.21.3 Halogenated Aromatic Hydrocarbons

These chemical compounds, which include chlorobenzene, volatilize readily in oxygenated environments and have a strong tendency to adsorb onto soil particles. They are insoluble in water and likely undergo limited biodegration. They may also bioaccumulate in the environment.

5.22 Semi-VOC's

5.22.1 Polynuclear Aromatic Hydrocarbons

PAHs are found naturally in coal and other carbon compounds in the environment and may, therefore, be encountered at the site. They are often a by-product of incomplete combustion processes. PAHs have low water solubilities, low volatilization rates and strong tendency to adsorb to soil. This generally results in little movement in water media in the environment. Due to their molecular size, they are not easily biodegraded in the environment.

5.22.2 Halogenated Aromatic Hydrocarbons

This class of compounds has a low vapor pressure and volatilization may be rapid. These compounds have a tendency to adsorb onto soils. These compounds are insoluble in water and exhibit limited biodegration. In addition, these compounds may also bioaccumulate in the environment.

5.23 Metals and Cyanide

Metals as a class are highly variable in their general properties and their behavior in the environment. Cyanides are used primarily in the extraction of ores, electroplating, metal treatment, and various manufacturing processes. The migration of metals is dependent on the metal's valence, the environment's pH variation and Eh conditions and also the presence of potential anions (such as sulfate, chloride and others), and many other factors. Therefore, metals can range from highly immobile to soluble. Thus, at the site and under the conditions that exist at the site, it appears that the frequently detected metals (zinc, lead, nickel, copper, chromium, and cadmium) may be considered to be soluble and mobile.

5.30 OBSERVED MIGRATION

This Section combines potential migration pathways with the site contaminant trends and distribution based on the project analytical data results to assist in determining if contaminant migration is apparently occurring at the site.

5.31 Potential Migration Pathways

Four principal migration pathways have been identified which may allow substances to migrate from the on-site source areas to potential off-site areas, or to a point where human exposure is possible. The principal site migration pathways have been identified based on the subsurface geologic conditions, hydrogeologic data, laboratory analytical results, and visual observations. The migration pathways and contaminant distribution trends generally provide indications of whether migration is occurring through a particular migration route. This discussion is not intended to address all potential means of contaminant migration of a particular chemical compound, but rather to present suspected migration pathways that appear to be substantiated based on the physical field observations and analytical data for this site.

5.31.1 Leaching and Overburden Groundwater Migration

Soluble contaminants, such as VOCs, within soils at the site may leach to the overburden groundwater. These contaminants in the groundwater migrate laterally and vertically with the overburden groundwater by advection to a point of discharge. Advection is the process by which solutes (contaminants) are transported by the bulk motion of the flowing groundwater. Site groundwater level elevations indicate that overburden groundwater generally flows towards the north and northwest directions. However, fluctuations in groundwater elevations combined with the pumping of the off-site Ruby-Gordon basement sumps apparently cause localized flow direction changes along the south property line as discussed in Section 3.3. The horizontal distribution of frequently detected site VOCs and their concentrations from groundwater analytical data is presented in Figure No. 12. This figure illustrates the horizontal (lateral) migration of trichloroethene and associated transformation compounds; 1,2 DCE (cis and trans) and vinyl chloride, from well OW-7S to downgradient wells MW-5 and OW-3S. The observed distribution of chemical compounds suggests that leaching and overburden groundwater migration is occurring at the site.

Vertical groundwater migration is also apparently occurring at the site, however, the effects of vertical contaminated migration appear to be less than the horizontal groundwater migration. Site vertical hydraulic gradients are generally downward which would suggest that overburden groundwater discharges to the underlying bedrock formation. However, the lower glacial till at the site is apparently acting as an acquitard, based on the physical characteristics and testing of this unit which overlies the bedrock formation at the site. As previously noted, upward vertical hydraulic gradients have been measured at the OW-3 well cluster. This suggests that the semi-confined bedrock groundwater may be discharging upward and into the overburden groundwater system near this location.

5.31.2 Bedrock Groundwater Transport

As stated previously, soluble site contaminants within soils at the site may leach to the overburden groundwater. Advection and dispersion processes may cause these contaminants to continue to migrate downward into the bedrock groundwater. However, downward vertical migration of contaminants from the overburden groundwater to the bedrock groundwater does not appear to be a significant migration pathway, since the low permeability lower glacial till unit appears to act as an acquitard as discussed in Section 3.7 of this report. The chemical compounds detected within the bedrock groundwater may migrate horizontally within the bedrock groundwater and may at some point discharge into surface water, or may discharge at some point to the overburden groundwater at locations where upward vertical gradients exist.

5.31.3 Erosion and Sediment Transport

Site surficial (surface) soils containing contaminants may become entrained within the surface water runoff and may be transported to the site stormwater sewer system and or to the off-site drainage swale along the western margin of the site and from surface run-off along the southern property line near Ruby-Gordon. The site is currently partially paved for parking areas and the remaining areas are grass lawn with other vegetated areas along the southern property line. The erosion process does not appear to be a significant migration mechanism at the site.

5.31.4 Volatilization and Soil Vapor Migration

VOCs present within the site overburden groundwater and soils may volatilize into the Vadose Zone. As noted, the thickness of the Vadose Zone, based on the explorations, may range from approximately 5 feet to 10 feet below groundsurface. Migration of these soil vapors (gases) occurs through the void spaces between the soil grains in the overburden. Eventually, these soil vapors discharge into the atmosphere. The soil gases may also discharge to on-site or off-site subsurface structures such as basements, manholes, or sumps. In addition, volatilization from VOC's may occur at groundwater discharge locations, such as sumps and/or surface water features.

5.32 Observed Migration Pathways

The Sections below are migration pathways which have been identified based on physical and analytical site information presented in Section 4.0. This relates the potential contaminant (compound) migration by the pathway identified in the above Section.

5.32.1 Overburden Groundwater Transport

The surficial soils at the site are generally variable with respect to both composition (grain size) and relative density. This variation is due to in part, the result of construction activities at the site during building and underground utilities construction, as well as the fire and associated demolition activities.

Direct surface water infiltration is likely occurring through the surface soils, with subsequent leaching of soluble contaminants and metals from previous site spills (releases). This appears to be a likely contaminant migration pathway from the on-site soils into the overburden groundwater.

Overburden groundwater analytical results collected from site monitoring wells indicate the presence of several VOCs. The frequently detected VOCs include the halogenated aliphatic hydrocarbons (Figure No. 12). Few semi-VOCs were detected in the overburden groundwater samples and the concentrations of those detected were generally less than 10 ppb.

Many of the same VOC's detected in overburden groundwater samples were also detected from subsurface soil samples collected above the groundwater table (Figure No. 11). This soil/groundwater contaminant distribution indicates that migration (leaching) of primarily aliphatic hydrocarbons compounds from soils at the site to the overburden groundwater has and may be currently occurring. This is consistent with the anticipated behavior as the halogenated aliphatic compounds typically have lower partitioning coefficients and thus, are less likely to adsorb onto the soils and instead, are likely to leach into the overburden groundwater.

The site wide distribution (detection) of semi-VOCs in the surface soils and subsurface soils with occasional detection of minor concentrations (low ppb) of these compounds in overburden groundwater samples suggests that the semi-VOCs may not be migrating (leaching) from the overburden soils to the overburden groundwater at the SOH site.

Frequently detected site metals (zinc, lead, nickel, copper, chromium and cadmium) (Figure No. 13) are commonly used in metal plating processes. These metals were detected in both the site soils and also in the overburden groundwater samples. Therefore, these metals also appear to have migrated (leached) from the site soils into the overburden groundwater.

Chemical compounds in the overburden groundwater appear to be migrating horizontally based on the predominant site overburden groundwater flow direction north/northwest as shown on Figure Nos. 7 and 8 and the distribution of detected VOC contaminants (Figure No. 13). As noted, VOC concentrations were detected in the groundwater samples from monitoring wells OW-7S, MW-5, and OW-3S. The distribution of VOCs (halogenated aliphatic hydrocarbons) at these well locations and more specifically the presence of trichloroethene and its transformation compounds 1,2-DCE total (CIS and TRANS) and vinyl chloride is indicative of horizontal transport (migration) of VOCs within the overburden groundwater system at the site.

5.32.2 Bedrock Groundwater Transport

As discussed in the previous Section 5.32.1, it appears that contaminants within the on-site soils in suspected source areas are migrating (leaching) into the overburden groundwater at the site. Many of the VOC compounds that were detected within the overburden groundwater samples at the site were also detected in top of bedrock groundwater samples. However, the contaminant concentrations in the bedrock groundwater samples were generally lower than the overburden groundwater concentrations, or the contaminants were not detected (Figure No. 14) with the exception of groundwater samples collected from OW-7R, SOH-IW-1R and SOH-IW-

2R. At these source well locations, the concentrations of VOCs suggest that vertical migration of VOC has occurred. Therefore, it appears that the limited vertical transport (migration) of overburden groundwater to the top of bedrock groundwater may indicate a limited hydraulic connection between the overburden groundwater and the top of bedrock groundwater. The primary feature which is likely to limit the hydraulic connection between the two groundwater systems is the lower glacial till which may be acting as an acquitard. The lower glacial till appears to be acting as a low permeability overburden unit which directly overlies the bedrock formation at the site (Section 3.0) which suggests a limited vertical contaminant migration from the overburden groundwater to the bedrock groundwater as further discussed below.

The potential for downward vertical migration from the overburden groundwater to the bedrock groundwater is also related to the vertical component of the hydraulic gradient. The vertical hydraulic gradient may be measured at a given location by comparing groundwater elevation data from the overburden well and the top of bedrock well at a monitoring well cluster (a location with a bedrock well and an overburden well). The vertical hydraulic gradients at the site are generally downward from the overburden to the bedrock formation. The downward vertical gradient relationship was observed at site well clusters OW-1S-1R, OW-2S-2R, and OW-7S-7R.

An upward vertical gradient was calculated at well cluster OW-3S-3R. The top of bedrock water level elevation in well OW-3R is above the overburden water level elevation in well OW-3S. The calculated upward vertical gradient at this well cluster was a hydraulic head that ranged from about 1 to 2.5 ft./ft., based on the August and October 1995 groundwater elevations. The upward vertical gradient indicates that the bedrock groundwater may be discharging to the overburden groundwater in the vicinity of the OW-3S - 3R well cluster (northwest corner of the site) This is consistent with the semi-confined condition of the groundwater in the top of bedrock. Therefore, vertical migration may not be occurring near this location.

Limited downward vertical migration from the overburden groundwater to the bedrock groundwater is further supported by comparing the generally elevated concentrations of frequently detected VOCs in the groundwater collected from the overburden wells with the generally lower levels of concentrations of frequently detected VOCs in groundwater collected from top of bedrock wells (Figure No. 12). VOCs detected in groundwater samples recovered from four (OW-1R, OW-2R, OW-3R, and OW-4R) of the five RI top of bedrock wells indicate low levels and/or non-detection for the frequently detected VOCs. Therefore, the lower glacial till may be acting as a low permeability unit above the top of bedrock groundwater. The concentrations of frequently detected VOCs are elevated in overburden monitoring well OW-7S and top of bedrock well OW-7R. This may suggest vertical migration of contaminants from the overburden to the bedrock groundwater at this location which is located closest to the potential source area near the SOH building.

One component which may be facilitating the vertical migration of VOC's at well cluster OW-7S - 7R is the reduced thickness of the lower glacial till (low permeable) in this area of the SOH site. At this location, the observed thickness of the lower till is approximately 4 feet less than the calculated average thickness for this unit at the SOH site (Figure No. 5). A second component which historically may have had a more pronounced effect on the bedrock groundwater quality at the site is the possible introduction of contaminants into the two facility water supply/process wells (SOH-IW-1R and SOH-IW-2R) and the floor drains, and or introduction of contaminants through the building floors.

Although the construction details of these wells are unknown, it appears based on depth to bedrock at the site, that the wells extend into the bedrock formation. These wells were reportedly used as a water supply for non-contact cooling, and other processes at the facility. The wells were initially installed outside of the SOH building and were later incorporated into the facility floor design after one of the building additions (Figure No. 3). These wells are open to the surface of the floor slab and well SOH-IW-1R appears to be connected to a floor slot drain. These wells may have provided a pathway for the introduction of contaminants into the bedrock groundwater. A horizontal migration component of contaminants from the area of these wells may also be contributing to the elevated contaminant levels indicated at the OW-7R well. However, the calculated horizontal hydraulic gradients for the bedrock groundwater are relatively small at the site and the calculated flow velocities are less when compared to the calculated overburden flow velocities and gradients. Therefore, horizontal migration within the bedrock groundwater appears to be at a slower rate than the overburden groundwater migration component at the SOH site.

5.32.3 Erosion and Sediment Transport

A limited degree of surface erosion occurs primarily during and immediately after storm events at the SOH site as surface water run-off flows over the ground surface. The ground surface at the site is relatively level, however, a sloped area (15 percent - 20 percent grade) is located along the southwestern property line adjacent to the Ruby-Gordon property. Most of the surface water run-off is controlled by the on-site storm water sewer and the drainage swale along the west property line. Generally, the limits of the existing building and the paved parking lot extend over the majority of the site, the remaining portions are primarily grass-covered with limited weed and scrub cover.

The effect of the erosion process has been observed during the RI project field tasks off-site within the limits of the drainage swale and by observation of accumulated sediments in on-site storm water catch basins as well as the off-site catch basin located at Ruby-Gordon's loading dock south of the SOH site. Some of the sediment noted at these locations is believed to have resulted from surficial erosion processes of site surface soils which would generally include the erosion of shallow site soils.

Analytical laboratory analytical results from the drainage swale sediment samples (SED-2 and SED-3) and site surface soil samples (SED-1, SED-4, SS-1 to SS-6) indicate similar compounds and concentrations for methylene chloride, several semi-VOCs and metals. Similar trends were also observed from sediment samples obtained from catch basins (NSM-1 through MSM-4). Therefore, the analytical data suggests that some off-site containment migration may have occurred or may continue to occur due to limited, shallow surface soil erosion as a result of surface water flows originating at the SOH site.

5.32.4 Volatilization and Soil Gas Migration

A soil vapor survey was performed at the site to indicate the presence of relative VOC's concentrations and to identify VOC compounds within the Vadose Zone. The samples were collected as described in Section 2.2 on a 50-foot grid (Figure No. 4). Several VOCs were detected and are summarized in Section 2.2. The distribution of the soil vapor results is shown on Figure No. 5. Volatilization of VOC's within the unsaturated overburden, with subsequent atmospheric discharge may be occurring at the site and volatilization may potentially occur when overburden groundwater is exposed (or discharges) to the atmosphere or building structures.

6.00 QUALITATIVE RISK ASSESSMENT

A qualitative baseline risk assessment was completed based on the information presented in Sections 1.00 through 5.00. Human health and ecological assessments were completed. Generally, the human health evaluation involved an exposure assessment, an evaluation of site occurrence, hazard identification and comparison to Federal and New York Standards, Criteria and Guidelines (SCGs). The environmental evaluation was completed in a manner similar to the human health assessment with the concentrations compared to SCGs derived for protection of wildlife.

6.10 CHEMICAL SPECIFIC INFORMATION

For informational purposes, toxicological profiles for the majority of compounds found on the site are included in Appendix G - Selected Toxicological Profiles. These profiles were compiled from "Chemical, Physical and Biological Properties of Compounds Present at Hazardous Waste Sites, Final Report" prepared by Clement Associates, Inc. for the United States Environmental Protection Agency (USEPA). These profiles were not prepared specifically for this report and not all site chemicals were available within the USEPA text.

6.20 HUMAN HEALTH EVALUATION

This Section discusses the exposure assessment, an evaluation of site occurrence and a comparison to SCGs related to potential impacts to human health. It should be noted that several conservative assumptions were used in completing this assessment and thus, the risks identified may not necessarily be realized. However, this assessment identifies exposures that may be considered "worse case scenarios" which may be mitigated through future remedial activities at the site.

6.21 Exposure Assessment

This exposure assessment discusses potential migration routes by which chemicals in the environment may be able to reach human receptors. This discussion is based on current and hypothetical future site conditions.

Currently, the site and adjoining properties are mixed commercial and industrial properties. A residential apartment complex is located approximately one half mile southwest of the site. The drainage swale which borders the site to the west (from which sediment and surface water samples were collected) flows westward in the immediate vicinity of the apartment complex. The area north of the site and beyond Commerce Drive is currently undeveloped. It is assumed, for the purposes of this evaluation, that the general area use will remain unchanged with the exception of potential future development north of Commerce Drive.

In developing hypothetical future site conditions, the possibility for the site and immediate surrounding area to be redeveloped for residential purposes was not evaluated since this is considered unlikely. However, development and/or intrusive site work in areas near the site, in particular in areas north of Commerce Drive were considered. In addition, the possibility for the SOH and/or Ruby Gordon facilities to be abandoned and left unattended was considered. Future site workers completing work on the site, unaware of potential contamination at the site were also considered.

A complete exposure pathway must exist for a population to be impacted by the chemicals at the site. A complete exposure pathway consists of four components:

1. a source and mechanism of chemical release;
2. a transport medium;
3. a point of potential human contact with the contaminated medium; and
4. an exposure route at the contact point.

Section 4.20 discussed potential source areas at the SOH site. Section 5.10 discussed potential routes of migration of chemical substances from source areas and Section 5.30 discussed observed migration at the site. This Section focuses primarily on identifying points of human contact with contaminated media.

The Sections below discuss exposure pathways identified for the SOH site. The exposure pathways are also summarized on Table No. 16 - Summary of Exposure Pathways Considered.

6.21.1 Surface Soils

Exposure to chemical substances within surface soils may occur via dermal contact or ingestion. Access to the site from the residential area located southwest of the site is unrestricted. It is possible that children from the residential area may enter the site where exposure to surface soils may occur. Furthermore, contaminated surface soils may also act as a source of groundwater contamination of chemical substances that leach into percolation water and then migrate downward to the water table. In addition, erosion of soil containing chemical substances may result in migration of these substances into adjacent surface water bodies or sumps where exposure may occur. The overall likelihood for exposure to surface soils at the site is relatively moderate.

6.21.2 Subsurface Soils

Exposure to chemical substances within on-site subsurface soils may occur via dermal contact, inhalation or ingestion under the hypothetical future scenario where on-site intrusive site work is performed and workers are unaware or not properly trained to work with potentially hazardous materials. Once these materials are brought to the surface, if not adequately secured, exposure to local residents may also occur as described above for surface soils. It should be noted that the site is currently recognized by the NYSDEC as an inactive hazardous waste site. As such, any intrusive work on the site would be conducted in accordance with requirements that include health and safety monitoring. Therefore, the likelihood of this potential exposure is relatively low.

Contaminated subsurface soils also may also act as a source of groundwater contamination if chemical substances leach into infiltration water and/or groundwater.

The overall likelihood for exposure to subsurface soils at the site is relatively moderate due to the potential of chemical substances impacting groundwater.

6.21.3 Surface Water

Exposure to chemical substances within surface water may occur via ingestion, inhalation and dermal contact. The drainage swale which borders the site to the west flows past a residential apartment complex one half mile downstream and access to the portion of the swale which borders site is not restricted. It is possible that children from the residential area playing in the swale may follow the swale to the site where intermittent moderate to low level exposure may occur. Furthermore, a sanitary sewer is located beneath this swale and exposure to surface water within the swale may, therefore, occur during some future intrusive work on the buried pipe. In addition, contaminants within the surface water may migrate downward and impact groundwater, since the area of the swale adjacent to the SOH site acts as a recharge area during periods of low flow. The overall likelihood for exposure to surface water at the site is relatively moderate.

6.21.4 Surface Water Sediments

Exposure to chemical substances within sediments may occur via dermal contact, inhalation or ingestion. The drainage swale which borders the site to the west flows through a residential apartment complex, and contaminated sediments may migrate from the site via surface water flow. As access to the portion of the swale which borders site is not restricted, it is possible that children from the residential area playing in the swale may follow the swale to the site where exposure may occur. Furthermore, a sanitary sewer is located beneath this swale, and exposure to surface water sediments within the swale may also occur during some future intrusive work on the buried pipe. In addition, contaminated surface water sediments may also act as a source of groundwater contamination if chemical substances leach into percolation water then migrate downward to the water table. The overall likelihood for exposure to surface water sediment at the site is relatively moderate.

6.21.5 Overburden Groundwater

Exposure to overburden groundwater, if used as a water supply, includes ingestion, dermal contact and inhalation of vapors. The expected yield of an overburden water supply well may not be sufficient to serve as a water supply source. In addition, a public water system currently services the area and the apparent need for an overburden water supply well is not apparent in the vicinity of the site. The well survey conducted by GZA as part of this evaluation did not reveal the presence of overburden wells within the ½-mile study area around the site. Thus, the likelihood of this exposure at this time is considered to be relatively low.

Based on the overburden groundwater flow direction, it appears that groundwater emanating from the site flows northwest of the site. Potential human exposure may occur at the point of groundwater contact. In addition, future development or utility repair within the area north of Commerce Drive may require excavation and dewatering, and site workers may be exposed to groundwater during such excavation and dewatering. However, the likelihood for these exposure scenarios is considered low to moderate.

6.21.6 Bedrock Groundwater

At this time, exposure to bedrock groundwater, if used as a water supply, includes ingestion, dermal contact and inhalation of vapors. A public water system currently services the area, and although the yield of the weathered bedrock zone may be sufficient to supply a municipal water supply well, the need for such a well is not apparent in the site vicinity. The well survey conducted by GZA as part of this study did not reveal the presence of bedrock water supply wells within the immediate vicinity of the site. However, two bedrock water supply wells are located inside the SOH building. It is reported that the wells were formerly used as a cooling water supply for their manufacturing processes. The likelihood of this exposure at this time is considered to be relatively low.

6.21.7 On-Site Sump Sediments

Exposure to chemical substances within on-site sump sediments may occur via dermal contact, inhalation or ingestion under the future scenario where maintenance is performed on the sumps or associated piping and workers are unaware or not properly trained to work with potentially hazardous materials. It should be noted that the site is currently recognized by the NYSDEC as an inactive hazardous waste site. As such, construction or maintenance work on the site should be conducted in accordance with OSHA requirements, including health and safety monitoring. Chemical substances within sump sediments may also act as a source of groundwater contamination if these substances leach into water. Potentially contaminated sump water may leak out of the sumps or associated piping and impact groundwater or discharge directly to a surface water body. The overall likelihood for exposure to sump sediments is considered relatively moderate. If proper health and safety procedures are followed when working in and around the sumps, the likelihood for exposure to sump sediments is considered relatively low.

6.21.8 On-Site Sump Water

Exposure to chemical substances within on-site sump water may occur via dermal contact, inhalation or ingestion under the hypothetical future scenario where maintenance is performed on the sumps or associated piping and workers are unaware or not properly trained to work with potentially hazardous materials. It should be noted that the site is currently recognized by the NYSDEC as an inactive hazardous waste site. As such, construction or maintenance work on the site should be conducted in accordance with OSHA requirements, including health and safety monitoring.

The point of discharge of water collected within the on-site sumps or the integrity of the associated sump piping is not known. Water which collects within the sumps pits may be discharging directly to the groundwater if the piping or sumps themselves are not water tight or may discharge directly to an adjacent surface water body.

The overall likelihood for exposure to on-site sump water at the site is relatively moderate.

6.21.9 Volatile Vapors in Ruby Gordon Basement

Currently, the groundwater analytical data and site observations indicate that groundwater containing VOC's enters the basement of the Ruby Gordon building through the existing underdrain system. Concentrations of volatile vapors within the basement may increase in the event the Ruby Gordon facility is abandoned and/or the sump system is not maintained. Discontinued operation of the sump system may also result in flooding of the basement, increasing the surface area for VOC (chemical) volatilization. If left unventilated, over time, significant concentrations of vapors may accumulate. The likelihood of this exposure is considered low to moderate.

6.21.10 Potential Volatile Vapors in Downgradient Excavation

The overburden groundwater flow direction is towards the northwest from the SOH site. Analytical laboratory data indicates this groundwater contains volatile chemical substances. Potential exposure from this groundwater near the site via inhalation may occur under the scenario where future development requires excavation (utilities or basement) to the water table. Excavation for work on utilities within the site or along Commerce Drive may also result in exposure to volatile chemical substances. The likelihood of this exposure is considered moderate.

Currently, there are no basements in the site vicinity other than at Ruby-Gordon that would likely be receptors of VOCs from the overburden groundwater. One shallow basement was identified (56 Commerce Drive) and sump water was sampled by the NYSDOH. From a review of the analytical results, the NYSDOH has concluded that the sump water in this basement has not been impacted by the SOH site.

6.22 Evaluation of Site Occurrence

An evaluation of the occurrence of the various chemical substances reported at the site was completed in order to compare the site concentrations to SCGs. Table Nos. 18 through 25 present the range of concentrations for the chemicals detected in the various media for the exposure scenarios discussed above. The summary includes the number of times a chemical was detected; the number of samples analyzed; the maximum value reported and the location where the maximum value was reported; the minimum value reported and the location where the minimum value was reported. For purposes of this qualitative assessment,the exposure point concentration was set as the maximum reported value, and this value was then compared to SCGs.

For potential off-site exposure points, the chemical concentrations reported for the site were used. This is a conservative approach. It is anticipated that the off-site concentrations should be less due to dilution. Table No. 17 - Overview of Properties of Chemicals Detected at Stuart-Olver-Holtz includes a summary of the sample results used to evaluate the occurrence of a chemical substance and exposure point concentration for each complete exposure pathway.

In evaluating site occurrence, reported analytical results qualified with an "R", indicating the data were rejected by the data validator, were omitted. In addition, data from matrix spike and matrix spike duplicate samples were also not included. Data from diluted, duplicate and re-analyzed samples were included for purposes of determining a maximum or minimum value, however these were combined as one sample in evaluating the frequency of occurrence. Organic data qualified with an "E" indicating that the data were estimated due to quantification above the calibration range, were omitted if an acceptable diluted sample was available in the evaluation of the maximum and minimum values.

An evaluation of occurrence was initially completed as described above for selected water samples in order to evaluate possible organic vapor concentrations within the basement of Ruby Gordon and within potential downgradient excavations. The Ruby-Gordon sump samples were evaluated for the Ruby-Gordon basement and overburden groundwater analytical results were used for the downgradient excavation evaluation. Resulting maximum and minimum values were then used to calculate maximum possible vapor phase concentrations. Additionally, any future basements that may be constructed are likely to be relatively shallow due to the proximity of a high groundwater table in this area. As such, the likelihood of exposure to VOCs in future basements, other than Ruby-Gordon, is considered low.

The maximum vapor phase concentrations were computed based on the estimated groundwater flow into the basement or excavation, the VOC concentration of groundwater inflow, an estimated air turnover rate, and the assumption that all of the contaminant mass that enters the basement or excavation in an aqueous phase instantly enters the vapor phase and is dispersed throughout the volume. This appears to be a conservative assumption because it is unlikely that all of the contaminant mass would volatilize prior to the liquid exiting the building or excavation. Groundwater flow into the Ruby Gordon basement was based on the reported pump rates for the existing sumps. Groundwater flow into the excavation was estimated based on an assumed trench configuration, several simplifying assumptions, and the Dupuit Forcheimer discharge equation. The selected air exchange rates for the Ruby-Gordon basement ranged from about one building volume per day to ½ the building volume per hour. The exchange rates are believed to be conservative and representative for a closed basement condition, where little heating/cooling and other ventilation is limited. The conservative nature of the approximations and assumptions should be considered when reviewing the data.

Overburden groundwater monitoring wells, bedrock groundwater monitoring wells and Ruby Gordon sumps were sampled during two events. As previously described, the number of samples and analytical testing during the second round was reduced based on a review of the Round 1 data. Therefore, the Round 2 sampling program included limited testing for VOCs and selected metals. During Round 2 samples from one overburden groundwater monitoring well (OW-7S) and one bedrock groundwater monitoring well (OW-7R) were also collected and analyzed for semi-VOCs. The data from the two sampling rounds were combined for this evaluation. As such, the number of times detected is not necessarily indicative of the number of individual locations in which a particular substance was found.

6.23 Hazard Identification and Comparison to SCGs

The site's potential hazards due to human exposures were reviewed based on chemical-specific health exposure based SCGs. SCGs included both state and federal values believed potentially applicable to the media or pathway being examined. The SCGs varied depending on environmental media and it should be noted that the applicability of a given SCG to a specific media or pathway was considered during the review and subsequent comparisons. The SCGs as well as maximum, minimum and detection frequency are presented in Table Nos. 18 through 25.

The Sections below discuss the SCGs used for each media and the comparison of anticipated exposure point concentrations to SCGs. It should be noted that additional SCGs (i.e., non-chemical specific) may subsequently be identified during the feasibility study.

6.23.1 Surface Soils

The SCGs used for site surface soils include the following:

- "Determination of Soil Cleanup Objectives and Cleanup Levels" NYSDEC TAGM 4046 Guidance. Criteria in this TAGM are developed for groundwater protection, based on NYSDEC Class GA groundwater quality criteria (see discussion in Section 6.23.5). Soil values are calculated by applying a partitioning model. A total organic carbon content of 1 percent was selected by GZA (based on TAGM 4046 Guidance) as representative for this calculation. In addition to criteria for individual chemicals the following total criteria are also included in this TAGM.

  Total VOCs $\leq$ 10 ppm
  Total Semi-VOCs $\leq$ 500 ppm
  Total Pesticides $\leq$ 10 ppm

  TAGM 4046 Guidance suggests the use of published and site background for metals.

- "Soil Screening Guidance", USEPA, EPA/540/R-94/101, December, 1994. It should be noted that this is a draft document currently under review. Therefore the generic values cited may be subject to change.

  This document presents generic soil screening levels (SSLs) for 107 chemicals using assumptions for residential land use for three pathways of exposure including ingestion of soil, inhalation of VOCs and ingestion of contaminated groundwater caused by migration of chemical substances through soil to an underlying groundwater. The SSLs are generally based on a 10^{-6} risk for carcinogens and a hazard quotient of 1 for non-carcinogens. SSLs for migration to groundwater are also based on non-zero Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) where available. A dilution attenuation factor of 10 was selected for migration to groundwater SSLs.

- Health Effects Assessment Summary Table (HEAST), 4th Quarter, 1990. Values within this table have been calculated based on direct ingestion assumptions of 1 g/day for a 70 kg (144 pound) person for a 70 year exposure period. The values shown correspond to acceptable carcinogenic risk levels.

A comparison of soil SCGs and site occurrence information compiled from analytical testing results of surface soil samples collected from the site is included on Table No. 18 - Summary of Health Based Surface Soil ARAs/SCGs. The data set used to compile this information included the surface soil samples (samples designated "SS" and samples SED-1 and SED-4 collected from the upper 0.5 feet (6 inches) of soil).

It should be noted that various metals are naturally occurring in surface soils. A clearly unimpacted surface soil sample was not identified to establish background metals concentrations at the SOH site. Therefore, analytical results from subsurface samples OW-11S (26 to 32 feet) and OW-9S (8 to 10 feet) were used to establish background concentrations of metals in surface soil. These samples were selected based on their location relative to the site and the apparent lack of organic contamination.

Three (3) VOCs were reported at least once within the surface soil samples. One compound, methylene chloride, exceeded the USEPA SSL for migration to groundwater.

Twenty three (23) semi-volatile compounds were detected at least once within surface soil samples. Maximum concentrations exceeded SCGs for 12 compounds. The majority of semi-volatile organic compounds which exceeded SCGs were PAHs. These compounds typically exceeded TAGM 4046 Guidance values (goals), USEPA SSLs for inhalation and migration to groundwater, and HEAST values. Exceedances were in some instances, about three orders of magnitude.

Twenty two (22) metal compounds were detected at least once within surface soil samples, and 13 had maximum concentrations above SCGs. Most metals which exceeded SCGs, also exceeded TAGM 4046 Guidance values (goals). As discussed above TAGM 4046 Guidance recommends published or background concentrations. It should be noted that background surface soil metal concentrations were not available because the surface soils at the site are generally fills. A comparison of metals concentrations within surface soils to those reported within subsurface "background" samples indicates that for several metals, maximum reported concentrations exceed "background concentrations" by about two or three orders of magnitude.

6.23.2 Subsurface Soils

The SCGs for subsurface soils are also used for surface soils. A comparison of soil SCGs and site occurrence information compiled from analytical testing results for subsurface soil samples (samples designated "SS" or "TP") collected from the site is included on Table No. 19 - Summary of Health Based Subsurface Soil ARARs/SCGs. Subsurface soil samples OW-11S (26-32 feet) and OW-9S (8-10 feet) were excluded from the data set used to compile the site occurrence information. Test results from these samples were used to establish background concentrations of metals in subsurface soil.

Comparison of the maximum reported concentrations in soils and SCGs indicates several parameters above SCGs. Eighteen (18) VOCs were detected at least once in subsurface soils, and eight (8) had maximum concentrations which exceeded SCGs. These VOCs include primarily halogenated aliphatic hydrocarbons (eg. trichloroethene and 1,2-DCE).

Twenty (20) semi-VOCs were detected at least once in subsurface soil samples and seven had maximum concentrations which exceeded SCGs. These included primarily PAHs and phenol. SCGs typically exceeded by these compounds included TAGM 4046 Guidance values and HEAST values. The USEPA SSL for inhalation was also exceeded by benzo (a) pyrene.

Twenty two (22) metals were detected at least once in subsurface soil samples, and 12 were reported with maximum concentrations exceeding SCGs. As discussed above, TAGM 4046 Guidance suggests the use of published or background concentrations. Results from subsurface soil samples OW-11S (26-32 feet) and OW-9S (8-10 feet) are presented on Table No. 19 as background for metals. These samples were selected based on their location relative to the site and the apparent lack of organic contamination. Maximum reported concentrations of metals within subsurface soils were typically within an order of magnitude of the presented "background" values (in TAGM 4046 Guidance guidelines).

6.23.3 Surface Water

The SCGs used for surface water include the following:

- NYSDEC Class C Surface Water Standards 6 NYCRR Part 701-703. Standards and guidance values have been developed to protect the best usage of this specific class of surface water. Best usage of Class C waters is fishing and fish propagation. Class C waters are also suitable for primary and secondary contact recreation.

- USEPA Ambient Water Quality Criteria (AWQC). AWQC are nonregulatory concentrations of water contaminants that provide a reasonable amount of protection to human health and aquatic life. Health based AWQC are based on human ingestion of water (2 liters/day) and aquatic organisms (6.5 grams/day).

A comparison of surface water SCGs and site occurrence information compiled from analytical results of surface water samples collected from the site (designated "SW") is included on Table No. 20 - Summary of Health Based Surface Water ARARs/SCGs. It should be noted that various metals are naturally occurring in surface water. Representative surface water samples were not available to establish background metals concentrations. Surface water available at and in the immediate vicinity of the site was limited to standing water within the drainage swale. This was not considered to be representative for background as the swale does not flow at all times, and it does not have a defined off-site source.

Comparison of maximum reported values of chemical substances in surface water samples with SCGs indicates 1 of 3 semi-volatile compounds detected and 3 of 15 metals detected had maximum concentrations which exceed SCGs. Maximum concentrations of Semi-VOCs Pentachlorophenol, and metals (aluminum, iron and silver) exceed NYSDEC Class C standards. Maximum concentrations of Iron also exceed USEPA ambient water quality criteria.

6.23.4 Surface Water Sediments

SCGs are not developed specifically for surface water sediments. However, due to the relatively shallow depth of surface water and potential seasonal variations in the surface water level, the SCGs for subsurface and surface soils are also appropriate for use with the surface water sediments. SCGs used for surface water sediments also included the following.

- USEPA Interim Sediment Quality Criteria. These criteria were developed based on AWQC through the use of an equilibrium partitioning model. GZA selected a total organic carbon content of 1 percent (based on TAGM 4046 Guidance) within site sediments to calculate the criteria.

- "Technical Guidance for Screening of Contaminated Sediments", NYSDEC Division of Fish and Wildlife, July 1994. This document provides SCGs for certain non-polar organic compounds to protect human health from toxic effects of bioaccumulation. The interstitial water concentration is calculated through the use of a partitioning model. The calculation was made using an organic carbon (TOC) content of 1 percent (based on TAGM 4046 Guidance). It should be noted TOC was not detected in a sample collected at SED-2 at a laboratory detection limit of 6.8 percent. This data indicates that the 1 percent TOC value used for this evaluation is representative.

  This document also includes SCGs for protection of fish and wildlife including metals SCGs. These are not believed appropriate for application to this human health assessment. Therefore, the metal values were not used in this analysis.

A comparison of surface water sediment SCGs and site occurrence information compiled from analytical results of surface water sediment samples collected from the site (samples SED-2 and SED-3) is included on Table No. 21 - Summary of Health Based Surface Water Sediment ARARs/SCGs. It should be noted that metals may be naturally occurring in sediments. As indicated in Section 6.23.1, a clearly unimpacted surface water sediment sample was not available to establish background metals concentrations.

Comparison of the maximum concentration of chemical substances in surface water sediments with SCGs indicates 11 of 22 semi-VOCs detected and 9 of 20 metals detected exceeded SCGs. Most semi-VOCs which exceed SCGs include PAHs. SCGs exceeded by PAH concentrations included TAGM 4046 Guidance values, NYSDEC Sediment Criteria, USEPA Sediment Criteria and USEPA SSLs for inhalation and migration to groundwater.

Most metals which exceeded SCGs, also exceeded TAGM 4046 Guidance values. As discussed above, TAGM 4046 Guidance values recommends published or background concentrations. As discussed above background surface water sediment samples were not collected.

6.23.5 Overburden Groundwater

Human health risks associated with exposure to overburden groundwater were examined by considering both use of the overburden groundwater as a drinking water source, and potential exposure to overburden groundwater at a point of contact, downgradient of the site to the northwest by construction or utility workers. Exposure to volatile vapors from overburden groundwater is addressed separately in Section 6.23.10. It should be noted that metals may be naturally occurring in groundwater. A clearly unimpacted groundwater sample was not identified to establish background metals concentrations.

The SCGs used for human health risks associated with use of overburden groundwater at the site as a drinking water source include the following.

- NYSDEC Class GA Groundwater Quality Criteria 6NYCRR Part 701-703. These criteria are developed for waters with a best usage as a potable water supply.

- USEPA MCLs and MCLGs. MCLs are enforceable standards which are considered feasible and safe for drinking water supply systems. MCLGs are guidance health goals applied to water systems.

- USEPA Health Advisories - USEPA health advisories are nonregulatory concentrations of drinking water contaminants considered protective of adverse noncarcinogenic health effects. Health advisories included are those for exposure of a child for one day and longer term (approximately 7 years or 10 percent of lifetime); and lifetime exposure for an adult.

As noted in Section 6.21.5, a public water system currently serves the area. In addition, the well survey that was conducted as part of this evaluation did not reveal the presence of overburden wells within ½-mile of the site.

A comparison of drinking water SCGs and site occurrence information compiled from analytical results of all the overburden groundwater samples collected is included on Table No. 23 - Summary of Health Based Overburden Groundwater ARAR's/SCG's.

Twelve (12) VOCs were detected at least once within the overburden groundwater samples and 11 had reported maximum concentrations which exceeded drinking water SCGs. These compounds included primarily halogenated aliphatic hydrocarbons (eg. trichloroethene and 1,2 DCE). Typically, these values exceeded the NYSDEC Class GA standards, MCLs, MCLGs and adult lifetime health advisories where available.

Eight (8) semi-VOCs, were detected at least one time in the overburden groundwater. One compound, phenol, had a maximum reported concentration which exceeded NYSDEC Class GA standards.

Nineteen (19) metal compound were detected at least once within the overburden groundwater samples and 11 exceeded drinking water SCGs. Typically these values exceeded NYSDEC Class GA standards. However, the following metals, arsenic (As), cadmium, nickel and vanadium, exceeded USEPA criteria and advisories, but not NYSDEC Class GA standards.

Maximum concentrations of chemical substances within groundwater were compared to NYSDEC Class C surface water criteria and to USEPA AWQC (Section 6.23.3) in order to evaluate the potential on-site worker health risks associated with a potential exposure of groundwater downgradient from the site to the northwest resulting from future building construction or utility repair/installation. These standards appear to be appropriate because groundwater becomes surface water at the point of groundwater exposure. It should be noted, however, that this appears to be a conservative assumption since it is likely that natural attenuation would decrease any possible chemical concentrations prior to reaching a point of groundwater exposure.

A comparison of surface water SCGs and site occurrence information compiled from analytical results of the overburden groundwater samples collected is included on Table No. 22 - Summary of Health Based Overburden Groundwater ARARs/SCGs.

Twelve (12) VOCs were detected at least once within the overburden groundwater, and 7 had reported maximum concentrations which exceeded USEPA AWQC. Similar to the comparison made above, these included primarily halogenated aliphatic hydrocarbons (eg. trichloroethene and 1,2-DCE). NYSDEC Class C standards were not available for these compounds.

Eight (8) semi-VOCs were detected at least once in the overburden groundwater. One compound had a maximum reported concentration which exceeded Class C standards.

Nineteen (19) metals were detected at least once within the overburden groundwater, and 12 exceeded surface water SCGs. Typically these values exceeded Class C standards, however, arsenic, iron, lead, manganese, mercury and nickel exceeded USEPA AWQC. The maximum reported concentration of Cyanide in overburden groundwater also exceeded NYSDEC Class C standards.

6.23.6 Bedrock Groundwater

Human health risks associated with exposure to bedrock groundwater were evaluated by considering use of the bedrock groundwater as a drinking water source. The SCGs used for bedrock groundwater are similar to those used for the overburden groundwater, including NYSDEC Class GA criteria, and USEPA MCLs, MCLGs, and human health advisories.

A comparison of drinking water SCGs and site occurrence information compiled from analytical results of the bedrock groundwater samples collected is included on Table No. 23 - Summary of Health Based Top of Bedrock Groundwater ARARs/SCGs. It should be noted that metal compounds are naturally occurring in groundwater. An unimpacted groundwater sample was not identified to establish background metals concentrations in bedrock groundwater.

Eighteen (18) VOCs were detected at least once within the bedrock groundwater and fourteen (14) had reported maximum concentrations which exceeded drinking water SCGs. These included primarily halogenated aliphatic hydrocarbons (eg. trichloroethene and 1,2 DCE). Typically, the concentration of these VOC's also exceeded the NYSDEC Class GA standards, MCLs and MCLGs where available.

Six (6) semi-VOCs were detected at least once within the top of bedrock groundwater. One compound, Phenol, had a maximum reported concentration which exceeded NYSDEC Class GA standards.

Twenty (20) metals were detected at least once within the overburden groundwater. Fourteen (14) metal concentrations exceeded drinking water SCGs.

6.23.7 SOH Catch Basin and Sump Sediment Samples

The SCGs applied to SOH sump and catch basin sediment samples were the same as the surface soils SCGs. A comparison of SCGs and site occurrence information compiled from analytical results of the sump and catch basin sediment samples collected is presented on Table No. 24a - Summary of Health Based On-Site Sump and Catch Basin Soil ARARs/SCGs. The data set used to compile this information included samples NSM-2 and NSM-3.

Thirteen (13) VOCs were detected at least once within SOH sump sediment samples and eleven (11) exceeded SCGs. These included primarily halogenated aliphatic hydrocarbons (eg. trichloroethene and 1,2 DCE). However, some aromatic compounds were also reported above SCGs. Typically these values exceeded TAGM 4046 Guidance values and SSLs for migration to groundwater. Some SSLs for inhalation and ingestion were also exceeded in some instances. USEPA HEAST derived values for carbon tetrachloride and tetrachloroethane were also exceeded.

Twenty four (24) semi-VOCs were detected at least once within SOH sump sediment samples and nine (9) had maximum reported concentrations which exceeded SCGs. The compounds included were primarily PAHs. SCGs which were exceeded included TAGM 4046 Guidance values, USEPA SSLs and USEPA HEAST derived values.

Twenty one (21) metals were detected at least once within SOH sump sediment samples. Eleven (11) were reported with maximum concentrations which exceeded SCGs.

6.23.8 SOH Sump Water Samples

The SCGs for SOH sump and catch basin water included those applied to groundwater that may be used as a drinking water source, since the potential exists for these waters to leak from the sumps and associated piping and impact groundwater. In addition, surface water SCGs were also used since the point of discharge of this water is unknown and may be discharging to a nearby surface water body. A comparison of SCGs and site occurrence information compiled from analytical results of the sump water samples collected is presented on Table No. 24b - Summary of Health Based On-Site Sump and Catch Basin Water ARARs/SCGs. The data set used to compile this information included samples NSM-1 and NSM-4.

Five (5) VOCs including two (2) halogenated aliphatic hydrocarbons compounds and three (3) aromatic compounds were reported at least once within the SOH sump water samples. The detected VOCs exceeded SCGs including NYSDEC Class GA standards, MCLs, MCLGs and USEPA Health Advisories. One halogenated aliphatic hydrocarbon also exceeded the USEPA AWQC.

Fifteen (15) semi-VOCs were detected at least once within the SOH sump water samples and seven (7) exceeded SCGs. Those which exceeded the SCG's included primarily PAHs. SCGs which were exceeded included MCLs and MCLGs.

Twenty two (22) metals were detected at least once within sump water samples and seventeen (17) had maximum concentrations which exceeded SCGs. Typically, each SCG used in the comparison was exceeded. The reported maximum concentration of cyanide exceeded the NYSDEC Class C water quality standard.

6.23.9 Potential Vapor Inhalation within Ruby Gordon Basement

Human health risks associated with exposure to potential vapor inhalation within the basement of the Ruby Gordon facility were assessed by considering only the VOC analytical results from samples of sump water, collected and analyzed during the RI, from the three sumps located within the basement (designated "SUMP"). As discussed in Section 6.22 above, water concentration values were converted to vapor concentrations. It is important to note that several simplifying assumptions were made in developing the vapor concentrations. Typically the assumptions were made to provide a relatively conservative value.

The SCGs used include the following:

- Draft New York State Air Guide-1; Guidelines for the Control of Toxic Ambient Air Contaminants. The Short-term Guideline Concentration (SGC) was considered.

A comparison of SCGs and site occurrence information compiled from analytical results of the Ruby Gordon sump samples collected is included on Table No. 25 - Summary of Health Based Ruby Gordon Basement Groundwater Equilibrium Vapor Concentration ARARs/SCGs.

Fifteen (15) VOCs were reported at least once within the Ruby Gordon sump samples. The computed dilution based vapor concentration did not exceed the SGC.

6.23.10 Volatile Vapors in Downgradient Excavation or Basement

Human health risks associated with temporary exposure to vapor inhalation within a downgradient excavation made near the site were assessed using conservative assumptions to calculate the vapor concentrations. The analytical data used to make the assessment included overburden groundwater VOC analytical results from SOH overburden monitoring wells.

The methodology and calculations required to evaluate potential vapors in downgradient excavations are dependent on many variables, such as: the depth, width, length, sidewall slope, and orientation of the trench; the depth of excavation below groundwater; subsurface soil permeability; atmospheric conditions including wind direction and velocity, and air temperature and humidity; and contaminant concentrations in the soils and groundwater at the time and location of the excavation. As such, any computations should be considered to be approximate.

Based on initial calculations, using conservative assumptions, it appears that the potential may exist for volatilization of vapors into downgradient excavations. However, due to the high anticipated air turnover rate associated with an open excavation, the calculations would suggest that the potential for vapor inhalation would be within acceptable limits.

6.23.11 Summary of Human Health Risk Assessment

A qualitative human health risk assessment was completed for the SOH site. Generally, the human health evaluation involved an exposure assessment, an evaluation of site occurrence, hazard identification and comparison to Federal and New York SCGs. Eleven (11) exposure scenarios were identified and evaluated based on analytical laboratory analytical results of samples collected from nine media. A summary of the results of the risk assessment, listed by media, and a conclusion as to the apparent need to address each of the media during the Feasibility Study is presented below.

6.23.12 Surface Soils

The potential for exposure to chemical substances within surface soils at the site appears to be moderate at this time due to the potential for workers and adults and children from nearby businesses and residences to gain access to the unrestricted site. In addition, chemical substances within the surface soil may impact the groundwater and nearby surface water through leaching and erosion. Several VOCs, semi-VOCs and metals encountered within the surface soils had maximum concentrations above identified SCGs. It appears that surface soil contamination at the site should be addressed during the FS.

6.23.13 Subsurface Soils

The potential for exposure to chemical substances within subsurface soils at the site appears to be moderate at this time primarily due to potential leaching and impact to groundwater. Several VOCs, semi-VOCs and metals encountered within the subsurface soils had maximum concentrations above identified SCGs. It appears that contaminated subsurface soils at the site may be addressed during the FS.

6.23.14 *Surface Water*

The potential for exposure to chemical substances within surface water at the site appears to be relatively low to moderate at this time primarily due to the potential for workers and adults and children from the nearby residences to gain access to the unrestricted site. The potential also exists for utility worker exposure when servicing buried piping beneath the swale and the potential impact to groundwater. Aluminum and magnesium were detected in the surface water above SCGs. It appears that contaminated surface water at the site should be addressed during the FS.

6.23.15 *Surface Water Sediments*

The potential for exposure to chemical substances within surface water sediments at the site appears to be relatively moderate at this time primarily due to the potential for children from the nearby residences to gain access to the unrestricted site. The potential also exists for utility worker exposure when servicing buried piping beneath the swale and the potential impact to groundwater. Some semi-VOCs and zinc reported within surface water sediments had maximum concentrations which exceeded SCGs. It appears that surface water sediments at the site should be addressed during the FS.

6.23.16 *Overburden Groundwater*

The potential for exposure to chemical substances within the overburden groundwater at the site appears to be low to moderate at this time due to the potential for exposure at a point of groundwater discharge into a downgradient excavation or adjacent basement and subsequent inhalation of volatile vapors. The potential for exposure due to use of overburden groundwater as a drinking water source is considered low. Several VOCs, semi-VOCs and metals reported with the overburden groundwater have maximum concentrations which exceed SCGs. It appears that contaminated overburden groundwater at the site should be addressed during the FS.

6.23.17 *Bedrock Groundwater*

The potential for exposure to chemical compounds within the bedrock groundwater due to use of bedrock groundwater as a drinking water source appears to be low at this time. Although several VOCs, semi-VOCs and metals were detected within the bedrock groundwater with maximum concentrations which exceed SCGs, it appears that exposure to contaminated bedrock groundwater at the site is limited and may not need to be addressed during the FS.

6.23.18 On-Site Sump and Catch Basin Sediments

The potential for exposure to chemical substances within on-site sump and catch basin sediments at the site appears to be moderate at this time due to the potential for exposure to site workers. In addition chemical substances within the sump sediments may result in an impact to the groundwater and to nearby surface water through leaching and erosion. Several VOCs, semi-VOCs and metals reported within the surface soils had maximum concentrations above identified SCGs. It appears that on-site sump sediments at the site may need to be addressed during the FS.

6.23.19 On-Site Sump and Catch Basin Water

The potential for exposure to chemical substances within on-site sump and catch basin water at the site appears to be moderate at this time due to the potential for exposure to site workers. In addition chemical substances within the sump water may leak and impact groundwater or be discharged to a surface water body. Several VOCs, semi-VOCs and metals reported within the surface soils had maximum concentrations above identified SCGs. It appears that contaminated on-site sump and catch basin water at the site may need to be addressed during the FS.

6.23.20 Potential Volatile Vapors in Ruby Gordon Basement

The potential may exist for exposure to VOC's which may volatilize from sump water during flooding, or may enter the basement in a vapor form (through cracks in the basement walls). Basement air quality sampling was not part of the RI investigation. However, there is a potential for vapors to accumulate within the basement if basement ventilation is inadequate. It appears that VOC (volatile) vapors within the basement of Ruby Gordon may need to be addressed during the FS if contaminated surface or groundwater continues to enter the Ruby Gordon basement.

6.30 FISH AND WILDLIFE EVALUATION

Analytical data indicates that organic compounds and metals are present in sediment, surface water and groundwater samples collected from locations shown on Figure No. 3. This Section assesses the significance of the results and the potential impacts of these compounds on the fish and wildlife resources identified in Section 3.91.

This evaluation contains the contaminant-specific impact assessment in accordance with NYSDEC's guidance document "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites" (October 1994). Potential exposure pathways are identified and levels of organic compounds and metals are compared to SCGs. These analyses follow the guidelines under Step II of the FWIA for pathway analysis and criteria specific analysis. Step II of the FWIA also includes toxic effect analysis which would be necessary to characterize the toxic and ecological effects of the identified contaminants on the productivity and diversity of ecological communities or populations.

6.31 Exposure Assessment

As in the Human Health Evaluation, this exposure assessment discusses potential pathways by which chemicals in the environment may reach fish and wildlife receptors. This discussion is based primarily on current ecological conditions (as described in Section 3.91 Site Description) and the assumption that general area land use will remain unchanged with the exception of potential future development north of Commerce Drive.

The Sections below describe potential exposure migration pathways by which fish and wildlife may come in contact with contaminated resources.

6.31.1 Surface Water

Fish and wildlife exposure to chemical substances within surface water may occur through use of the water as a drinking source, through actual physical contact with the water and adsorption through the dermal layer, and through inhalation. Fish and aquatic or amphibious animals spend all or portions of their life spans within or near the water. In addition, other local wildlife have unrestricted access to the drainage swale bordering the SOH site and the tributaries of Red Creek into which it flows. Commercial/industrial development and heavily travelled roadways in the area act to limit wildlife movement from areas other than those immediately adjacent to the site. However, the overall likelihood for exposure to surface water at the site appears to be moderate based on our evaluation at this time.

6.31.2 Surface Water Sediments

Fish and wildlife exposure to chemical substances within sediments may occur via actual physical contact with the sediments, adsorption, inhalation or ingestion. Fish and aquatic or amphibious organisms spend all or portions of their life spans within or near sediments associated with the surface water bodies in which they live. As noted above, other local wildlife also have unrestricted access to sediments in the drainage swale bordering the SOH site and in adjacent tributaries to Red Creek. In addition, because the drainage swale contains a sanitary sewer, fish and wildlife living in or passing near the swale could be exposed to contaminated sediments during future intrusive work on the buried sanitary sewer piping.

Commercial/industrial development and heavily travelled roadways in the area act to limit wildlife movement from areas other than those immediately adjacent to the site. However, the overall likelihood for exposure to surface water sediments at the site appears to be moderate based on our evaluation at this time.

6.31.3 Overburden Groundwater

Fish and wildlife exposure to overburden groundwater would be possible under conditions where groundwater discharged to a surface water body in the site vicinity. Groundwater elevations measured during the RI do not indicate that groundwater discharges to surface waters in the site vicinity. However, the scenario of groundwater discharge to the drainage swale was considered under the conservative assumption that it would be possible under future conditions.

Fish and wildlife exposure to groundwater which may discharge to the drainage swale would occur through use of the water as a drinking source, through actual physical contact with the water, and through inhalation of vapors, which are, at this time, intermittent exposure pathways. Therefore, it appears, based on our evaluation, that the likelihood of this exposure pathway is low.

6.32 Evaluation of Site Occurrence

The evaluation of the occurrence of the various chemical substances reported at the site was completed in the same manner as for the Human Health Evaluation outlined in Section 6.23.

6.33 Hazard Identification and Comparison to SCGs (Criteria Specific Analysis)

Because contaminated resources were found to be present at the SOH site and pathways for exposure to fish and wildlife have been identified, a comparison of contaminant concentrations at the site to SCGs is necessary. The SCGs established for specific media with respect to fish and wildlife protection are described in the Sections below. It should be noted that additional ARARs and SCGs (i.e. non-chemical specific) may be identified during the feasibility study.

Table Nos. 26 through 28 present the maximum, minimum and detection frequency for each compound along with the SCGs. The results are also summarized in the following Sections.

6.33.1 Surface Water

The SCGs used for surface water include the following:

- NYSDEC Class C Surface Water Standards 6 NYCRR Part 701-703.

  (previously described in Section 6.23.1 for Human Health Evaluation).

- USEPA AWQC.

  USEPA AWQC are nonregulatory concentrations of water contaminants that provide a reasonable amount of protection to aquatic life. Criteria are provided for both acute and chronic levels of contaminants, based on ingestion of 6.5 grams of water per day by aquatic organisms.

Table No. 26 - Qualitative Assessment of Ecological Risks in Surface Water provides a comparison of surface water SCGs and site occurrence information compiled from analytical results of surface water samples (designated SW series). It is important to note that this drainage swale receives runoff from other commercial and industrial properties located upgradient in the vicinity of the SOH building. In addition, it should be noted that although metal compounds may be naturally occurring in surface waters, a surface water sample was not identified to establish background metals concentrations.

Comparison of maximum reported values of chemical substances in surface water samples with SCGs indicates that one of the three semi-volatile compounds detected (pentachlorophenol) and four (4) of the 15 metals detected exceed SCGs. Lead and silver were found at or in exceedance of acute and chronic toxicity levels established in the AWQCs. Aluminum and Iron also exceeded NYSDEC or USEPA standards.

Pentachlorophenol is present in Surface Water Sample #SW-2 at approximately ten (10) times the water quality standard established for fish propagation and survival. However, the potential impact of pentachlorophenol is considered low because the low flow associated with the drainage swale does not currently nor has it been found to support a significant fisheries population.

6.33.2 Surface Water Sediments

The SCGs used for surface water sediments include the following:

- USEPA Interim Sediment Quality Criteria.

These criteria were developed based on AWQC through the use of an equilibrium partitioning model. GZA selected a total organic carbon content of 1 percent (based on TAGM 4060 Guidance) within site sediments to calculate the criteria.

- "Technical Guidance for Screening of Contaminated Sediments", NYSDEC Division of Fish and Wildlife, July 1994.

  This document provides SCGs for non-polar organic contaminants and metals considered harmful to marine and aquatic ecosystems. Acute and chronic toxicity levels of organic compounds have been derived for benthic aquatic life, along with standards for wildlife accumulation. Two levels of risk are provided for metals contamination in sediments: lowest effect level (LEL) and severe effect level (SEL). When only the lowest effect level is exceeded, moderate impacts to benthic life are anticipated. When both levels are exceeded, significant harm to benthic aquatic life is anticipated.

- "The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program", NOAA Technical Memorandum NOSOMA52, (Long and Morgan, 1990).

  NOAA values were compiled from an existing database regarding the effects of contaminated sediments on aquatic biota. These thresholds are reported as Effects Range-Low (ER-L) and Effects Range-Median (ER-M). The ER-L refer to the lower tenth percentile of sediment contamination concentrations associated with adverse biological effects. The ER-M refers to the median value.

Table No. 27 - Qualitative Assessment of Ecological Risks in Surface Water Sediments presents a comparison of surface water sediment SCGs and site occurrence information compiled from analytical results of surface water sediment samples collected from the site (samples SED-2 and SED-3). It should be noted that although metal compounds may be naturally occurring in surface water sediments, a surface water sediment sample was not identified to establish background metals concentrations. In addition, as previously discussed, this drainage swale receives runoff from other commercial and industrial properties located upgradient in the vicinity of the SOH building.

Comparison of the maximum concentration of chemical substances in surface water sediments with SCGs indicates 13 of 22 semi-VOCs detected exceed SCGs. It is noted that this represents every semi-volatile compound for which SCGs have been established. With regard to NYSDEC standards, four (4) PAH compounds exceeded the sediment standards established for the protection of aquatic life from chronic toxicity, including: acenaphthene, fluoranthene, bis(2-ethylhexyl)phthalate, and phenanthrene. A number of uncertainties are associated with the establishment of sediment criteria that make the data interpretation difficult. NYSDEC's technical guidance indicates that compounds found in amounts 1.5 to 5 times the established standard are a "gray area" where observable impacts may or may not occur. At SOH, the NYSDEC standards for each semi-VOC were exceeded by less than a factor of three, except phenanthrene, which exceeded the NYSDEC standards by a factor of 4. These exceedances place them within the range where the actual occurrence of effects is unknown.

Zinc exceeded both the lowest effect and severe effect levels established by NYSDEC indicating significant impacts.

Moreover, no fishery resources were found in the streams into which the swale eventually flows. As such, no potential pathway or exposure of these contaminants to human health has been identified and no risk of bioaccumulation is present.

6.33.3 Overburden Groundwater

Fish and wildlife risks associated with exposure to overburden groundwater were examined by considering exposure to overburden groundwater at a potential point of discharge, such as into the drainage swale or down-gradient wetland. The SCGs used for comparison of on-site contaminants in overburden groundwater include:

- NYSDEC Class C Surface Water Standards 6 NYCRR Part 701-703 (previously described in Section 6.23.1 for Human Health Evaluation).

- USEPA AWQC (previously described in Section 6.33.1 for surface water).

These standards are believed appropriate because at the point of groundwater discharge, the groundwater essentially becomes a surface water. This appears to be a conservative assumption since it is likely that attenuation would decrease chemical substance concentrations prior to reaching a point of groundwater discharge. In addition, it should be noted that although metal compounds may be naturally occurring in groundwater, a groundwater sample was not identified to establish background metals concentrations.

Table No. 28 - Qualitative Risk Assessment of Ecological Risks in Overburden Groundwater presents the comparison of drinking water SCGs and site occurrence information compiled from analytical results of overburden groundwater samples.

Of the twelve (12) VOCs detected within the overburden groundwater samples, one (trichloroethene) had a maximum concentration which exceeded SCGs. Trichloroethene exceeded the USEPA AWQC standard for acute toxicity for aquatic organisms. Of the 8 semi-VOCs detected, one compound had a maximum reported concentration which exceeded NYSDEC Class C standards.

Of the nineteen (19) metals detected within the overburden groundwater samples, 11 exceeded SCGs, including most of the Class C water standards. Aluminum, copper, lead, silver and zinc also exceeded both USEPA acute and chronic toxicity levels for aquatic organisms. Finally, the maximum reported concentration of cyanide in overburden groundwater exceeded NYSDEC Class C standards.

The areas at and surrounding the SOH site has a limited fish and wildlife population due primarily as a result of the commercial and industrial land use. Based on the concentrations of chemical compounds and metals detected in the various media, it appears that the impact of the site on the fish and wildlife is low. Therefore, potential impacts to fish and wildlife do not need to be addressed in the FS.

7.00 SUMMARY AND CONCLUSIONS

7.10 SITE HISTORY SUMMARY

Stuart-Olver-Holtz owned and operated a metal finishing facility on the site from its initial construction around 1962 to approximately 1987. SOH ceased operations in 1987 due to bankruptcy and subsequently leased the facility and site to Metalade, Inc., which currently operates the facility as a metal finishing facility.

The SOH metal finishing processes reportedly included plating, painting, polishing and buffing. NYSDEC records indicate the use of degreaser units which initially used trichloroethene as the degreasing agent. Specific documentation of other materials used at the facility is generally not available. However, the available site information indicates that the following materials were reportedly used, generated and/or stored by SOH at the facility: various metal plating solutions; various acids; various paint stripping solutions; phosphating solutions; and selenium stripping solutions.

Chemical and plating wastes were typically accumulated and stored on-site outdoors on the ground surface in 55-gallon drums. Available Fire Marshall and NYSDEC site inspection records have documented the storage of drummed waste and several of the drums were leaking. Several spills and environmental compliance violations have been documented over the time period from approximately 1977 to 1987. A major fire, that occurred in December of 1974, resulted in substantial damage to the building and a significant chemical spill. From available records, NYSDEC Spill No. 7481220 indicated a chemical spill of 855 gallons, including chromic acid, nickel chloride, nickel sulfate, paint strippers and alkali detergent. An unknown quantity of trichloroethene was also reportedly released in the fire.

7.11 Previous Studies Summary

A previous (on-site) site assessment for Stuart-Olver-Holtz, prepared by Lozier (1987) indicated that VOCs including: methylene chloride; trichloroethene; 1,1-DCE; 1,1,1-TCA; and tetrachlorethane were detected in groundwater from the monitoring wells MW-2 and MW-3 and low concentrations of chloroform in MW-5. VOCs were also measured in water.

Analyses completed on soil samples collected from test borings and well installations also detected VOCs, including trichloroethene; dibromochloromethane; 1,1,1-TCA; and cis-1,3; dichloropropene. Analyses for metals from the collected soil samples detected chromium, cobalt, nickel, lead, silver, copper, arsenic and cyanide.

Analytical laboratory results presented in "Report on Hydrogeologic Investigations Ruby Gordon Property, H and A of New York" (off-site) indicated the detection of a similar suite of VOC compounds: trichloroethene; 1,1,1-TCA; 1,2-DCE; 1,1-DCE and 1,1-dichloroethane in groundwater samples. The greater VOC concentrations were reported for sample locations along the north wall adjoining the SOH property.

Analytical results for the (off-site) Phase II Environmental Assessment for 50 Commerce Drive, prepared by Larsen Engineers (1992) indicated that some VOCs were detected in one groundwater grab sample from a borehole at the former fire station. However, the VOCs detected were different compounds from the SOH VOCs.

7.20 FIELD EXPLORATIONS SUMMARY

During the RI, various field explorations were completed at SOH in general accordance with the site Field Activities Plan to evaluate surface and subsurface environmental conditions and to provide data pertaining to the extent of nature and extent of on-site contamination. The field explorations included: a geophysical survey; soil vapor study; test boring and monitoring well installations; test pit explorations; water level measurements; hydraulic conductivity testing; water supply well inventory; existing monitoring well assessment; health and safety monitoring; environmental sampling; and community air monitoring.

7.30 PHYSICAL SITE CHARACTERISTICS SUMMARY

7.31 Summary of Surface Features and Surface Water Hydrology

Ground surface elevations at the SOH site range from approximately elevation 524 to 535 feet (NGVD) and the site ground surface generally slopes toward the northwest at approximately a 2 percent slope. The SOH building and paved parking lot occupy most of the site. The remaining areas are generally grass covered with weed or bush cover near the western property line.

Site drainage is controlled primarily by the site storm water sewer system located along Commerce Drive and the drainage swale along the western property line. This south flowing drainage swale begins at Commerce Drive and extends south beyond the Ruby Gordon building. The drainage swale eventually combines with a tributary of Red Creek.

7.32 Geologic and Hydrogeologic Summary

The site geology and hydrogeologic setting are generally consistent with the regional geology and hydrogeologic settings. The site overburden consists of fill soils, which overlie (in descending order) lacustrine silt and clay and glacial till. The glacial till consists of an upper unit which is relatively less dense and sandy and a dense lower till unit which contains a greater percentage of clay and silts. The glacial till deposit is the most prevalent overburden deposit encountered at the site and the upper till unit appears to be the primary water bearing unit in the overburden.

Bedrock underlying the glacial till is the Vernon Formation. The top of bedrock consists of weathered shale and is the second water bearing unit encountered during the RI at the site.

The overburden groundwater and top of bedrock groundwater appear to be under semi-confined conditions at the site. However, unconfined overburden groundwater conditions may exist at the site where the thickness of the overlying lacustrine deposit is absent or too thin to provide a semi-pervious layer. The top of bedrock groundwater hydrogeologic conditions at the site are also apparently represented by semi-confined conditions. The top of bedrock groundwater is bounded above by the semi-pervious (low permeability) lower glacial till and although not encountered as part of the RI study at some point below by a semi-pervious layer of bedrock.

The overburden groundwater at the site flows in a north to northwest direction. The overburden groundwater gradients at the site vary with respect to the observed groundwater elevations. During periods of high groundwater, a southward component of groundwater flow was observed along the Ruby Gordon property line in the vicinity of the building's basement (finished floor elev. 521.77). This southward flow direction is apparently induced when the basement sumps are pumping. It is reported that the sump pumps begin to pump when groundwater reaches approximately elevation 521 feet beneath the floor slab.

The top of bedrock groundwater flow direction is generally towards the northwest. The observed bedrock flow directions did not appear to change with respect to the measured groundwater elevations at the site. The bedrock groundwater gradients are relatively consistent between the low and high groundwater flow conditions measured at the site.

7.40 NATURE AND EXTENT OF CONTAMINATION SUMMARY

The RI multi-media environmental sampling program included collection of samples from the following site media: surface soils; surface water; subsurface soils; overburden groundwater; top of bedrock groundwater; surface water sediments; catch basin and sump sediments; and catch basin and sump water.

Based on the analytical laboratory tests results from the multi-media environmental sampling conducted during the RI, it appears that the primary chemical compound class detected and distributed at the site are the VOCs. The frequently detected VOCs (halogenated aliphatic hydrocarbons) at the site include: trichloroethene; 1,1,1-

Trichloroethane (1,1,1-TCA); 1,2-Dichloroethene (1,2-DCE); Tetrachloroethene (PCE); 1,1-Dichloroethane (1,1-DCA); 1,1-Dichloroethene (1,1 DCE); Vinyl Chloride (VC); and methylene chloride. Trichloroethene was known to be used and released at the site. Other chemical compound classes were detected in various multi-media samples such as semi-volatile organic compounds, however, the detection and distribution of these chemical compounds was limited at the site.

Metals were also detected and distributed in the multi media environmental sampling conducted at the site. It appears that the frequently detected metals include: zinc, lead, nickel, copper, chromium, and cadmium. These metals are also commonly used at metal finishing facilities and some of these metals were documented in spill reports for the SOH site.

7.50 CONTAMINANT FATE AND TRANSPORT SUMMARY

7.51 Summary of Contaminant Persistence and Behavioral Characteristics

Numerous classes of chemical compounds were detected in the environmental media samples at the site. In general, chemical compounds within a given chemical class will behave similarly in the environment. Their behavior is dependent on their physical and chemical properties as well as environmental conditions. The VOCs (halogenated aliphatic hydrocarbons) and several metals are the classes of chemical compounds and metals which were most frequently detected and disturbed at the site.

The frequently detected and widely distributed VOCs (halogenated aliphatic hydrocarbons) at the site are moderately soluble in water and have moderate adsorption characteristics. Therefore, these compounds may leach from site soils and enter the overburden groundwater. In addition, the degradation of several of the chemical compounds in this class may result in numerous transformation chemical compounds which may not have been originally released (spilled) at the site. At the SOH site it is likely that trichloroethene has undergone such a transformation to 1,2-DCE (total) and that the 1,2-DCE has subsequently transformed to vinyl chloride.

The frequently detected and widely distributed metals (zinc, lead, nickel, copper, chromium, and cadmium) at the SOH site are variable in their general properties and subsequently in the environment. Therefore, these metals may range from highly immobile to soluble. It appears that the frequently detected metals at the SOH site are relatively soluble in the site subsurface groundwater based on the wide distribution of these metals at the site. Metals were generally detected in the building source area and the northwest corner of the property. This migration pathway is consistent with the overburden groundwater flow direction at the site.

7.52 Observed Migration Summary

Four (4) primary observed migration pathways were identified. The pathways include:

- leaching and overburden groundwater migration;
- bedrock groundwater transport;
- erosion and sediment transport; and
- volatilization and soil vapor migration.

At the site, direct surface water infiltration through surface soils with subsequent leaching of soluble chemical compounds and metals from previous site spills results in a contaminant migration pathway from the on-site soils into the overburden groundwater. This pathway provides a vertical (through soils) as well as a horizontal (through groundwater flow) migration pathway. Many of these VOCs that were detected in the overburden groundwater samples were also detected in the top of bedrock groundwater samples. However, the contaminant concentrations in the top of bedrock groundwater samples were generally lower than the overburden groundwater concentrations and contamination was not detected in some locations. Therefore, with the exception of wells OW-7R, SOH-IW-1R, and SOH-IW-2R, it appears that there is limited vertical transport of contaminants from the overburden groundwater to the top of bedrock groundwater at the site. Other observed migration pathways identified at the site include erosion and sediment transport, and volatilization and soil gas migration. These migration pathways appear to be limited in areal extent and time of occurrence (i.e.; erosion and sediment transport generally occur during and immediately after rainfall or snowmelt periods).

7.60 QUALITATIVE RISK ASSESSMENT SUMMARY

A qualitative baseline risk assessment was completed based on the information and data obtained during the RI study. Human health and ecological assessments were completed.

7.61 Summary of Human Health Risk Assessment

The qualitative human health evaluation included an exposure assessment, an evaluation of site occurrence, hazard identification and comparison to Federal and New York State SCGs. A detailed summary of the results of the risk assessment, listed by media, with a conclusion as to the apparent need to address each of the media during the Feasibility Study is presented in Section 6.0 of this RI report.

A qualitative risk assessment was completed to assess site conditions, including the likelihood of public exposure to the various media. The potential of exposure to overburden groundwater is moderate and top of bedrock groundwater is low based on the current and anticipated future use of the site and the presence of a public water supply in the area. The exposure potential to subsurface site soils is considered moderate, as it would likely be limited to further construction or maintenance of existing subsurface utilities. There is a low exposure potential to surface water and a low to moderate exposure to surface water sediments due to the potential for children from the nearby residences playing in the drainage swale areas.

7.62 Fish and Wildlife Evaluation Summary

The SOH site and the areas surrounding the site have a limited fish and wildlife population due primarily to the commercial and industrial land use. Based on the concentrations of chemical compounds and metals detected in the various media, it appears that the impact on the area fish and wildlife population is low.

7.70 CONCLUSIONS

Based on the RI summarized above, the following conclusions regarding current site conditions are presented.

- The calculated exposure point concentrations of selected parameters in soil samples collected at the site exceeded ARARs/SCGs. The noted exceedances were generally associated with levels provided in the TAGM 4046 Guidance. Relatively few parameters had an anticipated exposure point concentration above HEAST levels. This indicates that while the site soils may not necessarily pose a significant risk to human health, the potential exists for contamination of groundwater. Based on this information, the areas where site soils contamination were identified may require future remedial attention. In addition, chemical concentrations and metal levels in other site media such as surface water sediments, surface water, and catch basin/sump sediment and water exceeded ARARs. However, these media do not require further study due to limited exceedances above the ARARs.

- The calculated exposure point concentrations of several VOCs and some metals have an anticipated exposure point concentration above ARARs/SCGs in the overburden groundwater at the site. The occurrence of exposure point concentrations within the top of bedrock groundwater are generally below ARARs/SCGs. The presence of chemical substances (VOCs) and metals within the top of bedrock monitoring wells OW-7R and supply wells SOH-IW-1R and SOH-IW-2R indicate that these chemical substances (VOCs) and metals have migrated from the overburden groundwater to the bedrock groundwater. The overburden and bedrock groundwater in the vicinity of the SOH site are not used as a potable water source, based on the water well survey conducted as part of the RI. Overburden groundwater exposure may occur at downgradient discharge locations or at future construction sites where dewatering is required. The top of bedrock groundwater will likely only require institutional controls. The overburden may require future remediation.

Several VOCs, semi-VOCs and metals were detected within the bedrock groundwater with maximum concentrations which exceed SCGs. It appears that exposure to contaminated bedrock groundwater at the site is limited and may not need to be addressed during the FS.

The following site environmental media need to be addressed during the feasibility study. In addition, future air quality considerations may be required to address the potential for VOC volatilization in the Ruby-Gordon basement air, if contaminated water continues to enter the basement. The maximum concentrations above identified SCGs for several VOCs, semi-VOCs, and metals are apparent for the media listed below and therefore, each of these site media should be addressed during the FS.

- surface soils;
- subsurface soils;
- surface water;
- surface water sediments;
- overburden groundwater;
- on-site sump and catch basin sediments; and
- on-site sump and catch basin water.

REFERENCES

References are divided into two groups. Group I lists the specific references cited in the text and Group II lists general references used to develop the RI Report.

GROUP I: SPECIFIC REFERENCES

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ACRONYM LIST

Ag	Silver
AGC	Annual Guideline Concentration
Aqueous	Liquid
ARARs	Applicable or Relevant and Appropriate Requirements
As	Arsenic
AWQC	Ambient Water Quality Criteria
cc	Cubic Centimeters
Cd	Cadmium
CME	Central Mining Equipment
Cn	Cyanide
Co	Cobalt
Cr	Chromium
CRQL	Contract Required Quantitation Limits
Cu	Copper
DCE	Dichloroethene
DNAPL	Dense Non-Aqueous Phase Liquids
EM	Electromagnetic
ER-L	Effects Range-Low
ER-M	Effects Range-Median
eV	Electron Volt
FAP	Field Activity Plan
Fe	Iron
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FOIL	Freedom of Information Law
FWIA	Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites
GC	Gas Chromatograph
GCI	Combustible Gas Indicator
GW series	Groundwater
GZA	GZA GeoEnvironmental of New York
H&A	Haley & Aldrich of New York
HASP	Health and Safety Plan
HCN	Hydrogen Cyanide
HEAST	Health Effects Assessment Summary Table
Hg	Mercury
HRG	Hager-Richter GeoScience, Inc.
HRZ	Contaminant Reduction Zone
I.D.	Inside Diameter
IDLH	Immediately Dangerous to Life or Health
Larsen	Larsen Engineers
LEL	Lowest Effect Level

ACRONYM LIST

LNAPL	light Non-Aqueous Phase Liquids
Lozier	Lozier Architects/Engineers
MC	Methylene Chloride
MCDOH	Monroe County Department of Health
MCLGs	Maximum Contaminant Level Goals
MCLs	Maximum Contaminant Levels
MEK	2-Butanone
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N-values	Standard Penetration Test values
NAAQS	National Ambient Air Quality Standard
NDC	Nothnagle Drilling Co.
NGVD	National Geodetic Vertical Datum
Ni	Nickel
NIOSH	National Institute for Occupational Safety and Health
NOAA	National Oceanographic and Atmospheric Administration
NSM series	On-Site Sump and Catch Basins
NWI	National Wetland Inventory
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
OW series	Monitoring Well Borings
PAH	Polynuclear Aromatic Hydrocarbons
Pb	Lead
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethylene
PELs	Permissible Exposure Limits
PID	Photoionization Detector
PM_{10}	Respirable Dust
Popli	Om P. Popli, P.E., L.S., P.C.
PVC	Polyvinyl Chloride
RELs	Recommended Exposure Limits
RI	Remedial Investigation
RQD	Rock Quality Designation
SB series	Soil Borings
SCGs	Standards, Criteria and Guidelines
Se	Selenium
SED series	Surface Water Sediments
SEL	Severe Effect Level
SGC	Short-Term Guideline Concentration
Slug Tests	Field Permeability Tests
Sn	Tin

ACRONYM LIST

SOH	Stuart-Olver-Holtz
SS Series	Surface Soil
SSLs	Soil Screening Levels
SSO	Site Safety Officer
SW series	Surface Water
TAGM	Technical and Administrative Guidance Memorandum
TAMS	TAMS Consultants, Inc.
TCE	Trichloroethene
TCL	Target Compound List
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TWA	Time Weighted Average
USEPA	United States Environmental Protection Agency
Vadose Zone	Unsaturated Overburden
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds
Zn	Zinc

Table No. 1
Summary of Soil Vapor Results

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

		Tentative Target Compound Identification and Estimated Concentration (ul/l or ppmv)															
Station Location	Peak Organic	1,1 Dichloroethene		1,1-Dichloroethane		2-Butanone		1,2-Dichloroethane		1,1,1-Trichloroethane		Trichloroethene		Tetrachloroethene		Total Xylenes	
	Meter Reading (ppm)	(1,1 DCE)	d.l.	(1,1 DCA)	d.l.	(MEK)	d.l.	(1,2 DCA)	d.l.	(1,1,1 TCA)	d.l.	(TCE)	d.l.	(PCE)	d.l.		d.l.
B0+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
B0+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
B1+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
B1+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
B2+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
B2+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
B2+50 (DUP)	ND	ND	0.25			ND	0.34			0.05		ND	0.19	ND	0.15		
B3+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
B3+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
C0+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
C0+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
C4+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
C4+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
D0+50	ND	0.03		ND	1	ND	0.2	ND	1	ND	1	0.01		ND	0.05	ND	0.2
D1+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
D4+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
D4+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
E0+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
E0+50 (DUP)	ND	ND	0.25			ND	0.34			0.07		ND	0.19	ND	0.15		
E1+00	1	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
E4+00	2	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.02		0.09		ND	0.2
E4+00 (DUP)	2	ND	0.25			ND	0.34			0.51		0.03		0.04			
E4+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
F1+00	1	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
F4+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.2		9		0.2	
F4+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	0.3		ND	0.2
E4+85	1	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.04		0.8		ND	0.2
G1+00	9	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
G1+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
G2+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
G3+00	Water encountered (no vapor sample collected)																
G3+50	85	0.2		ND	1	ND	0.2	ND	1	7.4		0.03		1.7		7.3	
G3+50 (DUP)	85	0.28				ND	1.7			8.8		ND	0.93	0.8			
G4+00	1	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.02		ND	0.05	ND	0.2
G4+50	16	1.1		ND	25	ND	5	ND	25	ND	25	0.5		87		ND	5.0
G4+50 (DUP)	16	1				ND	2.9			2.9		ND	0.4	21			

NOTES:

1) ND = Compound not detected above listed detection limit.

2) Soil gas samples collected at approximately 4 feet below the ground surface.

3) d.l. = Compound detection limit

4) (DUP) = Duplicate soil vapor analysis done by H2M Laboratories Inc. for selected parameters.

5) Shaded areas indicate concentrations above listed detection limit.

Table No. 1
Summary of Soil Vapor Results

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Station Location	Peak Organic	Tentative Target Compound Identification and Estimated Concentration (ul/l or ppmv)															
	Meter Reading (ppm)	1,1 Dichloroethene (1,1 DCE)	d.l.	1,1-Dichloroethane (1,1 DCA)	d.l.	2-Butanone (MEK)	d.l.	1,2-Dichloroethane (1,2 DCA)	d.l.	1,1,1-Trichloroethane (1,1,1 TCA)	d.l.	Trichloroethene (TCE)	d.l.	Tetrachloroethene (PCE)	d.l.	Total Xylenes	d.l.
G4+65	10	0.8		ND	25	ND	5	ND	25	ND	25	0.2		10		ND	5.0
H1+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
H2+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
H2+50	1	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
H3+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.03		ND	0.05	ND	0.2
H3+50	1	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.05		ND	0.05	ND	0.2
H4+00	1	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.05		ND	0.05	ND	0.2
H4+50	9	5		ND	2.5	ND	0.5	ND	2.5	71		6		78		ND	0.5
H4+65	6	3		ND	2.5	ND	0.5	ND	2.5	40		2		20		ND	0.5
I1+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
I2+00	ND	13		ND	1	ND	0.2	ND	1	ND	1	0.05		ND	0.05	ND	0.2
I2+50	4	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.01		1		ND	0.2
I2+50 (DUP)	4	ND	0.25			ND	0.34			0.05		ND	0.19	0.3			
I3+00	Water encountered (no vapor sample collected)																
I3+50	Water encountered (no vapor sample collected)																
I4+00	No vapor draw (no sample collected)																
I4+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
I4+85	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
J2+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
J2+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
J3+00	Water encountered (no sample collected)																
J3+50	1	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.01		ND	0.05	ND	0.2
J4+00	7	ND	2.5	ND	250	ND	50	ND	250	ND	250	73		>500		ND	50.0
J4+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.2		ND	0.05	ND	0.2
K2+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
K2+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	0.1		0.2	
K3+00	Water encountered (no sample collected)																
K3+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	9		ND	0.01	ND	0.05	ND	0.2
K4+00	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.03		ND	0.05	ND	0.2
K4+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	ND	0.01	ND	0.05	ND	0.2
L2+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.01		ND	0.05	0.3	
L3+00	ND	10		ND	1	ND	0.2	ND	1	ND	1	0.02		ND	0.05	ND	0.2
L3+50	1	3		ND	1	ND	0.2	ND	1	ND	1	0.05		ND	0.05	ND	0.2
L4+00	8	7		ND	25	ND	5	ND	25	270		11		ND	1.2	ND	5.0
L4+00 (DUP)	9	12.6				ND	1.1			159		8.2		ND	0.49		
L4+50	ND	ND	0.01	ND	1	ND	0.2	ND	1	ND	1	0.06		ND	0.05	ND	0.2

NOTES:

1) ND = Compound not detected above listed detection limit.
2) Soil gas samples collected at approximately 4 feet below the ground surface.
3) d.l. = Compound detection limit
4) (DUP) = Duplicate soil vapor analysis done by H2M Laboratories Inc. for selected parameters.
5) Shaded areas indicate concentrations above listed detection limit.

Table No. 2
Summary of Soil Boring Installations

Remedial Investigation Report
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Test Boring	Date Completed	Ground Surface Elevation (ft)	Thickness of Deposits Encountered (ft)				Top of Upper Till Elev. (ft)	Top of Lower Till Elev. (ft)	Top of Weathered Bedrock (ft)	Depth of Boring (ft)
			Fill	Lacustrine	Upper Till	Lower Till				
SB-1	10/18/94	533.7	1.7	2.9	17.4	11.0+	529.1	511.7	--	30.0
SB-2	10/17/94	533.4	6.8	--	15.6	2.8+	526.6	511.0	--	25.2
SB-3	10/5/94	528.5	7.0	7.0	10.0	19.0	514.5	504.5	485.5	50.4
SB-4	10/19/94	531.4	5.7	--	16.1	8.2+	525.7	509.6	--	30.0
SB-5	10/13/94	529.5	4.0	--	14.0	12.0+	525.5	511.5	--	30.0
SB-6	10/11/94	527.9	2.0	4.0	28.0	8.0	521.9	493.9	485.9	42.3
SB-7	10/5/94	527.8	1.5	1.5	22.0	16.0	524.8	502.8	486.8	46.0
SB-8	10/12/94	528.2	5.0	2.0	25.0	9.0	521.2	496.2	487.2	42.8
SB-9	10/7/94	526.0	4.0	5.0	6.0	13.3+	517.0	511.0	--	28.3
SB-10	10/10/94	527.3	6.0	7.7	7.8	8.2+	513.6	505.8	--	29.7
SB-11	10/10/94	527.8	4.0	8.5	19.5	4.0+	515.3	495.8	--	36.0
SB-12	10/4/94	528.7	4.0	9.0	25.0	4.0	515.7	490.7	486.7	45.3
SB-13	10/3/94	529.4	6.0	11.5	4.5	13.7+	511.9	507.4	--	35.7
SB-14	10/11/94	530.4	6.0	2.5	14.0	5.9+	521.9	507.9	--	28.4
SB-15	10/13/94	528.2	12.0	--	16.0	12.5	516.2	500.2	487.7	41.0
SB-16	6/20/95	526.0	2.2	7.8	12.0	13.2	516.0	504.0	490.8	44.0
SB-17	6/19/95	531.3	15.3	--	4.0	16.5	516.0	512.0	495.5	42.1

NOTES:
1) The symbol "+" following a number indicates the thickness encountered, and not the overall thickness of the deposit, since the boring did not penetrate the bottom of the deposit.
2) The dashed symbol, "--", indicates that the unit was not encountered.
3) See test boring logs (Appendix C) for additional information.

Table No. 3
Summary of Overburden Monitoring Well Installation Details

Remedial Investigation Report
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Well Name	Date of Installation	Ground Surface Elevation (ft)	Ref. Elev. (ft)	Thickness of Deposits Encountered (ft)				Top of Upper Till Elev. (ft)	Top of Lower Till Elev. (ft)	Top of Weathered Bedrock Elev. (ft.)	Depth of Boring (ft)	Diameter Of Well Casing (in)	Length of Well Screen (ft)	Well Intake Depth/Elevations				Hydraulic Conductivity (cm/sec)
				Fill	Lacustrine	Upper Till	Lower Till							Top of Sandpack Depth (ft)	Top of Sandpack Elev. (ft)	Bottom of Sandpack Depth (ft)	Bottom of Sandpack Elev. (ft)	Rising Head
OW-1S	11/1/94	529.0	530.8	2.8	3.2	16.8	11.9	523.0	506.2	494.3	35.0	4.0	9.5	12.0	517.0	24.5	504.5	9.2E-04
OW-2S	11/2/94	531.8	533.6	10.0	--	10.0	--	521.8	--	--	21.5	4.0	5.0	14.0	517.8	21.5	510.3	6.1E-04
OW-3S	11/4/94	523.3	527.2	4.7	17.4	1.6+	--	501.2	--	--	23.8	4.0	4.5	16.0	507.3	24.0	499.3	3.5E-03
OW-4S	11/21/94	530.0	531.8	6.0	8.8	7.8	2.9+	515.2	507.4	--	25.5	4.0	10.0	14.0	516.0	25.5	504.5	9.5E-04
OW-5S	11/2/94	526.0	528.7	1.0	9.5	4.1	15.4+	515.5	511.4	--	30.0	4.0	9.5	10.0	516.0	23.0	503.0	2.3E-04
OW-6S	11/3/94	529.0	531.0	2.6	5.8	14.1	10.9+	520.6	506.5	--	33.4	4.0	5.0	7.0	522.0	15.0	514.0	8.8E-05
OW-7S	11/28/94	528.1	527.5	2.4	4.0	24.6	--	521.7	497.1	--	31.0	4.0	5.0	23.5	504.6	31.0	497.1	2.6E-04
OW-8S	6/27/95	525.6	528.0	6.0	--	26.0	1.5+	519.6	496.0	--	33.5	4.0	5.0	25.0	500.6	32.5	493.1	1.5E-04
OW-9S	6/21/95	525.4	524.9	2.0	9.8	12.9	4.2+	513.6	500.7	--	28.9	2.0	5.0	18.0	507.4	25.5	499.9	3.6E-03
OW-10S	6/22/95	531.6	531.0	7.6	--	9.4	7.5+	524.0	514.6	--	24.5	2.0	5.0	10.0	521.6	17.5	514.1	1.0E-03
OW-11S	6/23/95	528.7	530.8	5.6	2.4	4.0	18.0	520.0	516.7	498.7	32.2	2.0	5.0	5.5	523.2	13.0	515.7	3.8E-03
B-101-OW	12/31/91	528.4	527.9	4.0	8.9	2.1+	--	515.5	--	--	15.0	2.0	10.0	3.0	525.4	15.0	513.4	4.5E-03
OW-LS	11/10/92	533.4	533.1	0.3	--	11.7+	--	--	--	--	12.0	2.0	10.0	1.0	532.4	12.0	521.4	8.4E-03
MW-2	1/15/87	529.4	532.3	2.0	14.0	9.0+	--	515.4	--	--	--	2.0	--	--	--	--	--	4.9E-03
MW-3	1/15/87	529.1	529.0	2.0	6.5	5.9	15.6+	520.6	--	--	30.0	2.0	10.0	6.5	522.6	18.5	510.6	8.5E-04
MW-5	1/19/87	527.4	530.3	4.0	12.7	2.3+	--	514.7	--	--	19.0	2.0	--	--	--	--	--	3.2E-04

NOTES:

1) The symbol "+" following a number indicates the thickness encountered, and not the overall thickness of the deposit, since the boring did not penetrate the bottom of the deposit.

2) The monitoring well label OW-LS was originally identified as "MW-2" in a Phase II Environmental Assessment Report completed by Erdman, Anthony and Associates dated December 1992 for the property located at 3711 West Henrietta Road, Rochester, NY.

3) The dashed symbol "--" indicates that the unit was not encountered.

4) Hydraulic conductivity data calculated by H. Bouwer 1989 method. See Appendix F for additional data.

Table No. 4
Summary of Top of Bedrock
Monitoring Well Installation Details

Remedial Investigation Report
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Well Name	Date of Installation	Ground Surface Elevation (ft)	Ref. Elev. (ft)	Thickness of Deposits Encountered (ft)				Top of Upper Till Elev. (ft)	Top of Lower Till Elev. (ft)	Top of Severely Weathered Bedrock Elev. (ft)	Depth of Boring (ft)	Diameter Of Well Casing (in)	Length of Well Screen (ft)	Well Intake Depth/Elevations				Hydraulic Conductivity (cm/sec)
														Top of Sandpack		Bottom of Sandpack		
				Fill	Lacustrine	Upper Till	Lower Till							Depth (ft)	Elev. (ft)	Depth (ft)	Elev. (ft)	Rising Head
OW-1R	11/8/94	529.2	531.15	2.3	3.7	17.7	13.2	523.2	505.5	492.3	42.0	4.0	5.5	33.5	495.7	42.0	487.2	2.8E-04
OW-2R	11/10/94	532.0	533.89	10.0	--	10.0	14.7	522.0	512.0	497.3	47.5	4.0	5.0	36.5	495.5	44.5	487.5	4.2E-03
OW-3R	11/14/94	525.5	527.04	4.7	12.6	4.7	17.7	508.2	503.5	485.8	48.2	4.0	5.0	37.0	488.5	45.0	480.5	1.2E-03
OW-4R	11/21/94	529.6	531.22	6.0	9.0	8.5	21.2	514.6	506.1	484.9	50.3	4.0	5.0	42.0	487.6	50.3	479.3	1.3E-03
OW-7R	11/23/94	528.2	527.85	2.4	4.0	24.3	11.2	521.8	497.5	486.3	47.0	4.0	5.0	39.0	489.2	47.0	481.2	1.1E-02
IW-1R	UNKNOWN	--	528.39	--	--	--	--	--	--	--	57.3	8.0	--	--	--	--	--	NO TEST
IW-2R	UNKNOWN	--	528.39	--	--	--	--	--	--	--	41.8	6.0	--	--	--	--	--	NO TEST

NOTES:

1) Ground Surface Elevations for IW-1R and IW-2R are established as the finished floor elevation of the Metalade building.

2) Subsurface boring logs were not available for review for IW-1R and IW-2R.

3) Hydraulic Conductivity tests were not completed for IW-1R and IW-2R due to down-hole pump equipment obstruction.

4) The location and the length of the well intake for IW-1R and IW-2R is unknown.

5) Hydraulic conductivity data calculated by H. Bouwer, 1989 method. See Appendix F for additional data.

Table No. 5
Summary of Groundwater Elevations for Monitoring Wells

Remedial Investigation Report
Stuart - Olver - Holtz
Site No. 8-28-079
Henriette, New York

Well	Reference	November, 18 1994		January 19,1995		February 24, 1995		August 24, 1995		October 23, 1995	
Name	Elev. (ft.)	Depth(ft.)	Elev (ft.)	Depth(ft.)	Elev (ft.)	Depth(ft.)	Elev (ft.)	Depth(ft.)	Elev (ft.)	Depth(ft.)	Elev (ft.)
OW-1S	530.76	9.81	520.95	9.18	521.58	8.88	521.88	10.76	520.00	8.52	522.24
OW-1R	531.15	12.78	518.37	12.08	519.07	11.70	519.45	13.83	517.32	13.54	517.61
OW-2S	533.57	9.58	523.99	6.80	526.77	6.26	527.31	7.98	525.59	5.78	527.79
OW-2R	533.89	16.62	517.27	14.83	519.06	14.40	519.49	16.60	517.29	16.25	517.64
OW-3S	527.19	12.76	514.43	11.26	515.93	10.61	516.58	13.04	514.15	11.91	515.28
OW-3R	527.04	9.46	517.58	8.88	518.16	8.50	518.54	10.48	516.56	10.42	516.62
OW-4S	531.79			9.18	522.61	9.14	522.65	12.20	519.59	9.84	521.95
OW-4R	531.22			12.23	518.99	11.82	519.40	14.00	517.22	13.66	517.56
OW-5S	528.72	15.27	513.45	15.04	513.68	14.89	513.83	15.75	512.97	14.43	514.29
OW-6S	530.97			7.00	523.97	7.90	523.07	10.31	520.66	7.44	523.53
OW-7S	527.48			5.64	521.84	6.22	521.26	7.88	519.60	6.03	521.45
OW-7R	527.85			8.82	519.03	8.42	519.43	10.59	517.26	10.25	517.60
OW-8S	527.97							9.37	518.60	7.34	520.63
OW-9S	524.88							4.44	520.44	2.51	522.37
OW-10S	530.99							9.02	521.97	9.03	521.96
OW-11S	530.76							9.10	521.66	6.62	524.14
OW-B101	527.93							6.38	521.55	3.92	524.01
OW-LS	533.07							7.41	525.66	5.21	527.86
MW-2	532.30							13.58	518.72	11.69	520.61
MW-3	528.97							5.58	523.39	2.45	526.52
MW-5	530.29							14.85	515.44	12.39	517.90
IW-1R	528.39							14.35	514.04	14.23	514.16
IW-2R	528.39							14.15	514.24	13.96	514.43
SUMP 1	521.77								>521.07	1.22	520.55
SUMP 2	521.77								>520	1.00	520.77
SUMP 3	521.77								520.87	1.73	520.04
CREEK	524.85									1.20	523.65

Notes:
1) Creek elevation is measured from the top of the catchbasin.
2) See Figure No. 3 for Well Locations.
3) Survey information provided by OM P. Popli, P.E., L.S., P.C. Consulting Engineers & Surveyors.
4) Elevations based on the 1929 adjustment of the National Geodetic Vertical Datum.

Table No. 6
Summary of Hydraulic Conductivity Results

Remedial Investigation Report
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Monitoring Well	Screened Zone	Rising Head Test Results (ft/min)	Rising Head Test Results (cm/sec)
OW-1S	Upper/Lower Till Interface	1.8E-03	9.2E-04
OW-2S	Upper Till	1.2E-03	6.1E-04
OW-3S	Upper Till	6.9E-03	3.5E-03
OW-4S	Upper/Lower Till Interface	1.9E-03	9.5E-04
OW-5S	Upper/Lower Till Interface	4.5E-04	2.3E-04
OW-6S	Upper Till	1.7E-04	8.8E-05
OW-7S	Upper Till	5.1E-04	2.6E-04
OW-8S	Upper Till	2.9E-04	1.5E-04
OW-9S	Upper/Lower Till Interface	7.1E-03	3.6E-03
OW-10S	Upper Till	2.0E-03	1.0E-03
OW-11S	Lacustrine/Upper/Lower Till Interfaces	7.6E-03	3.8E-03
OW-LS	Upper Till	1.7E-02	8.4E-03
B-101-OW	Upper Till	8.8E-03	4.5E-03
MW-2	Upper Till	4.5E-03	4.9E-03
MW-3	Upper Till	1.7E-03	8.5E-04
MW-5	Upper Till	6.3E-04	3.2E-04
OW-1R	Lower Till/Top of Weathered Rock Interface	5.5E-04	2.8E-04
OW-2R	Top of Weathered Rock	8.3E-03	4.2E-03
OW-3R	Lower Till/Top of Weathered Rock Interface	2.3E-03	1.2E-03
OW-4R	Lower Till/Top of Weathered Rock Interface	2.5E-03	1.3E-03
OW-7R	Lower Till/Top of Weathered Rock Interface	2.1E-02	1.1E-02

Notes:

1) Data calculated using the H. Bouwer, 1989 method.

2) For additional information see Appendix F.

Table No. 7
Target Compound List for ASP93

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

CAS Number	Parameter	Contract Required Quantitation Limits	
		Water (ug/l)	Low Soil/Sediment (ug/kg)
	Volatile Organic Compounds		
74-87-3	Chloromethane	10	10
74-83-9	Bromomethane	10	10
75-01-4	Vinyl chloride	10	10
75-00-3	Chloroethane	10	10
75-09-2	Methylene chloride	10	10
67-64-1	Acetone	10	10
75-15-0	Carbon Disulfide	10	10
75-35-4	1,1-Dichloroethene	10	10
75-34-3	1,1-Dichloroethane	10	10
540-59-0	1,2-Dichloroethene(Total)	10	10
67-66-3	Chloroform	10	10
107-06-2	1,2-Dichloroethane	10	10
78-93-3	2-Butanone	10	10
71-55-6	1,1,1-Trichloroethane	10	10
56-23-5	Carbon Tetrachloride	10	10
75-27-4	Bromodichloromethane	10	10
78-87-5	1,2-Dichloropropane	10	10
10061-01-5	cis-1,3-Dichloropropene	10	10
79-01-6	Trichloroethene	10	10
124-48-1	Dibromochloromethane	10	10
79-00-5	1,1,2-Trichloroethane	10	10
71-43-2	Benzene	10	10
10061-02-6	trans-1,3-Dichloropropene	10	10
75-25-2	Bromoform	10	10
108-10-1	4-Methyl-2-Pentanone	10	10
591-78-6	2-Hexanone	10	10
127-18-4	Tetrachloroethene	10	10
79-34-5	1,1,2,2-Tetrachloroethane	10	10
108-88-3	Toluene	10	10
108-90-7	Chlorobenzene	10	10
100-41-4	Ethylbenzene	10	10
100-42-5	Styrene	10	10
1330-20-7	Xylene (total)	10	10
	Semi-Volatile Organic Compounds		
108-95-2	Phenol	10	330
111-44-4	bis(2-Chloroethyl) Ether	10	330
95-57-8	2-Chlorophenol	10	330
541-73-1	1,3-Dichlorobenzene	10	330
106-46-7	1,4-Dichlorobenzene	10	330
95-50-1	1,2-Dichlorobenzene	10	330
95-48-1	2-Methylphenol	10	330
108-60-1	2,2'-oxybis (1-Chloropropane)	10	330
106-44-5	4-Methylphenol	10	330
621-64-7	N-Nitroso-Di-n-Propylamine	10	330
67-72-1	Hexachloroethane	10	330
98-95-3	Nitrobenzene	10	330
78-59-1	Isophorone	10	330
88-75-5	2-Nitrophenol	10	330
105-67-9	2,4-Dimethylphenol	10	330
111-91-1	bis(2-Chloroethoxy)Methane	10	330
120-83-2	2,4-Dichlorophenol	10	330
120-82-1	1,2,4-Trichlorobenzene	10	330
91-20-3	Naphthalene	10	330
106-47-8	4-Chloroaniline	10	330
87-68-3	Hexachlorobutadiene	10	330

Table No. 7
Target Compound List for ASP93

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

CAS Number	Parameter	Contract Required Quantitation Limits Water (ug/l)	Low Soil/Sediment (ug/kg)
	Semi-Volatile Organic Compounds		
59-50-7	4-Chloro-3-Methylphenol	10	330
91-57-6	2-Methylnaphthalene	10	330
77-47-4	Hexachlorocyclopentadiene	10	330
88-06-2	2,4,6-Trichlorophenol	10	330
95-95-4	2,4,5-Trichlorophenol	25	800
91-58-1	2-Chloronaphthalene	10	330
88-74-4	2-Nitroaniline	25	800
131-11-3	Dimethyl Phthalate	10	330
208-96-8	Acenaphthylene	10	330
606-20-2	2,6-Dinitrotoluene	10	330
99-09-2	3-Nitroanilene	25	800
83-32-9	Acenaphthene	10	330
51-28-5	2,4-Dinitrophenol	25	800
100-02-07	4-Nitrophenol	25	800
132-64-9	Dibenzofuran	10	330
121-14-2	2,4-Dinitrotoluene	10	330
84-66-2	Diethylphthalate	10	330
7005-72-3	4-Chlorophenyl-phenyl ether	10	330
86-73-7	Fluorene	10	330
100-01-6	4-Nitroaniline	25	800
534-62-1	4,6-Dimitro-2-Methyphenol	25	800
86-30-6	N-Nitrosodiphenylamine	10	330
101-55-3	4-Bromophenyl-phenylether	10	330
118-74-1	Hexachlorobenzene	10	330
87-86-5	Pentachlorophenol	25	800
85-01-8	Phenanthrene	10	330
120-12-7	Anthracene	10	330
	Carbazole	10	330
84-74-2	Di-n-Butylphthalate	10	330
206-44-0	Fluoranthene	10	330
129-00-0	Pyrene	10	330
85-68-7	Butylbenzylphthalate	10	330
91-94-1	3,3'-Dichlorobenzidine	10	330
56-55-3	Benzo (a) Anthracene	10	330
218-01-9	Chrysene	10	330
117-81-7	Bis (2-Ethylhexyl) Phthalate	10	330
117-84-0	Di-n-Octyl Phthalate	10	330
205-99-2	Benzo (b) Fluoranthene	10	330
207-08-9	Benzo (k) Fluoranthene	10	330
50-32-8	Benzo (a) Pyrene	10	330
193-39-5	Indeno (1,2,3-cd) Pyrene	10	330
53-70-3	Dibenzo (a,h) Anthracene	10	330
191-24-2	Benzo(g,h,i) Perylene	10	330
	Pesticides		
319-84-6	alpha-BHC	0.05	1.7
319-85-7	beta-BHC	0.05	1.7
319-86-8	delta-BHC	0.05	1.7
58-89-9	gamma-BHC (Lindane)	0.05	1.7
76-44-8	Heptachlor	0.05	1.7
309-00-2	Aldrin	0.05	1.7
1024-57-3	Heptaclor Epoxide	0.05	1.7
959-98-8	Endosulfan I	0.05	1.7
60-57-1	Dieldrin	0.10	3.3
72-55-9	4,4'-DDE	0.10	3.3
72-20-8	Endrin	0.10	3.3
33213-65-9	Endosulfan II	0.10	3.3
72-54-8	4,4'-DDD	0.10	3.3

Table No. 7
Target Compound List for ASP93

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

CAS Number	Parameter	Contract Required Quantitation Limits Water (ug/l)	Contract Required Quantitation Limits Low Soil/Sediment (ug/kg)
	Pesticides		
1031-07-8	Endosulfan Sulfate	0.10	3.3
50-29-3	4,4'-DDT	0.10	3.3
72-43-5	Methoxychlor	0.5	17.0
53594-70-5	Endrin Ketone	0.10	3.3
7421-36-3	Endrin Aldehyde	0.10	3.3
5103-71-9	alpha-Chlordane	0.5	1.7
5103-74-2	gamma-Chlordane	0.5	1.7
8001-35-2	Toxaphene	5.0	170.0
	PCB's		
12674-11-2	Aroclor-1016	1.0	33.0
11104-28-2	Aroclor-1221	2.0	67.0
11141-16-5	Aroclor-1232	1.0	33.0
53469-21-9	Aroclor-1242	1.0	33.0
12672-29-6	Aroclor-1248	1.0	33.0
11097-69-1	Aroclor-1254	1.0	33.0
11096-82-5	Aroclor-1260	1.0	33.0
	Metals		
	Aluminum	200	
	Antimony	60	
	Arsenic	10	
	Barium	200	
	Berylium	5	
	Cadmium	5	
	Calcium	5000	
	Chromium	10	
	Cobalt	50	
	Copper	25	
	Iron	100	
	Lead	5	
	Magnesium	5000	
	Manganese	15	
	Mercury	0.2	
	Nickel	40	
	Potassium	5000	
	Selenium	5	
	Silver	10	
	Sodium	5000	
	Thallium	10	
	Vanadium	50	
	Zinc	20	
	Cyanide	10	

Notes:
1) Contract Required Quantitation Limits (CRQL) obtained from NYSDEC ASP dated 9/93.
2) The values in this table are quantitation limits, not absolute detection limits. The quantitation limits in this table are set at the concentrations in the sample equivalent to the concentration of the lowest calibration standard analyzed for each analyte.
3) Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.
4) Quantitation limits for soil/sediments are based on net weight. The quantitation limits calculated by the laboratory for the soil/sediment, calculated on a dry weight basis as required by the contract, will be higher.

Table No. 8
Summary of Environmental Samples

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Sample Location Identification	Date Sampled	Media Sampled	Volatiles	Semi-Volatiles	PCB/PEST	Metals	Cyanide	TOC	Hardness	Alkalinity	MS/MSD	DUPLICATE
SOH-SB1-2/4	10/18/94	SOIL	X	X	X	X	X	X				
SOH-SB1-22/24	10/18/94	SOIL	X									
SOH-SB1-24/26	10/18/94	SOIL		X	X	X	X	X				
SOH-SB4-0/2	10/19/94	SOIL	X	X	X	X	X	X				
SOH-SB4-18/20	10/19/94	SOIL	X	X	X	X	X	X				
SOB-SB4-24/26	10/19/94	SOIL	X	X	X	X	X	X				
SOH-SB7A-0.5/2	10/24/94	SOIL			X							
SOH-SB8A-8/10	10/24/94	SOIL	X									
SOH-SB8A-10/12	10/24/94	SOIL		X	X	X	X					
SOH-SB16-12/14	6/20/95	SOIL	X	X	X	X	X					
SOH-SB16-26/28	6/20/95	SOIL	X	X	X	X	X					
SOH-SB17-16/18	6/19/95	SOIL	X	X	X	X	X					
SOH-OW2S-32/34	11/9/94	SOIL		X	X	X	X					
SOH-OW2S-34/36	11/9/94	SOIL	X									
SOH-OW4S-8/10	11/22/94	SOIL	X	X	X	X	X	X				
SOH-OW5S-14/16	11/2/94	SOIL	X	X	X	X	X					
SOH-OW6S-0/2	11/28/94	SOIL		X	X	X	X					
SOH-OW6S-2/4	11/3/94	SOIL		X								
SOH-OW6S-10/12	11/3/94	SOIL	X	X	X	X	X					
SOH-OW6S-20/22	11/4/94	SOIL	X	X	X	X	X					
SOH-OW7S-8/10	11/28/94	SOIL	X	X	X	X	X	X				
SOH-OW7S-28/30	11/28/94	SOIL	X	X	X	X	X	X				
SOH-OW8S-6/12	6/26/95	SOIL	X	X	X	X	X					
SOH-OW8S-32/34	6/26/95	SOIL	X	X	X	X	X					
SOH-OW9S-8/10	6/20/95	SOIL	X	X	X	X	X					
SOH-OW10S-18/21	6/21/95	SOIL	X	X	X	X	X					
SOH-OW11S-26/32	6/22/95	SOIL	X	X	X	X	X					
SOH-OW1R-6/8	10/20/94	SOIL	X	X	X	X	X					
SOH-OW1R-20/22	10/20/94	SOIL	X									
SOH-OW1R-22/23	10/20/94	SOIL		X	X	X	X	X				
SOH-OW4R-32/34	11/15/94	SOIL	X									
SOH-OW4R-34/36	11/15/94	SOIL		X	X	X	X					

Table No. 8
Summary of Environmental Samples

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Sample Location Identification	Date Sampled	Media Sampled	Volatiles	Semi-Volatiles	PCB/PEST	Metals	Cyanide	TOC	Hardness	Alkalinity	MS/MSD	DUPLICATE
SOH-OW4R-42/44	11/18/94	SOIL	X	X	X	X	X	X				
SOH-OW7R-34/36	11/17/94	SOIL	X	X	X	X	X					
SOH-OW7R-40/42	11/22/94	SOIL	X	X	X	X	X	X				
SOH-TP-1	11/3/94	SOIL	X	X	X	X	X				X	
SOH-TP-2	11/3/94	SOIL	X	X	X	X	X					
SOH-TP-3	11/3/94	SOIL	X	X	X	X	X					
SOH-TP-4	11/3/94	SOIL	X	X	X	X	X					
SOH-TP-5	11/3/94	SOIL	X	X	X	X	X					
SOH-TP-6	11/3/94	SOIL	X	X	X	X	X					
SOH-NSM-1	10/27/94	WATER	X	X	X	X	X		X	X		
SOH-NSM-2	10/27/94	SOIL	X	X	X	X	X					
SOH-NSM-3	10/27/94	SOIL	X	X	X	X	X					
SOH-NSM-4	10/25/94	WATER	X	X	X	X	X		X	X		
SOH-SS1-0	10/25/94	SOIL	X	X	X	X	X					
SOH-SS2-0	10/26/94	SOIL	X	X	X	X	X					
SOH-SS3-0	10/26/94	SOIL	X	X	X	X	X					
SOH-SS4-0	10/26/94	SOIL	X	X	X	X	X					
SOH-SS5-0	10/26/94	SOIL	X	X	X	X	X					
SOH-SS6-0	10/26/94	SOIL	X	X	X	X	X					
SOH-SW-1	10/26/94	WATER	X	X	X	X	X					
SOH-SW-2	10/25/94	WATER	X	X	X	X	X		X	X		
SOH-SW-3	10/26/94	WATER	X	X	X	X	X					
RUBY GORDON-SUMP-1	10/27/94	WATER	X	X	X	X	X		X	X		
RUBY GORDON-SUMP-2	10/27/94	WATER	X	X	X	X	X		X	X		
RUBY GORDON-SUMP-3	10/27/94	WATER	X	X	X	X	X		X	X		

Table No. 8
Summary of Environmental Samples

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henriette, New York

Sample Location Identification	Date Sampled	Media Sampled	Volatiles	Semi-Volatiles	PCB/PEST	Metals	Cyanide	TOC	Hardness	Alkalinity	MS/MSD	DUPLICATE
SOH-SED1-0/6	10/25/94	SOIL	X	X	X	X	X	X				
SOH-SED2-0/6	10/25/94	SOIL	X	X	X	X	X	X				
SOH-SED3-0/6-MS(D)	10/25/94	SOIL	X	X	X	X	X				X	
SOH-SED4-0/6	10/25/94	SOIL	X	X	X	X	X					
OW-1S	7/6/95	WATER	X	X	X	X	X		X	X		
OW-2S	7/6/95	WATER	X	X	X	X	X		X	X		
OW-3S	7/7/95	WATER	X	X	X	X	X		X	X		
OW-4S	7/7/95	WATER	X	X	X	X	X		X	X	X	
OW-5S	7/6/95	WATER	X	X	X	X	X		X	X		SOH-1-DUP1
OW-6S	7/7/95	WATER	X	X	X	X	X		X	X		
OW-7S	7/10/95	WATER	X	X	X	X	X		X	X		
OW-8S	7/7/95	WATER	X	X	X	X	X		X	X		
OW-9S	7/5/95	WATER	X	X	X	X	X		X	X		
OW-10S	7/5/95	WATER	X	X	X	X	X		X	X		
OW-11S	7/5/95	WATER	X	X	X	X	X		X	X		
MW-2	7/10/95	WATER	X	X	X	X	X		X	X		
MW-3	7/10/95	WATER	X	X	X	X	X		X	X		
MW-5	7/10/95	WATER	X	X	X	X	X		X	X		
B101-OW	7/5/95	WATER	X	X	X	X	X		X	X		
OW-LS (MW-2)	7/13/95	WATER	X	X	X	X	X		X	X		
OW-1R	7/11/95	WATER	X	X	X	X	X		X	X		
OW-2R	7/11/95	WATER	X	X	X	X	X		X	X	X	
OW-3R	7/11/95	WATER	X	X	X	X	X		X	X		
OW-4R	7/13/95	WATER	X	X	X	X	X		X	X		
OW-7R	7/13/95	WATER	X	X	X	X	X		X	X		SOH-1-DUP2
IW-1R	7/12/95	WATER	X	X	X	X	X		X	X		
IW-2R	7/12/95	WATER	X	X	X	X	X		X	X		
OW-1S	10/3/95	WATER	X			X						
OW-2S	10/4/95	WATER	X			X						
OW-3S	10/4/95	WATER	X			X						
OW-4S	10/4/95	WATER	X			X						
OW-5S	10/3/95	WATER	X			X						

Table No. 8
Summary of Environmental Samples

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henriette, New York

Sample Location Identification	Date Sampled	Media Sampled	Volatiles	Semi-Volatiles	PCB/PEST	Metals	Cyanide	TOC	Hardness	Alkalinity	MS/MSD	DUPLICATE
OW-6S	10/3/95	WATER	X			X						
OW-7S	10/4/95	WATER	X	X		X						
OW-8S	10/3/95	WATER	X			X						SOH-2-DUP1
OW-9S	10/2/95	WATER	X			X						
OW-10S	10/2/95	WATER	X			X						
OW-11S	10/2/95	WATER	X			X						
MW-2	10/3/95	WATER	X			X						
MW-3	10/3/95	WATER	X			X						
MW-5	10/3/95	WATER	X			X						
B101-OW	10/2/95	WATER	X			X						
OW-LS (MW-2)	10/2/95	WATER	X			X						
OW-1R	10/4/95	WATER	X			X						
OW-2R	10/4/95	WATER	X			X						
OW-3R	10/5/95	WATER	X			X						
OW-4R	10/5/95	WATER	X			X						
OW-7R	10/5/95	WATER	X	X		X						SOH-2-DUP2
IW-1R	10/6/95	WATER	X			X						
IW-2R	10/6/95	WATER	X			X						
RUBY GORDON-SUMP-1	10/5/95	WATER	X									
RUBY GORDON-SUMP-2	10/5/95	WATER	X									
RUBY GORDON-SUMP-3	10/5/95	WATER	X									

Table No. 9
Summary of Surface Soil Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	SED-1 0-6" 10/25/94	Q	SED-1 RE 0-6" 10/25/94	Q	SED-4 0-6" 10/25/94	Q	SED-4 RE 0-6" 10/25/94	Q	SS-1 0" 10/25/94	Q	SS-1 RE 0" 10/25/94	Q	SS-1 DL 0" 10/25/94	Q	SS-2 0" 10/26/94	Q	SS-3 0" 10/26/94	Q	SS-3 RE 0" 10/26/94	Q
Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Methylene chloride	7	J	9	J	7	J	NT		9	JN			NT				30			
Toluene							NT		4	J			NT							
Chlorobenzene					1	J	NT		25				NT							
Semi Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Naphthalene									370	J							280	J	NT	
2-Methylnaphthalene																			NT	
Acenaphthylene					49	J	51	J	2500	J	1500	J	3600	JD	80	J	2100	J	NT	
Acenaphthene					22	J	69	J	1700	J	1100	J	2800	JD	53	J	340	J	NT	
Dibenzofuran							53	J	1000	J	680	J	1800	JD	29	J			NT	
Fluorene					30	J	100	J	2800	J	2000	J	5100	JD	84	J	470	J	NT	
Phenanthrene	60	J	83	J	560		920		44000	E	27000		69000	D	1500		11000		NT	
Anthracene					130	J	230	J	8500		5200		12000	JD	270	J	3100	J	NT	
Carbazole					67	J	120	J	6800		4200		10000	JD	190	J	2200	J	NT	
Di-n-Butylphthalate	76	J	75	J	110	J	320	J	990	J	530	J	1500	JD	190	J	4000	J	NT	
Fluoranthene	120	J	180	J	1100		1500		82000	E	47000	E	130000	D	2900		26000		NT	
Pyrene	150	J	200	J	1300	J	1200		73000	EJ	44000	E	120000	D	2700		24000		NT	
Butylbenzylphthalate					83	J	64	J	2700	J	620	J	3900	JD	140	J	5500		NT	
Benzo (a) Anthracene	49	J	70	J	490		560		43000	E	26000		54000	D	1100		13000		NT	
Chrysene	86	J	100	J	840		740		56000	E	31000		79000	D	1600		21000		NT	
Bis (2-Ethylhexyl) Phthalate	85	J	80	J	940		280	J	7300		2300	J	11000	JD	590		27000		NT	
Di-n-Octyl Phthalate							310	J											NT	
Benzo (b) Fluoranthene	100	J	84	J	630		640		85000	E	34000	E	92000	D	1200		31000		NT	
Benzo (k) Fluoranthene	58	J	92	J	700		420		15000		14000		25000	D	1700		10000		NT	
Benzo (a) Pyrene	64	J	110	J	750		500		50000	E	24000		58000	D	1200		15000		NT	
Indeno (1,2,3-cd) Pyrene	96	J	81	J	920		400		48000	E	20000		50000	D	1200		25000		NT	
Dibenz (a,h) Anthracene					330	J	180	J	17000		7800		18000	JD	390		10000		NT	
Benzo(g,h,i) Perylene	32	J	150	J	310	J	150	J	21000		6600		23000	D	1000		3500	J	NT	
Metals	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Aluminum	9710		NT		7400		NT		8750		NT		NT		5960		6980		NT	
Antimony			NT				NT				NT		NT		24.8		23.1		NT	
Arsenic	3	NJ	NT		4	NJ	NT		8.8	NJ	NT		NT		5.1	NJ	8.1	SNJ	NT	
Barium	39.2	B	NT		46.1		NT		136		NT		NT		164		161		NT	
Beryllium	0.29	B	NT		0.33	B	NT		0.42	B	NT		NT		0.22	B	0.27	B	NT	
Cadmium			NT		0.85	B	NT		6.8		NT		NT		5.9		7.6		NT	
Calcium	3570		NT		33200		NT		30200		NT		NT		54600		71200		NT	
Chromium	20.8		NT		14		NT		107		NT		NT		1570		1560		NT	
Cobalt	3.9	B	NT		5.2	B	NT		7.3	B	NT		NT		6.4	B	5.7	B	NT	
Copper	14.2		NT		16.8		NT		56		NT		NT		62.7		66.2		NT	
Iron	11100		NT		12100		NT		19900		NT		NT		21300		19500		NT	
Lead	19.3	J	NT		15.8	S*	NT		171		NT		NT		48.5		36.8		NT	
Magnesium	2660		NT		10300		NT		13900		NT		NT		23500		32900		NT	
Manganese	113		NT		427		NT		470		NT		NT		531		407		NT	
Mercury			NT				NT				NT		NT		0.17		0.2		NT	
Nickel	22		NT		22.6		NT		116		NT		NT		45.4		56.7		NT	
Potassium	1310		NT		1770		NT		1320		NT		NT		1720		2150		NT	
Selenium	0.33	WNJ	NT		3.1	N	NT		14.1	SN	NT		NT		1.4	SN	0.75	NB	NT	
Silver	0.74	B	NT		0.68	B	NT		1.8	B	NT		NT		1.2	B	0.98	B	NT	
Sodium	196	B	NT		221	B	NT		107	B	NT		NT		119	B	316	B	NT	
Vanadium	18.3		NT		16		NT		21.4		NT		NT		14.8		16.4		NT	
Zinc	45.6		NT		118		NT		233		NT		NT		96.9		94.9		NT	
OTHERS	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Cyanide			NT				NT				NT		NT		2.3		39.9		NT	

Notes:
1) Blank indicates parameter not detected at the respective detection limit
2) NT - Not Tested
3) The samples listed were qualified as R (unusable/rejected) or U (not detected) for semi-volatile parameter 2,4 Dinitrophenol.
4) See Figure No. 3 for sample locations.
5) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table No. 9
Summary of Surface Soil Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	SS-3 DUP-1 10/26/94	Q	SS-3 DUP-1 RE 10/26/94	Q	SS-4 0" 10/26/94	Q	SS-4 RE 0" 10/26/94	Q	SS-5 0" 10/26/94	Q	SS-5 RE 0" 10/26/94	Q	SS-6 0" 10/26/94	Q	SS-6 RE 0" 10/26/94	Q	SS-6 DL 0" 10/26/94	Q
Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Methylene chloride	29																NT	
Toluene																	NT	
Chlorobenzene													4	J			NT	
Semi Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Naphthalene	280	J	NT				NT				NT				NT			
2-Methylnaphthalene			NT				NT				NT		220	J	NT			
Acenaphthylene	1500	J	NT				NT		250	J	NT		580	J	NT			
Acenaphthene	290	J	NT		510	J	NT		210	J	NT		3300	J	NT		4000	JD
Dibenzofuran			NT		230	J	NT		110	J	NT		1400	J	NT		1700	JD
Fluorene	410	J	NT		650	J	NT		250	J	NT		3200	J	NT		4000	JD
Phenanthrene	900		NT		7700		NT		4000		NT		31000	E	NT		52000	D
Anthracene	2600	J	NT		2000	J	NT		940	J	NT		5700		NT		7800	JD
Carbazole	1800	J	NT		720	J	NT		630	J	NT		5100		NT		6500	JD
Di-n-Butylphthalate	3300	J	NT				NT		210	J	NT				NT			
Fluoranthene	22000		NT		13000		NT		10000		NT		47000	E	NT		83000	D
Pyrene	22000		NT		11000		NT		9500		NT		49000	E	NT		76000	D
Butylbenzylphthalate	3800	J	NT				NT		360	J	NT		220	J	NT			
Benzo (a) Anthracene	10000		NT		4700		NT		5100		NT		24000		NT		31000	D
Chrysene	17000		NT		5800		NT		7200		NT		27000		NT		39000	D
Bis (2-Ethylhexyl) Phthalate	27000		NT		920	J	NT		1200	J	NT		370	J	NT			
Di-n-Octyl Phthalate			NT				NT				NT				NT			
Benzo (b) Fluoranthene	24000		NT		4800		NT		11000		NT		30000	E	NT		45000	D
Benzo (k) Fluoranthene	5800		NT		4300		NT				NT		7000		NT		16000	JD
Benzo (a) Pyrene	16000		NT		4500		NT		5200		NT		21000		NT		30000	D
Indeno (1,2,3-cd) Pyrene	22000		NT		3400	J	NT		6000		NT		18000		NT		25000	D
Dibenz (a,h) Anthracene	6900		NT		1300	J	NT		2500		NT		7200		NT		5900	JD
Benzo(g,h,i) Perylene	9800		NT		940	J	NT		1100	J	NT		6000		NT		8500	JD
Metals	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Aluminum	5260		NT		8520		NT		10700		NT		4990		NT		NT	
Antimony	9.2	B	NT				NT				NT				NT		NT	
Arsenic	72.9	SNJ	NT		3	SNJ	NT		4.6	SNJ	NT		3.5	SNJ	NT		NT	
Barium	3350		NT		57.7		NT		90.8		NT		36.5	B	NT		NT	
Beryllium			NT		0.34	B	NT		0.46	B	NT				NT		NT	
Cadmium	84.9		NT		1.2	B	NT				NT		1.5		NT		NT	
Calcium	40000		NT		25000		NT		47700		NT		58100		NT		NT	
Chromium	731		NT		21.1		NT		30.7		NT		13.8		NT		NT	
Cobalt	366		NT		4.1	B	NT		6	B	NT		3.2	B	NT		NT	
Copper	4710		NT		22.9		NT		65.7		NT		24.4		NT		NT	
Iron	54100		NT		12300		NT		16700		NT		11600		NT		NT	
Lead	529		NT		93		NT		311		NT		101		NT		NT	
Magnesium	19200		NT		8110		NT		16300		NT		22100		NT		NT	
Manganese	482		NT		206		NT		420		NT		287		NT		NT	
Mercury	0.33		NT		0.2		NT				NT				NT		NT	
Nickel	5850		NT		12.9		NT		17.8		NT		11.4		NT		NT	
Potassium	1270		NT		1330		NT		1770		NT		1040	B	NT		NT	
Selenium	185	SN	NT				NT				NT		1.1	SN	NT		NT	
Silver	16.3		NT		0.86	B*	NT		0.87	B	NT		0.6	B	NT		NT	
Sodium	289	B	NT		577	B	NT		677	B	NT		254	B	NT		NT	
Vanadium	13.3		NT		18.5		NT		26		NT		12.9		NT		NT	
Zinc	2280		NT		90		NT		364		NT		101		NT		NT	
OTHERS	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Cyanide	40.5		NT				NT		1.3		NT				NT		NT	

Notes:
1) Blank indicates parameter not detected at the respective detection limit
2) NT - Not Tested
3) The samples listed were qualified as R (unusable/rejected) or U (not detected) for semi-volatile parameter 2,4 Dinitrophenol.
4) See Figure No. 3 for sample locations.
5) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table No. 10
Summary of Subsurface Soil Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	SB-1 2-4' 10/18/94	Q	SB-1 22-24' 10/18/94	Q	SB-1 24-26' 10/18/94	Q	SB-4 0-2' 10/19/94	Q	SB-4 18-20' 10/19/94	Q	SB-4 24-26' 10/19/94	Q	SB-7 0.5-2' 10/24/94	Q
Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Chloroethane	4	JB			NT						6	J	NT	
Methylene chloride					NT								NT	
Acetone					NT								NT	
1,1-Dichloroethene					NT								NT	
1,1-Dichloroethane					NT								NT	
1,2-Dichloroethene(Total)					NT								NT	
Chloroform					NT								NT	
1,2-Dichloroethane					NT								NT	
1,1,1-Trichloroethane					NT								NT	
cis-1,3-Dichloropropene					NT								NT	
Trichloroethene			15		NT								NT	
1,1,2-Trichloroethane					NT								NT	
Benzene					NT								NT	
Tetrachloroethene					NT								NT	
Toluene					NT								NT	
Chlorobenzene					NT								NT	
Ethylbenzene					NT								NT	
Xylene (total)					NT								NT	
Semi-volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Phenol			NT										NT	
1,4 Dichlorobenzene			NT										NT	
Diethylphthalate			NT										NT	
Phenanthrene			NT				95	J					NT	
Anthracene			NT				25	J					NT	
Carbazole			NT										NT	
Di-n-Butylphthalate			NT										NT	
Fluoranthene	56	J	NT				260	J					NT	
Pyrene	40	J	NT				280	J					NT	
Butylbenzylphthalate			NT				280	J					NT	
Benzo (a) Anthracene			NT				110	J					NT	
Chrysene	28	J	NT				160	J					NT	
Bis (2-Ethylhexyl) Phthalate			NT										NT	
Di-n-Octyl Phthalate	290	J	NT		180	J	270	J	60	J	240	J	NT	
Benzo (b) Fluoranthene			NT				180	J					NT	
Benzo (k) Fluoranthene			NT				79	J					NT	
Benzo (a) Pyrene			NT				360						NT	
Indeno (1,2,3-cd) Pyrene			NT				200	J					NT	
Dibenz (a,h) Anthracene			NT				42	J					NT	
Benzo(g,h,i) Perylene			NT				1400						NT	
PCB/Pesticide	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Aroclor - 1254			NT											
Metals	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Aluminum	20400		NT		3500		5640		2350		2940		NT	
Antimony			NT										NT	
Arsenic	8.8	J	NT		1.2	J	6.7	J	1.4	B	1.5	J	NT	
Barium	153		NT		25.6	B	111		17.5	B	39.6	B	NT	
Beryllium	1	B	NT				0.25	B					NT	
Cadmium	0.8	B	NT				0.8	B					NT	
Calcium	4930		NT		51200		64100		52300		53300		NT	
Chromium	26.8		NT		6		16.5		3.9		4.7		NT	
Cobalt	13.9		NT		3.3	B	5	B	2.5	B	2.7	B	NT	
Copper	22.1		NT		8.9		30.8		6.7		7.7		NT	
Iron	30700		NT		7360		10500		5870		6340		NT	
Lead	13.2		NT		4.6		57.6		5.6		5.6		NT	
Magnesium	7240		NT		23900		26600		24200		25300		NT	
Manganese	726		NT		264		357		221		250		NT	
Mercury			NT										NT	
Nickel	35.3		NT		6	B	106		5.3	B	7.4	B	NT	
Potassium	2590		NT		1360		1590		974	B	1230		NT	
Selenium			NT				11.2						NT	
Silver			NT										NT	
Sodium	354	B	NT		142	B	144	B	155	B	163	B	NT	
Thallium	0.81	B	NT										NT	
Vanadium	37		NT		8.8	B	12.2		7.3	B	6.1	B	NT	
Zinc	65.1		NT		31		101		22.2		20.6		NT	
Others	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Cyanide			NT										NT	

Notes:
1) Blank indicates parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - see Appendix G for qualifier definitions.

Table No. 10
Summary of Subsurface Soil Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	SB-8 10-12' 10/24/94	Q	SB-8 8-10' 10/24/94	Q	SB-16 12-14' 6/20/95	Q	SB-16 26-28' 6/20/95	Q	SB-17 16-18' 6/19/95	Q	OW-2S 34-36' 11/9/94	Q	OW-2S 32-34' 11/9/94	Q
Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Chloroethane	NT												NT	
Methylene chloride	NT										270	J	NT	
Acetone	NT												NT	
1,1-Dichloroethene	NT												NT	
1,1-Dichloroethane	NT												NT	
1,2-Dichloroethene(Total)	NT		5	J									NT	
Chloroform	NT												NT	
1,2-Dichloroethane	NT												NT	
1,1,1-Trichloroethane	NT		2	J									NT	
cis-1,3-Dichloropropene	NT												NT	
Trichloroethene	NT		3	J									NT	
1,1,2-Trichloroethane	NT												NT	
Benzene	NT												NT	
Tetrachloroethene	NT		12										NT	
Toluene	NT										600	J	NT	
Chlorobenzene	NT												NT	
Ethylbenzene	NT												NT	
Xylene (total)	NT										360	J	NT	
Semi-volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Phenol			NT		410				230	J	NT			
1,4 Dichlorobenzene			NT								NT			
Diethylphthalate			NT		90	J			85	J	NT			
Phenanthrene			NT								NT		23	J
Anthracene			NT								NT			
Carbazole			NT								NT			
Di-n-Butylphthalate			NT		540		61	J	510		NT		81	J
Fluoranthene			NT								NT			
Pyrene			NT								NT			
Butylbenzylphthalate			NT								NT			
Benzo (a) Anthracene			NT								NT			
Chrysene			NT								NT		20	J
Bis (2-Ethylhexyl) Phthalate			NT						31	J	NT		1500	
Di-n-Octyl Phthalate	28	J	NT								NT		49	J
Benzo (b) Fluoranthene			NT								NT			
Benzo (k) Fluoranthene			NT								NT			
Benzo (a) Pyrene			NT								NT			
Indeno (1,2,3-cd) Pyrene			NT								NT			
Dibenz (a,h) Anthracene			NT								NT			
Benzo(g,h,i) Perylene			NT								NT			
PCB/Pesticide	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Aroclor - 1254			NT								NT			
Metals	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Aluminum	2710		NT		2810	*	3520	*	1610	*	NT		7650	
Antimony			NT								NT			
Arsenic	2.3	J	NT		1.1	BJ	1.1	BJ			NT		8	SNJ
Barium	27.8	B	NT		31.3	B	27.5	B	20.6	B	NT		55.5	
Beryllium			NT								NT		0.38	B
Cadmium			NT								NT			
Calcium	47900		NT		62900		48500		39400		NT		57400	
Chromium	4.2		NT		6.6		7.9		3.6		NT		9.5	
Cobalt	2.6	B	NT		3.4	B	3.7	B	2	B	NT		14.3	
Copper	11.7		NT		8.2	J	8.1	J	6.3	J	NT		25.6	
Iron	6980		NT		8490	*	9090	*	5070	*	NT		15100	
Lead	3.9		NT		3.3	S	4.1	S	2		NT		21.5	
Magnesium	21500		NT		28200		19500		16500		NT		27100	
Manganese	264		NT		318		266		198		NT		336	NJ
Mercury			NT								NT			
Nickel	5.7	B	NT		5	B	7.9	B	3.1	B	NT		26	
Potassium	893	B	NT		782	B	1120	B	419	B	NT		3000	
Selenium			NT								NT			
Silver			NT								NT			
Sodium	165	B	NT		163	B	157	B	122	B	NT		159	B
Thallium			NT								NT		0.38	B
Vanadium	7.8	B	NT		9.9	B	11.4	B	6.3	B	NT		12	
Zinc	36.5		NT			R		R		R	NT		40.7	EJ
Others	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/Kg)	
Cyanide	NT		NT								NT			

Notes:

1) Blank indicates parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - see Appendix G for qualifier definitions.

Table No. 10
Summary of Subsurface Soil Sample Analytical Test Results

Remedial Investigation
Stuart-Oiver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	OW-4S 8-10' 11/22/94	Q	OW-4S RE 8-10' 11/22/94	Q	OW-5S 14-16' 11/2/94	Q	OW-6S 0-2' 11/28/94	Q	OW-6S 2-4' 11/3/94	Q	OW-6S 10-12' 11/3/94	Q	OW-6S 20-22' 11/4/94	Q
Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Chloroethane							NT		NT					
Methylene chloride	7	J	6	J	7	J	NT		NT		5	J		
Acetone							NT		NT					
1,1-Dichloroethene							NT		NT					
1,1-Dichloroethane	12						NT		NT					
1,2-Dichloroethene(Total)	14						NT		NT				910	J
Chloroform							NT		NT					
1,2-Dichloroethane							NT		NT					
1,1,1-Trichloroethane	130		24	J			NT		NT		67			
cis-1,3-Dichloropropene							NT		NT					
Trichloroethene	200		38	J			NT		NT				160	J
1,1,2-Trichloroethane							NT		NT					
Benzene							NT		NT					
Tetrachloroethene							NT		NT		37		280	J
Toluene							NT		NT					
Chlorobenzene							NT		NT					
Ethylbenzene							NT		NT					
Xylene (total)							NT		NT					
Semi-volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Phenol			NT											
1,4 Dichlorobenzene			NT											
Diethylphthalate			NT											
Phenanthrene			NT				100	J	160	J	130	J		
Anthracene			NT						36	J	21	J		
Carbazole			NT						25	J			95	J
Di-n-Butylphthalate			NT		86	J	200	J	160	J	240	J		
Fluoranthene			NT				260	J	570		210	J		
Pyrene			NT		24	JB	200	J	480		170	J		
Butylbenzylphthalate			NT				140	J	71	J	41	J		
Benzo (a) Anthracene			NT				100	J	280	J	85	J		
Chrysene			NT				190	J	440		130	J		
Bis (2-Ethylhexyl) Phthalate			NT		580		120	J	1900		2200		260	J
Di-n-Octyl Phthalate			NT		350	J								
Benzo (b) Fluoranthene			NT				160	J	550		150	J		
Benzo (k) Fluoranthene			NT						160	J	52	J		
Benzo (a) Pyrene			NT				110	J	310	J	62	J		
Indeno (1,2,3-cd) Pyrene			NT				120	J	340	J	68	J		
Dibenz (a,h) Anthracene			NT				38	J	72	J	23	J		
Benzo(g,h,i) Perylene			NT				29	J	140	J				
PCB/Pesticide	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Aroclor - 1254			NT						NT					
Metals	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Aluminum	22800		NT		6520		10300		NT		4100		4430	
Antimony			NT				3.2	B	NT					
Arsenic	7.2	SNJ	NT		1.4	WBJ	5.3	S	NT		5.8	SNJ	3	SNJ
Barium	150		NT		49.9		64	EJ	NT		32.5	B	55.5	
Beryllium	1.1		NT		0.28	B	0.41	B	NT					
Cadmium			NT						NT		1.1	B		
Calcium	43000		NT		53700	*	24800		NT		107000		63400	
Chromium	30.3		NT		8.9	*	17.3		NT		5.5		6.2	
Cobalt	11.5		NT		4.3	B	7.4	B	NT		4.3	B	5.4	B
Copper	22.2		NT		9.7		17.6		NT		11.1		18.4	
Iron	32400		NT		11200	*	16400		NT		9430		9460	
Lead	9.7	S*J	NT		5.9	S*	5.8	S	NT		8.2	*	10.4	S*
Magnesium	12700		NT		21100	*	8500		NT		38200		31600	
Manganese	355		NT		313	N*J	424		NT		349	NJ	280	NJ
Mercury			NT				1.1		NT					
Nickel	32.4		NT		8.4	B	38		NT		9.5		9.7	
Potassium	4850		NT		2410		1630		NT		1040	B	1720	
Selenium			NT				1.4		NT					
Silver			NT						NT					
Sodium	244	B	NT		333	B	213	B	NT		165	B	161	B
Thallium			NT						NT		0.21	WBJ	0.46	B
Vanadium	46		NT		16.1		19.4		NT		9.6	B	7.9	B
Zinc	76.7		NT		30.1	*	56.3	*	NT		143	EJ	22.5	EJ
Others	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Cyanide			NT		NT		1.6		NT					

Notes:
1) Blank indicates parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - see Appendix G for qualifier definitions.

Table No. 10
Summary of Subsurface Soil Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	OW-7S 28-30' 11/28/94	Q	OW-7S 8-10' 11/28/94	Q	OW-8S 32-34' 6/26/95	Q	OW-8S 6-12' 6/26/95	Q	OW-9S 8-10' 6/20/95	Q	OW-10S 18-21' 6/21/95	Q	OW-11S 26-32' 6/22/95	Q	OW-1R 6-8' 10/20/94	Q
Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Chloroethane																
Methylene chloride																
Acetone					18											
1,1-Dichloroethene			2	J												
1,1-Dichloroethane			22				2	J								
1,2-Dichloroethene(Total)			55													
Chloroform																
1,2-Dichloroethane			8	J												
1,1,1-Trichloroethane			210				7	J								
cis-1,3-Dichloropropene																
Trichloroethene	1500		21				8	J								
1,1,2-Trichloroethane			4	J												
Benzene																
Tetrachloroethene			4	J			43									
Toluene			4	J												
Chlorobenzene																
Ethylbenzene																
Xylene (total)																
Semi-volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Phenol					390		340	J								
1,4 Dichlorobenzene																
Diethylphthalate											46	JB				
Phenanthrene																
Anthracene																
Carbazole																
Di-n-Butylphthalate			70	J							300	JB				
Fluoranthene																
Pyrene	36	J														
Butylbenzylphthalate																
Benzo (a) Anthracene																
Chrysene																
Bis (2-Ethylhexyl) Phthalate			66	J												
Di-n-Octyl Phthalate															380	J
Benzo (b) Fluoranthene																
Benzo (k) Fluoranthene																
Benzo (a) Pyrene																
Indeno (1,2,3-cd) Pyrene																
Dibenz (a,h) Anthracene																
Benzo(g,h,i) Perylene																
PCB/Pesticide	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Aroclor - 1254																
Metals	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Aluminum	2080		3070		4660	*	3060	*	3430	*	3060	*	5540	*	2790	
Antimony			3.5	B												
Arsenic	0.48	B	2.4	S	1.4	BJ	1	BJ	1.2	BJ	1.7	BS	0.86	BJ	1.1	J
Barium	18.5	BE	36.5	BE	38.2	B	25.1	B	40.2	B	158		60.8		19.6	B
Beryllium					0.25	B							0.28	B		
Cadmium																
Calcium	41700		59300		59100		53100		50100		62500		80100		46600	
Chromium	3.8	J	5.2	J	8.1		7		7.4		6.2		9.5		4	
Cobalt	2.1	B	4.3	B	4.2	B	3.4	B	3.7	B	2.9	B	3.6	B	2.3	B
Copper	7.1		8.9		9.8	J	9.7	J	10.3	J	7.4	J	3.6	B	8.2	
Iron	5450		7310		10600	*	8450	*	9020	*	7830	*	12400	*	6230	
Lead	4.1		7	S	4.1		4	S	3.2	S	3.3	S	1.6	S	5	
Magnesium	17900		23200		22300		19700		18800		26700		42300		19800	
Manganese	211		322		309		262		260		251		299		236	
Mercury																
Nickel			5.4	B	8.3	B	5.2	B	9.2		4.7	B	8.5	B	5.6	B
Potassium			956	B	1600		917	B	1030	B	1060	B	2560		824	B
Selenium																
Silver																
Sodium	120	B	117	B	194	B	146	B	154	B	176	B	201	B	165	B
Thallium																
Vanadium	6.5	B	7.9	B	13		10.3	B	11.1		10.1	B	9.7	B	7.1	B
Zinc	20.7	*	32.5	*		R		R		R		R		R	27.9	
Others	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Cyanide																

Notes:
1) Blank indicates parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - see Appendix G for qualifier definitions.

Table No. 10
Summary of Subsurface Soil Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	OW-1R 20-22' 10/20/94	Q	OW-1R 22-23' 10/20/94	Q	OW-4R 32-34' 11/15/94	Q	OW-4R 34-36' 11/15/94	Q	OW-4R 42-44' 11/18/94	Q	OW-7R 34-36' 11/19/94	Q	OW-7R 40-42' 11/22/94	Q
Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Chloroethane			NT				NT							
Methylene chloride			NT				NT		6	J			5	J
Acetone			NT				NT							
1,1-Dichloroethene			NT				NT							
1,1-Dichloroethane			NT				NT				5	J		
1,2-Dichloroethene(Total)			NT				NT							
Chloroform			NT				NT							
1,2-Dichloroethane			NT				NT							
1,1,1-Trichloroethane			NT				NT				6	J		
cis-1,3-Dichloropropene			NT				NT							
Trichloroethene	65		NT				NT				32		110	
1,1,2-Trichloroethane			NT				NT							
Benzene			NT				NT		110	J				
Tetrachloroethene			NT				NT							
Toluene			NT				NT		21					
Chlorobenzene			NT				NT							
Ethylbenzene			NT				NT		7	J				
Xylene (total)			NT				NT		11					
Semi-volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Phenol	NT				NT									
1,4 Dichlorobenzene	NT				NT									
Diethylphthalate	NT				NT									
Phenanthrene	NT				NT									
Anthracene	NT				NT									
Carbazole	NT				NT									
Di-n-Butylphthalate	NT				NT		67	J	110	J	79	J		
Fluoranthene	NT		26	J	NT									
Pyrene	NT				NT						25	J		
Butylbenzylphthalate	NT				NT									
Benzo (a) Anthracene	NT				NT									
Chrysene	NT				NT									
Bis (2-Ethylhexyl) Phthalate	NT				NT		52	J	85	J	28	J	40	J
Di-n-Octyl Phthalate	NT		63	J	NT									
Benzo (b) Fluoranthene	NT				NT									
Benzo (k) Fluoranthene	NT				NT									
Benzo (a) Pyrene	NT				NT									
Indeno (1,2,3-cd) Pyrene	NT				NT									
Dibenz (a,h) Anthracene	NT				NT									
Benzo(g,h,i) Perylene	NT				NT									
PCB/Pesticide	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Aroclor - 1254	NT				NT									
Metals	(mg/kg)				(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Aluminum	NT		1820		NT		5050		11100		4840		4180	
Antimony	NT				NT									
Arsenic	NT		1.3	J	NT		2.4	SNJ	0.95	WBNJ	1.2	WBJ	1.8	SBNJ
Barium	NT		16.6	B	NT		39.5	B	122		33.3	B	41.1	B
Beryllium	NT				NT		0.24	B	0.5	B	0.24	B	0.21	B
Cadmium	NT				NT								1.1	
Calcium	NT		38800		NT		58800		83100		54200		59900	
Chromium	NT		2.8		NT		8.2		13.6		7.7		6.9	
Cobalt	NT		1.5	B	NT		4.2	B	3.6	B	3.9	B	4.2	B
Copper	NT		4.3	B	NT		8.6		3.3	B	8.9		9.7	
Iron	NT		4310		NT		10400		20100		9320		8310	
Lead	NT		5		NT		5.9	*BJ	2.6	*BJ	3.2	*BJ	9	J*+
Magnesium	NT		16100		NT		23500		38900		20400		24700	
Manganese	NT		195		NT		336		311		265		272	
Mercury	NT				NT		0.33							
Nickel	NT		4.7	B	NT		7.5	B	10.1		7.6	B	13.5	
Potassium	NT		492	B	NT		1630		6250		2040		1860	
Selenium	NT				NT									
Silver	NT				NT									
Sodium	NT		93.1	B	NT		173	B	250	B	173	B	172	B
Thallium	NT				NT									
Vanadium	NT		4.2	B	NT		12.6		17		11.8		7.9	B
Zinc	NT		16.9		NT		29.4		26.3		26.5		31.6	
Others	(mg/kg)				(mg/kg)				(mg/kg)		(mg/kg)		(mg/kg)	
Cyanide	NT				NT									

Notes:
1) Blank indicates parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - see Appendix G for qualifier definitions.

Table No. 10
Summary of Subsurface Soil Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	TP-1 composite 11/3/94	Q	TP-2 composite 11/3/94	Q	TP-3 composite 11/3/94	Q	TP-4 composite 11/3/94	Q	TP-5 composite 11/3/94	Q	TP-6 composite 11/3/94	Q
Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Chloroethane												
Methylene chloride	19	J							20	J	6	J
Acetone												
1,1-Dichloroethene												
1,1-Dichloroethane												
1,2-Dichloroethene(Total)												
Chloroform	5	J			6	J						
1,2-Dichloroethane												
1,1,1-Trichloroethane									200			
cis-1,3-Dichloropropene												
Trichloroethene												
1,1,2-Trichloroethane									25	J		
Benzene												
Tetrachloroethene											6	J
Toluene												
Chlorobenzene	4	J	3	J								
Ethylbenzene												
Xylene (total)			2	J								
Semi-volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Phenol												
1,4 Dichlorobenzene	47	J			57	J						
Diethylphthalate												
Phenanthrene	160	J	69	J	130	J	120	J			41	J
Anthracene	21	J			23	J	27	J				
Carbazole												
Di-n-Butylphthalate					22	J	34	J	42	J	24	J
Fluoranthene	340	J	140	J	210	J	180	J			82	J
Pyrene	300	J	130	J	210	J	170	J			66	J
Butylbenzylphthalate					33	J						
Benzo (a) Anthracene												
Chrysene	120	J	57	J	77	J	74	J			43	J
Bis (2-Ethylhexyl) Phthalate	210	J	74	J	120	J	97	J			53	J
Di-n-Octyl Phthalate	360	J	53	J	130	J	35	J	25	J	34	J
Benzo (b) Fluoranthene	190	J	70	J	92	J	82	J			51	J
Benzo (k) Fluoranthene	130	J	41	J	70	J	64	J			36	J
Benzo (a) Pyrene	120	J	50	J	71	J	68	J			29	J
Indeno (1,2,3-cd) Pyrene	110	J	39	J	43	J	52	J			30	J
Dibenz (a,h) Anthracene												
Benzo(g,h,i) Perylene	53	J			28	J	28	J				
PCB/Pesticide	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Aroclor - 1254											41	
Metals	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Aluminum	7070		8020		8390		8560		7430		8320	
Antimony												
Arsenic	2.8	SN	3.4	SNJ	2.9	SNJ	3.5	SNJ	2.8	SNJ	3.4	SNJ
Barium	44.9	B	93.7		73.6		144		47.1		46.7	
Beryllium	0.3	B	0.35	B	0.43	B	0.45	B	0.33	B	0.35	B
Cadmium			0.77	B	1.7		0.85	B			0.7	B
Calcium	2820		26700		6740		12100		23300		12900	
Chromium	7.3		10		12.7		11.3		11.8		13.4	
Cobalt	3.9	B	5.5	B	4.8	B	9.7	B	4.7	B	5.1	B
Copper	9		14.3		11.3		15.2		10.7		15.3	
Iron	10200		12800		14700		17400		12000		13000	
Lead	13.9	*	20.1	*	21.5		30.9		12.2		34	
Magnesium	1920		11200		3270		5430		8150		6050	
Manganese	214	NJ	312	NJ	331	NJ	1670	NJ	274	NJ	276	NJ
Mercury									0.12		0.36	
Nickel	6.8	B	12.2		10.8		16		9.8		15.3	
Potassium			807	B	584	B	734	B	716	B	975	B
Selenium												
Silver	0.8	NJB										
Sodium	156	B	93.5	B	143	B	69.9	B	114	B	79.8	B
Thallium	0.49	B	0.4	B	0.56	B	0.22	WJB	0.38	WJB	0.26	WJB
Vanadium	12.2	B	14.8		17.1		18.4		14		17.1	
Zinc	34	EJ	104	EJ	49.5	EJ	52.8	EJ	37.7	EJ	55.2	EJ
Others	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Cyanide												

Notes:
1) Blank indicates parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - see Appendix G for qualifier definitions.

Table No. 11
Summary of Surface Water Sediment Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	SED-2 0-6" 10/25/94	Q	SED-2 RE 0-6" 10/25/94	Q	SED-3 0-6" 10/25/94	Q	SED-3 DL 0-6" 10/25/94	Q	SED-3 RE 0-6" 10/25/94	Q
Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Methylene chloride	7	J	NT		3	J	NT		NT	
1,1-Dichloroethane			NT		6	J	NT		NT	
1,1,1-Trichloroethane			NT		7	J	NT		NT	
Tetrachloroethene			NT		3	J	NT		NT	
Semi-Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)		(ug/kg)	
Naphthalene					420	J	610	J		
2-Methylnaphthalene					360	J	490	JD	250	J
Acenaphthylene	55	J	36	J	440	J	630	JD	230	J
Acenaphthene					1800	J	2700	JD	1400	J
Dibenzofuran					800	J	1100	JD	600	J
Fluorene					1600	J	2400	JD	1200	J
Phenanthrene	550	J	340	J	19000		21000	D	11000	
Anthracene	72	J	62	J	3000		3400	JD	2400	J
Carbazole			65	J	2200	J	2900	JD	1600	J
Di-n-Butylphthalate	85	J	180	J						
Fluoranthene	1200		810		30000	E	34000	D	17000	
Pyrene	810	J	820		29000	EJ	31000	D	15000	
Benzo (a) Anthracene	330	J	260	J	11000		15000	D	7100	
Chrysene	690		450	J	18000		18000	D	8600	
Bis (2-Ethylhexyl) Phthalate	280	J	210	J	3800		4700	JD	2400	J
Di-n-Octyl Phthalate			350	J						
Benzo (b) Fluoranthene		R	530	J	27000		27000	D	9300	
Benzo (k) Fluoranthene		R	390	J	11000		11000	D	3300	
Benzo (a) Pyrene		R	750		2100	J	17000	D	6800	
Indeno (1,2,3-cd) Pyrene		R	91	J	20000	E	22000	D	5800	
Dibenz (a,h) Anthracene		R	140	J	6900		6700	D	2600	
Benzo(g,h,i) Perylene		R	1200		7500		7900	D	1800	J
Metals	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
Aluminum	10600		NT		4540		NT		NT	
Antimony	5.1	B	NT				NT		NT	
Arsenic	6.2	SNJ	NT		1.4	NBJ	NT		NT	
Barium	63.2	B	NT		22.1	B	NT		NT	
Beryllium	0.59	B	NT				NT		NT	
Cadmium			NT		1.6		NT		NT	
Calcium	7020		NT		7590		NT		NT	
Chromium	35.5		NT		14.1		NT		NT	
Cobalt	10.1	B	NT		3.7	B	NT		NT	
Copper	17.1		NT		68.9		NT		NT	
Iron	51000		NT		8970		NT		NT	
Lead	41.2		NT		61.5	*	NT		NT	
Magnesium	4090		NT		4140		NT		NT	
Manganese	725		NT		119		NT		NT	
Nickel	26.2		NT		11.2	B	NT		NT	
Potassium	1850		NT		1210	B	NT		NT	
Silver	1.1	B	NT		0.69	B	NT		NT	
Sodium	2.54	B	NT		529	B	NT		NT	
Vanadium	23.8		NT		13.9	B	NT		NT	
Zinc	442		NT		844		NT		NT	

Notes:
1) Blank indicates parameter not detected at the respective detection limit
2) NT = Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table No. 12
Summary of Surface Water Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	SW-1 10/26/94	Q	SW-2 10/25/94	Q	SW-3 10/26/94	Q
Volatile Organics	(ug/l)		(ug/l)		(ug/l)	
Acetone					25	
Semi Volatile Organics	(ug/l)		(ug/l)		(ug/l)	
Pentachlorophenol			4	J		
Fluoranthene	1	J				
Pyrene	1	J				
Metals	(ug/l)		(ug/l)		(ug/l)	
Aluminum	317	JE	997	EJ	158	BEJ
Barium	80.8	B	183	B	48.8	B
Calcium	101000		70400		63900	
Chromium					2.2	B
Cobalt					2.4	B
Copper			2.8	B	4.1	B
Iron	744	EJ	4850	EJ	2200	EJ
Lead	7.4	*	7.8	*	8.2	*
Magnesium	38500		22800		17400	
Manganese	185		909		444	
Potassium	10400		12400		12800	
Silver					2.4	B*
Sodium	96900		69600		38700	
Vanadium			3.7	B		
Zinc	30.6	EJ	80.1	EJ	63.1	EJ
OTHERS	(mg/l)		(mg/l)		(mg/l)	
Alkalinity	NT		360		NT	
Hardness	NT		5300		NT	

Notes:
1) Blank indicates parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table No. 13a
Summary of On-Site Sump and Catch Basin Water Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	NSM-1 10/27/94	Q	NSM-1 RE 10/27/94	Q	NSM-4 10/25/94	Q	NSM-4 DL 10/25/94	Q
Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)	
1,1-Dichloroethane			NT		72000	E	61000	D
1,1,1-Trichloroethane			NT		7900		6500	JD
Toluene			NT				5800	JN
Ethylbenzene			NT				2700	JN
Xylene (total)			NT				15000	N
Semi-Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Phenol					360		NT	
4-Methylphenol					24	J	NT	
Phenanthrene	2	J	2	J			NT	
Anthracene	1	J	1	J			NT	
Fluoranthene	5	J	5	J			NT	
Pyrene	5	J	4	J			NT	
Butylbenzylphthalate	14		13				NT	
Benzo (a) Anthracene	2	J	1	J			NT	
Chrysene	3	J	3	J			NT	
Bis (2-Ethylhexyl) Phthalate	10		10				NT	
Benzo (b) Fluoranthene	5	J	4	J			NT	
Benzo (k) Fluoranthene	2	J	3	J			NT	
Benzo (a) Pyrene	3	J	3	J			NT	
Indeno (1,2,3-cd) Pyrene	3	J	2	J			NT	
Benzo(g,h,i) Perylene	3	J	3	J			NT	
Metals	(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Aluminum	2940		NT		15700	EJ	NT	
Antimony	13.2	B	NT		111	B	NT	
Arsenic	4.1	B	NT			RSN	NT	
Barium	198	B	NT		918	B	NT	
Cadmium	34.7		NT		4430		NT	
Calcium	36800		NT		191000		NT	
Chromium	454		NT		4940		NT	
Cobalt	11.6	B	NT		266		NT	
Copper	261		NT		3580		NT	
Iron	5630		NT		1700000	EJ	NT	
Lead	457		NT		696	*	NT	
Magnesium	4870	B	NT		17300	B	NT	
Manganese	288		NT		7980		NT	
Mercury	2.4		NT				NT	
Nickel	840		NT		56700	EJ	NT	
Potassium	2140	B	NT		68800		NT	
Selenium	3.6	BJ	NT			R	NT	
Silver	6.3	B	NT		99.9	*	NT	
Sodium	7770		NT		193000		NT	
Thallium			NT		20	EJW	NT	
Vanadium	3.7	B	NT		102	B	NT	
Zinc	7610		NT		63500	EJ	NT	
Others								
Cyanide (ug/l)	30		NT				NT	
Alkalinity	60		NT		250		NT	
Hardness	540		NT		1100		NT	

Notes:
1) Blank indicated parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table No. 13b
Summary of On-Site Sump and Catch Basin Soil Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	NSM-2 10/27/94	Q	NSM-2 DL 10/27/94	Q	NSM-3 10/27/94	Q
Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)	
1,1-Dichloroethane	32000	J	25000	JD		
1,2-Dichloroethene(Total)	17000	J				
1,1,1-Trichloroethane	1000000	E	2000000	D	8300	
Trichloroethene	8900	J				
Tetrachloroethene	88000	J	91000	JD	350	J
Toluene	110000	J	110000	JD	580	J
Chlorobenzene	8600	J				
Ethylbenzene	9200	J				
Xylene (total)	44000	J	46000	JD	490	J
Semi-Volatile Organics	(ug/kg)		(ug/kg)		(ug/kg)	
1,4-Dichlorobenzene	1000	J				
1,2 Dichlorobenzene	3900		5500	JD		
Naphthalene	1400	J	1800	JD	1100	J
2-Methylnaphthalene	420	J			240	J
Dimethyl Phthalate	440	J			220	J
Acenaphthylene	600	J				
Acenaphthene	490	J				
Dibenzofuran	440	J				
Fluorene	770	J	990	JD		
Phenanthrene	12000		16000	JD	3400	J
Anthracene	1200	J	1500	JD	590	J
Carbazole	1800	J	2500	JD	680	J
Di-n-Butylphthalate	2500	J	3200	JD	8000	J
Fluoranthene	14000		19000	D	7200	J
Pyrene	13000		18000	JD	7200	J
Butylbenzylphthalate	65000	E	110000	D	28000	J
Benzo (a) Anthracene	4400		5100	JD	3100	J
Chrysene	17000		21000	D	5200	J
Bis (2-Ethylhexyl) Phthalate	44000	E	67000	D	8200	J
Di-n-Octyl Phthalate	1300	J	1700	JD		
Benzo (b) Fluoranthene	14000		17000	JD	5400	J
Benzo (k) Fluoranthene	4400		9000	JD	2000	J
Benzo (a) Pyrene	2800	J	4200	JD	3200	J
Indeno (1,2,3-cd) Pyrene	7400	J	9600	JD	3100	J
Dibenz (a,h) Anthracene	3100	J	2800	JD	750	J
Benzo(g,h,i) Perylene	3600	J	5700	JD	1200	J
Metals	(mg/kg)		(mg/kg)		(mg/kg)	
Aluminum	4460		NT		3250	
Antimony	13.6		NT		5.3	B
Arsenic	46.2	S	NT		6.6	
Barium	384		NT		148	
Cadmium	63.3	*	NT		4.2	*
Calcium	60900	*	NT		162000	*
Chromium	714	*	NT		165	*
Cobalt	6.1	B	NT		3.8	B
Copper	355		NT		90.8	
Iron	34500	*	NT		19700	*
Lead	253	S	NT		381	
Magnesium	20000	*	NT		32500	*
Manganese	310	NJ*	NT		259	NJ*
Mercury	0.8	NJ	NT			
Nickel	983		NT		233	
Potassium	1090	B	NT		1100	B
Selenium	89.8	S*	NT		4.4	S*
Silver	16.9		NT		2.9	
Sodium	343	B	NT		364	B
Vanadium	13.7		NT		11.5	B
Zinc	2210	*	NT		256	*

Notes:
1) Blank indicated parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table 14a
Summary of Round 1 Overburden Groundwater Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	SOH-OW-1S 7/6/95	Q	SOH-OW-2S 7/6/95	Q	SOH-OW-3S 7/7/95	Q	SOH-OW-4S 7/7/95	Q	SOH-OW-5S 7/6/95	Q	SOH-OW-5S (DUP1) 7/6/95	Q	SOH-OW-6S 7/7/95	Q	SOH-OW-7S 7/10/95	Q	SOH-OW-8S 7/7/95	Q
Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Vinyl chloride					6200	D	7.4	J									5	J
Chloroethane													21					
Acetone																	9.8	J
1,1-Dichloroethene					9.2	J	17	J					900	DJ			4.7	J
1,1-Dichloroethane					60		800	D	58		66		3700	D	1500	JD	180	
1,2-Dichloroethene (total)					4800	D	14								10000	JD	2.9	J
Chloroform																		
1,1,1-Trichloroethane							170						24000	D			3.1	J
Trichloroethene (TCE)	34				800	D	2.4	J					88		140000	D	1.4	J
1,1,2-Trichloroethane													12					
Tetrachloroethene					1500	D	4.7	J					2400	D			3.3	J
Semi-Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Phenol															9	J		
2-Methylphenol															9	J		
Isophorone															23			
Di-n-butyl phthalate																		
Bis(2-ethylhexyl)phthalate	1	J	1	J	2	J	1	J	2	J	2	J	2	J				
Metals	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Aluminum	152	BE*J	478	E*J	200	E*J	1030	E*J	6360	E*J	3430	E*J	726	E*J	321		28.9	BE*J
Arsenic							6.1	B	5.4	BJ					4.6	BNJ		
Barium	114	B	76.6	B	71.5	B	98.8	B	178	B	150	B	86.6	B	81.8	B	31.5	B
Cadmium															5.5			
Calcium	173000		102000		126000		107000		126000		103000		140000		61000		86100	
Chromium	15				3.4	B	3.7	B	39.1		24.4		6.7	B	8.2	B		
Cobalt	4.5	B			5	B	3.8	B	8.4	B	5.9	B	4.4	B			3.9	B
Copper	55.9		4.1	B	7.9	B	12.5	B	38		31.7		6.9	B	38.6			
Iron	96700	*J	14200	*J	65800	*J	34500	*J	20700	*J	10600	*J	8560	*J	40300		320	*J
Lead	2.5	B	1.4	BJ			2.0	B	20		16.2		9.4		2.7	BNJ		
Magnesium	52100		83800		62300		54400		68200		59500		58400		43400		59700	
Manganese	450	*	218	*	707	*	374	*	553	*	363	*	350	*	684		85.4	*
Nickel	41.6		17.7	B	43.5		114		169		136		55.3		32.8	B	46.6	
Potassium	2900	B	8680		2860	B	3470	B	16900		15700		4250	B	9880		4030	B
Silver															1.4	B		
Sodium	124000		153000		32300		27100		49500		48100		34700		21200		42100	
Vanadium									11.8	B	7.5	B			2.6	B		
Zinc	45	J	24.3	J	30.7		25.9	J	66.7	J	62.5	J	21.2	J	38.2		15.3	B
Others																		
Cyanide (ug/l)	11.5	NJ	11.3	NJ														
Alkalinity, as CaCO3 (mg/l)	380		340		380		180		210		220		410		200		260	
Hardness, as CaCO3 (mg/l)	580		580		520		500		470		700		570		350		460	

Notes:
1) Blank indicated parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table 14a
Summary of Round 1 Overburden Groundwater Sample Analytical Test Results

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	SOH-OW-9S 7/5/95	Q	SOH-0W-10S 7/5/95	Q	SOH-0W-11S 7/5/95	Q	SOH-B-101-0W 7/5/95	Q	SOH-MW-2 7/10/95	Q	SOH-MW-3 7/10/95	Q	SOH-MW-5 7/10/95	Q	SOH-OW-LS 7/13/95	Q
Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Vinyl chloride					2.7	JJ					27	D	11000	D		
Chloroethane																
Acetone																
1,1-Dichloroethene					19		96	JD	580	JD	42	D				
1,1-Dichloroethane					8.6	J			10000	D	250	D				
1,2-Dichloroethene (total)							63	J	590	JD	49	D	7200	D		
Chloroform			7.2	J												
1,1,1-Trichloroethane					520	D	1400	D	2600	D	11	JD				
Trichloroethene (TCE)									1800	D			2600	D	4.3	J
1,1,2-Trichloroethane																
Tetrachloroethene													8800	D		
Semi-Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Phenol													8	J		
2-Methylphenol																
Isophorone																
Di-n-butyl phthalate	2	J													1	J
Bis(2-ethylhexyl)phthalate	3	J	2	J												
Metals	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Aluminum	1110	E*J	14900	E*J	6170	E*J	896	E*J	994		1230		3150		2250	
Arsenic			6.6	BJ	3.1	B			4.5	BNJ	4.6	BNJ	3.3	BNJ		
Barium	124	B	305		200		157	B	78.5	B	122	B	191	B	106	B
Cadmium									2.4	B	3.9	B	2.8	B		
Calcium	91700		301000		237000		199000		136000		144000		162000		219000	
Chromium	3.6	B	31.6		14				2.3	B	21		6.4	B	4	B
Cobalt	3.8	B	19.1	B	12.8	B	2.8	B					3.8	B	10.1	B
Copper	2.9	B	56.9		36.9		2.6	B	3.8	B	14.5	B	24.5	B	9.3	B
Iron	5670	*J	31600	*	14200	*J	1810	*J	3960		3860		5770		6080	
Lead	1.6	B	25.1	+J	14.6	S	19		1.6	BNJ	10	NJ	7.6	NJ	20.1	NJ
Magnesium	50000		132000		97200		68600		82500		825000		66800		75800	
Manganese	105	*	1420	*	930	*	120		154		276		695		808	
Nickel	23.2	B	89.1		83.4						32	B	15.6	B		
Potassium	6680		27500		6200		3240	B	4030	B	5330		2760	B	2940	B
Silver									1.5	B	1.5	B			1.9	B
Sodium	103000		168000		35900		50600		42800		63000		40300		73900	
Vanadium	3	B	28.2	B	12.7	B					3.4	B	8.6	B	6.2	B
Zinc	31	J	169	J	114	J	33.5	J	23.6		66		46.2		79.7	
Others																
Cyanide (ug/l)																
Alkalinity, as CaCO3 (mg/l)	240		200		430		460		310		230		400		490	
Hardness, as CaCO3 (mg/l)	420		850		970		780		680		690		780		960	

Notes:
1) Blank indicated parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table 14b
Summary of Round 1 Top of Bedrock Groundwater
Sample Analytical Test Results

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	SOH-OW-1R 7/11/95	Q	SOH-OW-2R 7/11/95	Q	SOH-OW-3R 7/11/95	Q	SOH-OW-4R 7/13/95	Q	SOH-OW-7R 7/13/95	Q	SOH-IW-1R 7/12/95	Q	SOH-IW-2R 7/12/95	Q
Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Chloromethane					8.1	J								
Vinyl chloride											110	D		
Methylene chloride									5500	BD				
Acetone			6.5	J	12									
1,1-Dichloroethene									250	JD				
1,1-Dichloroethane							12		5900	D	21	JD		
1,2-Dichloroethene (total)			3.8	J			14		9000	D	580	D	6700	D
1,1,1-Trichloroethane									170	JD				
Trichloroethene (TCE)							15		10000	D	64	D		
2-Hexanone					5.4	J								
Tetrachloroethene									66	JD				
Semi-Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Phenol									10					
4-Methylphenol									2	J				
Isophorone									3	J				
Di-n-butyl phthalate			1	J	1	J			1	J				
Metals	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Aluminum	559		290		248		1400		247		753		522	
Antimony											47.8	B		
Arsenic	8.3	BNJ			4.8	BNJ			3	BNJ	18.6	SNJ	11	SNJ
Barium	61	B	35.4	B	10.4	B	23.5	B	41.4	B	62.8	B	44.5	B
Cadmium	2.7	BJ	3.3	BJ			3	BJ			190		51.4	
Calcium	83900		73000		388000		458000		208000		224000		202000	
Chromium	13.3		8	B	7.8	B	4.8	B	4	B	3700		110	
Cobalt	4.1	B	4.6	B	3.5	B	2.1	B	2.4	B	19.4	B	18.8	B
Copper	52.8		45		65.9		29.6		36.1		678		280	
Iron	89800		64800		60200		39300		42300		265000		49800	
Lead	3.5	NJ	2.2	BNJ			2.8	BSNJ	2.4	BNJ	78.1	NJ	35.4	SNJ
Magnesium	51700		33600		44000		59700		23400		28400		55100	
Manganese	874		836		1670		606		518		559		428	
Mercury	0.39						0.24				0.2	B		
Nickel	54.3		39.3	B	38.3	B	25.5	B	66.3		1270		7770	
Potassium	8420		9970		13300		19100		75600		6570		10200	
Silver	3	B	1.4	B	2.1	B	2.2	B	2.2	B	15.8		2.6	B
Sodium	18100		18100		16200		22200		81600		18700		87600	
Vanadium	5.2	B	3.8	B	3	B	3.5	B	3.4	B	22.7	B	3.9	B
Zinc	45.5		36.4		34.6		25.4		34		2790		961	
Others														
Alkalinity, as CaCO3	230		61		34		150		57		120		280	
Cyanide (ug/l)											16.6			
Hardness, as CaCO3	460		330		1200		1500		700		640		520	

Notes:
1) Blank indicates parameter not detected at the respective detection limit.
2) See Figure No. 3 for sample locations
3) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table No. 14c
Summary of Round 2 Overburden Groundwater Sample Analytical Test Results

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	SOH-OW-1S 10/3/95	Q	SOH-OW-2S 10/4/95	Q	SOH-OW-3S 10/4/95	Q	SOH-OW-4S 10/4/95	Q	SOH-OW-5S 10/3/95	Q	SOH-OW-6S 10/3/95	Q	SOH-OW-7S 10/4/95	Q	SOH-OW-8S 10/3/95	Q	SOH-OW-9S 10/2/95	Q
Volatile Organics (ug/l)	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Vinyl chloride					1400													
Chloroethane																		
Methylene chloride									4	J	300	J			5.9	J		
1,1-Dichloroethene							8	J	9.4	J	450	J			3.6	J		
1,1-Dichloroethane					64	J	170		97		1500		1000	J	130			
1,2-Dichloroethene (total)	3.6	J			2900				39				9300		3.3	J		
1,2-Dichloroethane																		
1,1,1-Trichloroethane							50		3.2	J	14000	DJ						
Trichloroethene (TCE)	26				350				26		82	J	140000	D				
1,1,2-Trichloroethane																		
Tetrachloroethene	8.9	J			640						1800							
Xylenes (total)																		
Semi-Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
2-Methylphenol	NT		NT		NT		NT		NT		NT		7.9	J	NT		NT	
4-Methylphenol	NT		NT		NT		NT		NT		NT		1.4	JN	NT		NT	
Isophorone	NT		NT		NT		NT		NT		NT		19		NT		NT	
Dimethyl phthalate	NT		NT		NT		NT		NT		NT		0.74	J	NT		NT	
Diethyl phthalate	NT		NT		NT		NT		NT		NT		1.5	J	NT		NT	
Bis(2-ethylhexyl)phthalate	NT		NT		NT		NT		NT		NT		2.4	J	NT		NT	
Metals	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Arsenic							10.8	J					4.6	BJ			3.7	BJ
Barium	59.7	BE	78.8	B	38.7	B	79.6	B	130	BE	75.2	BE	78.9	B	35.6	BE	88.9	BE
Cadmium	2	B					2.4	B										
Chromium	10.3												2	B				
Copper	39.7								3	B			3.7	B				
Lead	1.9	B	2.7	B	1.2	B			2.4	B	4							
Mercury																		
Nickel	17.1	B					86.6		43.8		32.7	B			81.7			
Silver													1.5	B				
Zinc	18.6	B	13.5	B	10.5	B	10.3	B	16.4	B	9.8	B	48.3		21.8		30.8	

Notes:
1) Blank indicated parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table 14c
Summary of Round 2 Overburden Groundwater Sample Analytical Test Results

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-078
Henrietta, New York

Parameter	SOH-OW-10S 10/2/95	Q	SOH-OW-11S 10/2/95	Q	SOH-B-101-OW 10/2/95	Q	SOH-MW-2 10/3/95	Q	SOH-MW-3 10/3/95	Q	SOH-MW-5 10/3/95	Q	SOH-OW-LS 10/2/95	Q
Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Vinyl chloride									3.4	J	980			
Chloroethane														
Methylene chloride							350	J	3.9	J	100	J		
1,1-Dichloroethene			43	J	380	J	260	J	19					
1,1-Dichloroethane			21	J			7800		110					
1,2-Dichloroethene (total)							620	J	43		4700	D		
1,2-Dichloroethane														
1,1,1-Trichloroethane			870		2800		3200		34					
Trichloroethene (TCE)									2.4	J	1200			
1,1,2-Trichloroethane											53	JN		
Tetrachloroethene									15		4300			
Xylenes (total)														
Semi-Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
2-Methylphenol	NT		NT		NT		NT		NT		NT		NT	
4-Methylphenol	NT		NT		NT		NT		NT		NT		NT	
Isophorone	NT		NT		NT		NT		NT		NT		NT	
Dimethyl phthalate	NT		NT		NT		NT		NT		NT		NT	
Diethyl phthalate	NT		NT		NT		NT		NT		NT		NT	
Bis(2-ethylhexyl)phthalate	NT		NT		NT		NT		NT		NT		NT	
Metals	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Arsenic			4.5	BJ					3.6	B				
Barium	146	BE	147	BE	164	BE	69	BE	104	BE	155	BE	158	BE
Cadmium					2.1	B								
Chromium	10		6.4	B					2.8	B			9.5	B
Copper	5.3	B	10.2	B	3	B			3.7	B	8.6	B	60.6	
Lead			3.2		18.9								61.9	S
Mercury			0.23											
Nickel	144		48.8						18.8	B	17	B	17.4	B
Silver														
Zinc	25.6		38.2		23.2		17	B	33.6		67.8		168	

Notes:
1) Blank indicated parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table 14d
Summary of Round 2 Top of Bedrock Groundwater
Sample Analytical Test Results

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	SOH-OW-1R 10/4/95	Q	SOH-OW-2R 10/4/95	Q	SOH-OW-3R 10/5/95	Q	SOH-OW-4R 10/5/95	Q	SOH-OW-7R 10/5/95	Q	SOH-IW-1R 10/6/95	Q	SOH-IW-2R 10/6/95	Q
Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Vinyl chloride									24		69	J	8.8	J
Chloroethane									21					
Methylene chloride					7	J			3400	D				
Acetone									100					
Carbon disulfide					8	J								
1,1-Dichloroethene									130				5	J
1,1-Dichloroethane			1.5	J					3100	D	96	J	28	
1,2-Dichloroethene (total)			5.5	J					6900	D	670		280	D
1,2-Dichloroethane									12					
1,1,1-Trichloroethane									110				110	
Trichloroethene (TCE)	1.8	J	1.5	J					7100	D	150		19	
Benzene									3	J				
Tetrachloroethene									4	J				
Toluene									8	J			1.5	J
Ethylbenzene									2	J				
Xylenes (total)									9	J				
Semi-Volatile Organics	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
2-Methylphenol	NT		NT		NT		NT		1.4	J	NT		NT	
4-Methylphenol	NT		NT		NT		NT		0.83	J	NT		NT	
Isophorone	NT		NT		NT		NT		2.7	J	NT		NT	
Di-n-butyl phthalate	NT		NT		NT		NT		0.96	J	NT		NT	
Bis(2-ethylhexyl)phthalate	NT		NT		NT		NT		2.7	J	NT		NT	
Metals	(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)		(ug/l)	
Arsenic	11.6	J							3.8	BWJ	23.3	S	8.2	BJ
Barium	72.4	B	47.8	B	4.8	B	11.1	B	33.4	B	109	B	60.9	B
Cadmium			3.2	B							797		288	
Chromium	8.3	B	44.7		3.5	B	2.5	B			4380		207	
Copper	7	B	10.3	B	8.7	B	4.5	B	10.3	B	708		378	
Lead	9.3		3.6								72.7		75.8	
Mercury					0.41				0.22				0.34	
Nickel	19.5	B	23.7	B					40.1		2410		4660	
Silver					1.3	B					18.3		4.7	B
Zinc	29.5		38.8		22.2		20.7		46.3		4280		955	

Notes:
1) Blank indicates that the parameter was not detected at the respective detection limit.
2) See Figure No. 3 for sample locations.
3) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table No. 14e
Summary of October 1994 Ruby Gordon Sump Sample Analytical Test Results

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	RG-SUMP-1 10/27/94	Q	RG-SUMP-2 10/27/94	Q	RG-SUMP-3 10/27/94	Q
Volatile Organics	(ug/l)		(ug/l)		(ug/l)	
Vinyl chloride			17			
Methylene chloride			84	B	76	B
1,1-Dichloroethene	6	J				
1,1-Dichloroethane	39		630	D	450	D
1,2-Dichloroethene (total)	9	J	590	D	540	D
1,2-Dichloroethane			3	J	3	J
1,1,1-Trichloroethane	16		2000	D	1600	D
Trichloroethene (TCE)	5	J	550	D	530	D
1,1,2-Trichloroethane			8	J	8	J
Bromoform					1	J
4-Methyl 2-Pentanone					2	J
Tetrachloroethene	3	J	150		95	
1,1,2,2-Tetrachloroethane					2	J
Semi-Volatile Organics	(ug/l)		(ug/l)		(ug/l)	
Phenanthrene			5	J		
Anthracene			1	J		
Carbazole			1	J		
Fluoranthene			11			
Pyrene			8	J		
Benzo (a) anthracene			3	J		
Chrysene			4	J		
Bis(2-ethylhexyl)phthalate	2	J	1	J	2	J
Benzo (b) fluoranthene			4	J		
Benzo (k) fluoranthene			3	J		
Benzo (a) pyrene			4	J		
Indeno (1,2,3-cd) pyrene			4	J		
Dibenz (a,h) anthracene			1	J		
Benzo (g,h,i) perylene			4	J		
Metals	(ug/l)		(ug/l)		(ug/l)	
Aluminum	106	B	951		36.5	B
Antimony	12.1	B				
Barium	94.7	B	270		163	B
Calcium	118000		218000		157000	
Chromium			4.4	B	2.6	B
Cobalt			3.8	B	2.1	B
Copper	5.1	B	53.8		59.4	
Iron	63.0	B	3650		181	
Lead	1.5	BN	19.6	SN	1.5	BN
Magnesium	52800		94100		74000	
Manganese	96.9	N	191	N	68.2	N
Nickel					13.2	B
Potassium	22400		9070		9930	
Selenium	1.3	BN				
Silver	2.3	B	2.6	B	3.4	B
Sodium	123000		479000		260000	
Vanadium			4.2	B		
Zinc	31.1		89.0		60.4	

Notes:
1) Blank indicated parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table 14f
Summary of October 1995 Ruby Gordon Sump Sample Analytical Test Results

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	RG-SUMP-1 10/5/95	Q	RG-SUMP-2 10/5/95	Q	RG-SUMP-3 10/5/95	Q
Volatile Organics	(ug/l)		(ug/l)		(ug/l)	
Vinyl chloride			30		15	J
Chloroethane			8.8	J		
Methylene chloride	4	J	120	J	59	J
1,1-Dichloroethene	3.6	J	120		60	J
1,1-Dichloroethane	26		750	D	310	
1,2-Dichloroethene (total)	5.2	J	760	D	290	
1,2-Dichloroethane			4.1	J		
1,1,1-Trichloroethane	15		3200	D	1200	
Trichloroethene (TCE)	4.4	J	460	D	210	
Tetrachloroethene	4.6	J	180		78	J
Xylenes (total)	1.6	J				
Semi-Volatile Organics	(ug/l)		(ug/l)		(ug/l)	
2-Methylphenol	NT		NT		NT	
4-Methylphenol	NT		NT		NT	
Isophorone	NT		NT		NT	
Dimethyl phthalate	NT		NT		NT	
Diethyl phthalate	NT		NT		NT	
Bis(2-ethylhexyl)phthalate	NT		NT		NT	
Metals	(ug/l)		(ug/l)		(ug/l)	
Arsenic	NT		NT		NT	
Barium	NT		NT		NT	
Cadmium	NT		NT		NT	
Chromium	NT		NT		NT	
Copper	NT		NT		NT	
Lead	NT		NT		NT	
Mercury	NT		NT		NT	
Nickel	NT		NT		NT	
Silver	NT		NT		NT	
Zinc	NT		NT		NT	

Notes:
1) Blank indicated parameter not detected at the respective detection limit
2) NT - Not Tested
3) See Figure No. 3 for sample locations.
4) Q = Data Qualifier - See Appendix G for qualifier definitions.

Table No. 15
Average Temperature and Precipitation

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Month	Temperature (°F)			Precipitation (in)	
	Average Daily Minimum	Average Daily Maximum	Average	Average	Average Snowfall
January	17.6	31.5	24.6	2.4	23.0
February	17.1	32.0	24.6	2.4	22.6
March	25.2	40.6	32.9	2.6	14.3
April	36.2	54.2	45.2	2.6	3.7
May	46.8	66.8	56.8	2.9	0.3
June	56.2	76.6	66.4	3.0	0.0
July	61.3	81.3	71.3	3.1	0.0
August	59.7	78.9	69.3	2.9	0.0
September	52.9	72.1	62.5	2.8	0.0
October	42.4	60.1	51.3	2.7	0.2
November	33.0	46.6	39.8	2.7	6.6
December	22.7	35.3	29.0	2.6	19.4
Yearly Average	39.3	56.3	47.8	32.7	90.1

Notes:
1) Data obtained from the Northeast Regional Climate Center (NRCC) at Cornell University.
2) Recording period is from 1965 through 1995 in Rochester, New York.

Table No. 16
Summary of Exposure Pathways Considered

Remedial Investigation
Stuart - Olver - Holtz
Site No. 8-28-079
Henrietta, New York

Media	Exposure	Likelihood of Exposure	Data Set	Standards
Surface Soils	Ingestion, Inhalation and Dermal Contact by local residents and migration to surface water through erosion.	Moderate	All Surface Soil Test Results and Samples SED-1 and SED-4	TAGM 4046 Soil Cleanup Objectives Health Effects Summary Table Derived Values USEPA Draft Generic Residential Screening Levels
Subsurface Soils	Ingestion, Inhalation and Dermal Contact by maintenance workers or local residents.	Low	All Subsurface Soil Test Results excluding samples from OW-11S and OW-9S which are used to establish background.	TAGM 4046 Soil Cleanup Objectives Health Effects Summary Table Derived Values USEPA Draft Generic Residential Screening Levels
	Leaching to groundwater.	Moderate	All Subsurface Soil Test Results excluding samples from OW-11S and OW-9S which are used to establish background.	TAGM 4046 Soil Cleanup Objectives Health Effects Summary Table Derived Values USEPA Draft Generic Residential Screening Levels
Surface Water	Ingestion, Inhalation and Dermal Contact by local residents	Moderate	SW-1, SW-2 and SW-3	NYSDEC Class C Water Standards USEPA Ambient Water Quality Criteria
Surface Water Sediments	Ingestion, Inhalation and Dermal Contact by local residents	Moderate	SED-2 and SED-3	USEPA Sediment Quality Criteria TAGM 4046 Soil Cleanup Objectives Health Effects Summary Table Derived Values USEPA Draft Generic Residential Screening Levels NYSDEC Sediment Criteria - Human Health Bioaccumulation
Overburden Groundwater	Ingestion, Inhalation and Dermal Contact from use as a drinking water source	Low	All Overburden Groundwater Test Results (Round 1 and 2 combined).	NYSDEC Class GA Groundwater Quality Criteria USEPA MCL's and MCLG's USEPA Health Advisories
	Ingestion, Inhalation and Dermal Contact at points of groundwater discharge	Moderate	All Overburden Groundwater Test Results (Round 1 and 2 combined).	NYSDEC Class C Water Standards USEPA Ambient Water Quality Criteria
Bedrock Groundwater	Ingestion, Inhalation and Dermal Contact from use as a drinking water source	Low	All Bedrock Groundwater Test Results (Round 1 and 2 combined).	NYSDEC Class GA Groundwater Quality Criteria USEPA MCL's and MCLG's USEPA Health Advisories
On-site Sump Sediment	Ingestion, Inhalation and Dermal Contact by maintenance workers or local residents and leaching to groundwater.	Low	NSM-2 and NSM-3	TAGM 4046 Soil Cleanup Objectives Health Effects Summary Table Derived Values USEPA Draft Generic Residential Screening Levels
On-site Sump Water	Ingestion, Inhalation and Dermal Contact by maintenance workers or local residents	Moderate	NSM-1 and NSM-4	NYSDEC Class C Water Standards USEPA Ambient Water Quality Criteria NYSDEC Class GA Groundwater Quality Criteria USEPA MCL's and MCLG's USEPA Health Advisories
Soil Vapor	Inhalation within the basement of Ruby Gordon Building	Low to Moderate	SUMP-1, SUMP-2 and SUMP-3 results (Round 1 and 2 combined) used to calculate maximum possible vapor concentrations by applying Henry's Law	NYSDEC Air Guide I
	Inhalation within an excavation or basement downgradient of the site.	Moderate	All Overburden Groundwater Test Results (Round 1 and 2 combined) used to calculate maximum possible vapor concentrations by applying Henry's Law	NYSDEC Air Guide I

Notes:
1) See text section 6.0 for futher discussion of Likelihood of Exposure.

Table No. 17
Overview of Properties of Chemicals Detected at Stuart-Olver-Holtz

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

CHEMICAL CLASS	EXAMPLES	COMMON USE/ ORIGIN	BEHAVIORAL CHARACTERISTICS IN THE ENVIRONMENT	MEDIA TYPE (TOTAL SAMPLE LOCATIONS PER MEDIA)								
				GROUNDWATER								
				Overburden (16)	Severely Weathered Bedrock (5)	Interior Wells (2)	SUBSURFACE SOILS (24)	SURFACE SOILS (8)	SURFACE WATER (3)	SURFACE WATER SEDIMENTS (2)	ON-SITE SUMP AND CATCH BASINS (4)	RUBY-GORDON SUMPS (9)
Volatile Organic Compound Compounds				Number of sample locations detected								
Halogenated Aliphatic Hydrocarbons	Trichloroethene 1,1,1-Trichloroethane 1,2-Dichloroethene Tetrachloroethene 1,1-Dichloroethane Methylene Chloride 1,2-Dichloroethane Vinyl Chloride 1,1-Dichloroethene	Industrial Solvents	Some of these compounds are more dense than water, such pure products would sink in the environment (DNAPL). Due to a relatively high Henry's Law constant, volatilization may play a significant role in transport of this chemical class. Water solubility and partitioning coefficients indicate most compounds in this class have the potential to leach from soils and to migrate in surface and ground waters.	13	5	2	14	4	0	2	3	3
Aromatic Hydrocarbons	Benzene Ethylbenzene Toluene Xylenes	Petroleum Products Solvents	Less dense than water, these compounds, in pure form, tend to float (LNAPL). Due to a high Henry's Law constant, volatilization may play a significant role in transport of this chemical class. Water solubility and partitioning coefficients indicate most compounds in this class have the potential to leach from soils and migrate in surface and ground waters.	0	1	1	4	1	0	0	3	1
Ketones	Acetone 2-Hexanone	Industrial Solvents Laboratory Solvent	High vapor pressures indicate volatility of this chemical class. Water solubility and partition coefficients indicate a high potential for leaching from soils and to migrate in surface and ground waters.	1	3	0	1	0	1	0	0	0
Halogenated Aromatic Hydrocarbons	Chlorobenzene	Chemical Intermediate	While these compounds have low vapor pressures volatilization of this chemical class may be rapid. Low water solubility and the high partition coefficient suggests a tendency of these compounds to sorb onto solids. The densities are generally greater than that of water.	0	0	0	2	3	0	0	1	0

Table No. 17
Overview of Properties of Chemicals Detected at Stuart-Olver-Holtz

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

CHEMICAL CLASS	EXAMPLES	COMMON USE/ ORIGIN	BEHAVIORAL CHARACTERISTICS IN THE ENVIRONMENT	MEDIA TYPE (TOTAL SAMPLE LOCATIONS PER MEDIA) GROUNDWATER Overburden (16)	GROUNDWATER Severely Weathered Bedrock (5)	GROUNDWATER Interior Wells (2)	SUBSURFACE SOILS (24)	SURFACE SOILS (8)	SURFACE WATER (3)	SURFACE WATER SEDIMENTS (2)	ON-SITE SUMP AND CATCH BASINS (4)	RUBY-GORDON SUMPS (3)
Semi-Volatile Organic Compounds				Number of sample locations detected								
Polynuclear Aromatic Hydrocarbons	Benzo (a) Anthracene Benzo (a) Pyrene Chrysene Dibenz (a,h) Anthracene Fluoranthene Pyrene	Coal Burning By-product By-product of Internal Combustion Processes	Low water solubilities and high partition coefficient indicate a relatively low potential for leaching and migration. PAHs typically display low volatilization rates. Absorption is likely high.	0	0	0	12	8	1	2	3	1
Phthalates	Bis(2-ethyhexyl) phthalate Butylbenzyl phthalate Di-n-octyl phthalate Di-n-butyl phthalate	Plastic Manufacturing Plasticizers	Vapor pressures of this chemical class are relatively low, indicating volatilization is not a significant transport mechanism. Water solubility ranges from low to moderate; partition coefficients are high. This suggests significant leaching to and transport by surface and ground waters to be minimal.	10	3	0	20	8	0	2	3	3
Phenols	Phenol 2-Methylphenol 4-Methylphenol	Chemical Intermediates	A moderately low vapor pressure and high water solubility suggests little volatilization. A low partition coefficient suggests minimal sorption onto solids. This class of compounds can readily leach from soils and migrate in surface and ground waters.	2	1	0	3	0	1	0	1	0
Miscellaneous SVOCs	Carbazole Dibenzofuran Isophorone	Chemical Intermediates	These miscellaneous compounds are considered SVOCs, and thus are typically characterized by a low water solubility, low vapor pressures and high partition coefficients. Additional details are presented in Appendix G.	Varies by specific compound of interest.								

Table No. 17
Overview of Properties of Chemicals Detected at Stuart-Olver-Holtz

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

CHEMICAL CLASS	EXAMPLES	COMMON USE/ ORIGIN	BEHAVIORAL CHARACTERISTICS IN THE ENVIRONMENT	MEDIA TYPE (TOTAL SAMPLE LOCATIONS PER MEDIA)								
				GROUNDWATER								
				Overburden (16)	Severely Weathered Bedrock (5)	Interior Wells (2)	SUBSURFACE SOILS (24)	SURFACE SOILS (8)	SURFACE WATER (3)	SURFACE WATER SEDIMENTS (2)	ON-SITE SUMP AND CATCH BASINS (4)	RUBY-GORDON SUMPS (3)
PCBs and Pesticides				Number of sample locations detected								
Polychlorinated Biphenyl's	Aroclor 1254	Heat resistance additives to oil.	Although vapor pressures of PCBs are low, atmospheric transport may occur as an aerosol. PCBs have low water solubilities and high partition coefficients, thus do not tend to migrate in groundwater. Migration may result from their tendency to bioaccumulate.	0	0	0	1	0	0	0	0	0
Pesticides	BHCs 4,4'-DDT Endosulfan Isophrone	Agricultural Pest Control	Pesticides typically have low vapor pressures, low water solubility and high partition coefficients. Thus, significant migration of pesticides within groundwater is not anticipated.	0	0	0	0	0	0	0	0	0
Metals				Number of sample locations detected								
Metals	Zinc Lead Nickel Copper Chromium Cadmium	Paints and Pigments Naturally Occurring	Physical and chemical properties affecting the transport of metals vary with the metal and the environmental conditions (pH, Eh, alkalinity, etc.) as well as the presence of other compounds such as sulfate, chlorides, etc. Depending on these conditions, metals vary from highly immobile to very soluble.	16	5	2	24	8	3	2	4	3
Cyanide				Number of sample locations detected								
Cyanide	Hydrogen Cyanide			2	0	1	1	3	0	0	1	0

Notes:
1) See Appendix G for properties of specific chemicals within topological profiles.
2) See Tables 9 - 15b for analytical test data.

Table No. 18
Summary of Health Based Surface Soil ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence						SCG's					Background			
	Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	NYSDEC TAGM 4046	USEPA DRAFT Residential Generic Soil Screening Levels: Inhalation	Ingestion	Protection of GW	USEPA HEAST	OW-11S 26-32' 6/22/95	Q	OW-9S 8-10' 6/20/95	Q
Volatile Organics (ug/kg)															
Methylene chloride	4	8	30	SS-3	7	SED 1&4	100	85000	7000	10	93000				
Toluene	1	8	4	SS-1	4	SS-1	1500	16000000	520000	5000	20000000				
Chlorobenzene	3	8	25	SS-1	1	SED-4	1700	16000000	94000	600	2000000				
Semi-Volatile Organics (ug/kg)															
Naphthalene	2	8	370	SS-1	280	SS-3	13000	3100000		30000	300000				
2-Methylnaphthalene	1	8	220	SS-6	220	SS-6	36400								
Acenaphthylene	6	8	3600	SS-1	49	SED-4	41000				300000				
Acenaphthene	7	8	4000	SS-6	22	SED-4	50000	4700000		200000	5000000				
Dibenzofuran	6	8	1800	SS-1	29	SS-2	6200								
Fluorene	7	8	5100	SS-1	30	SED-4	50000	3100000		160000	3000000				
Phenanthrene	8	8	69000	SS-1	60	SED-1	50000								
Anthracene	7	8	12000	SS-1	130	SED-4	50000	23000000		4300000	20000000				
Carbazole	7	8	10000	SS-1	67	SED-4	50000	32000		200	8300				
Di-n-Butylphthalate	6	8	4000	SS-3	75	SED-1	8100	7800000	100000	120000					
Fluoranthene	8	8	130000	SS-1	120	SED-1	50000	3100000		980000	3000000				
Pyrene	8	8	120000	SS-1	150	SED-1	50000	2300000		1400000	2000000				
Butylbenzylphthalate	6	8	5500	SS-3	64	SED-4	50000	16000000	530000	68000	20000000				
Benzo (a) Anthracene	8	8	54000	SS-1	49	SED-1	224 or MDL	900		700	220				
Chrysene	8	8	79000	SS-1	86	SED-1	400	88000		1000					
Bis (2-Ethylhexyl) Phthalate	8	8	27000	SS-3	80	SED-1	50000	46000	210000	11000	50000				
Di-n-Octyl Phthalate	1	8	310	SED-4	310	SED-4	50000				2000000				
Benzo (b) Fluoranthene	8	8	92000	SS-1	84	SED-1	1100	900		4000	220				
Benzo (k) Fluoranthene	7	8	25000	SS-1	58	SED-1	1100	9000		4000	220				
Benzo (a) Pyrene	8	8	58000	SS-1	64	SED-1	61 or MDL	90		4000	60				
Indeno (1,2,3-cd) Pyrene	8	8	50000	SS-1	81	SED-1	3200	900		35000					
Dibenz (a,h) Anthracene	7	8	18000	SS-1	180	SED-4	14 or MDL	90		11000	14				
Benzo(g,h,i) Perylene	8	8	23000	SS-1	32	SED-1	50000								

Table No. 18
Summary of Health Based Surface Soil ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence: Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	SCG's: NYSDEC TAGM 4046	USEPA DRAFT Residential Generic Soil Screening Levels: Inhalation	Ingestion	Protection of GW	USEPA HEAST	Background: OW-11S 26-32' 8/22/95	Q	OW-9S 8-10' 8/20/95	Q
Metals (mg/kg)															
Aluminum	8	8	10700	SS-5	4990	SS-6						5540	*	3430	*
Antimony	2	8	24.8	SS-2	9.2	SS-3		31			30				
Arsenic	8	8	72.9	SS-3	3	SS-4 &SED-1	7.5	0.4	380	15	80	0.86	BJ	1.2	BJ
Barium	8	8	3350	SS-3	36.5	SS-6	300	5500	350000	32	4000	60.8		40.2	B
Beryllium	7	8	0.46	SS-5	0.22	SS-2	0.16	0.1	690	180	0.16	0.28	B		
Cadmium	6	8	84.9	SS-3	0.85	SED-4	1	39	920	6	80				
Calcium	8	8	71200	SS-3	3570	SED-1						80100		50100	
Chromium	8	8	1570	SS-2	13.8	SS-6	10				80000	9.5		7.4	
Cobalt	8	8	366	SS-3	3.2	SS-6	30					3.6	B	3.7	B
Copper	8	8	4710	SS-3	14.2	SED-1	25					3.6	B	10.3	J
Iron	8	8	54100	SS-3	11100	SED-1	2000					12400	*	9020	*
Lead	8	8	529	SS-3	15.8	SED-4	200-500	400			250	1.6	S	3.2	S
Magnesium	8	8	32900	SS-3	2660	SED-1						42300		18800	
Manganese	8	8	531	SS-2	113	SED-1					20000	299		260	
Mercury	3	8	0.33	SS-3	0.17	SS-2	0.1	23	7	3	20				
Nickel	8	8	5850	SS-3	11.4	SS-6	13	1600	6900	21	2000	8.5	B	9.2	
Potassium	8	8	2150	SS-3	1040	SS-6						2560		1030	B
Selenium	6	8	185	SS-3	0.33	SED-1	2	390		3					
Silver	8	8	16.3	SS-3	0.6	SS-6		390			200	0.45	U	0.44	U
Sodium	8	8	677	SS-5	107	SS-1						201	B	154	B
Vanadium	8	8	26	SS-5	12.9	SS-6	150	550			600	9.7	B	11.1	
Zinc	8	8	2280	SS-3	45.6	SED-1	20	23000		42000	20000		R		R
Others (mg/kg)															
Cyanide	3	8	40.5	SS-3	1.3	SS-5		1600			2000				

Notes:
1) Site occurrence includes maximum and minimum detected values of the respective test parameters.
2) TAGM 4046 = "Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives Levels", prepared by NYSDEC, January 24, 1994.
For organic compounds, a TOC of 1 percent was selected based on information obtained from TAGM 4046.
3) HEAST - Values derived from USEPA Health Effects Summary Table
4) HEAST value for chromium assumes trivalent chromium.
5) USEPA Draft Soil Screening Guidance = Soil Screening Guidance, USEPA, EPA/540/R-94/101, December, 1994. It should be noted this document is in review draft form.

Table No. 19
Summary of Health Based Subsurface Soil ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum Well	Location of Maximum Depth	Minimum	Location of Minimum Well	Location of Minimum Depth	SCG's NYSDEC TAGM 4046	SCG's USEPA DRAFT Residential Generic Soil Screening Levels Inhalation	Ingestion	Protection of GW	USEPA HEAST	Background OW-11S 26-32' 6/22/95	Q	Background OW-9S 8-10' 6/20/95	Q
Volatile Organics (ug/kg)																	
Chloroethane	2	34	6	SB-4	24-26	4	SB-1	2-4	1900				540000				
Methylene chloride	10	34	270	OW-2S	34-36	5	OW-6S & 7R	10-12 &40-42	100	85000	7000	10	93000				
Acetone	1	34	18	OW-8S	32-34	18	OW-8S	32-34	200	7800000	6.2E+07	8000	6000000				
1,1-Dichloroethene	1	34	2	OW-7S	8-10	2	OW-7S	8-10	400	1000	40	30	12000				
1,1-Dichloroethane	4	34	22	OW-7S	8-10	2	OW-8S	6-12	200	7000	300	10	8000000				
1,2-Dichloroethene(Total)	4	34	910	OW-6S	20-22	5	SB-8	8-10	300	780000	1500000	200	800000				
Chloroform	2	34	6	TP-3	composite	5	TP-1	composite	300	200	110000	300	110000				
1,2-Dichloroethane	1	34	8	OW-7S	8-10	8	OW-7S	8-10	100	7000	300	10	7700				
1,1,1-Trichloroethane	8	34	210	OW-7S	8-10	2	SB-8	8-10	800		980000	900	7000000				
Trichloroethene	11	34	1500	OW-7S	28-30	3	SB-8	8-10	700	58000	3000	20	64000				
1,1,2-Trichloroethane	2	34	26	TP-5	composite	4	OW-7S	8-10		11000	800	10	120000				
Benzene	1	34	110	OW-4R	42-44	110	OW-4R	42-44	60	22000	500	20	24000				
Tetrachloroethene	6	34	280	OW-6S	20-22	4	OW-7S	8-10	1400	12000	11000	40	14000				
Toluene	3	34	600	OW-2S	34-36	4	OW-7S	8-10	1500	16000000	520000	5000	20000000				
Chlorobenzene	2	34	4	TP-1	composite	3	TP-2	composite	1700	1600000	94000	600	2000000				
Ethylbenzene	1	34	7	OW-4R	42-44	7	OW-4R	42-44	5300	7800000	260000	5000	8000000				
Xylene (total)	3	34	360	OW-2S	34-36	2	TP-2	composite	1200	160000000	320000	74000	200000000				
Semi-volatile Organics (ug/kg)																	
Phenol	4	35	410	SB-16	12-14	230	SB-17	16-18	30 or MDL				50000000				
1,4 Dichlorobenzene	2	35	57	TP-3	composite	47	TP-1	composite	8,500	27000	7700000	1000	29000				
Diethylphthalate	3	35	90	SB-16	12-14	46	OW-10S	18-21	7100	63000000	520000	110000	60000000				
Phenanthrene	10	35	160	OW-6S	2-4	23	OW-2S	34-36	50000								
Anthracene	6	35	36	OW-6S	2-4	21	OW-6S & TP-1	10-12 & composite	50000	23000000		4300000	20000000				
Carbazole	2	35	95	OW-6S	20-22	25	OW-6S	2-4	50000	32000		200	8300				
Di-n-Butylphthalate	17	35	540	SB-16	12-14	22	TP-3	composite	8100	7800000	100000	120000					
Fluoranthene	11	35	570	OW-6S	2-4	26	OW-1R	22-23	50000	3100000		980000	3000000				
Pyrene	13	35	480	OW-6S	2-4	24	OW-5S	14-16	50000	2300000		1400000	2000000				
Butylbenzylphthalate	5	35	280	SB-4	0-2	33	TP-3	composite	50000	16000000	530000	68000	20000000				
Benzo (a) Anthracene	4	35	280	OW-6S	2-4	85	OW-6S	10-12	224 or MDL	900		700	220				
Chrysene	11	35	440	OW-6S	2-4	20	OW-2S	34-36	400	88000		1000					
Bis (2-Ethylhexyl) Phthalate	17	35	2200	OW-6S	10-12	28	OW-7R	34-36	50000	46000	210000	11000	50000				
Di-n-Octyl Phthalate	16	35	380	OW-1R	6-8	25	TP-5	composite	50000				2000000				
Benzo (b) Fluoranthene	9	35	550	OW-6S	2-4	51	TP-6	composite	1100	900		4000	220				
Benzo (k) Fluoranthene	8	35	160	OW-6S	2-4	36	TP-6	composite	1100	9000		4000	220				
Benzo (a) Pyrene	9	35	360	SB-4	0-2	29	TP-6	composite	61 or MDL	90		4000	60				
Indeno (1,2,3-cd) Pyrene	9	35	340	OW-6S	2-4	30	TP-6	composite	3200	900		35000					
Dibenz (a,h) Anthracene	4	35	72	OW-6S	2-4	23	OW-6S	10-12	14 or MDL	90		11000	14				
Benzo(g,h,i) Perylene	6	35	1400	SB-4	0-2	28	TP-3,4	composite	50000								

Table No. 19
Summary of Health Based Subsurface Soil ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum		Minimum	Location of Minimum		SCG's					Background			
				Well	Depth		Well	Depth	NYSDEC TAGM 4046	USEPA DRAFT Residential Generic Soil Screening Levels			USEPA HEAST	OW-11S 26-32' 6/22/95	Q	OW-9S 8-10' 6/20/95	Q
										Inhalation	Ingestion	Protection of GW					
PCB/Pesticides (mg/kg)																	
Aroclor - 1254	1	34	41	TP-6	composite	41	TP-6	composite									
Metals (mg/kg)																	
Aluminum	34	34	22800	OW-4S	8-10	1610	SB-17	16-18						5540	*	3430	*
Antimony	2	34	3.5	OW-7S	8-10	3.2	OW-6S	0-2		31			30				
Arsenic	33	34	8.8	SB-1	2-4	0.48	OW-7S	28-30	7.5	0.4	380	15	80	0.86	BJ	1.2	BJ
Barium	34	34	158	OW-10S	18-21	16.6	OW-1R	20-22	300	5500	350000	32	4000	60.8		40.2	B
Beryllium	18	34	1.1	OW-4S	8-10	0.21	OW-7R	40-42	0.16	0.1	690	180	0.16	0.28	B		
Cadmium	8	34	1.7	TP-3	composite	0.7	TP-6	composite	1	39	920	6	80				
Calcium	34	34	107000	OW-6S	10-12	2820	TP-1	composite						80100		50100	
Chromium	34	34	30.3	OW-4S	8-10	2.8	OW-1R	22-23	10				80000	9.5		7.4	
Cobalt	34	34	14.3	OW-2S	34-36	1.5	OW-1R	22-23	30					3.6	B	3.7	B
Copper	34	34	30.8	SB-4	0-2	3.3	OW-4R	42-44	25					3.6	B	10.3	J
Iron	34	34	32400	OW-4S	8-10	4310	OW-1R	22-23	2000					12400	*	9020	*
Lead	34	34	57.6	SB-4	0-2	2	SB-17	16-18	200-500	400			250	1.6	S	3.2	S
Magnesium	34	34	42300	OW-11S	26-32	3270	TP-3	composite						42300		18800	
Manganese	34	34	1670	TP-4	composite	195	OW-1R	22-23					20000	299		260	
Mercury	5	34	1.1	OW-6S	0-2	0.12	TP-5	composite	0.1	23	7	3	20				
Nickel	33	34	106	SB-4	0-2	3.1	SB-17	16-18	13	1600	6900	21	2000	8.5	B	9.2	
Potassium	32	34	6250	OW-4R	42-44	419	SB-17	16-18						2560		1030	B
Selenium	2	34	11.2	SB-4	0-2	1.4	OW-6S	0-2	2	390		3					
Sodium	34	34	354	SB-1	2-4	69.9	TP-4	composite		390				201	B	154	B
Thallium	10	34	0.81	SB-1	2-4	0.21	OW-6S	10-12				0.4	6				
Vanadium	34	34	46	OW-4S	8-10	4.2	OW-1R	22-23	150	550			600	9.7	B	11.1	
Zinc	26	34	143	OW-6S	10-12	16.9	OW-1R	22-23	20	23000		42000	20000		R		R
Others (mg/kg)																	
Cyanide	1	34	1.6	OW-6S	0-2	1.6	OW-6S	0-2		1600			2000				

Notes:
1) Site occurrence includes maximum and minimum detected values of the respective test parameters.
2) TAGM 4046 = "Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives Levels", prepared by NYSDEC, January 24, 1994.
For organic compounds, a TOC of 1 percent was assumed. For metals, soil test results for samples from OW-11S and OW-9S are used as background as shown above.
3) HEAST - Values derived from USEPA Health Effects Summary Table
4) HEAST value for chromium assumes trivalent chromium.
5) USEPA Draft Soil Screening Guidance = Soil Screening Guidance, USEPA, EPA/540/R-94/101, December, 1994. It should be noted this document is in review draft form.

Table No. 20
Summary of Health Based Surface Water ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence						SCG's			
	Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	NYSDEC Class C Water	AWQC Aquatic Acute	AWQC Aquatic Chronic	USEPA AWQC Health
Volatile Organics (ug/l)										
Acetone	1	3	25	SW-3	25	SW-3				
Semi Volatile Organics (ug/l)										
Pentachlorophenol	1	3	4	SW-2	4	SW-2	0.4			
Fluoranthene	1	3	1	SW-1	1	SW-1		3980		310
Pyrene	1	3	1	SW-1	1	SW-1				
Metals (ug/l)										
Aluminum	3	3	997	SW-2	158	SW-3	100			
Barium	3	3	183	SW-2	48.8	SW-3				1000
Calcium	3	3	101000	SW-1	63900	SW-3				
Chromium	1	3	2.2	SW-3	2.2	SW-3	5594	1700	210	170000
Cobalt	1	3	2.4	SW-3	2.4	SW-3	5			
Copper	2	3	4.1	SW-3	2.8	SW-2	368	18	12	1000
Iron	3	3	4850	SW-2	744	SW-1	300		1000	30
Lead	3	3	8.2	SW-3	7.4	SW-1	526	8.2	3.2	50
Magnesium	3	3	38500	SW-1	17400	SW-3				
Manganese	3	3	909	SW-2	185	SW-1				50
Potassium	3	3	12800	SW-3	10400	SW-1				
Silver	1	3	2.4	SW-3	2.4	SW-3	0.1	0.92	0.12	50
Sodium	3	3	96900	SW-1	38700	SW-3				
Vanadium	1	3	3.7	SW-2	3.7	SW-2	14			
Zinc	3	3	80.1	SW-2	30.6	SW-1	2530	96	86	5000
Others (mg/l)		3								
Alkalinity	1	1	360	SW-2	360	SW-2				
Hardness	1	1	5300	SW-2	5300	SW-2				

Notes:
1) Site Occurrence includes maximum and minimum detected values of the respective test parameters.
2) Class C standards as promulgated in 6 NYCRR 703.
3) Class C standards for selected metals is based on the hardness of the water. .
For the purposes of making these calculations, a hardness of 250 ppm was selected based on the calciferous nature of the streambed.
Chromium = exp (0.819 [ln (ppm hardness)] + 1.561)
Copper = exp (0.8545 [ln (ppm hardness)] - 1.465)
Lead = exp (1.266 [ln (ppm hardness)] - 4.661)
Nickel = exp (0.76 [ln (ppm hardness)] + 1.06)
Zinc = exp (0.85 [ln (ppm hardness)] + 0.50)
* Hardness estimated at 250 ppm due to calceriferous nature of stream bed.
4) AWQC = USEPA Ambient Water Quality Criteria for Human Health; water and fish ingestion.
5) Chromium is assumed to be trivalent chromium.
6) Silver Class C standard is for ionic silver.

Table No. 21
Summary of Health Based Surface Water Sediment ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence						SCG's						
	Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	NYSDEC TAGM 4046	NYSDEC Sediment Criteria Human Health Bioaccumulation	USEPA DRAFT Residential Generic Soil Screening Levels			USEPA HEAST	USEPA Sediment Criteria
									Inhalation	Ingestion	Protection of GW		
Volatile Organics (ug/kg)													
Methylene chloride	2	2	7	SED-2	3	SED-3	100		85000	7000	10	93000	
1,1-Dichloroethane	1	2	6	SED-3	6	SED-3	200		7800000	980000	11000	8000000	
1,1,1-Trichloroethane	1	2	7	SED-3	7	SED-3	800			980000	900	7000000	
Tetrachloroethene	1	2	3	SED-3	3	SED-3	1400	8	12000		40	14000	
Semi-Volatile Organics (ug/kg)													
Naphthalene	1	2	610	SED-3	420	SED-3	13000		3100000		30000	300000	
2-Methylnaphthalene	1	2	490	SED-3	250	SED-3	36400						
Acenaphthylene	2	2	630	SED-3	36	SED-2	41000					300000	
Acenaphthene	1	2	2700	SED-3	1400	SED-3	50000		4700000		200000	5000000	1400
Dibenzofuran	1	2	1100	SED-3	600	SED-3	6200						
Fluorene	1	2	2400	SED-3	1200	SED-3	50000		3100000		160000	3000000	
Phenanthrene	2	2	21000	SED-3	340	SED-2	50000						1200
Anthracene	2	2	3400	SED-3	62	SED-2	50000		23000000		4300000	2000000	
Carbazole	2	2	2900	SED-3	65	SED-2	50000		32000		200	8300	
Di-n-Butylphthalate	1	2	180	SED-2	85	SED-2	8100		7800000	100000	120000		
Fluoranthene	2	2	34000	SED-3	810	SED-2	50000		3100000		980000	3000000	10200
Pyrene	2	2	31000	SED-3	810	SED-2	50000		2300000		1400000	2000000	
Benzo (a) Anthracene	2	2	15000	SED-3	260	SED-2	224 or MDL	13	900		700	220	
Chrysene	2	2	18000	SED-3	450	SED-2	400	13	88000		1000		
Bis (2-Ethylhexyl) Phthalate	2	2	4700	SED-3	210	SED-2	50000		46000	210000	11000	50000	
Di-n-Octyl Phthalate	1	2	350	SED-2	350	SED-2	50000					2000000	
Benzo (b) Fluoranthene	2	2	27000	SED-3	530	SED-2	1100	13	900		4000	220	
Benzo (k) Fluoranthene	2	2	11000	SED-3	390	SED-2	1100	13	9000		4000	220	
Benzo (a) Pyrene	2	2	17000	SED-3	750	SED-2	61 or MDL	13	90		4000	60	
Indeno (1,2,3-cd) Pyrene	2	2	22000	SED-3	91	SED-2	3200	13	900		35000		
Dibenz (a,h) Anthracene	2	2	6900	SED-3	140	SED-2	14 or MDL		90		11000	14	
Benzo(g,h,i) Perylene	2	2	7900	SED-3	1200	SED-2	50000						

Table No. 21
Summary of Health Based Surface Water Sediment ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence						SCG's						
	Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	NYSDEC TAGM 4046	NYSDEC Sediment Criteria Human Health Bioaccumulation	USEPA DRAFT Residential Generic Soil Screening Levels			USEPA HEAST	USEPA Sediment Criteria
									Inhalation	Ingestion	Protection of GW		
Metals (mg/kg)													
Aluminum	2	2	10600	SED-2	4540	SED-3							
Antimony	1	2	5.1	SED-2	5.1	SED-2			31			30	
Arsenic	2	2	6.2	SED-2	1.4	SED-3	7.5		0.4	380	15	80	
Barium	2	2	63.2	SED-2	22.1	SED-3	300		5500	350000	32	4000	
Beryllium	1	2	0.59	SED-2	0.59	SED-2	0.16		0.1	690	180	0.16	
Cadmium	1	2	1.6	SED-3	1.6	SED-3	1		39	920	6	80	
Calcium	2	2	7590	SED-3	7020	SED-2							
Chromium	2	2	35.5	SED-2	14.1	SED-3	10					80000	
Cobalt	2	2	10.1	SED-2	3.7	SED-3	30						
Copper	2	2	68.9	SED-3	17.1	SED-2	25						
Iron	2	2	51000	SED-2	8970	SED-3	2000						
Lead	2	2	61.5	SED-3	41.2	SED-2	200-500		400			250	
Magnesium	2	2	4140	SED-3	4090	SED-2							
Manganese	2	2	725	SED-2	119	SED-3						20000	
Nickel	2	2	26.2	SED-2	11.2	SED-3	13		1600	6900	21	2000	
Potassium	2	2	1850	SED-2	1210	SED-3							
Silver	2	2	1.1	SED-2	0.69	SED-3			390			200	
Sodium	2	2	529	SED-3	2.54	SED-2							
Vanadium	2	2	23.8	SED-2	13.9	SED-3	150		550			600	
Zinc	2	2	844	SED-3	442	SED-2	20		23000		42000	20000	

Notes:
1) Site occurrence includes maximum and minimum detected values of the respective test parameters.
2) TAGM 4046 = "Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives Levels", prepared by NYSDEC, January 24, 1994. For organic compounds a TOC value of 1 percent was selected based on information obtained from TAGM 4046. For metals, site sediment background test results were not available.
3) HEAST - Values derived from USEPA Health Effects Summary Table
4) HEAST value for chromium assumes trivalent chromium.
5) NYSDEC Sediment Criteria = "Technical Guidance for Screening of Contaminated Sediments", NYSDEC, July 1994. A TOC value of 1 percent was assumed in deriving criteria.
6) USEPA Draft Soil Screening Guidance = Soil Screening Guidance, USEPA, EPA/540/R-94/101, December, 1994. It should be noted this document is in review draft form.
7) USEPA Sediment Criteria based on a TOC of 1 percent.

Table No. 22
Summary of Health Based Overburden Groundwater ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

	Summary of Site Occurrence						SCG's									
							NYSDEC	USEPA	USEPA	USEPA Health Advisories			NYSDEC	USEPA	USEPA	USEPA
Parameter	Samples Detected	Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	Class GA	MCL's	MCLG's	Child/ One Day	Child/ Long Term	Adult Lifetime	Class C Water	AWQC Human Health	AWQC Aquatic Acute	AWQC Aquatic Chronic
Volatile Organics (ug/l)																
Vinyl chloride	9	32	11000	MW-5	2.7	OW-11S	2	2	0	3000	10			2		
Chloroethane	1	32	21	OW-6S	21	OW-6S	5									
Methylene chloride	6	32	350	MW-2	3.9	MW-3	5									
Acetone	1	32	9.8	OW-8S	9.8	OW-8S	50									
1,1-Dichloroethene	16	32	900	OW-6S	3.6	OW-8S	5	7	7	2000	1000	7		0.033	11600	
1,1-Dichloroethane	18	32	10000	MW-2	8.6	OW-11S	5									
1,2-Dichloroethene (total)	16	32	10000	MW-2	2.9	OW-8S	5	70	70	20000	2000	100				
Chloroform	1	32	7.2	OW-10S	7.2	OW-10S	7	100						5.7	28900	1240
1,1,1-Trichloroethane	14	32	24000	OW-6S	3.1	OW-8S	5	200	200	100000	40000	200		1.03		
Trichloroethene (TCE)	16	32	140000	OW-7S	1.4	OW-8S	5	5	0					2.7	45000	219000
1,1,2-Trichloroethane	2	32	53	MW-5	12	OW-6S	35	5	3	600	400	3		0.6	18000	94000
Tetrachloroethene	10	32	8800	MW-5	3.3	OW-8S	5	5	0	2000	1000			0.17		
Semi-Volatile Organics (ug/l)																
Phenol	2	17	9	OW-7S	8	MW-5	1			6000	6000	4000		20900	10200	2560
4-Methyl Phenol	1	17	1.4	OW-7S	1.4	OW-7S	50									
2-Methylphenol	2	17	9	OW-7S	7.9	OW-7S	50									
Isophorone	2	17	23	OW-7S	19	OW-7S	50			15000	15000	100		5200	11700	
Di methyl Phthalate	1	17	0.74	OW-7S	0.74	OW-7S	50									
Di-n-butyl phthalate	2	17	2	OW-9S	1	OW-LS	50									
Diethyl Phthalate	1	17	1.5	OW-7S	1.5	OW-7S	50									
Bis(2-ethylhexyl)phthalate	9	17	3	OW-9S	1	OW--1S,2S &4S	50						0.6			

Table No. 22
Summary of Health Based Overburden Groundwater ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, new York

Parameter	Summary of Site Occurrence						SCG's									
							NYSDEC Class GA	USEPA MCL's	USEPA MCLG's	USEPA Health Advisories			NYSDEC Class C Water	USEPA AWQC Human Health	USEPA AWQC Aquatic Acute	USEPA AWQC Aquatic Chronic
	Samples Detected	Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum				Child/ One Day	Child/ Long Term	Adult Lifetime				
Metals (ug/l)																
Aluminum	16	16	14900	OW-10S	28.9	OW-8S	100						100		750	87
Arsenic	13	32	10.8	OW-4S	3.1	OW-11S	25	5					190	0.0022		
Barium	32	32	305	OW-10S	31.5	OW-8S	1000	2000	2000			2000		1000		
Cadmium	7	32	5.5	OW-7S	2	OW-1S	10	5	5	40	5	5	3.03	10	130	503
Calcium	16	16	301000	OW-10S	61000	OW-7S	10									
Chromium	19	32	39.1	OW-5S	2	OW-7S	50	100	100	1000	200	100	577.5	170000	1700	210
Cobalt	12	16	19.1	OW-10S	2.8	101-OW							5			
Copper	24	32	56.9	OW-10S	2.6	101-OW	200		1300				34.5	1000	18	12
Iron	16	16	96700	OW-1S	320	OW-8S	300						300	30		1000
Lead	21	32	61.8	OW-LS	1.2	OW-3S	25		0				15.7	50	8.2	3.2
Magnesium	16	16	825000	MW-3	43400	OW-7S	35000									
Manganese	16	16	1420	OW-10S	85.4	OW-8S	500		200					50		
Mercury	1	32	0.23	OW-11S	0.23	OW-11S		2	2			2		0.144	2.4	0.012
Nickel	23	32	169	OW-5S	15.6	MW-5		100	100	1000	500	100	248	13.4	1400	100
Potassium	16	16	27500	OW-10S	2760	MW-5										
Silver	5	32	1.9	OW-LS	1.4	OW-7S	50			200	200	100	0.1		0.92	0.2
Sodium	16	16	168000	OW-10S	21200	OW-7S	20000									
Vanadium	8	16	28.2	OW-10S	2.6	OW-7S				80	30	20	14			
Zinc	32	32	169	OW-10S	9.6	OW-6S	300			6000	3000	2000	240		96	86
Others																
Cyanide (ug/l)	2	16	11.5	OW-2S	11.3	OW-1S	100	200	200	200	200	200	5.2	200	22	52
Alkalinity, as CaCO3 (mg/l)	16	16	490	OW-LS	180	OW-4S										
Hardness, as CaCO3 (mg/l)	16	16	970	OW-11S	350	OW-7S										

Notes:
1) Site occurrence includes maximum and minimum detected values of the respective test parameters.
2) The total number of samples tested includes two rounds of sampling the same wells for VOCs and selected metals. One semi-VOC sample was also collected during the second round from well OW-7S
3) NYSDEC Class GA effluent standard are developed for water discharged to a Class GA groundwater.
4) USEPA MCLs and MCLGs apply to public water supplies.
5) USEPA Health Advisories developed to be protective of adverse non-carcinogenic health effects associated with exposure of child for one day and longer term (approximately 7 years or 10 % of lifetime) and lifetime exposure for adults.

Table No. 23
Summary of Health Based Top of Bedrock Groundwater ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence						SCG's					
										USEPA Health Advisories		
	Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	NYSDEC Class GA	USEPA MCL's	USEPA MCLG's	Child/ One Day	Child/ Long Term	Adult Lifetime
Volatile Organics (ug/l)												
Chloromethane	1	14	8.1	OW-3R	8.1	OW-3R	5			9000	1000	3
Vinyl chloride	4	14	110	IW-1R	8.8	IW-2R	2	2	0	3000	10	
Chloroethane	1	14	21	OW-7R	21	OW-7R	5					
Methylene chloride	3	14	5500	OW-7R	7	OW-3R	5	5	0	10000		
Acetone	3	14	100	OW-7R	6.5	OW-2R	50					
Carbon disulfide	1	14	8	OW-3R	8	OW-3R	50					
1,1-Dichloroethene	3	14	250	OW-7R	5	IW-2R	5	7	7	2000	1000	7
1,1-Dichloroethane	7	14	5900	OW-7R	1.5	OW-2R	5					
1,2-Dichloroethene (total)	9	14	9000	OW-7R	3.8	OW-2R	5	70	70	20000	2000	100
1,2 Dichloroethane	1	14	12	OW-7R	12	OW-7R	5	5	0	700	700	
1,1,1-Trichloroethane	3	14	170	OW-7R	110	OW-7R, IW-2R	5	200	200	100000	40000	200
Trichloroethene (TCE)	8	14	10000	OW-7R	1.5	OW-2R	5	5	0			
Benzene	1	14	3	OW-7R	3	OW-7R	5	5	0	200		
2-Hexanone	1	14	5.4	OW-3R	5.4	OW-3R	50					
Tetrachloroethene	2	14	66	OW-7R	4	OW-7R	5	5	0	2000	1000	
Toluene	2	14	8.0	OW-7R	1.5	IW-2R	5					
Ethyl benzene	1	14	2	OW-7R	2	OW-7R	5	700	700	30000		700
Xylenes (total)	1	14	9	OW-7R	9	OW-7R	5	10000	10000	40000	40000	10000
Semi-Volatile Organics (ug/l)												
2 Methyl Phenol	1	8	1.4	OW-7R	1.4	OW-7R	50					
Phenol	1	8	10	OW-7R	10	OW-7R	1			6000	6000	4000
4-Methylphenol	2	8	2	OW-7R	0.83	OW-7R	50					
Isophorone	2	8	3	OW-7R	2.7	OW-7R	50			15000	15000	100
Di-n-butyl phthalate	4	8	1	OW-2R,-3R,-7R	0.96	OW-7R	50					
Bis (2-ehtylhexyl) Phthalate	1	8	2.7	OW-7R	2.7	OW-7R	50					

Table No. 23
Summary of Health Based Top of Bedrock Groundwater ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence: Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	SCG's: NYSDEC Class GA	USEPA MCL's	USEPA MCLG's	USEPA Health Advisories: Child/ One Day	Child/ Long Term	Adult Lifetime
Metals (ug/l)												
Aluminum	7	7	1400	OW-4R	247	OW-7R	100					
Antimony	1	7	47.8	IW-1R	47.8	IW-1R		6	6	15	15	3
Arsenic	9	14	23.3	IW-1R	3	OW-7R	25	5				
Barium	14	14	109	IW-1R	4.8	OW-3R	1000	2000	2000			2000
Cadmium	8	14	797	IW-1R	2.7	OW-1R	10	5	5	40	5	5
Calcium	7	7	458000	OW-4R	73000	OW-2R						
Chromium	13	14	4380	IW-1R	2.5	OW-4R	50	100	100	1000	200	100
Cobalt	7	7	19.4	IW-1R	2.1	OW-4R						
Copper	14	14	708	IW-1R	4.5	OW-4R	200		1300			
Iron	7	7	265000	OW-1R	39300	OW-7R	300					
Lead	10	14	78.1	IW-1R	2.2	OW-2R	25		0			
Magnesium	7	7	59700	OW-4R	23400	OW-7R	35000					
Manganese	7	7	1670	OW-3R	428	IW-2R	500		200			
Mercury	6	14	0.41	OW-3R	0.2	IW-1R	2					
Nickel	12	14	7770	IW-2R	19.5	OW-1R		100	100	1000	500	100
Potassium	7	7	75600	OW-7R	6570	IW-1R						
Silver	10	14	18.3	IW-1R	1.3	OW-3R	50			200	200	100
Sodium	7	7	87600	IW-2R	16200	OW-3R	20000					
Vanadium	7	7	22.7	IW-1R	3	OW-3R				80	30	20
Zinc	14	14	4280	IW-1R	20.7	OW-4R	300			6000	3000	2000
Others												
Cyanide (ug/l)	1	7	16.6	IW-1R	16.6	IW-1R	100	200	200	200	200	200
Alkalinity, as CaCO3 (mg/l)	7	7	280	IW-2R	34	OW-3R						
Hardness, as CaCO3 (mg/l)	7	7	1500	OW-4R	330	OW-2R						

Notes:
1) Site occurrence includes maximum and minimum detected values of the respective test parameters.
2) The total number of samples tested includes two rounds of sampling the same wells for VOCs and selected metals. One semi-VOC sample was also collected during the second round from well OW-7R.
3) NYSDEC Class GA criteria developed for waters with a best usage as potable water supply.
4) USEPA MCLs and MCLGs developed for public water supplies.
5) USEPA Health Advisories developed to be protective of adverse non-carcinogenic health effects associated with exposure of child for one day and longer term (approximately 7 years or 10 % of lifetime) and lifetime exposure for adults.
6) This table includes observation wells installed during the course of this Remedial Investigation, as well as the two existing supply wells located within the SOH building.

Table No. 24a
Summary of Health Based On-Site Sump and Catch Basin Soil ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

	Summary of Site Occurrence						SCG's				
	Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	NYSDEC TAGM 4046	USEPA DRAFT Residential Generic Soil Screening Levels			USEPA HEAST
Parameter								Inhalation	Ingestion	Protection of GW	
Volatile Organics (ug/kg)											
1,1-Dichloroethane	1	2	32000	NSM-2	25000	NSM-2	200	7000	300	10	8000000
1,2-Dichloroethene(Total)	1	2	17000	NSM-2	17000	NSM-2	300	780000	1500000	200	800000
1,1,1-Trichloroethane	2	2	2000000	NSM-2	8300	NSM-3	800		980000	900	7000000
Trichloroethene	1	2	8900	NSM-2	8900	NSM-2	700	58000	3000	20	64000
Tetrachloroethene	2	2	91000	NSM-2	350	NSM-3	1400	12000	11000	40	14000
Toluene	2	2	110000	NSM-2	580	NSM-3	1500	16000000	520000	5000	20000000
Chlorobenzene	1	2	8600	NSM-2	8600	NSM-2	1700	1600000	94000	600	2000000
Ethyl benzene	1	2	9200	NSM-2	9200	NSM-2	5500	7800000	260000	5000	8000000
Xylene (total)	2	2	46000	NSM-2	490	NSM-3	1200	160000000	320000	74000	200000000
Semi-Volatile Organics (ug/kg)											
1,4-Dichlorobenzene	1	2	1000	NSM-2	1000	NSM-2	8500	27000	7700000	1000	29000
1,2 Dichlorobenzene	1	2	5500	NSM-2	3900	NSM-2	7900	7000000	300000	6000	700000
Naphthalene	2	2	1800	NSM-2	1100	NSM-3	13000	3100000		30000	300000
2-Methylnaphthalene	2	2	420	NSM-2	240	NSM-3	36400				
Dimethyl Phthalate	2	2	440	NSM-2	220	NSM-3		780000000	1600000	1200000	
Acenaphthylene	1	2	600	NSM-2	600	NSM-2	41000				300000
Acenaphthene	1	2	490	NSM-2	490	NSM-2	50000	4700000		200000	5000000
Dibenzofuran	1	2	440	NSM-2	440	NSM-2	6200				
Fluorene	1	2	990	NSM-2	770	NSM-2	50000	3100000		160000	3000000
Phenanthrene	2	2	16000	NSM-2	3400	NSM-3	50000				
Anthracene	2	2	1500	NSM-2	590	NSM-3	50000	23000000		4300000	20000000
Carbazole	2	2	2500	NSM-2	680	NSM-3	50000	32000		200	8300
Di-n-Butylphthalate	2	2	8000	NSM-3	2500	NSM-2	8100	7800000	100000	120000	
Fluoranthene	2	2	19000	NSM-2	7200	NSM-3	50000	3100000		980000	3000000
Pyrene	2	2	18000	NSM-2	7200	NSM-3	50000	2300000		1400000	2000000
Butylbenzylphthalate	2	2	110000	NSM-2	28000	NSM-3	50000	16000000	530000	68000	20000000
Benzo (a) Anthracene	2	2	5100	NSM-2	3100	NSM-3	224 or MDL	900		700	220
Chrysene	2	2	21000	NSM-2	5200	NSM-3	400	88000		1000	
Bis (2-Ethylhexyl) Phthalate	2	2	67000	NSM-2	8200	NSM-3	50000	46000	210000	11000	50000
Di-n-Octyl Phthalate	1	2	1700	NSM-2	1300	NSM-2	50000				2000000
Benzo (b) Fluoranthene	2	2	17000	NSM-2	5400	NSM-3	1100	900		4000	220
Benzo (k) Fluoranthene	2	2	9000	NSM-2	2000	NSM-3	1100	9000		4000	220
Benzo (a) Pyrene	2	2	4200	NSM-2	2800	NSM-2	61 or MDL	90		4000	60
Indeno (1,2,3-cd) Pyrene	2	2	9600	NSM-2	3100	NSM-3	3200	900		35000	
Dibenz (a,h) Anthracene	2	2	3100	NSM-2	750	NSM-3	14 or MDL	90		11000	14
Benzo(g,h,i) Perylene	2	2	5700	NSM-2	1200	NSM-3	50000				

Table No. 24a
Summary of Health Based On-Site Sump and Catch Basin Soil ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence: Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	SCG's: NYSDEC TAGM 4046	USEPA DRAFT Residential Generic Soil Screening Levels: Inhalation	Ingestion	Protection of GW	USEPA HEAST
Metals (mg/kg)											
Aluminum	2	2	4460	NSM-2	3250	NSM-3					
Antimony	2	2	13.6	NSM-2	5.3	NSM-3		31			30
Arsenic	2	2	46.2	NSM-2	6.6	NSM-3	7.5	0.4	380	15	80
Barium	2	2	384	NSM-2	148	NSM-3	300	5500	350000	32	4000
Cadmium	2	2	63.3	NSM-2	4.2	NSM-3	1	39	920	6	80
Calcium	2	2	162000	NSM-3	60900	NSM-2					
Chromium	2	2	714	NSM-2	165	NSM-3	10				80000
Cobalt	2	2	6.1	NSM-2	3.8	NSM-3	30				
Copper	2	2	355	NSM-2	90.8	NSM-3	25				
Iron	2	2	34500	NSM-2	19700	NSM-3	2000				
Lead	2	2	381	NSM-3	253	NSM-2	200-500	400			250
Magnesium	2	2	32500	NSM-3	20000	NSM-2					
Manganese	2	2	310	NSM-2	259	NSM-3					20000
Mercury	1	2	0.8	NSM-2	0.8	NSM-2	0.1	23	7	3	20
Nickel	2	2	983	NSM-2	233	NSM-3	13	1600	6900	21	2000
Potassium	2	2	1100	NSM-3	1090	NSM-2					
Selenium	2	2	89.8	NSM-2	4.4	NSM-3	2	390		3	
Silver	2	2	16.9	NSM-2	2.9	NSM-3		390			200
Sodium	2	2	364	NSM-3	343	NSM-2					
Vanadium	2	2	13.7	NSM-2	11.5	NSM-3	150	550			600
Zinc	2	2	2210	NSM-2	256	NSM-3	20	23000		42000	20000

Notes:
1) Site occurrence includes maximum and minimum detected values of the respective test parameters.
2) TAGM 4046 = "Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives Levels", prepared by NYSDEC, January 24, 1994. For organic compounds, a TOC of 1 percent was selected based on
3) HEAST - Values derived from USEPA Health Effects Summary Table.
4) HEAST value for chromium assumes trivalent chromium.
5) USEPA Draft Soil Screening Guidance = Soil Screening Guidance, USEPA, EPA/540/R-94/101, December, 1994. It should be noted this document is in review draft form.

Table No. 24b
Summary of Health Based On-Site Sump and Catch Basin Water ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence						SCG's									
							NYSDEC	USEPA	USEPA	USEPA Health Advisories			NYSDEC	USEPA	AWQC	AWQC
	Samples Detected	Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	Class GA	MCL's	MCLG's	Child/ One Day	Child/ Long Term	Adult Lifetime	Class C Water	AWQC Health	Aquatic Acute	Aquatic Chronic
Volatile Organics (ug/l)																
1,1-Dichloroethane	1	2	72000	NSM-4	61000	NSM-4	5									
1,1,1-Trichloroethane	1	2	7900	NSM-4	6500	NSM-4	5	200	200	100000	40000	200		1.03		
Toluene	1	2	5800	NSM-4	5800	NSM-4	5	1000	1000	20000	2000	1000		14300	17500	
Ethyl benzene	1	2	2700	NSM-4	2700	NSM-4	5	700	700	30000	1000	700		3000	32000	
Xylene (total)	1	2	15000	NSM-4	15000	NSM-4	5	10000	10000	40000	40000	10000				
Semi-Volatile Organics (ug/l)																
Phenol	1	2	360	NSM-4	360	NSM-4	1			6000	6000	4000		20900	10200	2560
4-Methylphenol	1	2	24	NSM-4	24	NSM-4	50									
Phenanthrene	1	2	2	NSM-1	2	NSM-1	50									
Anthracene	1	2	1	NSM-1	1	NSM-1	50									
Fluoranthene	1	2	5	NSM-1	5	NSM-1	50							310	3980	
Pyrene	1	2	5	NSM-1	4	NSM-1	50									
Butylbenzylphthalate	1	2	14	NSM-1	13	NSM-1	50	100	0							
Benzo (a) Anthracene	1	2	2	NSM-1	1	NSM-1	50									
Chrysene	1	2	3	NSM-1	3	NSM-1	50	0.2	0							
Bis (2-Ethylhexyl) Phthalate	1	2	10	NSM-1	10	NSM-1	50						0.6			
Benzo (b) Fluoranthene	1	2	5	NSM-1	4	NSM-1	50	0.2	0							
Benzo (k) Fluoranthene	1	2	3	NSM-1	2	NSM-1	50	0.2	0							
Benzo (a) Pyrene	1	2	3	NSM-1	3	NSM-1	50	0.2	0					2800		
Indeno (1,2,3-cd) Pyrene	1	2	3	NSM-1	2	NSM-1	50	0.4	0							
Benzo(g,h,i) Perylene	1	2	3	NSM-1	3	NSM-1	50									

Table No. 24b
Summary of Health Based On-Site Sump and Catch Basin Water ARARs/SCGs

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

	Summary of Site Occurrence						SCG's									
							NYSDEC	USEPA	USEPA	USEPA Health Advisories			NYSDEC	USEPA	AWQC	AWQC
Parameter	Samples Detected	Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	Class GA	MCL's	MCLG's	Child/ One Day	Child/ Long Term	Adult Lifetime	Class C Water	AWQC Health	Aquatic Acute	Aquatic Chronic
Metals (ug/l)																
Aluminum	2	2	15700	NSM-4	2940	NSM-1	100						100		750	87
Antimony	2	2	111	NSM-4	13.2	NSM-1		6	6	1.5	1.5	3		146	88	30
Arsenic	1	2	4.1	NSM-1	4.1	NSM-1	25	50					190	0.0022		
Barium	2	2	918	NSM-4	198	NSM-1	1000	2000	2000			2000		1000		
Cadmium	2	2	4430	NSM-4	34.7	NSM-1	10	5	5	40	5	5	3.03	10	130	503
Calcium	2	2	191000	NSM-4	36800	NSM-1										
Chromium	2	2	4940	NSM-4	454	NSM-1	50	100	100	1000	200	100	824	170000	1700	210
Cobalt	2	2	266	NSM-4	11.6	NSM-1							5			
Copper	2	2	3580	NSM-4	261	NSM-1	200		1300				50	1000	18	12
Iron	2	2	1700000	NSM-4	5630	NSM-1	300						300	30		1000
Lead	2	2	696	NSM-4	457	NSM-1	25		0				27	50	8.2	3.2
Magnesium	2	2	17300	NSM-4	4870	NSM-1	35000									
Manganese	2	2	7980	NSM-4	288	NSM-1	500		200					50		
Mercury	1	2	2.4	NSM-1	2.4	NSM-1	2							0.144	2.4	0.012
Nickel	2	2	56700	NSM-4	840	NSM-1		100	100	1000	500	100	345	13.4	1400	100
Potassium	2	2	68800	NSM-4	2140	NSM-1										
Selenium	1	2	3.6	NSM-1	3.6	NSM-1	10	60	50				1	10	20	5
Silver	2	2	99.9	NSM-4	6.3	NSM-1	50			200	200	100	0.1	50	0.92	0.12
Sodium	2	2	193000	NSM-4	7770	NSM-1	20000									
Thallium	1	2	20	NSM-4	20	NSM-4		2	0.5	7	7	0.4	8	13	1400	40
Vanadium	2	2	102	NSM-4	3.7	NSM-1				80	30	20	14			
Zinc	2	2	63500	NSM-4	7610	NSM-1	300			6000	3000	2000	346	5000	96	86
Others																
Cyanide ug/l	1	2	30	NSM-1	30	NSM-1	100	200	200	200	200	200	5.2	200	22	52
Alkalinity mg/l	2	2	250	NSM-4	60	NSM-1										
Hardness mg/l	2	2	1100	NSM-4	540	NSM-1										

Notes:
1) Site occurrence includes maximum and minimum detected values of the respective test parameters.
2) NYSDEC Class GA effluent standard are developed for water discharged to a Class GA groundwater.
3) Class C Surface Water Standards as promulgated in 6 NYCRR 703.
4) Class C Surface Water Standards for selected metals is based on the hardness of the water. .
For the purposes of making these calculations, a hardness of 540 ppm was assumed
Chromium = exp (0.819 [ln (ppm hardness)] + 1.561)
Copper = exp (0.8545 [ln (ppm hardness)] - 1.465)
Lead = exp (1.266 [ln (ppm hardness)] - 4.661)
Nickel = exp (0.76 [ln (ppm hardness)] + 1.06)
Zinc = exp (0.85 [ln (ppm hardness)] + 0.50)
5) AWQC = USEPA Ambient Water Quality Criteria for Human Health; water and fish ingestion.
6) Chromium is assumed to be trivalent chromium.
7) Silver Class C Surface Water Standard is for ionic silver.
8) USEPA MCLs and MCLGs apply to public water supplies.
9) USEPA Health Advisories developed to be protective of adverse non-carcinogenic health effects associated with exposure of child for one day and longer term (approximately 7 years or 10 % of lifetime) and lifetime exposure for adults.

Table 25
Summary of Health Based Ruby Gordon Basement
Equilibrium Vapor Concentration ARARs/SCGs

Renedial Investigation
Stuart-Olver-Holtz
8-28-079
Henrietta, New York

Parameter	Summary of Occurrence										SCGs	
	Number of Samples Detected	Number of Samples Tested	Maximum (ug/l)	Location of Maximum	Dilution Based Vapor Concentration (1/2 Vol. per hour) (mg/m^3)	Dilution Based Vapor Concentration (1 Vol per day) (mg/m^3)	Minimum (ug/l)	Location of Minimum	Dilution Based Vapor Concentration (1/2 Vol. per hour) (mg/m^3)	Dilution Based Vapor Concentration (1 Vol per day) (mg/m^3)	Air Guide - 1 SGC (mg/m^3)	Air Guide - 1 AGC (mg/m^3)
Volatile Organics												
Vinyl chloride	3	6	130	SUMP-2	0.0208	0.247	15	SUMP-3	0.0024	0.0285	1.3	0.00002
Chloroethane	1	6	8.8	SUMP-2	0.001408	0.01672	8.8	SUMP-2	0.001408	0.01672	63	13
Methylene chloride	5	6	120	SUMP-2	0.0192	0.228	4	SUMP-1	0.00064	0.0076		
1,1-Dichloroethene	4	6	120	SUMP-2	0.0192	0.228	3.6	SUMP-1	0.000576	0.00684	2	0.00002
1,1-Dichloroethane	6	6	750	SUMP-2	0.12	1.425	26	SUMP-1	0.00416	0.0494	96	0.5
1,2-Dichloroethene(Total)	6	6	760	SUMP-2	0.1216	1.444	5.2	SUMP-1	0.000832	0.00988	190	1.9
1,2-Dichloroethane	3	6	4.1	SUMP-2	0.000656	0.00779	3	SUMP-2,3	0.00048	0.0057	0.95	0.000039
1,1,1-Trichloroethane	6	6	3200	SUMP-2	0.512	6.08	15	SUMP-1	0.0024	0.0285	450	1
Trichloroethene	6	6	560	SUMP-2	0.0896	1.064	4.4	SUMP-1	0.000704	0.00836	33	0.00045
1,1,2-Trichloroethane	2	6	19	SUMP-2	0.00304	0.0361	8	SUMP-2,3	0.00128	0.0152	13	0.00006
Bromoform	2	6	15	SUMP-2	0.0024	0.0285	1	SUMP-3	0.00016	0.0019	1.2	0.0009
4-Methyl-2-Pentanone	2	6	21	SUMP-2	0.00336	0.0399	2	SUMP-3	0.00032	0.0038	48	0.48
Tetrachloroethene	6	6	180	SUMP-2	0.0288	0.342	4.6	SUMP-1	0.000736	0.00874	40	0.0012
1,1,2,2-Tetrachloroethane	2	6	23	SUMP-2	0.00368	0.0437	2	SUMP-3	0.00032	0.0038	1.6	0.00002
Xylenes (total)	1	6	1.6	SUMP-1	0.000256	0.00304	1.6	SUMP-1	0.000256	0.00304	100	0.3

Notes:

1) Site occurrence includes maximum and minimum detected values of the respective test parameters.
2) PEL = Permissible Exposure Level. REL = Recommended Exposure Limits. IDLH =Immediately Dangerous to Life or Health
3) TWA = Time Weighted Average Exposure Limit for a max 10 hour day (NIOSH) and max 8 hr day (OSHA) of a 40 hour work week.
4) Ca = NIOSH identified occupational carcinogen.
5) SGC - Short Term Guidance Criteria
6) AGC - Annual Guidance Criteria

Table No. 26
Qualitative Assessment of Ecological Risks in Surface Water

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

	Summary of Site Occurrence						SCG's		
	Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	NYSDEC Class C Water	AWQC Aquatic Acute	AWQC Aquatic Chronic
Volatile Organics (ug/l)									
Acetone	1	3	25	SW-3	25	SW-3			
Semi Volatile Organics (ug/l)									
Pentachlorophenol	1	3	4	SW-2	4	SW-2	0.4		
Fluoranthene	1	3	1	SW-1	1	SW-1		3980	
Pyrene	1	3	1	SW-1	1	SW-1			
Metals (ug/l)									
Aluminum	3	3	997	SW-2	158	SW-3	100		
Barium	3	3	183	SW-2	48.8	SW-3			
Calcium	3	3	101000	SW-1	63900	SW-3			
Chromium	1	3	2.2	SW-3	2.2	SW-3	5594	1700	210
Cobalt	1	3	2.4	SW-3	2.4	SW-3	5		
Copper	2	3	4.1	SW-3	2.8	SW-2	368	18	12
Iron	3	3	4850	SW-2	744	SW-1	300		1000
Lead	3	3	8.2	SW-3	7.4	SW-1	526	8.2	3.2
Magnesium	3	3	38500	SW-1	17400	SW-3			
Manganese	3	3	909	SW-2	185	SW-1			
Potassium	3	3	12800	SW-3	10400	SW-1			
Silver	1	3	2.4	SW-3	2.4	SW-3	0.1	0.92	0.12
Sodium	3	3	96900	SW-1	38700	SW-3			
Vanadium	1	3	3.7	SW-2	3.7	SW-2	14		
Zinc	3	3	80.1	SW-2	30.6	SW-1	2530	96	86
OTHERS (mg/l)		3							
Alkalinity	1	1	360	SW-2	360	SW-2			
Hardness	1	1	5300	SW-2	5300	SW-2			

Notes:
1) Site Occurrence includes maximum and minimum detected values of the respective test parameters.
2) Class C standards as promulgated in 6 NYCRR 703.
3) Class C standards for selected metals is based on the hardness of the water. .
For the purposes of making these calculations, a hardness of 250 ppm was selected based on the calciferous nature of the streambed.
Chromium = exp (0.819 [in (ppm hardness)] + 1.561)
Copper = exp (0.8545 [in (ppm hardness)] - 1.465)
Lead = exp (1.266 [in (ppm hardness)] - 4.661)
Nickel = exp (0.76 [in (ppm hardness)] + 1.06)
Zinc = exp (0.85 [in (ppm hardness)] + 0.50)
4) AWQC = USEPA Ambient Water Quality Criteria for Human Health; water and fish ingestion.
5) Chromium is assumed to be trivalent chromium.
6) Silver Class C standard is for ionic silver.

Table No. 27
Qualitative Assessment of Ecological Risks in Surface Water Sediments

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence						SCG's					
							NYSDEC Sediment Criteria			NOAA Memo SOMA52		USEPA Sediment Criteria
							Aquatic Toxicity		Wildlife			
	Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	Acute	Chronic	Bioaccumulation	ER-L	ER-M	
Volatile Organics (ug/kg)												
Methylene chloride	2	2	7	SED-2	3	SED-3						
1,1-Dichloroethane	1	2	6	SED-3	6	SED-3						
1,1,1-Trichloroethane	1	2	7	SED-3	7	SED-3						
Tetrachloroethene	1	2	3	SED-3	3	SED-3						
Semi-Volatile Organics (ug/kg)												
Naphthalene	1	2	610	SED-3	420	SED-3				140	2100	
2-Methylnaphthalene	1	2	490	SED-3	250	SED-3				65	670	
Acenaphthylene	2	2	630	SED-3	36	SED-2						
Acenaphthene	1	2	2700	SED-3	1400	SED-3		1400		150	650	1440
Dibenzofuran	1	2	1100	SED-3	600	SED-3						
Fluorene	1	2	2400	SED-3	1200	SED-3				35	640	
Phenanthrene	2	2	21000	SED-3	340	SED-2		1200		225	1380	1200
Anthracene	2	2	3400	SED-3	62	SED-2				85	960	
Carbazole	2	2	2900	SED-3	65	SED-2						
Di-n-Butylphthalate	1	2	180	SED-2	85	SED-2						
Fluoranthene	2	2	34000	SED-3	810	SED-2		10200		600	3600	10200
Pyrene	2	2	31000	SED-3	810	SED-2				350	2200	
Benzo (a) Anthracene	2	2	15000	SED-3	260	SED-2				230	1600	
Chrysene	2	2	18000	SED-3	450	SED-2				400	2800	
Bis (2-Ethylhexyl) Phthalate	2	2	4700	SED-3	210	SED-2		1995				
Di-n-Octyl Phthalate	1	2	350	SED-2	350	SED-2						
Benzo (b) Fluoranthene	2	2	27000	SED-3	530	SED-2						
Benzo (k) Fluoranthene	2	2	11000	SED-3	390	SED-2						
Benzo (a) Pyrene	2	2	17000	SED-3	750	SED-2				400	2500	
Indeno (1,2,3-cd) Pyrene	2	2	22000	SED-3	91	SED-2						
Dibenz (a,h) Anthracene	2	2	6900	SED-3	140	SED-2				60	260	
Benzo(g,h,i) Perylene	2	2	7900	SED-3	1200	SED-2						

Notes:
1) Site occurrence includes maximum and minimum detected values of the respective test parameters.
2) NOAA Memo SOMA 52 = "The Potential for Biological Effects of Sediment Sorbed Contaminants Tested in National Status and Trends Program", NOAA, 1990. ER-L = Effects Range Low, ER-M - Effects Range Median.
3) NYSDEC Sediment Criteria = "Technical Guidance for Screening of Contaminated Sediments", NYSDEC, July 1994. A TOC value of 1 percent was assumed in deriving criteria.
4) USEPA Sediment Criteria based on a TOC of 1 percent.

Table No. 27
Qualitative Assessment of Ecological Risks in Surface Water Sediments

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence						SCG's					
							NYSDEC Sediment Criteria			NOAA Memo SOMA52		USEPA Sediment Criteria
	Number of Samples Detected	Number of Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	Background (1)	Lowest Effect Level	Severe Effect Level	ER-L	ER-M	
Metals (mg/kg)												
Aluminum	2	2	10600	SED-2	4540	SED-3						
Antimony	1	2	5.1	SED-2	5.1	SED-2		2	25	2	25	
Arsenic	2	2	6.2	SED-2	1.4	SED-3	7.5	6	33	33	85	
Barium	2	2	63.2	SED-2	22.1	SED-3	300					
Beryllium	1	2	0.59	SED-2	0.59	SED-2	0.16				9	
Cadmium	1	2	1.6	SED-3	1.6	SED-3	1	0.6	9	5		
Calcium	2	2	7590	SED-3	7020	SED-2					145	
Chromium	2	2	35.5	SED-2	14.1	SED-3	10	26	110	80		
Cobalt	2	2	10.1	SED-2	3.7	SED-3	30				390	
Copper	2	2	68.9	SED-3	17.1	SED-2	25	16	110	70		
Iron	2	2	51000	SED-2	8970	SED-3	2000	20000	40000		110	
Lead	2	2	61.5	SED-3	41.2	SED-2	200-500	31	110	35		
Magnesium	2	2	4140	SED-3	4090	SED-2						
Manganese	2	2	725	SED-2	119	SED-3		460	1100		50	
Nickel	2	2	26.2	SED-2	11.2	SED-3	13	16	50	30		
Potassium	2	2	1850	SED-2	1210	SED-3					2.2	
Silver	2	2	1.1	SED-2	0.69	SED-3		1	2.2	1		
Sodium	2	2	529	SED-3	2.54	SED-2						
Vanadium	2	2	23.8	SED-2	13.9	SED-3	150			120	270	
Zinc	2	2	844	SED-3	442	SED-2	20	120	270			

Notes:
1) Site occurrence includes maximum and minimum detected values of the respective test parameters.
2) NOAA Memo SOMA 52 = "The Potential for Biological Effects of Sediment Sorbed Contaminants Tested in National Status and Trends Program", NOAA, 1990. ER-L = Effects Range Low, ER-M - Effects Range Median.
3) NYSDEC Sediment Criteria = "Technical Guidance for Screening of Contaminated Sediments", NYSDEC, July 1994. A TOC value of 1 percent was assumed in deriving criteria.
4) USEPA Sediment Criteria based on a TOC of 1 percent.

Table No. 28
Qualitative Risk Assessment of Ecological Risks in Overburden Groundwater

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

	Summary of Site Occurrence						SCG's		
Parameter	Samples Detected	Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	NYSDEC Class C Water	USEPA AWQC Aquatic Acute	USEPA AWQC Aquatic Chronic
Volatile Organics (ug/l)									
Vinyl chloride	9	32	11000	MW-5	2.7	OW-11S			
Chloroethane	1	32	21	OW-6S	21	OW-6S			
Methylene chloride	6	32	350	MW-2	3.9	MW-3			
Acetone	1	32	9.8	OW-8S	9.8	OW-8S			
1,1-Dichloroethene	16	32	900	OW-6S	3.6	OW-8S		11600	
1,1-Dichloroethane	18	32	10000	MW-2	8.6	OW-11S			
1,2-Dichloroethene (total)	16	32	10000	MW-2	2.9	OW-8S			
Chloroform	1	32	7.2	OW-10S	7.2	OW-10S		28900	1240
1,1,1-Trichloroethane	14	32	24000	OW-6S	3.1	OW-8S			
Trichloroethene (TCE)	16	32	140000	OW-7S	1.4	OW-8S		45000	219000
1,1,2-Trichloroethane	2	32	53	MW-5	12	OW-6S		18000	94000
Tetrachloroethene	10	32	8800	MW-5	3.3	OW-8S			
Semi-Volatile Organics (ug/l)									
Phenol	2	17	9	OW-7S	8	MW-5		10200	2560
4-Methyl Phenol	1	17	1.4	OW-7S	1.4	OW-7S			
2-Methylphenol	2	17	9	OW-7S	7.9	OW-7S			
Isophorone	2	17	23	OW-7S	19	OW-7S		11700	
Dimethyl Phthalate	1	17	0.74	OW-7S	0.74	OW-7S			
Di-n-butyl phthalate	2	17	2	OW-9S	1	OW-LS			
Diethyl Phthalate	1	17	1.5	OW-7S	1.5	OW-7S			
Bis(2-ethylhexyl)phthalate	9	17	3	OW-9S	1	OW--1S,2S &4S	0.6		

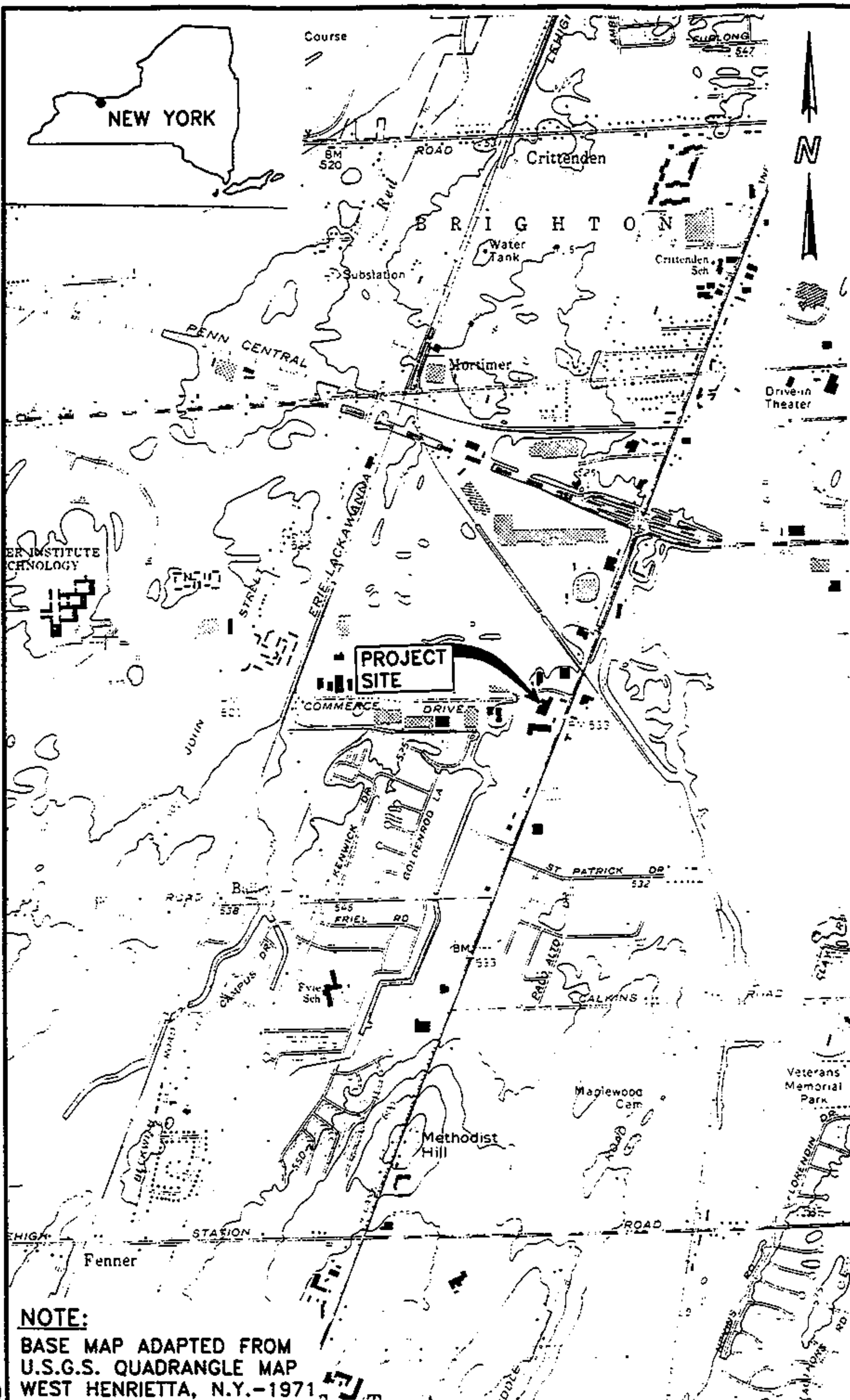
Table No. 28
Qualitative Risk Assessment of Ecological Risks in Overburden Groundwater

Remedial Investigation
Stuart-Olver-Holtz
Site No. 8-28-079
Henrietta, New York

Parameter	Summary of Site Occurrence						SCG's		
	Samples Detected	Samples Tested	Maximum	Location of Maximum	Minimum	Location of Minimum	NYSDEC Class C Water	USEPA AWQC Aquatic Acute	USEPA AWQC Aquatic Chronic
Metals (ug/l)									
Aluminum	16	16	14900	OW-10S	28.9	OW-8S	100	750	87
Arsenic	13	32	10.8	OW-4S	3.1	OW-11S	190		
Barium	32	32	305	OW-10S	31.5	OW-8S			
Cadmium	7	32	5.5	OW-7S	2	OW-1S	3.03	130	503
Calcium	16	16	301000	OW-10S	61000	OW-7S			
Chromium	19	32	39.1	OW-5S	2	OW-7S	577.5	1700	210
Cobalt	12	16	19.1	OW-10S	2.8	101-OW	5		
Copper	24	32	56.9	OW-10S	2.6	101-OW	34.5	18	12
Iron	16	16	96700	OW-1S	320	OW-8S	300		1000
Lead	21	32	61.8	OW-LS	1.2	OW-3S	15.7	8.2	3.2
Magnesium	16	16	825000	MW-3	43400	OW-7S			
Manganese	16	16	1420	OW-10S	85.4	OW-8S			
Mercury	1	32	0.23	OW-11S	0.23	OW-11S		2.4	0.012
Nickel	23	32	169	OW-5S	15.6	MW-5	248	1400	100
Potassium	16	16	27500	OW-10S	2760	MW-5			
Silver	5	32	1.9	OW-LS	1.4	OW-7S	0.1	0.92	0.2
Sodium	16	16	168000	OW-10S	21200	OW-7S			
Vanadium	8	16	28.2	OW-10S	2.6	OW-7S	14		
Zinc	32	32	169	OW-10S	9.6	OW-6S	240	96	86
Others									
Cyanide (ug/l)	2	16	11.5	OW-2S	11.3	OW-1S	5.2	22	52
Alkalinity, as CaCO3 (mg/l)	16	16	490	OW-LS	180	OW-4S			
Hardness, as CaCO3 (mg/l)	16	16	970	OW-11S	350	OW-7S			

Notes:

1) Site occurrence includes maximum and minimum detected values of the respective test parameters.
2) The total number of samples tested includes two rounds of sampling the same wells for VOCs and selected metals. One semi-VOC sample was also collected during the second round from well OW-7S.
3) AWQC = USEPA Ambient Quality Criteria for Human Health; water and fish ingestion.
4) Class C Surface Water Standards as promulgated in 6 NYCRR 703.
5) Class C Surface Water Standards for selected metals are based on the hardness of the water.
   For the purposes of making these calculations, a hardness of 350 ppm was assumed
   Chromium = exp (0.819 [ln (ppm hardness)] + 1.561)
   Copper = exp (0.8545 [ln (ppm hardness)] - 1.465)
   Lead = exp (1.266 [ln (ppm hardness)] - 4.661)
   Nickel = exp (0.76 [ln (ppm hardness)] + 1.06)
   Zinc = exp (0.85 [ln (ppm hardness)] + 0.50)
6) Chromium is assumed to be trivalent chromium.
7) Silver Class C Surface Water Standard is for ionic silver.



NOTE:

BASE MAP ADAPTED FROM U.S.G.S. QUADRANGLE MAP WEST HENRIETTA, N.Y.-1971

DRAWN BY: DEW

DATE: JANUARY 1996

GZA GeoEnvironmental of New York

SCALE IN FEET

0 1000 2000 4000

STUART-OLVER-HOLTZ SITE

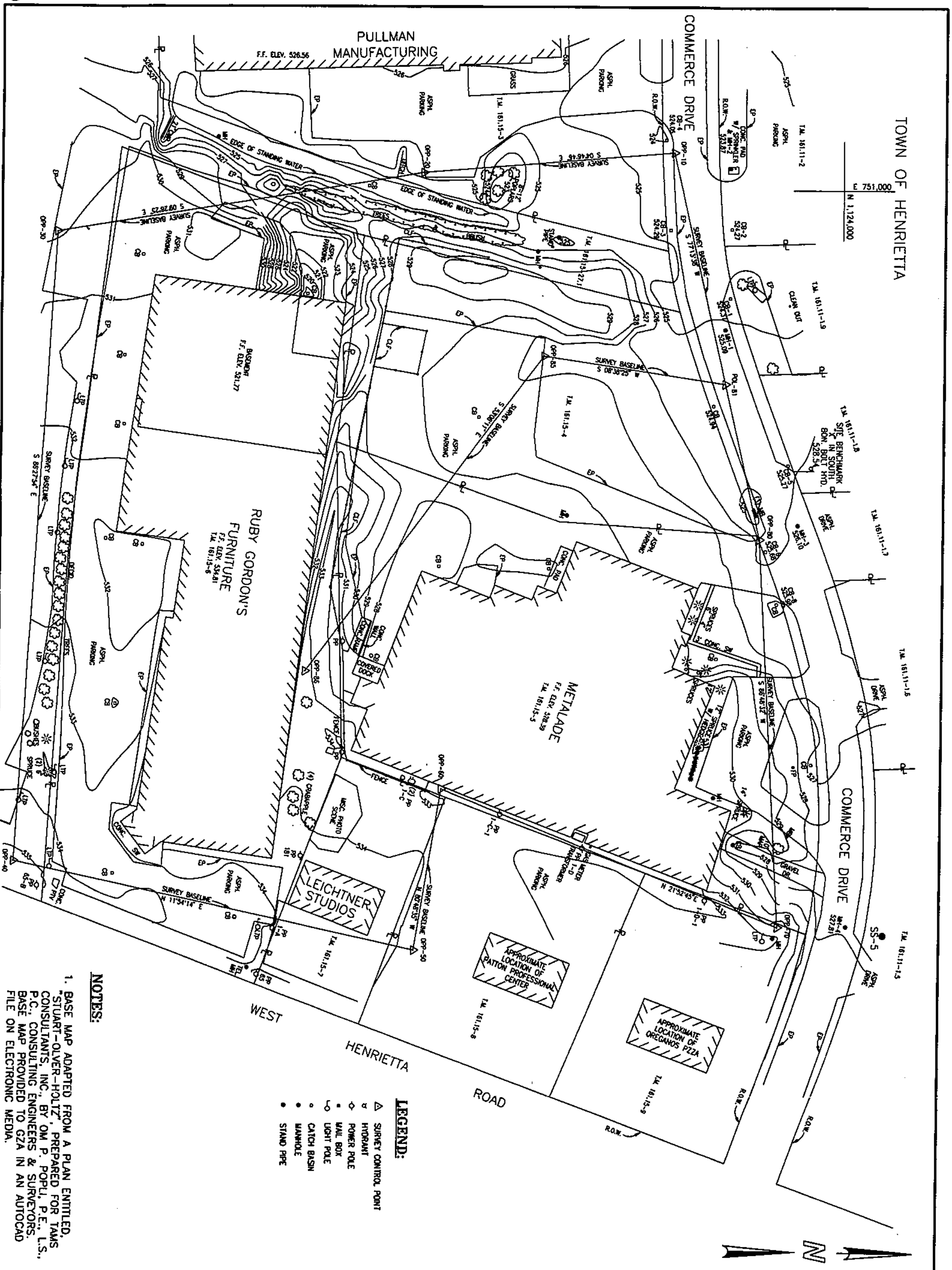
HENRIETTA, NEW YORK

REMEDIAL INVESTIGATION

LOCUS PLAN

PROJECT No. 19078.1

FIGURE No. 1

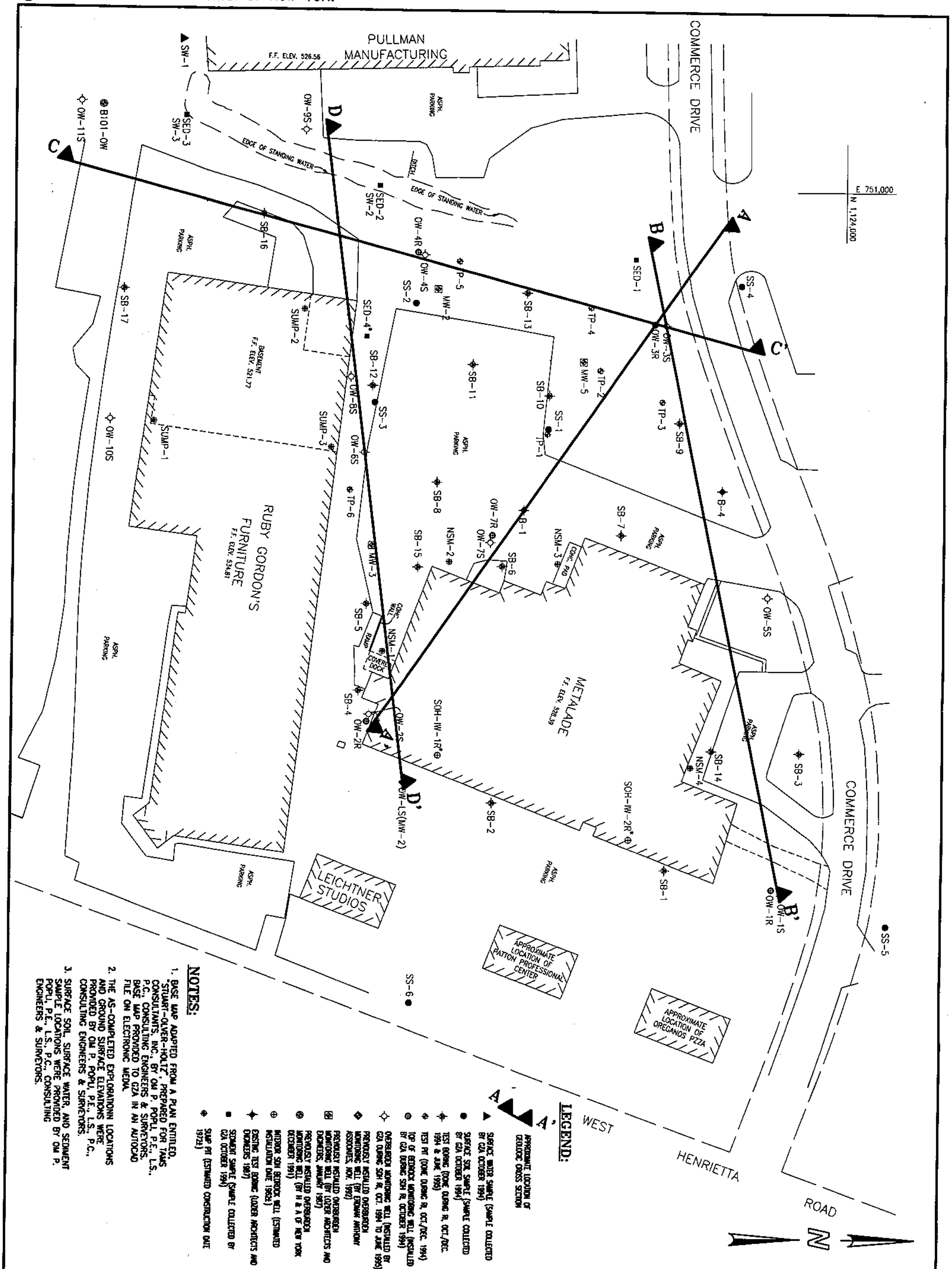


NOTES:

1. BASE MAP ADAPTED FROM A PLAN ENTITLED, "STUART-OLVER-HOLTZ", PREPARED FOR TAMS CONSULTANTS, INC. BY OM P. POPLI, P.E., L.S., P.C. CONSULTING ENGINEERS & SURVEYORS. BASE MAP PROVIDED TO GZA IN AN AUTOCAD FILE ON ELECTRONIC MEDIA.

STUART–OLVER–HOLTZ SITE HENRIETTA, NEW YORK REMEDIAL INVESTIGATION	REV No. / DESCRIPTION / BY / DATE
EXISTING CONDITIONS PLAN	SCALE IN FEET: 0 40 80 160
PROJECT No. 19078.1	DRAWN BY: DEW
FIGURE No. 2	DATE: JANUARY 1996

GZA GeoEnvironmental of New York



NOTES:

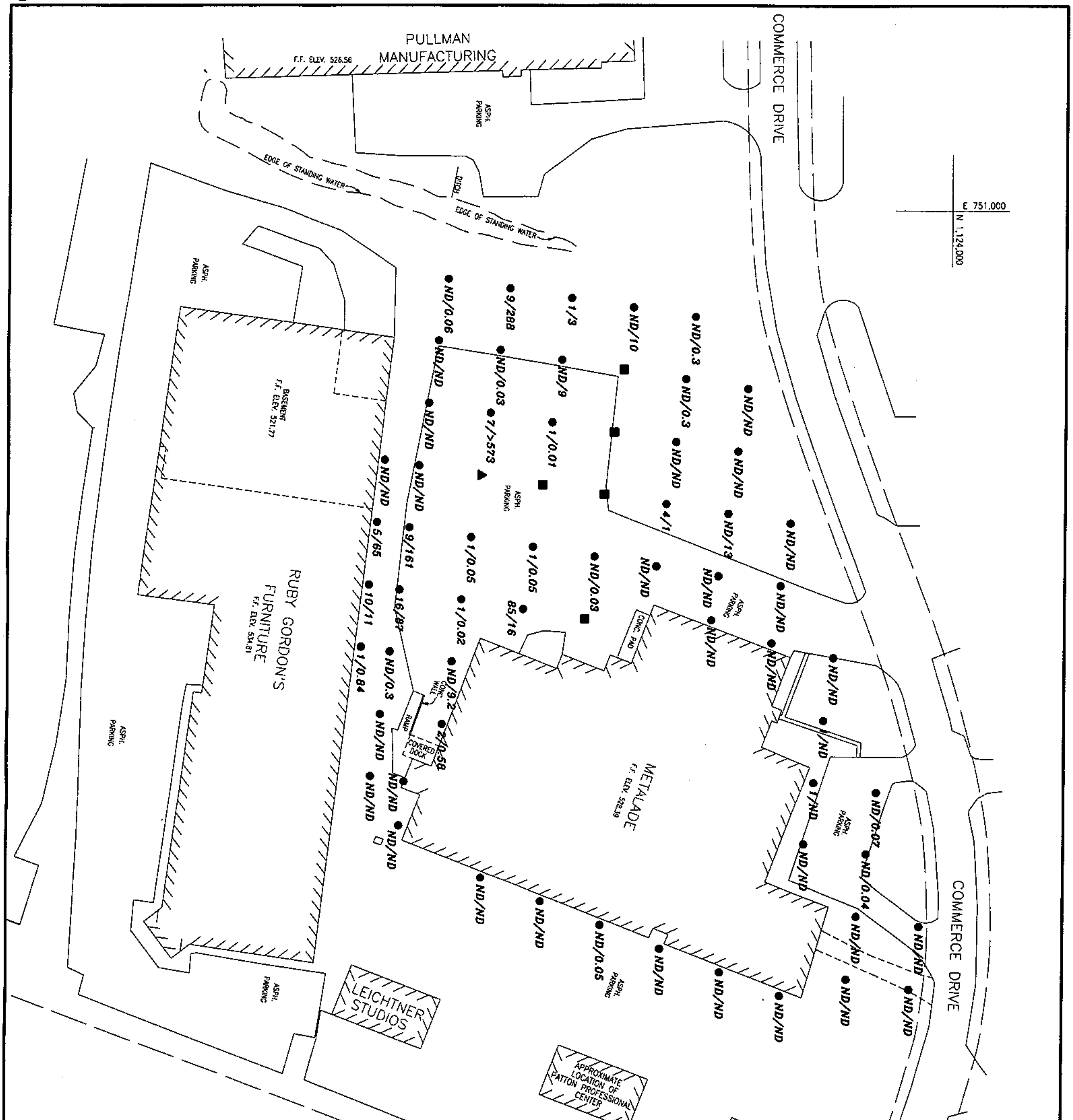
1. BASE MAP ADAPTED FROM A PLAN ENTITLED, "STUART-OLVER-HOLTZ", PREPARED FOR TAMS CONSULTANTS, INC. BY OM P. POPLI, P.E., L.S., P.C. CONSULTING ENGINEERS & SURVEYORS. BASE MAP PROVIDED TO GZA IN AN AUTOCAD FILE ON ELECTRONIC MEDIA.
2. THE AS-COMPLETED EXPLORATION LOCATIONS AND GROUND SURFACE ELEVATIONS WERE PROVIDED BY OM P. POPLI, P.E., L.S., P.C. CONSULTING ENGINEERS & SURVEYORS.
3. SURFACE SOIL, SURFACE WATER, AND SEDIMENT SAMPLE LOCATIONS WERE PROVIDED BY OM P. POPLI, P.E., L.S., P.C. CONSULTING ENGINEERS & SURVEYORS.

LEGEND:

- A A' — APPROXIMATE LOCATION OF GEOLOGIC CROSS SECTION
- SURFACE WATER SAMPLE (SAMPLE COLLECTED BY GZA OCTOBER 1994)
- SURFACE SOIL SAMPLE (SAMPLE COLLECTED BY GZA OCTOBER 1994)
- TEST BORING (DONE DURING RI. OCT./DEC. 1994 & JUNE 1995)
- TEST PIT (DONE DURING RI. OCT./DEC. 1994)
- TOP OF BEDROCK MONITORING WELL (INSTALLED BY GZA DURING SOH RI. OCTOBER 1994)
- OVERBURDEN MONITORING WELL (INSTALLED BY GZA DURING SOH RI. OCT. 1994 TO JUNE 1995)
- PREVIOUSLY INSTALLED OVERBURDEN MONITORING WELL (BY ERDMAN ANTHONY ASSOCIATES, NOV. 1992)
- PREVIOUSLY INSTALLED OVERBURDEN MONITORING WELL (BY LOZIER ARCHITECTS AND ENGINEERS, JANUARY 1987)
- PREVIOUSLY INSTALLED OVERBURDEN MONITORING WELL (BY H & A OF NEW YORK DECEMBER 1991)
- INTERIOR SOH BEDROCK WELL (ESTIMATED INSTALLATION DATE 1960s)
- EXISTING TEST BORING (LOZIER ARCHITECTS AND ENGINEERS 1987)
- SEDIMENT SAMPLE (SAMPLE COLLECTED BY GZA OCTOBER 1994)
- SUMP PIT (ESTIMATED CONSTRUCTION DATE 1970s)

FIGURE No. 3	PROJECT No. 19078.1	STUART-OLVER-HOLTZ SITE HENRIETTA, NEW YORK REMEDIAL INVESTIGATION	REV No. / DESCRIPTION / BY / DATE
		EXPLORATION AND CROSS SECTION LOCATION PLAN	SCALE IN FEET: 0, 40, 80, 160 — DRAWN BY: DEW — DATE: JANUARY 1996

GZA GeoEnvironmental of New York



LEGEND:

- ● 1/0.01 — SOIL VAPOR SAMPLE LOCATION; TOTAL TARGET COMPOUND VOLATILE ORGANIC CONCENTRATION (ppm); TOTAL ORGANICS VAPOR METER READING (ppm)
- ▲ LOCATION WHERE A SOIL VAPOR SAMPLE WAS NOT COLLECTED DUE TO VERY DENSE SOILS WHICH PREVENTED SOIL VAPOR FROM ENTERING THE SAMPLE PROBE (COLLECTION EQUIPMENT) WHICH RESULTED IN NO SOIL VAPOR FLOW AT THE COLLECTION POINT
- ■ LOCATION WHERE A SOIL VAPOR SAMPLE WAS NOT COLLECTED DUE TO WATER ENTERING THE SAMPLE PROBE AT THE COLLECTION POINT

NOTES:

1. BASE MAP ADAPTED FROM A PLAN ENTITLED, "STUART-OLVER-HOLTZ", PREPARED FOR TAMS CONSULTANTS, INC., BY OM P. POPLI, P.E., L.S., P.C., CONSULTING ENGINEERS & SURVEYORS. BASE MAP PROVIDED TO GZA IN AN AUTOCAD FILE ON ELECTRONIC MEDIA.
2. SOIL VAPOR SAMPLE LOCATIONS WERE LOCATED (WHERE POSIBLE) ON AN APPROXIMATE 50 FOOT GRID PATTERN AT THE SITE BY OM P. POPLI, P.E., L.S., P.C., CONSULTING ENGINEERS & SURVEYORS. SAMPLE LOCATIONS WHICH WERE NOT LOCATED DIRECTLY ON THE SURVEY GRID, WERE MEASURED WITH A 100 FT. TAPE AND REFERECED TO EXISTING SITE FEATURES OR EXISTING SURVEY GRID LOCATIONS BY GZA.
3. SOIL VAPOR SURVY WAS CONDUCTED BY GZA BETWEEN SEPTEMBER 22, 1994 AND OCTOBER 18, 1994.
4. FLUCTUATIONS IN SOIL VAPOR MEASUREMENTS MAY OCCUR DUE TO SEVERAL FACTORS AND ARE INTENDED AS APPROXIMATE VALUES.

FIGURE No. 4	PROJECT No. 19078.1	**STUART-OLVER-HOLTZ SITE** HENRIETTA, NEW YORK REMEDIAL INVESTIGATION **SOIL VAPOR SURVEY RESULTS**

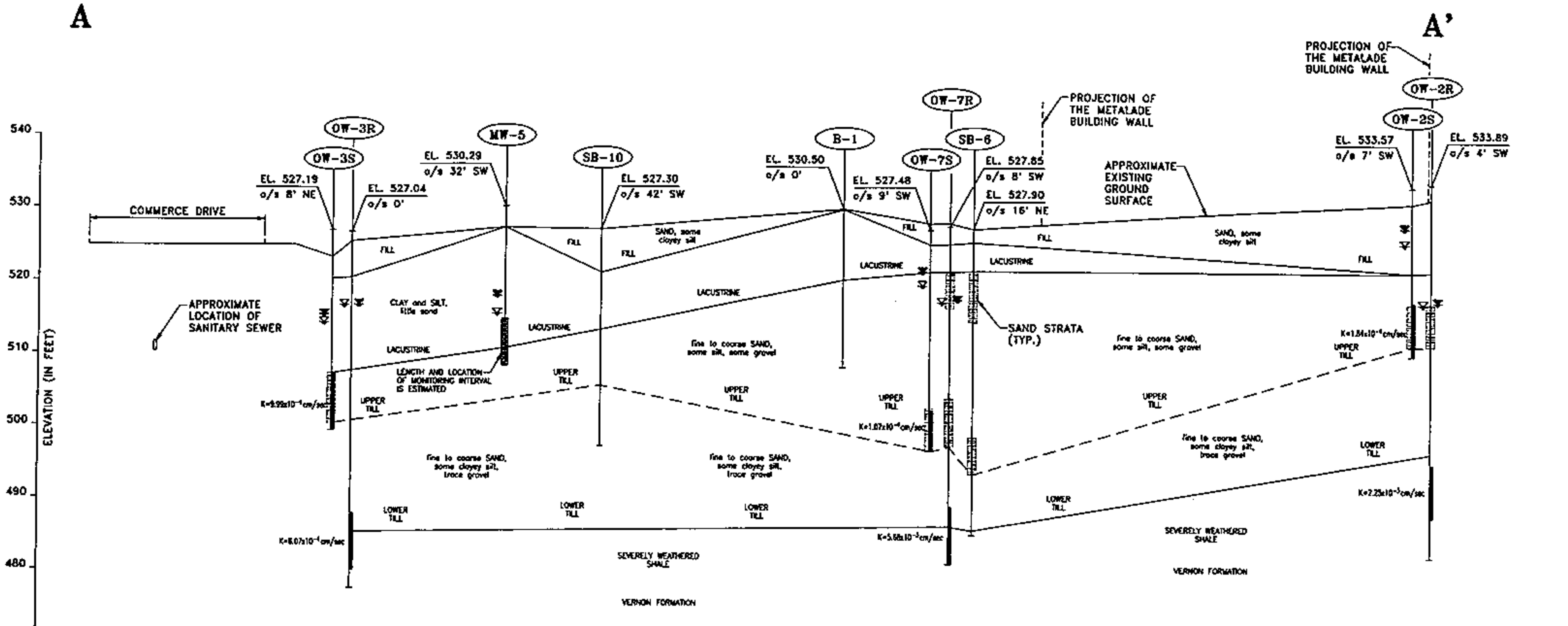
REV No.	DESCRIPTION	BY	DATE

SCALE IN FEET: 0 40 80 160

DRAWN BY: DEW

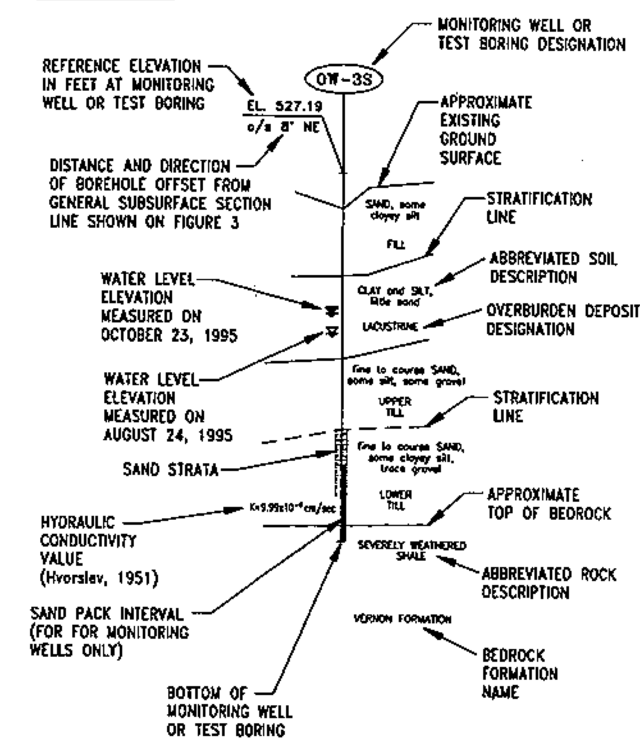
DATE: JANUARY 1996

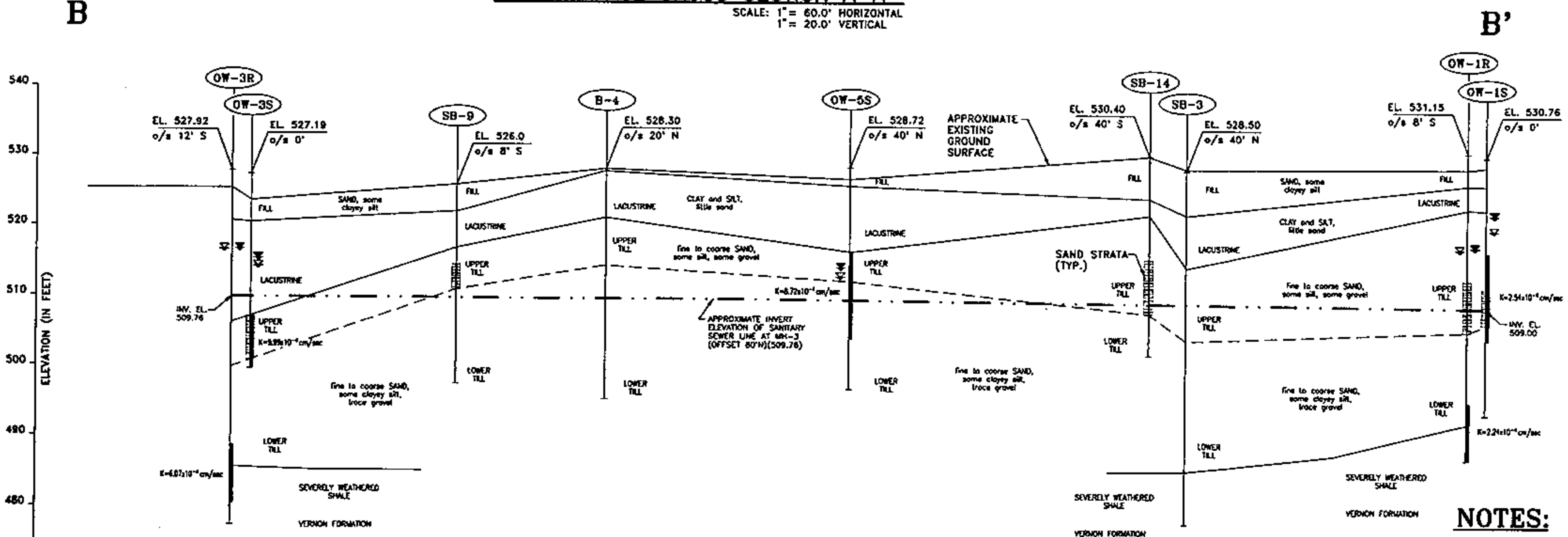
GZA GeoEnvironmental of New York



SUBSURFACE CROSS SECTION A–A'
SCALE: 1" = 60.0' HORIZONTAL
1" = 20.0' VERTICAL

LEGEND:





SUBSURFACE CROSS SECTION B–B'
SCALE: 1" = 60.0' HORIZONTAL
1" = 20.0' VERTICAL

NOTES:

1. SEE FIGURE 3 FOR LOCATION OF SUBSURFACE CROSS SECTIONS A-A' AND B-B'.
2. THE STRATIFICATION LANES ARE BASED UPON INTERPOLATION BETWEEN WIDELY-SPACED TEST BORINGS (SEE APPENDIX C) AND REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL AND ROCK TYPES. THE ACTUAL TRANSITIONS MAY VARY FROM THOSE SHOWN.
3. THE CROSS SECTIONS ARE INTENDED TO SHOW GENERAL GEOLOGIC TRENDS AND TO ILLUSTRATE INTERPRETATIONS OF THE SUBSURFACE CONDITIONS MAY VARY FROM THOSE SHOWN.
4. FLUCTUATIONS IN WATER LEVELS MAY OCCUR DUE TO VARIATIONS IN PRECIPITATION, BAROMETRIC PRESSURE AND OTHER FACTORS.
5. ABBREVIATED GENERALIZED SOIL DESCRIPTIONS ARE PROVIDED BASED ON VISUAL DESCRIPTIONS AND LABORATORY GRAIN-SIZE ANALYSIS.
6. REFERENCE ELEVATIONS AND GROUND SURFACE ELEVATIONS WERE MEASURED BY OM P. POPLI, P.E. L.S., P.C., CONSULTING ENGINEERS AND SURVEYORS.

REV No.	DESCRIPTION	BY	DATE

DRAWN BY: DEW
DATE: JANUARY 1996

SCALE IN FEET
AS SHOWN

GZA GeoEnvironmental of New York

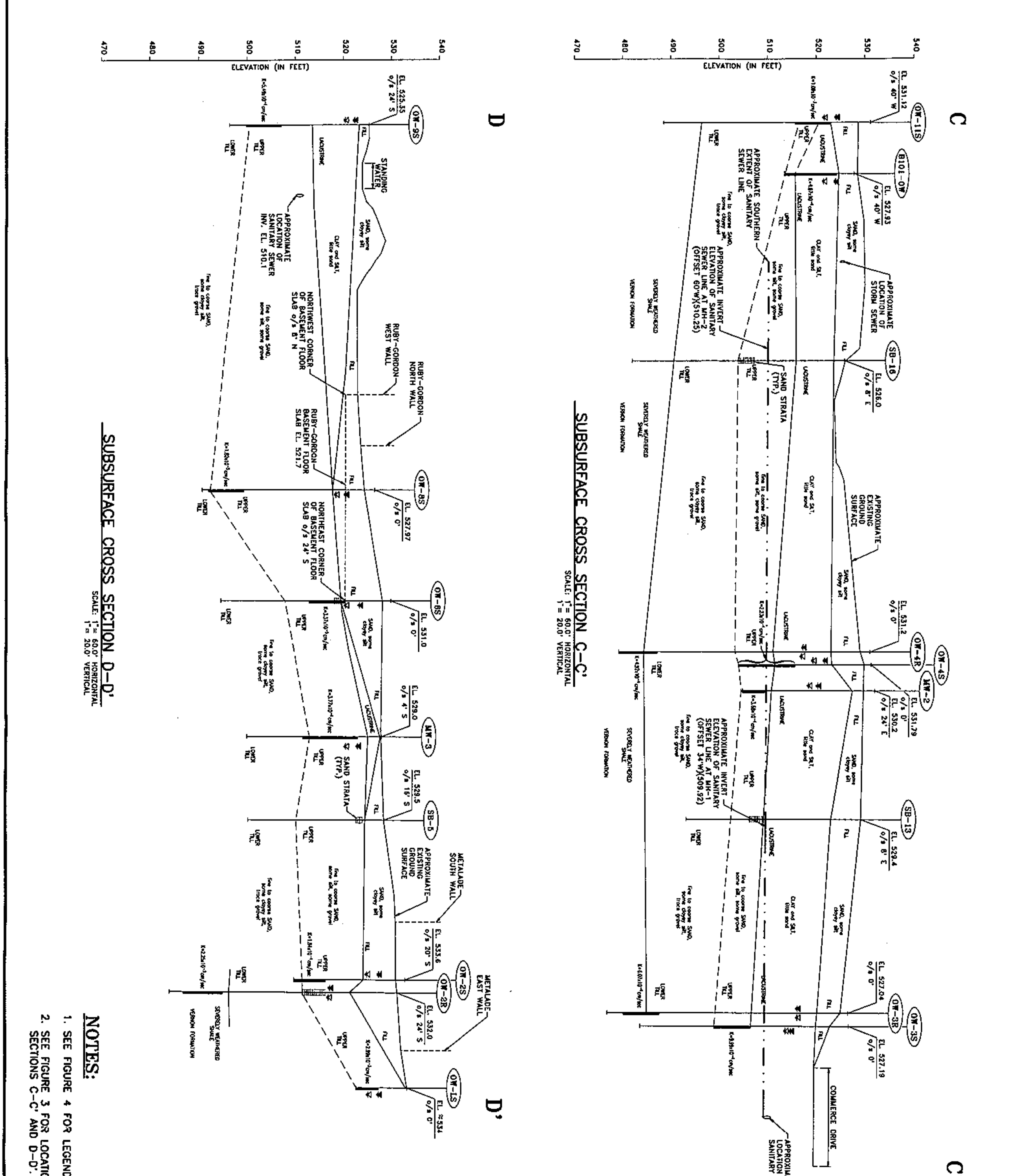
STUART-OLVER-HOLTZ SITE
HENRIETTA, NEW YORK

REMEDIAL INVESTIGATION

SUBSURFACE CROSS SECTIONS A-A' AND B-B'

PROJECT No. 19078.1

FIGURE No. 5



NOTES:

1. SEE FIGURE 4 FOR LEGEND AND ADDITIONAL NOTES.
2. SEE FIGURE 3 FOR LOCATION OF SUBSURFACE CROSS SECTIONS C-C' AND D-D'.

REV No.	DESCRIPTION	BY	DATE

STUART-OLVER-HOLTZ SITE
HENRIETTA, NEW YORK

REMEDIAL INVESTIGATION

SUBSURFACE CROSS SECTIONS C-C' AND D-D'

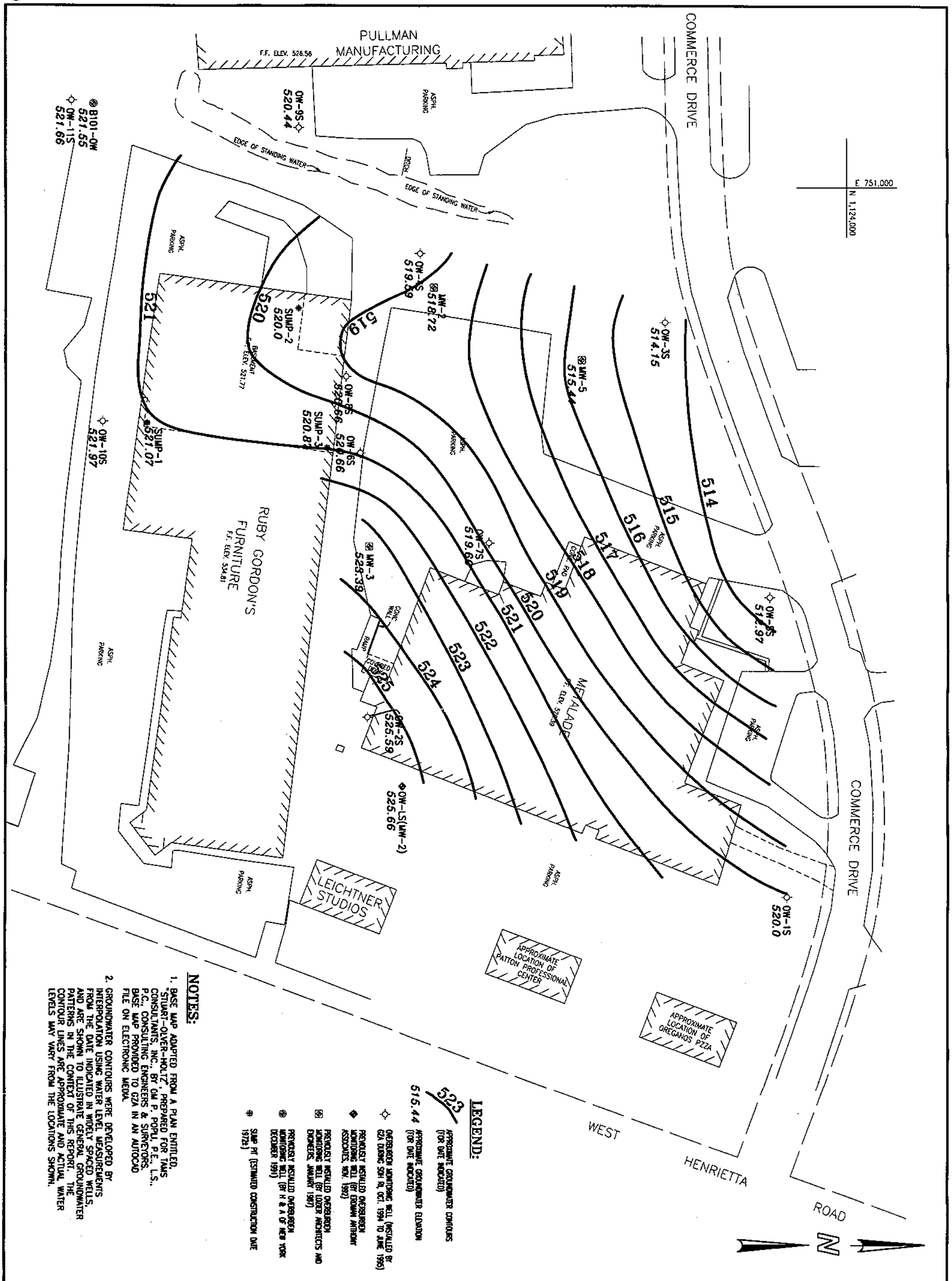
PROJECT No. 19078.1

FIGURE No. 6

SCALE IN FEET
AS SHOWN

DRAWN BY: DEW
DATE: JANUARY 1996

GZA GeoEnvironmental of New York



PROJECT No. 19078.1	**STUART-OLVER-HOLTZ SITE** HENRIETTA, NEW YORK REMEDIAL INVESTIGATION	REV No. / DESCRIPTION / BY / DATE
FIGURE No. 7	**OVERBURDEN GROUNDWATER CONTOUR MAP** **AUGUST 24, 1995**	SCALE IN FEET: 0, 40, 80, 160 DRAWN BY: DEW DATE: JANUARY 1996 GZA GeoEnvironmental of New York

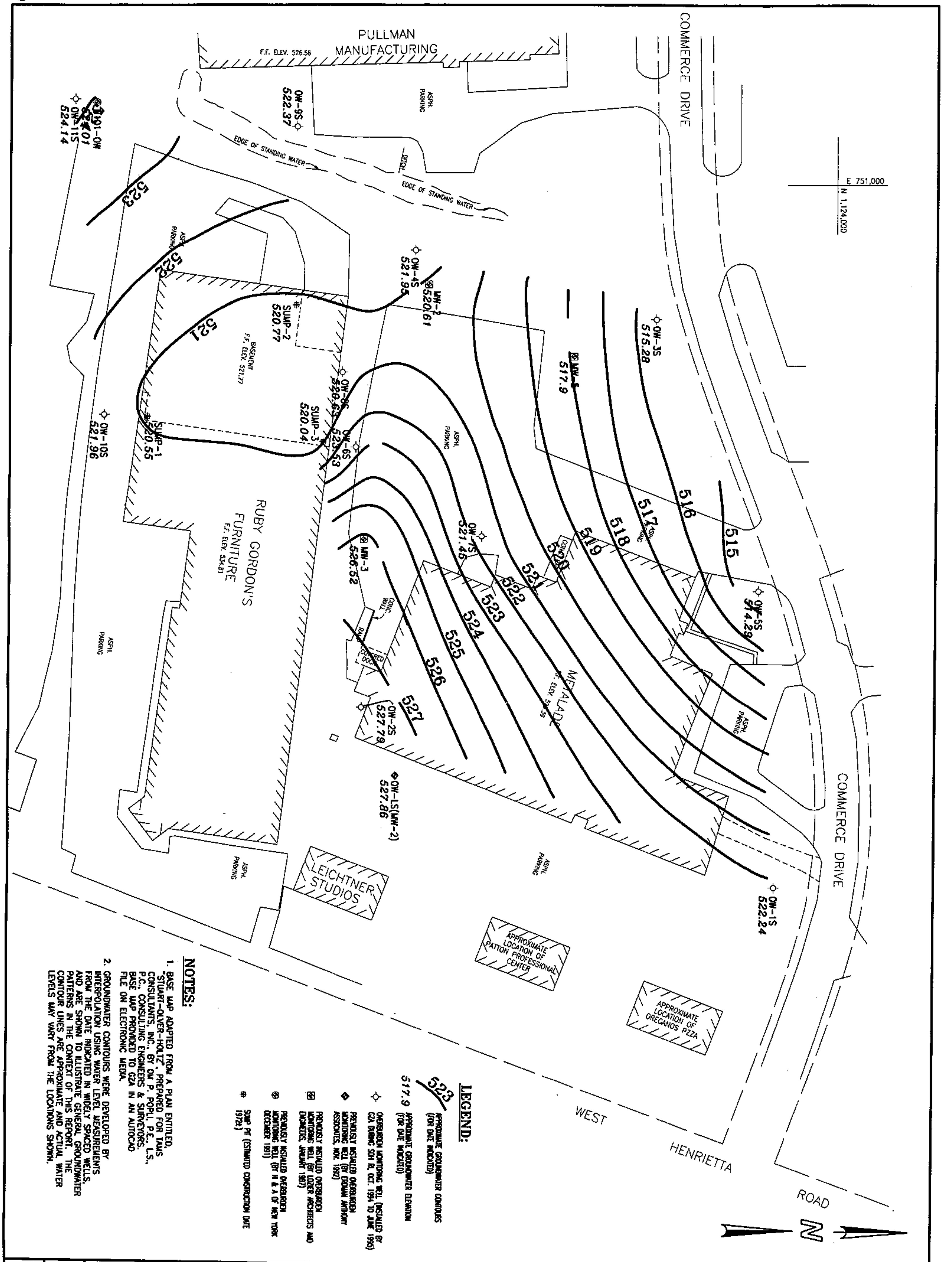


FIGURE No. 8

PROJECT No. 19078.1

STUART-OLVER-HOLTZ SITE
HENRIETTA, NEW YORK

REMEDIAL INVESTIGATION

OVERBURDEN GROUNDWATER CONTOUR MAP OCTOBER 23, 1995

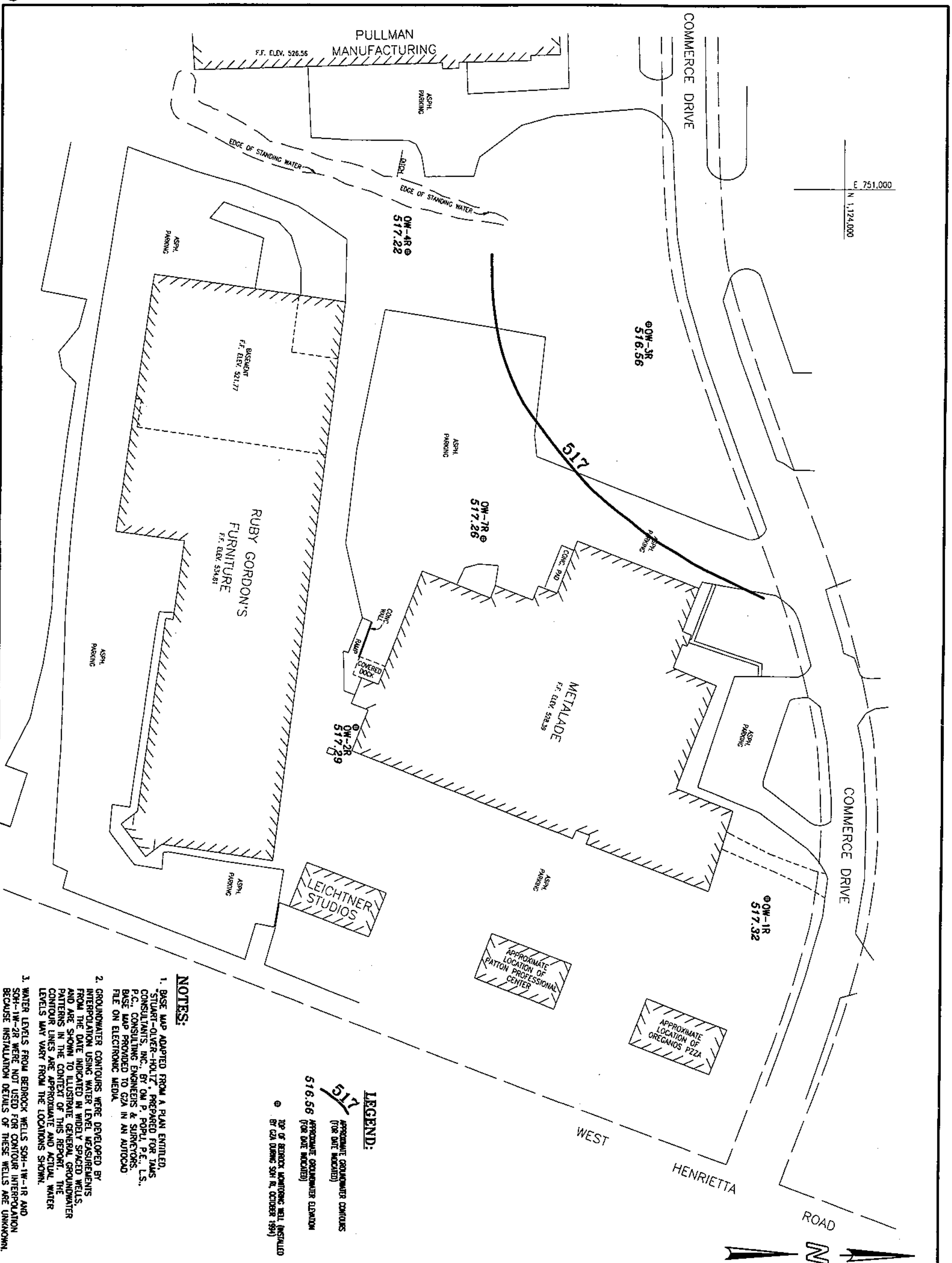
REV No.	DESCRIPTION	BY	DATE

SCALE IN FEET: 0 40 80 160

DRAWN BY: DEW

DATE: JANUARY 1996

GZA GeoEnvironmental of New York



LEGEND:

517 — APPROXIMATE GROUNDWATER CONTOURS (FOR DATE INDICATED)

516.56 — APPROXIMATE GROUNDWATER ELEVATION (FOR DATE INDICATED)

⊕ — TOP OF BEDROCK MONITORING WELL (INSTALLED BY GZA DURING SOH RI, OCTOBER 1994)

NOTES:

1. BASE MAP ADAPTED FROM A PLAN ENTITLED, "STUART-OLVER-HOLTZ", PREPARED FOR TAMS CONSULTANTS, INC., BY OM P. POPLI, P.E., L.S., P.C. CONSULTING ENGINEERS & SURVEYORS. BASE MAP PROVIDED TO GZA IN AN AUTOCAD FILE ON ELECTRONIC MEDIA.
2. GROUNDWATER CONTOURS WERE DEVELOPED BY INTERPOLATION USING WATER LEVEL MEASUREMENTS FROM THE DATE INDICATED IN WIDELY SPACED WELLS, AND ARE SHOWN TO ILLUSTRATE GENERAL GROUNDWATER PATTERNS IN THE CONTEXT OF THIS REPORT. THE CONTOUR LINES ARE APPROXIMATE AND ACTUAL WATER LEVELS MAY VARY FROM THE LOCATIONS SHOWN.
3. WATER LEVELS FROM BEDROCK WELLS SOH-1W-1R AND SOH-1W-2R WERE NOT USED FOR CONTOUR INTERPOLATION BECAUSE INSTALLATION DETAILS OF THESE WELLS ARE UNKNOWN.

REV No.	DESCRIPTION	BY	DATE

STUART-OLVER-HOLTZ SITE
HENRIETTA, NEW YORK

REMEDIAL INVESTIGATION

TOP OF BEDROCK POTENTIOMETRIC CONTOUR MAP AUGUST 24, 1995

PROJECT No. 19078.1

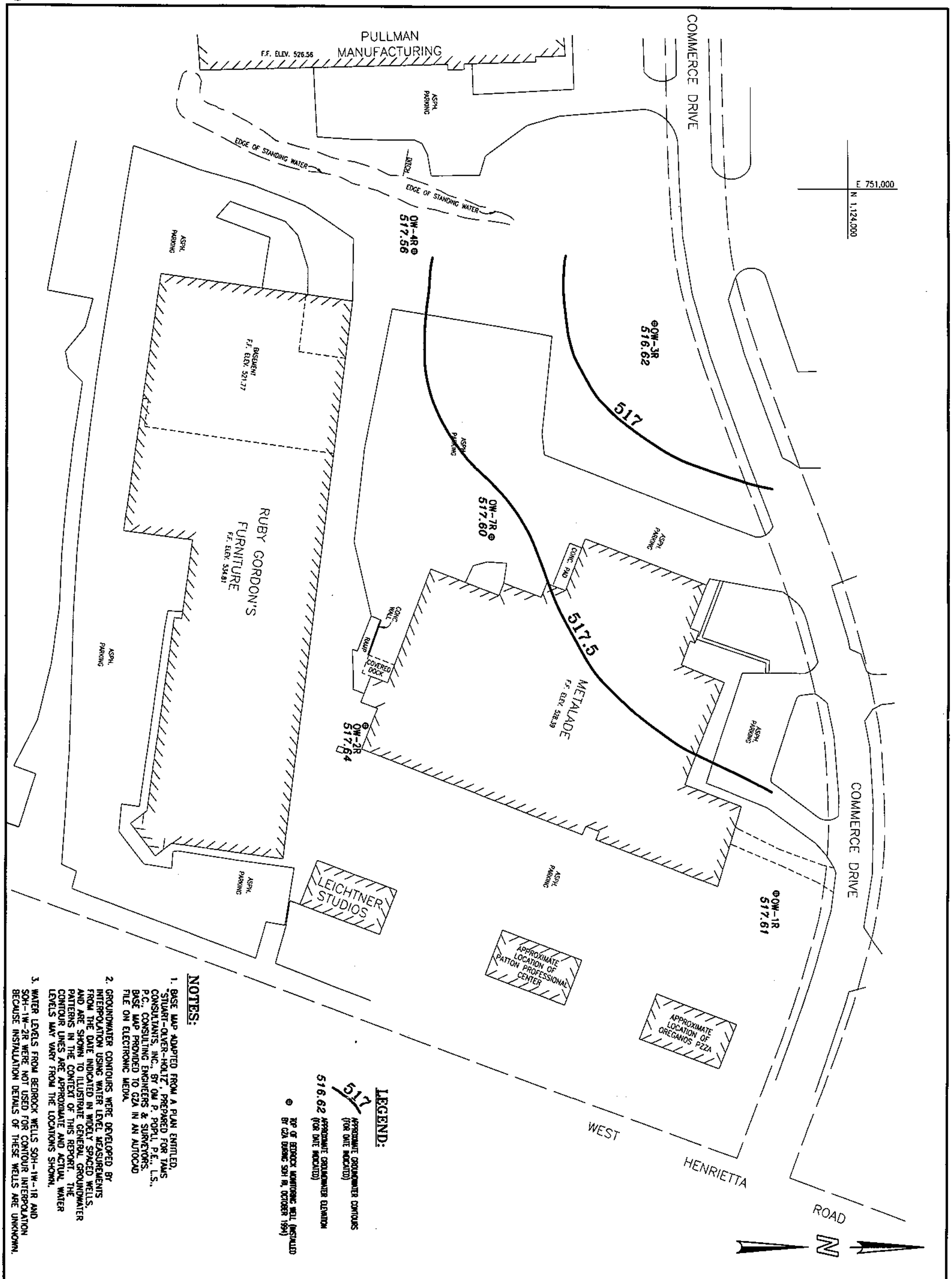
FIGURE No. 9

SCALE IN FEET: 0 40 80 160

DRAWN BY: DEW

DATE: JANUARY 1996

GZA GeoEnvironmental of New York



STUART-OLVER-HOLTZ SITE
HENRIETTA, NEW YORK

REMEDIAL INVESTIGATION

TOP OF BEDROCK POTENTIOMETRIC CONTOUR MAP OCTOBER 23, 1995

PROJECT No. 19078.1

FIGURE No. 10

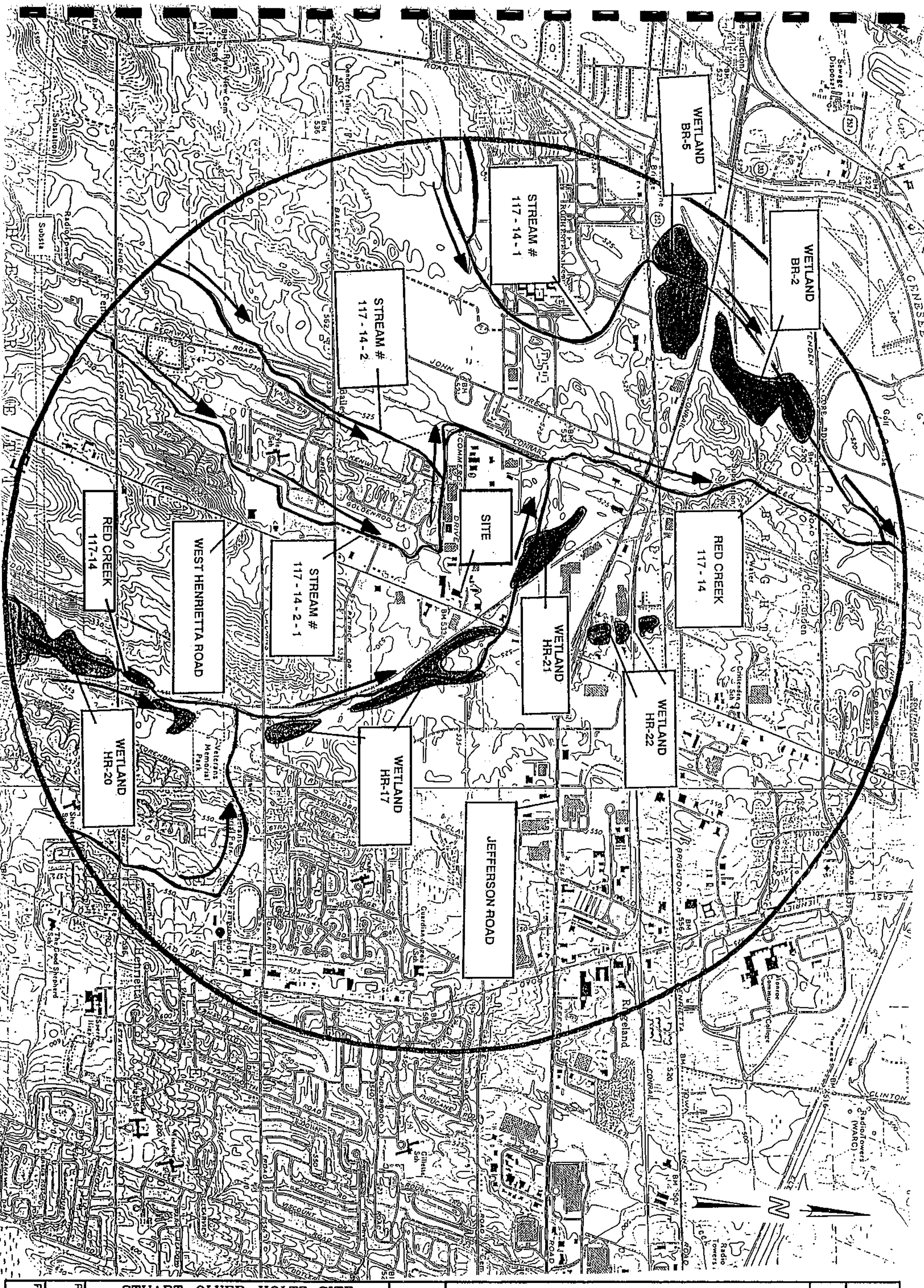
REV No.	DESCRIPTION	BY	DATE

SCALE IN FEET: 0 40 80 160

DRAWN BY: DEW

DATE: JANUARY 1996

GZA GeoEnvironmental of New York



STUART-OLVER-HOLTZ SITE
HENRIETTA, NEW YORK

REMEDIAL INVESTIGATION

AREA TOPOGRAPHIC MAP

PROJECT No. 19078.1

FIGURE No. 11

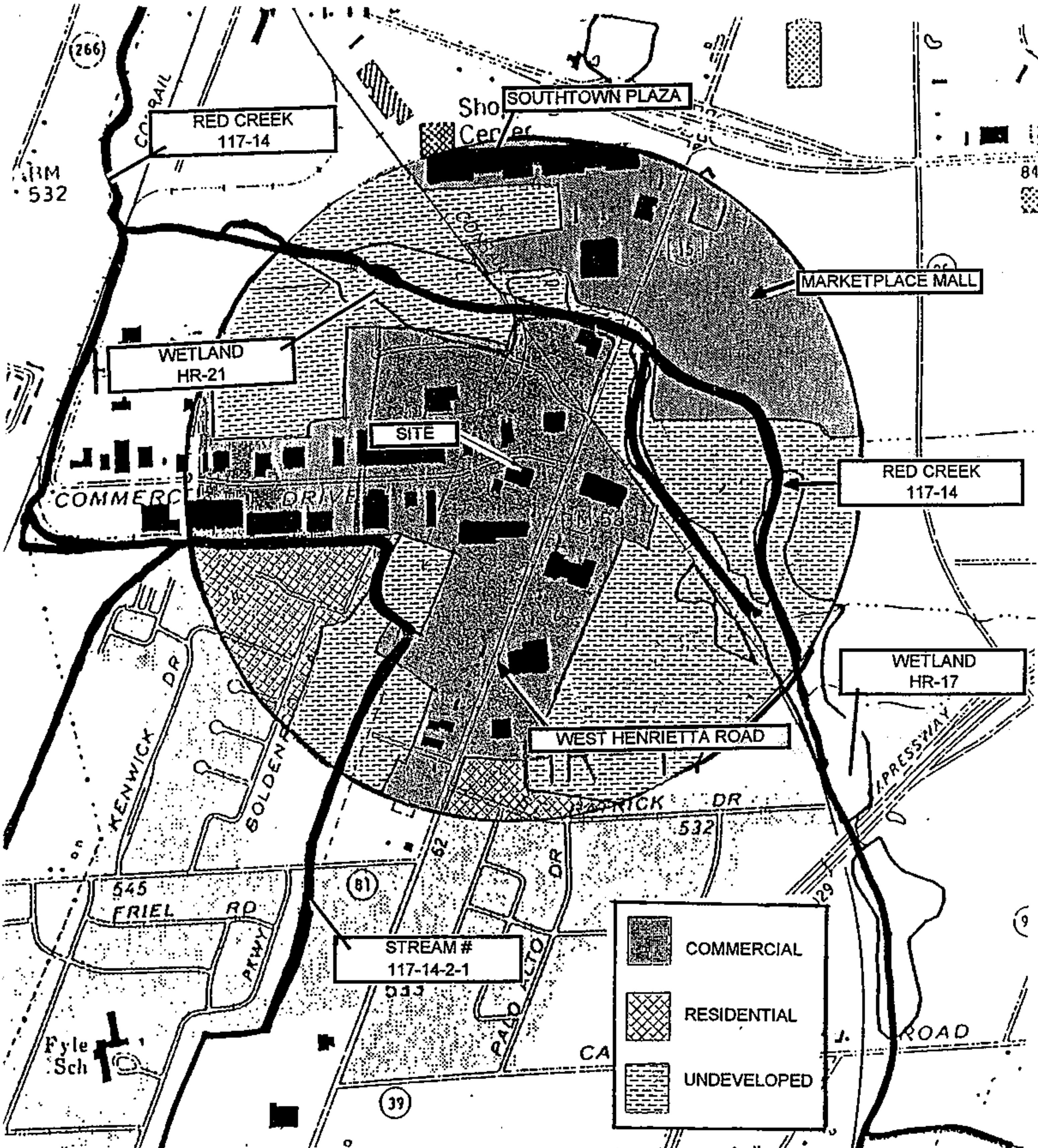
REV No.	DESCRIPTION	BY	DATE

SCALE IN FEET
0 2000 4000

DRAWN BY: DEW

DATE: JANUARY 1996

GZA GeoEnvironmental of New York



REV No.	DESCRIPTION	BY	DATE

FIGURE No. 12

PROJECT No. 19078.1

STUART-OLVER-HOLTZ SITE
HENRIETTA, NEW YORK

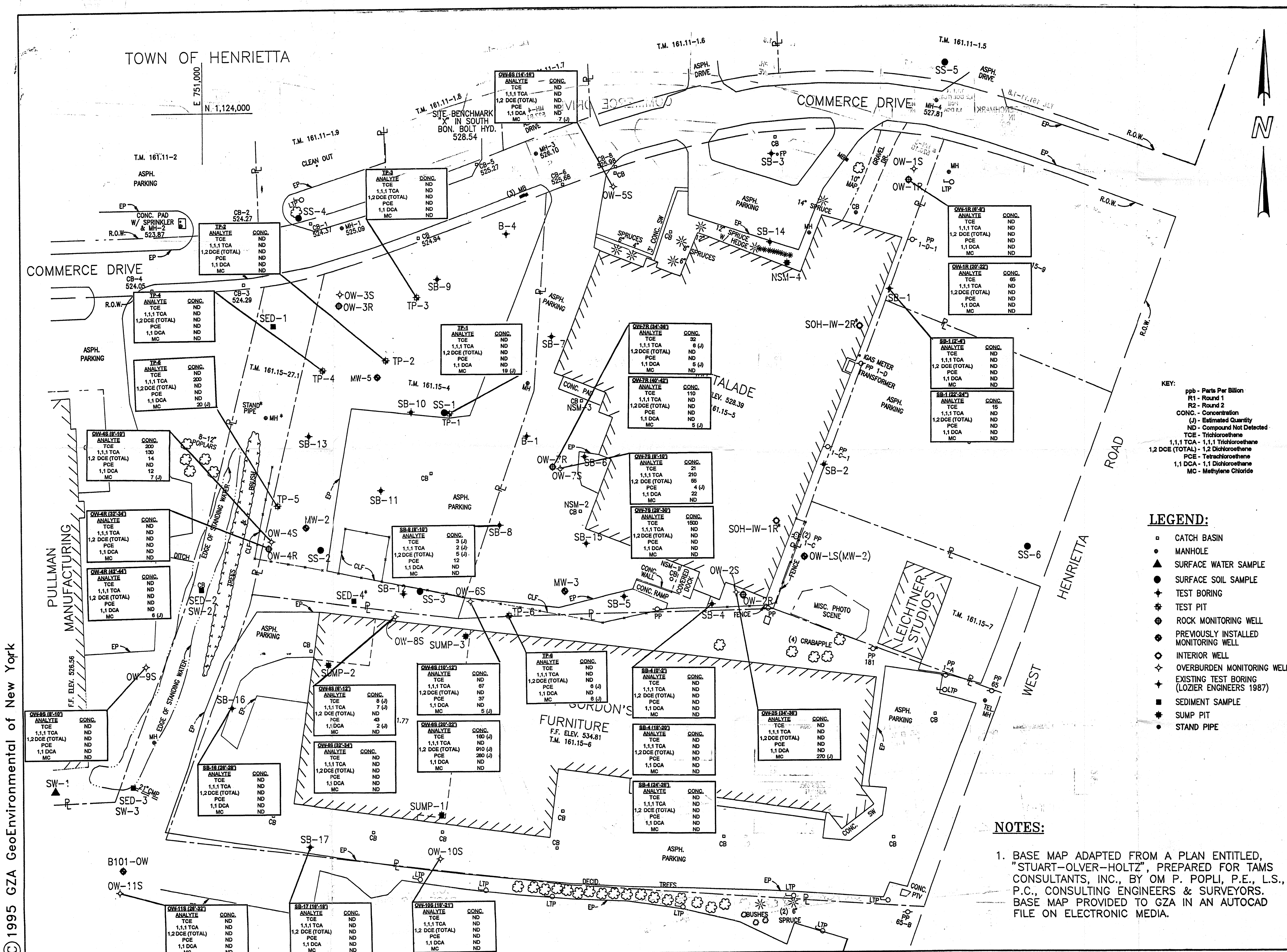
REMEDIAL INVESTIGATION

COVER TYPE MAP

DRAWN BY: DEW

DATE: JANUARY 1996

GZA GeoEnvironmental of New York



REV No.	DESCRIPTION	BY	DATE

SCALE IN FEET: 0 40 80 160

DRAWN BY:

DATE: DECEMBER 1995

GZA GeoEnvironmental of New York

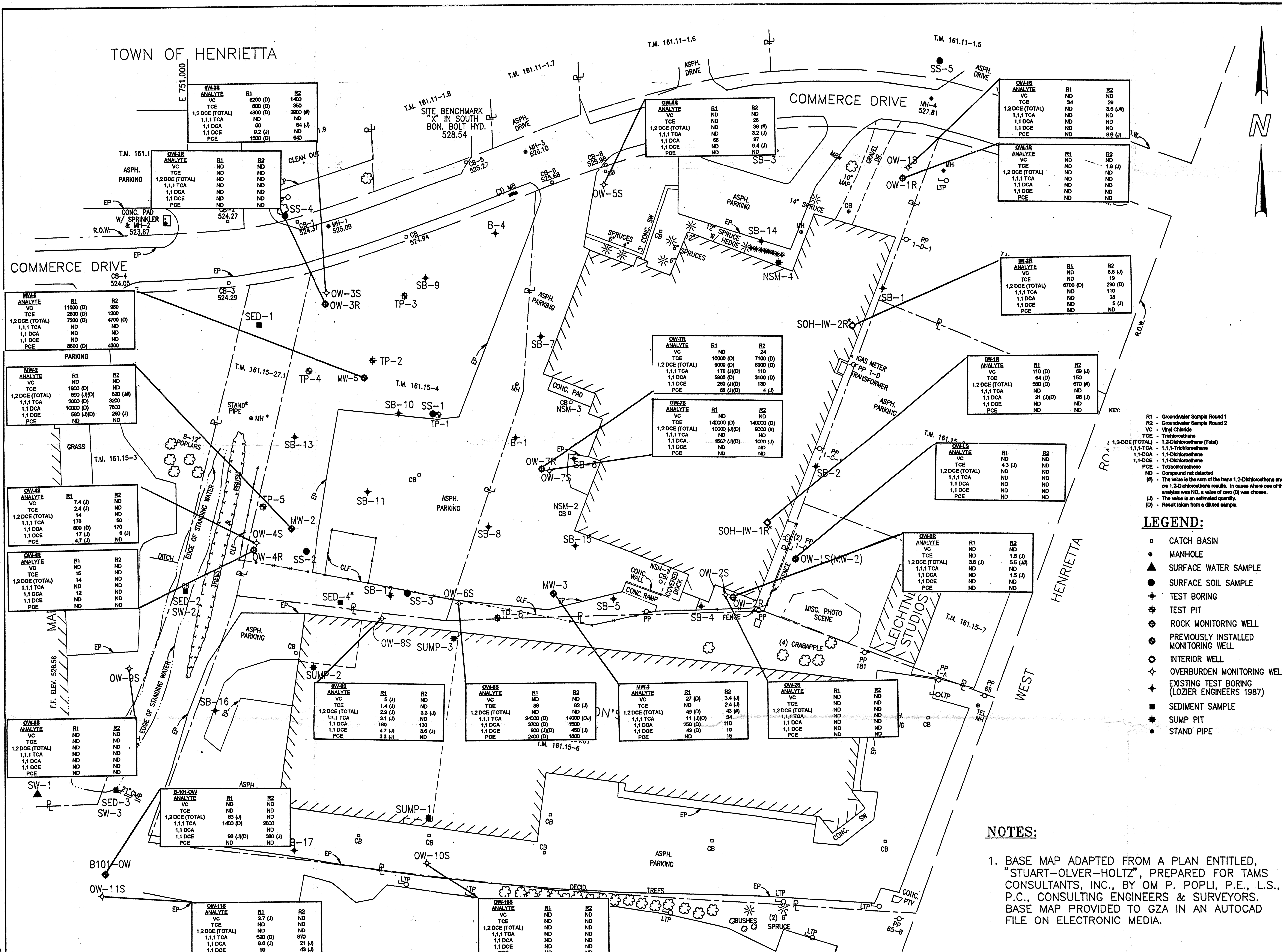
STUART-OLVER-HOLTZ SITE
HENRIETTA, NEW YORK

REMEDIAL INVESTIGATION

FREQUENTLY DETECTED HALOGENATED ALIPHATIC HYDROCARBONS IN SUB-SURFACE SOILS

PROJECT No. **19078.1**

FIGURE No. **13**



OW-3S ANALYTE	R1	R2
VC	6200 (D)	1400
TCE	600 (D)	360
1,2 DCE (TOTAL)	4800 (D)	2600 (#)
1,1,1 TCA	ND	ND
1,1 DCA	60	64 (J)
1,1 DCE	9.2 (J)	ND
PCE	1500 (D)	640

OW-3R ANALYTE	R1	R2
VC	ND	ND
TCE	ND	ND
1,2 DCE (TOTAL)	ND	ND
1,1,1 TCA	ND	ND
1,1 DCA	ND	ND
1,1 DCE	ND	ND
PCE	ND	ND

OW-5S ANALYTE	R1	R2
VC	ND	ND
TCE	ND	26
1,2 DCE (TOTAL)	ND	39 (#)
1,1,1 TCA	ND	3.2 (J)
1,1 DCA	66	97
1,1 DCE	ND	9.4 (J)
PCE	ND	ND

OW-1S ANALYTE	R1	R2
VC	ND	ND
TCE	34	28
1,2 DCE (TOTAL)	ND	3.6 (J#)
1,1,1 TCA	ND	ND
1,1 DCA	ND	ND
1,1 DCE	ND	ND
PCE	ND	8.9 (J)

OW-1R ANALYTE	R1	R2
VC	ND	ND
TCE	ND	1.8 (J)
1,2 DCE (TOTAL)	ND	ND
1,1,1 TCA	ND	ND
1,1 DCA	ND	ND
1,1 DCE	ND	ND
PCE	ND	ND

MW-4 ANALYTE	R1	R2
VC	11000 (D)	980
TCE	2600 (D)	1200
1,2 DCE (TOTAL)	7200 (D)	4700 (D)
1,1,1 TCA	ND	ND
1,1 DCA	ND	ND
1,1 DCE	ND	ND
PCE	8800 (D)	4300

MW-2 ANALYTE	R1	R2
VC	ND	ND
TCE	1800 (D)	ND
1,2 DCE (TOTAL)	590 (J)(D)	620 (J#)
1,1,1 TCA	2600 (D)	3300
1,1 DCA	10000 (D)	7800
1,1 DCE	580 (J)(D)	280 (J)
PCE	ND	ND

OW-4S ANALYTE	R1	R2
VC	7.4 (J)	ND
TCE	2.4 (J)	ND
1,2 DCE (TOTAL)	14	ND
1,1,1 TCA	170	50
1,1 DCA	800 (D)	170
1,1 DCE	17 (J)	6 (J)
PCE	4.7 (J)	ND

OW-4R ANALYTE	R1	R2
VC	ND	ND
TCE	15	ND
1,2 DCE (TOTAL)	14	ND
1,1,1 TCA	ND	ND
1,1 DCA	12	ND
1,1 DCE	ND	ND
PCE	ND	ND

OW-7R ANALYTE	R1	R2
VC	ND	24
TCE	10000 (D)	7100 (D)
1,2 DCE (TOTAL)	9000 (D)	6900 (D)
1,1,1 TCA	170 (J)(D)	110
1,1 DCA	5900 (D)	3100 (D)
1,1 DCE	250 (J)(D)	130
PCE	68 (J)(D)	4 (J)

OW-7S ANALYTE	R1	R2
VC	ND	ND
TCE	140000 (D)	140000 (D)
1,2 DCE (TOTAL)	10000 (J)(D)	9300 (#)
1,1,1 TCA	ND	ND
1,1 DCA	1500 (J)(D)	1000 (J)
1,1 DCE	ND	ND
PCE	ND	ND

IW-2R ANALYTE	R1	R2
VC	ND	8.8 (J)
TCE	ND	19
1,2 DCE (TOTAL)	6700 (D)	280 (D)
1,1,1 TCA	ND	110
1,1 DCA	ND	28
1,1 DCE	ND	5 (J)
PCE	ND	ND

IW-1R ANALYTE	R1	R2
VC	110 (D)	69 (J)
TCE	64 (D)	150
1,2 DCE (TOTAL)	580 (D)	670 (#)
1,1,1 TCA	ND	ND
1,1 DCA	21 (J)(D)	98 (J)
1,1 DCE	ND	ND
PCE	ND	ND

OW-LS ANALYTE	R1	R2
VC	ND	ND
TCE	4.3 (J)	ND
1,2 DCE (TOTAL)	ND	ND
1,1,1 TCA	ND	ND
1,1 DCA	ND	ND
1,1 DCE	ND	ND
PCE	ND	ND

OW-2R ANALYTE	R1	R2
VC	ND	ND
TCE	ND	1.5 (J)
1,2 DCE (TOTAL)	3.6 (J)	5.5 (J#)
1,1,1 TCA	ND	ND
1,1 DCA	ND	1.5 (J)
1,1 DCE	ND	ND
PCE	ND	ND

OW-9S ANALYTE	R1	R2
VC	ND	ND
TCE	ND	ND
1,2 DCE (TOTAL)	ND	ND
1,1,1 TCA	ND	ND
1,1 DCA	ND	ND
1,1 DCE	ND	ND
PCE	ND	ND

OW-8S ANALYTE	R1	R2
VC	5 (J)	ND
TCE	1.4 (J)	ND
1,2 DCE (TOTAL)	2.9 (J)	3.3 (J)
1,1,1 TCA	3.1 (J)	ND
1,1 DCA	180	130
1,1 DCE	4.7 (J)	3.6 (J)
PCE	3.3 (J)	ND

OW-6S ANALYTE	R1	R2
VC	ND	ND
TCE	88	82 (J)
1,2 DCE (TOTAL)	ND	ND
1,1,1 TCA	24000 (D)	14000 (DJ)
1,1 DCA	3700 (D)	1500
1,1 DCE	600 (J)(D)	450 (J)
PCE	2400 (D)	1800

MW-3 ANALYTE	R1	R2
VC	27 (D)	3.4 (J)
TCE	ND	2.4 (J)
1,2 DCE (TOTAL)	49 (D)	43 (#)
1,1,1 TCA	11 (J)(D)	34
1,1 DCA	250 (D)	110
1,1 DCE	42 (D)	19
PCE	19	15

OW-2S ANALYTE	R1	R2
VC	ND	ND
TCE	ND	ND
1,2 DCE (TOTAL)	ND	ND
1,1,1 TCA	ND	ND
1,1 DCA	ND	ND
1,1 DCE	ND	ND
PCE	ND	ND

B-101-OW ANALYTE	R1	R2
VC	ND	ND
TCE	ND	ND
1,2 DCE (TOTAL)	63 (J)	ND
1,1,1 TCA	1400 (D)	2800
1,1 DCA		ND
1,1 DCE	96 (J)(D)	380 (J)
PCE	ND	ND

OW-11S ANALYTE	R1	R2
VC	2.7 (J)	ND
TCE	ND	ND
1,2 DCE (TOTAL)	ND	ND
1,1,1 TCA	520 (D)	870
1,1 DCA	8.6 (J)	21 (J)
1,1 DCE	19	43 (J)
PCE	ND	ND

OW-10S ANALYTE	R1	R2
VC	ND	ND
TCE	ND	ND
1,2 DCE (TOTAL)	ND	ND
1,1,1 TCA	ND	ND
1,1 DCA	ND	ND
1,1 DCE	ND	ND
PCE	ND	ND

KEY:

- R1 - Groundwater Sample Round 1
- R2 - Groundwater Sample Round 2
- VC - Vinyl Chloride
- TCE - Trichloroethene
- 1,2-DCE (TOTAL) - 1,2-Dichloroethene (Total)
- 1,1,1-TCA - 1,1,1-Trichloroethane
- 1,1-DCA - 1,1-Dichloroethane
- 1,1-DCE - 1,1-Dichloroethene
- PCE - Tetrachloroethene
- ND - Compound not detected
- (#) - The value is the sum of the trans 1,2-Dichloroethene and the cis 1,2-Dichloroethene results. In cases where one of these analyses was ND, a value of zero (0) was chosen.
- (J) - The value is an estimated quantity.
- (D) - Result taken from a diluted sample.

LEGEND:

- CATCH BASIN
- MANHOLE
- SURFACE WATER SAMPLE
- SURFACE SOIL SAMPLE
- TEST BORING
- TEST PIT
- ROCK MONITORING WELL
- PREVIOUSLY INSTALLED MONITORING WELL
- INTERIOR WELL
- OVERBURDEN MONITORING WELL
- EXISTING TEST BORING (LOZIER ENGINEERS 1987)
- SEDIMENT SAMPLE
- SUMP PIT
- STAND PIPE

NOTES:

1. BASE MAP ADAPTED FROM A PLAN ENTITLED, "STUART-OLVER-HOLTZ", PREPARED FOR TAMS CONSULTANTS, INC., BY OM P. POPLI, P.E., L.S., P.C., CONSULTING ENGINEERS & SURVEYORS. BASE MAP PROVIDED TO GZA IN AN AUTOCAD FILE ON ELECTRONIC MEDIA.

SCALE IN FEET: 0 40 80 160

REV No.	DESCRIPTION	BY	DATE

DRAWN BY:

DATE: DECEMBER 1995

GZA GeoEnvironmental of New York

STUART-OLVER-HOLTZ SITE

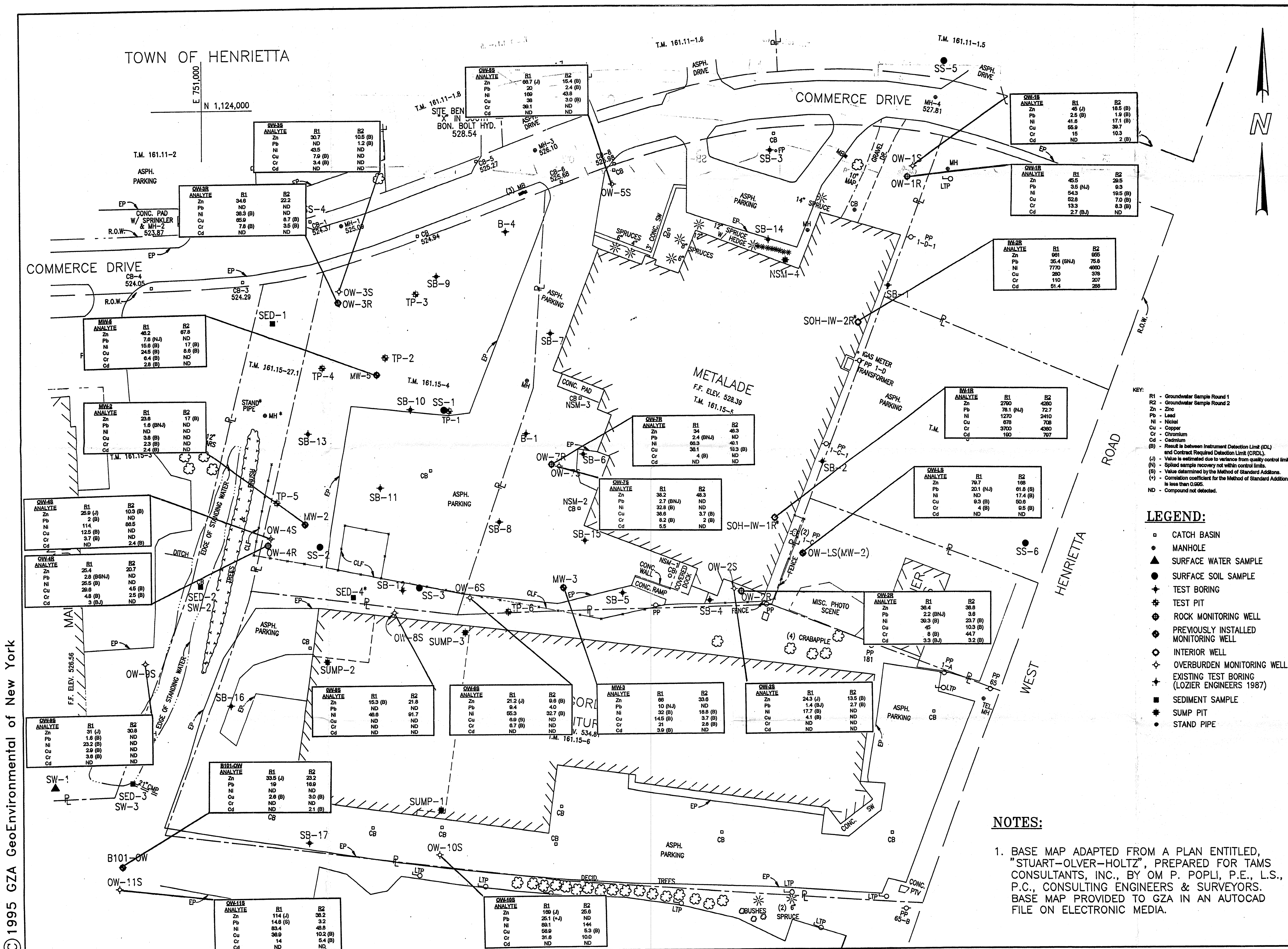
HENRIETTA, NEW YORK

REMEDIAL INVESTIGATION

GROUNDWATER FREQUENTLY DETECTED HALOGENATED ALIPHATIC HYDROCARBONS

PROJECT No. **19078.1**

FIGURE No. **14**



OW-5S ANALYTE	R1	R2
Zn	66.7 (J)	15.4 (B)
Pb	20	2.4 (B)
Ni	169	43.8
Cu	38	3.0 (B)
Cr	39.1	ND
Cd	ND	ND

OW-3S ANALYTE	R1	R2
Zn	30.7	10.5 (B)
Pb	ND	1.2 (B)
Ni	43.5	ND
Cu	7.9 (B)	ND
Cr	3.4 (B)	ND
Cd	ND	ND

OW-3R ANALYTE	R1	R2
Zn	34.6	22.2
Pb	ND	ND
Ni	38.3 (B)	ND
Cu	65.9	8.7 (B)
Cr	7.8 (B)	3.5 (B)
Cd	ND	ND

MW-5 ANALYTE	R1	R2
Zn	46.2	67.8
Pb	7.6 (NJ)	ND
Ni	15.6 (B)	17 (B)
Cu	24.5 (B)	8.6 (B)
Cr	6.4 (B)	ND
Cd	2.8 (B)	ND

MW-2 ANALYTE	R1	R2
Zn	23.6	17 (B)
Pb	1.6 (BNJ)	ND
Ni	ND	ND
Cu	3.8 (B)	ND
Cr	2.3 (B)	ND
Cd	2.4 (B)	ND

OW-4S ANALYTE	R1	R2
Zn	25.9 (J)	10.3 (B)
Pb	2 (B)	ND
Ni	114	86.5
Cu	12.5 (B)	ND
Cr	3.7 (B)	ND
Cd	ND	2.4 (B)

OW-4R ANALYTE	R1	R2
Zn	25.4	20.7
Pb	2.6 (BSNJ)	ND
Ni	25.5 (B)	ND
Cu	29.6	4.5 (B)
Cr	4.8 (B)	2.5 (B)
Cd	3 (BJ)	ND

OW-9S ANALYTE	R1	R2
Zn	31 (J)	30.8
Pb	1.6 (B)	ND
Ni	23.2 (B)	ND
Cu	2.9 (B)	ND
Cr	3.6 (B)	ND
Cd	ND	ND

B101-OW ANALYTE	R1	R2
Zn	33.5 (J)	23.2
Pb	19	16.9
Ni	ND	ND
Cu	2.6 (B)	3.0 (B)
Cr	ND	ND
Cd	ND	2.1 (B)

OW-11S ANALYTE	R1	R2
Zn	114 (J)	38.2
Pb	14.6 (S)	3.2
Ni	83.4	48.8
Cu	36.9	10.2 (B)
Cr	14	5.4 (B)
Cd	ND	ND

OW-8S ANALYTE	R1	R2
Zn	15.3 (B)	21.8
Pb	ND	ND
Ni	46.6	91.7
Cu	ND	ND
Cr	ND	ND
Cd	ND	ND

OW-6S ANALYTE	R1	R2
Zn	21.2 (J)	9.6 (B)
Pb	9.4	4.0
Ni	55.3	32.7 (B)
Cu	6.9 (B)	ND
Cr	6.7 (B)	ND
Cd	ND	ND

MW-3 ANALYTE	R1	R2
Zn	66	33.6
Pb	10 (NJ)	ND
Ni	32 (B)	18.8 (B)
Cu	14.5 (B)	3.7 (B)
Cr	21	2.8 (B)
Cd	3.9 (B)	ND

OW-2S ANALYTE	R1	R2
Zn	24.3 (J)	13.5 (B)
Pb	1.4 (BJ)	2.7 (B)
Ni	17.7 (B)	ND
Cu	4.1 (B)	ND
Cr	ND	ND
Cd	ND	ND

OW-10S ANALYTE	R1	R2
Zn	169 (J)	25.6
Pb	25.1 (+J)	ND
Ni	89.1	144
Cu	56.9	5.3 (B)
Cr	31.6	10.0
Cd	ND	ND

OW-2R ANALYTE	R1	R2
Zn	36.4	38.8
Pb	2.2 (BNJ)	3.6
Ni	39.3 (B)	23.7 (B)
Cu	45	10.3 (B)
Cr	8 (B)	44.7
Cd	3.3 (BJ)	3.2 (B)

OW-7R ANALYTE	R1	R2
Zn	34	46.3
Pb	2.4 (BNJ)	ND
Ni	66.3	40.1
Cu	36.1	10.3 (B)
Cr	4 (B)	ND
Cd	ND	ND

OW-7S ANALYTE	R1	R2
Zn	38.2	48.3
Pb	2.7 (BNJ)	ND
Ni	32.8 (B)	ND
Cu	38.6	3.7 (B)
Cr	8.2 (B)	2 (B)
Cd	5.5	ND

OW-1S ANALYTE	R1	R2
Zn	45 (J)	18.5 (B)
Pb	2.5 (B)	1.9 (B)
Ni	41.6	17.1 (B)
Cu	55.9	39.7
Cr	15	10.3
Cd	ND	2 (B)

OW-1R ANALYTE	R1	R2
Zn	45.5	29.5
Pb	3.5 (NJ)	9.3
Ni	54.3	19.5 (B)
Cu	52.8	7.0 (B)
Cr	13.3	8.3 (B)
Cd	2.7 (BJ)	ND

IW-2R ANALYTE	R1	R2
Zn	961	955
Pb	35.4 (SNJ)	75.8
Ni	7770	4660
Cu	280	378
Cr	110	207
Cd	51.4	288

IW-1R ANALYTE	R1	R2
Zn	2790	4280
Pb	78.1 (NJ)	72.7
Ni	1270	2410
Cu	678	708
Cr	3700	4380
Cd	190	797

OW-LS ANALYTE	R1	R2
Zn	79.7	168
Pb	20.1 (NJ)	61.8 (S)
Ni	ND	17.4 (B)
Cu	9.3 (B)	50.6
Cr	4 (B)	9.5 (B)
Cd	ND	ND

KEY:

- R1 - Groundwater Sample Round 1
- R2 - Groundwater Sample Round 2
- Zn - Zinc
- Pb - Lead
- Ni - Nickel
- Cu - Copper
- Cr - Chromium
- Cd - Cadmium
- (B) - Result is between *Instrument Detection Limit (IDL)* and Contract Required Detection Limit (CRDL).
- (J) - Value is estimated due to variance from quality control limits.
- (N) - Spiked sample recovery not within control limits.
- (S) - Value determined by the Method of Standard Additons.
- (+) - Correlation coefficient for the Method of Standard Additions is less than 0.995.
- ND - Compound not detected.

LEGEND:

- CATCH BASIN
- MANHOLE
- SURFACE WATER SAMPLE
- SURFACE SOIL SAMPLE
- TEST BORING
- TEST PIT
- ROCK MONITORING WELL
- PREVIOUSLY INSTALLED MONITORING WELL
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STUART-OLVER-HOLTZ SITE

HENRIETTA, NEW YORK

REMEDIAL INVESTIGATION

GROUNDWATER FREQUENTLY DETECTED METALS

PROJECT No. 19078.1

FIGURE No. 15