FEASIBILITY STUDY REPORT
ORDER-ON-CONSENT: INDEX #B8-0400-92-03

FORMER GENERAL CIRCUITS FACILITY
INACTIVE HAZARDOUS WASTE DISPOSAL SITE
NYSDEC SITE CODE #828085
95 MT. READ BLVD.
ROCHESTER, NEW YORK

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1.0 INTRODUCTION

The assessments and evaluations outlined in this Feasibility Study (FS) report are in general accordance with the requirements outlined in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA") [42 U.S.C. 9601 ET SEQ.], as amended; the National Contingency Plan ("NCP") of July 1, 1998 [40 CFR Part 300]; and the USEPA guidance document titled "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" dated October, 1988.

1.1 Purpose and Organization of Report

This report presents the findings of the FS that was performed by Day Environmental, Inc. (DAY). This FS was conducted in general conformance with the scope of work outlined in the "*Remedial Investigation/Feasibility Study Work Plan, Order on Consent Index #B8-0400-92-03*" dated May 30, 1997 (May 30, 1997 Work Plan) as formally amended by letters from DAY to the New York State Department of Environmental Conservation (NYSDEC) dated October 27, 1997; December 1, 1997; April 3, 1998; and August 13, 1998.

The subject property is located at 95 Mt. Read Blvd, City of Rochester, Monroe County, New York (Site). Currently, the NYSDEC lists the site as a Class 2 Inactive Hazardous Waste Disposal Site (NYSDEC Site Code #828085). Figure FS-1 (Project Locus Map) included in Appendix A of this report illustrates the location of the Site. A Site Plan is included in Appendix A as Figure FS-2.

1.2 Site Improvements and History

The Site consists of approximately 3.5 acres of land currently improved with an approximately 120,000-square foot single-story building. The remaining land area not covered by the building is improved primarily with asphalt-paved driveways and parking areas. A landscaped area is located east of the building.

The Site is located in a predominantly industrial area of the City of Rochester and zoned for manufacturing; however, commercial and residential properties are present nearby. The Site is bounded to the north and west by industrial properties; to the south by Buffalo Road with industrial/commercial properties beyond; and to the east by a used automobile sales facility and Mt. Read Boulevard with a gasoline station and residential dwellings beyond.

The original portion of the building was constructed in the 1920s, and the Site was reportedly operated as a printing facility until the early 1960s. Rochester Lithograph Corporation was a former owner/operator of the Site when it was operated as a printing business. It has been reported that Pluta Manufacturing acquired the Site around 1960 and began General Circuits, a printed circuit board manufacturer. Several building expansions were constructed in the 1960s and 1970s that increased the floor space of the building about four times the original size. General Circuits was then acquired in 1979 by Brand-Rex, a division of Akzona. In 1985, the name Brand-Rex was changed to BRIntec after a leveraged buyout. In June 1990, General Circuits (a division of BRIntec) closed as a result of bankruptcy. The current owner purchased the Site in 1991, and the current owner has subdivided and leased the building to light-industrial and commercial businesses (i.e., tenants).

1.3 Summary of Remedial Investigation

Fieldwork associated with the Remedial Investigation (RI) was conducted between April 1998 and October 2000. The fieldwork performed included the advancement of overburden test borings, the installation of one overburden/shallow bedrock well and five deep bedrock wells, the collection and analysis of soil samples, the collection and analysis of groundwater samples from new and existing Site wells, a basement sump evaluation, slug tests to measure hydraulic conductivity, and the collection of data for use in the development of groundwater potentiometric maps. See Figure FS-3 included in Appendix A for monitoring well and test boring locations.

1.4 Summary of Supplemental Chromium Delineation

Two additional rounds of test borings were advanced between December 2001 and July 2002 to further delineate a chromium source area identified in the soil. This work was summarized in the *Data Summary Report* dated November 2002. The additional test borings delineated the source area of chromium to determine the horizontal and vertical extent of chromium at concentrations greater than 500 parts per million (ppm). See Figure FS-3A included in Appendix A for the additional test borings advanced in the chromium source area.

1.5 Summary of Sub-Slab Soil Gas and Indoor Air Evaluation

A sub-slab soil gas and indoor air evaluation was conducted in March 2004. This evaluation consisted of installing four sub-slab gas sampling points and subsequently collecting sub-slab soil gas from these points, and indoor air samples in proximity to these points. In addition, a background air sample was also collected. The samples were tested for volatile organic compounds (VOCs), and the test results were submitted to the NYSDEC in a report dated May 6, 2004. A copy of this report is included in Appendix D. This report includes a figure showing the sampling locations, and a table summarizing the testing results. (Note, the intention of the sub-slab soil gas study was to install a sampling point in each area of the building divided by the building footers. However, the location of the foundation wall between Slab Areas 3 and 4 was incorrect as shown in the report dated May 6, 2004. Based on the revised location shown on Figure FS-3B included in Appendix A of this report, Samples 3A and 3B were taken in Slab Area 4. As a result, a sub-slab soil gas sample and indoor air sample were not taken from Slab Area 3.)

1.6 Nature and Extent of Contamination

Based upon the work described above, contaminants of concern (COCs) that appear attributable to former operations at the Site include chlorinated VOCs and the metal chromium, including hexavalent chromium (chromium VI). The chlorinated VOCs at the Site generally consist of perchloroethene (PCE) and trichloroethene (TCE), and their breakdown products 1,2-dichloroethene (DCE) and vinyl chloride (VC). According to available information, PCE and TCE were used at the Site in the past for metal degreasing operations. Some target analyte list (TAL) metals were also detected at concentrations that exceeded NYSDEC guidance values.

These TAL metals were primarily detected in a soil sample from beneath the building and in some of the groundwater samples tested.

A potential source for VOCs appears to be an area of former outdoor disturbance/storage located west of the original portion of the building (refer to Figure FS-2 included in Appendix A). This area of disturbance/storage was observed in the 1951 and 1961 historical aerial photographs.

Potential sources of the chromium contamination appear to be the area of former outdoor disturbance/storage discussed above, and/or former operations and/or wastewater discharges involving chromic acid that were performed in proximity to the former shipping room located at the western end of the original portion of the building (refer to Figure FS-2).

Except for chromium, the source of elevated TAL metals in soil and/or groundwater is unknown, but may be attributable to localized on-site sources, off-site sources, or fill material placed below the concrete floor. Also, the presence of TAL metals could be naturally occurring.

COCs were detected in soil, groundwater, and sub-slab soil gas samples at the Site. The COCs attributable to the Site that were measured in soil samples are primarily located beneath the building. The highest concentrations of VOCs and/or chromium exceeding NYSDEC groundwater standards and guidance values were detected in four overburden wells, one deep bedrock well, and the basement sump that are located inside the building. Lower concentrations of COCs that exceeded NYSDEC groundwater standards and guidance values were detected in some of the wells located around the perimeter of the Site. The highest concentration of COCs in the soil gas and indoor air corresponds to the areas of groundwater with the highest VOC concentrations. The area of VOC-impacted media overlaps the area of chromium-impacted media.

Based on the work performed as part of the RI, the vertical extent of COCs attributable to the Site in the vicinity of the presumed source areas has been defined. The nature and extent of these COCs are further discussed below.

1.6.1 Contaminants of Concern (COCs) in Soil

Chlorinated VOCs that exceed NYSDEC guidance values were detected in one soil sample collected during the RI (i.e., test boring TB-11 [12'-14.5'] and one soil sample collected from the additional test borings (i.e., test boring TB-58 [9.0']). Refer to Figure FS-4 included in Appendix A. These samples were collected below the water table, and the test results are probably more representative of groundwater quality. Elevated photoionization detector (PID) readings were detected above the apparent saturated zone in test borings TB-53 (4-5 feet bgs) and TB-58 (6-9 feet bgs). These vadose zone VOC impacts appear to be anomalies based on the numerous test borings that were advanced in proximity to and between these test borings that did not have evidence of VOCs. As such, the FS does not include evaluation of remedial alternatives to address chlorinated VOCs in soil. [Note, test boring TB-53 is within the source area of chromium contamination in the soil (see below) and will be remediated with the chromium.] In addition, petroleum-related VOCs were detected above NYSDEC guidance value at test boring TB-20; however, this contamination appears to be attributable to an off-site source and is not addressed as part of this FS.

Elevated concentrations of calcium and magnesium exceeding NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 (1995) soil cleanup objectives were detected in many of the soil samples tested for TAL metals. Other TAL metals besides chromium (i.e., arsenic, barium, copper, lead, silver, and zinc) were detected at concentrations exceeding NYSDEC TAGM 4046 (1995) soil cleanup objectives beneath the building in a fill sample collected from a depth between 1.5-3.0 feet from test boring TB-27A. The TAL metals copper, silver, and zinc were also detected at concentrations exceeding NYSDEC TAGM 4046 (1995) cleanup objectives beneath the paved area north of the building in a sample from test boring TB-30 (0-4 feet in depth).

The chromium levels in soil that exceeded the proposed NYSDEC TAGM 4046 (1995) soil level of 50 ppm are primarily concentrated underneath the building at the Site (refer to Figure FS-5). The highest concentrations of chromium in the soil at the Site are located beneath the "former shipping room" (refer to Figure FS-5A included in Appendix A). The “former shipping room” is believed to be the source area for chromium and possibly other TAL metals. The extent of chromium contamination in soil greater than 500 ppm was delineated as part of the supplemental chromium delineation and is shown on Figure FS-7 and described below:

- Former Shipping Room: Soil beneath the former shipping room between 0 and 6 feet bgs. Note, at depths greater than 6 feet bgs, the highest chromium concentration detected in the soil beneath the former shipping room was 238 ppm.

- North of the Former Shipping Room (Boiler Room): Soil between 0 and 2 feet bgs located at distances of up to 12 feet northeast of the Former Shipping Room.

- South of the Former Shipping Room (Tenant Space [Office] and Compressor Room): Soil generally between 0 and 4 feet bgs, and soil up to 8 feet bgs on the east side of the Compressor Room.

- East of the Former Shipping Room (Tenant Space): In general, the inferred extent of soil chromium concentrations greater than 500 ppm is between 0 and 10 feet bgs. Chromium concentrations greater that 500 ppm in soils between 2 and 4 feet bgs appear to be present within 15 feet of the east wall of the former shipping room (i.e., west wall of this tenant space) and up to 10 feet to the southeast (i.e., into the hallway). Chromium concentrations greater than 500 ppm in soils between 4 and 6 feet bgs appear to extend up to 30 feet east to northeast of the former shipping room and 15 feet southeast. The extent of chromium concentrations greater than 500 ppm in soils between 6 and 10 feet bgs is inferred to extend within approximately 28 feet east of the former shipping room and up to 12 feet southeast (6-8’ bgs) and 12 feet northeast (8-10’ bgs).

Other than chromium, the TAL metals detected in soil/fill samples that exceeded NYSDEC guidance values are generally not the same as the TAL metals detected in groundwater that exceeded NYSDEC groundwater standards and guidance values. Based on this comparison, it is concluded that the metals detected in soil/fill at concentrations exceeding NYSDEC guidance values (except for chromium) do not appear to be impacting groundwater above NYSDEC groundwater standards and guidance values. However, soil remedial alternatives will discuss both chromium and TAL metals that exceed NYSDEC guidance values.

1.6.2 Contaminants of Concern (COCs) in Groundwater

Chromium concentrations above the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 groundwater standard of 50 ppb were detected in wells MW-8 (52,300 ppb), MW-9 (1,110 ppb), MW-12 (621 ppb) and MW-21 (53.5 ppb). With the exception of monitoring well MW-21, these monitoring wells are located within the building at the Site (refer to Figure FS-10 included in Appendix A).

In general, the TAL metals, iron, magnesium, sodium and thallium were detected above NYSDEC groundwater standards and guidance values in groundwater samples collected from monitoring wells positioned across the Site (upgradient, downgradient, and beneath the building). Also, one or more of the TAL metals antimony, cadmium, copper, lead, manganese and/or selenium were detected in groundwater samples at concentrations exceeding NYSDEC groundwater standards and guidance values in monitoring wells MW-8, MW-9, MW-16 and MW-17. [Note, monitoring well MW-8, MW-9, and MW-17 are within the area where chromium in the groundwater was measured at concentrations exceeding NYSDEC groundwater standards and guidance values.]

The highest concentration of total VOCs was detected in a groundwater sample from overburden monitoring well MW-9 (greater than 155,000 ppb total VOCs were detected in a December 1998 sample). Groundwater samples from overburden monitoring wells MW-8, MW-10 and MW-12, deep bedrock monitoring well MW-17, and the basement sump also contained concentrations of total VOCs between 2,140 ppb and 20,340 ppb (refer to Figure FS-10 included in Appendix A). VOCs were also detected at concentrations above NYSDEC groundwater standards and guidance values in many of the monitoring wells positioned around the perimeter of the Site, but at lower concentrations (i.e., less than 144 ppb) than detected in interior monitoring wells MW-8, MW-9, MW-10, MW-17 and the basement sump.

The vertical extent of COCs in groundwater was delineated in the RI by evaluating groundwater quality in monitoring wells sealed within the overburden and within the bedrock. VOCs were not detected in groundwater samples that were collected approximately 50 feet below the ground surface in proximity of the VOC source area. Also, chromium was not detected at concentrations that exceed NYSDEC groundwater standards and guidance values in bedrock groundwater monitoring wells, with the exception of monitoring well MW-21. However, monitoring well MW-21 is an "open hole" well starting at 18 feet below the ground surface; therefore, this chromium concentration could be indicative of the shallow bedrock groundwater.

1.6.3 Contaminants of Concern (COCs) in Sub-Slab Soil Gas

VOCs were detected above the reported laboratory detection limits in the four sub-slab soil gas samples tested (refer to Appendix D). The highest VOC concentrations were reported in samples 3A and 4A, which are located in the same area of elevated VOC concentrations in groundwater. Two of the primary VOCs identified in the sub-slab soil gas samples (PCE and TCE) were also detected in the corresponding indoor air samples. The concentrations of VOCs detected in the indoor air samples were below Occupational Safety and Health Association (OSHA) Permissible Exposure Limits (PELs); however, the concentration of TCE and PCE in the indoor air samples exceeded the NYSDOH action levels. As a result, a vapor mitigation system (including air filtration units in the basement) is being installed in the building as part of an Interim Remedial Measure (IRM).

1.7 Contaminant Fate and Transport

Fate of Chlorinated VOCs

The chlorinated VOC COCs (i.e., TCE and PCE) and their breakdown compounds (i.e., DCE and VC), are persistent in the environment. As referenced in *Handbook of Environmental Degradation Rates*, Philip Howard, 1991, PCE has a half-life in soil between six months and 1 year. PCE has a half-life in groundwater between one and two years. TCE has a half-life in soil between six months and 1 year. TCE has a half-life in groundwater between 11 months and 4.5 years. VC has a half-life in soil between four weeks and six months. VC has a half-life in groundwater between 8 months and 8 years. The shorter half-lives of chlorinated VOCs in soil in relation to their longer half lives in groundwater may provide one reason why the concentrations of chlorinated VOCs detected in soil were lower than the concentrations of chlorinated VOCs detected in groundwater.

These chlorinated VOC COCs, and their breakdown compounds, have specific gravity values greater than 1.0. As such, free product (if present) would be considered to be a dense non-aqueous phase liquid (DNAPL).

When released to the environment, these VOCs can adsorb to soil, occupy the pore space as a vapor phase in unsaturated soil, slightly dissolve in water, or sink as DNAPL through the groundwater table.

Fate of Chromium

The chromium appears to be present due to the past use of chromic acid at the Site. Trivalent chromium (chromium III) is the dominant naturally occurring form of chromium. The hexavalent chromium (chromium VI) can be reduced to trivalent chromium, and under some circumstances, trivalent chromium can be oxidized to form hexavalent chromium. Under most conditions, hexavalent chromium is relatively soluble and trivalent chromium is rather insoluble. Trivalent chromium is the most stable form of chromium.

Fate of TAL Metals

TAL metals other than chromium detected at the Site above the NYSDEC guidance values may be attributable to the former outdoor disturbance/storage area located west of the original portion of the building that was observed in the 1951 and 1961 historical aerial photographs, or the near-surface fill material. TAL metals are persistent in the environment and with the exception of dispersion through the groundwater, total concentrations will not decrease with time.

Transport of COCs

The building and paved surfaces cover the majority of the Site and appear to be acting as a cap that inhibits infiltration of precipitation that would otherwise accelerate movement of COCs away from the potential source areas. The influence of the basement foundation drain system that is connected to the basement groundwater sump (i.e., the passive pump-and-treat system) also appears to be inhibiting the migration of COCs away from the Site. However, based on a review of the potentiometric groundwater maps and on cumulative groundwater test results for monitoring wells located along the perimeter of the Site that show steady or increasing concentrations of COCs, it appears that some migration at the Site is occurring.

Potential transport mechanisms of COCs appear to include possible DNAPL flow on or in bedrock (e.g., in proximity to wells MW-9 and MW-10), migration in groundwater in a dissolved phase, diffusion through the saturated and unsaturated soil or bedrock, and vapor intrusion into the building through the concrete floor. Information reviewed as part of the RI suggests that bedrock joint patterns noted in the nearby Monroe County Pure Waters Combined Sewer Overflow Abatement program tunnels data trend 60° to 80° east of north, which may explain some of the distribution patterns of VOCs away from potential source areas at the Site in more than one direction.

1.8 Risk Assessment

The International Center for Toxicology and Medicine (ICTM) completed a report titled *Qualitative Human Health and Environmental Risk Assessment* dated January 2, 2001 (revised February 2003 and January 2005) for the Site. The risk assessment evaluates potential exposure pathways for environmental contaminants associated with the Site. A copy of the risk assessment report is included in Appendix B.

In summary, the risk assessment uses the site-specific information available to determine risk to human health or the environment. A qualitative risk assessment does not incorporate modeling or predictive measures as used in a quantitative risk assessment. The risk assessment process included a review of the analytical data available for the Site prior to January 2005, as well as a site visit to observe potential on-site and off-site exposures to the COCs. The findings of this risk assessment are summarized below.

1.8.1 Potential Exposure Pathways

The qualitative risk assessment determined that potential exposure pathways, based on the current use of the Site, are limited to possible inhalation of VOCs from the sump in the basement of the building and potential migration of VOCs through the concrete floor. The Risk Assessment report also states that the concentration of VOCs detected in the indoor air are below OSHA PELs; however, the concentrations of some of the VOCs (i.e., TCE and PCE) exceed the NYSDOH action levels. As a result a vapor mitigation system (including air filtration units in the basement) is being installed in the building as part of an IRM in order to address this potential exposure pathway.

The direct pathway of VOCs and chromium compounds through oral ingestion and dermal contact is minimized/eliminated since the contaminated soil and groundwater is located under the building. Also, the lack of use of the surrounding area for farming, fishing, or agricultural purposes reduces the potential for exposure.

Additionally, the environmental assessment conducted as a part of the risk assessment identified no viable habitats (e.g., forest, wetlands, water bodies) for wildlife or aquatic species, and no adverse impacts to ecological receptors.

1.8.2 Allowable Exposures Based on Risk Assessment

The qualitative risk assessment concluded that:

- Based on the data obtained during the RI, at this time there is no discernible potential risk to off-site human receptors.
- Various record checks did not indicate that groundwater below or in proximity to the Site is used as a potable water supply.
- A review of the air monitoring data show that indoor air samples detected VOCs at concentrations below OSHA PELs; however, several analytes exceeded NYSDOH action levels. Therefore, a vapor mitigation system is being installed to eliminate/minimize potential migration through the slab floor.
- A quantitative chemical-by-chemical risk analysis is not warranted at this time, given the Site operations, location of contaminants, and limited exposure that exists for subsurface COCs.

The qualitative risk assessment results recommended the following actions in order to minimize exposures at the Site:

- Site management should create a process to ensure that potential worker exposure to chromium or other contaminants that might result from activities related to soil removal or remediation is minimized through the use of personal protective equipment (PPE). Generally, if any remedial activities were to occur and if contaminated soil were considered a hazardous waste, then workers would be required to be HAZWOP trained. Use of PPE should minimize or eliminate exposure and ultimately diminish or eliminate health risk.

- A similar management system should be created so that in case utility (e.g., gas, electric, water) repairs or other on-site work necessitates groundbreaking activities, proper PPE is used to minimize or eliminate worker exposure to contaminated soil.

- VOC concentrations in the basement sump room should be monitored on a semi-annual basis (for one year) for verification that airborne concentrations are within acceptable limits. Subsequently, annual sampling should be sufficient. [Note, the groundwater remedial alternatives include sealing sumps in the basement and operation of air filters in the basement to further address potential exposures.] In addition, one sampling of indoor air should be conducted following, but within, the first year after the vapor mitigation system has been installed.

- If future land use changes such that either the soil or groundwater becomes accessible to humans, or if these media enable completed pathways of exposure to exist, quantitative risk assessment methods should be employed to estimate potential human health risk.

- If future structural changes occur onsite such that exposure pathways to onsite occupants are altered, an evaluation of quantitative risk should be employed to estimate human health risk.

2.0 FEASIBILITY STUDY OBJECTIVE

The objective of this FS is to develop and screen remedial alternatives and to complete a detailed analysis of remedial alternatives so that a remedy can be selected that will satisfy the remedial action objectives (RAOs).

2.1 Remedial Action Objectives

Site-specific RAOs developed as part of this FS are based on the findings of the RI; identification of site-specific COCs; Standards, Criteria, and Guidelines (SCGs); and evaluation of human health and environmental risks and their potential exposure pathways. The following RAOs have been established for the Site:

- Establish recommended areas of remediation.
- Eliminate, to the extent practicable, off-site migration of groundwater that does not attain NYSDEC TOGS 1.1.1 groundwater standards for dissolved constituents.
- Eliminate, to the extent practicable, migration of potential DNAPL.
- Eliminate, to the extent practicable, exposures to COCs.
- Remediate, to the extent practicable, COCs to concentrations below SCGs.

2.2 Standards, Criteria, and Guidelines

SCGs review chemical-specific, location-specific, and action-specific requirements for the COCs.

Chemical-Specific Requirements were determined by a review of the health or risk based concentration limits or ranges in various environmental media. New York State and the federal government have not developed chemical standards for soil, however, soil may be characterized as hazardous through use of the Toxicity Characteristic Leaching Procedure (TCLP). The TCLP evaluates the ability of the COC to leach from the soil and impact groundwater in the area. The TCLP concentration limit for chromium in soil is 5.0 mg/l (ppm).

The NYSDEC has published a proposed guidance values for soil cleanup in the *Technical and Administrative Guidance Memorandum, Determination of Soil Cleanup Objectives and Cleanup Levels* (TAGM) 4046 dated January 24, 1994 and a draft revision dated August 4, 1995. The TAGM 4046 cleanup objectives are primarily based upon soil concentrations which are protective of groundwater, and background values. Below is a list of the TAGM 4046 soil cleanup objectives and typical background ranges for COCs in the soil at the Site:

Constituent	Recommended Soil Cleanup Objective (ppm)	Typical Background Range [(1)] (ppm)
Chromium	50* or SB	1.5-40
Arsenic	7.5 or SB	3-12
Barium	300 or SB	15-600
Cadmium	10* or SB	0.1-1
Calcium	SB	130-35,000
Copper	25 or SB	1-50
Lead	SB	200-500
Magnesium	SB	100-5,000
Silver	SB	N/A
Zinc	20 or SB	9-50

SB = Site Background
* = Recommended soil cleanup objective from 1995 draft revision.
(1) = Typical background ranges listed are for the Eastern United States. Also, the typical background range for lead is for metropolitan areas.

The NYSDEC published standards and guidance values for groundwater cleanup in TOGS 1.1.1 dated June 1998. The following TOGS 1.1.1 groundwater standards and guidance values are available for the primary COCs identified in groundwater samples collected from monitoring wells at the Site:

Constituent	Groundwater Standards and Guidance Values (µg/L)
Total Chromium	50
Hexavalent Chromium	50
1,2-Dichloroethene (1,2-DCE)	5*
Trichloroethene (TCE)	5*
Tetrachloroethene (PCE)	5*
Vinyl Chloride (VC)	2

- *The principal organic contaminant standard for groundwater of 5 ug/L applies to this substance.*

Location-Specific Requirements are based upon a review of the local and state concerns for plant and animal species, environmental habitats, and property use (i.e., zoning laws).

According to information provided by the City of Rochester, the Site and its neighbors to the north, west, south, and southeast are zoned for manufacturing. Single-family residential zoning is located to the east/northeast of the Site. Requirements of the zoning area include no groundwater withdrawal wells for potable water needs. Manufacturing zoning may have groundwater withdrawal wells for non-potable/manufacturing uses only (e.g., cooling water).

The Site is located outside of 100-year flood plain areas and is described on the Flood Insurance Rate Map as an area of minimal flooding (i.e., zone C).

A review of the NYS Freshwater Wetland Map (Rochester West Quadrangle) dated May 29, 1986 identified three freshwater wetlands (GT-3, GT-8, and RH-18) that are located approximately 1.6-miles west/southwest, approximately 1.1-miles west/southwest, and approximately 1.0-miles north of the Site, respectively.

The National Wetlands Inventory (Rochester West Quadrangle), updated in April 1981, identified one wetland that is located approximately 0.7-miles southwest of the Site. This wetland is noted as being forested with broadleaf deciduous trees and is seasonally saturated.

The Erie Canal is located approximately 0.57 miles west of the Site.

Since there are no wetlands or publicly used waterways in proximity to the Site, location-specific requirements are not applicable. Also, information suggests groundwater is not being used as a supply for potable water.

Action-Specific Requirements include a review of the regulatory requirements that must be met in developing and executing remedial technologies. Technology screening includes a review of the Applicable or Relevant and Appropriate Requirements (ARARs). These action-specific ARARs are based upon Federal regulations, such as CERCLA, SARA, Federal Clean Air Act, Clean Water Act, and Land Disposal Restrictions developed in the Hazardous and Solid Waste amendments to RCRA. The action-specific requirements must also include the New York State Hazardous Waste Management System (6 NYCRR, Parts 370 – 374).

The selected remedial alternative will need to meet Federal and State action-specific requirements associated with activities conducted in the alternative. For example, if groundwater is extracted, or soil is excavated, and meets hazardous waste criteria, the Site may be subject to RCRA regulations applicable to generation, storage, transportation and disposal of hazardous waste (40 CFR 262) or the Land Disposal Restrictions (6 NYCRR Part 376). If groundwater monitoring is conducted at the Site, monitoring must meet Federal requirements as defined in 40 CFR 264, Subpart F.

The selected remedial alternative may include discharge to a Monroe County publicly owned treatment works (POTW). Such discharges may not create a fire or explosion hazard, cause corrosive damage, obstruct flow, or increase the wastewater temperature where the discharge interferes with treatment plant operation. Also, local POTW requirements, such as pretreatment requirements, must be followed. The limits for discharges to the local POTW, identified in Monroe County Sewer Use Law and in the Site Wastewater Discharge Permit (i.e., the permit for the existing passive pump-and-treat system associated with the basement sump), are as follows:

Contaminant	**Monroe County Limit (mg/L)**	**Site Permit Limit (mg/L)**
Total VOCs	2.13	2.0
Total Chromium	3.0	NA
Iron *	5.0	NA

* *Only other TAL metal contaminant observed in groundwater that exceeds current POTW pretreatment discharge limitations*

NA Not currently applicable to the permit

3.0 IDENTIFICATION AND SCREENING OF TECHNOLOGY TYPES & PROCESS OPTIONS

This section presents a review of technologies for remediation of soil and groundwater containing the COCs identified at the Site. Remedial technologies and the process options screened are shown for soil and for groundwater.

The NYSDEC has identified a hierarchy of remedial technologies for hazardous waste disposal sites, from most desirable to least desirable. Permanent remedies, as indicated by a "*", are preferred technologies to be included in selected remedial alternatives.

- *Destruction – permanently reduce toxicity of all or most of the hazardous wastes to "acceptable cleanup level(s)";
- *Separation / Treatment – separate and/or concentrate the hazardous waste from the wastes to permanently and significantly reduce the volume of waste mixed with hazardous wastes;
- *Solidification / Chemical Fixation – significantly and permanently reduce the mobility and hence the availability of the inorganic hazardous wastes to environmental transport and uptake;
- Control and Isolation Technologies - significantly reduce the mobility and hence the availability of the inorganic hazardous wastes to environmental transport and uptake; and
- Off-Site Land Disposal – remove contaminated media and land dispose the wastes at an off-site permitted facility.

Preferences are given to technologies that have been successfully demonstrated on a full-scale or pilot-scale for one or more of the following:

- under a Federal Superfund Innovative Technology Evaluation (SITE) Program;
- at a Federal Superfund site, at a State Superfund site anywhere in the country, or at a PRP site overseen by a State environmental agency or USEPA;
- the technology has a RCRA Part B or a RCRA Research Development permit; or
- the technology has a documented history of successful treatment.

3.1 Remedial Technologies for Soil

Remedial technologies for soil are evaluated based on technical feasibility, effectiveness, and cost. The technologies evaluated in the screening process for soil include: no action; institutional action; capping; excavation and off-site disposal options; and four in-situ treatment processes/technologies. [Note, in-ground, or "in-situ" treatments involve the treatment of soils without removal/excavation. Treatment technologies that are considered include stabilization/solidification, vitrification, and soil flushing.]

3.1.1 No Action

No action indicates that the Site would be left as currently found.

Applicability: The current Site cap (i.e., paved surfaces and building) appears to be inhibiting infiltration of precipitation that would otherwise act to accelerate migration of COCs from the apparent source areas located beneath the building into the groundwater and/or off-site. Also, the current passive pump-and-treat system has served to reduce/minimize migration of contaminants.

The qualitative risk assessment performed as part of this FS concluded that COCs located in soil underneath the Site property are not readily accessible to humans and therefore do not appear to pose significant exposure and hence health risk. However, potential exposure pathways exist through the basement sump and vapor intrusion through the concrete floor. Indoor air sampling conducted in 1993 and 2004 indicated that concentrations of detected VOCs were below the OSHA PELs; however, the concentrations of TCE and PCE in the indoor air samples exceeded the NYSDOH action levels. Therefore, a sub-slab soil gas mitigation system is being installed for the main building floor, and air filtration units are being installed in the basement, in order to address these potential exposure pathways (refer to Section 3.3).

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- The concentration of chromium and TAL metals in soil will not decrease with time. Some natural attenuation may occur to reduce the chromium VI to chromium III with time; however, a timeframe or the completeness of natural attenuation would be unknown.

This alternative will be included in the detailed analysis of remedial alternatives.

3.1.2 Institutional Action

Restrictions may be placed on the property (e.g., environmental easements, building permit restrictions, zoning restrictions, etc.) to limit land use to specific types of growth (e.g., industrial and commercial). Restrictions would supplement no action or engineering controls that reduce or destroy the COCs. Other institutional action would include development of a Site Management Plan (SMP) to protect workers from exposure to COCs in the soil if it is to be disturbed in the future (i.e., remedial activities, repair/installation of buried utilities, construction activities, etc.).

Applicability: The current Site cap (i.e., paved surfaces and building) appears to be inhibiting infiltration of precipitation that would otherwise act to accelerate migration of COCs from the apparent source areas located beneath the building into the groundwater and/or off-site. Also, the current passive pump-and-treat system has served to reduce/minimize migration of contaminants.

The qualitative risk assessment performed as part of this FS concluded that COCs located in soil underneath the Site property are not readily accessible to humans and therefore do not appear to pose significant exposure and hence health risk. However, potential exposure pathways exist through the basement sump and vapor intrusion through the concrete floor. Indoor air sampling conducted in 1993 and 2004 indicated that concentrations of detected VOCs were below the OSHA PELs; however, the concentrations of TCE and PCE in the indoor air samples exceeded the NYSDOH action levels. Therefore, a sub-slab soil gas mitigation system is being installed for the main building floor, and air filtration units are being installed in the basement, in order to address these potential exposure pathways (refer to Section 3.3).

An SMP would put in-place procedures to handle soil properly to protect Site workers and the public, in the event that soils are disturbed in the future.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- The concentration of chromium and TAL metals in soil will not decrease with time, although some natural attenuation may occur to reduce the chromium VI to chromium III with time.

This alternative will be included in the detailed analysis of remedial alternatives.

3.1.3 Capping

A site cap would inhibit infiltration of precipitation that would otherwise act to accelerate migration of COCs from the apparent source areas located beneath the building into the groundwater and/or offsite.

Applicability: The qualitative risk assessment has found that COCs located in soil underneath the Site property are not readily accessible to humans and therefore do not appear to pose significant exposure and hence health risk. However, potential exposure pathways exist through the basement sump and vapor intrusion through the concrete floor. Indoor air sampling conducted in 1993 and 2004 indicated that concentrations of detected VOCs were below the OSHA PELs; however, the concentrations of TCE and PCE in the indoor air samples exceeded the NYSDOH action levels. Therefore, a sub-slab soil gas mitigation system is being installed for the main building floor, and air filtration units are being installed in the basement, in order to address these potential exposure pathways (refer to Section 3.3).

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- The site is effectively capped at this time (i.e., the building and paved surfaces cover the majority of the Site) and further capping is not possible with the current Site use.

- Maintaining the current cap will provide protection against risks due to contact with the soils.
- The concentration of chromium and TAL metals in soil will not decrease with time, although some natural attenuation may occur to reduce the chromium VI to chromium III with time.

Since the Site is already generally capped (i.e., paved surfaces and building), this option will not be included in the detailed analysis of remedial alternatives because further capping will not significantly reduce/eliminate the observed COCs.

3.1.4 Excavation and Off-Site Disposal

Excavation of part or all of the soils containing COCs at concentrations exceeding NYSDEC TAGM 4046 (1995) soil cleanup levels includes removal, transport, and disposal of the soils at a landfill with approval to accept wastes containing the known concentrations of the COCs (e.g., a RCRA Facility).

Applicability: Excavation and off-site disposal is applicable to COCs in the soil. This technology is a standard treatment method for chromium/metal-contaminated soils. Partial excavation (i.e., "source area excavation"), transport, and disposal of soils containing chromium is also possible (e.g., remove soil with chromium concentrations above 500 ppm).

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- A majority (90% or more) of the contaminated soils are located underneath an occupied building making it difficult and expensive to remove such material. Also, excavation and removal of contaminated soils is potentially hazardous to the remedial workers, occupants of the building, and the community.
- The contaminated soil that will be removed contains chromium and TAL metals and will require disposal as a hazardous waste.
- Excavation activities will also be detrimental to the current use of the Site due to multiple industrial and commercial tenants, depending on the proposed area to be excavated (e.g., relocation of tenants, remodeling of building access points, etc.).
- Considering the minimum risk to human health associated with leaving these soils in place (refer to Section 1.8), construction costs to access, excavate, transport, and dispose of the contaminated soils and rebuild the facility will be excessive compared to the benefit gained by implementing this remedial alternative.
- Excavated areas will need to be filled with clean soil and the impacted building area (i.e., flooring, walls, utilities, etc.) will need to be reconstructed over and around the excavated area.

Full and partial excavation processes will be included in the detailed analysis of remedial alternatives. [Note, partial excavation options will also include institutional actions for the soils left in-place at concentrations above NYSDEC guidance values.]

3.1.5 In-Situ Stabilization/Solidification

The in-situ stabilization/solidification process is dependent on the stabilizing reagent used to chemically reduce chromium (i.e., reduce chromium VI to chromium III) in the soil at the Site. An auger and/or jet nozzles can deliver the reducing chemicals (e.g., ferrous sulfate), and mix the soils in-situ to depths up to 100 feet. Subsequently, the reduced soil is solidified with the addition of admixtures. Over an approximate month-long period, the matrix solidifies and cures into a concrete-like final product. The auger method requires removal of the concrete floor and overhead clearance in the area of remediation. Jet grouting (i.e., pressure injecting) does not require as much disturbance of the floor area at the site, but could require a longer time to complete the work due to an effective treatment area of only 5 feet to 10 feet in diameter for each jet nozzle.

Applicability: Stabilization/solidification of the chromium in soil will be achieved by reducing the chromium VI, the more toxic and mobile form of chromium, to chromium III. This will reduce the potential for leaching to the environment (i.e., reducing/immobilizing the source of chromium contamination). In-situ soil stabilization should also decrease the mobility of TAL metals. In-situ stabilization has been tested and used in the field for full-scale soil treatment.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- The total levels of chromium and TAL metals will remain in the soil and may require removal in the future.
- Pilot studies to evaluate the treatability of the soils at the Site will be required during pre-design activities to determine the soil characteristics and the presence of any substances that may reverse the process over time.
- Emissions from the process will need to be evaluated.
- Underground utilities (e.g., sanitary sewer piping, electrical conduits, and natural gas piping) could be damaged during stabilization and solidification injections.
- Costs associated with this process will be high due to the volume of soil requiring stabilization.
- The location of the soils to be stabilized will require relocation of many building tenants.
- Building walls and ceilings may need to be removed to allow for proper clearance to perform this type of remediation.
- Chromium III under certain circumstances can oxidize back to chromium VI, the more toxic and mobile form of chromium.

This option will be included in the detailed analysis of remedial alternatives.

3.1.6 Vitrification

Vitrification of the soil matrix is based on the principle of heating the waste to a molten state and allowing it to cool to a material similar to volcanic glass. Vitrification may be done in-situ or after excavation in an external reactor. The process melts the soil matrix at temperatures exceeding 1600 degrees Celsius, and the cooling process may take up to one year. The process would be implemented beneath the occupied building.

Applicability: In-situ vitrification would entomb the COCs present in the soils to a chemically and physically inert product resulting from the vitrification process. Vitrification should immobilize the chromium and TAL metals, and prevent leaching into the groundwater.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- Hazardous conditions are associated with this technology (e.g., hydrogen gas generation and high temperatures).
- The property is fully developed, has multiple tenants that would require relocation, and has underground utilities (e.g., sanitary sewer piping, electrical conduits, and natural gas piping), which could be damaged by vitrification of the soil.
- This technology is not feasible due to the hazards associated with implementing this technology on contamination under an occupied, industrial/commercial site.

This option will not be included in the detailed analysis of remedial alternatives.

3.1.7 Soil Flushing

Soil flushing technology uses injection of water and other solvents or chemicals (e.g., water/alcohol mixture) through soil to either dissolve or direct the soil contamination. The water is injected, collected, treated, and then re-injected into the soil. Upgradient and downgradient locations from which to inject and withdraw the water must be well defined.

Applicability: Soil flushing can be effective at removing metals from soil.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- Soil flushing performance may be impeded by the permeability of the overburden soils at the Site (e.g., the overburden soil is a mixture of silt with lesser amounts of sand in the remedial area). Soil flushing works best in soils with high permeability.
- Flushing soils is not recommended when underground utilities are in the area of remediation.
- Introduction of the water/flushing agents would require construction in currently occupied areas (i.e., relocation of tenants would be required).
- The chromium in soil might be oxidized to chromium VI, which is more toxic.

This option will not be included in the detailed analysis of remedial alternatives.

3.2 Remedial Technologies for Groundwater

A passive pump-and-treat system has been operated by the current owner of the Site since 1992. The chlorinated VOC concentrations detected in groundwater in monitoring well MW-9, the monitoring well that has the highest VOC concentrations, has decreased approximately 38% between 1990 and 1998 (i.e., from 252,278 ppb down to 155,969 ppb). This decrease may be attributable to the passive pump-and-treat system, natural attenuation, dispersion, advection, adsorption, etc. Discontinuation of the passive pump-and-treat system will result in the continued presence of VOCs in the groundwater. Continuation of the passive pump-and-treat system may result in further decrease in VOC levels. However, the system will require operation and maintenance for many years, and the findings of the RI suggest this system may not be achieving complete capture of COCs. Influence of the passive pump-and-treat system on the selected remedial technology, and possible discontinuation of the system will be evaluated in the design phase.

The technologies evaluated in this screening process include: no action; institutional action; vertical barriers; in-situ treatment/processes; and ex-situ treatment/processes. No action and institutional action will include the effects of the passive pump-and-treat system and assume continued operation. The other groundwater alternatives included in the detailed analysis will evaluate the influence, and possible modification or discontinuation, of the passive pump-and-treat system.

3.2.1 No Action

No action indicates that the Site would be left as currently found. The passive pump-and-treat system would continue to operate.

Applicability: The qualitative risk assessment completed for this Site (refer to Section 1.8) concludes that the current concentration of COCs in groundwater, under the existing use of the Site and surrounding properties, poses no threat to off-site human health. For Site occupants, the risk assessment indicates there are no exposure pathways for chromium; however, inhalation of VOCs in proximity to the basement sump and sub-slab soil gas intrusion through the concrete floor were identified as potential exposure pathways. Indoor air sampling conducted in 1993 and 2004 indicated that concentrations of detected VOCs were below the OSHA PELs; however, the concentrations of TCE and PCE in the indoor air samples exceeded the NYSDOH action levels. Therefore, a sub-slab soil gas mitigation system is being installed for the main building floor, and air filtration units are being installed in the basement, in order to address these potential exposure pathways (refer to Section 3.3).

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- Based on the RI report, groundwater in perimeter wells at the Site have shown steady or increasing concentrations of COCs. This suggests that the passive pump-and-treat system may not be achieving complete capture of COCs in groundwater at the Site.

- Chromium levels in groundwater will not decrease with time. Some natural attenuation may occur overtime to reduce the chromium VI to chromium III over time; however, chromium VI currently makes up a large percentage (approximately 80%) of total chromium in the groundwater at hot spots (i.e., overburden well MW-8).

This option will be included in the detailed analysis of remedial alternatives.

3.2.2 Institutional Action

Restrictions may be placed on the property deed, building permits, zoning changes, etc. to limit groundwater use in the area and limit land use to specific types of growth (e.g., industrial and commercial). Restrictions would supplement no action or engineering controls that reduce or destroy COCs at the Site. The passive pump-and-treat system would continue to be operated.

Applicability: The qualitative risk assessment completed for this Site (refer to Section 1.8) concludes that the current concentration of COCs in groundwater, under the existing use of the Site and surrounding properties, poses no threat to off-site human health. For Site occupants, the risk assessment indicates there are no exposure pathways for chromium; however, inhalation of VOCs in proximity to the basement sump and sub-slab soil gas intrusion through the concrete floor were identified as potential exposure pathways. Indoor air sampling conducted in 1993 and 2004 indicated that concentrations of detected VOCs were below the OSHA PELs; however, the concentrations of TCE and PCE in the indoor air samples exceeded the NYSDOH action levels. Therefore, a sub-slab soil gas mitigation system is being installed for the main building floor, and air filtration units are being installed in the basement, in order to address these potential exposure pathways (refer to Section 3.3).

Institutional action on the property would further limit possibilities of exposure to contaminants.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- Based on the RI report, samples from the monitoring wells located at the perimeter of the Site have shown steady or increasing concentrations of COCs. This suggests that the passive pump-and-treat system may not be achieving complete capture of COCs in groundwater at the Site.
- Chromium levels in groundwater will not decrease with time. Some natural attenuation may occur over time to reduce the chromium VI to chromium III; however, chromium VI currently makes up a large percentage (approximately 80%) of total chromium in the groundwater at hot spots (i.e., overburden well MW-8).

This option will be included in the detailed analysis of remedial alternatives.

3.2.3 Vertical Treatment Barriers

Low permeability walls (e.g., iron barrier or anaerobic mechanisms in permeable membrane walls) are sometimes placed downgradient of the Site to remediate groundwater as it moves away from the source area.

Applicability: The qualitative risk assessment completed for this Site (refer to Section 1.8) concludes that the current concentration of COCs in groundwater, under the existing use of the Site and surrounding properties, poses no threat to off-site human health. For Site occupants, the risk assessment indicates there are no exposure pathways for chromium; however, inhalation of VOCs in proximity to the basement sump and sub-slab soil gas intrusion through the concrete floor were identified as potential exposure pathways. Indoor air sampling conducted in 1993 and 2004 indicated that concentrations of detected VOCs were below the OSHA PELs; however, the concentrations of TCE and PCE in the indoor air samples exceeded the NYSDOH action levels. Therefore, a sub-slab soil gas mitigation system is being installed for the main building floor, and air filtration units are being installed in the basement, in order to address these potential exposure pathways (refer to Section 3.3).

Vertical barriers would reduce or eliminate the migration of COCs above the bedrock.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- The organic COCs at the Site have specific gravities greater than that of water, which may result in contamination moving in a vertical direction lower than the vertical barrier can be constructed (i.e., into the bedrock). Such treatment walls are usually tied into the bedrock or confining layers.
- Any migration of COCs that could be occurring at the Site does not appear to be in a specific downgradient direction due to the hydraulic complexities of this Site. It would be difficult to identify a specific location for installation of a vertical barrier.

This option will not be included in the detailed analysis of remedial alternatives.

3.2.4 In-Situ Chemical Reduction

In-situ chemical reduction processes (e.g. denitrification, iron reduction, sulfate reduction, and methanogenesis) can be enhanced with the addition of chemical reagents (e.g., zero-valent iron, substrate release composition [SRC], etc.) that react with the COCs to reduce or degrade them to lower mobile and toxic states. Injection of chemicals to the saturated zone creates plumes of anaerobic (i.e., reducing) conditions resulting in the degradation mechanisms of denitrification, iron reduction, manganese reduction, sulfate reduction, and methanogenesis. Methanogenesis also results in reductive dehalogenation of chlorinated hydrocarbons (e.g., TCE and PCE), and immobilization of metals through reduction (i.e., reduction of chromium VI to chromium III).

Applicability: Chemical reduction results in reductive dehalogenation of chlorinated hydrocarbons (e.g., TCE and PCE) and immobilization of metals through reduction (i.e., reduction of chromium VI to chromium III).

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- Non-aqueous phase liquids are not actively addressed with this technology, as biodegration does not take place directly in the non-aqueous phase. Therefore, treatment of DNAPL would be indirect as it dissolves into the aqueous phase and is degraded, or require alternative collection/treatment activities.
- The total concentration of metals within the groundwater (i.e., chromium) would remain similar to the current concentration but in a less mobile and less toxic form.
- This reduction process would involve the following degradation sequence: PCE to TCE; TCE to DCE; DCE to VC; VC to ethylene. Vinyl chloride is more toxic than PCE and TCE, therefore contingency plans would be required to ensure the reduction process does not result in leaving behind unacceptable amounts of vinyl chloride concentrations.

This option will be included in the detailed analysis of remedial alternatives.

3.2.5 In-Situ Chemical Oxidation

In-situ chemical oxidation processes can be enhanced by addition of chemical reagents (e.g., injection of hydrogen peroxide [Fenton's Reagent] or potassium permanganate). These chemicals are injected into the groundwater/soil matrix and degrade the VOCs to breakdown products and inert compounds.

Applicability: Chemical oxidation is effective in remediating the chlorinated VOCs at the Site, but will not effectively remediate metals.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- This process may have off-gas emissions from the reactions that could affect tenants.
- The injection of hydrogen peroxide is an exothermic process, which would be a concern at an active facility with tenants, and in an area where underground utilities are located.
- Injecting permanganate or hydrogen peroxide into the saturated zone could oxidize the chromium III to the more mobile and toxic chromium VI form.

This option will be included in the detailed analysis of remedial alternatives.

3.2.6 Electrokinetics

Electrokinetics remediation of chromium and other metals is an alternative based on the principle that high voltage electricity, passed through contaminated soil in groundwater, will carry certain types of contaminants through the soil to a removal location.

Applicability: Electrokinetics may be useful in removing metals from the groundwater.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- This technology is not widely used at this time, and it is typically applied to hazardous waste sites that are not accessible to the public.
- This technology will increase explosive potential due to hydrogen gas generation, generate hazardous materials during chrome removal, and will require Site precautions to control hazardous materials during implementation.
- The technology will only remove chromium VI from the soil, leaving chromium III, the more stable and less toxic form, behind.
- The technology will not address chlorinated VOCs.

This option will not be included in the detailed analysis of remedial alternatives.

3.2.7 Dual Phase Vacuum Extraction

Vacuum extraction can be considered as a technology for groundwater treatment at the Site if dual-phase (i.e., liquid and vapor) extraction is set-up. Dual phase vacuum extraction involves the installation of a withdrawal well in the area of the COCs with the screen placed in the vadose and saturated zone. The groundwater is removed through the use of a groundwater extraction pump in the well and/or through high vacuum to also extract the vapor from the soil. The liquids and vapor phases are separated at the surface and treated.

Applicability: Vacuum extraction will remove VOCs in groundwater.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- Dual phase vacuum extraction is more suited for removal of VOCs from soil and groundwater, and is not applicable for inorganics (i.e., chromium) in the soil.
- It is possible that the application of a vacuum within the vadose zone could increase the oxygen content in the soil and result in the oxidation of chromium III to chromium VI, the more toxic and more mobile form of chromium.

This option will not be included in the detailed analysis of remedial alternatives.

3.2.8 Ex-Situ Groundwater Collection/Treatment

3.2.8.1 Collection

Collecting groundwater at the Site will prevent off-site migration of the COCs. Groundwater may be collected using withdrawal wells to collect water via pumping for subsequent treatment or using bioslurping to collect groundwater and NAPL. Trenches may also be used to assist in the collection of groundwater.

3.2.8.1.1 Extraction Wells

Extraction wells collect the groundwater for ex-situ treatment. Groundwater movement at the Site is currently influenced by the passive pump-and-treat system located in the basement of the building. The current system has resulted in some reduction of organic COCs; however, the current system does not appear to be capable of full capture of COCs in groundwater at the Site (e.g., COCs in bedrock). Thus, active pumping of groundwater with subsequent treatment for the COCs will probably be more effective than the passive pump-and-treat system. Due to the limited area affected by the COCs, placement of extraction wells at or near current monitoring wells (e.g., MW-8, MW-9, MW-10, MW-12, MW-17, and MW-21) should be effective in capturing source area COCs and preventing their off-site migration. [Note, a pump test would be required to determine actual pumping rates and zones of influence.]

Applicability: Extraction wells should prevent migration of COCs off-site in the overburden and bedrock.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- The number of extraction wells will depend on the radius of influence.
- Extraction and treatment of COCs in the groundwater at an active facility will require precautions to minimize potential exposures to tenants.

The use of extraction wells will be considered in the detailed analysis of remedial alternatives.

3.2.8.1.2 Bioslurping

Bioslurping may be used to extract groundwater for treatment. This process, extracts groundwater intermittently or very slowly to collect non-aqueous phase liquids (NAPL) with the groundwater. The slower process allows the NAPL time to dissolve into the groundwater for pumping.

Applicability: Bioslurping is effective for remediating NAPL in the groundwater.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- The area requiring treatment at this Site is broad for a bioslurping application, and potential DNAPL appears present in only one monitoring well (i.e., overburden well MW-9). DNAPL does not appear widespread or in large quantities at this Site.
- Effective capture of the dissolved contamination plume may not be achieved through bioslurping.
- The traditional pump-and-treat process will be quicker, thereby lowering long term Operation and Maintenance (O&M) costs associated with the process.

This option will not be included in the detailed analysis of remedial alternatives.

3.2.8.1.3 Collection Trenches

Subsurface collection trenches placed downgradient of the area of contamination may intercept the off-site migration of COCs. A trench would consist of perforated pipes protected by stone and a geotextile filter fabric.

Applicability: Collection trenches will prevent migration of COCs off-site in the overburden.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- The organic COCs at the Site have specific gravities greater than that of water, which may result in contamination moving in a vertical direction lower than the depth of the collection trench (i.e., migrating into the bedrock).
- Any migration of COCs at the Site that could be occurring does not appear to be in a specific downgradient direction, due to the hydraulic complexities of the Site; therefore, several broad collection trenches would probably be required to prevent migration of COCs off-site.
- Since the Site is fully developed and occupied by multiple commercial/industrial tenants, installation of a blasted bedrock trench would be difficult and may not even be feasible at this Site.

This option will not be included in the detailed analysis of remedial alternatives.

3.2.8.2 Ex-Situ Treatment Options

COCs can be treated ex-situ in a number of different ways. The screening of treatment technologies is summarized below.

3.2.8.2.1 Air Stripping Column

Stripping column processes are designed to remove VOCs from the extracted contaminated groundwater. A recommended process is to use a packed column with counter-current flow of air and groundwater to allow "stripping" of the VOCs from the groundwater.

Applicability: Air stripping is an effective and proven treatment for removing VOCs from the groundwater.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- The process will not decrease metal concentrations from the groundwater, and metal ions may cause fouling of the air stripper; therefore, pretreatment for metals would be recommended in-conjunction with air stripping.
- Vapor recovery equipment may be required for treatment of emissions from the column (i.e., vapor phase carbon).

This option will be considered for treatment of organic COCs in groundwater.

3.2.8.2.2 Carbon Adsorption

Carbon adsorption may be used to treat low-solubility, high molecular weight, non-polar branched compounds (e.g., solvents and pesticides) effectively in water at contaminant concentrations of less than 10,000 ppm. Carbon adsorption is already effectively being used at the Site as part of the passive pump-and-treat system that is being used to treat VOCs in groundwater that is captured in the basement sump.

Applicability: Carbon adsorption is an effective treatment of organic COCs found at the Site.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- Inorganics (e.g., chromium and other TAL metals) would require pre-treatment (i.e., inorganics removed to less than 10 ppm) for effective carbon adsorption treatment.
- Due to high levels of VOCs present in the groundwater, this process would follow a primary treatment technology such as air stripping.

This option will be considered for the treatment of organic COCs in groundwater.

3.2.8.2.3 Ultraviolet/Oxidation Treatment

Ultraviolet/Oxidation (UV/Oxidation) treatment is designed to destroy VOCs without release to the atmosphere. Groundwater must be pumped to the reactor to be exposed to UV radiation, ozone, and hydrogen peroxide in order to oxidize the organic compounds. Off-gas is passed through a catalytic ozone destruction unit that reduces ozone levels before venting. VOCs that are stripped off in the reactor are degraded to carbon dioxide, water and salts in the ozone destruction unit.

Applicability: UV/Oxidation treatment is effective in remediation of VOCs in groundwater.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- Groundwater with heavy metal ions must be pretreated before being sent through this system to reduce the potential for fouling of the UV quartz sleeves.
- High turbidity and high-suspended solid concentrations in the groundwater will cause interference and filtering may be required.
- This technology should primarily be considered if carbon adsorption does not adequately treat the groundwater and a destruction technology is required.
- UV/Oxidation systems have high operation and maintenance costs.
- Air stripping of VOCs should adequately treat the COCs with less operation and maintenance costs.

This option will not be considered for detailed analysis for treatment of organic COCs in groundwater.

3.2.8.2.4 Precipitation

Precipitation of the inorganic COCs from the groundwater can be accomplished through the addition of a chemical reducing agent (e.g., ferrous sulfate) to reduce chromium VI to chromium III, and then additional chemicals (e.g., polymer, sodium hydroxide, etc.) can be added to precipitate the chromium III out of solution. The levels of iron remaining in the solution (greater than Monroe County pretreatment discharge limits – refer to Section 2.2) would need to go through oxidation precipitation with a chemical oxidizer (e.g., lime), aeration and filtration.

Applicability: Precipitation is effective in removing metals from groundwater.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- Chemical precipitation will not effectively treat VOCs.

- Pre-design analysis of groundwater (i.e., treatability study) would be necessary to determine the best chemical addition system, optimal chemical dose and pH conditions, flocculation requirements, and sludge production, flocculation, settling, and dewatering characteristics (e.g., filter press).

This option will be considered for treatment of inorganic COCs in groundwater.

3.2.8.2.5 Ion Exchange

Ion exchange systems may be used in ex-situ groundwater treatment to remove metals in groundwater prior to treatment for VOC removal. Inorganic COCs may be removed from an aqueous solution by passing the solution through an anion exchange resin.

Applicability: Ion exchange is effective at removing chromium in groundwater.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- Cationic metals must be removed first through precipitation if this process is used, so that the hydroxides present will not precipitate on the anion exchange resin.
- Ion exchange can be a difficult process to control and, although cheaper for removal of chromium, requires precipitation of cationic ions (i.e., iron), which will increase the cost significantly for a process that has the same effect as precipitation for reducing levels of inorganic COCs from the groundwater.

This option will not be considered for treatment of inorganic COCs in the groundwater.

3.2.8.2.6 Disposal

Disposal of the contaminated water via hazardous waste disposal is an alternative.

Applicability: Off-site disposal of groundwater containing untreated COCs collected from the Site is effective.

Limitations: Factors that would limit the applicability and effectiveness of the process include:

- Costs for off-site disposal of groundwater containing the COCs at the Site would be cost prohibitive (i.e., approximately $2,300 per 5,000 gallon tanker truck).

This option will not be considered for treatment of COCs in the groundwater.

3.3 Remedial Technologies for Sub-Slab Soil Gas

Based on results from the March 2004 sub-slab soil gas and indoor air sampling (refer to Appendix D), the NYSDEC requested in a letter dated June 4, 2004 that the installation of a vapor mitigation system be evaluated and implemented at the Site as a separate Interim Remedial Measure (IRM). As such, an IRM report was developed that evaluated the remedial technologies available for vapor mitigation in the building at the Site. This report, entitled, "Interim Remedial Measures Design Plan, Indoor Vapor Intrusion System, Order-On-Consent: Index #B8-0400-92-03" and dated September 2004 was submitted to the NYSDEC. The NYSDEC approved the IRM Design Plan in a letter dated September 16, 2004. This system consists of sub-slab soil gas mitigation for the main floor slab of the building, and air filtration units for the basement of the building. [Note, sub-slab mitigation was not feasible in the basement due to high groundwater conditions.] As described in the IRM Design Plan, COCs in sub-slab soil gas for the main floor of the building have been addressed with a permanent sub-slab soil gas mitigation system; however, the air filters for the basement are considered a temporary remedy by the NYSDEC. Additional measures for the basement have been included in Section 4.2 as part of the detailed evaluation of groundwater alternatives.

3.4 Summary of Technology Selection

Following is a summary of the remedial technologies selected for development and detailed evaluation for soils and groundwater.

Soil Alternatives

Below is the list of the soil alternatives to remediate COCs in soil at the Site:

- No Action
- Institutional Action
- Extensive Soil Excavation
- Source Area Soil Excavation
- Source Area and Exterior Soil Excavation
- In-Situ Soil Stabilization/Solidification

The extensive soil excavation would generally excavate soils contaminated with total chromium levels exceeding the proposed TAGM 4046 (1995) value of 50 ppm, which equates to an area approximately 20,000-square foot in size (Figure FS-6). The source area soil excavation would excavate soils to the extent feasible containing total chromium levels exceeding 500 ppm (the area that contains total chromium exceeding 500 ppm is approximately 2,800-square foot in size, refer to Figure FS-7). The source area and exterior soil excavation would excavate the source area to the extent feasible (i.e., soils containing total chromium concentrations greater than 500 ppm) and exterior soils with chromium concentrations greater than 50 ppm (i.e., approximately 2,500-square feet). This equates to an approximate 5,300 total square-foot area (refer to Figure FS-8) that would be excavated to the extent feasible. The soil stabilization/solidification alternative would stabilize/solidify soils contaminated with hexavalent chromium (chromium VI) that exceed the proposed TAGM value of 50 ppm (approximately 7,000 square foot area refer to Figure FS-9) to the extent feasible. In addition, options for remediation of the TAL metals above the NYSDEC guidance values (i.e., TB-27 [1.5'-3.0'] and TB-30 [0'-4.0']) will be discussed within the options for chromium.

Groundwater Alternatives

Below is a list of the groundwater alternatives to remediate COCs in groundwater at the Site:

- No Action
- Institutional Action
- In-Situ Chemical Reduction (SRC)
- In-Situ Chemical Oxidation (potassium permanganate)
- Site-Wide Ex-Situ Pump-and-Treat
- COC (VOCs & Chromium) Source Area Pump-and-Treat
- Chromium Source Area Pump-and-Treat with In-Situ Chemical Reduction

The COCs in groundwater will be remediated to different extents based on the alternative. A discussion of which COCs (i.e., VOCs, chromium, or TAL metals) that will or will not be treated, and the areal/vertical extent of treatment, are included with each alternative. Prior to implementation of the selected groundwater treatment option a treatability study will be completed. Also, in the event of implementing ex-situ groundwater treatment, a pump test will be completed to determine collection volumes and the number of extraction wells required for capture. For the ex-situ treatment options, cost estimating will assume on-site pretreatment of groundwater using precipitation of the inorganic COCs, and an air-stripping column with a carbon adsorption unit to polish the groundwater to required limits. Treated groundwater will be discharged to the Monroe County POTW. The in-situ chemical reduction treatment option cost estimate is based on using substrate release composition (SRC) as the treatment chemical, and the in-situ chemical oxidation treatment option cost estimate is based on potassium-permanganate as the treatment chemical. [Note, the actual in-situ and ex-situ treatment options will be based on treatibility studies, detailed design evaluation, etc.]

4.0 DEVELOPMENT AND DETAILED EVALUATION OF ALTERNATIVES

The remedial alternatives described in this section are the site-specific remedial technologies and applicable process options that will achieve the remediation goals for the Site. The remedial alternative development process is based on the following criteria:

Compliance with SCGs: This evaluation criterion determines how each alternative complies with SCGs and ARARs, discussed and identified in Section 2.2. The actual determination of which requirements are applicable or relevant and appropriate is made by the NYSDEC in consultation with the NYSDOH. If an SCG or ARAR is not met, the basis for a waiver is discussed. If an alternative does not meet the SCGs or ARARs, and a waiver is not approved by the NYSDOH and NYSDEC, the alternative is not considered further.

Overall Protection of Human Health and the Environment: This criterion serves as a check to assess whether an alternative is protective of human health and the environment. The overall assessment of protection is based on a composite of factors assessed under other evaluation criteria; especially long-term effectiveness and performance, short-term effectiveness, and compliance with SCGs. This evaluation focuses on how a specific alternative achieves protection over time and how site risks are reduced. The analysis includes how each source of contamination is to be eliminated, reduced or controlled for each alternative.

Short-Term Impacts and Effectiveness: This evaluation criterion assesses the effects of the alternative during the construction and implementation phase and the effectiveness of the remedy in the short-term. Alternatives are evaluated with respect to their effects on human health and the environment. The aspects evaluated include: protection of the community during remedial actions, environmental impacts as a result of remedial actions, time until the remedial response objectives are achieved, and protection of workers during the remedial action.

Long-Term Effectiveness and Permanence: This evaluation criterion addresses the results of a remedial action in terms of its permanence and the quantity/nature of waste or residual remaining at the Site after response objectives have been met. The primary focus of this evaluation is the extent and effectiveness of the controls that may be required to manage the waste or residual remaining at the Site and the operating system necessary for the remedy to remain effective. The factors evaluated include the permanence of the remedial alternative, magnitude of the remaining risk, adequacy of controls used to manage residual waste, and the reliability of controls used to manage residual waste.

Reduction of Toxicity, Mobility and Volume: This evaluation criterion assesses the remedial alternative's use of the technologies that permanently and significantly reduce toxicity, mobility, or volume of the hazardous wastes as their principal element. The NYSDEC's policy is to give preference to alternatives that eliminate any significant threats at a Site through destruction of toxic contaminants, reduction of the total mass of toxic contaminants, irreversible reduction in the contaminant's mobility, or reduction of the total volume of contaminated media. This evaluation includes: the amount of the hazardous materials to be destroyed or treated, the degree of expected reduction in toxicity, mobility or volume measured as a percentage, the degree in which the treatment is irreversible, and the type and quantity of treatment residuals that remain following treatment.

Implementability: This criterion addresses the technical and administrative feasibility of implementing an alternative, and the availability of various services and materials required during its implementation. The evaluation includes: feasibility of construction and operation; the reliability of the technology; the ease of undertaking additional remedial action; monitoring considerations; activities needed to coordinate with other offices or agencies; availability of adequate off-site treatment, storage, and disposal services; availability of equipment; and the availability of services and materials.

Cost: Cost estimates for each alternative include: capital costs, operation and maintenance costs, and future capital costs. This evaluation includes a present worth cost analysis, which is based on the following factors: the effective life of the remediation, the capital costs, and the O&M costs. Using a 5% discount rate over the life of the project, the cost comparison is completed for projects with different life cycles. The present worth cost is the equivalent amount of year 2003 money that would be required to fully fund the project.

Community Acceptance: After completion of the FS, a Proposed Remedial Action Plan (PRAP) is prepared that presents the prepared remedial alternative for the Site, and this PRAP is released to the public for comment. A "Responsiveness Summary" will be prepared that presents the public comments received and how the NYSDEC will address the concerns raised. If the final remedy selected differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

4.1 Alternatives for Soil

This section presents the detailed evaluation of the alternatives to address COCs in the soil that passed the initial screening process described in Section 3.1, so that one of the alternatives may be selected as the most appropriate and cost effective remedy for the soils at the Site. The approximate time to complete each alternative following the record of decision (ROD) is included. Table 1 included in Appendix C presents a cost summary for each alternative included in the detailed evaluation. A detailed breakdown of costs for soil alternatives is found in Tables 2 - 6 also included in Appendix C.

4.1.1 No Action: Involves no activities, short-term or long-term, at the Site.

Total Present Worth Cost	$ 0
Capital/Initial Cost	$ 0
O&M/Annual Present Cost	$ 0
Closeout Present Cost	$ 0

Compliance with SCGs: This alternative does not result in compliance with chemical-specific SCGs. Action-specific ARARs and SCGs do not apply. Location-specific SCGs are met for the Site.

Protection of Human Health and the Environment: The Site characteristics are not modified through implementation of this alternative. However, current capping of the Site mitigates human exposure to contaminated soils. If the future use of the Site was unrestricted, and if future activity at the Site (i.e., construction, etc.) compromised the integrity of this cap, human exposure could then occur.

Short-Term Impacts and Effectiveness: Since there is no remediation technology being implemented, there are no significant short-term risks to the community or environment that must be addressed by this alternative. However, if future activities compromise the integrity of the cap at the Site, human exposure to contaminated soils could occur.

Long-Term Effectiveness: There is no remediation technology being implemented, therefore, the risk at the Site remains the same. However, the concentrations of COCs in the soil will remain at the Site and future exposures are possible if the use of the Site changes or the Site is modified (i.e., if future activities, such as construction at the Site, compromise the integrity of the cap, etc.).

Reduction in Toxicity, Mobility, or Volume: With the exception of the natural attenuation processes, there is no change in the waste characteristics of the soil obtained by implementing this alternative.

Implementability: This alternative is easy to implement. This alternative makes no modifications to existing conditions at the Site.

Cost: This alternative is the lowest cost alternative evaluated for soil with a total present worth of $0.00

4.1.2 Institutional Action: This remedial alternative involves use/access restrictions (i.e., environmental easements) for the Site. The environmental easements will include the Site owner recording an instrument with the Monroe County Clerk to run with the land (environmental easements) that:

a) Shall prohibit the Site from ever being used for purposes other than for the current use (i.e., commercial/industrial) without the express written waiver of such prohibition by the NYSDEC. [Note, the environmental easements will allow tenant spaces to change use and allow new tenants without obtaining a waiver provided changes to the tenants space do not include ground intrusive work.]
b) Shall require the current owner and future owners to properly maintain the protective layer materials (i.e., asphalt, flooring, etc.). If development or excavation occurs on-site, any subsurface soils below the protective layer that are excavated will have to be disposed of off-site at an approved and permitted landfill in accordance with all applicable regulations. A plan (e.g., a SMP) must be submitted and NYSDEC approval must be given before any work proceeds.
c) Shall require the current owner and future owners to annually certify to the NYSDEC that the remedy and protective cover have been maintained, that all environmental easements are in place, and that the conditions at the Site are fully protective of public health and the environment in accordance with the proposed plan (i.e., as identified in the Record of Decision).

Current capping at the Site (i.e. asphalt, flooring etc.) will be maintained. In addition, the recommendation of the risk assessment to develop and implement a SMP will be initiated. The SMP will provide procedures for handling, characterizing, transporting, and disposing of soil in the event that ground intrusive work is performed at the Site (i.e., utility repairs, construction, etc.) [Note, the cost estimate does not include implementation of the SMP (i.e., the cost for potential future ground intrusive work, analytical testing, soil disposal, etc.).] A detailed cost summary for soil institutional action is included in Table 2 in Appendix C.

Total Present Worth Cost	$ 73,340
Capital/Initial Cost	$ 18,000
O&M/Annual Present Cost	$ 55,340
Closeout Present Cost	$ 0
Estimated Time to Completion After ROD	approx. 1 year

Compliance with SCGs: This alternative does not result in compliance with chemical-specific SCGs. Action-specific ARARs and SCGs do no apply. Location-specific SCGs are met for the Site.

Protection of Human Health and the Environment: The Site's characteristics are not modified through implementation of this alternative. Current capping of the Site mitigates exposure to contaminated soils. Compared to the no action alternative, additional protection is achieved through use/access restrictions and implementation of a SMP at the Site.

Short-Term Impacts and Effectiveness: Since there is no remediation being implemented, there are no significant short-term risks to the community or environment that must be addressed by this alternative. Also, there is no exposure of the contaminated media to Site workers or the community. [Note, in the event future construction activity occurs, the SMP will be implemented and it is expected that the short-term impacts will be addressed in this plan.]

Long-Term Effectiveness: There is no remediation technology being implemented, therefore, the COC concentrations in soil remain the same. However, maintaining the Site cap should reduce potential migration of COCs in soil, and environmental easements/development of a SMP should reduce potential future exposure risks compared to no action.

Reduction in Toxicity, Mobility, or Volume: With the exception of the natural attenuation processes, there is no change in the waste characteristics of the soil at the Site resulting from implementation of this alternative. However, maintaining the Site cap should serve to reduce migration of COCs in the soil.

Implementability: The alternative is easily implemented. This alternative makes no modifications to existing conditions with the exception of maintaining the current cap (i.e., asphalting) at the Site.

Cost: This alternative has a total present worth of $73,340.

4.1.3 Extensive Soil Excavation: This alternative involves removal of soil from the Site that contains chromium concentrations exceeding the TAGM 4046 level of 50 ppm (refer to Figure FS-6). This area termed the "extensive excavation area" is approximately 20,000 square feet, and includes excavating chromium-contaminated soils located outside of the building. [Note, this alternative also includes removal of TAL metals that exceed NYSDEC guidance values (i.e., TB-27A [1.5'-3.0'] and TB-30 [0-4']).] Removing soil from the extensive soil excavation area to an estimated depth of 12 feet equates to approximately 9,000 cubic yards or about 18,000 tons of material requiring off-site disposal. For the purpose of this evaluation, it is anticipated that the excavated soil will require disposal as a hazardous waste. The extensive excavation will require relocation of tenants, relocation of the boiler room equipment and other Site utilities (public and private), and removal and rebuilding of floors, walls, and ceilings etc. X-Ray Fluorescence (XRF) equipment may be used during excavation work to assist in determining the extent of removal. However, confirmatory samples will be analyzed before backfilling and restoration work in order to verify that the removal was successful. The extensive soil excavation is estimated to require four years to complete. This timeframe is based on the need to relocate tenants, the difficulties of removing soil from beneath an existing building, and the time required to rebuild. The cost estimate includes the loss of income during the implementation of this alternative. Refer to Table 3 for a detailed cost summary for the extensive soil excavation.

Total Present Worth Cost	$ 15,798,860
Capital/Initial Cost	$ 12,114,380
O&M/Annual Present Cost	$ 2,127,600
Closeout Present Cost	$ 1,556,880
Estimated Time to Completion After ROD	approx. 4 years

Compliance with SCGs: This alternative will meet chemical specific SCGs for soil at the Site. Action-specific ARARs and SCGs for transport and disposal of the soils, monitoring of the work, and OSHA health and safety requirements will have to be met (e.g., implementation of a HASP). Location-specific SCGS are met for the soil at the Site.

Protection of Human Health and the Environment: This alternative provides removal of soil containing chromium (and selected TAL metals) exceeding TAGM 4046 recommended soil cleanup objectives at the Site, and thus, provides a much higher level of long-term protection than the no action alternative. The potential risks/impacts in relation to the soil will be completely removed by implementation of this alternative.

Short-Term Impacts and Effectiveness: Short-term risks are primarily associated with dust and volatile emissions resulting from excavation of contaminated soils, and safety factors related to extensive building shoring and/or demolition. The risks can be controlled with a HASP; however, there will be a significant impact on the building and the operations of the tenants during the remedial process (i.e., tenant relocation, building demolition and reconstruction, etc.). The estimated time to complete the extensive soil excavation is four years; therefore, this alternative will not be effective in the short-term.

Long-Term Effectiveness: This alternative employs excavation of chromium (and some associated TAL metals) in the soil. Excavation followed by off-site land disposal will result in soils at the Site that contain levels below NYSDEC TAGM 4046 recommended soil cleanup objectives. The removal of the contaminated soil is permanent and therefore, potential for future exposures will be removed.

Reduction in Toxicity, Mobility, or Volume: After the extensive excavation is completed, it is anticipated that the remaining soil will be below chemical specific SCGs for chromium (and select TAL metals).

Implementability: Excavation of soils under the building will be difficult due to structural considerations and safety requirements. Delays are possible due to location of utilities under the Site (i.e., high-pressure gas main, electric, water, sewer, etc.) and the impact on tenants in the building.

Cost: The present worth for this alternative is $15,798,860.

4.1.4 Source Area Soil Excavation: This alternative involves the limited removal of soil from the source area and includes institutional actions (i.e., environmental easements/SMP; refer to Section 4.1.2) for the soil left in-place. The goal of the source area soil excavation alternative is to remove soil with chromium concentrations above 500 ppm to the extent feasible. The approximate areal extent of chromium concentrations above 500 ppm is shown on Figure FS-7. This area consists of approximately 2,800 square feet. [Note, soil concentrations exceeding NYSDEC guidance values that are left in-place will be managed by the Institutional Actions. In addition, this alternative includes management of the TAL metals that exceed NYSDEC guidance values (i.e., TB-27A [1.5'-3.0'] and TB-30 [0-4']) through the implementation of the SMP.] The depth of the source area excavation will range between 6 feet and 10 feet below the floor surface (refer to Section 1.6.1).

For the purpose of this evaluation, it appears feasible to remove and dispose approximately 1,350 tons of soil. The estimated areal extent of the feasible source area removal is shown on Figure FS-7A. As shown, this area does not include the hallway (with the exception of the portion of the hallway that is shown on Figure FS-7A) or the boiler room. Soil removal in the hallway and boiler boom does not appear feasible since excavation in the boiler room would require removal and relocation of the boiler room equipment, and excavation in the hallway would effectively shut down the building. XRF equipment may be used during excavation work to assist in determining the extent of removal. However, confirmatory samples will be analyzed before backfilling and restoration work in order to verify that the removal was successful. This evaluation assumes that excavated soils will require off-site disposal as hazardous waste.

This alternative assumes that excavations will be completed as a tenant vacates a targeted area. (Note, the ability to wait until a tenant vacates a targeted area makes this option more feasible.) Source area excavation involves removal and rebuilding of floors, walls, and ceilings. A detailed cost summary is included in Table 4. [Note, the cost summary assumes that the excavations will occur as tenants vacate the targeted areas and is based on only excavating the areas shown on Figure FS-7A. It is anticipated that all excavations will be completed about five years after completion of the ROD (i.e., about mid 2010).]

Total Present Worth Cost	$ 1,216,670
Capital/Initial Cost	$ 725,080
O&M/Annual Present Cost	$ 149,360
Closeout Present Cost	$ 342,230
Estimated Time to Completion After ROD	approx. 5 years

Compliance with SCGs: This alternative will meet the chemical-specific SCGs for soil in the source area excavation, however, there will be areas where COCs remain in the soil at the Site that do not meet chemical-specific SCGs. Action-specific ARARs and SCGs for transport and disposal of the soils, monitoring of the work, and OSHA health and safety requirements will have to be met (e.g., implementation of a HASP). Location-specific SCGs are met at the Site.

Protection of Human Health and the Environment: The source area excavation will remove chromium concentrations in the soil greater than 500 ppm to the extent feasible, and the soil left in-place will be managed by environmental easements and a SMP (including TAL metals). In comparison to the no action alternative, this alternative will provide additional protection of human health and the environment.

Short-Term Impacts and Effectiveness: Short-term risks are primarily associated with dust and volatile emissions resulting from excavation of contaminated soils. These risks can be controlled with a HASP; however, the operations of tenants in the building during the remedial process will be impacted (i.e., tenant relocation). It is anticipated that the source area soil excavation will be completed by about December 31, 2009 (i.e., in order to accommodate the relocation of the tenants currently occupying the area where source removal will be required); therefore, this remedial alternative will not be effective in the short-term.

Long-Term Effectiveness: The source area soil excavation will permanently remove chromium in soil at concentrations greater than 500 ppm to the extent feasible. Some COCs will remain in the soil at levels exceeding chemical-specific SCGs including chromium and TAL metals. These COCs will be managed by Institutional Actions and implementation of the SMP which should reduce the potential for future exposures.

Reduction in Toxicity, Mobility, or Volume: The source area of chromium will be removed through excavation and off-site disposal. The removal of this soil eliminates the presence of the chromium in the removal area and significantly reduces the amount of COCs in soil at the Site. However, there will be other areas at the Site where COCs remain and the chemical-specific SCGs are not met.

Implementability: Limited excavation of soils under the building will be difficult due to structural considerations and safety requirements for tenants remaining in the building. As described above, it does not appear feasible to excavate the hallway (except as shown) or the boiler room. Also, delays are possible due to potential utilities under the site and the impact on tenants in the building.

Cost: The present worth of the source area soil excavation is $ 1,216,670.

4.1.5 Source Area and Exterior Soil Excavation: This alternative involves the limited removal of soil from the source area, and soil on the exterior of the building. Institutional actions (i.e., environmental easements/SMP; refer to Section 4.1.2) would also be implemented for the soil left in-place. The goal of this alternative is to remove soil from the source area with chromium concentrations above 500 ppm and soil on the exterior of the building that exceeds chromium concentrations of 50 ppm (i.e., soil north of the building), to the extent feasible. The area of chromium concentrations in soil above 500 ppm is approximately 2,800 square feet, and the exterior soil with chromium concentrations above 50 ppm is approximately 2,500 square feet (refer to Figure FS-8). This soil removal option also includes removal of TAL metals detected in TB-30 (0-4'); however, TAL metals detected in TB-27A (1.5'-3.0') will be left in-place. Environmental easements and a SMP will be implemented to manage COCs that are left in-place at levels that exceed NYSDEC guidance values (refer to Institutional Action). The depth of the source area excavation will range between six feet and 10 feet below the floor surface (refer to Section 1.6.1). [Note, the source area excavation for this alternative is the same area as that described in Section 4.1.4.] The depth of the exterior soil excavation will be approximately 12 feet (i.e., the two soil samples collected on the exterior of the building that exceeded 50 ppm of chromium were collected between eight and 12 feet in depth).

For the purpose of this evaluation, it appears feasible to remove and dispose approximately 3,550 tons of soil from these areas. The feasible areas of soil removal for this alternative are shown on Figure FS-8. As shown, this area does not include the hallway (with the exception of the portion of the hallway that is shown on Figure FS-8) or the boiler room. Soil removal in the hallway and boiler boom does not appear feasible since excavation in the boiler room would require removal and relocation of the boiler room equipment, and excavation in the hallway would effectively shut down the building. XRF equipment may be used during excavation work to assist in determining the extent of removal. However, confirmatory samples will be analyzed before backfilling and restoration work in order to verify that the removal was successful. This evaluation assumes that excavated soil will require off-site disposal as hazardous waste.

The source area excavation will require relocation of tenants in the excavation area, and removal and rebuilding of floors, walls, and ceilings. The exterior soil excavation will require shoring of the exterior wall of the building and working around underground gas and electric utilities that are located in the exterior excavation area. These utilities may have to be turned off and/or monitored by utility companies during excavation work (i.e., turning off these utilities would essentially shut down tenant operations in the building). A detailed cost summary is included in Table 5. [Note, it is currently anticipated that this alternative could be completed by about five years after completion of the ROD (i.e., about mid 2010) to accommodate the relocation of the tenants currently occupying the area where source removal will be required.]

Total Present Worth Cost	$ 2,038,480
Capital/Initial Cost	$ 1,545,010
O&M/Annual Present Cost	$ 149,360
Closeout Present Cost	$ 344,110
Estimated Time to Completion After ROD	approx. 5 years

Compliance with SCGs: This alternative will meet the chemical-specific SCGs for soil in the excavation areas, however, there will be some soil left in-place at the Site that does not meet chemical-specific SCGs. Action-specific ARARs and SCGs for transport and disposal of the soils, monitoring of the work, and OSHA health and safety requirements will have to be met (e.g., implementation of a HASP). Location-specific SCGs are met at the Site.

Protection of Human Health and the Environment: These excavations will remove chromium concentrations in the soil greater than 500 ppm from the source area and exterior soil chromium concentrations that exceed 50 ppm to the extent feasible. TAL metals that exceed NYSDEC guidance values that were detected in TB-30 (0-4') will also be removed. Soils that are left in-place that exceed NYSDEC guidance values will be managed by environmental easements and a SMP. In comparison to the no action alternative, this alternative will provide additional protection of human health and the environment.

Short-Term Impacts and Effectiveness: Short-term risks are primarily associated with dust and volatile emissions resulting from excavation of soils containing COCs. Also, there are risks associated with working around gas and electric utilities. These risks can be controlled with a HASP and proper engineering/planning; however, the operations of tenants in the building during the remedial process will be impacted (i.e., tenant relocation and potentially shut-down of the building during excavation around the gas and electric utilities). It is anticipated that the source area and exterior soil excavation will be completed by about December 31, 2009; therefore, this remedial alternative will not be effective in the short-term.

Long-Term Effectiveness: This alternative involves excavation and off-site disposal of approximately 3,550 tons of contaminated soil. Soils at levels exceeding chemical-specific SCGs that are left in-place at the Site will be managed by institutional actions and implementation of a SMP that should reduce the potential for future exposures.

Reduction in Toxicity, Mobility, or Volume: Up to 3,550 tons of soil will be removed through excavation and off-site disposal. The removal of this soil eliminates the presence of the chromium in the removal areas; however, there will be other areas containing soil at the Site that do not meet chemical-specific SCGs, which will be managed by the Institutional Actions and implementation of a SMP.

Implementability: Excavation of soils under the building and adjacent to the exterior wall will be difficult due to structural considerations and safety requirements for workers and tenants remaining in the building. Also, utilities in the exterior soil excavation area will increase cost and time required to remove soils up to 12 feet in depth.

Cost: The present worth of the source area and exterior soil excavation is $ 2,038,480.

4.1.6 In-Situ Soil Stabilization/Solidification: This alternative involves the in-situ stabilization/solidification of metals, and specifically the reduction of chromium VI to chromium III (which is the less toxic and less mobile form of chromium). Environmental easements and a SMP will also be implemented (refer to institutional action option) for soil left in-place that exceeds SCGs. The goal of of this alternative is to treat hexavalent chromium concentrations in soil above 50 ppm to the extent feasible. The areal extent of hexavalent chromium concentrations in soil above 50 ppm is approximately 7,000 square feet (refer to Figure FS-9). Assuming depths up to 12 feet, an estimated total of 3,200 cubic yards of soil will require stabilization/solidification. [Note, the in-situ stabilization area includes the TAL metals detected in TB-30 (0-4').] Soil stabilization/solidification will require a treatability study to determine exact treatment methods to be used; however, for the purposes of this evaluation, it will be assumed that this treatment method will involve pressure injecting ferrous sulfate (i.e., to reduce or 'stabilize' the chromium) through borings positioned on five to ten foot centers. Subsequently, admixtures would also be injected to solidify the reduced soil in order to return the structural integrity of the subsurface to support the building. [Note, the need for solidification will be determined during the treatability study/design phase; however, for this evaluation solidification is included.] Due to the additional volume of reagents and admixtures being injected into the subsurface, it is anticipated that up to 20 percent of the total treatment volume would be 'refused' (i.e., treated soil with reagents and admixtures). This refused treated soil would require disposal (anticipated to be non-hazardous). This alternative will require tenant relocation in the areas to be treated. Flooring, walls, and ceilings will be worked around or removed as needed. Confirmatory samples will be collected from the treated 'refused' soil. Refer to Table 6 for a detailed summary of costs for soil stabilization/solidification.

Total Present Worth Cost	$ 1,617,400
Capital/Initial Cost	$ 1,210,500
O&M/Annual Present Cost	$ 278,470
Closeout Present Cost	$ 128,430
Estimated Time to Completion After ROD	approx. 2 years

Compliance with SCG: This alternative will not meet the chemical specific SCGs for COCs at the Site; however, the COCs in the treatment area should be immobilized and, specifically, chromium will be reduced to a less toxic form. Action-specific ARARs and SCGs will be met at the Site. Location-specific ARARs and SCGS are met at the Site.

Protection of Human Health and the Environment: Although total concentrations of COCs in soil remain the same, this alternative provides reduction of chromium (i.e., chromium VI is reduced to chromium III, the less toxic and less mobile form of chromium) in the treatment area beneath the building. This alternative results in the reduction of the mobility and toxicity of residual levels of chromium in the soil at the Site. Thus, in comparison to the no action alternative, this alternative reduces the potential for human exposure to chromium VI.

Short-Term Impacts and Effectiveness: Some short-term risks are associated with pressure injection in the area where soil will be treated (e.g., contact with treatment chemicals, contact with soils, etc.). The risks can be controlled with a HASP; however, the operations of tenants in the building during the remedial process will be impacted (e.g., relocation of tenants). The in-situ soil stabilization/solidification alternative is anticipated to require approximately two years to achieve remedial objectives; therefore, this alternative will be more effective in the short-term than the excavation alternatives.

Long-Term Effectiveness: This alternative employs chemical reduction technology to stabilize and solidify COCs in the soil in the treatment area. Although the COCs will be less mobile and chromium will be in a less toxic form, the chromium and TAL metals will remain in the soil at levels exceeding chemical-specific SCGs. In addition, it is possible that the chemical reduction of the chromium in the soil may be reversible under certain circumstances (e.g., oxidation). Potential future exposures could be realized in areas not within the treatment area; however, institutional controls will be implemented as part of this alternative.

Reduction in Toxicity, Mobility, or Volume: COCs in the soil at the Site should be immobilized through stabilization, and chromium will be reduced to a less toxic form. However, the chemical reduction of the chromium in the soil may be reversible under certain circumstances (e.g., oxidation).

Implementability: In-situ stabilization/solidification depends on the ability to inject into the soil under the Site. It is anticipated that the injection process will significantly impact tenants in the treatment area. Also, delays are possible due to the location of utilities under the Site and the impact on tenants in the building. [Note, presence of utilities may limit areas of injection to avoid damage to lines, etc.]

Cost: The estimated present worth of this alternative is $1,617,400.

4.2 Alternatives for Groundwater

The alternatives developed for groundwater are evaluated in detail in this section so that one alternative may be selected as the most appropriate and cost-effective remedy for the groundwater containing COCs at the Site. The approximate time to complete each alternative following the ROD is also included in this evaluation. Table 1 included in Appendix C presents a cost summary for each alternative included in the detailed evaluation. A detailed breakdown of costs for each groundwater alternative is provided in Tables 7 – 13 included in Appendix C.

4.2.1 No Action: This alternative involves no additional activities, short-term or long-term, at the Site; however, this evaluation assumes that the passive pump-and-treat system currently operated will continue to operate. Table 7 shows a detailed cost summary for this alternative.

Total Present Worth Cost	$ 160,180
Capital/Initial Cost	$ 0
O&M/Annual Present Cost	$ 160,180
Closeout Present Cost	$ 0
Estimated Time to Completion After ROD	approx. 30 years

Compliance with SCGs: This alternative does not result in complete compliance with chemical-specific SCGs since some COCs not captured by the passive pump-and-treat system could migrate from the Site. It is anticipated that action-specific ARARs and SCGs will continue to be met for the discharge of groundwater from the existing basement foundation drain and sump system. Location-specific SCGs are met for the Site.

Protection of Human Health and the Environment: Implementation of this alternative does not change the present characteristics of the Site. The qualitative risk assessment completed for this Site (refer to Section 1.8) concludes that the current concentration of COCs in groundwater, under the existing use of the Site and surrounding properties, poses no threat to off-site human health. For Site occupants, the risk assessment indicates there are no exposure pathways for chromium; however, inhalation of VOCs in proximity to the basement sump and sub-slab soil gas intrusion through the concrete floor were identified as potential exposure pathways. Indoor air sampling conducted in 1993 and 2004 indicated that concentrations of detected VOCs were below the OSHA PELs; however, the concentrations of TCE and PCE in the indoor air samples exceeded the NYSDOH action levels. Therefore, a sub-slab soil gas mitigation system is being installed for the main building floor, and air filtration units are being installed in the basement, in order to address these potential exposure pathways (refer to Section 3.3).

Short-Term Impacts and Effectiveness: There are no significant short-term risks that must be addressed by this alternative, and there should not be any impacts to human health. However, this alternative is not effective in the short-term.

Long-Term Effectiveness: The passive pump-and-treat system should continue to reduce concentrations of COCs over time, but may not prevent some COCs from migrating off-site. Therefore, the potential exists for future exposures and off-site impacts.

Reduction in Toxicity, Mobility, or Volume: The passive pump-and-treat system should continue to reduce concentrations of COCs in the groundwater over time; however, the passive pump-and-treat system does not appear to be achieving complete capture of COCs at the Site.

Implementability: This alternative makes no modifications to existing conditions at the Site. Also, on-going operation and maintenance of the current system would continue. As such, this alternative can be readily implemented.

Cost: This alternative is the lowest cost alternative evaluated for groundwater with a total present worth of $160,180.

4.2.2 Institutional Action: This alternative involves use/access restrictions (i.e., environmental easements) and continued operation of the passive pump-and-treat system. The environmental easements will include the Site owner recording an instrument with the Monroe County Clerk to run with the land (environmental easements) that:

a) Shall prohibit the Site from ever being used for purposes other than for the current use (i.e., commercial/industrial) without the express written waiver of such prohibition by the NYSDEC. [Note, the environmental easements will allow tenant spaces to change use and allow new tenants without obtaining a waiver provided changes to the tenant space do not include ground intrusive work.]
b) Shall prohibit the use of the groundwater underlying the Site without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains permission to do so from the NYSDEC.
c) Shall require the current owner and future owners to properly maintain the protective layer materials (i.e., asphalt, flooring, etc.).
d) Shall require the current owner and future owners to annually certify to the NYSDEC that the remedy and protective cover have been maintained, that all environmental easements are in place, and that the conditions at the Site are fully protective of public health and the environment in accordance with the proposed plan (Record of Decision).

Current capping at the Site (i.e. asphalt, flooring etc.) will be maintained. [Note, the cost for maintaining the capping is included as part of the soil alternative.] Table 8 shows a detailed breakdown of costs for this alternative.

Total Present Worth Cost	$ 166,180
Capital/Initial Cost	$ 6,000
O&M/Annual Present Cost	$ 160,180
Closeout Present Cost	$ 0
Estimated Time to Completion After ROD	approx. 30 years

Compliance with SCGs: This alternative does not result in compliance with chemical-specific SCGs. It is anticipated that action-specific ARARs and SCGs will continue to be met for the discharge of groundwater from the existing basement foundation drain and sump system. Location-specific SCGs are met for the Site.

Protection of Human Health and the Environment: Implementation of this alternative does not change the Site's characteristics.

Short-Term Impacts and Effectiveness: Based on the current use of the Site, there are no significant short-term risks to the community or tenants that must be addressed by this alternative. However, this alternative is not effective in the short-term for remediation of the Site.

Long-Term Effectiveness: The passive pump-and-treat system should continue to reduce concentrations of COCs over time, but may not prevent migration of COCs off-site. Therefore, the potential exists for future exposures and off-site impacts.

Reduction in Toxicity, Mobility, or Volume: The passive pump-and-treat system should continue to reduce concentrations of COCs over time and has shown a limited capture zone; however, the passive pump-and-treat system does not appear to be achieving complete capture of COCs at the Site.

Implementability: The alternative is easily implemented; however, this alternative makes no modifications to existing conditions at the Site.

Cost: The present worth of this alternative is $ 166,180.

4.2.3 In-Situ Groundwater Chemical Reduction: This alternative involves the treatment of groundwater through chemical reduction to degrade and stabilize the COCs. The treatment process involves installation of a grid of injection points (i.e., groundwater wells) throughout the area for use in applying treatment chemicals (e.g., zero-valent iron or SRC). Due to the existence of off-site contaminants identified in the RI that may be migrating onto the Site (e.g., petroleum in soil samples at TB-20, and SVOCs such as chloropyridines in a groundwater sample collected from MW-16), groundwater treatment will be limited to the approximate area shown in Figure FS-11. A treatability study will be necessary to determine the required treatment program (i.e., well spacing, chemical consumption rates, etc.). The preliminary design used for estimation purposes for this FS is based on analytical laboratory data from the RI and using SRC. It is estimated that 30 additional wells (4-inch diameter) will be installed in a grid-like pattern over the treatment area shown on Figure FS-11. Treatment applications are estimated to be bi-monthly for a period of 5 years at a rate of 75 lbs. of treatment product per well. [Note, the five year clean-up period is estimated from the RI data. If more time is required, the costs for this option will increase.] The degradation sequence of Site VOCs is generally as follows: PCE to TCE; TCE to DCE; DCE to VC; VC to ethylene. Also, chromium VI will be reduced to chromium III, the less toxic and less mobile form, in the treatment area.

Monitoring of the groundwater is based on a ten-year monitoring program. Groundwater will be monitored quarterly for the first year and the 10th year. Two of the quarterly rounds will consist of sampling 20 wells and the basement sump (i.e., "full round"), while the other quarterly rounds (i.e., "limited rounds") will consist of sampling 10 wells (i.e., wells in the source area and up/down gradient wells) and the basement sump. For years 2-9, wells will be sampled on a semi-annual basis and include sampling for one "full round", and one "limited round".

The existing passive pump-and-treat system will continue to operate for dewatering of the basement drain system; however, the sumps in the basement will be sealed to minimize potential VOC off-gasing into the basement air from groundwater in the sump. The air filters installed in the basement as part of an IRM (refer to Section 3.3) will continue to operate. In addition, air quality monitoring will be conducted bi-annually the first year and annually thereafter for a period of ten years. This monitoring will consist of collecting/analyzing an air sample from the basement for volatile COCs. In the event that the air sampling identifies COCs above action levels, additional appropriate measures (i.e., additional ventilation, a permanent vapor mitigation system, etc.) will be evaluated and implemented (with NYSDEC approval).

Environmental easements as presented in the groundwater institutional action option will also be implemented with this alternative. Refer to Table 9 for a detailed breakdown of costs for the in-situ chemical reduction alternative.

Total Present Worth Cost	$ 1,420,870
Capital/Initial Cost	$ 491,770
O&M/Annual Present Cost	$ 920,480
Closeout Present Costs	$ 8,620
Estimated Time to Completion After ROD	approx. 5 years

Compliance with SCGs: This alternative should meet the chemical-specific SCGs at the Site for VOCs. Hexavalent chromium will be reduced to chromium III but total chromium levels in groundwater at the Site will remain in exceedence of TOGS 1.1.1 groundwater standards and guidance values. Action-specific ARARs and SCGs will have to be met. Location-specific SCGs are met at the Site.

Protection of Human Health and the Environment: As the concentration of organic COCs (i.e., VOCs) decrease, the potential exposures to human health and the environment will also decrease. Total chromium concentrations will remain in exceedance of SCGs; however, the chromium should be in a less toxic and less mobile form.

Short-Term Impacts and Effectiveness: Some short-term risks are associated with dust and volatile emissions resulting from advancement of additional wells within the building, and risks to tenants are associated with injecting treatment chemicals at an active facility; however, these risks can be controlled with a HASP. There will be an impact on the operations of tenants in the building during the remedial process (e.g., tenant relocation, etc.). This alternative requires approximately five years to achieve the remedial objectives and, therefore, is not an effective remedy in the short-term.

Long-Term Effectiveness: Degradation of organic COCs to non-hazardous forms is considered a permanent remedy by the NYSDEC (refer to Section 3.0). Inorganic COCs in the groundwater will remain on-site at levels that exceed NYSDEC TOGS 1.1.1 groundwater standards and guidance values; however, the treated residual (i.e., chromium III) should be in a less toxic and less mobile form. The complete degradation of VOCs to ethylene would require long-term monitoring. The possibility exists that degradation may stop at VC and DCE. The removal of DCE and VC would have to be addressed if further degradation is not possible. [Note, the degradation of DCE and VC through oxidation, the preferred method for these compounds, may not be possible at the Site due to the presence of chromium III.] Under certain conditions, the chromium III could be oxidized back to chromium VI, the more toxic and more mobile form of chromium.

Reduction in Toxicity, Mobility, or Volume: The degradation of organic COCs in groundwater is permanent. Chemical reduction should reduce the mobility and toxicity of chromium; however, total chromium concentrations will remain, and reduction may be reversible under certain circumstances (i.e., oxidation).

Implementability: Reduction treatment technology may be difficult to construct and control due to uncertainties. Therefore, the estimated time frame for treatment of groundwater at the Site may not be conclusively determined until implemented, and it may require a longer time period to complete than indicated in this FS report. In addition, relocation of tenants in the remediation area will be necessary for implementation.

Cost: The present worth of the in-situ groundwater chemical reduction option is $1,420,870.

4.2.4 In-Situ Groundwater Chemical Oxidation: This alternative involves the treatment of groundwater through chemical oxidation for degradation of organic COCs. The treatment process involves installation of a grid of injection points (i.e., groundwater wells) throughout the area for applying the treatment chemicals (i.e., potassium-permanganate or Fentons Reagent). Due to the existence of off-site contaminants identified in the RI that may be migrating onto the Site (e.g., petroleum in soil samples at TB-20, and SVOCs such as chloropyridines in a groundwater sample collected from MW-16), groundwater treatment will be limited to the approximate area of influence shown in Figure FS-11. A treatability study and a pilot test will be necessary to determine the required treatment program (i.e., well spacing, chemical consumption rates, etc.). The preliminary design utilized for the purpose of this FS is based on analytical laboratory data from the RI and using potassium permanganate. It is estimated that four horizontal overburden injection wells and 10 bedrock wells would be installed for delivering the permanganate. The horizontal injection wells will be installed to deliver the permanganate to the overburden groundwater, and the bedrock wells would be installed up to 40 feet deep for delivering permanganate to the bedrock groundwater. The horizontal wells would be installed on 50-foot centers and the bedrock wells would be installed on 60-foot centers. The estimated area of treatment is shown on Figure FS-11. It is assumed that approximately two treatment applications will be required over a one-year period. The treatment applications are estimated to require approximately 1,700 pounds of permanganate per well injected over a 15-day period. If more time or treatment applications are required, the costs for this option will increase. [Note, chromium will not be addressed under this option; however, it is possible chromium III may be oxidized to chromium VI, the more toxic and mobile form.]

Groundwater/air monitoring as presented in Section 4.2.3 (In-situ Chemical Reduction) will be implemented and environmental easements as presented in the groundwater institutional action alternative will also be implemented.

The existing passive pump-and-treat system will continue to operate for dewatering of the basement drain system; however, the sumps in the basement will be sealed to minimize potential VOC off-gasing into the basement air from groundwater in the sump. The air filters installed in the basement as part of an IRM (refer to Section 3.3) will continue to operate. In addition, air quality monitoring will be conducted bi-annually the first year and annually thereafter for a period of ten years. This monitoring will consist of collecting/analyzing an air sample from the basement for volatile COCs. In the event that the air sampling identifies COCs above action levels, additional appropriate measures (i.e., additional ventilation, a permanent vapor mitigation system, etc.) will be evaluated and implemented (with NYSDEC approval). Refer to Table 10 for a detailed breakdown of costs for the in-situ chemical oxidation alternative.

Total Present Worth Cost	$ 1,566,500
Capital/Initial Cost	$ 1,247,040
O&M/Annual Present Cost	$ 310,840
Closeout Present Costs	$ 8,620
Estimated Time to Completion After ROD	approx. 2 years

Compliance with SCGs: This alternative should meet the chemical-specific SCGs at the Site for organic COCs. Total chromium levels will remain at the Site; however, due to the oxidation treatment chromium III may be oxidized to chromium VI. Action-specific ARARs and SCGs will have to be met. Location-specific SCGs are met at the Site.

Protection of Human Health and the Environment: This alternative provides remediation through chemical oxidation of organic COCs in the groundwater at the Site. Concentrations of inorganic COCs will remain in the groundwater after remediation. Reduction of the concentrations of organic COCs in the groundwater at the Site will provide an additional level of protection to human health and the environment at the Site. However, the human exposure to inorganic COCs at the Site will remain the same or potentially increase, if the chromium is oxidized to the more toxic and mobile form (i.e., hexavalent chromium).

Short-Term Impacts and Effectiveness: Some short-term risks are associated with dust and volatile emissions resulting from advancement of additional wells within the building, and risks to tenants are associated with injecting treatment chemicals at an active facility; however, these risks can be controlled with a HASP. There could be an impact on the operations of tenants in the building during the remedial process (i.e., tenant relocation, etc.). This alternative requires approximately two years to achieve the remedial goals; therefore, this alternative will be effective in the short-term for organic COCs at the Site. However, the potential exists in the long term for the oxidation of chromium III to chromium VI.

Long-Term Effectiveness: Degradation of organic COCs to non-hazardous forms is considered a permanent remedy by the NYSDEC (refer to Section 3.0). Inorganic COCs in the groundwater will remain on-site at levels exceeding NYSDEC TOGS 1.1.1 groundwater standards and guidance values. In addition, the potential oxidation of chromium III to chromium VI could create a long-term risk and off-site impacts.

Reduction in Toxicity, Mobility, or Volume: The degradation of organic COCs in groundwater is permanent; however, inorganic COCs will remain at the Site and chromium may be more mobile and toxic (i.e., due to oxidation).

Implementability: Chemical oxidation technology may be difficult to construct and control due to the uncertainties associated with this Site. Therefore, the estimated time frame for treatment of groundwater at the Site cannot be accurately estimated until this system is implemented. In addition, relocation of tenants in the treatment area will be necessary for implementation.

Cost: The present worth of the in-situ groundwater chemical oxidation option is $ 1,566,500.

4.2.5 Site Wide Ex-Situ Pump-and-Treat: Groundwater will be extracted to remove COCs from the groundwater by treatment (refer to Figure FS-11 for the extent of anticipated capture). Groundwater that is captured in the existing foundation drain and sump system in the basement will also be passed through the treatment system selected for this alternative; however, the sump will be sealed to minimize potential VOC off-gasing into the basement air from groundwater in the sump. A pump test and a treatability study will be required to determine the exact pumping rates and system size/requirements. The Site wide pump-and-treat system evaluated as part of the FS is based on preliminary design calculations that utilize information collected as part of the RI. Based on the preliminary design, approximately 15 overburden/shallow bedrock extraction wells (i.e., depths up to 20 feet below the ground surface) and 15 bedrock extraction wells (i.e., depth up to 50 feet below the ground surface) will be used to extract groundwater from the Site with a combined anticipated extraction rate between 80 to 100 gpm. The treatment system will be installed in the basement of the building at the Site. Extracted groundwater will be sent through a heavy metals (i.e., chromium, iron, etc.) removal system, then an air stripper (for VOC removal), followed by liquid phase carbon for polishing. Air stripper off-gas will be treated with vapor phase carbon, if necessary, before emission to the atmosphere. Treated groundwater will be discharged to the Monroe County POTW.

Monitoring of the groundwater is based on a thirty-year monitoring program. Groundwater will be monitored quarterly for the first year and the 30th year. Two of the quarterly rounds will consist of sampling 20 wells and the basement sump (i.e., "full round"), while the other quarterly rounds (i.e., "limited rounds") will consist of sampling 10 wells (i.e., wells in the source area and up/down gradient wells) and the basement sump. For years 2-29, wells will be sampled on a semi-annual basis and include sampling for one "full round", and one "limited round".

The existing passive pump-and-treat system will continue to operate for dewatering of the basement drain system; however, the sumps in the basement will be sealed to minimize potential VOC off-gasing into the basement air from groundwater in the sump. The air filters installed in the basement as part of an IRM (refer to Section 3.3) will continue to operate. In addition, air quality monitoring will be conducted bi-annually the first year and annually thereafter for a period of ten years. This monitoring will consist of collecting/analyzing an air sample from the basement for volatile COCs. In the event that the air sampling identifies COCs above action levels, additional appropriate measures (i.e., additional ventilation, permanent vapor mitigation system, etc.) will be evaluated and implemented (with NYSDEC approval).

Environmental easements as presented in the groundwater institutional action option will also be implemented with this alternative. It is assumed that the site wide ex-situ pump-and-treat remediation will be performed for a period of up to 30 years Refer to Table 11 for detailed breakdown of costs for the site wide ex-situ pump-and-treat alternative.

Total Present Worth Cost	$ 7,648,420
Capital/Initial Cost	$ 1,006,180
O&M/Annual Present Cost	$ 6,639,690
Closeout Present Costs	$ 2,550
Estimated Time to Completion After ROD	approx. 30 years

Compliance with SCGs: This alternative should meet the chemical-specific SCGs for groundwater at the Site. Action-specific ARARs and SCGs for extracting and treating groundwater will have to be met. Location-specific SCGs are met at the Site.

Protection of Human Health and the Environment: This alternative provides capture (i.e., should prevent off-site migration of COCs) and remediation of groundwater contamination at the Site. As the concentrations of the COCs decrease in the groundwater (i.e., through treatment), the potential exposures to human health and the environment will also decrease.

Short-Term Impacts and Effectiveness: Some short-term risks are associated with dust and volatile emissions resulting from advancement of groundwater withdrawal wells and extracting/treating contaminated groundwater at an active industrial/commercial site. However, the risks can be controlled by a HASP, and it is anticipated that there would be minimal to no impacts to the on-site occupants and the community. This alternative will be implemented over 30 years; therefore, it will not be effective in the short term. However, capture of the groundwater should minimize migration of the COCs in the short term.

Long-Term Effectiveness: This alternative employs technology to extract groundwater and treat it on-site. Separation of the hazardous waste from the groundwater is considered a permanent remedy by the NYSDEC (refer to Section 3.0). Capture of the Site groundwater should eliminate off-site impacts and, remediation of the groundwater should be effective over time.

Reduction in Toxicity, Mobility, or Volume: Wastes produced from groundwater treatment will be disposed off-site (i.e., sludge, spent carbon, etc.). The removal of COCs from groundwater is considered a permanent remedy (refer to Section 3.0) and COCs at the Site will be reduced over time. Capture of the groundwater at the site should prevent migration of contaminants off-site.

Implementability: Groundwater extraction is a known technology, and has minimal uncertainties associated with construction.

Cost: The present worth for the pump-and-treat alternative is $ 7,648,420.

4.2.6 COC Source Area (VOCs and Chromium) Ex-Situ Pump-and-Treat: Groundwater will be extracted to remove COCs (VOCs and Chromium) from the source area and perimeter well MW-21 (refer to Figure FS-12 for the extent of anticipated capture). Groundwater that is captured in the existing foundation drain and sump system in the basement will also be passed through the treatment system selected for this alternative. A pump test and a treatability study will be required to determine the exact pumping rates and system size/requirements. For the purposes of this FS, the source area pump-and-treat system is based on preliminary design calculations determined from information generated during the RI. Based on the preliminary design, approximately ten to twelve overburden/shallow bedrock extraction wells (i.e., depths up to 20 feet below the ground surface) and the basement sump will be used to extract groundwater from the Site with a combined anticipated extraction rate between 40 to 50 gpm. The treatment system will be installed in the basement of the building. Extracted groundwater will be sent through a heavy metals (i.e., chromium, iron, etc.) removal system, then an air stripper (for VOC removal), followed by liquid phase carbon for polishing. Air stripper off-gas will be treated with vapor phase carbon (if necessary) before emission to the atmosphere. Treated groundwater will be discharged to the Monroe County POTW.

Monitoring of the groundwater is based on a thirty-year monitoring program. Groundwater will be monitored quarterly for the first year and the 30th year. Two of the quarterly rounds will consist of sampling 20 wells and the basement sump (i.e., "full round"), while the other quarterly rounds (i.e., "limited rounds") will consist of sampling 10 wells (i.e., wells in the source area and up/down gradient wells) and the basement sump. For years 2-29, wells will be sampled on a semi-annual basis and include sampling for one "full round", and one "limited round".

The sumps in the basement will be sealed to minimize potential VOC off-gasing into the basement air from groundwater in the sump. The air filters installed in the basement as part of an IRM (refer to Section 3.3) will continue to operate. In addition, air quality monitoring will be conducted bi-annually the first year and annually thereafter for a period of ten years. This monitoring will consist of collecting/analyzing an air sample from the basement for volatile COCs. In the event that the air sampling identifies COCs above action levels, additional appropriate measures (i.e., additional ventilation, a permanent vapor mitigation system, etc.) will be evaluated and implemented (with NYSDEC approval).

Environmental easements as presented in the groundwater institutional action option will also be implemented with this alternative. For this cost estimate, it has been assumed that the pump-and-treat system will run for thirty years. Refer to Table 12 for detailed breakdown of costs for the source area ex-situ pump-and-treat alternative.

Total Present Worth Cost	$ 5,205,160

Capital/Initial Cost	$ 513,080
O&M/Annual Present Cost	$ 4,689,530
Closeout Present Costs	$ 2,550
Estimated Time to Completion After ROD	approx. 30 years

Compliance with SCGs: Initially, this alternative will not meet the chemical-specific SCGs at the Site; however, it is anticipated that over time the source area pump-and-treat, alternative will meet the chemical specific SCGs in the capture areas. Action-specific ARARs and SCGs for extracting and treating groundwater will have to be met. Location-specific SCGs are met at the Site.

Protection of Human Health and the Environment: This alternative provides remediation of the source area of groundwater contamination at the Site for thirty years. As the concentrations of COCs decrease in the groundwater (i.e., through treatment), the potential for exposure to human health and the environment will also decrease.

Short-Term Impacts and Effectiveness: Some short-term risks are associated with dust and volatile emissions resulting from advancement of groundwater withdrawal wells, and extracting/treating contaminated groundwater at an active industrial/commercial site. However, these risks can be controlled by a HASP, and it is anticipated that there would be minimal to no impacts to the on-site occupants and the community. It is anticipated that this alternative will be implemented for 30 years; therefore, this alternative is not effective in the short-term. However, capture of the source area groundwater and groundwater in the area of monitoring well MW-21 should minimize migration of COCs in the short-term.

Long-Term Effectiveness: This alternative employs technology to extract groundwater and treat it on-site. Separation of the hazardous waste from the groundwater is considered a permanent remedy by the NYSDEC (refer to Section 3.0). Capture of the source area should reduce potential off-site impacts.

Reduction in Toxicity, Mobility, or Volume: Wastes produced from groundwater treatment will be disposed off-site (i.e., sludge, spent carbon, etc.). The removal of COCs from groundwater is considered a permanent remedy (refer to Section 3.0). Capture of the source area should minimize migration of contaminants off-site.

Implementability: Groundwater extraction is a known technology, and has minimal uncertainties associated with construction.

Cost: The present worth for the soil area pump-and-treat alternative is $ 5,205,160.

4.2.7 Chromium Source Area Ex-Situ Pump-and-Treat with In-Situ Chemical Reduction: The goal of this alternative is to initially reduce chromium concentrations in the source area (i.e., chromium source area [refer to Figure FS-13 for the extent of anticipated capture]) using ex-situ pump-and-treat. Subsequent to reducing chromium concentrations to acceptable levels, in-situ chemical reduction treatment throughout the impacted areas of groundwater (i.e., VOCs and chromium) will be implemented. For the purpose of this evaluation, it is assumed that the source area pump-and-treat system will be operated for approximately five years at which time the concentrations of chromium in the groundwater will be acceptable for implementing in-situ chemical reduction treatment. [Note, dependent on the actual concentrations of chromium in the groundwater at that time, the pump-and-treat system may continue to operate longer until chromium source area groundwater concentrations decrease to adequate levels.] Also, for the purpose of developing this cost estimate, it is assumed that in-situ chemical reduction will consist of using SRC. [Note: The actual reducing agent will be selected based on the existing site data, treatability studies, case study reviews, etc.]

A pump test and a treatability study will be required to determine the exact pumping rates and system size/requirements. The pump-and-treat system and in-situ treatment described in this FS are based on preliminary design calculations using data generated during the RI. From the preliminary design, approximately six to eight overburden/shallow bedrock extraction wells (i.e., depths up to 20 feet below the ground surface) and the basement drain will be used to extract groundwater from the Site with a combined anticipated extraction rate between 30 to 50 gpm. It is assumed that the treatment system will be installed in the basement of the building. Extracted groundwater will be sent through a heavy metals (i.e., chromium, iron, etc.) removal system, then an air stripper (for VOC removal), followed by liquid phase carbon for polishing. Air stripper off-gas will be treated with vapor phase carbon (if necessary) before emission to the atmosphere. Treated groundwater will be discharged to the Monroe County POTW. For the purpose of this evaluation, it is assumed that the chromium source area pump-and-treat system will be operated for about five years, then shutdown and the remaining groundwater COCs will be treated using in-situ chemical reduction with SRC. [Note, the in-situ treatment may include use of the pump-and-treat system for assisting in distribution of the treatment chemicals; however, the cost estimate developed as part of this evaluation does not include this event. This option will be evaluated during the design phase of the in-situ treatment.]

The in-situ reduction with SRC is described in Section 4.2.3 and consists of installing 30 additional four-inch diameter wells. A treatability study and pilot test will also be conducted to determine the well-grid system, chemical dosage volumes, etc. Treatment applications are estimated to be bi-monthly for a period of five years at a rate of 75 lbs. of SRC per well. [Note, if the pump-and-treat system is shutdown, the basement drain system will be reconnected to the passive pump-and-treat system.]

Monitoring of the groundwater is based on a ten-year monitoring program. Groundwater will be monitored quarterly for the first year and the 10th year. Two of the quarterly rounds will consist of sampling 20 wells and the basement sump (i.e., "full round"), while the other quarterly rounds (i.e., "limited rounds") will consist of sampling 10 wells (i.e., wells in the source area and up/down gradient wells) and the basement sump. For years 2-9, wells will be sampled on a semi-annual basis and include sampling for one "full round", and one "limited round".

The sumps in the basement will be sealed to minimize potential VOC off-gasing into the basement air from groundwater in the sump. The air filtration units installed in the basement as part of an IRM (refer to Section 3.3) will continue to operate. In addition, air quality monitoring will be conducted bi-annually the first year and annually thereafter for a period of ten years. This monitoring will consist of collecting/analyzing an air sample from the basement for volatile COCs. In the event that the air sampling identifies COCs above action levels, additional appropriate measures (i.e., additional ventilation, a permanent vapor mitigation system, etc.) will be evaluated and implemented (with NYSDEC approval).

Environmental easements as presented in the groundwater institutional action option will also be implemented with this alternative. Refer to Table 13 for detailed breakdown of costs for the source area pump-and-treat with in-situ chemical treatment alternative.

Total Present Worth Cost	$ 2,687,020
Capital/Initial Cost	$ 881,860
O&M/Annual Present Cost	$ 1,789,410
Closeout Present Costs	$ 6,750
Estimated Time to Completion After ROD	approx. 10 years

Compliance with SCGs: This alternative should meet the chemical-specific SCGs for groundwater at the Site. Action-specific ARARs and SCGs for extracting and treating groundwater will have to be met. Location-specific SCGs are met at the Site.

Protection of Human Health and the Environment: This alternative provides remediation of groundwater at the Site. As the concentrations of COCs decrease in the groundwater (i.e., through treatment), the potential for exposure to human health and the environmental will also decrease.

Short-Term Impacts and Effectiveness: Some short-term risks are associated with dust and volatile emissions resulting from advancement of groundwater withdrawal/treatment wells, and extracting/treating groundwater at an active industrial/commercial site. Also, risks are associated with injecting in-situ treatment chemicals at an active industrial/commercial Site. However, these risks can be controlled by a HASP, and it is anticipated that there would be minimal to no impacts to the on-site occupants and the community. It is anticipated that this alternative will require 10 or more years to achieve the remedial objectives; therefore, it will not be effective in the short term. However, capture of the groundwater should minimize migration of the COCs in the short term.

Long-Term Effectiveness: This alternative employs technology to extract/treat groundwater, as well as to implement in-situ treatment. Separation and destruction of the hazardous waste from the groundwater are considered permanent remedies by the NYSDEC (refer to Section 3.0). The groundwater will be effectively treated over time (i.e., at least 10 years).

Reduction in Toxicity, Mobility, or Volume: Wastes produced from groundwater treatment will be disposed off-site (i.e., sludge, spent carbon, etc.). The removal and destruction of COCs in groundwater are considered permanent remedies (refer to Section 3.0).

Implementability: Groundwater extraction and in-situ chemical reduction are known technologies and have minimal uncertainties associated with construction. However, the recommended well grid for in-situ treatment would impact numerous tenants.

Cost: The present worth for the pump-and-treat alternative is $ 2,687,020.

5.0 COMPARISON OF ALTERNATIVES

5.1 Comparison of Soil Alternatives

This section presents a comparison of the remedial alternatives evaluation for soil that is presented in Section 4.1 for each of the seven evaluation criteria. A summary of these comparisons is also shown in Table 14, included in Appendix C.

Compliance with SCGs: The no action and institutional action alternatives do not meet the soil SCGs for the Site. The soil stabilization/solidification, source area excavation, and source area with exterior soil excavation will only meet the soil SCGs for the Site in the areas where treatment/removal occurred. The extensive excavation should meet the soil SCGs for the Site.

Overall Protection of Human Health and the Environment: Current capping of the Site mitigates human exposure to contaminated soils. The no action alternative increases the risk of human exposure to contaminated soil because if the use of the Site was unrestricted, and if future activity at the Site (i.e., construction, etc.) compromised the integrity of the cap, human exposure could then occur. The institutional action alternative provides an additional level of protection of human exposure to contaminated soils at the Site through the implementation of a SMP and use/access restrictions. The in-situ soil stabilization/solidification alternative would provide an additional level of protection to human health and the environment because the chromium in the soil would be reduced to a less mobile and less toxic form. However, under certain conditions, the chemical reduction of the chromium in the soil could be reversible (i.e., the chromium could be oxidized back into the more mobile and toxic form [i.e., hexavalent chromium]). The source area soil excavation alternative provides an additional level of protection of human health and the environment because soil that contains chromium concentrations greater than 500 ppm will be removed to the extent feasible from the Site, and the remaining contaminated soil will be managed through institutional controls (i.e., use/access restrictions, and a SMP). The source area and exterior soil excavation alternative provides another level of protection to human health and the environment because it also includes removal to the extent feasible of chromium-contaminated soils on the exterior of the building that exceed 50 ppm, and removal of soil in the vicinity of TB-30 (0-4') that contain TAL metals in excess of NYSDEC guidance values. Remaining contaminated soil will also be managed through institutional controls. The extensive soil excavation alternative provides the highest level of long-term protection to human health and the environment because soil containing chromium (and selected TAL metals) exceeding TAGM 4046 recommended soil cleanup objectives would be removed from the Site.

Short-Term Impacts and Effectiveness: The no action and institutional action alternatives will not increase short-term impacts or risks to human health or the environment. The soil stabilization/solidification alternative has some short-term risks (e.g., workers could come in contact with treatment chemicals or with contaminated soils, etc.) that should be able to be controlled with a HASP. The excavation alternatives also have short-term risks (e.g., dust and volatile emissions resulting from excavation of contaminated soils, safety factors relating to building shoring and/or demolition, safety factors working around gas and electric utilities, etc.); however, implementation of a HASP and implementation of air monitoring during excavation should control the risks. The excavation alternatives will not achieve remedial objectives in the short-term (i.e., each excavation alternative requires four to five years before completion). The in-situ stabilization alternative will also have short-term risks (i.e., workers could come in contact with treatment chemicals or with contaminated soils, etc.); however, implementation of a HASP should control these risks. The in-situ stabilization alternative will also stabilize the treatment area in the short-term; however, the permanence of this remedy is uncertain (see below).

Long-Term Effectiveness and Permanence: The no action and institutional action alternatives will not treat or dispose the contaminated soils at the Site. The institutional action alternative will restrict/control activities; thus, reducing potential future impacts/risks; and the use of a SMP will provide a means to address potential risks if future disturbance is required. The soil stabilization/solidification alternative (i.e., reduction of chromium VI to chromium III) may be reversible under certain circumstances (i.e., oxidation). The source area excavation and source area with exterior soil excavation alternatives will permanently remove the highest concentration of chromium in the soil (i.e., source area) to the extent feasible and the institutional actions will reduce potential future impacts/risks at the Site. The extensive excavation alternative should permanently remove the chromium to concentrations below the applicable SCGs.

Reduction of Toxicity, Mobility, and Volume: The no action and institutional action alternatives will not change the waste characteristics of the soil at the Site. The soil stabilization/solidification alternative should reduce the toxicity and mobility of chromium in the soil; however, the total chromium concentrations will remain in the soil. The source area excavation alternative will remove a majority of COCs in the soil. The extensive excavation alternative will remove chromium-contaminated soils that exceed SCGs.

Implementability: The no action alternative is the easiest to implement. The institutional action alternative is also easily implemented. Soil stabilization/solidification and the excavation alternatives require relocation of tenants; re-leasing of tenant spaces; removing and rebuilding of walls, floors, ceilings; and working around underground utilities. In addition, it does not appear feasible to implement excavation activities in the Boiler Room or Hallway (except as shown).

Cost: A summary of the costs is presented in Table 1 included in Appendix C. A detailed breakdown of each alternative for soil is presented in Tables 2-6. The present worth is based on a 5% discount rate over the estimated life of the project.

5.2 Comparison of Groundwater Alternatives

This section presents a comparison of the remedial alternatives evaluation for groundwater that is presented in Section 4.2 for each of the seven evaluation criteria. A summary of these comparisons is also shown in Table 15, included in Appendix C.

Compliance with SCGs: The no action and institutional action alternatives do not meet the SCGs for the Site. The in-situ chemical reduction and oxidation alternatives should meet the SCGs for organic COCs in groundwater; however, total chromium concentrations and other TAL metals will remain at concentrations that exceed the NYSDEC groundwater standards and guidance values. [Note, the in-situ chemical reduction should reduce chromium VI to chromium III, whereas the in-situ chemical oxidation may oxidize chromium III to chromium VI.] The pump-and-treat alternatives should meet the groundwater SCGs for the Site in the respective remedial areas. The chromium source area pump-and-treat with in-situ chemical reduction should meet the SCGs for the Site.

Overall Protection of Human Health and the Environment: The qualitative risk assessment completed for this Site (refer to Section 1.8) concludes that the current concentration of COCs in groundwater, under the existing use of the Site and surrounding properties, poses no threat to off-site human health. For Site occupants, the risk assessment indicates there are no exposure pathways for chromium; however, inhalation of VOCs in proximity to the basement sump and sub-slab soil gas intrusion through the concrete floor were identified as potential exposure pathways. Indoor air sampling conducted in 1993 and 2004 indicated that concentrations of detected VOCs were below the OSHA PELs; however, the concentrations of TCE and PCE in the indoor air samples exceeded the NYSDOH action levels. Therefore, a sub-slab soil gas mitigation system is being installed for the main building floor, and air filtration units are being installed in the basement, in order to address these potential exposure pathways (refer to Section 3.3). Implementation of the no action alternative does not change the present characteristics of the Site. Implementation of the institutional action also does not change the present characteristics of the Site. The in-situ groundwater chemical reduction alternative will reduce the chromium to a less toxic and less mobile form. Thus, this alternative provides some additional protection to human health and the environment. Also, based on the risk assessment, it does not appear that receptors should be impacted by the presence of chromium in the groundwater at the Site. The in-situ groundwater chemical oxidation alternative will reduce the concentration of organic COCs in the groundwater at the Site, which will provide an additional level of protection to human health and the environment at the Site. However, this alternative could also potentially oxidize the chromium at the Site into its more toxic and mobile form (i.e., hexavalent chromium). The ex-situ pump-and-treat alternatives will provide additional protection to human health and the environment because the concentration of COCs in the areas of capture will decrease as the groundwater is extracted. The chromium source area ex-situ pump-and-treat with in-situ chemical reduction alternative involves operating a chromium source area pump-and-treat system for at least five years, and then implementing in-situ chemical reduction. This alternative provides additional protection to human health and the environment as the concentration of COCs at the Site decrease due to the treatment technologies that are implemented.

In addition, for each of the 'active' remedial alternatives, the sumps in the basement will be sealed and the air filters will continue to operate. These measures should provide additional protection of human health in relation to the basement air. To evaluate the effectiveness of these measures, air sampling will be conducted. The results of the air sampling will determine if these measures are effective in mitigating potential VOCs in the basement air or if additional measures are required.

Short-Term Impacts and Effectiveness: The no action and institutional action alternatives should not increase short-term exposure risks to human health or the environment. The in-situ chemical treatments and pump-and-treat alternatives have some short-term risks (i.e., exposure to dust and volatile emissions during advancement of wells in the building, exposure of workers and tenants to treatment chemicals, exposure of workers and tenants to contaminated groundwater that is extracted from the Site, etc.) that should be able to be controlled with a HASP. The in-situ chemical oxidation treatment alternative is an effective alternative for treating organic COCs in the short-term; however, inorganic COCs (i.e., chromium) are not remediated by this alternative. The other alternatives (i.e., in-situ chemical reduction, pump-and-treat alternative) require longer time periods to be effective.

Long-Term Effectiveness and Permanence: The no action and institutional action alternatives may reduce COCs in the groundwater through natural attenuation and/or the operation of the passive pump-and-treat system currently in place. The in-situ chemical treatment alternatives will leave concentrations of total chromium and TAL metals that exceed the NYSDEC guidelines. The in-situ chemical reduction treatment should leave chromium in a less mobile and less toxic form, although the reduction process may be reversible under certain circumstances; therefore, long-term effectiveness may be questionable. The pump-and-treat alternatives will permanently remove COCs over time from the groundwater at the Site. The effectiveness of the chromium source area pump-and-treat with in-situ chemical reduction alternative will be re-evaluated after five years, at which time in-situ chemical reduction remedial technologies could be implemented to "polish" the groundwater.

Reduction of Toxicity, Mobility, and Volume: The no action and institutional action alternatives may reduce the toxicity, mobility, and volume of COCs through natural attenuation and the operation of the passive pump-and-treat system currently in place. The in-situ chemical treatment alternatives should reduce the volume of organic COCs at the Site; however, the inorganic COCs (primarily chromium) will remain at concentrations that exceed the NYSDEC groundwater standards and guidance values. The in-situ treatment of DCE and VC to ethylene may be difficult under anaerobic conditions. Vinyl chloride is more toxic than PCE and TCE, and may require additional remediation if not degraded to ethylene. The pump-and-treat alternatives should prevent migration of COCs from the Site, and will permanently remove COCs from the groundwater over time.

Implementability: The no action alternative is the easiest to implement. The institutional action alternative is also easily implemented. The in-situ chemical treatment alternatives will require relocation of tenants and working around underground utilities. The pump-and-treat alternatives are a technology that probably will not require the temporary relocations of tenants or working around underground utilities.

Cost: A summary of the costs is presented in Table 1 included in Appendix C. A detailed breakdown of each alternative for groundwater is presented in Tables 7-13. The present worth is based on a 5% discount rate over the estimated life of the project.

6.0 RECOMMENDED REMEDIAL ALTERNATIVES

This section presents the recommended remedial alternatives for the soil and groundwater at the Site.

Soil Remedial Alternative

The *Source Area Soil Excavation* (refer to Section 4.1.4) is the recommended remedial alternative for the soil. Soil impacted with total chromium at concentrations above 500 ppm (refer to Figure FS-7) will be removed to the extent feasible and disposed off-site (refer to Figure FS-7A for the removal area). This alternative will also assist in minimizing the migration of chromium to the groundwater. [Note, it is anticipated that the source area soil removal will be completed within five years of the ROD (i.e., be completed by about mid 2010).] Soil remaining in-place with COCs at concentrations above SCGs will be managed through institutional actions (i.e., SMP, environmental easements, etc.). Based on the excessive costs and implementation problems associated with the other remedial alternatives, the source area soil excavation is the most feasible alternative. However, soil removal in the hallway and boiler boom does not appear feasible since excavation in the boiler room would require removal and relocation of the boiler room equipment, and excavation in the hallway would effectively shut down the building. Therefore, it will be requested that a waiver be approved for not complying with the SCGs outside of the removal area.

Groundwater Remedial Alternative

The *Chromium Source Area Ex-Situ Pump-and-Treat with In-Situ Chemical Reduction* (refer to Section 4.2.7) is the recommended remedial alternative for the groundwater. [Note, this alternative also includes environmental easements.] This alternative will initially capture and remove the source area of chromium in groundwater (and VOCs in the capture area) and will result in minimizing off-site migration of COCs (refer to Figure FS-13 for the anticipated capture area). Pump-and-treat is a proven and relatively easily implemented technology that will remove COCs from the groundwater over time. In addition, the pump-and-treat alternative will control COCs that leach to groundwater from soil present at the Site. The chromium source area ex-situ pump-and-treat system will be operated until the concentrations of chromium in groundwater are reduced to acceptable concentrations for implementing in-situ chemical reduction treatment. [Note, the cost estimate provided in this evaluation assumes that the chromium source area pump-and-treat system will operate for about five-years at which time the in-situ chemical reduction treatment will be implemented. However, the actual timeframe that the pump-and-treat system will operate will depend on the actual groundwater concentrations. In addition, the pump-and-treat system may continue to operate during implementation of the chromium reduction treatment process in order to assist in distribution of the in-situ treatment chemicals (if warranted). A final determination as to whether or not to shut down the pump-and-treat system will be made during the design phase for the in-situ reduction process.] Also, for the purposes of this evaluation (i.e., cost estimate) it is assumed that SRC will be used as the reducing agent; however, the actual reducing agent(s) that will be selected will be based on treatability studies, case study reviews, and other available guidance.

In addition, the sumps in the basement will be sealed, and the air filtration units installed as part of the IRM in the basement will continue to operate. Also, air sampling will be conducted in the basement to evaluate the effectiveness of these measures. In the event that air sampling identifies COCs above action levels, additional appropriate measures (i.e., additional ventilation, a permanent vapor mitigation system, etc.) will be evaluated and implemented (with NYSDEC approval).

Summary

The recommended remedial alternatives discussed above have been designed to complement each other. Initially, after finalization of the ROD, a SMP will be developed for the Site and environmental easements will be put in-place for the Site (as described in Sections 4.1.2 and 4.2.2). Subsequently, the chromium source area pump-and-treat system will be designed and installed approximately one year after finalization of the ROD. During installation of the chromium source area pump-and-treat system the sumps in the basement will be sealed and air sampling in the basement will be conducted. The source area of chromium contamination in the soil will be excavated to the extent feasible within about five years after finalization of the ROD (i.e., about mid 2010). Subsequent to operating the chromium source area pump-and-treat system for about five years, groundwater monitoring results (i.e., results that represent the quality of the groundwater after the removal of the source area of chromium in the soil, and the removal and treatment of the source area of chromium in the groundwater) will be evaluated to assess the effectiveness of the two remedial options in obtaining the remedial objectives (i.e., capture of the source area, reduction of chromium and VOCs in the groundwater, etc.). This alternative also includes implementing in-situ chemical reduction to remediate COCs remaining in the groundwater (i.e., subsequent to reducing chromium source area groundwater concentrations to acceptable levels). The in-situ chemical reduction will be implemented, as warranted, for a period of up to five years. Chemical reduction appears more feasible than chemical oxidation because chemical oxidation has the potential to oxidize chromium III to chromium VI. [Note, dependant on the results of the analytical testing results after five years, an amendment to the ROD may be warranted (i.e., if an alternative technology appears more feasible at that time, etc).]

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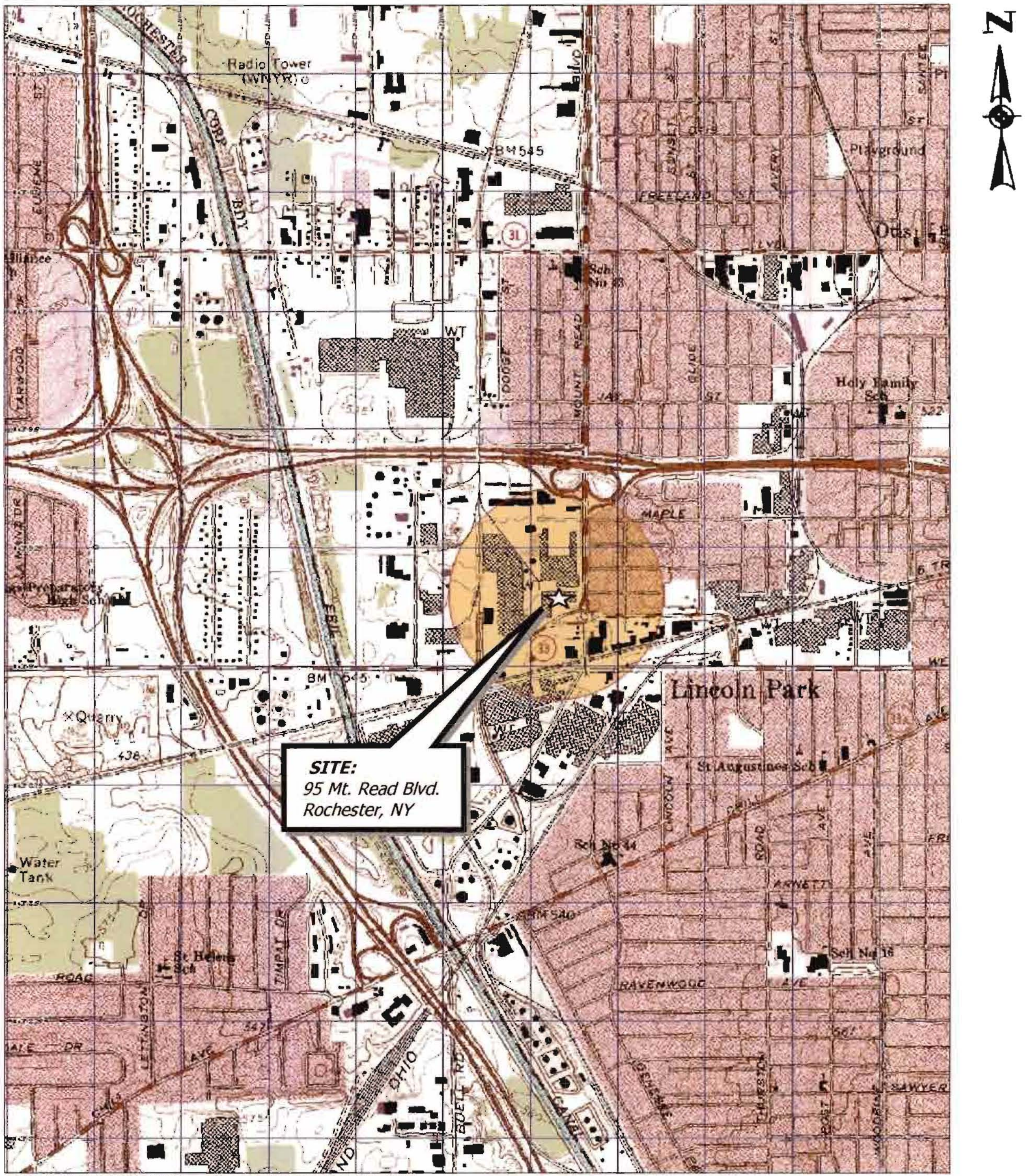
ACRONYM LIST

1,2-DCE	1,2-Dichloroethene
ARAR	Applicable or Relevant and Appropriate Requirements
BGS	Below Ground Surface
COCs	Contaminants of Concern
DAY	Day Environmental, Inc.
DNAPL	Dense Non-Aqueous Phase Liquid
ERM	Environmental Resources Management, Inc.
LNAPL	Light Non-Aqueous Phase Liquid
MCDOH	Monroe County Department of Health
NAPL	Non-Aqueous Phase Liquid
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCE	Tetrachloroethene, Tetrachloroethylene, Perchloroethene, Perchloroethylene
PEL	Permissible Exposure Limit
POTW	Publicly Owned Treatment Works
PPB	Parts Per Billion
PPM	Parts Per Million
RAOs	Remedial Action Objectives
RI	Remedial Investigation
ROD	Record of Decision
RQD	Rock Quality Determination
SCGs	Standard, Criteria, and Guidelines
SMP	Site Management Plan
SRC	Substrate Release Composition
SVOC	Semi-Volatile Organic Compound
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target Analyte List
TCE	Trichloroethylene, Trichloroethene
TCLP	Toxicity Characteristic Leachate Procedure
TOGS	Technical and Operational Guidance Series
VC	Vinyl Chloride
VOC	Volatile Organic Compound

APPENDIX A

Figures



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME04096 Source Data: USGS

544 ft Scale: 1 : 19,200 Detail: 14-0 Datum: NAD27

Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad map Rochester West (NY) 1995. Site Lat/Long: N43d-09.15' – W77d-39.67'

DATE
02-28-2003

DRAWN BY
RJK/tw

SCALE
1" = 2000'

day

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

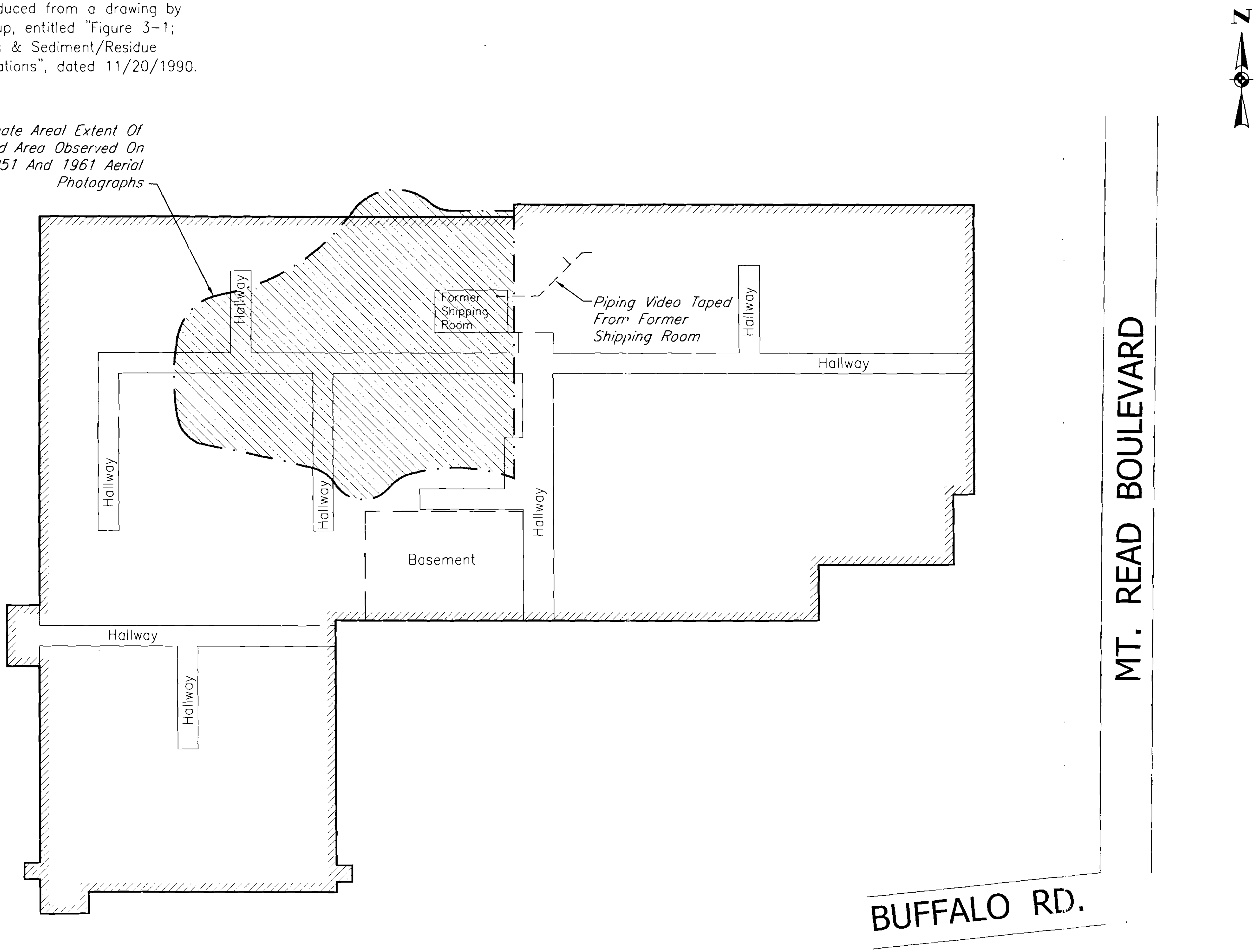
FEASABILITY STUDY REPORT

DRAWING TITLE
PROJECT LOCUS MAP

PROJECT NO.
2712R-01

FS-1

NOTE:
Site plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.



SITE PLAN
1" = 50'

FIELD VERIFIED BY DPN
DATE 03-2003
DRAWN BY LRP
DATE DRAWN 03-13-2003
SCALE 1" = 50'
DATE ISSUED 03-14-2003

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008

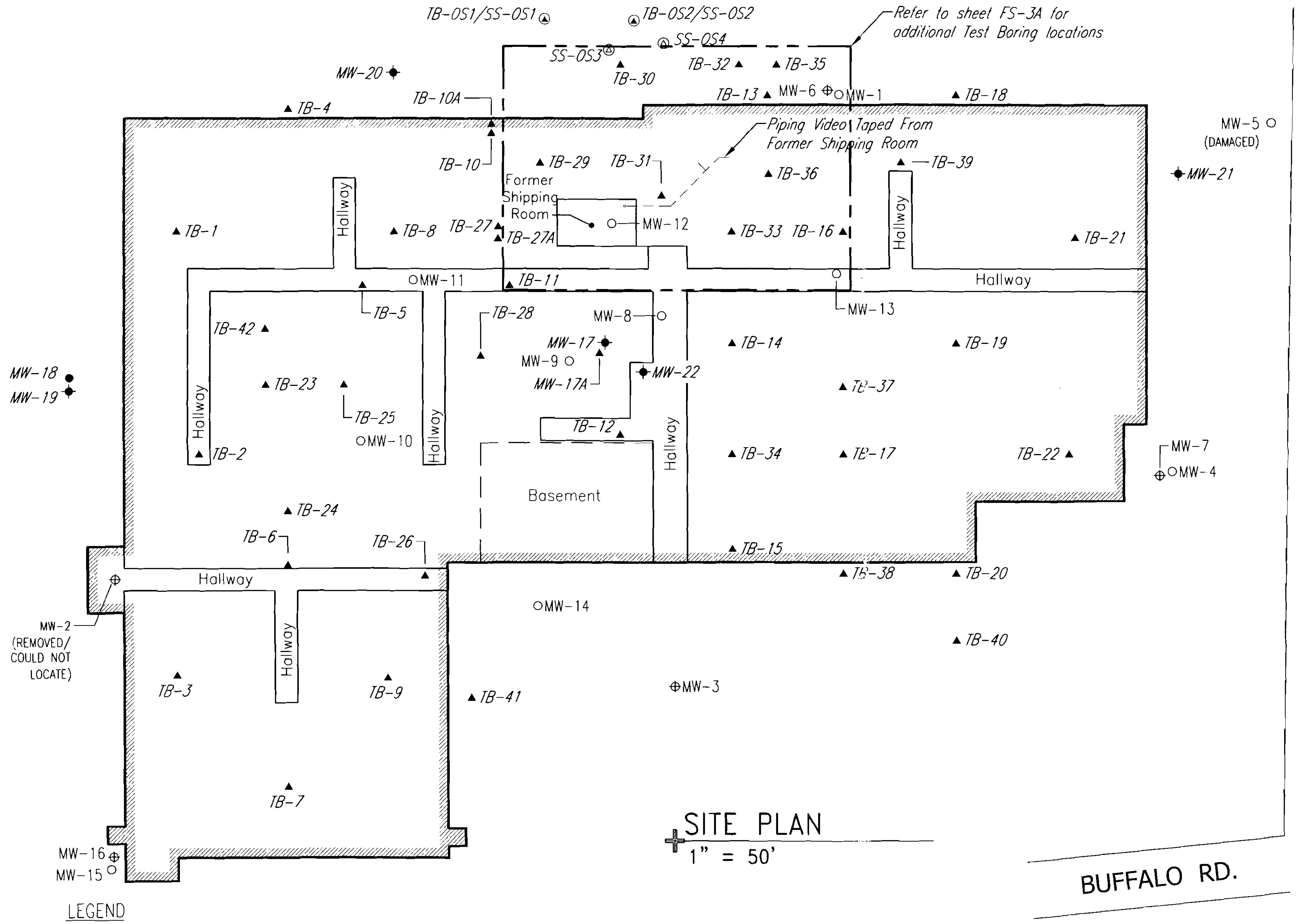
PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY

FEASIBILITY STUDY

DRAWING TITLE
Site Plan

PROJECT NO
2712R-01

FS-2



SITE PLAN

1" = 50'

LEGEND

● MW-18	Shallow Bedrock Monitoring Well Installed During The Remedial Investigation	○MW-1	Overburden And/Or Shallow Bedrock Monitoring Well Installed Prior To The Remedial Investigation
◆ MW-17	Deep Bedrock Monitoring Well Installed During The Remedial Investigation	⊕MW-3	Existing Deep Bedrock Monitoring Well Installed Prior To The Remedial Investigation
▲ TB-1	Test Boring Advanced During The Remedial Investigation	◎ SS-0S4	Offsite Surface Sample Collected During The Remedial Investigation
◎ TB-0S1/SS-0S1	Off-Site Test Boring/Surface Sample Advanced During The Remedial Investigation		

NOTES:

1. Site plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.
2. Bedrock well MW-2 has been abandoned due to new construction. Overburden well MW-5 is damaged.
3. Test boring elevations on cross sections not surveyed, but are inferred based on surveyed elevations of monitoring wells.

DATE 04-2003
Field Verified By DPN
DATE DRAWN 04-02-2003
DRAWN BY LRP
DATE ISSUED 04-02-2003
SCALE 1" = 50'

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
**95 MT. READ BOULEVARD
ROCHESTER, NY**

FEASIBILITY STUDY

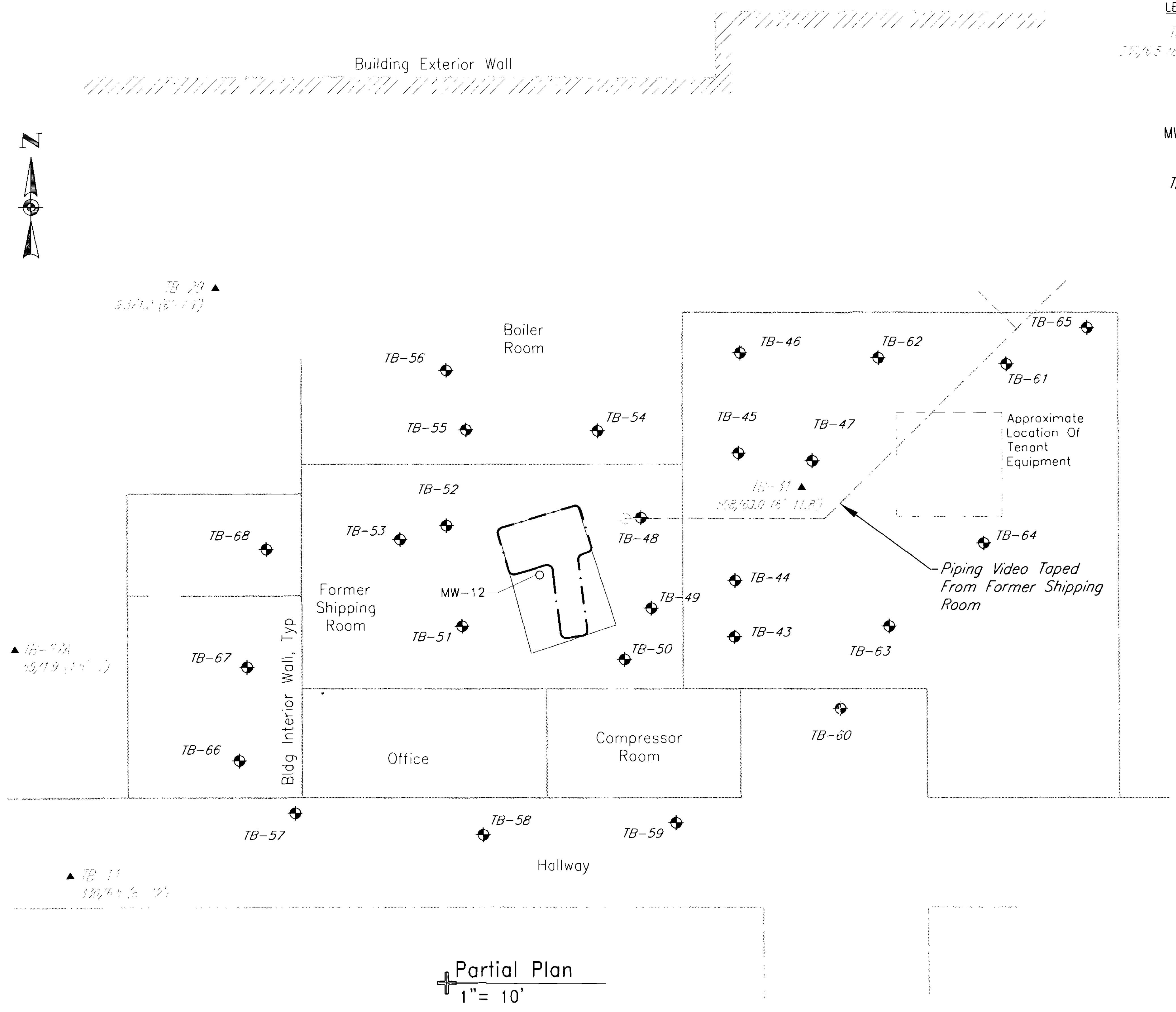
DRAWING TITLE
**Site Plan With Monitoring Well
And Test Boring Locations**

PROJECT NO.
2712R-01

FS-3

LEGEND:

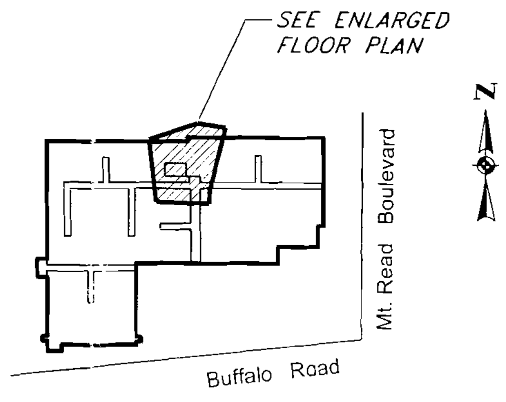
TB-11 ▲	Test Boring Advanced During The Remedial Investigation With Total Chromium/Hexavalent Chromium Concentration In Parts Per Million (ppm) Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis, Test Borings Were Advanced Between April And September 1998
MW-12 ○	Overburden and/or Shallow Bedrock Monitoring Well Installed Prior To The Remedial Investigation
TB-51 ⊕	Test Borings advanced During The Supplemental Chromium Delineation



Partial Plan
1"= 10'

NOTE:

1. Partial plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.



BUILDING KEY PLAN
NTS

DATE 04-2002
DATE DRAWN 04-02-2003
DATE ISSUED 04-02-2003
Field Verified By DPN
DRAWN BY LRP
SCALE 1" = 10'

day
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ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY

FEASIBILITY STUDY

DRAWING TITLE
Partial Plan With Supplemental Chromium
Delineation Test Boring Locations

PROJECT NO
2712R-01

FS-3A

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Layout Name: Layout3
Ref1: 0-2contoursMap-1.dwg
Ref2: 2712base-3dwg.dwg
Ref3:
Ref4:
Ref5:
Ref6:

Time Plotted: Fri Aug 20 07:28 2004
File Name: Maguire\1506\FeasStudy2001\2712-100

Xerox432AnsiB-2; 11 x 17
Layout Name: 11x17 Slab Area Plan Fig 3A

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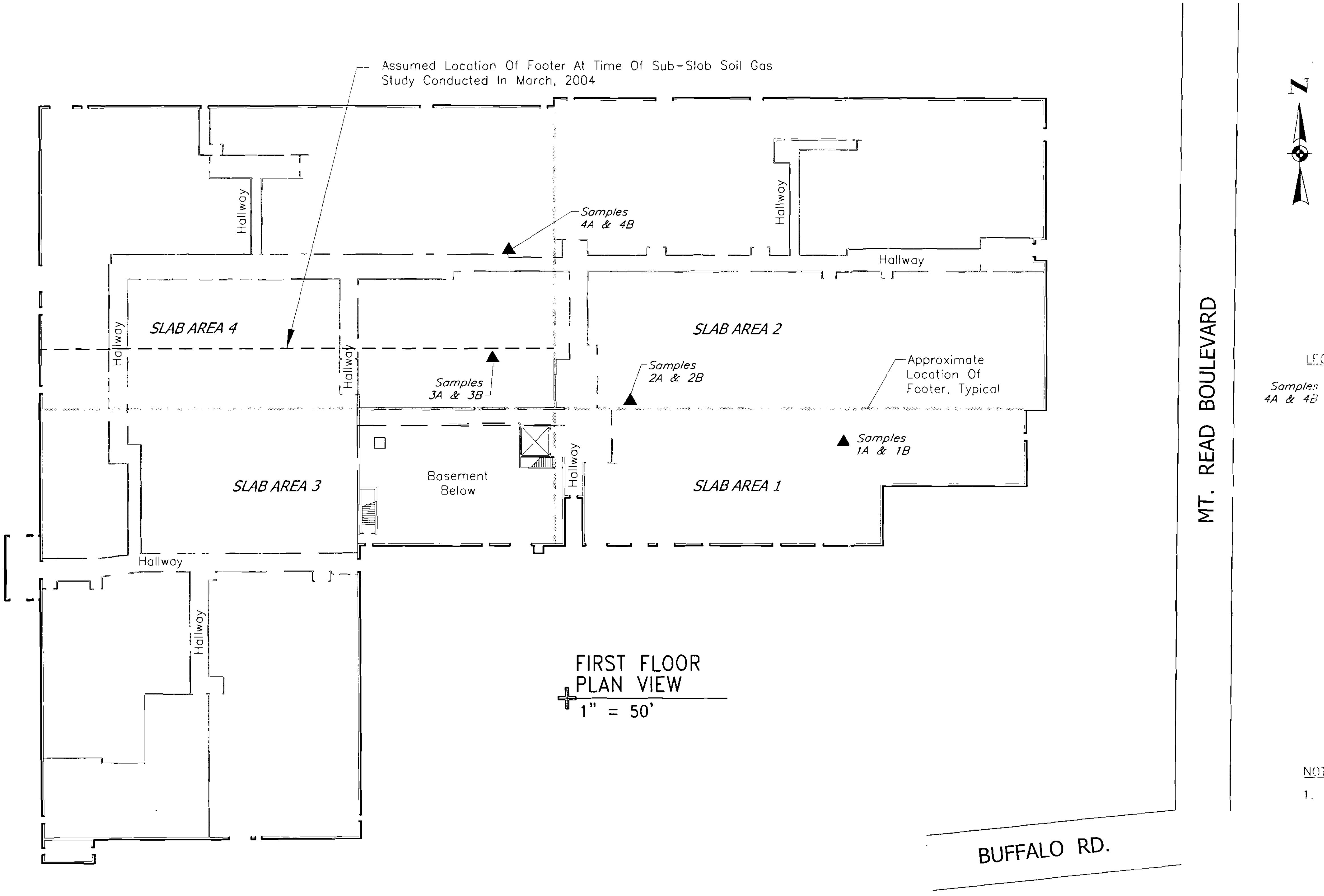
Ref2:
Ref3:

Ref4:
Ref5:
Ref6:



FIRST FLOOR PLAN VIEW
1" = 50'

LEGEND:

Samples 4A & 4B ▲ Sub-Slab Soil Gas and Indoor Air Sampling Point Locations

NOTE:

1. Drawing produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990; A blueline print by Miller-Anderson Architects, entitled "1st Floor Plan Details", date issued 3-3-2000; and from notes of site visits by representatives of Day Environmental, Inc.

DESIGNED BY TKH/BFK	DATE 07-2004	
DRAWN BY LRP/Tw	DATE DRAWN 07-2004	
SCALE As Noted	DATE ISSUED 08-19-2004	

day
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NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY

INDOOR VAPOR INTRUSION SYSTEM IRM DESIGN PLAN

DRAWING TITLE
Sub-Slab Soil Gas Sample Locations and
Indoor Air Sample Locations Associated With March, 2004 Study

PROJECT NO.
2712R-01

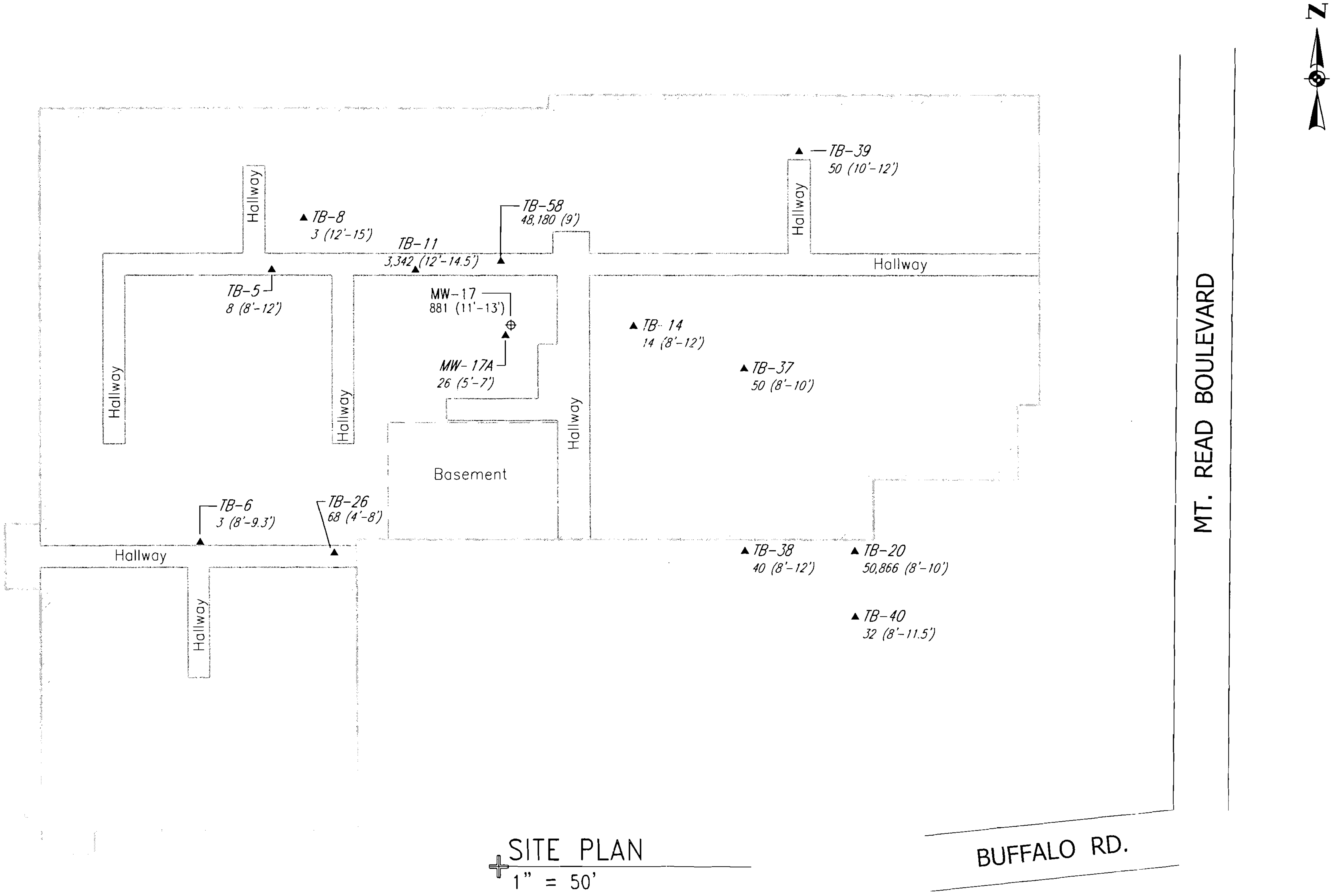
Figure 3B

NOTE:

1. Site plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.
2. Soil samples tested for VOCs using ASP Method 95-1 and total VOCs shown on this figure are a summation of VOCs detected via this test method.

LEGEND

⊕MW-17 881 (11'-13')	Monitoring Well Installed During The Remedial Investigation With Maximum Total VOC Concentration In Parts Per Billion (ppb) Measured In A Soil Sample, Depth Interval (Feet) In Parenthesis
▲ TB-38 40 (8'-12')	Test Boring Location With Maximum Total VOC Concentration In ppb Measured In A Soil Sample, Depth Interval (Feet) In Parenthesis



SITE PLAN
1" = 50'

Time Plotted: Tue Jan 18 10:55 2005
File Name: \Maguir\1506\FeasStudy2001\2712-13.dwg

Xerox432AnsiB-2; 11 x 17
Layout Name: Layout1

Ref1:
Ref2:
Ref3:

Ref4:
Ref5:
Ref6:

FIELD VERIFIED BY DPN	DATE 04-2003
DRAWN BY LRP	DATE DRAWN 04-02-2003
SCALE 1" = 50'	DATE ISSUED 04-02-2003

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY

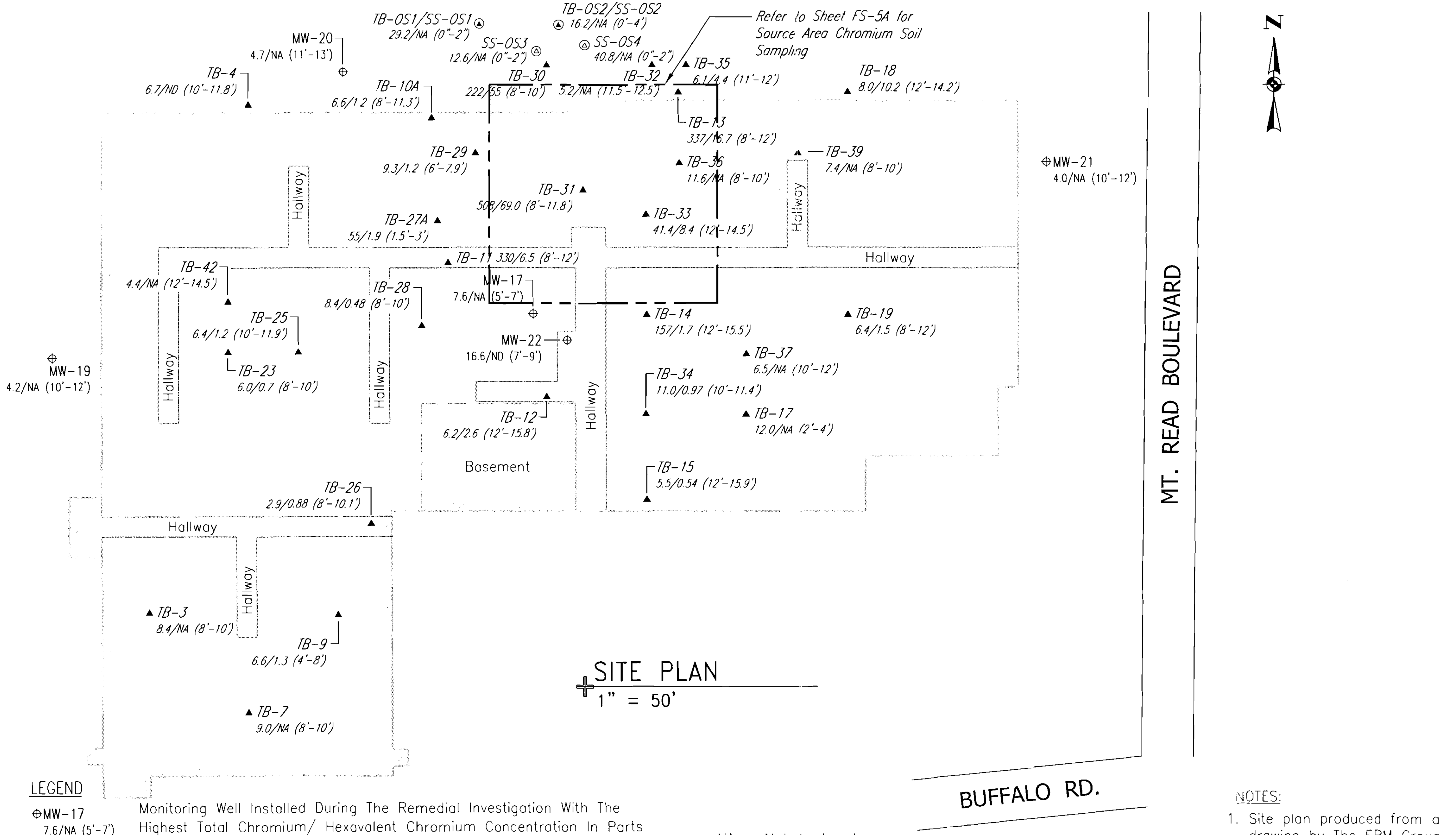
FEASIBILITY STUDY

DRAWING TITLE
Site Plan With Maximum Total VOC Concentrations Measured In Soil Samples

PROJECT NO
2712R-01

FS-4

Time Plotted Tue Jan 18 11:10 2005 Xerox432AnsiB-2, 11 x 17 Ref1: Ref2: Ref3: Ref4: Ref5: Ref6:
File Name: \Maguir\1506\FeasStudy2001\2712-14.dwg Layout Name: Layout1



SITE PLAN

1" = 50'

LEGEND

⊕MW-17 7.6/NA (5'-7')	Monitoring Well Installed During The Remedial Investigation With The Highest Total Chromium/ Hexavalent Chromium Concentration In Parts Per Million (ppm) Measured In A Soil Sample From This Location, Depth Interval (Feet) In Parenthesis
▲TB-19 6.4/1.5 (8'-12')	Test Boring Advanced During The Remedial Investigation With The Highest Total Chromium/Hexavalent Chromium Concentration In ppm Measured In A Soil Sample From This Location, Depth Interval (Feet) In Parenthesis
TB-OS1/SS-OS1 ⊛ 29.9/NA (0"-2")	Off-Site Test Boring/Surface Sample Advanced/Collected During The Remedial Investigation With The Highest Total Chromium/Hexavalent Chromium Concentration In ppm Measured In A Soil Sample From This Location, Depth Interval (Feet) In Parenthesis

NA Not Analyzed

ND Not Detected Above Laboratory Detection Limits

NOTES:

1. Site plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.
2. Soil samples tested for chromium using ASP Method CLP-M.

FIELD VERIFIED BY DPN
DATE 04-2003
DRAWN BY LRP
DATE DRAWN 04-02-2003
SCALE 1" = 50'
DATE ISSUED 04-02-2003

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY
FEASIBILITY STUDY

DRAWING TITLE
Site Plan With Maximum Chromium Concentrations Measured In Soil Samples

PROJECT NO
2712R-01

FS-5

Time Plotted: Tue Jan 18 11:25 2005
File Name: \Moguir\1506\FeasStudy2001\2712-25.dwg
Xerox432AnsiB-2: 11 x 17
Layout Name: Model
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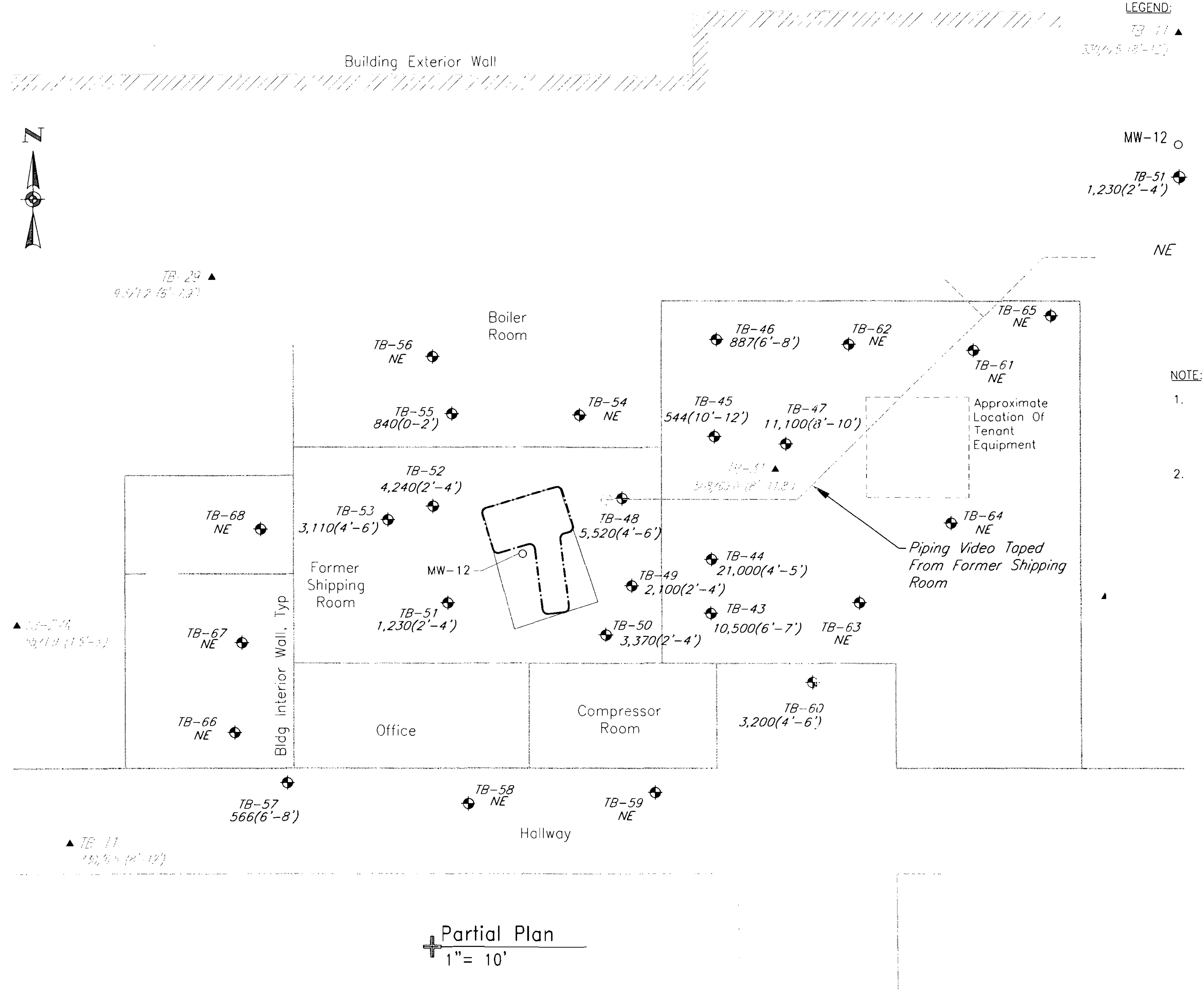
Ref2: 2712base-3dwg.dwg
Ref3:
Ref4:
Ref5:
Ref6:



Partial Plan
1"= 10'

LEGEND:

▲ Test Boring Advanced During The Remedial Investigation With Total Chromium/Hexavalent Chromium Concentration In Parts Per Million (ppm) Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis. Test Borings Were Advanced Between April And September 1998.

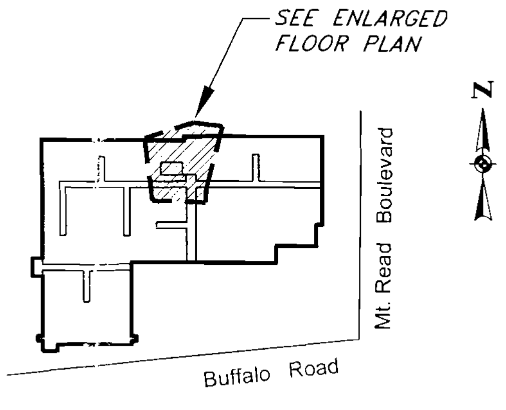
MW-12 ○ Overburden and/or Shallow Bedrock Monitoring Well Installed Prior To The Remedial Investigation

TB-51 1,230(2'-4') Test Boring Location And Deepest Soil Sample With Total Chromium Concentration Greater Than 500 ppm. These Test Borings Were Advanced During The Supplemental Chromium Delineation.

NE Indicates That Soil Samples Collected From This Test Boring Did Not Exceed 500 ppm Total Chromium.

NOTE:

1. Partial plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.
2. Soil samples tested for Chromium using ASP Method CLP-M.



BUILDING KEY PLAN
NTS

FIELD VERIFIED BY	DATE
DPN	04-2003
DRAWN BY	DATE DRAWN
LRP	04-02-2003
SCALE	DATE ISSUED
1" = 10'	04-02-2003

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

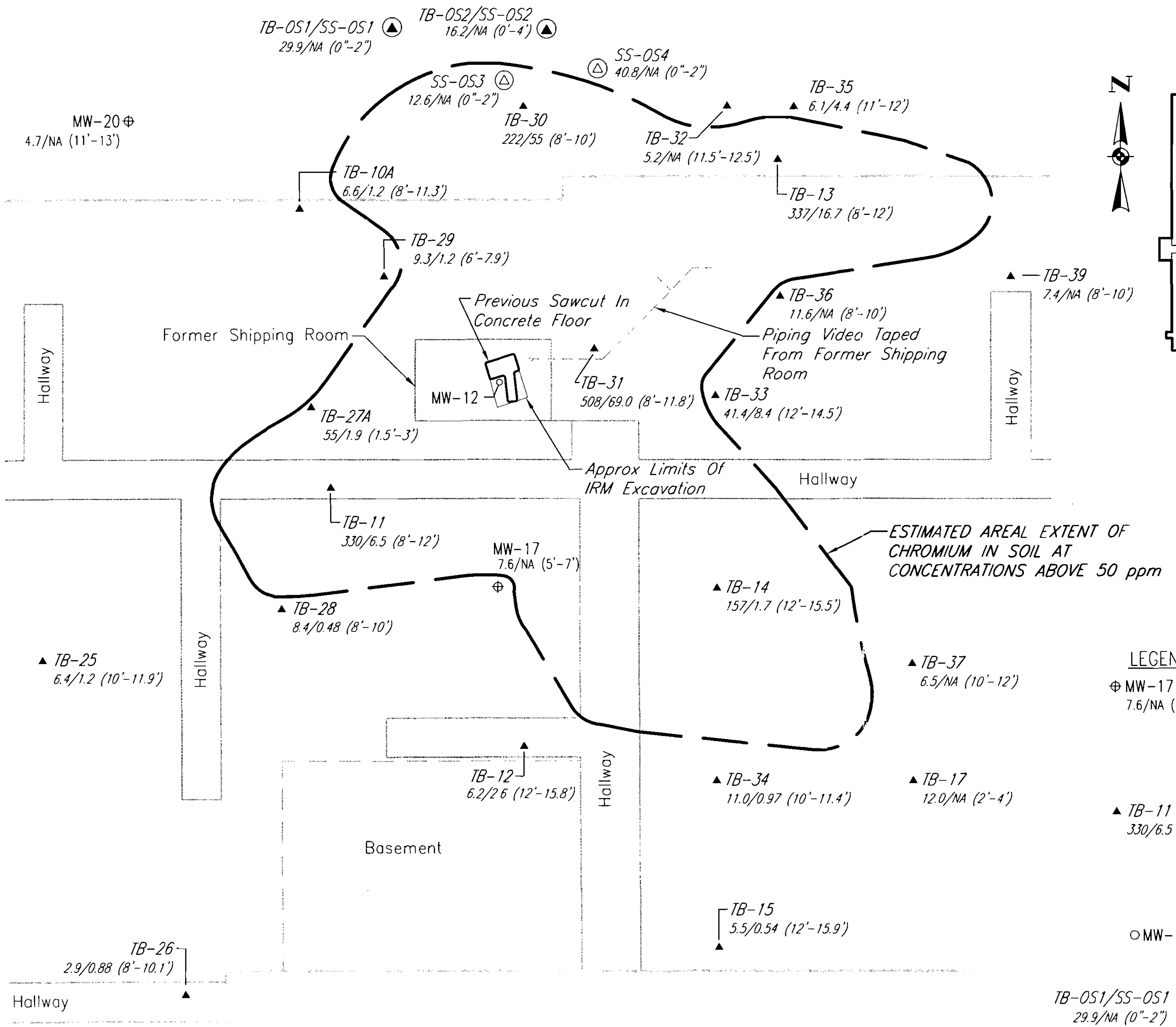
PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY

FEASIBILITY STUDY

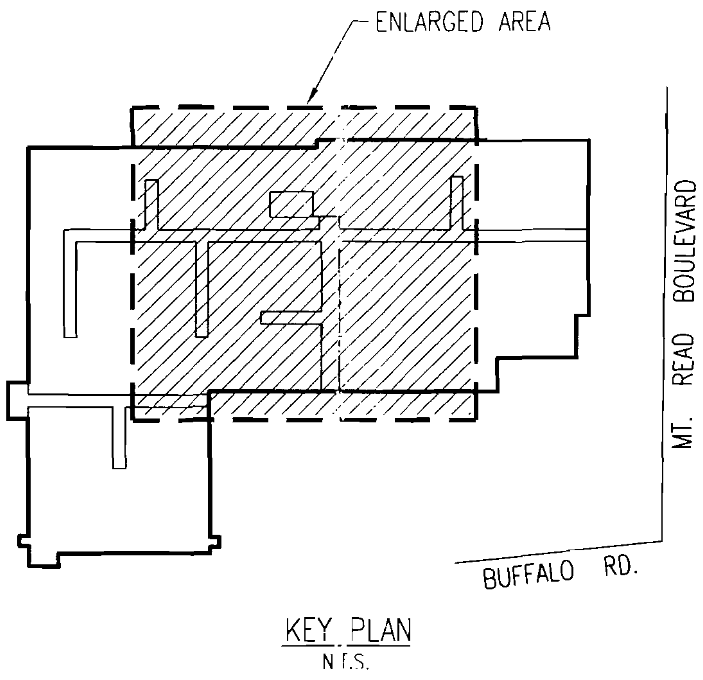
DRAWING TITLE
Partial Plan With Deepest Soil Samples Containing Concentrations Of Chromium Greater Than 500 ppm

PROJECT NO
2712R-01

FS-5A



PARTIAL PLAN
1" = 30'



KEY PLAN
N.T.S.

LEGEND

⊕ MW-17 7.6/NA (5'-7')	Deep Bedrock Monitoring Well Installed During The Remedial Investigation With Peak Total Chromium/Hexavalent Chromium Concentration In Parts Per Million (ppm) Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis
▲ TB-11 330/6.5 (8'-12')	Test Boring Advanced During The Remedial Investigation With Peak Total Chromium/Hexavalent Chromium Concentration In ppm Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis
○ MW-12	Overburden and/or Shallow Bedrock Monitoring Well Installed Prior To The Remedial Investigation
TB-0S1/SS-0S1 ▲ 29.9/NA (0"-2")	Off-Site Test Boring/Surface Sample Advanced During The Remedial Investigation With Peak Total Chromium /Hexavalent Chromium Concentration In ppm Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis
NA	Not Analyzed
ND	Not Detected Above Laboratory Detection Limits

NOTE:

1. Partial plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.

Time Plotted: Fri Jan 21 10:20 2005
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Xerox432AnsiB-2; 11 x 17
Layout Name: Layout1
Ref1:
Ref2:
Ref3:
Ref4:
Ref5:
Ref6:

DATE
03-2003
DATE DRAWN
03-14-2003
DATE ISSUED
03-14-2003
FIELD VERIFIED BY
DPN
DRAWN BY
LRP
SCALE
1" = 30'

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY
FEASIBILITY STUDY
DRAWING TITLE
Partial Plan With Isopleth For
Total Chromium Within Soil Exceeding 50 ppm

PROJECT NO
2712R-01

FS-6

Ref1: 0-2contourMaguir-1.dwg Ref4:
Ref2: 2712base-3dwg.dwg Ref5:
Ref3: Ref6:

Xerox432AnsiB-2; 11 x 17
Layout Name: Model

Time Plotted: Fri Jun 21 09:05 2005
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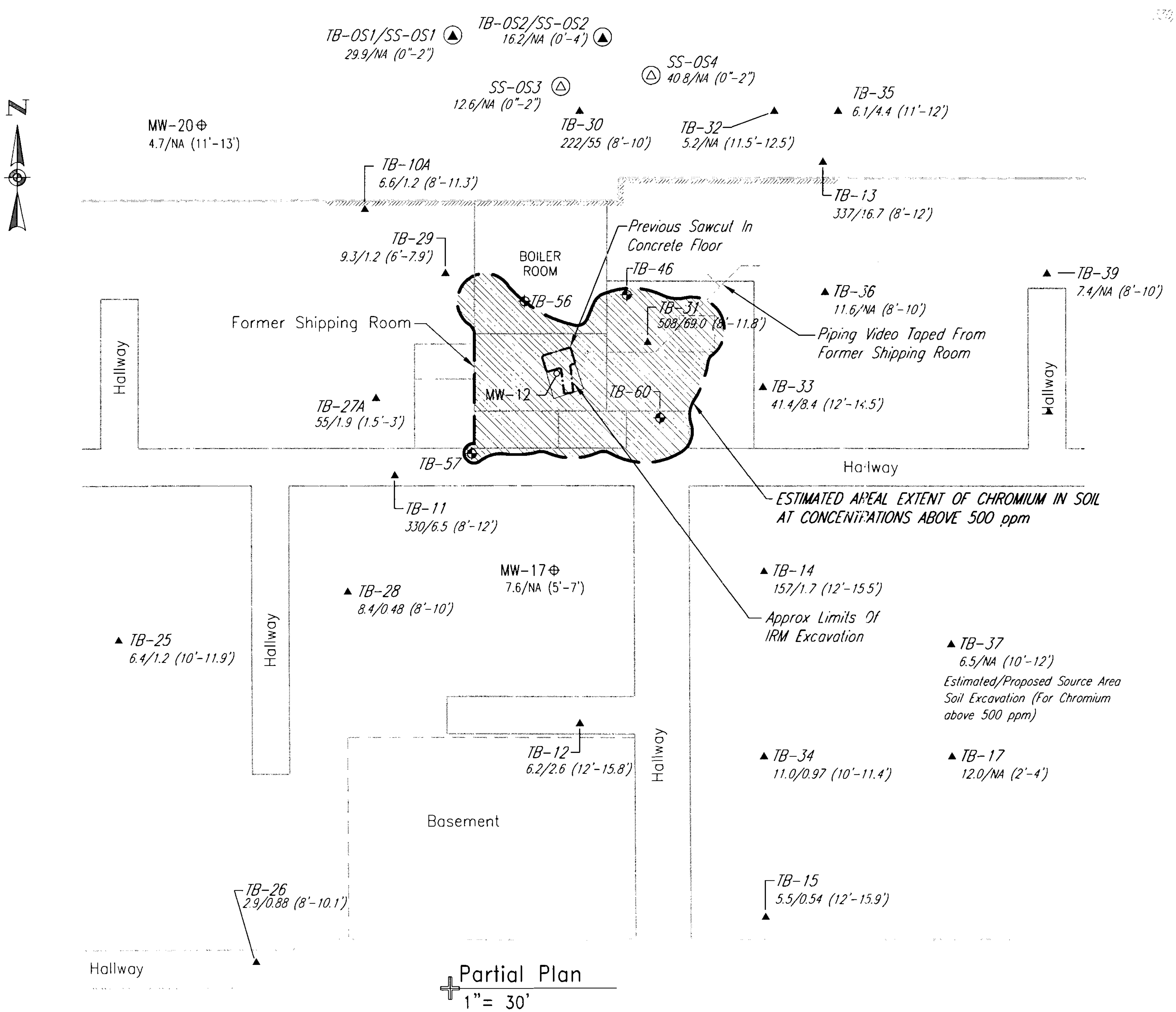


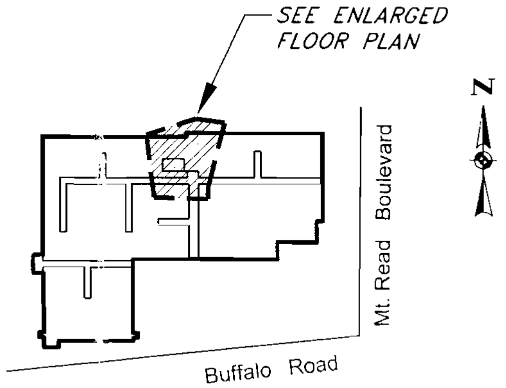
Partial Plan
1"= 30'

LEGEND:

TB-11 ▲	Test Boring Advanced Between During Remedial Investigation With Total Chromium/Hexavalent Chromium Concentration In Parts Per Million (ppm) Detected In A Soil Sample, Depth Interval (Feet) in Parenthesis. Test Borings Were Advanced Between April And September 1998.
MW-12 ○	Overburden and/or Shallow Bedrock Monitoring Well Installed Prior To The Remedial Investigation
MW-17 ⊕ 7.6/NA (5'-7')	Deep Bedrock Monitoring Well Installed During The Remedial Investigation With Peak Total Chromium/Hexavalent Chromium Concentration In Parts Per Million (ppm) Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis

NOTE:

1. Partial plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1999.



BUILDING
KEY PLAN
NTS

DATE 04-2003
FIELD VERIFIED BY DPN
DATE DRAWN 04-02-2003
DRAWN BY LRP
DATE ISSUED 04-02-2003
SCALE 1" = 30'

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

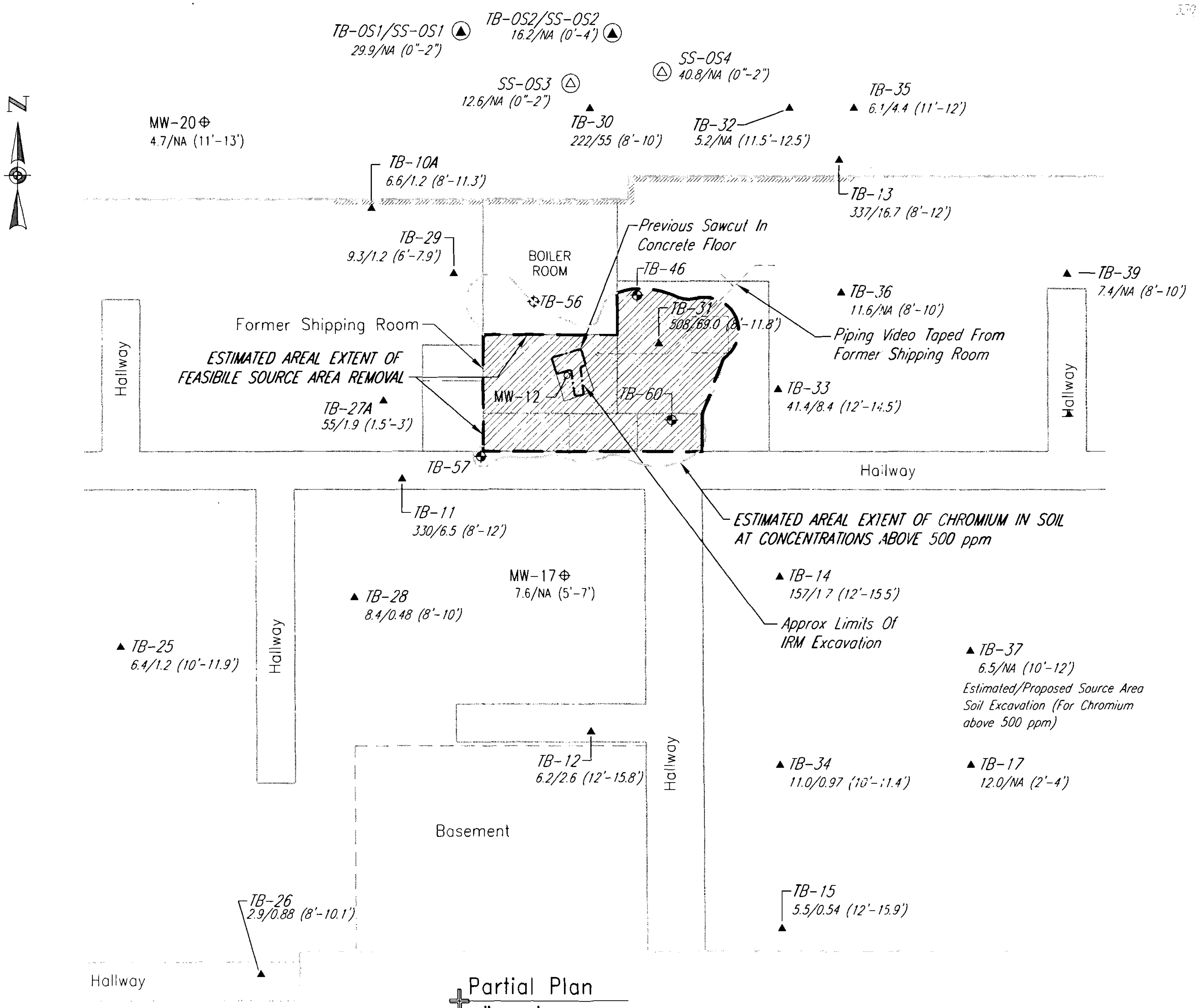
PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY

FEASIBILITY STUDY

DRAWING TITLE
Partial Plan With Isopleth For
Total Chromium Within Soil Exeecding 500 ppm

PROJECT NO
2712R-01

FS-7



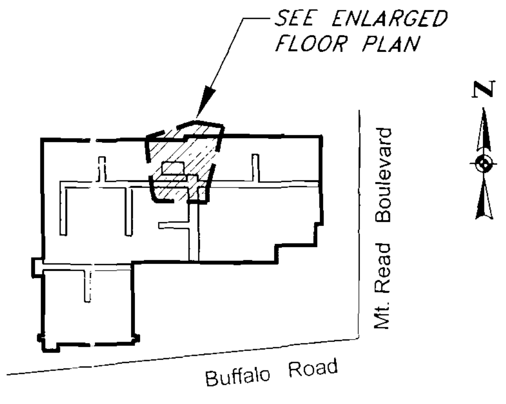
Partial Plan
1"= 30'

LEGEND:

TB-11 ▲	Test Boring Advanced Between During Remedial Investigation With Total Chromium/Hexavalent Chromium Concentration In Parts Per Million (ppm) Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis, Test Borings Were Advanced Between April And September 1998.
MW-12 ○	Overburden and/or Shallow Bedrock Monitoring Well Installed Prior To The Remedial Investigation
MW-17 ⊕ 7.6/NA (5'-7')	Deep Bedrock Monitoring Well Installed During The Remedial Investigation With Peak Total Chromium/Hexavalent Chromium Concentration In Parts Per Million (ppm) Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis

NOTE:

1. Partial plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.



BUILDING KEY PLAN
NTS

DATE 04-2003
DATE DRAWN 04-02-2003
DATE ISSUED 04-02-2003
FIELD VERIFIED BY DPN
DRAWN BY LRP
SCALE 1" = 30'

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

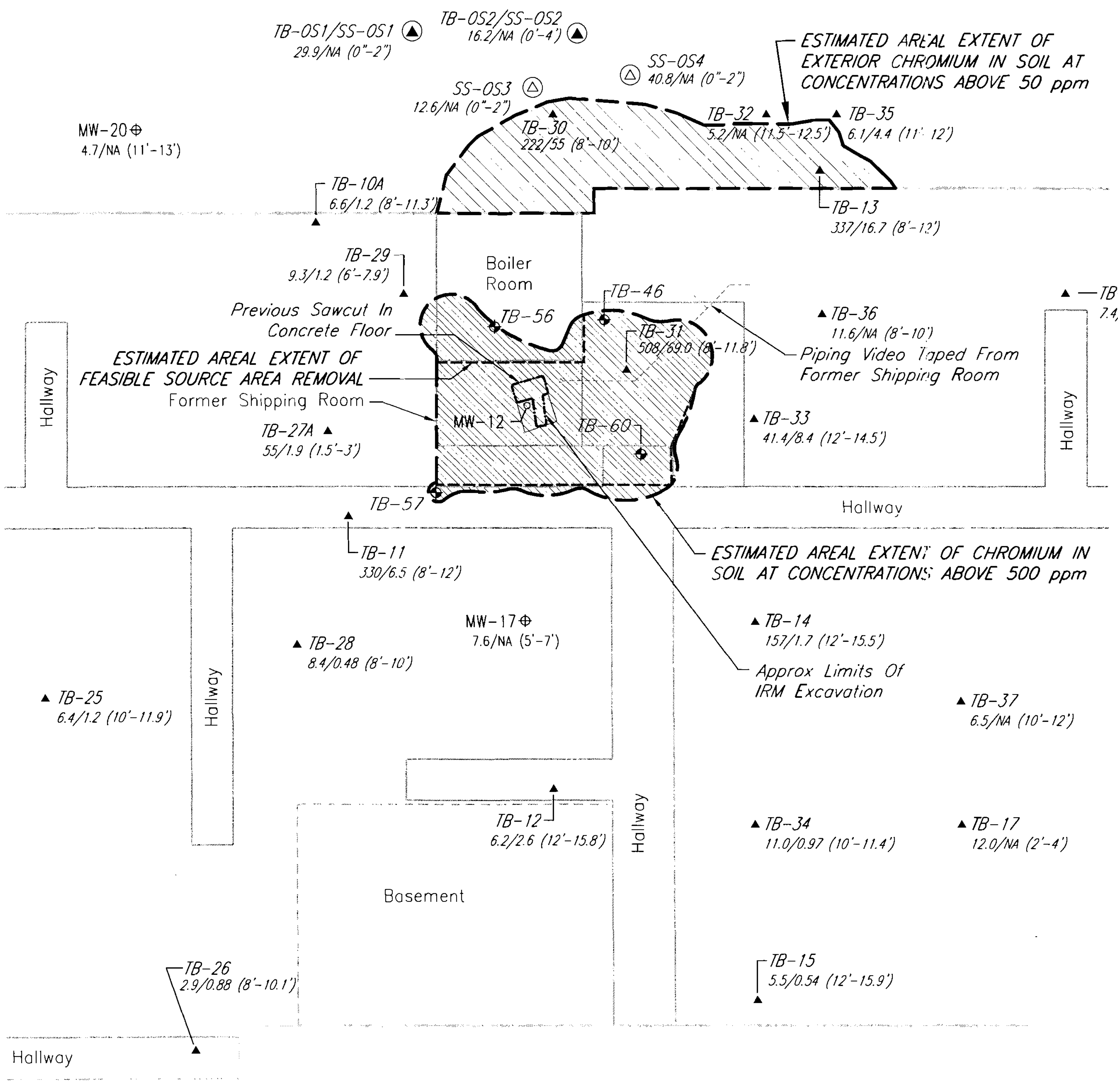
PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY

FEASIBILITY STUDY

DRAWING TITLE
Partial Plan With Isopleth For Total Chromium Within Soil Exceeding 500 ppm And Estimated Extent Of Feasible Source Area Soil Removal

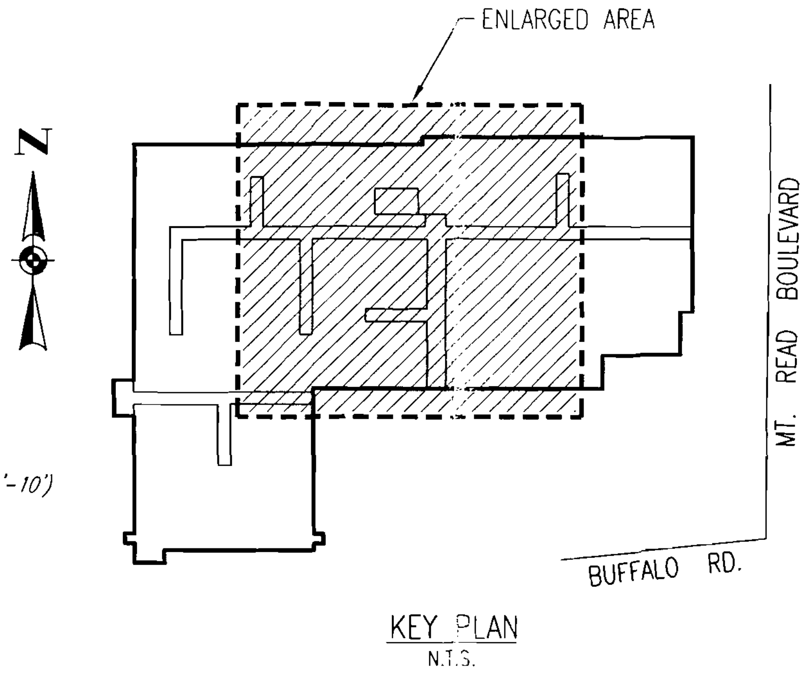
PROJECT NO
2712R-01

FS-7A



PARTIAL PLAN

1" = 30'



KEY PLAN

N.T.S.

NOTE:

1. Partial plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.

LEGEND

⊕ MW-17 7.6/NA (5'-7')	Deep Bedrock Monitoring Well Installed During The Remedial Investigation With Peak Total Chromium/Hexavalent Chromium Concentration In Parts Per Million (ppm) Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis
▲ TB-11 330/6.5 (8'-12')	Test Boring Advanced During The Remedial Investigation With Peak Total Chromium/Hexavalent Chromium Concentration In ppm Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis
○ MW-12	Overburden and/or Shallow Bedrock Monitoring Well Installed Prior To The Remedial Investigation
TB-OS1/SS-OS1 ▲ 29.9/NA (0"-2")	Off-Site Test Boring/Surface Sample Advanced During The Remedial Investigation With Peak Total Chromium/Hexavalent Chromium Concentration In ppm Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis
NA	Not Analyzed
ND	Not Detected Above Laboratory Detection Limits

Time Plotted: Fri Jan 21 10:35 2005
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Xerox432AnsiB-2; 11 x 17
Layout Name: Layout1
Ref1:
Ref2:
Ref3:
Ref4:
Ref5:
Ref6:

FIELD VERIFIED BY DPN	DATE 03-2003
DRAWN BY LRP	DATE DRAWN 03-14-2003
SCALE 1" = 30'	DATE ISSUED 03-14-2003

day

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

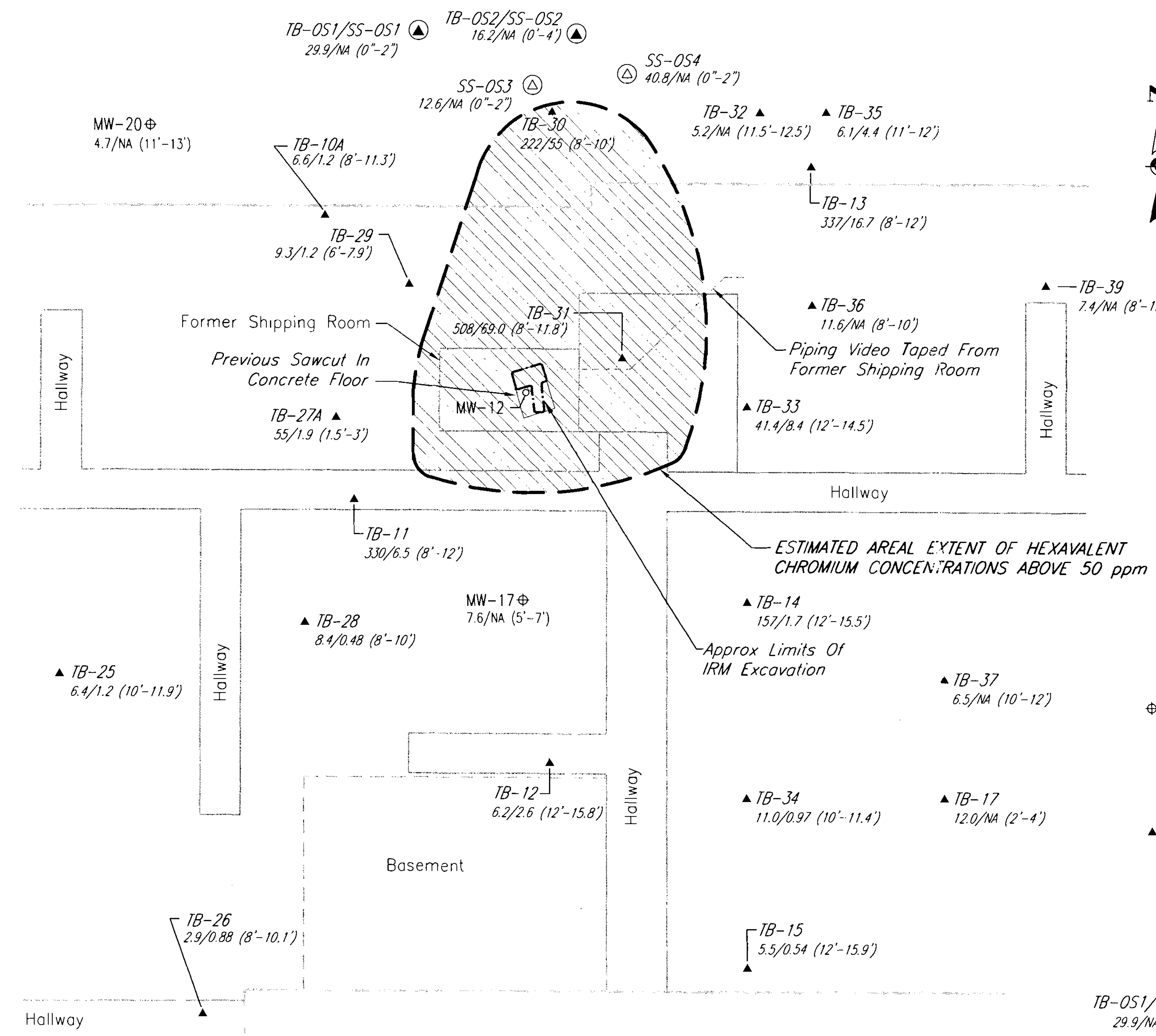
PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY

FEASIBILITY STUDY

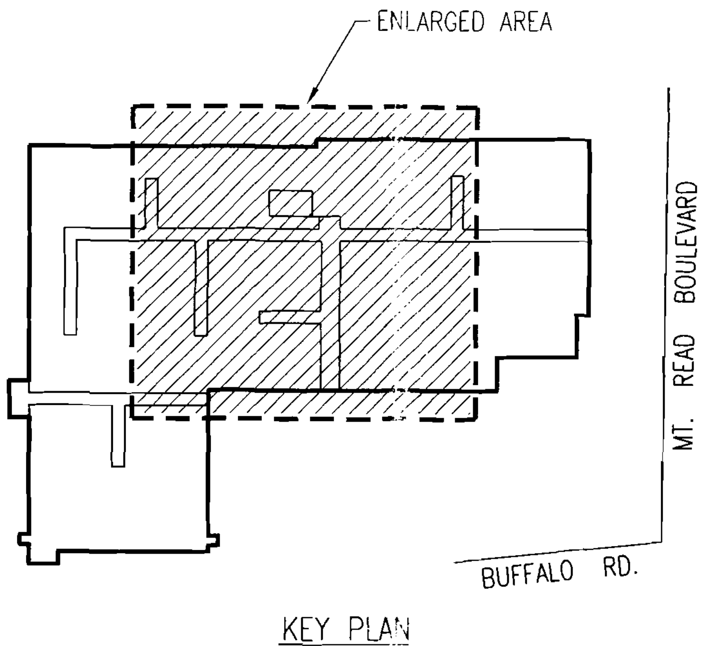
DRAWING TITLE
Partial Plan with Isopleths for Total Chromium within Soil Exceeding 500 ppm and Total Chromium within Exterior Soil Exceeding 50 ppm

PROJECT NO
2712R-01

FS-8



PARTIAL PLAN
1" = 30'



KEY PLAN
N.T.S.

LEGEND

⊕ MW-17 7.6/NA (5'-7')	Deep Bedrock Monitoring Well Installed During The Remedial Investigation With Peak Total Chromium/Hexavalent Chromium Concentration In Parts Per Million (ppm) Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis
▲ TB-11 330/6.5 (8'-12')	Test Boring Advanced During The Remedial Investigation With Peak Total Chromium/Hexavalent Chromium Concentration In ppm Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis
○ MW-12	Overburden and/or Shallow Bedrock Monitoring Well Installed Prior To The Remedial Investigation
TB-0S1/SS-0S1 ▲ 29.9/NA (0"-2")	Off-Site Test Boring/Surface Sample Advanced During The Remedial Investigation With Peak Total Chromium/Hexavalent Chromium Concentration In ppm Detected In A Soil Sample, Depth Interval (Feet) In Parenthesis
NA	Not Analyzed
ND	Not Detected Above Laboratory Detection Limits

NOTE:

1. Partial plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.

FIELD VERIFIED BY
DPN
DATE
04-2003
DRAWN BY
LRP
DATE DRAWN
04-02-2003
SCALE
1" = 30'
DATE ISSUED
04-02-2003

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY
FEASIBILITY STUDY
DRAWING TITLE
Partial Plan With Isopleth For
Hexavalent Chromium Within Soil Exceeding 50 ppm

PROJECT NO
2712R-01

FS-9

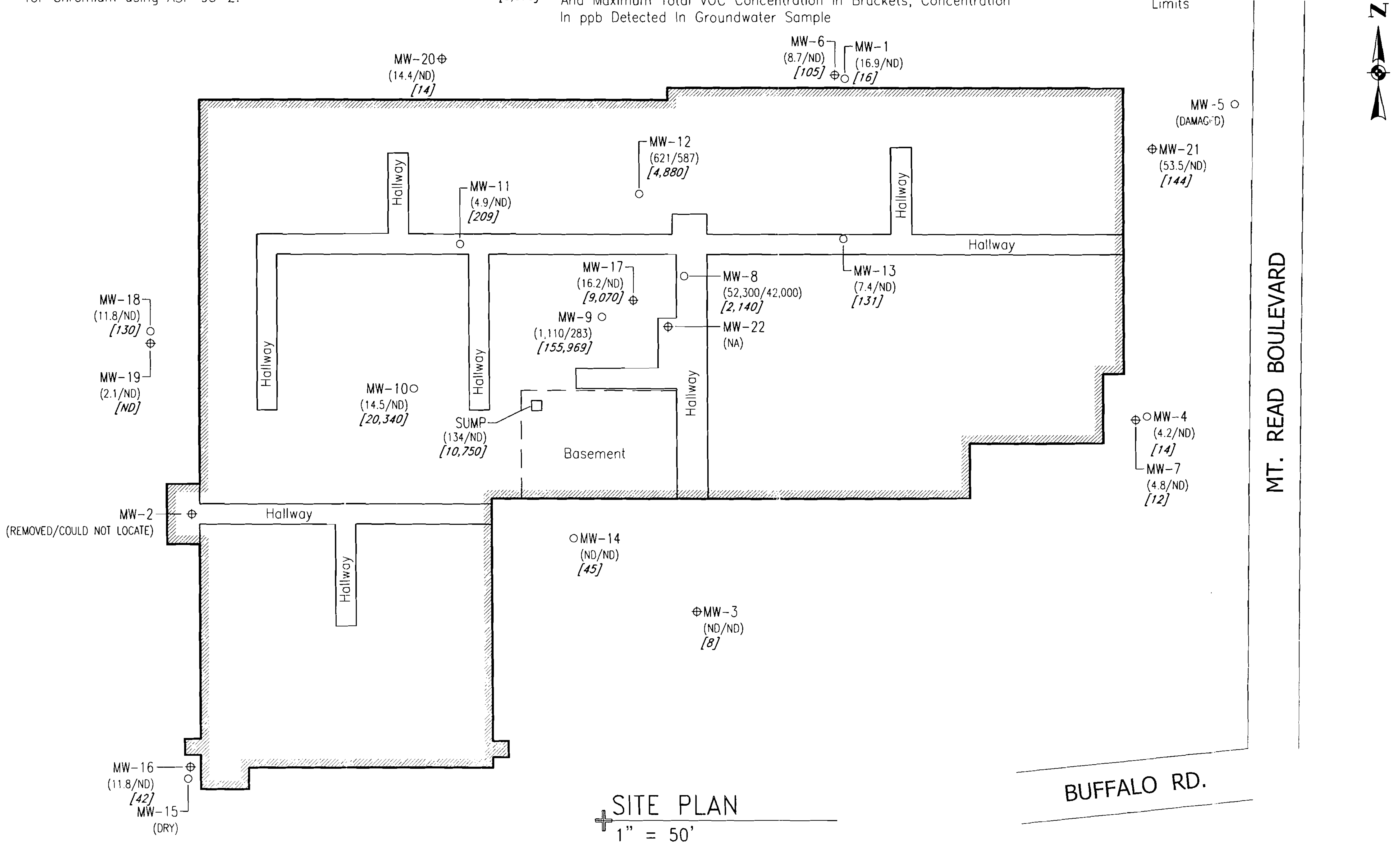
Time Plotted: Fri Jan 21 10:50 2005 Xerox432AnsiB-2; 11 x 17
File Name: \Maguir\1506\FeasStudy2001\2712-16.dwg Layout Name: Layout1
Ref2: Ref3:
Ref5: Ref6:

NOTE:

1. Site plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.
2. Bedrock well MW-2 has been abandoned due to new construction. Overburden well MW-5 is damaged.
3. Groundwater samples analyzed for VOCs using ASP 95-1 and for Chromium using ASP 95-2.

LEGEND

○MW-1 (16.9/ND) *[16]*	Overburden and/or Shallow Bedrock Monitoring Well Location With maximum Chromium/Hexavalent Chromium Concentration In Parenthesis, And Maximum Total VOC Concentration In Brackets, Concentration In Parts Per Billion (ppb) Detected In Groundwater Sample
⊕MW-17 (16.2/ND) *[9,070]*	Deep Bedrock Monitoring Well Location With Maximum Chromium/Hexavalent Chromium Concentration In Parenthesis, And Maximum Total VOC Concentration In Brackets, Concentration In ppb Detected In Groundwater Sample
☐ SUMP (134/ND) *[10,750]*	Basement Sump With Maximum Chromium/ Hexavalent Chromium Concentration In Parenthesis, And Maximum Total VOC Concentration In Brackets, Concentration In ppb Detected In Groundwater Sample
ND	Not Detected Above Laboratory Detection Limits



SITE PLAN
1" = 50'

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Xerox432AnsiB-2: 11 x 17
Layout Name: Layout1

Ref1:
Ref2:
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Ref4:
Ref5:
Ref6:

FIELD VERIFIED BY DPN		DATE 04-2003
DRAWN BY LRP		DATE DRAWN 04-02-2003
SCALE 1" = 50'		DATE ISSUED 04-02-2003

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY

FEASIBILITY STUDY

DRAWING TITLE
Partial Plan With Maximum Chromium And
Maximum Total VOCs Detected In Groundwater Samples

PROJECT NO
2712R-01

FS-10

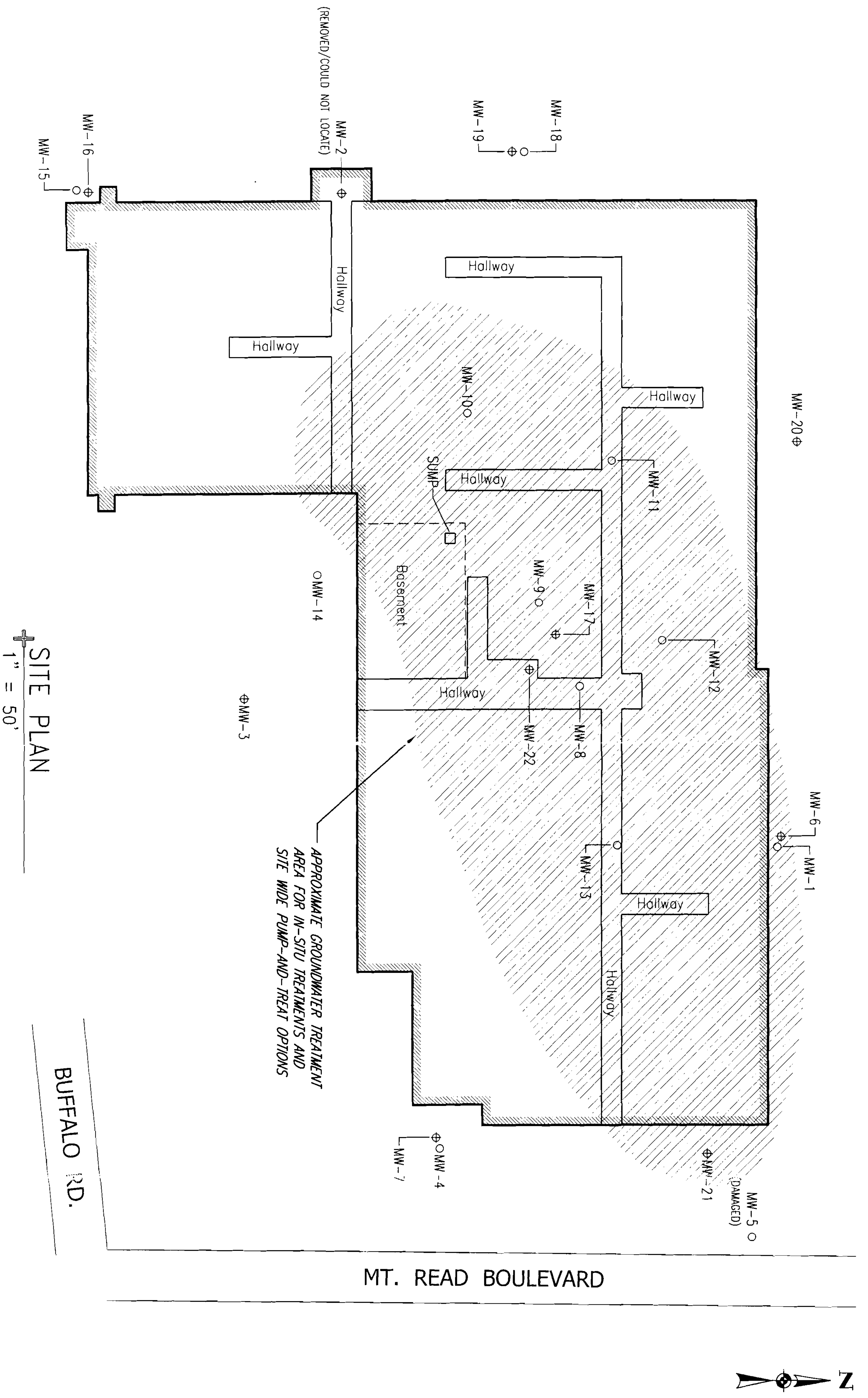
NOTE:

1. Site plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.
2. Bedrock well MW-2 has been abandoned due to new construction. Overburden well MW-5 is damaged.

LEGEND

○MW-14 Overburden and/or Shallow Bedrock Monitoring Well Location

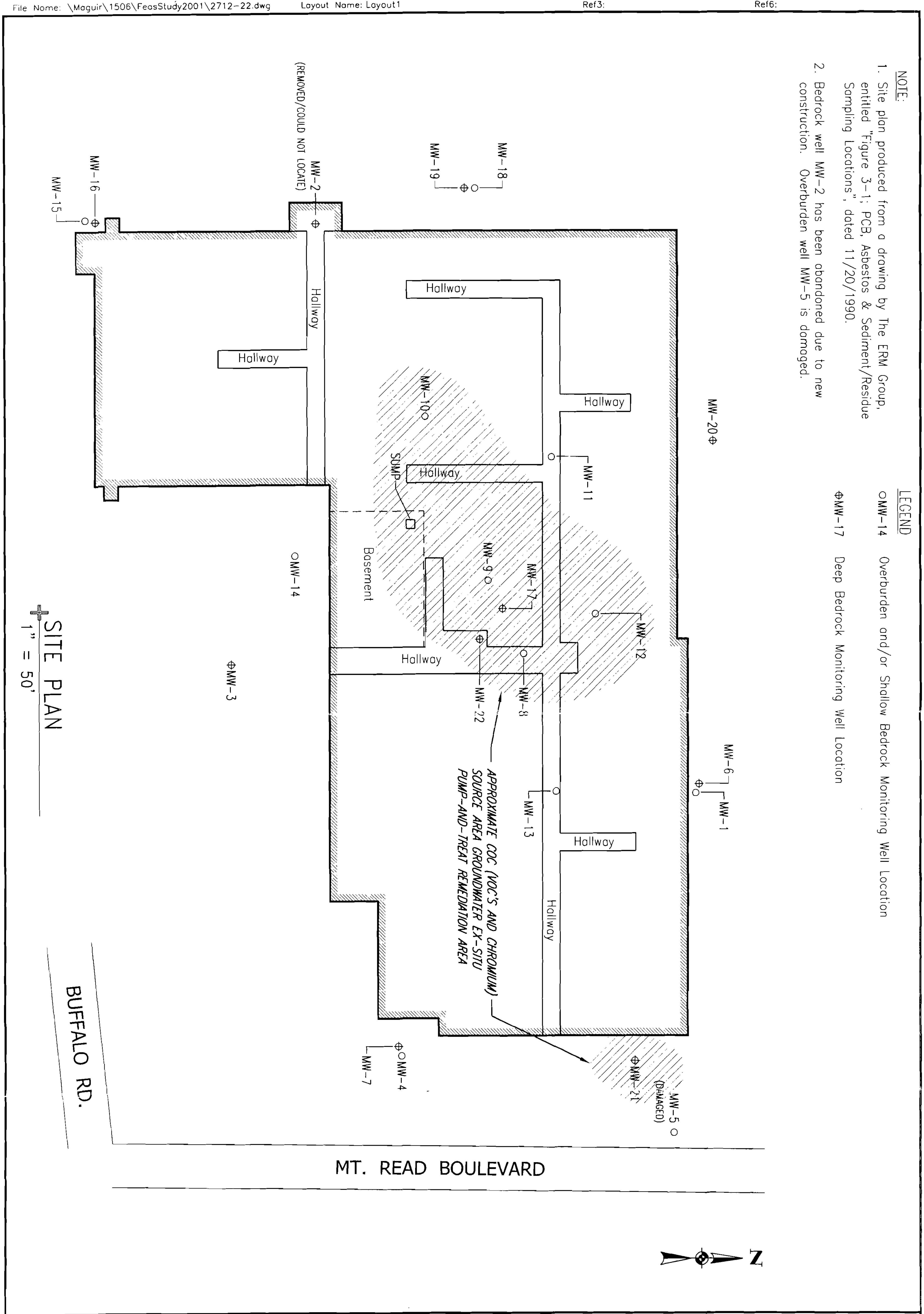
⊕MW-17 Deep Bedrock Monitoring Well Location



SITE PLAN
1" = 50'

FS-11	PROJECT NO 2712R-01	PROJECT TITLE 95 MT. READ BOULEVARD ROCHESTER, NY FEASIBILITY STUDY DRAWING TITLE Site Plan With Proposed Groundwater Treatment Area For In-Situ Chemical Treatments and Site Wide Pump-and-Treat Options	day DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008 NEW YORK, NEW YORK 10165-1617

FIELD VERIFIED BY DPN	DATE 04-2003
DRAWN BY LRP	DATE DRAWN 04-01-2003
SCALE 1" = 50'	DATE ISSUED 04-01-2003



SITE PLAN
1" = 50'

NOTE:

1. Site plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.
2. Bedrock well MW-2 has been abandoned due to new construction. Overburden well MW-5 is damaged.

LEGEND

○MW-14 Overburden and/or Shallow Bedrock Monitoring Well Location
⊕MW-17 Deep Bedrock Monitoring Well Location

PROJECT NO
2712R-01

FS-12

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY

FEASIBILITY STUDY

DRAWING TITLE
Site Plan With Proposed COC (VOCs And Chromium) Source Area Groundwater Pump-And-Treat Remediation Area

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

FIELD VERIFIED BY DPN	DATE 04-2003
DRAWN BY LRP	DATE DRAWN 04-01-2003
SCALE 1" = 50'	DATE ISSUED 04-01-2003

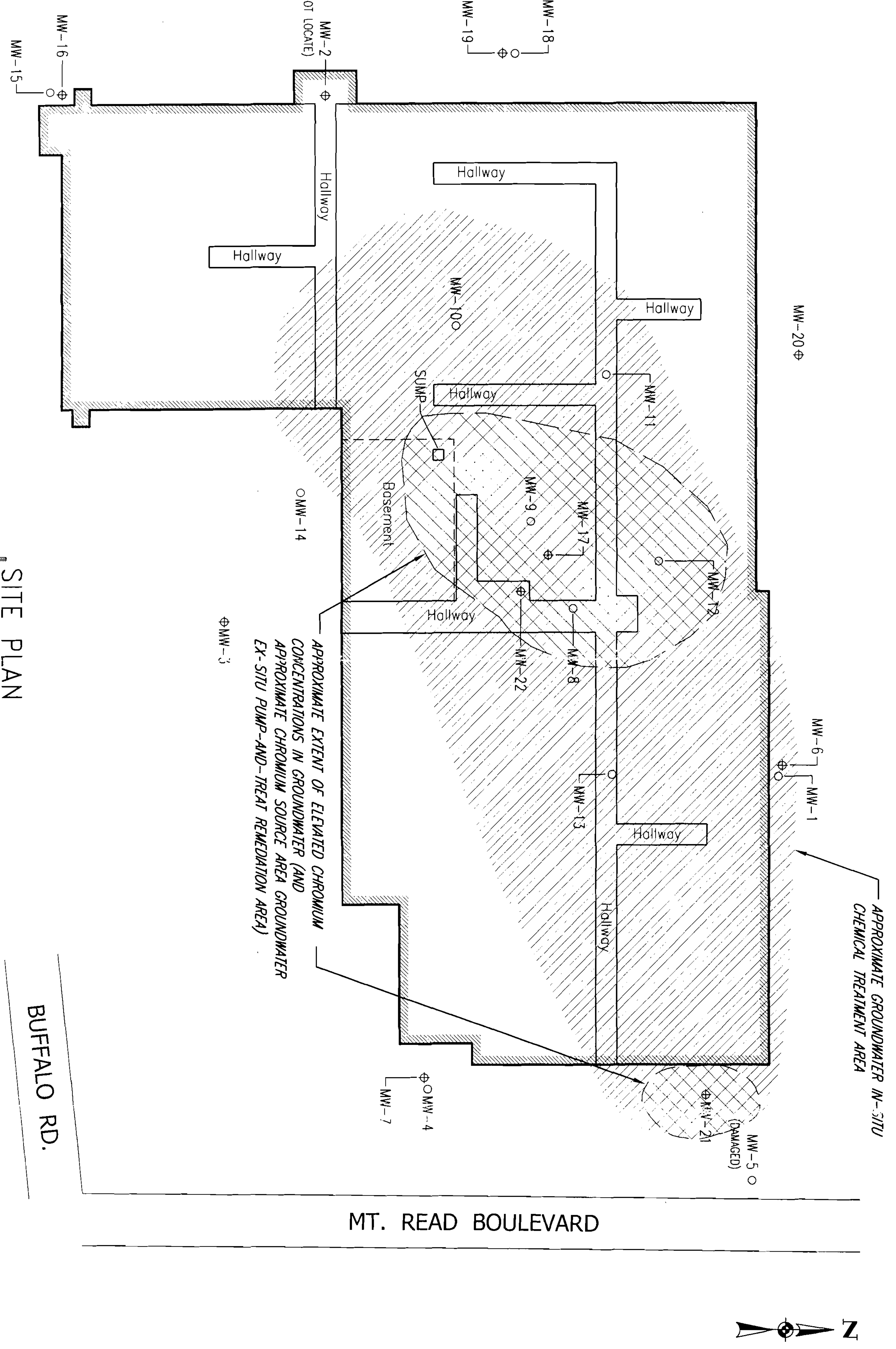
NOTE:

1. Site plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.
2. Bedrock well MW-2 has been abandoned due to new construction. Overburden well MW-5 is damaged.

LEGEND

○MW-14 Overburden and/or Shallow Bedrock Monitoring Well Location

⊕MW-17 Deep Bedrock Monitoring Well Location



SITE PLAN
1" = 50'

PROJECT NO 2712R-01 FS-13	PROJECT TITLE **95 MT. READ BOULEVARD** **ROCHESTER, NY** **FEASIILITY STUDY**	**day** DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008 NEW YORK, NEW YORK 10165-1617	FIELD VERIFIED BY **DPN**	DATE **04-2003**
			DRAWN BY **LRP**	DATE DRAWN **04-15-2004**
	DRAWING TITLE **Site Plan With Chromium Source Area Groundwater** **Ex-Situ Pump-And-Treat With In-Situ Chemical Reduction**		SCALE **1"= 50'**	DATE ISSUED **04-15-2004**

APPENDIX B

Risk Assessment

Qualitative Human Health and Environmental Risk Assessment

Former General Circuits Facility
Inactive Hazardous Waste Disposal Site
NYSDEC Site Code #828085
95 Mt. Read Blvd
Rochester, New York

January 2, 2001

(Revised February 13, 2003)
(Revised January 24, 2005)

Daland R. Juberg, Ph.D.

Qualitative Risk Assessment Pertaining to NYSDEC Site Code #828085

I. Purpose

The primary motivation for conducting a qualitative site-specific risk assessment for Site Code #828085 (hereafter Site) is to evaluate whether environmental contaminants associated with the Site pose a risk to human health or the environment. If potential risks are identified, it is important to characterize the likelihood of adverse impacts to human health and the environment and to recommend remedial or mitigating measures that will decrease or eliminate the occurrence of such risks.

II. Background

The former General Circuits Site consists of 3.5 acres that includes a 120,000 square foot building (Day Environmental Inc. RI Report, December 2000; hereafter, Day, 2000). The remaining land not covered by the building has been improved with asphalt driveways and parking lots. The Site is located in an area of Rochester, New York that is zoned primarily for industrial and commercial uses (RI-3 in Appendix). The Site building is currently leased to multiple light industrial and commercial businesses.

Day Environmental Inc. conducted remedial investigation (RI) fieldwork at the Site between April 1998 and October 2000. Environmental characterization data was provided by Day Environmental Inc. to the International Center for Toxicology and Medicine (ICTM) so that specific environmental contaminants could be identified. Based on this fieldwork, contaminants of concern (COCs) include chlorinated VOCs in the groundwater and total/hexavalent chromium in the soil and groundwater. Some target analyte list (TAL) metals were also detected in various Site soil and groundwater samples at concentrations that exceeded New York State Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series (NYSDEC TOGS) 1.1.1 groundwater standards/guidance values and NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 recommended soil cleanup objectives. The source of the chlorinated VOCs may be attributable to the historic use of solvent degreasers, while the source of chromium was thought to be former acid cleaning operations. The COCs associated with the Site are located beneath the building (i.e., in soil and groundwater) and are physically separated from the aboveground environment by barrier materials (e.g., cement flooring, asphalt pavement).

III. Qualitative Risk Assessment Approach

Both qualitative and quantitative risk assessments should be considered when evaluating human health risk, depending on the availability of site-specific data and the concerns and goals related to the evaluation. A qualitative risk assessment may utilize site-specific information without specifically incorporating modeled or predictive risk measures (as used in quantitative risk assessment) to address risk to human health or the environment.

Relative to the present Site of concern, a qualitative risk assessment is appropriate as an initial approach for the evaluation of potential health risks given the limited area of contamination, the relative inaccessibility of humans to the contaminated environmental media, and the local zoning and Site characteristics (industrial/commercial) that limit the pathways of exposure to on-site workers, occupants of nearby commercial/industrial businesses, and residential homes. This type of initial assessment is being conducted on behalf of Day Environmental Inc. to support the RI recommendation (Day, 2000) that a risk assessment be performed to identify potential routes and points of exposure, information that is considered qualitative in nature and useful in determining whether subsequent quantitative risk assessment is needed.

IV. Site Analytical Data Review

The RI report provides evidence of contaminants located on the Site (RI-4, RI-5, RI-6, RI-7, and RI-OS1 in Appendix). Analytical data confirm that the COCs are located either in groundwater or soils beneath the Site building or in localized areas around the perimeter which is largely covered by asphalt paving. For the majority of COCs, the highest concentrations are located in the north central region of the Site, underneath, or adjacent to the present building site. The following information is provided to highlight those contaminants and sampling locations where exceedances from current or proposed NYSDEC criteria are known and to aid in the qualitative risk assessment for the Site. For a more complete analysis of the Site contamination, the reader is referred to the RI report (Day, 2000).

Chromium

In review of the soil chromium data, the areas of contamination (for both total and hexavalent forms) that exceed the NYSDEC TAGM 4046 objective (proposed value of 50 ppm) for chromium (unspecified as to total chromium, hexavalent chromium, or other) are concentrated in the northern sections of the Site underneath the building (RI-5 and RI-OS1 in Appendix). Data generated during interim remedial measures (soil excavation and removal from the area where chromic acid operations were conducted) showed total chromium levels in soil ranging from 2,390 to 21,400 ppm. There are also elevated levels at the building's perimeter (TB-13) and at a location (TB-30) approximately 25 feet north of the building. Site soil concentrations at test borings away from the former shipping room, where chromic acid operations were historically performed, range from 2.9-508 parts per million (ppm) for total chromium and 0.48-69.0 ppm for hexavalent chromium. There were six test boring locations (TB-11, TB-13, TB-14, TB-27A, TB-30, and TB-31) where total chromium levels exceeded the proposed cleanup objective of 50 ppm. Analytical data for all other test boring locations (RI-5, RI-OS1, and Table 11 in Appendix) are generally reflective of background concentrations (NYSDEC TAGM 4046 range of 1.5-40 ppm) and do not indicate either widespread chromium contamination or migration in a clear, discernible pattern in soil beneath the building.

In review of the monitoring well chromium data, with the exception of one well (MW-21), the areas of contamination that exceed the NYSDEC TOGS 1.1.1 groundwater standard of 50 ppb (for both total and hexavalent forms of chromium) are again concentrated in the north central portion of the Site underneath the building (RI-7 in Appendix). MW-21, with a concentration of 53.5 ppb (total chromium), slightly exceeded the groundwater standard for chromium. Monitoring wells MW-8, MW-9, and MW-12 showed total chromium levels in excess of the NYSDEC TOGS 1.1.1 chromium standard (RI-7 in Appendix). As with the soil chromium data, monitoring data for chromium in groundwater do not indicate widespread plume movement or off-site migration. This is consistent with historical information that suggests that former operations confined to small regions of the existing Site may be responsible for the existence of chromium in underlying soil and groundwater (Day, 2000).

VOCs

In review of the soil VOC data, none of the individual VOCs detected exceeded NYSDEC TAGM 4046 objectives for any of the test borings (RI-4 and Tables 10A and 10B in Appendix). Only at TB-20 was the total VOC level ((50,866 ppb) in excess of the NYSDEC TAGM 4046 total VOC clean-up objective of <10,000 ppb. TB-20 is located adjacent to an existing business (used automobile sales) that may have influenced the elevated VOC concentrations at this location, a perspective based on information contained in the RI report (e.g., visual observation of outdoor container storage, housekeeping practices, lack of on-Site source; Day, 2000). However, as was the pattern of contamination for chromium, VOCs in soil appear to be confined to a limited area near where chromium contamination was most evident.

For VOCs in groundwater, analytical data indicate that the majority of contaminated monitoring wells are located in the central region of the Site building (RI-6 in Appendix). Groundwater samples collected from MW-9, located in the center of the building contained the highest total peak VOC concentrations, while most other wells contained very low total peak VOC concentrations. Thus, while there are localized hotspots indicative of VOC contamination, there is no evidence of widespread contamination.

In summary, the analytical data suggest that the contamination associated with the Site appears to be associated with a localized region underneath the Site building and that, over time, VOC and chromium (both total and hexavalent) concentrations in monitoring wells have either fluctuated slightly or decreased in concentration (Tables 20, 21 in Appendix).

In addition to the soil and groundwater VOC data, there are historical (1993) air sampling data that indicate very low indoor VOC concentrations in the area of the sump in the basement (Table 1).

Table 1. VOC Concentrations in the Basement Sump Room[a]

Constituent	Location 1 (ppm)	Location 2 (ppm)	ACGIH TLV (ppm)
Vinyl chloride	<0.1	<0.1	5
1,1-dichloroethene	<0.1	<0.1	5
Cis-1,2-dichloroethene	<0.1	0.3	200
Trichloroethene	<0.1	0.1	50
Tetrachloroethene	<0.08	<0.08	25

[a] Reproduced from Day Environmental, 1993 (Day, 2000).

For the analytes detected, airborne concentrations were either below or just above the analytical detection limit for each analyte. The sump is in the Site basement where presently there is little, if any, human activity occurring on a daily basis. While this situation could change in the future, at present, there appears to be minimal, if any, regular exposure to Site occupants from this VOC source.

More recently (i.e., 2004) some additional VOC monitoring was conducted on sub-slab soil, indoor air at the Site, and ambient air, external to the Site. These data are presented in Table 2.

TABLE 2

SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS (VOCs) TEST RESULTS IN MICROGRAMS PER CUBIC METER ($\mu g/m^3$)

DETECTED VOCs	SAMPLE LOCATION AND DESIGNATION								
	Sub-Slab (Sample-1A)	Indoor Air (Sample-1B)	Sub-Slab (Sample-2A)	Indoor Air (Sample-2B)	Sub-Slab (Sample 3A)	Indoor Air (Sample-3B)	Sub-Slab (Sample 4A)	Indoor Air (Sample 4B)	Roof Background (Sample 5)
Acetone	48	380	15	240	--	110	--	140	11
Trichlorofluoromethane	21	9.2	3.6	5.8	--	4.9	--	3.4	--
Methylene Chloride	--	3.8	4.7	15	--	90	--	62	--
Carbon Disulfide	--	--	5.6	--	--	--	--	--	--
trans-1,2-Dichloroethene	--	--	--	--	7,200	--	4,900	--	--
Vinyl Acetate	--	--	2.6	--	--	--	--	--	--
2-Butanone (MEK)	5.7	--	4.9	--	--	6.0	--	4.3	1.5
cis-1,2-Dichloroethene	--	--	--	2.8	18,000	4.2	11,000	--	--
Chloroform	--	--	23	--	2,000	1.6	1,500	--	--
1,1,1-Trichloroethane	18	--	110	--	--	--	--	--	--
Benzene	--	--	1.8	1.9	--	1.8	--	--	--
1,2-Dichloropropane	--	--	2.0	--	--	--	--	--	--
Bromodichloromethane	--	--	2.5	--	--	--	--	--	--
Trichloroethene	--	--	6.4	--	160,000	5.9	360,000	3.6	--
4-Methyl-2-pentanone	--	--	--	--	--	1.8	--	--	--
Toluene	11	24	16	93	--	270	--	430	4.4
Tetrachloroethene	8.0	--	73	3.5	47,000	9.8	190,000	7.1	--
Chlorobenzene	--	--	--	--	--	1.3	--	--	--
Ethylbenzene	11	--	12	13	--	31	--	35	--
m,p-Xylenes	40	6.3	42	36	--	85	--	98	1.6
Styrene	--	--	2.3	--	--	--	--	--	--
o-Xylene	13	--	14	8.5	--	20	--	23	--
1,4-Dichlorobenzene	--	--	--	1.9	--	3.4	--	5.4	--

A review of the subsurface soil gas and indoor air concentrations reveals these findings; (1) For those VOCs detected in both soil and indoor air samples, the concentrations in soil are significantly higher than indoor air concentrations, which suggests limited volatilization; (2) Although a quantitative assessment of human health risk has not been conducted relative to indoor air concentrations of the detected VOCs, if one were to compare the concentrations to an occupational health benchmark (i.e., OSHA PELs), the data demonstrate that indoor air concentrations are well below occupational standards; (3) However, VOC concentrations for a few of the analytes exceeded NYS DOH action levels. Therefore, because of the detectable concentrations of several VOCs in subsurface soil as well as concentrations of PCE and TCE in indoor air samples, a soil gas mitigation system (including carbon filtration units in the basement) has been employed on-Site, an intervention that should reduce both subsurface and indoor air concentrations of VOCs.

TAL Metals

Soil and groundwater sampling data generated during the remedial investigation show the presence of various target analyte list (TAL) metals, generally at relatively low concentrations with the exception of a few peak values at various wells and test boring sites (Tables 12, 17 in Appendix). Some of the TAL metals detected at elevated concentrations or levels (e.g., sodium, calcium, magnesium) are not among those considered to be particularly toxic to humans. Conversely, some of the more common toxic environmental metals (i.e., arsenic, mercury, cadmium) were generally not detected at concentrations that exceeded NYSDEC TOGS 1.1.1 groundwater standards/guidance values or NYSDEC TAGM 4046 recommended soil cleanup objectives. With the exception of TB-27A and TB-30, there is no consistent pattern of TAL metal contamination in either test boring or monitoring well sites. Without identifiable exposure pathways to humans, the presence of these metals in the environment does not connote a health risk to humans.

V. Site Visit and Observations Related to Evaluation of Risk

A site visit is important in any environmental investigation for the strict purposes of (a) visually inspecting the surrounding area of the contaminated area of concern; (b) identifying affected environmental media and potential exposure pathways, and (c) determining if relevant human receptors are present. A site ·visit was made to the property on July 28, 1999 during which time a walking tour was completed of the building and perimeter grounds. The following represent those significant observations related to (a) the analysis of potential risk to humans and the environment and (b) confounding factors that may influence any potential risk associated with historical contamination on the Site.

- *Exposure Pathway Delineation*

The most immediate and relevant observation related to potential human health risk is that there are few, if any, viable complete pathways of exposure given the current Site conditions and use of the property. Because the Site contamination is underneath the building and overlain with barrier materials (asphalt, pavement, cement, wood flooring), there is minimal potential for dermal exposure to Site contaminants. For VOCs contained in the soil, a potential source of exposure (inhalation) appears to be from the sump in the basement of the building, an area that is presently not occupied on a full-time basis (space leased by tenants for storage) and which is used for housing a passive groundwater treatment system. Additionally, results of recent soil gas/indoor air monitoring demonstrate a limited potential for volatilization of a few VOCs from sub-surface soil into surrounding above ground indoor air (Table 2). Chromium and other TAL metals are not expected to volatilize given present Site conditions and should not pose inhalation exposure potential. Finally, groundwater located beneath and around the building is not used for potable purposes and thus, ingestion of contaminated water by Site occupants can be eliminated as a route of exposure (J. Danzinger communication; Monroe County Department of Health communication; Groundwater Resources of Monroe County, New York, Appendix). In summary, at present, there do not appear to be any significant direct pathways of exposure to on-site occupants (Table 3). It is recognized that if future activities at the Site in any way materially change the Site conditions, then characterization of both direct and indirect pathways of exposure for both onsite workers and offsite residents should be revisited.

Table 3. Direct Pathway Characterization for Site Occupants

Exposure Pathway	**VOCs**	**Chromium Compounds**
Oral Ingestion	None	None
Inhalation	Possible	None
Dermal Contact	None	None

It is important to evaluate indirect pathways of exposure as well, as these may contribute to human exposure in certain situations. Indirect pathways of exposure that are typically evaluated and considered in evaluation of risk include soil ingestion, above ground produce ingestion, as well as beef, milk, and fish ingestion, all of which may be impacted if the site of investigation supports livestock, produce production, or aquatic species such as fish. For the present Site, indirect pathways of exposure are not relevant, as the surrounding area is not used for farming, fishing, or agriculture purposes. Finally, since the contaminated media (e.g., soil/groundwater) are located underneath the building proper, there is no opportunity for indirect contamination via soil ingestion (pica behavior by children).

- *Present On-Site Businesses and Coexposures*

  During the Site visit, it was determined by a review of the types of businesses that inhabit the Site building and through visual observation that there are solvents on Site (drums and paints were observed on the premises). Activities associated with current on-site businesses include furniture restoration and some types of metal operations. The use of other solvents on the Site may present a confounding variable in relation to possible secondary exposure resulting from VOC emanation from the sump in the basement.A review of the recent (Table 2) sub-surface soil gas/indoor air VOC monitoring data demonstrates that there were VOCs detected in indoor air (e.g., toluene, acetone) that were not detected in subsurface soil gas samples, indicating that current on-Site activities and/or solvent use are contributing to detectable levels in indoor air samples.

- *Adjacent Businesses and Potential Environmental Impact*

  Given the general zoning (industrial/commercial applications) near the Site of investigation, there are other adjacent businesses that (a) may be suspect in some of the present Site contamination and (b) may confound future analysis of possible off-site migration of contaminants from the Site of interest (Day, 2000). There is evidence from the RI report that on-site migration of various contaminants may have occurred in the past, both from businesses East and West of the Site (see RI report for further discussion). Additionally, there is a petroleum station located adjacent to the closest residential homes, and this represents a possible confounding source of environmental contamination should future investigative work identify soil contamination associated with this petroleum station.

- *Off-Site Residents*

  There do not appear to be any direct or indirect pathways of exposures to those residents living in homes proximal to the Site. The closest homes to the Site proper are several hundred feet in distance and while it is not known if these homes have basements, geological data do not provide any evidence of off-site plume migration. These homes are presumed to have public water supply (similar to the Site itself) and available records do not indicate the presence of private wells. Inhalation and dermal exposure to Site contaminants is not anticipated for persons living in off-Site homes. If conditions change either onsite or in residential areas proximal to the Site, such that potential exposure pathways are impacted, revisiting of all pathways of exposure to offsite residents should commence.

VI. Analysis of Potential Human Health and Environmental Risk

Because potential risk to human receptors from known sources of environmental contamination involves both hazard and exposure, a site-specific review of factors that impact both components of the risk equation is required. The following represent qualitative findings and observations for the Site and should serve as the basis for future discussions and actions related to risk reduction activities (Table 4).

Table 4. Site-Specific Factors Related to Evaluation of Potential Risk

Risk Factor	Relevant Site-Specific Information	Conclusion
Hazard	VOCs and chromium are primary COCs	If exposure potential exists, hazard and primary exposure pathway associated with COC may necessitate quantitative risk analysis
Extent of Contamination	Analytical data suggest lateral and vertical confinement of contamination	Off-site migration and contamination not evident
Exposure Assessment (direct)	COCs are in soil and groundwater beneath Site building	No significant direct pathways of exposure exist
Exposure Assessment (indirect)	Surrounding land is not used for farming, agriculture, or subsistence fishing	No obvious indirect pathways of exposure exist
Zoning	Primarily industrial/commercial	Few residential homes off-Site; no known exposure from Site contaminants to residents
Groundwater Use	Not used as potable source	Ingestion of groundwater for on-site occupants is not a relevant exposure pathway

Human Health Assessment

Relative to potential routes of contaminant exposure to on-site occupants, there is virtually no possibility for dermal contact, and ingestion of groundwater is not anticipated given that the groundwater is not used as a drinking water source (personal communication, J. Danzinger). In addition, the closest residential homes are located some distance off-site and no direct or indirect pathways of exposure appear to exist for these residents. Given the existing Site conditions and extent of contamination, the most realistic exposure scenario appears to be volatilization from either the sump or through the subsurface flooring and subsequent inhalation of VOCs by occupants of the Site building. The following factors, however, should be considered in any future estimation of risk from these sources.

Relative to the VOCs that have been detected during air monitoring events, some of the VOC indoor air concentrations exceed NYS DOH action levels (i.e., TCE, PCE) or

USEPA target indoor air concentrations (e.g., acetone, toluene). Therefore, any subsequent evaluation of potential health risk should consider a quantitative exposure assessment and the results should be compared to appropriate health benchmarks (e.g., OSHA PELs, ACGIH TLVs), as these standards are used for work-day exposures (i.e., 8 hr time-weighed averages), typical for occupants at this Site. Conversely, if there are occupants who reside on-Site on a chronic basis (i.e., 24 hrs/day, 365 days/yr, 70 yrs), then chronic exposure health benchmarks (e.g., USEPA RfC for non-carcinogens) should be considered. Note, as previously indicated, because air monitoring data has shown that several VOCs exceed NYS DOH action levels and in order to minimize volatilization to indoor air, a subsurface soil gas mitigation system (including carbon filtration units in the basement) has been employed.

Environmental Assessment

Given the zoning of the general area, the presence of multiple businesses in the vicinity, and the physical conditions associated with the Site (i.e., no direct access to soil or groundwater because of pavement, asphalt barriers), there do not appear to be viable habitats (e.g., forest, wetlands, water bodies) for most types of wildlife or aquatic species. If future Site conditions change such that either the groundwater or soil become accessible to any receptor, or if changes in these contaminated media enable completed pathways of exposure to exist (e.g. soil ingested by farm animals), then environmental impacts may be realized and should be evaluated. At the present, there are no visible indications to suggest that adverse impacts to ecological receptors have occurred.

VII. Hazard Characterization of Chromium Compounds

Because the presence of chromium in environmental media often drives the perception of human health risk as a result of its carcinogenicity potential, it is important to briefly analyze the hazard (toxicity characterization) associated with chromium and to review the basis for its classification as a potential carcinogen within the context of the present Site.

A. Sentinel Health Hazards

Inhalation Exposure

- Hexavalent chromium is recognized and classified as a carcinogen from inhalation of chromium compounds, principally in industrial chromate production. Carcinogenicity related to hexavalent chromium has only been noted in the respiratory tract and as such, this is considered a tissue-specific (and route-specific) cancer. Evidence of carcinogenicity from hexavalent chromium exposure via ingestion or dermal exposure is lacking (Hrudey et al., 1996).

- The primary acute effect resulting from inhalation of hexavalent chromium is irritation and ulceration of the nasal septum. Hexavalent chromium is also known to have sensitization properties, yet manifestation of this dermal effect is independent of dose, such that concentration in soil or other media is not relevant to a calculation of the likelihood of this effect (Goyer, 1996).

Oral Exposure

- Major effect from ingestion of high levels of chromium (trivalent) is kidney damage.
- Evidence for adverse effects from lower level chronic exposure is equivocal, suggesting that a threshold exists for kidney damage following oral exposure (Goyer, 1996).

B. Chemical Speciation

- Trivalent chromium is substantially less toxic than hexavalent chromium and is not irritating or corrosive.
- Hexavalent chromium in groundwater is not commonly detected as the hexavalent form is converted to the trivalent state in the migration and leaching from soil to groundwater (Hrudey et al., 1996). This physical transformation is evident on the Site of concern as seen from monitoring well data indicating largely non-detectable concentrations of hexavalent chromium in various monitoring wells away from the source area (RI-7 in Appendix).

C. Published Risk Assessments Involving Chromium in Soils

Because of the widespread use of chromite-ore processing residue used as fill in various locations in northern New Jersey and other sites within the United States, substantial work has been conducted pertaining to the potential risk associated with exposure to these residues (Paustenbach *et al.*, 1991a). While the present Site of interest, and the subject of this qualitative risk assessment, does not involve chromite-ore processing residue, many of the factors that are involved in chromium-related risk assessments (e.g., exposure levels, route of exposure, health benchmarks such as the Reference Dose (RfD)) are relevant to the Site under review and therefore it is pertinent to present limited information on previously published risk assessments involving chromium. Paustenbach *et al* (1991a) conducted an extensive assessment and quantitative uncertainty analysis of the health risks to workers exposed to chromium contaminated soils at a trucking terminal (site = 91,800 square feet; approximately one-third was covered with pavement and gravel; visible airborne dust during truck operations) and concluded the following:

- The hazard posed by Cr (III) is negligible due to its low acute and chronic toxicity.

- Using site analytical data and Monte Carlo statistical simulation of human exposure (with consideration of concentration of Cr(VI) and total chromium in air and soil, fraction of the year when suspension of airborne soil particulates is likely to occur, fraction of Cr(VI) in air which is respirable (< 10 um), soil loading rate on skin, occupational tenure, and body weight), the estimated average daily dose via ingestion and dermal absorption for the individual exposed at the 95th percentile was about 48,000 and 91-fold below the U.S. EPA Reference Dose (RfD) for Cr(III) and Cr(VI) respectively. Since inhalation of Cr(VI) contaminated dust (but not ingestion or dermal contact) poses a cancer hazard, the lifetime average daily doses (LADDs) associated with exposure at the 50th and 95th percentile were calculated to be 9.8×10^{-8} and 1.3×10^{-6}, respectively. Based on this analysis, industrial sites having soil concentrations of Cr(VI) below 230 ppm do not pose a significant noncarcinogenic or carcinogenic health hazard following acute or chronic exposure. Finally, as Paustenbach *et al* (1991a) note, the health risk is even smaller if the site is paved, as is the case with the present Site of discussion.

In a similar review, an expert panel (Paustenbach et al., 1991b) evaluated the health hazards posed by chromium-contaminated soils in residential and industrial areas and concluded the following:

- Soils containing < 1000 ppm trivalent chromium or 75 ppm hexavalent chromium do not pose a significant health hazard to nearby residents and workers.

- Using risk assessment methods, the Panel estimated that the plausible incremental cancer risk to individuals at residential sites would be substantially less than 1 in 1,000,000.

- The average measured levels of airborne Cr(VI) at typical industrial sites were more than 1000-fold lower than the current OSHA Permissible Exposure Level (PEL).

- The maximum plausible increased cancer risk for an average worker at a dusty industrial site was estimated to be less than 1 in 100,000.

- The Panel was of the opinion that 75 ppm total chromium [Cr(III) and Cr(VI)] cleanup requirement established by the NJDEP was unusually stringent and that much higher levels would still be protective of public health.

It is important within the context of this report to emphasize that these previously published risk assessments involving chromium are included here, not to specifically demonstrate what other States have recommended concerning soil cleanup levels, but rather because they assessed the relative hazard that direct exposure to environmental chromium presents using a toxicological and risk-based approach. An in-depth analysis of the hazard characteristics associated with chromium, coupled with estimates of human exposure, were the motivating and driving forces for the conclusions that emanated from these two risk assessments. These risk-based criteria are not directly applicable at the present Site since Site soils are covered and are not available to human receptors. However, this risk analysis process (e.g., hazard evaluation, exposure estimation) is an appropriate one for those sites where direct exposures could occur.

VIII. Identification of Possible Site Exposure Scenarios

Following EPA risk assessment methodology, determination of a health risk associated with an environmental contaminant requires that a link exist between the contaminant source (hazard) and a target receptor(s). In other words, there must be an identifiable and viable pathway between the constituent(s), in this case those in soil and groundwater, and an identified receptor (e.g., Site workers). If no exposure pathway can be identified, there is no associated health risk.

For the present Site, there are specific factors and available information that can be used to justify the elimination of certain target receptors and exposure pathways. First, because the Site is currently zoned for light industrial/commercial business (Day, 2000), for practical purposes, off-site residential receptors can be eliminated with regard to Site exposure potential. Second, because local groundwater is not used as a potable drinking source (personal communication, J. Danzinger), the drinking water pathway to both Site building and nearby residential home occupants can be eliminated. This assumption is based on knowledge that city water serves the Site and surrounding area (J. Danzinger communication), and was reconfirmed by the Monroe County Department of Health which indicated that it had no record of, nor was it likely, for water supply wells to exist within a quarter-mile radius of the Site. In addition, a review of a historical report (Groundwater Resources of Monroe County, New York; Appendix) indicates that the closest wells to the Site property are more than a half-mile NE of the Site and these were industrial wells. Third, because the property is covered with impervious materials, ingestion, inhalation, or dermal contact associated with contaminated soil are not expected exposure routes.

Therefore, the following possible exposure scenarios exist:

1. **Full time worker exposure:** The only potential exposures appear to be from VOCs that may volatilize from contaminated groundwater located in the vicinity of the sump in the basement or from limited volatilization from subsurface soils. There is no apparent exposure pathway to chromium as volatilization is not expected (due to physical/chemical properties of metals) and dermal and oral exposure pathways are not relevant for Site contaminants.

2. **Contractor exposure:** This scenario assumes that a contractor is hired to perform short-term activities that disturb soil or groundwater containing Site contaminants. Potential exposure pathways would include incidental ingestion of soil, dermal contact with contaminated soils, or inhalation of VOCs from contaminated soil. Inhalation of chromium dusts is a possible, yet less likely pathway and estimation of airborne concentrations would be more uncertain due to assumptions and extrapolations involved in this scenario.

3. **Off-site receptors:** Available analytical data do not indicate that off-site migration of contaminants at concentrations that could pose a risk to humans is occurring.

IX. Management of Potential Risk Associated with Exposure Scenarios

Given the above identified exposure scenarios, the following risk management steps may be useful in addressing the current Site contamination related to these scenarios in an efficient, effective, and health-protective manner.

1. Potential worker exposure to fugitive VOCs:

Given the location of the basement sump (i.e., in an area only used for storage and not occupied on a full-time basis) and the low concentrations of VOCs that have been detected there, it is unlikely that VOC volatilization from the sump connotes a significant exposure pathway to Site occupants and workers. In addition, carbon filtration units are being installed in this area as part of the vapor mitigation system. Additional VOC air sampling would provide additional data that could be used to insure that airborne concentrations are maintained below relevant State or Federal standards or health benchmarks. Also, the limited volatilization of several VOCs from subsurface soils to indoor air represents a related pathway of exposure, similar to potential inhalation of VOCs from the sump area. Following the completion of the soil gas mitigation efforts that are being implemented, indoor air monitoring should be conducted for purposes of comparison to previous indoor air monitoring data (Table 2) and/or to relevant State or Federal standards or health benchmarks.

2. Potential contractor exposure to contaminated soils:

The existence of hexavalent chromium in soil appears to represent the greatest potential onsite hazard for the scenario involving contract workers engaged in activities that disturb soil. Acute dermal exposure could occur if Site remediation, reconstruction, or soil excavation was to occur, although potential exposure in these cases could be minimized, if not eliminated, through the use of process or institutional controls (e.g., personal protective equipment). Chromium compounds contained in soil are generally bound to the soil matrix and in such cases dermal bioavailability will be low (Hrudey et al., 1996). Based on solubility of such forms, it is estimated that only 1% of total soil chromium may leach from soil and be dissolved in the sweat on skin (Paustenbach et al., 1991b). It is important to note that if dermal contact were to occur, the principal hazard associated such exposure is sensitization, a potential health outcome that can be eliminated through the use of appropriate personal protective equipment such as impervious gloves. Paustenbach et al (1991b) noted that, based on published studies of human volunteers, a small percentage (less than 5%) of persons already sensitized may respond to Cr(VI) in solution at concentrations above 35 ppm, although concluded that much higher concentrations in soil (e.g., 350 ppm Cr(VI)) would be necessary to elicit dermatitis because of the low solubility of chromium in soil. Such elevated levels of Cr (VI) are known to be present at the current Site in only a limited area beneath the building (i.e., former shipping room where chromic acid etching processes were previously performed).

Another concern resulting from chromium in soil is oral ingestion by children who demonstrate pica behavior. Relative to the present Site, this is not a foreseeable possibility either for children or adults as no open soil exists (i.e., Site is physically capped with the building and paved surfaces). Even for children with pica behavior, the hazard resulting from such exposure is considered minimal unless soil levels are extremely high (Paustenbach et al., 1991b).

In summary, institutional and engineering controls (e.g., personal protective equipment, HAZWOP Training) should protect human health should this exposure scenario be realized during future Site activities that involve disturbing soil or groundwater that may contain Site contaminants. If adequate personal protective measures and/or HAZWOP training have not been made available to contractors on Site, management systems should ensure that such procedures are put in place before commencement of Site remedial or construction activities.

3. Potential off-site migration of contaminants via groundwater:

Since available groundwater quality data from deep well MW-22 indicate no presence of site-related VOCs, this off-site scenario (e.g., migration into a deep-well aquifer) can effectively be eliminated as an exposure pathway. In addition, information obtained from the Monroe County Department of Health and historical records (Groundwater Resources of Monroe County, New York) indicate that groundwater is not being used as a water supply (potable or other) within at least a quarter-mile radius of the Site.

X. CONCLUSIONS

- The data obtained during the RI, including the groundwater monitoring data from deep well MW-22 located in proximity to the presumed VOC source area beneath the Site building, support the conclusion that there is no discernible potential risk to off-site human receptors. Through records checks (Monroe County Department of Health; Groundwater Resources of Monroe County, New York and communications (J. Danzinger communication), there is no indication that groundwater below or proximal to the Site is used as a water supply.

- A review of the air monitoring data show that indoor air samples detected VOCs at concentrations below OSHA PELs. However, for several analytes, indoor air concentrations exceeded NYS DOH action levels. Therefore, a vapor mitigation system has been installed to eliminate/minimize potential migration through the slab floor.

- A quantitative chemical-by-chemical risk analysis is not warranted at this time, given the Site operations, location of contaminants, and limited exposure that exists for subsurface COCs. While there were several TAL metals, including chromium, whose groundwater and/or soil concentrations exceed existing criteria, until a known or completed pathway of exposure to humans can be demonstrated, expanded toxicological analysis or quantitative risk analysis is not recommended.

XI. RECOMMENDATIONS

- Site management should create a process to insure that potential worker exposure to chromium or other contaminants that might result from activities related to soil removal or remediation is minimized through the use of personal protective equipment (PPE). Generally, if any remedial activities were to occur and if contaminated soil were considered a hazardous waste, then workers would be required to be HAZWOP trained. Use of PPE should minimize or eliminate exposure and ultimately diminish or eliminate health risk.

- A similar management system should be created so that in case utility (e.g., gas, electric, water) repairs or other on-site work necessitates groundbreaking activities, proper PPE is used to minimize or eliminate worker exposure to contaminated soil.

- VOC concentrations in the basement sump room should be monitored on a semi-annual basis (for one year) for verification that airborne concentrations are below relevant State or Federal standards or health benchmarks. Subsequently, annual sampling should be sufficient. In addition, one sampling of indoor air should be conducted following, but within the first year after the vapor mitigation system has been installed.

- If future land use changes such that either the soil or groundwater becomes accessible to humans, or if these media enable completed pathways of exposure to exist, quantitative risk assessment methods should be considered to evaluate potential human health risk.

- If future structural changes occur onsite such that exposure pathways to onsite occupants are altered, a quantitative exposure assessment should be considered to evaluate potential human health risk.

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Personal Communication. Mr. Jeff Danzinger, Day Environmental Inc.

Appendix

(Qualitative Human Health and Environmental Risk Assessment)

NYSDEC Site Code #828085

TABLE 10A

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

VOLATILE ORGANIC COMPOUND TEST RESULTS IN PARTS PER BILLION (PPB)

SOIL SAMPLES

DETECTED VOLATILE COMPOUNDS	SAMPLE AND LOCATION									NYSDEC TAGM 4046 RECOMMENDED SOIL CLEANUP OBJECTIVE (PPB)	USEPA HEAST VALUE (PPB)
	1506-S-08 TB-20(8-10')	1506-S-09 TB-6(8-9.3')	1506-S-10 TB-8(12-15')	1506-S-11 TB-14(8-12')	1506-S-12 TB-11(12-14.5')	1506-S-13 TB-11(0-4')	1505-S-14 TB-5(8-12')	1506-S-16 TB-11(8-12')	1506-S-17 TB-11(8-12')		
Acetone	ND	ND	ND	ND	5 J	31	ND	ND	ND	200	8,000,000
Carbon Disulfide	ND	3 J	ND	ND	ND	ND	ND	ND	2 J	2,700	8,000,000
2-Butanone (MEK)	ND	ND	ND	ND	ND	6 J	ND	ND	ND	300	4,000,000
1,1-Dichloroethane	ND	ND	ND	ND	2 J	ND	2 J	ND	5 J	200	8,000,000
1,1-Dichloroethene	ND	ND	3 J	ND	ND	ND	6 J	ND	ND	400	12,000
Total 1,2-Dichloroethene	ND	ND	ND	11	15 J	140	ND	3 J	12 J	300	2,000,000
Trichloroethene	ND	ND	ND	3 J	120 J	6 J	ND	12	21 J	700	64,000
Tetrachloroethene	ND -	ND	ND	ND	3,200 D	2 J	ND	40	84 J	1,400	14,000
Ethylbenzene	18 J	ND	ND	ND	ND	ND	ND	ND	ND	5,500	8,000,000
Total Xylenes	18 J	ND	ND	ND	ND	ND	ND	ND	ND	1,200	200,000,000
TENTATIVELY IDENTIFIED COMPOUNDS											
Total Unknowns	28,300 J	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Total Alkyl Benzenes	13,500 J	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Total Trimethylbenzenes	3,100 J	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Total Diethylbenzenes	2,100 J	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
1,4-Diethylbenzene	170 JN	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Unknown Cyclic Hydrocarbon	1,800 J	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Total Methylmethyl-ethylbenzenes	1,050 J	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Total Ethyldimethylbenzenes	130 J	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Total Methylpropylbenzenes	510 J	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Decahydronaphthalene	170 J	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
TOTAL VOCS	50,866	3	3	14	3,342	185	8	55	124	≤ 10,000	NA

J	= Indicates an estimate value.
D	= Identifies compounds identified in an analysis at a secondary dilution factor.
N	= Indicates presumptive evidence of tentatively identified compounds.
ND	= Not detected above reported laboratory detection limit value.
NA	= Not available.

TABLE 10B

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

VOLATILE ORGANIC COMPOUND TEST RESULTS IN PARTS PER BILLION (PPB)

SOIL SAMPLES

DETECTED VOLATILE COMPOUNDS	SAMPLE AND LOCATION														NYSDEC TAGM 4046 RECOMMENDED SOIL CLEANUP OBJECTIVE	USEPA HEAST VALUE
	1506-S-46 TB-26(4-8')		1506-S-47 TB-38(8-12')		1506-S-48 TB-40(8-11.5')		1506-S-49 TB-37(8-10')		1506-S-50 TB-39(10-12')		1506-S-58 MW-17A(5-7')		1506-S-56 MW-17(11-13')			
Acetone	ND		ND		ND		ND		ND		ND		ND		200	8,000,000
Carbon Disulfide	2	J	ND		ND		ND		ND		ND		ND		2,700	8,000,000
2-Butanone (MEK)	3	JR	3	JR	3	JR	3	JR	2	JR	ND		ND		300	4,000,000
1,1-Dichloroethane	ND		ND		ND		ND		ND		ND		ND		200	8,000,000
1,1-Dichloroethene	ND		ND		ND		ND		ND		ND		ND		400	12,000
Total 1,2-Dichloroethene	ND		ND		ND		ND		ND		ND		ND		300	2,000,000
Trichloroethene	14	J	ND		ND		ND		ND		9	J	120	DJ	700	64,000
Tetrachloroethene	ND		ND		ND		ND		12		ND		720	DJ	1,400	14,000
Ethylbenzene	ND		ND		ND		ND		ND		ND		ND		5,500	8,000,000
Total Xylenes	ND		ND		ND		ND		ND		ND		ND		1,200	200,000,000
Methylene chloride	ND		ND		ND		ND		ND		ND		1	J	100	93,000
TENTATIVELY IDENTIFIED COMPOUNDS																
Unknown Silicone Compounds	31	JR	22	JR	23	JR	28	JR	27	JR	ND		ND		NA	NA
Trichlorofluoromethane	18	JN	14	JN	6	JN	19	JN	9	JN	ND		ND		NA	NA
TOTAL VOCS	68		39		32		50		50		9		841		≤ 10,000	NA

J	= Indicates an estimate value.
D	= Identifies compounds identified in an analysis at a secondary dilution factor.
N	= Indicates presumptive evidence of tentatively identified compounds.
ND	= Not detected above reported laboratory detection limit value.
NA	= Not analyzed for this specific constituent or Not available.
R	= 2-Butanone (MEK), Toluene, and an unknown silicone compound were detected in a field equipment rinsate sample (Sample 1506-S-57).

TABLE 11

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

CHROMIUM TEST RESULTS
IN PARTS PER MILLION (PPM)

SOIL SAMPLES

SAMPLE NUMBER	LOCATION AND DEPTH	TOTAL CHROMIUM (PPM)		HEXAVALENT CHROMIUM (PPM)	
1506-S-01	TB-12 (12-15.8')	6.2		2.6	J
1506-S-02	TB-15 (12-15.9')	5.5		0.54	J
1506-S-03	TB-19 (8-12')	6.4		1.5	J
1506-S-04	TB-14 (12-15.5')	157	*	1.7	J
1506-S-05	TB-13 (8-12')	337	*	16.7	J
1506-S-06	TB-18 (12-14.2')	8.0	*	10.2	J
1506-S-07	TB-9 (4-8')	6.6	*	1.3	J
1506-S-13	TB-11 (0-4')	14.5	*	ND	
1506-S-15	TB-10A (8-11.3')	5.4	*	1.2	J
1506-S-16	TB-11 (8-12')	330	*	6.5	J
1506-S-17	TB-11 (8-12')	300	*	2.5	J
1506-S-19	TB-10A (8-11.3')	6.6	*	NA	
1506-S-20	TB-17 (2-4')	12.0	EN*J	NA	
1506-S-21	TB-4 (10-11.8')	6.7		ND	
1506-S-22	TB-4 (10-11.8')	5.4		ND	
1506-S-23	TB-17 (8-10')	5.0	EN*J	NA	
1506-S-24	TB-3 (8-10')	8.4	EN*J	NA	
1506-S-25	TB-7 (8-10')	9.0	EN*J	NA	
1506-S-26	TB-28 (8-10')	8.4	EN*J	0.48	J
1506-S-27	TB-34 (10-11.4')	11.0	EN*J	0.97	J
1506-S-28	TB-27A (1.5-3.0')	55.0	EN*J	1.9	J
1506-S-29	TB-26 (8-10.1')	2.9	EN*J	0.88	J
1506-S-30	TB-42 (12-14.5')	4.4	EN*J	NA	
1506-S-31	TB-31 (8-11.8')	508	EN*J	69.0	J
1506-S-32	TB-31 (4-8')	408	EN*J	NA	
1506-S-33	TB-31 (11.8-14')	371	EN*J	NA	
1506-S-34	TB-33 (12-14.5')	41.4	EN*J	8.4	J
1506-S-35	TB-30 (0-4')	23.6	EN*J	NA	
1506-S-36	TB-30 (8-10')	222	EN*J	54.0	J
1506-S-37	TB-32 (11.5-12.5')	5.2	EN*J	ND	
1506-S-38	TB-35 (11-12')	6.1	EN*J	4.4	J
1506-S-40	TB-37 (10-12')	6.5	EN*J	NA	
1506-S-41	TB-39 (8-10')	7.4	EN*J	NA	
1506-S-42	TB-36 (8-10')	11.6		NA	
1506-S-43	TB-29 (6-7.9')	9.3		1.2	J
1506-S-44	TB-25 (10-11.9')	6.4		1.2	J
1506-S-45	TB-23 (8-10')	6.0		0.7	J
1505-S-52	MW-20 (11-13')	4.7		NA	
1506-S-53	MW-21 (10-12')	4.0		NA	
1506-S-54	MW-19 (10-12')	4.2		NA	
1506-S-55	MW-17 (5-7')	7.6		NA	
NYSDEC TAGM 4046 RECOMMENDED SOIL CLEANUP OBJECTIVE (PPM)		10 or SB (50)[1]		(50)[1]	
NYSDEC TAGM 4046 TYPICAL BACKGROUND RANGES (PPM)		1.5 - 40		NA	
USEPA HEAST VALUE (PPM)		80,000		400	

E	= Indicates a value estimated or not reported due to the presence of interference
N	= Indicates spike sample recovery is not within the control limits
J	= Estimated value as recommended in the Data Usability Summary Report
ND	= Not detected above reported laboratory detection limit value
NA	= Not analyzed for this specific constituent
*	= Indicates duplicate analysis was not within the control limits
SB	= Site background
1	= 1995 TAGM 4046 "proposed" recommended soil cleanup objective for chromium of 50 ppm.

TABLE 11 (Continued)

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

CHROMIUM TEST RESULTS
IN PARTS PER MILLION (PPM)

SOIL SAMPLES

SAMPLE NUMBER	LOCATION AND DEPTH	TOTAL CHROMIUM (PPM)	HEXAVALENT CHROMIUM (PPM)
1506-S-59	TB-OS1(0-4')	21.4	NA
1506-S-60	TB-OS1 (4-8')	6.0	NA
1506-S-61	TB-OS1 (8-12')	4.6	NA
1506-S-62	TB-OS1 (12-13')	6.9	NA
1506-S-63	TB-OS2 (0-4')	16.2	NA
1506-S-64	TB-S2 (4-7')	8.4	NA
1506-S-65	SS-OS1 (0-2")	29.9	NA
1506-S-66	SS-OS2 (0-2")	8.9	NA
1506-S-67	SS-OS3 (0-2")	12.6	NA
1506-S-68	SS-OS4 (0-2")	40.8	NA
1506-S-70	MW-22 (7-9')	16.6	ND
NYSDEC TAGM 4046 RECOMMENDED SOIL CLEANUP OBJECTIVE (PPM)		10 or SB (50)[1]	(50)[1]
NYSDEC TAGM 4046 TYPICAL BACKGROUND RANGES (PPM)		1.5 - 40	NA
USEPA HEAST VALUE (PPM)		80,000	400

E	= Indicates a value estimated or not reported due to the presence of interference
N	= Indicates spike sample recovery is not within the control limits
J	= Estimated value as recommended in the Data Usability Summary Report
ND	= Not detected above reported laboratory detection limit value
NA	= Not analyzed for this specific constituent
*	= Indicates duplicate analysis was not within the control limits
SB	= Site background
1	= 1995 TAGM 4046 "proposed" recommended soil cleanup objective for chromium of 50 ppm.

TABLE 12

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

TARGET ANALYTE LIST (TAL) METAL TEST RESULTS IN PARTS PER MILLION (PPM)

SOIL SAMPLES

DETECTED ANALYTES	SAMPLE AND LOCATION												NYSDEC TAGM 4046 TYPICAL BACKGROUND RANGES (PPM)	NYSDEC TAGM 4046 RECOMMENDED SOIL CLEANUP OBJECTIVE (PPM)
	1506-S-06 TB-18(12-14.2')		1506-S-15 TB-10A(8-11.3')		1506-S-19 TB-10A(8-11.3')		1506-S-28 TB-27A(1.5-3')		1506-S-35 TB-30(0-4')		1506-S-55 MW-17(5-7')			
Aluminum	3,210		3,600		3,420		22,900	*	4,990	*	4,510	*	33,000	SB
Antimony	ND		ND		ND		1.9	BNJ	ND	N	ND	NJ	NA	SB
Arsenic	1.2	B	1.3	B	1.8	B	14.0		5.2		2.4		3-12	7.5 or SB
Barium	28.1	BEJ	38.8	BEJ	35.8	BE	2,650		57.4		71.3		15-600	300 or SB
Beryllium	ND		ND		ND		1.6	NJ	1.1	N	0.34	B	0-1.75	0.16 or SB
Cadmium	ND	N	ND	N	ND	N	9.9	NJ	6.2	N	0.15	B	0.1-1	1 or SB (10)^1
Calcium	49,700		42,100		39,400		56,100	*J	82.2	B*	51,600		130-35,000	SB
Chromium	8.0	*	5.4	*	6.6	*	55.0	EN*J	23.6	EN*	7.6		1.5-40	10 or SB (50)^2
Cobalt	2.8	B	3.3	B	3.3	B	10.6	BN	3.6	BN	4.3	B	2.5-60	30 or SB
Copper	8.2		8.8		8.0		1,310	N*J	122	N*	12.3	EJ	1-50	25 or SB
Iron	6,940		8,260		7,080		15,000	N*	9,550		10,900		2,000-550,000	2,000 or SB
Lead	4.0	*J	4.4	*J	2.9	*	565	N*J	86.5	N*	4.6		200-500	SB
Magnesium	17,800		9,990		9,940		10,100		44,400		10,500	*	100-5,000	SB
Manganese	271		385		329		2,120		238		353	NJ	50-5,000	SB
Mercury	ND		ND		ND		ND		ND		ND	N	0.001-0.2	0.1
Nickel	4.7	B	6.1	B	6.3	B	19.3	NJ	14.0	N	8.5		0.5-25	13 or SB
Potassium	840	B	805	B	758	B	1,980	E	1,730	E	830	BE	8,500-43,000	SB
Selenium	ND		ND		ND		ND		ND		ND		0.1-3.9	2 or SB
Silver	ND		ND		ND		0.71	BNJ	0.86	BN	ND		NA	SB
Sodium	1,430		914	B	984	B	1,540		851	B	272	B	6,000-8,000	SB
Thallium	ND		ND		ND		2.0	B	ND		ND		NA	SB
Vanadium	8.0	B	9.7	B	7.8	B	25.8		11.0	B	14.3		1-300	150 or SB
Zinc	16.5	EJ	23.3	EJ	19.3	E	2,770	NJ	61.7	N	27.8		9-50	20 or SB
Molybdenum	0.55		ND		ND		23.1		0.86	B	NA		NA	NA

* .	= Indicates duplicate analysis is not within the control limits.
E	= Indicates a value estimated or not reported due to the presence of interference.
B	= Indicates a value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
N	= Indicates spike sample recovery is not within the control limits.
J	= Estimated value as recommended in the Data Usability Summary Report.
ND	= Not detected above reported laboratory detection limit value.
NA	= Not available.
1	= 1995 TAGM 4046 "proposed" recommended soil cleanup objective for cadmium of 10 ppm
2	= 1995 TAGM 4046 "proposed" recommended soil cleanup objective for chromium of 50 ppm.

TABLE 17

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

TARGET ANALYTE LIST (TAL) METAL TEST RESULTS
IN PARTS PER BILLION (PPB)

DECEMBER 1998 GROUNDWATER SAMPLES

DETECTED ANALYTES	SAMPLE AND LOCATION												NYSDEC TOGS 1.1.1 GROUNDWATER STANDARDS/GUIDANCE VALUES (PPB)
	1506-W-MW9 from MW-9		1506-W-MW16 from MW-16		1506-W-MW17 from MW-17		B21616 From MW-16		B21620 From MW-20		B21608 From MW-8		
Aluminum	9270	EN*J	456	EN*J	4,090	EN*J	167	B	3,260		721		NA
Antimony	19.8	B	20.6	B	ND		ND		ND		780		3
Arsenic	ND		ND		ND		ND	N	ND	N	24.7	N	25
Barium	104	B	147	B	173	B	102	B	121	B	26.9	B	1,000
Beryllium	ND		1.2	B	ND		2.8	B	2	B	0.35	B	3
Cadmium	10		10		4.4	B	3.6	B	2.2	B	ND		5
Calcium	239,000	EJ	191,000	EJ	194,000	EJ	188,000		169,000		373,000		NA
Chromium	1,110		11.8		16.2		1.4	B	14.4		52,300		50
Cobalt	17.2	B	19.9	B	2	B	ND		ND		4.3	B	NA
Copper	273		233		14.8	B	ND		28		10.1	B	200
Iron	14,400		13,400		7,340		18,200		11,200		1,710		300
Lead	36.1	*J	24.4	*J	80.9	*J	ND		9		ND		25
Magnesium	108,000	EN*J	55,000	EN*J	65,200	EN*J	48,900		86,200		151,000		35,000
Manganese	643	EJ	230	EJ	145	EJ	270		186		123		300
Mercury	ND		ND		ND		ND		ND		ND		0.7
Nickel	309		30.9	B	12	B	2.5	B	9	B	16.3	B	100
Potassium	10,200	*J	25,800	*J	8,900	*J	5,260		7,700		10,500		NA
Selenium	ND	N	18.5	NJ	ND	N	ND	WN	ND	WN	1.6	BWN	10
Silver	ND		2.8	B	ND		2.3	B	3.1	B	3.7	B	50
Sodium	117,000	EN*J	418,000	EN*J	93,600	EN*J	510,000		108,000		64,200		20,000
Thallium	11.3		ND		ND		28.4		19.2		111		0.5
Vanadium	51.4		25.3	B	8.1	B	ND	N	8.6	BN	ND	N	NA
Zinc	117		218		64.6		30.1		37.2		9.3	B	2,000
Cyanide	ND		ND		ND		NA		NA		NA		200

*	= Indicates duplicate analysis is not within the control limits.
E	= Indicates a value estimated or not reported due to the presence of interference.
B	= Indicates a value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
N	= Indicates spike sample recovery is not within the control limits.
J	= Estimated value as recommended in the Data Usability Summary Report.
W	= Post digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.
ND	= Not detected above reported laboratory detection limit value.
NA	= Not available.

TABLE 20

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

CUMMULATIVE VOC TEST RESULTS
TOTAL AND SELECT VOLATILE ORGANIC COMPOUNDS
IN PARTS PER BILLION (PPB)

GROUNDWATER SAMPLES

LOCATION	DATE SAMPLED	DETECTED VOLATILE COMPOUNDS								
		TOTAL VOCs	PCE	TCE	1,2-DCE	1,2-DCA	VC	1,1-DCE	1,1-DCA	Acetone
MW-1	8/90	19	--	--	--	--	--	--	--	19
MW-1	11/90	0	--	--	--	--	--	--	--	--
MW-1	10/95	0	--	--	--	--	--	--	--	--
MW-1	12/98	16	--	--	--	--	--	--	--	--
MW-2	11/90	0	--	--	--	--	--	--	--	--
MW-3	11/90	0	--	--	--	--	--	--	--	--
MW-3	2/95	8	--	1.6	6.4	--	--	--	--	--
MW-3	10/95	4	--	--	4	--	--	--	--	--
MW-3	12/98	8	--	--	8	--	--	--	--	--
MW-4	8/90	38	--	--	--	--	--	--	--	38
MW-4	11/90	0	--	--	--	--	--	--	--	--
MW-4	10/95	0	--	--	--	--	--	--	--	--
MW-4	12/98	14	--	--	--	--	--	--	--	--
MW-5	8/90	24	--	--	--	--	--	--	--	24
MW-5	11/90	0	--	--	--	--	--	--	--	--
MW-6	11/90	48	--	5	37	6	--	--	--	--
MW-6	2/95	67	--	--	35	--	--	--	--	21
MW-6	10/95	130	--	4	113	5	4	--	--	4
MW-6	12/98	105	--	--	100	3	2	--	--	--
MW-7	11/90	0	--	--	--	--	--	--	--	--
MW-7	10/95	8	--	--	--	--	--	--	--	8
MW-7	12/98	12	--	--	--	--	--	--	--	--
MW-8	11/90	5,334	3,400	1,900	19	--	--	--	--	--
MW-8	2/95	3,200	2,100	1,100	--	--	--	--	--	--
MW-8	10/95	2,237	1,500	710	16	--	--	--	--	--
MW-8	12/98	2,140	1,600	540	--	--	--	--	--	--

-- = Not detected above reported laboratory detection limit value, or detected in method blank or trip blank.

TABLE 20 (Continued)

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

CUMMULATIVE VOC TEST RESULTS
TOTAL AND SELECT VOLATILE ORGANIC COMPOUNDS
IN PARTS PER BILLION (PPB)

GROUNDWATER SAMPLES

LOCATION	DATE SAMPLED	DETECTED VOLATILE COMPOUNDS								
		TOTAL VOCs	PCE	TCE	1,2-DCE	1,2-DCA	VC	1,1-DCE	1,1-DCA	Acetone
MW-9	11/90	252,278	110,000	130,000	8,900	--	--	29	54	2,600
MW-9	2/95	183,000	73,000	110,000	--	--	--	--	--	--
MW-9	10/95	192,900	95,000	87,000	1,900	--	--	--	--	6,400
MW-9	12/98	155,969	95,000	59,000	2,000	--	--	17	23	53
MW-9 (pre-purge)	12/98	119,000	66,000	51,000	2,000	--	--	--	--	--
MW-10	11/90	21,448	10	19,000	2,400	--	--	18	9	--
MW-10	2/95	18,200	--	17,000	1,200	--	--	--	--	--
MW-10	10/95	19,100	--	18,000	1,100	--	--	--	--	--
MW-10	12/98	20,340	--	18,000	2,000	--	230	110	--	--
MW-11	10/95	192	58	67	19	1	--	23	19	--
MW-11	12/98	209	120	37	22	--	--	10	10	--
MW-12	10/95	3,810	3,400	170	--	--	--	--	--	210
MW-12	12/98	5,050	4,500	550	--	--	--	--	--	--
MW-13	10/95	183	33	65	81	--	--	--	2	--
MW-13	12/98	131	10	30	71	--	--	--	--	--
MW-14	10/95	3	--	1	2	--	--	--	--	--
MW-14	12/98	45	--	--	--	--	--	--	--	--
MW-16	10/95	68	22	15	4	--	--	25	2	--
MW-16	12/98	42	--	11	5	--	--	--	--	--
MW-17	12/98	9,070	5,800	3,000	270	--	--	--	--	--
MW-18	12/98	130	5	13	72	--	30	10	--	--
MW-19	12/98	--	--	--	--	--	--	--	--	--
MW-20	12/98	14	--	--	14	--	--	--	--	--
MW-21	12/98	144	--	--	140	--	4	--	--	--
SUMP	10/90	9,650	410	2,200	5,800	--	540	560	14	--
SUMP	11/90	10,905	770	3,000	5,700	--	720	680	--	--
SUMP	10/95	13,730	1,800	6,500	4,420	--	220	--	340	390
SUMP	12/98	10,750	2,400	4,900	3,200	--	110	140	--	--

-- = Not detected above reported laboratory detection limit value, or detected in method blank or trip blank.

TABLE 21

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

CUMULATIVE CHROMIUM TEST RESULTS IN PARTS PER BILLION (PPB)

GROUNDWATER SAMPLES

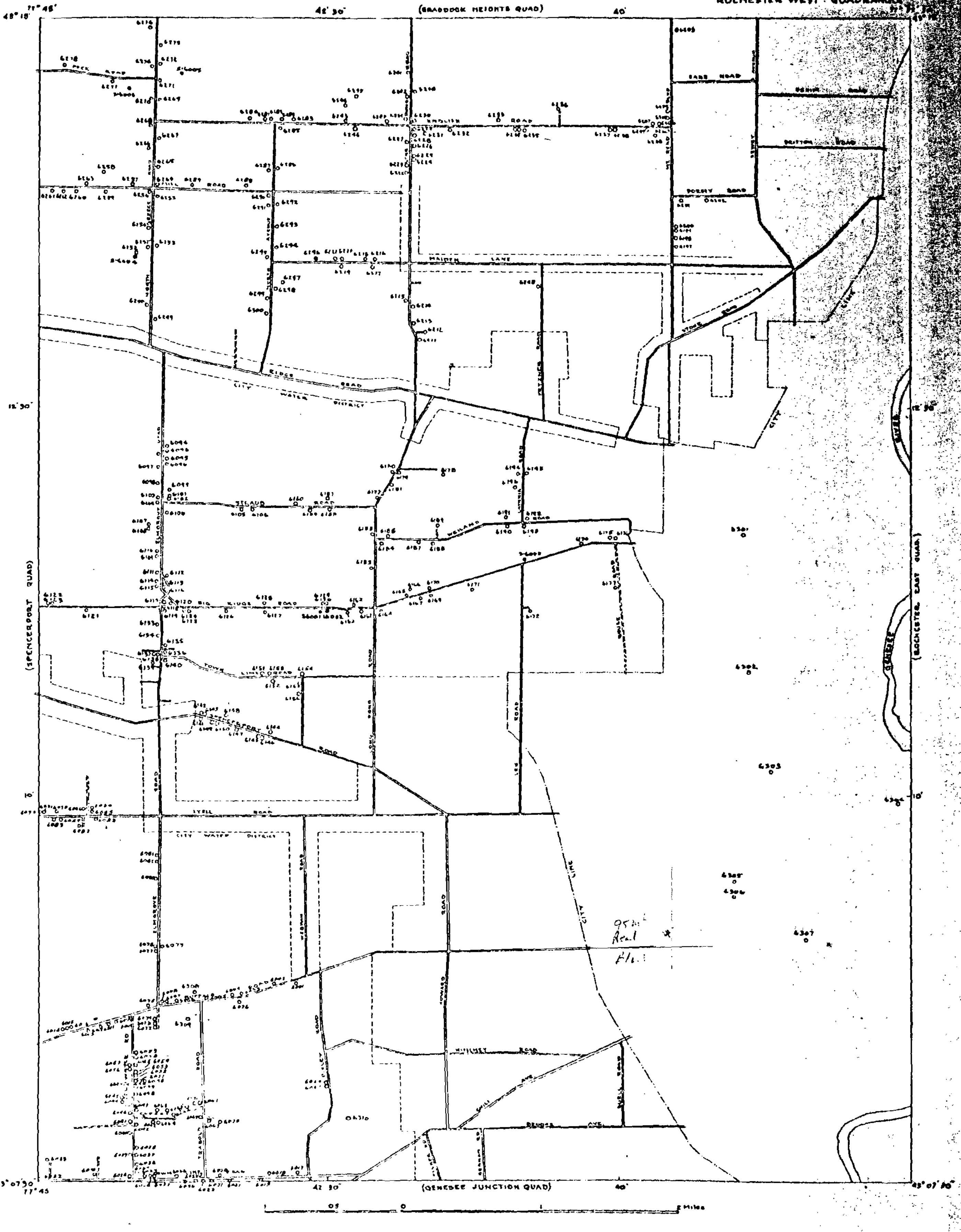
LOCATION	DATE SAMPLED	TOTAL CHROMIUM (PPB)	HEXAVALENT CHROMIUM (PPB)
MW-1	4/95	--	--
MW-1	10/95	10.6	--
MW-1	12/98	16.9	--
MW-3	10/95	2.7	--
MW-3	12/98	--	--
MW-4	4/95	--	--
MW-4	10/95	3.4	--
MW-4	12/98	4.2	--
MW-6	10/95	--	--
MW-6	12/98	8.7	--
MW-7	4/95	--	--
MW-7	10/95	--	--
MW-7	12/98	4.8	--
MW-8	2/95	35,000	NA
MW-8	4/95	44,400	57,700
MW-8	10/95	17,600	23,400
MW-8	9/96	60,100	57,500
MW-8	12/98	49,100	32,300
MW-8	12/98	52,300	42,000
MW-9	4/95	2,080	2,810
MW-9	10/95	38	--
MW-9	9/96	93.1	--
MW-9	12/98	1,110	283
MW-9 (pre-purge)	12/98	955	394
MW-10	9/96	--	--
MW-10	10/95	3.8	--
MW-10	12/98	14.5	--
MW-11	10/95	--	--
MW-11	9/96	--	--
MW-11	12/98	4.9	--
MW-12	10/95	223	41.9
MW-12	9/96	4,210	4,400
MW-12	12/98	621	587
MW-13	10/95	5	--
MW-13	9/96	--	--
MW-13	12/98	7.4	--
MW-14	10/95	--	--
MW-14	12/98	--	--
MW-16	10/95	--	--
MW-16	12/98	11.8	--
MW-16	12/98	1.4	NA
MW-17	12/98	16.2	--
MW-18	12/98	11.8	--
MW-19	12/98	2.1	--
MW-20	12/98	4.2	--
MW--20	12/98	14.4	NA
MW-21	12/98	53.5	--
SUMP	10/95	4.5	--
SUMP	12/98	134	--

--	= Not detected above reported laboratory detection limit value
NA	= Not available

The following was obtained from

Groundwater Resources of Monroe County
(Leggette *et al.*, 1935)

NEW YORK
MONROE COUNTY
ROCHESTER WEST · QUADRANGLE



RECORD OF WELLS AND ANALYSES IN MONROE COUNTY, N. Y.
ROCHESTER WEST QUADRANGLE (CONT.)

DESCRIPTION											CHEMICAL ANALYSES (PARTS PER MILLION)										
Well No.	Location	Owner	Surface Elev.	Type of Well	Depth of Well (Ft)	Diam. (In.)	Depth to Rock (Ft)	Water bearing bed	Depth to Water (Ft)	Use	Date	Temp. °F	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)(Calc.)	Bicarbonate (HCO_3)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Hardness as $CaCO_3$
6187	Welland Road	J. Rein	460	Drilled	52	6	17	Queen.-Med.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6188	do.	A. Webber	460	Drilled	82.6	6	--	Queenston	--	Dom.	9-7-34	--	--	--	--	--	**238	--	[illegible]	--	[illegible]
6189	do.	W. B. McDowell	455	Drilled	54	6	--	Queen.-Med.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6190	do.	F. Liebeck	440	Dug	18	40	--	Gravel	--	Dom.	9-7-34	52	--	--	--	--	164	--	4	--	[illegible]
6191	do.	do.	442	Drilled	--	6	--	--	--	Stk.	--	--	--	--	--	--	--	--	--	--	--
6192	do.	G. Wolf	442	Dug	17	48	--	Gravel	12.5	Dom.	--	--	--	--	--	--	--	--	--	--	--
6193	do.	Brown	442	Drilled	--	6	--	--	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6194	Latonia Road	A. Duval	445	Drilled	90	--	--	Queenston	84.6	Dom.	9-7-34	50	--	--	--	--	**146	--	8	--	172
6195	do.	Mrs. N. Welland	440	Drilled	--	6	--	--	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6196	do.	B. E. Noyes	445	Drilled	40	6	--	--	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6197	Mt. Read Blvd.	E. Turpin	385	Dug	8	54	--	Quicksand	--	Dom.	9-6-34	52	--	--	--	--	180	--	8	--	[illegible]
6198	do.	L. Verstring	395	Dug	--	--	--	--	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6199	do.	J. Croft	395	Dug	7.3	42	--	Sand	1.6	Dom.	--	--	--	--	--	--	--	--	--	--	--
6200	do.	do.	395	Dug	8.8	50	--	do.	2.6	Dom.	--	--	--	--	--	--	--	--	--	--	--
6201	Dorsey Road	F. Krebs	380	Dug	13	36	--	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6202	do.	F. Utter	380	Dug	12	--	--	Gravel	--	Dom.	9-6-34	52	--	--	--	--	232	--	14	--	[illegible]
6203	Mt. Read Blvd.	--	310	Dug	15	36	--	do.	10	Dom.	--	--	--	--	--	--	--	--	--	--	--
6204	do.	C. W. Hepp	340	Drilled	57	6	--	Queenston	--	Dom.	2-14-36	50	.57	78	.17	100	**267	78	240	0.6	[illegible]
6205	do.	do.	339	Dug	24	24	--	Gravel	--	Stk.	--	--	--	--	--	--	--	--	--	--	--
6206	English Road	C. B. Rose	345	Dug	10.1	24	--	do.	4.3	Dom.	--	--	--	--	--	--	--	--	--	--	--
6207	do.	F. B. Quinlan	350	Dug	18	42	--	do.	9	Dom.	--	--	--	--	--	--	--	--	--	--	--
6208	do.	F. Keeler	358	Dug	8.5	48	--	do.	8	Dom.	--	--	--	--	--	--	--	--	--	--	--
6209	do.	D. Vereolst	350	Dug	18	34	--	do.	6	Dom.	--	--	--	--	--	--	--	--	--	--	--
6210	do.	C. Turpin	350	Dug	--	24	--	--	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6211	Long Pond Road	Mrs. Ida Dietz	400	Drilled	40	6	18	Queenston	8.3	Dom.	9-6-34	--	--	--	--	--	268	--	230	--	310
6212	do.	C. A. Kort	400	Dug	12	--	--	Gravel	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6213	do.	L. Reniff	400	Drilled	52	6	20	Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6214	do.	J. Krath	400	Drilled	57	6	18	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6215	do.	F. Schaupp	395	Dug	19	54	--	Gravel	11	Dom.	9-6-34	58	--	--	--	--	300	--	30	--	304
6216	Maiden Lane	S. Dragt	380	Drilled	52	6	20	Queenston	--	Dom.	9-6-34	50	--	--	--	--	191	--	138	--	198
6217	do.	A. Lalle	385	Drilled	50	6	--	do.	12	Dom.	--	--	--	--	--	--	--	--	--	--	--
6219	do.	E. Yerris	385	Dug	23	42	--	Sand	9	Stk.	--	--	--	--	--	--	--	--	--	--	--
6220	do.	C. De Meir	365	Dug	22	48	--	Gravel	10	Dom.	9-6-34	51	--	--	--	--	340	--	170	--	372
6221	do.	L. Delos	375	Drilled	45	6	--	Queenston	--	Dom.	9-7-34	50	--	--	--	--	210	--	90	--	240
6222	Long Pond Road	L. Heinagel	375	Dug	20	48	17	*Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6223	do.	Ryan	355	Drilled	50	6	20	Queenston	--	Dom.	9-6-34	--	--	--	--	--	280	--	132	--	349
6224	do.	J. Combs	355	Drilled	48	6	--	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6225	do.	P. Lutley	355	Dug	18	42	--	Sand	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6226	do.	Wm. Gray	350	Dug	14.5	48	--	do.	9.5	Dom.	9-6-34	52	--	--	--	--	236	--	37	--	278
6227	do.	S. Butts	350	Dug	11.6	42	--	do.	4.6	Dom.	--	--	--	--	--	--	--	--	--	--	--
6228	do.	H. J. Bennett	345	Dug	24	42	--	Gravel	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6229	do.	Wm. Shea	345	Drilled	63	6	--	Queenston	30.2	Dom.	--	--	--	--	--	--	--	--	--	--	--
6230	do.	J. Cook	340	Drilled	49	6	--	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6231	English Road	T. D. Gray	348	Dug	14	42	--	Sand	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6232	do.	Wm. Vorholzer	345	Dug	14	40	--	do.	5.2	Dom.	--	--	--	--	--	--	--	--	--	--	--
6233	do.	Ed. Pierson	345	Dug	18	45	--	Drift	--	Dom.	9-6-34	52	--	--	--	--	168	--	15	--	177
6234	do.	M. Roller	350	Dug	14	34	--	Sand	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6235	do.	Mrs. J. Goodwin	350	Dug	18	45	--	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6236	do.	Ed. McGuire	340	Dug	19.6	48	--	Drift	15.8	Dom.	--	--	--	--	--	--	--	--	--	--	--
6237	do.	B. Crampton	350	Dug	15.9	36	--	Sand	3.3	Dom.	--	--	--	--	--	--	--	--	--	--	--
6238	do.	do.	350	Drilled	64	6	--	Queenston	--	Dom.	9-6-34	50	--	--	--	--	**145	--	48	--	117
6239	do.	G. Hutson	340	Dug	18	30	--	Gravel	6	Dom.	9-6-34	50	--	--	--	--	424	--	170	--	537
6240	Long Pond Road	D. E. Acker	330	Drilled	30	6	--	Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6241	do.	D. B. Hickman	325	Drilled	70	6	--	do.	--	Dom.	2-7-35	50	.10	96	[illegible]	[illegible]	346	[illegible]	[illegible]	13	515
6242	do.	do.	350	Drilled	32	6	24	do.	24	Dom.	--	--	--	--	--	--	--	--	--	--	--
6243	English Road	D. Harris	350	Drilled	43	6	13	do.	13	Dom.	9-6-34	50	--	--	--	--	**256	--	30	--	245
6244	do.	do.	335	Drilled	60	6	13	do.	--	Stk.	--	--	--	--	--	--	--	--	--	--	--
6245	do.	do.	335	Dug	11	72	6	*Queenston	Full	Stk.	9-6-34	52	--	--	--	--	284	--	50	--	281
6246	do.	G. Justice.	345	Dug	18	30	--	Sand	11	Dom.	--	--	--	--	--	--	--	--	--	--	--
6247	do.	--	340	Drilled	47	6	20	Queenston	--	--	--	--	--	--	--	--	--	--	--	--	--
6248	Fetzner Road	G. Roery	350	Dug	15	42	15	Sand	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6249	North Greece Road	C. H. Harris	410	Drilled	30	6	5	Queenston	--	Dom.	4-3-35	50	0.05	227	36	17	304	180	139	225	611
6250	do.	C. F. Zarnstorff	450	Dug	15	36	2	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6251	do.	E. Conroe	385	Dug	14	42	3	do.	8.5	Dom.	--	--	--	--	--	--	--	--	--	--	--
6252	do.	H. Jones	385	Drilled	48	6	10	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6253	do.	A. J. Smith	385	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6254	do.	W. Brodie	385	Dug	15.5	42	--	--	8	Dom.	--	--	--	--	--	--	--	--	--	--	--
6255	do.	Mrs. B. Siebert	385	Dug	9.3	36	--	Gravel	6.9	Dom.	--	--	--	--	--	--	--	--	--	--	--
6256	do.	W. W. Engaboom	380	Dug	12	36	--	do.	--	Dom.	9-4-34	50	--	--	--	--	238	--	30	--	315
6257	Mill Road	L. Koreezko	375	Drilled	35	6	25	*Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6258	do.	G. Forman	375	Drilled	49	6	23	Queenston	10	Dom.	--	--	--	--	--	--	--	--	--	--	--
6259	do.	E. L. Hildreth	375	Dug	19.2	36	--	Gravel	9.6	Dom.	--	--	--	--	--	--	--	--	--	--	--
6260	do.	C. Zarnstorff	380	Drilled	49	6	23	Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6261	do.	J. M. Tora	390	Drilled	50	6	--	do.	--	Dom.	9-4-34	50	--	--	--	--	178	--	222	--	100
6262	do.	C. H. Schoelman	390	Drilled	48	6	12	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6263	do.	G. Wibbe	375	Dug	13	36	--	Gravel	--	Dom.	2-15-35	50	.03	70	9.9	25	200	61	25	15	216
6264	do.	F. Mahne	390	Drilled	48	6	--	Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6265	North Greece Rd.	E. Miller	370	Drilled	7	6	--	do.	--	Dom.	9-4-34	50	--	--	--	--	136	--	67	--	240
6266	do.	A. Imblheim	370	Dug	14	36	--	Gravel	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6267	do.	C. Leyes	365	Dug	14	36	--	do.	--	Dom.	9-4-34	50	--	--	--	--	169	--	36	--	216
6268	do.	C. J. Morley	345	Dug	8	24	--	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6269	do.	C. L. Parish	350	Dug	6	36	--	do.	3	Dom.	9-4-34	52	--	--	--	--	202	--	25	--	288
6270	do.	Kermer Kloe.	350	Drilled	25.6	6	--	*Queenston	18	Dom.	--	--	--	--	--	--	--	--	--	--	--
6271	do.	H. Peck	345	Drilled	--	--	--	--	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6272	do.	C. E. Imblheim	345	Drilled	30	6	20	*Queenston	--	Dom.	9-4-34	50	--	--	--	--	191	--	19	--	186
6274	do.	H. Miller	340	Drilled	34	6	24	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6275	do.	W. Peters	335	Drilled	30	6	--	Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6276	do.	J. Fuller	340	Drilled	40	6	--	--	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6277	Peck Road	P. Dorobiale	350	Drilled	42	6	--	Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6278	do.	J. Marburger	350	Drilled	70	6	--	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6280	English Road	C. Venzelf	345	Dug	30	42	--	Gravel	--	Dom.	9-4-34	52	--	--	--	--	244	--	37	--	221
6281	do.	Mrs. O. Slater	345	Drilled	24	6	--	Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6282	do.	G. Slater	350	Dug	23	42	--	Gravel	8	Dom.	--	--	--	--	--	--	--	--	--	--	--
6283	do.	T. R. VanDiendonck	350	Drilled	42	6	--	Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6284	do.	J. B. Fenyon	350	Drilled	42	6	12	do.	7.9	Dom.	9-4-34	48	--	--	--	--	280	--	300	--	309
6285	do.	--	365	Drilled	--	--	--	--	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6286	North Avenue	D. Fewett	370	Drilled	44	--	--	Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6287	do.	Edward Preisilck	375	Drilled	40	6	--	do.	--	Dom.	2-18-36	--	.02	60	13	28	218	40	30	80	203
6288	Mill Road	B. Kipp	380	Drilled	40	6	25	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6289	do.	L. Feltus	375	Drilled	50	6	--	do.	--	Dom.	9-4-34	50	--	--	--	--	193	--	368	--	147
6290	do.	E. J. Dengler	335	Drilled	42	6	8	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6291	North Avenue	E. Justice	390	Drilled	80	6	18	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6292	do.	R. Verstreet	385	Drilled	50	--	--	do.	--	Dom.	9-4-34	49	--	--	--	--	181	--	40	--	197
6293	do.	H. Croft	385	Drilled	50	6	15	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6294	do.	A. Mitchell	390	Drilled	81	6	10	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6295	do.	W. Mitchell	395	Drilled	50	6	11	do.	--	Dom.	9-4-34	55	--	--	--	--	271	--	46	--	194
6296	Maiden Lane	Vacent	390	Dug	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6297	North Avenue	J. Lalle	390	Drilled	50	6	15	Queenston	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6298	do.	J. Roste	390	Drilled	50	6	15	do.	--	Dom.	--	--	--	--	--	--	--	--	--	--	--
6299	do.	C. D. Perry	395	Drilled	120	6	25	do.	--	Dom.	9-4-34	50	--	--	--	--	248	--	20	--	302
6300	do.	E. Lynn	395	Dug	10.4	43	--	Gravel	8.7	Dom.	9-4-34	50	--	--	--	--	236	--	22	--	218
6301	Avis St. Roch.	Haag & Haag Mfg.Co.	460	Drilled	86	6	7	Medina	8	Ind.	--	--	--	--	--	--	--	--	--	--	--
6302	do.	Defender Photo Co.	510	Drilled	730	8	7	Queen.-Medina	19	Ind.	--	--	--	--	--	--	--	--	--	--	--
6303	do.	Haloid Co.	515	Drilled	52	6	25	Rochester	25	Ind.	--	--	--	--	--	--	--	--	--	--	--
6304	do.	Cons. Milk Co.	500	Drilled	250	8	21	Queen.-Medina	25	Ind.	--	--	--	--	--	--	--	--	--	--	--
6305	do.	Roch. Tallow Co.	525	Drilled	115	6	--	Rochester	40	Ind.	--	--	--	--	--	--	--	--	--	--	--
6306	do.	Roch. P'king Co.	515	Drilled	250	8	14	Medina-Clinton	16	Ind.	--	--	--	--	--	--	--	--	--	--	--
6307	do.	C. Bowker	530	Drilled	100	8	18	Roch.-Lockport	15	Ind.	--	--	--	--	--	--	--	--	--	--	--
6308	Buffalo Road	H. J. Heber	570	Drilled	58	6	15	Lockport	10.1	Dom.	--	--	--	--	--	--	--	--	--	--	--
6309	off Tresold Rd.	Joe DiFrancesco	570	Drilled	22	6	7	do.	5.8	None	--	--	--	--	--	--	--	--	--	--	--
6310	Pixley Road	Brooklea C. Club	570	Drilled	35	6	Flow.	do.	27	Irr.	--	--	--	--	--	--	--	--	--	--	--

*Well enters this formation less than 10 ft. Water may also be derived from overlying drift.

**Carbonate (CO_3) present.

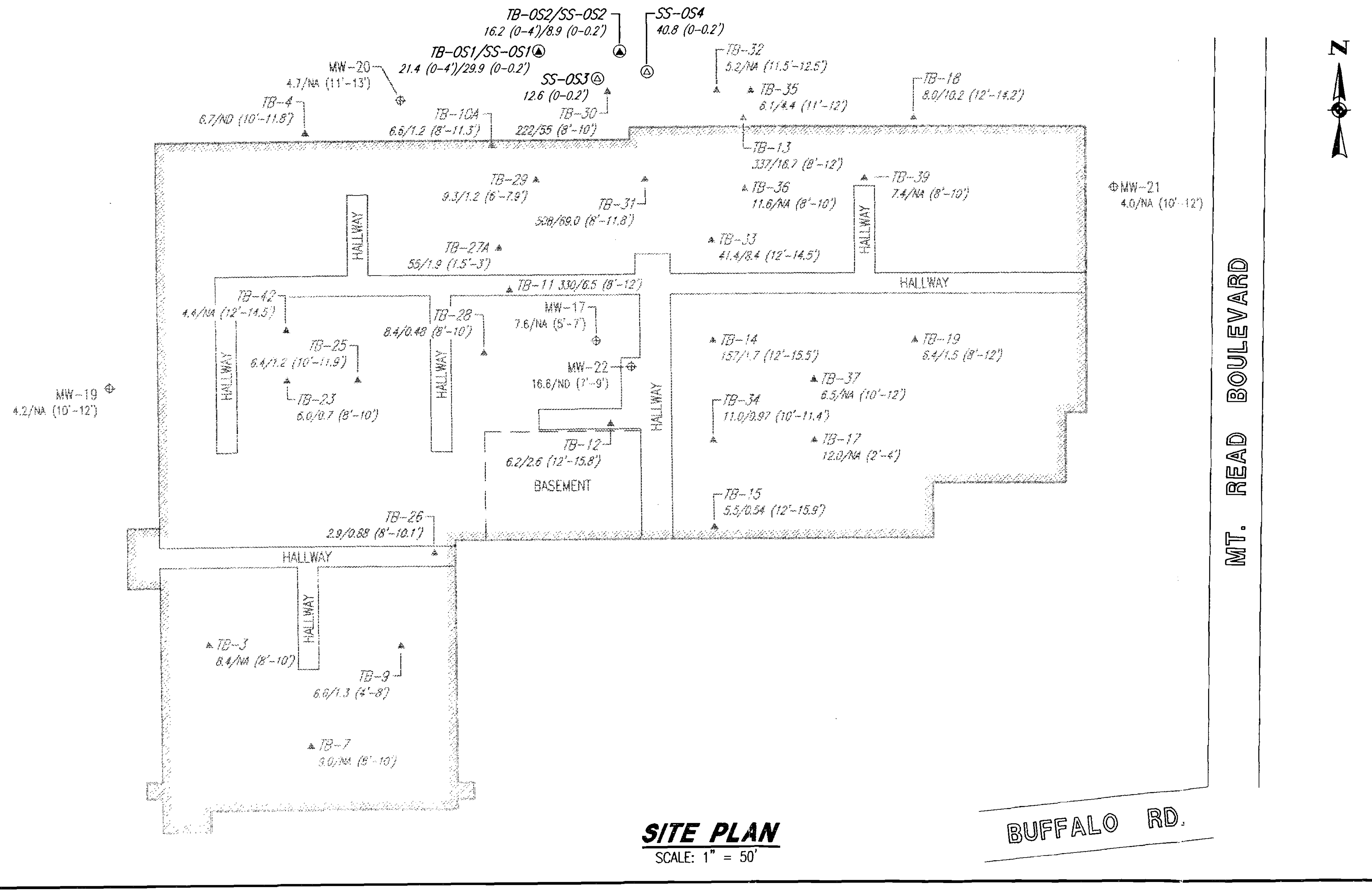
REF1: BORDER12
REF2: REF2
REF3: REF3

NOTES

1. SITE PLAN PRODUCED FROM A DRAWING BY: THE ERM GROUP, ENTITLED "FIGURE 3-1 PCB, ASBESTOS & SEDIMENT/RESIDUE SAMPLING LOCATIONS", AND DATED 11/20/90.
2. BEDROCK WELL MW-2 HAS BEEN ABANDONED DUE TO NEW CONSTRUCTION, OVERBURDEN WELL MW-5 IS DAMAGED.

LEGEND

⊕ MW-17 7.6/NA (5'-7')	DEEP BEDROCK MONITORING WELL LOCATION WITH PEAK CHROMIUM/HEXAVALENT CHROMIUM CONCENTRATION RECORDED IN PARTS PER MILLION (ppm) DETECTED IN A SOIL SAMPLE, DEPTH INTERVAL (FEET) IN PARENTHESIS
▲ TB-19 6.4/1.5 (8'-12')	TEST BORING LOCATION WITH PEAK TOTAL CHROMIUM/HEXAVALENT CHROMIUM CONCENTRATION RECORDED IN PARTS PER MILLION (ppm) DETECTED IN A SOIL SAMPLE, DEPTH INTERVAL (FEET) IN PARENTHESIS
● *TB-OS1/SS-OS1* *21.4 (0-4')/29.9 (0-0.2')*	OFF-SITE TEST BORING/SURFACE SAMPLE LOCATION WITH PEAK TOTAL CHROMIUM CONCENTRATION RECORDED IN PARTS PER MILLION (ppm) DETECTED IN A SOIL SAMPLE, DEPTH INTERVAL (FEET) IN PARENTHESIS
○ *SS-OS3* *12.6 (0-0.2')*	OFF-SITE SURFACE SAMPLE LOCATION WITH PEAK TOTAL CHROMIUM CONCENTRATION RECORDED IN PARTS PER MILLION (ppm) DETECTED IN A SOIL SAMPLE, DEPTH INTERVAL (FEET) IN PARENTHESIS
NA	NOT ANALYZED
ND	NOT DETECTED ABOVE LABORATORY DETECTION LIMITS



SITE PLAN

SCALE: 1" = 50'

TIME PLOTTED: TUES NOV 21, 08:00:00 2000
FILENAME: \MAGUIR\1506R-18R

DATE	REVISED BY
11/20/00	RJM

FIELD VERIFIED BY JAD
DATE 9/99
DRAWN BY RJM
DATE DRAWN 9/2/99
SCALE
DATE ISSUED

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
REMEDIAL INVESTIGATION
DRAWING TITLE OFF-SITE LOCATIONS WITH PEAK

PROJECT NO.
1506R-97

RI-OS1

SHEET 1 OF 1

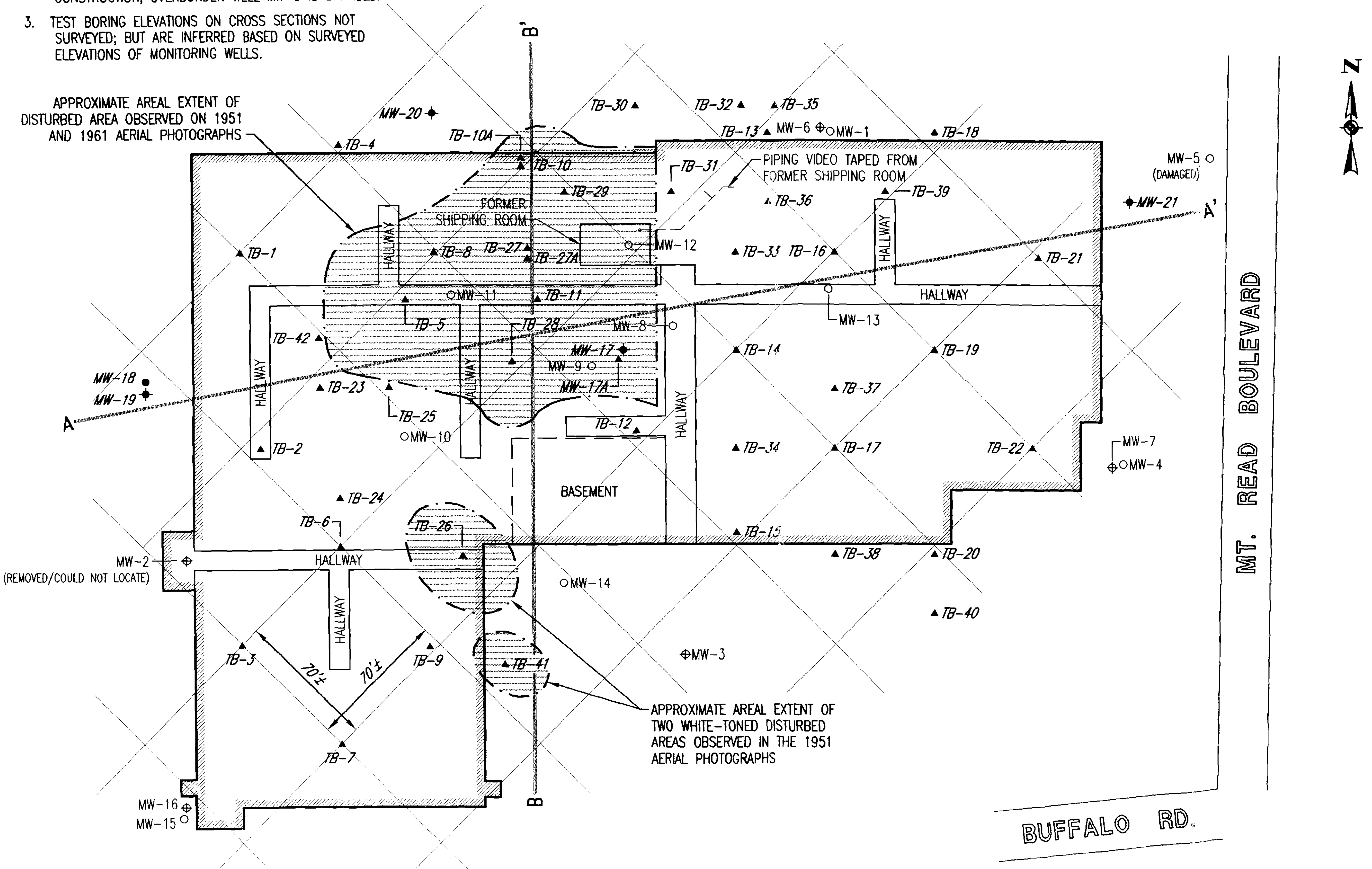
REF1: BORDER1Z
REF2: REF2
REF3: REF3

NOTES

1. SITE PLAN PRODUCED FROM A DRAWING BY: THE ERM GROUP, ENTITLED "FIGURE 3-1 PCB, ASBESTOS & SEDIMENT/RESIDUE SAMPLING LOCATIONS", AND DATED 11/20/90.
2. BEDROCK WELL MW-2 HAS BEEN ABANDONED DUE TO NEW CONSTRUCTION, OVERBURDEN WELL MW-5 IS DAMAGED.
3. TEST BORING ELEVATIONS ON CROSS SECTIONS NOT SURVEYED; BUT ARE INFERRED BASED ON SURVEYED ELEVATIONS OF MONITORING WELLS.

LEGEND

● *MW-18*	NEW SHALLOW BEDROCK MONITORING WELL LOCATION
⊕ *MW-17*	NEW DEEP BEDROCK MONITORING WELL LOCATION
▲ *TB-1*	TEST BORING LOCATION
○ MW-1	EXISTING OVERBURDEN AND/OR SHALLOW BEDROCK MONITORING WELL LOCATION
⊕ MW-3	EXISTING DEEP BEDROCK MONITORING WELL LOCATION



SITE PLAN

SCALE: 1" = 50'

TIME PLOTTED: FRI JULY 16, 08:50:00 1999
FILENAME: \MAGUIR\1506R-8

DATE	REVISED BY
7/16/99	RJM

FIELD VERIFIED BY JAD	DATE 4/99
DRAWN BY RJM	DATE DRAWN 4/21/99
SCALE	DATE ISSUED

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
REMEDIAL INVESTIGATION

DRAWING TITLE
SITE PLAN WITH MONITORING WELL
AND TEST BORING LOCATIONS

PROJECT NO.
1506R-97

RI-3

SHEET 1 OF 1

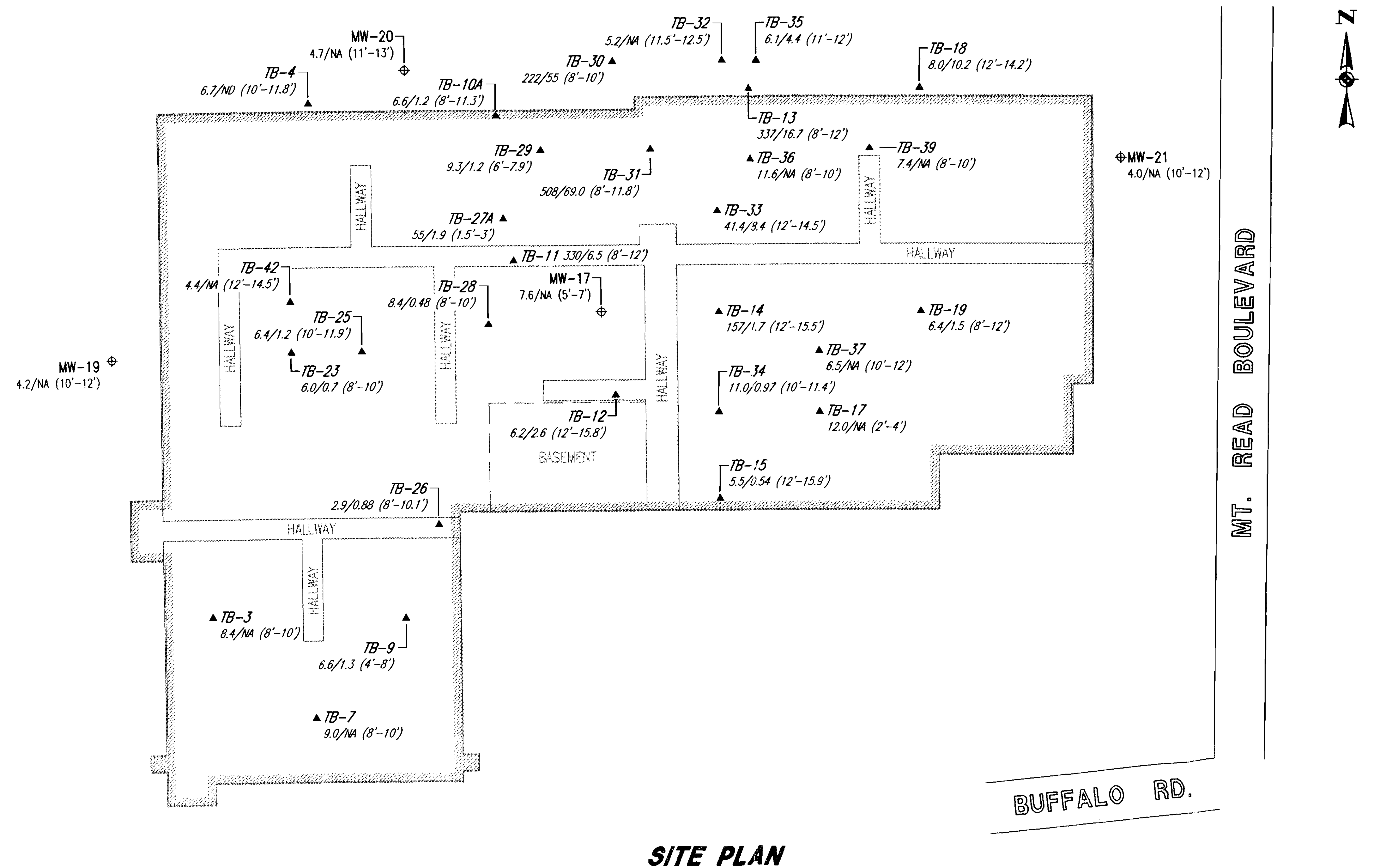
REF1: BORDER12
REF2: REF2
REF3: REF3

NOTES

1. SITE PLAN PRODUCED FROM A DRAWING BY: THE ERM GROUP, ENTITLED "FIGURE 3-1 PCB, ASBESTOS & SEDIMENT/RESIDUE SAMPLING LOCATIONS", AND DATED 11/20/90.
2. BEDROCK WELL MW-2 HAS BEEN ABANDONED DUE TO NEW CONSTRUCTION, OVERBURDEN WELL MW-5 IS DAMAGED.

LEGEND

⊕MW-17 7.6/NA (5'-7')	DEEP BEDROCK MONITORING WELL LOCATION WITH PEAK TOTAL CHROMIUM/HEXAVALENT CHROMIUM CONCENTRATION RECORDED IN PARTS PER MILLION (ppm) DETECTED IN A SOIL SAMPLE, DEPTH INTERVAL (FEET) IN PARENTHESIS
▲ *TB-19* *6.4/1.5 (8'-12')*	TEST BORING LOCATION WITH PEAK TOTAL CHROMIUM/HEXAVALENT CHROMIUM CONCENTRATION RECORDED IN PARTS PER MILLION (ppm) DETECTED IN A SOIL SAMPLE, DEPTH INTERVAL (FEET) IN PARENTHESIS
NA	NOT ANALYZED
ND	NOT DETECTED ABOVE LABORATORY DETECTION LIMITS



SITE PLAN

SCALE: 1" = 50'

TIME PLOTTED: MON JULY 19, 13:30:00 1999
FILENAME: \MAGUIR\1506R-10

REVISED BY	DATE

FIELD VERIFIED BY JAD	DATE 4/99
DRAWN BY RJM	DATE DRAWN 4/21/99
SCALE	DATE ISSUED

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
REMEDIAL INVESTIGATION

DRAWING TITLE SITE PLAN WITH PEAK CHROMIUM

PROJECT NO.
1506R-97

RI-5

SHEET 1 OF 1

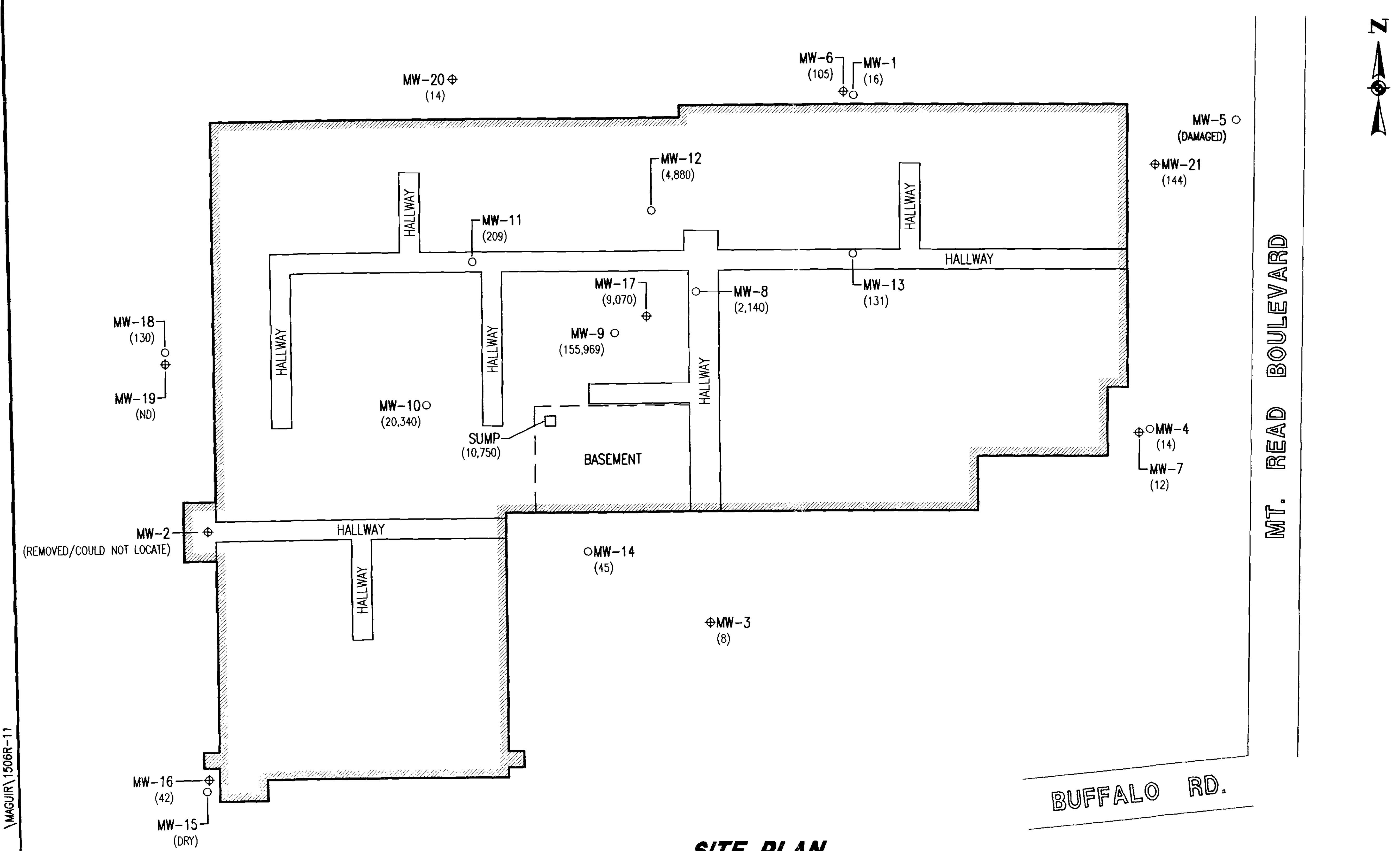
REF1: BORDER12
REF2: REF2
REF3: REF3

NOTES

1. SITE PLAN PRODUCED FROM A DRAWING BY: THE ERM GROUP, ENTITLED "FIGURE 3-1 PCB, ASBESTOS & SEDIMENT/RESIDUE SAMPLING LOCATIONS", AND DATED 11/20/90.
2. BEDROCK WELL MW-2 HAS BEEN ABANDONED DUE TO NEW CONSTRUCTION, OVERBURDEN WELL MW-5 IS DAMAGED.

LEGEND

○MW-14 (47)	OVERBURDEN AND/OR SHALLOW BEDROCK MONITORING WELL LOCATION WITH PEAK TOTAL VOC'S IN PARENTHESIS, RECORDED IN PARTS PER BILLION (ppb) DETECTED IN GROUNDWATER SAMPLE
⊕MW-17 (9,070)	DEEP BEDROCK MONITORING WELL LOCATION WITH PEAK TOTAL VOC'S IN PARENTHESIS, RECORDED IN PARTS PER BILLION (ppb) DETECTED IN GROUNDWATER SAMPLE
☐ SUMP (10,750)	BASEMENT SUMP WITH TOTAL VOC'S IN PARENTHESIS, RECORDED IN PARTS PER BILLION (ppb) DETECTED IN GROUNDWATER SAMPLE
(ND)	NOT DETECTED



SITE PLAN

SCALE: 1" = 50'

TIME PLOTTED: FRI JULY 16, 09:20:00 1999
FILENAME: \MAGUIR\1506R-11

REVISED BY
DATE

FIELD VERIFIED BY JAD
DATE 4/99
DRAWN BY RJM
DATE DRAWN 4/21/99
SCALE
DATE ISSUED

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
REMEDIAL INVESTIGATION

DRAWING TITLE SITE PLAN WITH PEAK TOTAL VOC'S

PROJECT NO.
1506R-97

RI-6

SHEET 1 OF

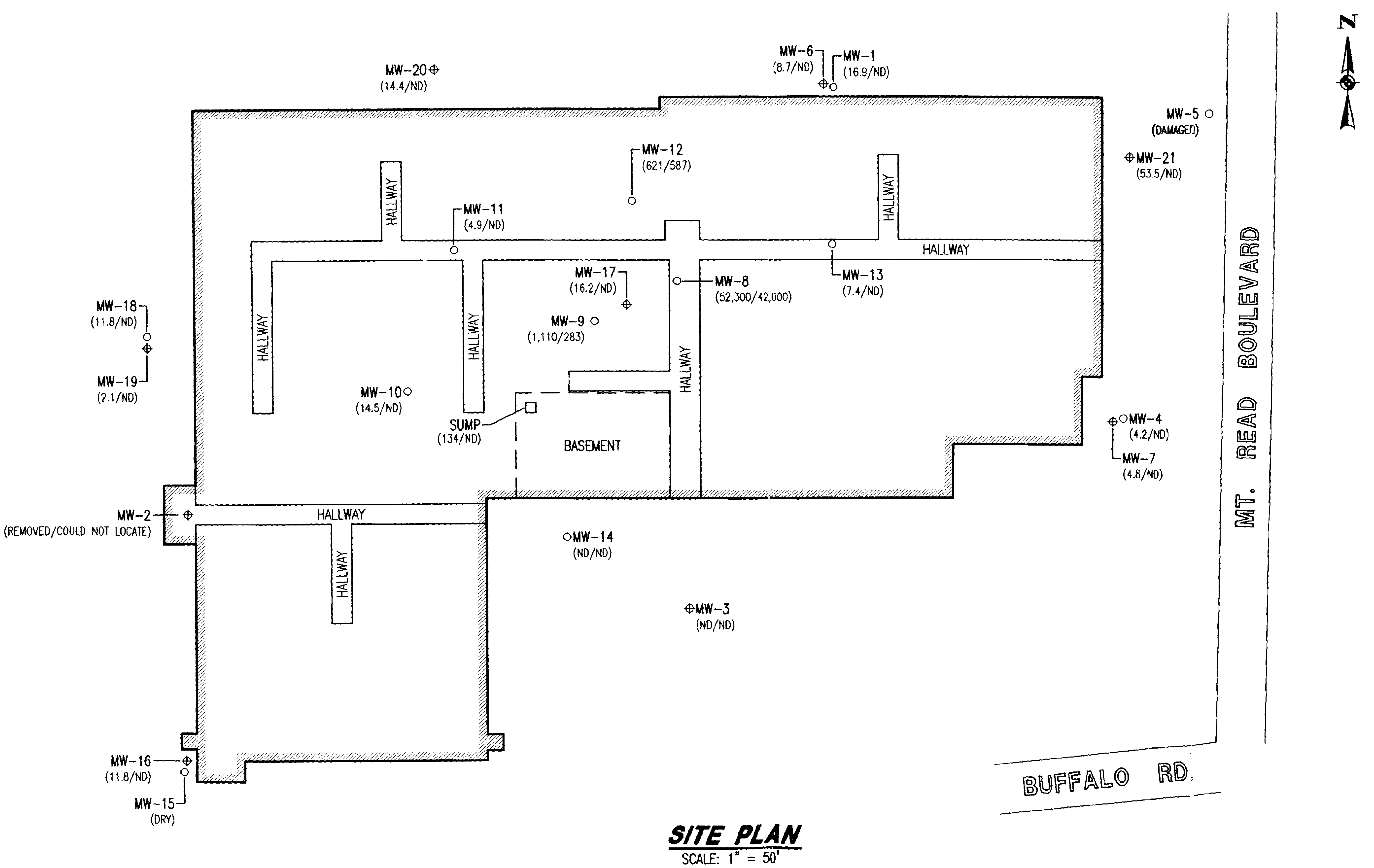
REF1: BORDER12
REF2: REF2
REF3: REF3

NOTES

1. SITE PLAN PRODUCED FROM A DRAWING BY: THE ERM GROUP, ENTITLED "FIGURE 3-1 PCB, ASBESTOS & SEDIMENT/RESIDUE SAMPLING LOCATIONS", AND DATED 11/20/90.
2. BEDROCK WELL MW-2 HAS BEEN ABANDONED DUE TO NEW CONSTRUCTION, OVERBURDEN WELL MW-5 IS DAMAGED.

LEGEND

○MW-1 (16.9/ND)	OVERBURDEN AND/OR SHALLOW BEDROCK MONITORING WELL LOCATION WITH PEAK TOTAL CHROMIUM/HEXAVALENT CHROMIUM CONCENTRATIONS IN PARENTHESIS, RECORDED IN PARTS PER BILLION (ppb) DETECTED IN GROUNDWATER SAMPLE
⊕MW-17 (16.2/ND)	DEEP BEDROCK MONITORING WELL LOCATION WITH PEAK TOTAL CHROMIUM/HEXAVALENT CHROMIUM IN PARENTHESIS, RECORDED IN PARTS PER BILLION (ppb) DETECTED IN GROUNDWATER SAMPLE
☐SUMP (134/ND)	BASEMENT SUMP WITH TOTAL PEAK CHROMIUM/HEXAVALENT CHROMIUM IN PARENTHESIS, RECORDED IN PARTS PER BILLION (ppb) DETECTED IN GROUNDWATER SAMPLE
ND	NOT DETECTED ABOVE LABORATORY DETECTION LIMITS



SITE PLAN

SCALE: 1" = 50'

REVISED BY | DATE

FIELD VERIFIED BY JAD | DATE 4/99
DRAWN BY RJM | DATE DRAWN 4/22/99
SCALE | DATE ISSUED

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
REMEDIAL INVESTIGATION

PEAK CHROMIUM

PROJECT NO.
1506R-

RI-7

SHEET 1

TIME PLOTTED: FRI JULY 16, 09: 25:00 1999
FILENAME: \MAGUIR\1506R-12

CURRICULUM VITAE

DALAND RICHARD JUBERG

Home Address
7887 Ridgeland Drive
Indianapolis, IN 46250
317-570-1277
jubergs@comcast.net

EDUCATION

Diploma, Oakwood High School, Dayton, Ohio (1979)

B.A., Biology (Magna Cum Laude), Wittenberg University, Springfield, Ohio (1983)

M.S., Environmental Health Sciences, University of Michigan, Ann Arbor, Michigan (1984)

Ph.D., Toxicology, University of Michigan (1992)

PROFESSIONAL EXPERIENCE

Senior Scientist/Toxicologist. Dow Agrosciences, LLC, Indianapolis, IN (2002-present)
Toxicological consultation and science focal point for product development and stewardship purposes. Responsibilities include oversight for scientific and regulatory toxicological management of 6-8 key herbicides, fungicides, pesticides and participation on company-level science policy issues and strategies. Responsible for oversight of toxicological testing required for registration/reregistration of key molecules, including EU dossier submissions. Task force chair for triazole task force toxicology group, regular interactions and presentations before the U.S. Environmental Protection Agency, and issue management related to cancer guidelines, endocrine disruption, and children's health. Participant on Six Sigma, strategic planning, and AgPac committees.

Principal. International Center for Toxicology and Medicine, Rockville, MD (operated the Rochester, N.Y. office; 1999-2002)

Business development and marketing director of core services on a regional and national basis for public and private sector clients. Expert consultation in applied toxicology, human health and environmental risk assessment and management, occupational health and safety, and environmental medicine. Emphasis in client activities related to evaluation of environmental and human health hazards and subsequent evaluation of risk. Core services included litigation support, toxicological review and critique, risk assessment, scientific writing, indoor air evaluations, technical presentations, and risk communication.

Senior Toxicologist. Applied and Regulatory Toxicology, Corporate Health and Environment Laboratories, Eastman Kodak Company, Rochester, N.Y. (1992-99)

Product toxicology including technical, regulatory, and scientific support for four business units; human health and environmental risk assessments for product and site-related concerns; study director for acute and subchronic toxicology testing for product registration; expert testimony and litigation support related
to product liability; corporate environmental, health, and safety compliance auditing; participation on trade association chemical- and risk-specific panels; development of internal occupational exposure limits; coordination of corporate reproductive health assessment program; material safety data sheet and product labeling preparation and review; involvement with State and Federal air issues including regulatory programs and guidance, comparative risk, and establishment of ambient air guidelines; technical analysis of ozone and particulate matter (PM10 and PM2.5); risk evaluation for occupational hazards, reproductive toxicants, consumer products, medical devices, air toxics, and environmental contaminants; white-paper development associated with multi-media health risk assessment, toxicity evaluations, environmental hazards, and broad-scope environmental health issues (California Proposition 65, Great Lakes Water Quality Initiative, TSCA test rules, Clean Air Act, National Ambient Air Quality Standards, organochlorine compounds and estrogenic substances); chemical-specific knowledge of ozone, boron, carbon black, silver, DDT, particulates, phthalate esters.

Consultant to *The American Council on Science and Health,* New York, N.Y. (1996-present)

Toxicological consultation and author for both consumer-oriented and scientific publications related to environmental contaminants, industrial chemicals and their impact to human health.

Consulting toxicologist and coordinator for a Blue-Ribbon Panel, chaired by former Surgeon General, Dr. C. Everett Koop, charged with the safety assessment and evaluation of phthalate-containing toys and medical devices (1999).

Consultant (1987-89) Ann Arbor, Michigan

Contract assignments encompassing environmental compliance audits, RCRA facility water sampling and monitoring, asbestos abatement supervision, and assessment of groundwater contaminants for fate and transport in the environment.

Staff Scientist (1988-89) Limnotech, Ann Arbor, Michigan

Assessment of aquatic toxicology studies, risk assessment for remedial action at Superfund sites, and industrial wastewater investigations.

Senior Environmental Scientist (1984-87) Environmental Control Technology Corporation, Ann Arbor, Michigan

Laboratory technician for inorganic and organic chemical analyses. Senior scientist responsible for environmental consulting services including proposal development, supervision of field crews, environmental sampling (air, water, soil), analytical interpretation, and report generation. Extensive field experience including asbestos abatement monitoring, PCB cleanup supervision, lagoon closure and delisting implementation, supervision of soil boring and well installation, hydrogeological investigations,

contaminated groundwater plume delineation, industrial waste stream characterization, RCRA facility leachate sampling, mass balance modeling of VOC emissions, and air sampling for both human health monitoring and industrial compliance testing.

RESEARCH EXPERIENCE

(1989-1992) Dissertation research involved the effects of pesticides (e.g., DDT isomers, dieldrin, pyrethrins) on uterine smooth muscle contractility and function, in relation to potential influence on preterm birth. Specific studies characterized the stimulatory effect of DDT and related isomers on rat uterine contraction frequency, *in vitro,* and whether the toxicological mechanism was influenced by estrogen, prostaglandin, or sodium channel mediation. Other studies investigated the effects of DDT on intracellular calcium levels and membrane potential in cultured rat uterine cells. (Dr. R. Loch Caruso, Chair)

(1988) Research rotation involving determination of the inheritance pattern of the rat N-acetylation polymorphism (Dr. W.W. Weber, supervisor)

(1987) Research investigation concerning the effects of dieldrin on intercellular communication (Dr. R. Loch Caruso, supervisor)

(1982) Independent research internship involving the investigation of macroinvertebrate-macrophyte associations in a Southeastern swamp (Savannah River Ecology Laboratory, Aiken, S.C.). Results presented at the NABS Conference, March, 1983.

(1980-84) Independent research during undergraduate and graduate studies including investigations at Michigan State University's Kellogg Biological Station (1981), Duke University's Marine Laboratory (1982), and The University of Michigan, School of Public Health, Aquatic Toxicology Program (1984)

RELEVANT GRADUATE COURSEWORK

Mammalian Toxicology
Molecular Mechanisms of Toxicology
Fundamentals of Biochemistry
Biochemistry (Gene Expression)
Biochemistry (Protein Structure)
Pharmacology (Principles of Drug Action)
Water Quality Management
Instrumental Methods of Analysis
Chem. Analysis of Water/Wastewater
Pathology
Human Physiology
Reproductive Endocrinology
Medical Pharmacology I,II
Ecological Toxicology
Water Pollution Biology
Water Management Practices
Applied Statistics
Experimental Design

FELLOWSHIPS/AWARDS

Society of Toxicology Robert L. Dixon Award (1992)

Society of Toxicology Reproductive and Developmental Specialty Section Award (1992)

Horace H. Rackham Dissertation Grant (1991-92)

Sigma Xi Grant-in-Aid (1991)

Society of Toxicology Reproductive and Developmental Specialty Section Award (1991)

Society of Toxicology Student Travel Award (1991)

NIH Predoctoral Fellowship - Reproductive Sciences Program Trainee, University of Michigan (1990-92)

Rackham Travel Grant, University of Michigan (1990-91)

NIH Predoctoral Fellowship - Pharmacological Sciences Training Program, University of Michigan (1987-89)

Rackham Block Grant, University of Michigan (1983-84)

Charles and Anne Morrow Lindbergh Scholarship, Wittenberg University (1981-83)

Lutheran Honor Scholar, Wittenberg University (1979-83)

ACADEMIC HONORS Wittenberg University (1979-83)

Magna Cum Laude graduate
The Tri-Beta (Biology Honorary) Outstanding Senior Biology Major Award
President and member, Beta Beta Beta, (Biology Honorary)
Mortar Board (Sr. Scholarship and Service Honorary)
Omicron Delta Kappa (Sr. Leadership and Service Honorary)
Pick and Pen (Jr. Scholarship Honorary)
Phi Eta Sigma (Soph. Scholarship Honorary, Treasurer)
Dean's List (10/12 terms)

PROFESSIONAL SOCIETY MEMBERSHIP

American College of Toxicology
American Society for Testing and Materials (ASTM)

Society of Environmental Toxicology and Chemistry

Society of Toxicology
International Society of Regulatory Toxicology and Pharmacology

COMMITTEE, WORKGROUP, AND BOARD PARTICIPATION

Program Committee, Michigan Chapter of the Society for Risk Analysis (1991-92)

Training Committee, Reproductive Sciences Program, University of Michigan (1991-92)

Program in Environmental Risk Communication, Center for Environmental Information, Rochester, New York, (1993)

Diethyl Ether Manufacturers Technical Committee. Associated with the EPA Neurotoxicity Test Rule (1993-99)

CMA Hazardous Air Pollutants Testing Work Group - Chair, Toxicology Technical Subgroup (1994-99)

CMA Ad Hoc NAAQS Health and Risk Issue Group - Ozone, PM (1994-99)

ASTM E47.13 Committee - Assessment of Risk to Human Health and the Environment from Contaminated Sites - Human Exposure Assessment Task Group (1996-99)

International Joint Commission - Great Lakes Science Advisory Board Workgroup on Ecosystem Health (1996-98)

International Life Sciences Institute Risk Science Institute - Workgroup on Human Variability (1996)

Rochester Embayment Remedial Action Plan (RAP) - Priority Pollutant Task Group (1996-98)

ASTM E50 Committee - Environmental Assessment (1997-present)

Steering Committee - NSF International Conference on Indoor Air Health (1998-99)

American Industrial Health Council - Ecological Risk Assessment Committee (1998-99)

New York State Dept. of Environmental Conservation - Comparative Risk Technical Group (1997-99)

New York State Business Council – Environment Committee (1999-present)

Steering Committee – NSF 2nd International Conference on Indoor Air Health (2000)

U.S. Triazole Task Force (USTTF) – Toxicology Subcommittee Chair (2002-present)

PROFESSIONAL DEVELOPMENT

Organizational Behavior/Human Resources Management. Audited course in the School of Business, University of Michigan (1991)

6th Annual Course on New Directions in Risk Assessment. Sponsor, Society for Risk Analysis, Washington, D.C. (1991)

Conference on the Risk Assessment Paradigm After Ten Years. Sponsors, U.S. EPA Environmental Criteria and Assessment Office; Toxicology Division, Armstrong Laboratory, Dayton, Ohio (1993)

Mastering Environmental, Health, and Safety Auditing Skills and Techniques. Arthur D. Little, Inc. Center for Environmental Assurance. Cambridge, Massachusetts (1993)

Good Laboratory Practices (GLP) for Study Directors. International Center for Health and Environmental Education. Rochester, New York (1994)

Risk Assessment for the Environmental Professional. National Groundwater Association. Orlando, Florida (1996).

Media Training. Nichols Dezenhall Communications Management Group. Washington, D.C. (1999).

SELECTED SYMPOSIA PARTICIPATION

Toxicological Implications of Altered Gap Junctional Intercellular Communication. Sponsor, Michigan State University for Environmental Toxicology, East Lansing, Michigan (1988)

Uterine Contractility: Mechanisms of Control. Sponsor, Serono Symposia USA, St. Louis, Missouri (1990)

Assessment of Human Exposure to Chemicals from Superfund Sites. Sponsor, NIEHS, East Lansing, Michigan (1990)

The Toxicology Forum - 1993 Annual Summer Meeting. Aspen, Colorado (1993)

Transport, Fate and Effects of Silver in the Environment - 1st International Conference. University of Wisconsin-Madison (1993)

Transport, Fate and Effects of Silver in the Environment - 2nd International Conference. University of Wisconsin-Madison (1994)

State of the Lakes Ecosystem Conference (SOLEC) - Dearborn, Michigan (1994)

Wingspread Conference - Environmental Exposures that Affect the Endocrine System. Racine, Wisconsin (1995)

Transport, Fate and Effects of Silver in the Environment - 3rd International Conference. Washington, D.C. (1995)

Workshop on Environmental Results: Monitoring and Trends of Effects Caused by Persistent Toxic Substances. International Joint Commission/Great Lakes Science Advisory Board's Workgroup on Ecosystem Health. Windsor, Ontario (1996)

Transport, Fate and Effects of Silver in the Environment - 4th International Conference. University of Wisconsin-Madison (1996)

Health Conference '97 - Great Lakes/St. Lawrence. Health Canada/ATSDR. Montreal, Quebec, Canada (1997)

Transport, Fate and Effects of Silver in the Environment - 5th International Conference. Hamilton, Ontario, Canada (1997)

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EDITORIAL/ADVISORY BOARDS

International Journal of Toxicology - Editorial Board
Journal of Healthcare Safety, Compliance & Infection Control – Editorial Board
American Council on Science and Health - Board of Scientific and Policy Advisors
Society of Toxicology – Media Resource Specialist
Toxicology Excellence for Risk Assessment (TERA), Cincinnati, OH
The Journal of Children's Health – Editorial Board

PEER-REVIEWER – Scientific Publications

International Journal of Toxicology
Environmental Toxicology and Chemistry
Neurotoxicology

PEER-REVIEWER – Government Contractors

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22. Invited Speaker. Juberg, D.R. Silver and human health. Photomarketing Association (PMA) 98. New Orleans, LA. 1998.

23. Invited Panelist. Transport, Fate and Effects of Silver in the Environment. Risk Analysis Panel. Madison, WI. 1999.

24. Invited Speaker. ACSH Blue-Ribbon Panel Report on Phthalates and the Risk to Reproductive Health. Presented before the NIEHS Center for Evaluation of Risks to Human Reproduction. Arlington, VA. 1999.

25. Invited Speaker. American Council on Science and Health: A Scientific and Multidisciplinary Assessment of DEHP in Medical Devices. FDA CBER Workshop on Plasticizers: Scientific Issues in Blood Collection, Storage, and Transfusion. NIH, Washington, D.C. 1999.

26. Invited Speaker. 7th Annual Advances in Toxicology & Emergency Medicine. University of Connecticut Health Center. 1999.

27. Advancements in the Risk Assessment Process and Management of Health Risk at Hazardous Waste Sites. OSHA Hazardous Waste Site Worker Training. Xerox Corporation. 1999.

28. Invited Speaker. Emerging Issues Conference. National Groundwater Association. The Use of Toxicology and Science in Distinguishing Real from Perceived Human Health Risks. June, 2000. Minneapolis.

29. Keynote Speaker. Medical Plastics 2000. Society of Plastics Engineers. Medical Plastics Division and Chicago Section. October, 2000. Chicago.

30. Invited Speaker. N.Y. State Business Council Industry-Environment Conference. Understanding the Science Behind Risk. October, 2000. Saratoga Springs, N.Y.

31. Session Chair. Health Endpoints and Case Studies. Indoor Air Health – 2nd International Conference. NSF International. Miami, FL. January, 2001.

32. Invited Speaker. Facilities Management Executive Summit. FM '01: People, Productivity and the Bottom Line. Distinguishing Perceived from Real Facility Hazards. April, 2001. Kiawah Island, S.C.

33. Invited Speaker. The Growing Burden of Mold to the Insurance Industry – Trends, Science, and Strategies to Manage This Environmental Health Concern. Buffalo Claims Association. Buffalo, N.Y. October 2001.

34. Invited Speaker. Same as Above. Rochester Claims Association. Rochester, N.Y. October, 2001.

35. Invited Speaker. Review of Lead Literature. Mealey's Lead Litigation 101 Conference. New Orleans, LA. November 2001.

36. Training Presentations – Toxicology and Management of Health Risk at Hazardous Waste Sites. Xerox Hazwoper Training, Rochester, NY. March, 2002.

37. Invited Speaker. The Growing Concerns over Indoor Air Quality, Molds, and the Impact to the Business Community. Risk Insurance Management Society. Rochester, N.Y. March, 2002.

38. Invited Speaker. Current Perspectives on the Lead Literature and its Use in Litigation. Mealeys Lead Litigation Conference. Philadelphia, PA. April, 2002.

39. Training Presentations – Toxicology and Management of Health Risk at Hazardous Waste Sites. Conducted for RG&E Hazwoper Training. Rochester, NY April, 2002.

40. Invited Speaker. The Increasing Importance of Managing Environmental Health Hazards: Perceived and Real. BOCES of New York. Watertown, NY June, 2002.

41. Seminar Speaker. A Scientific Evaluation of Plasticizers in Medical Devices and Toys – Implications for Human Health Risk. Purdue University Department of Pharmacology and Toxicology, West Lafayette, IN. November, 2002.

42. Pesticides in Today's Environment: The World of Regulatory Safety Testing. Wittenberg University Department of Biology. Springfield, Ohio. November, 2004.

COMMUNITY SERVICE

Rochester, NY

First Congregational Church of Fairport Board of Trustees (1995-98); Chairman (1996-97)

Monroe County Cornell Cooperative Extension - Foundation Board Trustee (1996-present); Treasurer (1996-1997); Chairman (1998-99)

Monroe County Cornell Cooperative Extension - Board of Directors (1997-2000)

First Congregational Church of Fairport - Assistant Moderator (1998-99); Moderator (1999-2000)

First Congregational Church of Fairport – Membership Committee (2000-2003); Chair (2001-02)

Otetiana Council Pack 80 Cub Scouts Den Leader (2001-02)

Indianapolis, IN

Washington Township Schools Parents Advisory Committee (PAC) – Representative from Allisonville Elementary School (2002-present)

Allisonville Elementary School Dad's Club (2002-03)

Crossroads Council – Pack 282 Webelos Den Leader (2003-05)

Crossroads Council – Pack 282 Committee Chair (2003-05)

APPENDIX C

Tables

TABLE 1

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Present Worth Cost Summary

SOIL				
Alternative	**Capital/Initial Present Worth**	**O&M/Annual Present Worth**	**Closeout Present Worth**	**Total Present Worth Costs**
No Action	$ 0	$ 0	$ 0	$ 0
Institutional Action	$ 18,000	$ 55,340	$ 0	$ 73,340
Extensive Soil Excavation	$ 12,114,380	$ 2,127,600	$ 1,556,880	$ 15,798,860
Source Area Soil Excavation	$ 725,080	$ 149,360	$ 342,230	$ 1,216,670
Source Area with Exterior Soil Excavation	$ 1,545,010	$ 149,360	$ 344,110	$ 2,038,480
In-Situ Soil Stabilization/Solidification	$ 1,210,500	$ 278,470	$ 128,430	$ 1,617,400

GROUNDWATER				
Alternative	**Capital/Initial Present Worth**	**O&M/Annual Present Worth**	**Closeout Present Worth**	**Total Present Worth Costs**
No Action	$ 0	$ 160,180	$ 0	$ 160,180
Institutional Action	$ 6,000	$ 160,180	$ 0	$ 166,180
In-Situ Chemical Reduction	$ 491,770	$ 920,480	$ 8,620	$ 1,420,870
In-Situ Chemical Oxidation	$ 1,247,040	$ 310,840	$ 8,620	$ 1,566,500
Site Wide Pump-and-Treat	$ 1,006,180	$ 6,639,690	$ 2,550	$ 7,648,420
COC (VOCs and Chromium) Source Area Pump-and-Treat	$ 513,080	$ 4,689,530	$ 2,550	$ 5,205,160
Source Area Chromium Pump-and-Treat with In-Situ Chemical Reduction	$ 881,860	$ 1,798,410	$ 6,750	$ 2,687,020

Present worth costs are based on a 5% discount rate over life of project.

TABLE 2

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Soil Institutional Action Cost
(1 Year @ 5% Discount Factor)
(30 Years @ 5% Discount Factor for Asphalt Maintenance/Certification)

Capital/Initial Costs	
Environmental Easements	$ 5,000
Site Management Plan	$ 10,000
20% Contingency	$ 3,000
Total Capital/Initial Costs	**$ 18,000**
Operation/Maintenance/Annual Costs	
Annual Asphalt Maintenance/Certification to NYSDEC	$ 3,000
20% Contingency	$ 600
Total Operation/Maintenance/Annual Costs	**$ 3,600**
Closeout Costs	$ 0
Present Worth Cost	
Present Worth Capital/Initial Costs	$ 18,000
Present Worth Operation/Maintenance/Annual Costs (F = 15.3725)	$ 55,340
Total Present Worth Costs	**$ 73,340**

Notes:

- F = Discount Factor of 5% at the n^{th} year of project.

TABLE 3

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Extensive Soil Excavation Cost
(4 Years @ 5% Discount Factor)

Capital/Initial Costs	
Design	$ 25,000
Excavation and Removal Contractor	$ 2,500,000
Fieldwork Oversight ($63/hr x 640hrs)	$ 40,320
Soil Disposal ($360/ton x 18,000 tons)	$ 6,480,000
Boiler Room Relocation	$ 50,000
Relocation of Tenants	$ 1,000,000
20% Contingency	$ 2,019,060
Total Capital/Initial Costs	**$ 12,114,380**
Operation/Maintenance/Annual Costs	
Loss of Rental Income	$ 500,000
20% Contingency	$ 100,000
Total Operation/Maintenance/Annual Costs	**$ 600,000**
Closeout Costs	
Re-Lease	$ 500,000
Re-Build	$ 1,050,000
Confirmatory Sampling	$ 12,000
Report	$ 15,000
20% Contingency	$ 315,400
Total Closeout Costs	**$ 1,892,400**
Present Worth Cost	
Present Worth Capital/Initial Costs	$ 12,114,380
Present Worth Operation/Maintenance/Annual Costs (F = 3.5460)	$ 2,127,600
Present Worth Closeout Costs (F= 0.8227)	$ 1,556,880
Total Present Worth Costs	**$ 15,798,860**

Notes:

- F = Discount Factor of 5% at the nth year of project.
- Design includes work plans, selecting and coordinating subcontractors, locating underground utilities and meetings with agencies.
- It is anticipated that soils exceeding chromium levels of 50 ppm (approximately 9,000 cy or 18,000 tons) will be removed and disposed of off-site as hazardous waste at a cost of $360/ton .
- Due to the size of the excavation and the number of unknowns (i.e., location of utilities, floor thickness, etc.) the excavation and removal contractor cost is a gross estimate.
- The excavation and removal contractor cost includes removal of floors, excavation and removal of soils, backfilling, compacting excavation, and restoration of floors.

TABLE 4

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Source Area Soil Excavation Cost
(5 Years @ 5% Discount Factor)
(30 Years @ 5% Discount Factor for Asphalt Maintenance/Certification)

Capital/Initial Costs		
Design	$	20,000
Environmental Easements	$	5,000
Site Management Plan	$	10,000
Excavation and Removal Contractor	$	225,000
Fieldwork Oversight ($63/hr x 400hrs)	$	25,200
Soil Disposal ($360/ton x 1350 tons)	$	486,000
20% Contingency	$	154,240
Total Capital/Initial Costs	**$**	**925,440**
Operation/Maintenance/Annual Costs		
Loss of Rental Income	$	100,000
20% Contingency	$	20,000
Total Loss of Rental Income Costs	**$**	**120,000**
Annual Asphalt Maintenance/Certification to NYSDEC	$	3,000
20% Contingency	$	600
Total Asphalt Maintenance/Certification Costs	**$**	**3,600**
Closeout Costs		
Re-Lease	$	100,000
Re-Build	$	250,000
Confirmatory Sampling	$	4,000
Report	$	10,000
20% Contingency	$	72,800
Total Closeout Costs	**$**	**436,800**
Present Worth Cost		
Present Worth Capital/Initial Costs (F=0.7835)	$	725,080
Present Worth Operation/Maintenance/Annual Costs		
Loss of Rental Income (F=0.7835)	$	94,020
Annual Asphalt Maintenance/Certification (F=15.3725)	$	55,340
Present Worth Closeout Costs (F=0.7835)	$	342,230
Total Present Worth Costs	**$**	**1,216,670**

Notes:

- F = Discount Factor of 5% at the n^{th} year of project.
- Environmental Easements/SMP will be the same as soil institutional action.
- Design includes work plans, selecting and coordinating subcontractors, locating underground utilities and meetings with agencies.
- It is anticipated that soil exceeding chromium levels of 500 ppm will be removed to the extent practical (approximately 1350 tons) and disposed of off-site as hazardous waste at a cost of $360/ton.
- The excavation and removal contractor cost includes removal of floors, excavation and removal of soils, backfilling, compacting excavation, and restoration of floors.

TABLE 5

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Source Area and Exterior Soil Excavation Cost
(5 Years @ 5% Discount Factor)
(30 Years @ 5% Discount Factor for Asphalt Maintenance/Certification)

Capital/Initial Costs	
Design	$ 20,000
Environmental Easements	$ 5,000
Site Management Plan	$ 10,000
Excavation and Removal Contractor	$ 295,000
Fieldwork Oversight ($63/hr x 560hrs)	$ 35,280
Soil Disposal ($360/ton x 3550 tons)	$ 1,278,000
20% Contingency	$ 328,660
Total Capital/Initial Costs	**$ 1,971,940**
Operation/Maintenance/Annual Costs	
Loss of Rental Income	$ 100,000
20% Contingency	$ 20,000
Total Loss of Rental Income Costs	**$ 120,000**
Annual Asphalt Maintenance/Certification to NYSDEC	$ 3,000
20% Contingency	$ 600
Total Asphalt Maintenance/Certification Costs	**$ 3,600**
Closeout Costs	
Re-Lease	$ 100,000
Re-Build	$ 250,000
Confirmatory Sampling	$ 6,000
Report	$ 10,000
20% Contingency	$ 73,200
Total Closeout Costs	**$ 439,200**
Present Worth Cost	
Present Worth Capital/Initial Costs (F=0.7835)	$ 1,545,010
Present Worth Operation/Maintenance/Annual Costs	
Loss of Rental Income (F=0.7835)	$ 94,020
Annual Asphalt Maintenance/Certification (F=15.3725)	$ 55,340
Present Worth Closeout Costs (F= 0.7835)	$ 344,110
Total Present Worth Costs	**$ 2,038,480**

Notes:

- F = Discount Factor of 5% at the nth year of project.
- Environmental Easements/SMP will be the same as soil institutional action.
- Design includes work plans, selecting and coordinating subcontractors, locating underground utilities and meetings with agencies.
- It is anticipated that soil exceeding chromium levels of 500 ppm on the building interior and exterior soil exceeding 50 ppm will be removed to the extent practical (approximately 3550 tons) and disposed of off-site as hazardous waste at a cost of $360/ton.
- The excavation and removal contractor cost includes removal of floors, excavation and removal of soils, backfilling, compacting excavation, and restoration of floors.

TABLE 6

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

In-Situ Soil Stabilization/Solidification Cost
(2 Year @ 5% Discount Factor)
(30 Years @ 5% Discount Factor for Asphalt Maintenance/Certification)

Capital/Initial Costs	
Design	$ 20,000
Environmental Easements	$ 5,000
Site Management Plan	$ 10,000
Treatment Injection Contractor	
Treatability Study	$ 20,000
Mobilization/Demobilization	$ 50,000
Pressure Injecting Ferrous Sulfate ($200/cy x 3,200cy)	$ 640,000
Disposal of Treated Refused Soil ($40/ton x 1,200 tons)	$ 48,000
Fieldwork Oversight ($63/hr x 250 hrs)	$ 15,750
Relocation of Tenants	$ 200,000
20% Contingency	$ 201,750
Total Capital/Initial Costs	**$ 1,210,500**
Operation/Maintenance/Annual Costs	
Loss of Rental Income	$ 100,000
20% Contingency	$ 20,000
Total Loss of Rental Income Costs	**$ 120,000**
Annual Asphalt Maintenance/Certification to NYSDEC	$ 3,000
20% Contingency	$ 600
Total Asphalt Maintenance/Certification Costs	**$ 3,600**
Closeout Costs	
Re-Lease	$ 100,000
Confirmatory Sampling	$ 8,000
Report	$ 10,000
20% Contingency	$ 23,600
Total Closeout Costs	**$ 141,600**
Present Worth Cost	
Present Worth Capital/Initial Costs	$ 1,210,500
Present Worth Operation/Maintenance/Annual Costs	
Loss of Rental Income (F = 1.8594)	$ 223,130
Annual Asphalt Maintenance/Certification (F-15.3725)	$ 55,340
Present Worth Closeout Costs (F= 0.9070)	$ 128,430
Total Present Worth Costs	**$ 1,617,400**

Notes:

- F = Discount Factor of 5% at the n^{th} year of project.
- The soil stabilization program will be designed to treat soils with hexavalent chromium levels above 50 ppm to the extent practical (approximately 3,200 cubic yards) and will require a treatability study.
- Environmental Easements/SMP will be the same as Soil Institutional Action.
- Design includes work plans, selecting and coordinating subcontractors, locating underground utilities, and meetings with agencies.
- It is assumed that confirmatory sampling can be completed on the treated refusal soil.

TABLE 7

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater No Action Cost
(30 Years @ 5% Discount Factor)

Capital/Initial Costs	$	0
Operation/Maintenance/Annual Costs		
Passive Pump-and-Treat System		
Liquid Phase Carbon Usage ($800/change x 2changes)	$	1,600
Maintenance ($63/hr x 85 hrs)	$	5,355
Electricity	$	800
POTW Charges ($1.50/1,000gal x 110,000gal)	$	165
Discharge Sampling ($190/sample x 4 samples)	$	760
20% Contingency	$	1,740
Total Passive Pump-and-Treat System Operation/Maintenance/Annual Costs	**$**	**10,420**
Closeout Costs	$	0
Present Worth Cost		
Present Worth Operation/Maintenance/Annual Costs (F = 15.3725)	$	160,180
Total Present Worth Costs	**$**	**160,180**

Notes:

- F = Discount Factor of 5% at the nth year of project.
- No additional actions will be taken; however, groundwater will continue to be treated by the passive pump-and-treat system.

TABLE 8

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater Institutional Action Cost
(30 Years @ 5% Discount Factor Passive Pump-and-Treat System)

Capital/Initial Costs		
Environmental Easements	$	5,000
20% Contingency	$	1,000
Total Capital/Initial Costs	**$**	**6,000**
Operation/Maintenance/Annual Costs		
Total Passive Pump-and-Treat System Operation/Maintenance/Annual Costs (refer to Table 7 for details)	**$**	**10,420**
Closeout Costs	$	0
Present Worth Cost		
Present Worth Capital/Initial Costs	$	6,000
Present Worth Operation/Maintenance/Annual Costs		
Passive Pump-and-Treat System Present Worth (F = 15.3725)	$	160,180
Total Present Worth Costs	**$**	**166,180**

Notes:

- F = Discount Factor of 5% at the nth year of project.
- Groundwater will continue to be treated by the passive pump-and-treat system.

TABLE 9

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater In-Situ Chemical Reduction Cost
(5 Years @ 5% Discount Factor In-Situ Chemical Reduction)
(10 Years @ 5% Discount Factor Groundwater Monitoring)
(10 Years @ 5% Discount Factor Air Monitoring)

Capital/Initial Costs		
Design	$	20,000
Environmental Easements	$	5,000
Treatment Wells		
Mob/Demob	$	350
Flush-Mount Curb Box ($150/ea x 40)	$	6,000
Decontamination ($150/hr x 40 hrs)	$	6,000
Development ($150/hr x 50 hrs)	$	7,500
55-gal Drums ($40 ea. x 120)	$	4,800
Installation Oversight ($63/hr x 320 hrs)	$	20,160
Auger Drilling ($10/ft x 600ft)	$	6,000
Rotary Drilling ($18/ft x 1,200ft)	$	21,600
Screen & Riser ($18/ft x 1,800ft)	$	32,400
Treatability Study	$	20,000
Relocation of Tenants	$	250,000
Report	$	10,000
20% Contingency	$	81,960
Total Capital/Initial Costs	**$**	**491,770**
Operation/Maintenance/Annual Costs		
In-Situ Chemical Reduction		
Chemical Applications ($5/lb x 450lbs/well x 40 wells)	$	90,000
Sock Filters ($25/sock x 6 socks/well x 40 wells)	$	6,000
Labor ($63/hr x 180 hrs)	$	11,340
Reporting	$	10,000
20% Contingency	$	23,470
In-Situ Chemical Reduction Operation/Maintenance/Annual Costs	**$**	**140,810**
Year 1 Groundwater Monitoring		
Analytical Testing ($190/sample x 68 samples)	$	12,920
Equipment ($550/week x 3 weeks)	$	1,650
Labor ($600/day x 12 days)	$	7,200
Reporting ($850/report x 4 reports)	$	3,400
20% Contingency	$	5,030
Year 1 Groundwater Monitoring peration/Maintenance/Annual Costs	**$**	**30,200**

TABLE 9 (continued)

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater In-Situ Chemical Reduction Cost

Years 2 – 9 Groundwater Monitoring		
Analytical Testing ($190/sample x 34 samples)	$	6,460
Equipment ($550/week x 1.5 weeks)	$	825
Labor ($600/day x 6 days)	$	3,600
Reporting ($850/report x 2 reports)	$	1,700
20% Contingency	$	2,515
Years 2-9 Groundwater Monitoring Operation/Maintenance/Annual Costs	**$**	**15,100**
Year 10 Groundwater Monitoring		
Analytical Testing ($190/sample x 68 samples)	$	12,920
Equipment ($550/week x 3 weeks)	$	1,650
Labor ($600/day x 12 days)	$	7,200
Reporting ($850/report x 4 reports)	$	3,400
20% Contingency	$	5,030
Year 10 Groundwater Monitoring Operation/Maintenance/Annual Costs	**$**	**30,200**
Year 1 Air Monitoring		
Analytical Testing ($300/sample x 2 samples)	$	600
Labor/Reporting ($700/event x 2 events)	$	1,400
20% Contingency	$	400
Year 1 Air Monitoring Operation/Maintenance/Annual Costs	**$**	**2,400**
Years 2-10 Air Monitoring		
Analytical Testing ($300/sample x 1 sample)	$	300
Labor/Reporting ($700/event x 1 event)	$	700
20% Contingency	$	200
Years 2-10 Air Monitoring Operation/Maintenance/Annual Costs	**$**	**1,200**
Total Passive Pump-and-Treat System Operation/Maintenance/Annual Costs (refer to Table 7 for details)	**$**	**10,420**
Closeout Costs		
Report	$	10,000
20 % Contingency	$	1,000
Total Closeout Costs	**$**	**11,000**

TABLE 9 (continued)

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater In-Situ Chemical Reduction Cost

Present Worth Cost

Present Worth Capital/Initial Costs	$	491,770
Present Worth Operation/Maintenance/Annual Costs		
Groundwater Chemical Reduction Present Worth (F = 4.3295)	$	609,640
Groundwater Monitoring Year 1 Present Worth (F = 0.9524)	$	28,760
Groundwater Monitoring Years 2-9 Present Worth (F = 7.1078 - 0.9524)	$	92,950
Groundwater Monitoring Year 10 Present Worth (F = 0.6139)	$	18,540
Air Monitoring Year 1 Present Worth (F = 0.9524)	$	2,290
Air Monitoring Years 2-10 Present Worth (F = 7.7217 - 0.9524)	$	8,120
Present Worth Passive Pump-and-Treat System Annual Costs (F = 15.3725)	$	160,180
Present Worth Closeout Costs (F = 0.7835)	$	8,620
Total Present Worth Costs	**$**	**1,420,870**

Notes:

- F = Discount Factor of 5% at the nth year of project.
- The passive pump-and-treat system will continue to operate.
- Groundwater chemical reduction requires a treatability study. The above costs are based on an estimated consumption rate of 75lbs./well/2 months (i.e., 40 wells will require 18,000 lbs./year). Sock filters will be replaced with each application (i.e., 240 sock filters/year).
- Labor cost is based on 30 hours to remove and replace sock filters with treatment applications in 40 wells bi-monthly (i.e., 180 hrs/year).

TABLE 10

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater In-Situ Chemical Oxidation Cost
(10 Years @ 5% Discount Factor Groundwater Monitoring)
(10 Years @ 5% Discount Factor Air Monitoring)

Capital/Initial Costs		
Design	$	20,000
Environmental Easements	$	5,000
Treatment Wells		
Mob/Demob	$	350
Flush-Mount Curb Box ($150/ea x 10)	$	1,500
Decontamination ($150/hr x 10 hrs)	$	1,500
Development ($150/hr x 15 hrs)	$	2,250
55-gal Drums ($40 ea. x 30)	$	1,200
Installation Oversight ($63/hr x 100 hrs)	$	6,300
Auger Drilling ($10/ft x 100ft)	$	1,000
Rotary Drilling ($18/ft x 300ft)	$	5,400
Screen & Riser ($18/ft x 400ft)	$	7,200
Horizontal Drilling ($125/ft x 800ft)	$	100,000
Treatability Study/Pilot Study	$	85,000
Relocation of Tenants	$	250,000
Chemical Applications ($22/lb x 1,700lbs/well x 14 wells)	$	523,600
Labor ($63/hr x 300 hrs)	$	18,900
Report	$	10,000
20% Contingency	$	207,840
Total Capital/Initial Costs	**$**	**1,247,040**

Operation/Maintenance/Annual Costs

Year 1 Groundwater Monitoring **Operation/Maintenance/Annual Costs (refer to Table 9 for details)**	**$**	**30,200**
Years 2-9 Groundwater Monitoring **Operation/Maintenance/Annual Costs (refer to Table 9 for details)**	**$**	**15,100**
Year 10 Groundwater Monitoring **Operation/Maintenance/Annual Costs (refer to Table 9 for details)**	**$**	**30,200**
Year 1 Air Monitoring **Operation/Maintenance/Annual Costs (refer to Table 9 for details)**	**$**	**2,400**
Years 2-10 Air Monitoring **Operation/Maintenance/Annual Costs (refer to Table 9 for details)**	**$**	**1,200**
Total Passive Pump-and-Treat System **Operation/Maintenance/Annual Costs (refer to Table 7 for details)**	**$**	**10,420**

TABLE 10 (continued)

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater In-Situ Chemical Oxidation Cost

Closeout Costs		
Report	$	10,000
20 % Contingency	$	1,000
Total Closeout Costs	**$**	**11,000**

Present Worth Cost		
Present Worth Capital/Initial Costs	$	1,247,040
Present Worth Operation/Maintenance/Annual Costs		
Groundwater Monitoring Year 1 Present Worth (F = 0.9524)	$	28,760
Groundwater Monitoring Years 2-9 Present Worth (F = 7.1078 - 0.9524)	$	92,950
Groundwater Monitoring Year 10 Present Worth (F = 0.6139)	$	18,540
Air Monitoring Year 1 Present Worth (F = 0.9524)	$	2,290
Air Monitoring Years 2-10 Present Worth (F = 7.7217 - 0.9524)	$	8,120
Present Worth Passive Pump-and-Treat System Annual Costs (F = 15.3725)	$	160,180
Present Worth Closeout Costs (F = 0.7835)	$	8,620
Total Present Worth Costs	**$**	**1,566,500**

Notes:

- F = Discount Factor of 5% at the n^{th} year of project.
- The passive pump-and-treat system will continue to operate.
- Air and groundwater monitoring is the same as In-situ Chemical Reduction.
- Groundwater chemical oxidation requires a treatability study and pilot test. The above costs are based on an estimated consumption rate of 1,700 lbs./well (i.e., 14 wells will require 23,800 lbs./year).
- Labor cost is based on two treatment applications requiring fifteen 10-hour work days each (i.e., 300 hrs/year).

TABLE 11

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater Site Wide Ex-Situ Pump-and-Treat Cost
(30 Years @ 5% Discount Factor Ex-Situ Pump-and-Treat)
(30 Years @ 5% Discount Factor Groundwater Monitoring)
(10 Years @ 5% Discount Factor Air Monitoring)

Capital/Initial Costs		
Design	$	20,000
Environmental Easements	$	5,000
Extraction Wells		
Mob/Demob	$	350
Flush-Mount Curb Box ($150/ea x 30)	$	4,500
Decontamination ($150/hr x 30 hrs)	$	4,500
Development ($150/hr x 40 hrs)	$	6,000
55-gal Drums ($40 ea. x 100)	$	4,000
Installation Oversight ($63/hr x 250 hrs)	$	15,750
5 gpm Pump ($1,700 ea x 30)	$	51,000
Auger Drilling ($10/ft x 450ft)	$	4,500
Rotary Drilling ($18/ft x 450ft)	$	8,100
Screen & Riser ($18/ft x 900ft)	$	16,200
Treatability Study	$	10,000
Chromium Removal System	$	275,000
Air Stripper System	$	95,000
Liquid Phase Carbon	$	7,000
Vapor Phase Carbon	$	7,000
Compressor	$	1,500
Shipping	$	3,000
Contractor Installation	$	25,000
Construction Oversight ($63/hr x 160 hrs)	$	10,080
Start-up	$	5,000
Relocation of Tenants	$	250,000
Report	$	10,000
20% Contingency	$	167,700
Total Capital/Initial Costs	**$**	**1,006,180**
Operation/Maintenance/Annual Costs		
Groundwater Treatment System		
Sodium Hydroxide ($375/drum x 60 drums)	$	22,500
Sulfuric Acid ($610/drum x 60 drums)	$	36,600
Oxidation Solution ($950/drum x 80 drums)	$	76,000
Polymer ($625/drum x 100 drums)	$	62,500
Liquid Phase Carbon Usage ($3,000/change x 1 change)	$	3,000

TABLE 11 (continued)

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater Site Wide Ex-Situ Pump-and-Treat Cost

Vapor Phase Carbon Usage ($1,500/change x 4 changes)	$	6,000
Maintenance ($63/hr x 200 hrs)	$	12,600
Consulting Fees ($75/hr x 100 hrs)	$	7,500
Spare Parts	$	3,000
Electricity	$	8,000
POTW Charges ($1.50/1,000gal. x 52,560,000 gal)	$	78,840
Disposal ($190/drum x 80 drums)	$	15,200
Discharge Sampling ($190/month x 12 months)	$	2,280
Off-gas Sampling ($150/month x 12 months)	$	1,800
Reporting	$	10,000
20% Contingency	$	69,160
Groundwater Treatment System Operation/Maintenance/Annual Costs	**$**	**414,980**
Year 1 Groundwater Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**30,200**
Years 2-29 Groundwater Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**15,100**
Year 30 Groundwater Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**30,200**
Year 1 Air Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**2,400**
Years 2-10 Air Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**1,200**
Closeout Costs		
Report	$	10,000
20% Contingency	$	1,000
Total Closeout Costs	**$**	**11,000**

TABLE 11 (continued)

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater Site Wide Ex-Situ Pump-and-Treat Cost

Present Worth Cost

Present Worth Capital/Initial Costs	$ 1,006,180
Present Worth Operation/Maintenance/Annual Costs	
Groundwater Treatment System Present Worth (F = 15.3725)	$ 6,379,280
Groundwater Monitoring Year 1 Present Worth (F = 0.9524)	$ 28,760
Groundwater Monitoring Years 2-29 Present Worth (F = 15.1411 - 0.9524)	$ 214,250
Groundwater Monitoring Year 30 Present Worth (F = 0.2314)	$ 6,990
Air Monitoring Year 1 Present Worth (F = 0.9524)	$ 2,290
Air Monitoring Years 2-10 Present Worth (F = 7.7217 - 0.9524)	$ 8,120
Present Worth Closeout Costs (F = 0.2314)	$ 2,550
Total Present Worth Costs	**$ 7,648,420**

Notes:

- F = Discount Factor of 5% at the n^th^ year of project.
- Air and groundwater monitoring will be the same as In-situ Chemical Reduction (except for 30 year timeframe).
- Design includes work plans, selecting and coordinating subcontractors, locating underground utilities and meetings with agencies.
- 30 pumping wells and the basement sump will extract groundwater; 15 wells 45 ft deep and 15 wells 15 feet deep; 2" diameter, 10' screens on shallow wells and 30' screens on deep wells; use PVC screen and riser.
- System costs based on vendor quotes.
- A pump test to determine actual pumping rates will be required.
- A bench scale treatability study will be required.

TABLE 12

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater COC (VOCs and Chromium) Source Area
Ex-Situ Pump-and-Treat Cost
(30 Years @ 5% Discount Factor Ex-Situ Pump-and-Treat)
(30 Years @ 5% Discount Factor Groundwater Monitoring)
(10 Years @ 5% Discount Factor Air Monitoring)

Capital/Initial Costs		
Design	$	20,000
Environmental Easements	$	5,000
Extraction Wells		
Mob/Demob	$	350
Flush-Mount Curb Box ($150/ea x 10)	$	1,500
Decontamination ($150/hr x 10 hrs)	$	1,500
Development ($150/hr x 40 hrs)	$	6,000
55-gal Drums ($40 ea. x 30)	$	1,200
Installation Oversight ($63/hr x 180 hrs)	$	11,340
5 gpm Pump ($2,000 ea x 10)	$	20,000
Auger Drilling ($10/ft x 150 ft)	$	1,500
Rotary Drilling ($18/ft x 150 ft)	$	2,700
Screen & Riser ($18/ft x 300 ft)	$	5,400
Treatability Study	$	10,000
Chromium Removal System	$	190,000
Air Stripper System	$	86,000
Liquid Phase Carbon	$	6,000
Vapor Phase Carbon	$	6,000
Compressor	$	1,000
Shipping	$	2,000
Contractor Installation	$	25,000
Construction Oversight ($63/hr x 160 hrs)	$	10,080
Start-up	$	5,000
Report	$	10,000
20% Contingency	$	85,510
Total Capital/Initial Costs	**$**	**513,080**
Operation/Maintenance/Annual Costs		
Groundwater Treatment System		
Sodium Hydroxide ($375/drum x 40 drums)	$	15,000
Sulfuric Acid ($610/drum x 40 drums)	$	24,400
Oxidation Solution ($950/drum x 60 drums)	$	57,000
Polymer ($625/drum x 80 drums)	$	50,000
Liquid Phase Carbon Usage ($3,000/change x 1 change)	$	3,000

TABLE 12 (continued)

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater COC (VOCs and Chromium) Source Area
Ex-Situ Pump-and-Treat Cost

Vapor Phase Carbon Usage ($1,000/change x 4 changes)	$	4,000
Maintenance ($63/hr x 200 hrs)	$	12,600
Consulting Fees ($75/hr x 100 hrs)	$	7,500
Spare Parts	$	1,500
Electricity	$	4,000
POTW Charges ($1.50/1,000gal. x 26,280,000 gal)	$	39,420
Disposal ($190/drum x 40 drums)	$	7,600
Discharge Sampling ($190/month x 12 months)	$	2,280
Off-gas Sampling ($150/month x 12 months)	$	1,800
Reporting	$	10,000
20% Contingency	$	48,020
Groundwater Treatment System Operation/Maintenance/Annual Costs	**$**	**288,120**
Year 1 Groundwater Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**30,200**
Years 2-29 Groundwater Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**15,100**
Year 30 Groundwater Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**30,200**
Year 1 Air Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**2,400**
Years 2-10 Air Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**1,200**
Closeout Costs		
Report	$	10,000
20% Contingency	$	1,000
Total Closeout Costs	**$**	**11,000**

TABLE 12 (continued)

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater COC (VOCs and Chromium) Source Area
Ex-Situ Pump-and-Treat Cost

Present Worth Cost	
Present Worth Capital/Initial Costs	$ 513,080
Present Worth Operation/Maintenance/Annual Costs	
Groundwater Treatment System Present Worth (F = 15.3725)	$ 4,429,120
Groundwater Monitoring Year 1 Present Worth (F = 0.9524)	$ 28,760
Groundwater Monitoring Years 2-29 Present Worth (F = 15.1411 - 0.9524)	$ 214,250
Groundwater Monitoring Year 10 Present Worth (F = 0.2314)	$ 6,990
Air Monitoring Year 1 Present Worth (F = 0.9524)	$ 2,290
Air Monitoring Years 2-10 Present Worth (F = 7.7217 - 0.9524)	$ 8,120
Present Worth Closeout Costs (F = 0.2314)	$ 2,550
Total Present Worth Costs*	**$ 5,205,160**

Notes:

- F = Discount Factor of 5% at the nth year of project.
- Air and groundwater monitoring will be the same as In-situ Chemical Reduction (except for 30 year timeframe).
- Design includes work plans, selecting and coordinating subcontractors, locating underground utilities and meetings with agencies.
- 10 pumping wells and the basement sump will extract groundwater; well depths will be between 15 and 20 feet deep; 2" diameter wells with 10' screens; use PVC screen and riser.
- System costs based on vendor quotes.
- A pump test to determine actual pumping rates will be required.
- A bench scale treatability study will be required.

TABLE 13

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater Chromium Source Area
Ex-Situ Pump-and-Treat with In-Situ Chemical Reduction Cost
(5 Years @ 5% Discount Factor Ex-Situ Pump-and-Treat)
(5 Years @ 5% Discount Factor In-Situ Chemical Reduction)
(10 Years @ 5% Discount Factor Groundwater Monitoring)
(10 Years @ 5% Discount Factor Air Monitoring)

Capital/Initial Costs

Year 1: Ex-Situ Source Area Pump-and-Treat System		
Design	$	20,000
Environmental Easements	$	5,000
Extraction Wells		
Mob/Demob	$	350
Flush-Mount Curb Box ($150/ea x 8)	$	1,200
Decontamination ($150/hr x 8 hrs)	$	1,200
Development ($150/hr x 32 hrs)	$	4,800
55-gal Drums ($40 ea. x 24)	$	960
Installation Oversight ($63/hr x 150 hrs)	$	9,450
5 gpm Pump ($2,000 ea x 8)	$	16,000
Auger Drilling ($10/ft x 120ft)	$	1,200
Rotary Drilling ($18/ft x 120ft)	$	2,160
Screen & Riser ($18/ft x 240ft)	$	4,320
Treatability Study	$	10,000
Chromium Removal System	$	190,000
Air Stripper System	$	86,000
Liquid Phase Carbon	$	6,000
Vapor Phase Carbon	$	6,000
Compressor	$	1,000
Shipping	$	2,000
Contractor Installation	$	25,000
Construction Oversight ($63/hr x 160 hrs)	$	10,080
Start-up	$	5,000
Report	$	10,000
20% Contingency	$	83,540
Year 1 Capital/Initial Costs	**$**	**501,260**
Year 5: In-Situ Chemical Reduction		
Design	$	20,000
Treatment Wells		
Mob/Demob	$	350
Flush-Mount Curb Box ($150/ea x 40)	$	6,000
Decontamination ($150/hr x 40 hrs)	$	6,000
Development ($150/hr x 50 hrs)	$	7,500
55-gal Drums ($40 ea. x 120)	$	4,800
Installation Oversight ($63/hr x 320 hrs)	$	20,160
Auger Drilling ($10/ft x 600ft)	$	6,000
Rotary Drilling ($18/ft x 1,200ft)	$	21,600
Screen & Riser ($18/ft x 1,800ft)	$	32,400

TABLE 13 (Continued)

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater Chromium Source Area
Ex-Situ Pump-and-Treat with In-Situ Chemical Reduction Cost

Treatability Study	$	20,000
Relocation of Tenants	$	250,000
Report	$	10,000
20% Contingency	$	80,960
Total Year 5 Capital/Initial Costs	**$**	**485,770**

Operation/Maintenance/Annual Costs

Year 1-5: Groundwater Treatment System

Sodium Hydroxide ($375/drum x 40 drums)	$	15,000
Sulfuric Acid ($610/drum x 40 drums)	$	24,400
Oxidation Solution ($950/drum x 60 drums)	$	57,000
Polymer ($625/drum x 80 drums)	$	50,000
Liquid Phase Carbon Usage ($3,000/change x 1 change	$	3,000
Vapor Phase Carbon Usage ($1,000/change x 4 changes)	$	4,000
Maintenance ($63/hr x 200 hrs)	$	12,600
Consulting Fees ($75/hr x 100 hrs)	$	7,500
Spare Parts	$	1,500
Electricity	$	4,000
POTW Charges ($1.50/1,000gal. x 26,280,000 gal)	$	39,420
Disposal ($190/drum x 40 drums)	$	7,600
Discharge Sampling ($190/month x 12 months)	$	2,280
Off-gas Sampling ($150/month x 12 months)	$	1,800
Reporting	$	10,000
20% Contingency	$	48,020
Total Year 1-5 Groundwater Treatment System Operation/Maintenance/Annual Costs	**$**	**288,120**

Year 6-10: In-Situ Chemical Reduction

Chemical Applications ($5/lb x 450lbs/well x 40 wells)	$	90,000
Sock Filters ($25/sock x 6 socks/well x 40 wells)	$	6,000
Labor ($63/hr x 180 hrs)	$	11,340
Reporting	$	10,000
20% Contingency	$	23,470
Total Year 6 - 10 In-Situ Chemical Reduction Operation/Maintenance/Annual Costs	**$**	**140,810**

Year 6-10 Passive Pump-and-Treat System Operation/Maintenance/Annual Costs (refer to Table 7 for details)	**$**	**10,420**
Year 1 Groundwater Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**30,200**
Years 2-9 Groundwater Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**15,100**
Year 10 Groundwater Monitoring Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$**	**30,200**

TABLE 13 (continued)

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Groundwater Chromium Source Area
Ex-Situ Pump-and-Treat with In-Situ Chemical Reduction Cost

Year 1 Air Monitoring	
Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$ 2,400**
Years 2-10 Air Monitoring	
Operation/Maintenance/Annual Costs (refer to Table 9 for details)	**$ 1,200**
Closeout Costs	
Report	$ 10,000
20% Contingency	$ 1,000
Total Closeout Costs	**$ 11,000**

Present Worth Cost

Present Worth Capital/Initial Costs	
Year 1 Ex-Situ Source Area Treatment	$ 501,260
Year 5 In-Situ Chemical Reduction Treatment (F=0.7835)	$ 380,600
Present Worth Operation/Maintenance/Annual Costs	
Ex-Situ Source Treatment Years 1-5 Present Worth (F = 4.3295)	$ 1,247,420
In-Situ Chemical Reduction Years 6 – 10 Present Worth (F= 7.7217 – 5.0757)	$ 372,580
Passive Pump-and-Treat System Years 6 – 10 Present Worth (F= 7.7217 – 5.0757)	$ 27,750
Groundwater Monitoring Year 1 Present Worth (F = 0.9524)	$ 28,760
Groundwater Monitoring Years 2-9 Present Worth (F = 7.1078 - 0.9524)	$ 92,950
Groundwater Monitoring Year 10 Present Worth (F = 0.6139)	$ 18,540
Air Monitoring Year 1 Present Worth (F = 0.9524)	$ 2,290
Air Monitoring Years 2-10 Present Worth (F = 7.7217 - 0.9524)	$ 8,120
Present Worth Closeout Costs (F = 0.6139)	$ 6,750
Total Present Worth Costs	**$ 2,687,020**

Notes:

- F = Discount Factor of 5% at the n^{th} year of project.
- Air and groundwater monitoring will be the same as In-situ Chemical Reduction.
- Design includes work plans, selecting and coordinating subcontractors, locating underground utilities and meetings with agencies.
- 8 pumping wells and the basement sump will extract groundwater; well depths will be between 15-20 feet deep; 2" diameter with 10' screens; use PVC screen and riser.
- System costs based on vendor quotes.
- A pump test and treatability study will be required for the pump-and-treat system.
- Groundwater chemical oxidation requires a treatability study and pilot test. The above costs are based on an estimated consumption rate of 1,700 lbs./well (i.e., 14 wells will require 23,800 lbs./year).
- Labor cost is based on two treatment applications requiring fifteen 10-hour work days each (i.e., 300 hrs/year).

TABLE 14

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Comparison of Soil Alternatives

Criteria	No Action	Institutional Action	Extensive Soil Excavation	Source Area Soil Excavation	Source Area with Exterior Soil Excavation	In-Situ Soil Stabilization
Compliance with SCGs	Does not comply	Does not comply	Complies for Site	Complies in source area only	Complies in excavation areas only	Complies in treatment area only
Protective of Human Health and the Environment	Site characteristics are not changed	Site characteristics are not changed	In comparison to the no action alternative, provides a high level of protection of human health and the environment	In comparison to the no action alternative, provides additional protection of human health and the environment	In comparison to the no action alternative, provides additional protection of human health and the environment	In comparison to the no action alternative, provides additional protection of human health and the environment
Short-Term Impacts	None	None	Controllable with HASP	Controllable with HASP	Controllable with HASP	Controllable with HASP
Long-Term Effectiveness and Permanence	No treatment or disposal of soil	Restricts/controls activities with soil (thus, reduce exposure risks)	Permanent removal of soils that exceed SCGs	Permanent removal in excavation area	Permanent removal in excavation areas	Chemical reduction of chromium could be reversible
Reduction of Toxicity, Mobility, and Volume	Does not change waste characteristics in soil	Does not change waste characteristics in soil	Removes COCs in soil that exceeds SCGs	Chromium removed in excavation area	Chromium removed in excavation areas	Should reduce the mobility and toxicity of chromium in soil
Implementability	Easy	Easy	Very Difficult	Difficult	Difficult	Difficult
Cost (Present Worth)	**$ 0**	**$ 73,340**	**$ 15,798,860**	**$ 1,216,670**	**$ 2,038,480**	**$ 1,617,400**

TABLE 15

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

Comparison of Groundwater Alternatives

Criteria	No Action	Institutional Action	In-Situ Chemical Reduction	In-Situ Chemical Oxidation	Site Wide Pump-and-Treat	COC (VOCs and Chromium) Source Area Pump-and-Treat	Chromium Source Area Pump-and-Treat with In-Situ Chemical Reduction
Compliance with SCGs	Does not comply	Does not comply	Complies for VOCs, not for chromium	Complies for VOCs, not for chromium	Complies with SCGs	Complies with SCGs in capture zone	Complies with SCGs
Protective of Human Health and the Environment	Site characteristics are not significantly changed	Site characteristics are not significantly changed	In comparison to the no action alternative, provides additional protection of human health and the environment	In comparison to the no action alternative, provides additional protection of human health and the environment	In comparison to the no action alternative, provides a high level of protection of human health and the environment	In comparison to the no action alternative, provides additional protection of human health and the environment	In comparison to the no action alternative, provides a high level of protection of human health and the environment. Also, in comparison to the other pump-and-treat alternatives, this alternative will achieve added protection of human health and the environment in a relatively shorter period of time.
Short-Term Impacts	None	None	Controllable with HASP	Controllable with HASP	Controllable with HASP	Controllable with HASP	Controllable with HASP
Long-Term Effectiveness and Permanence	May reduce COCs through the passive pump-and-treat system	May reduce COCs through the passive pump-and-treat system	Will leave total chromium levels in exceedence of SCGs	Will leave total chromium levels in exceedence of SCGs	Permanently removes COCs	Permanently removes COCs from capture zone	Permanently removes COCs from capture zone. In-Situ treatment implemented, as warranted, for any remaining contamination
Reduction of Toxicity, Mobility, and Volume	May reduce COCs through the passive pump-and-treat system	May reduce COCs through the passive pump-and-treat system	Should degrade VOCs, and reduce Cr VI to Cr III	Should degrade VOCs, but could oxidize Cr III to Cr VI	Captures and removes COCs from groundwater	Captures and removes COCs from groundwater in the source area	Captures and removes COCs from capture zone
Implementability	Easy	Easy	Difficult	Difficult	Difficult	Moderate	Difficult
Cost (Present Worth)	**$ 160,180**	**$ 166,180**	**$ 1,420,870**	**$ 1,566,500**	**$ 7,648,420**	**$ 5,205,160**	**$ 2,687,020**

APPENDIX D

Sub-Slab Soil Gas and Indoor Air Evaluation

day
DAY ENVIRONMENTAL, INC.

ENVIRONMENTAL CONSULTANTS
AN AFFILIATE OF DAY ENGINEERING, P.C.

May 6, 2004

Frank Sowers
Environmental Engineer 1
Division of Environmental Remediation
NYSDEC
6274 East Avon-Lima Road
Avon, New York 14414-9519

Re: Sub-slab Soil Gas and Indoor Air Sampling
General Circuits IWHDS #8-28-085
95 Mt. Read Boulevard
Rochester, New York

Dear Mr. Sowers:

This letter was developed by Day Environmental, Inc. (DAY) on behalf of Maguire Properties and describes the sub-slab soil gas and indoor air sampling completed at the Site. This work was completed in-accordance with the Remedial Investigation/Feasibility Study (RI/FS) Work Plan Addendum #5.

SAMPLING POINT INSTALLATION

On March 5, 2004, four sub-slab soil gas sampling points were installed through the floor of the building at the Site. One sampling point was installed in each of the four slab sections divided by building footers (i.e., four sub-slab soil gas sampling points). The sub-slab soil gas sampling points were installed in the accessible areas (i.e., based on tenant operations) that corresponded to areas with elevated concentrations of volatile organic compounds (VOCs) in the soil and/or groundwater based on the RI/FS data (i.e., photoionization detector (PID) field screening results, and the VOC analytical results). [Note, due to tenant activities potentially affecting sampling results (i.e., use of solvents), the actual sampling locations were moved from the locations shown in Work Plan Addendum #5. However, the locations selected in the field were mutually agreed upon by representatives of New York State Department of Environmental Conservation (NYSDEC), Monroe County Department of Health (MCDOH), DAY, and Maguire Properties.] The approximate locations of the sampling points are shown on Figure 1 included in Attachment A.

Initially, a rotary hammer drill was used to cut an opening approximately 1-inch in diameter through the floor slab. Subsequently, a piece of tygon tubing was inserted into the resulting hole, and the tubing was sealed to the concrete using anchoring cement. Prior to sampling, the sub-slab soil gas sampling points were left for 4 days to allow the cement to cure and allow the sub-slab soil gas to return to ambient conditions. The tubing was capped (sealed) above the floor surface to prevent vapors from escaping between the installation date and sampling date.

40 COMMERCIAL STREET
ROCHESTER, NEW YORK 14614-1008

(585) 454-0210
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staff@daymail.net

SAMPLE COLLECTION

Prior to sampling, DAY, NYSDEC, and MCDOH representatives visually evaluated the integrity of the seal between the tubing and concrete. Based on the visual observations, the integrity of the sampling point seals appeared 'good', and the NYSDEC and MCDOH approved proceeding with the sampling event. Samples were collected on March 10, 2004. Initially, the tubing from the sub-slab soil gas sampling points were cut (i.e., between the seal and the floor slab) and immediately connected to the Summa Canisters. Directly adjacent to each sub-slab soil gas sampling point (designated Samples 1A, 2A, 3A, and 4A), an indoor air sample (designated Samples 1B, 2B, 3B, and 4B) was also collected. A background sample (designated sample 5) was also collected on the southwest portion of the roof of the building (refer to Figure 1). The background sample location was determined based on a wind direction from the south (i.e., upwind from building air vents at the time of sampling). Each sample was collected using 6-liter Summa Canisters over the same approximate time period. Following sampling, the tubing from each sub-slab soil gas sampling point was temporarily sealed. [Note: The sub-slab soil gas sampling points will be permanently sealed in the future.]

The Summa Canisters were shipped by the laboratory with pre-calibrated regulators to allow a flow rate of approximately 16 milliliters per minute (ml/min). This "low-flow" of air was used to collect a sample over a 6-hour period and to prevent pulling air in from above the slab. In addition, vacuum gauges were attached between each Summa Canister and the regulator, and the gauge readings were monitored approximately every hour to verify proper operation (i.e., adequate initial vacuum and gradual changes in vacuum during sampling). Sampling logs showing sample designation, description of location, and the vacuum gauge readings are included in Attachment B.

The nine Summa Canister samples (i.e., 4 sub-slab soil gas samples, 4 indoor air samples, and 1 background air sample) were delivered under chain-of-custody documentation to Paradigm Environmental Services, Inc. (Paradigm) for subsequent testing. [Note: Paradigm subcontracted the analytical testing to Columbia Analytical Services, Air Quality Laboratory in Simi Valley, California.] Each of the samples were tested for VOCs using United States Environmental Protection Agency (USEPA) Method TO-15. A copy of the laboratory reports are included in Attachment C.

ANALYTICAL LABORATORY RESULTS

Table 1 included in Attachment C summarizes the results of the VOCs detected in the samples collected during this study. Table 1 also presents a comparison of the indoor air samples and the sub-slab soil gas samples with the USEPA Target Indoor Air Concentrations and Target Shallow Soil Gas Concentrations referenced in Table 2C (Risk = 1 x 10^{-6}) included in the USEPA *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* dated November 20, 2002.

> As shown on Table 1, four or more VOCs were detected above the reported laboratory detection limits in each of the nine samples analyzed. The background sample also detected four VOCs above the reported laboratory detection limits; however, the concentrations of VOCs in the background sample are below the USEPA Target Indoor Air Concentrations. The concentrations of four or more VOCs detected in sub-slab soil gas samples 2A, 3A, and 4A exceeded the USEPA Target Shallow Soil Gas Concentrations (i.e., the VOCs detected in sample 1A were below the USEPA Target Shallow Soil Gas Concentrations). The concentration of one or more VOCs detected in the indoor air samples also exceeded their respective USEPA Target Indoor Air Concentrations.

The above sub-slab soil gas and indoor air sampling results will be evaluated in the FS report. In addition, recommendations for remedial activities (e.g., sub-slab soil gas mitigation systems, etc.) will be included in the FS report, as warranted.

If there are any questions, please call this office.

Very truly yours,
Day Environmental, Inc.

Daniel P Noll\db

Daniel P. Noll
Project Engineer

David D Day, Pres

David D. Day
President

Attachment A: Figures
Attachment B: Summa Canister Sampling Logs
Attachment C: Table 1, Analytical Laboratory Reports, and Chain-of-Custody Documentation

cc: Charlotte Bethoney (NYSDOH)
Joseph Albert (MCDOH)
Glen R. Bailey (NYSDEC)
Edward R. Belmore (NYSDEC)
Thomas Maguire (Maguire Properties)

ATTACHMENT A

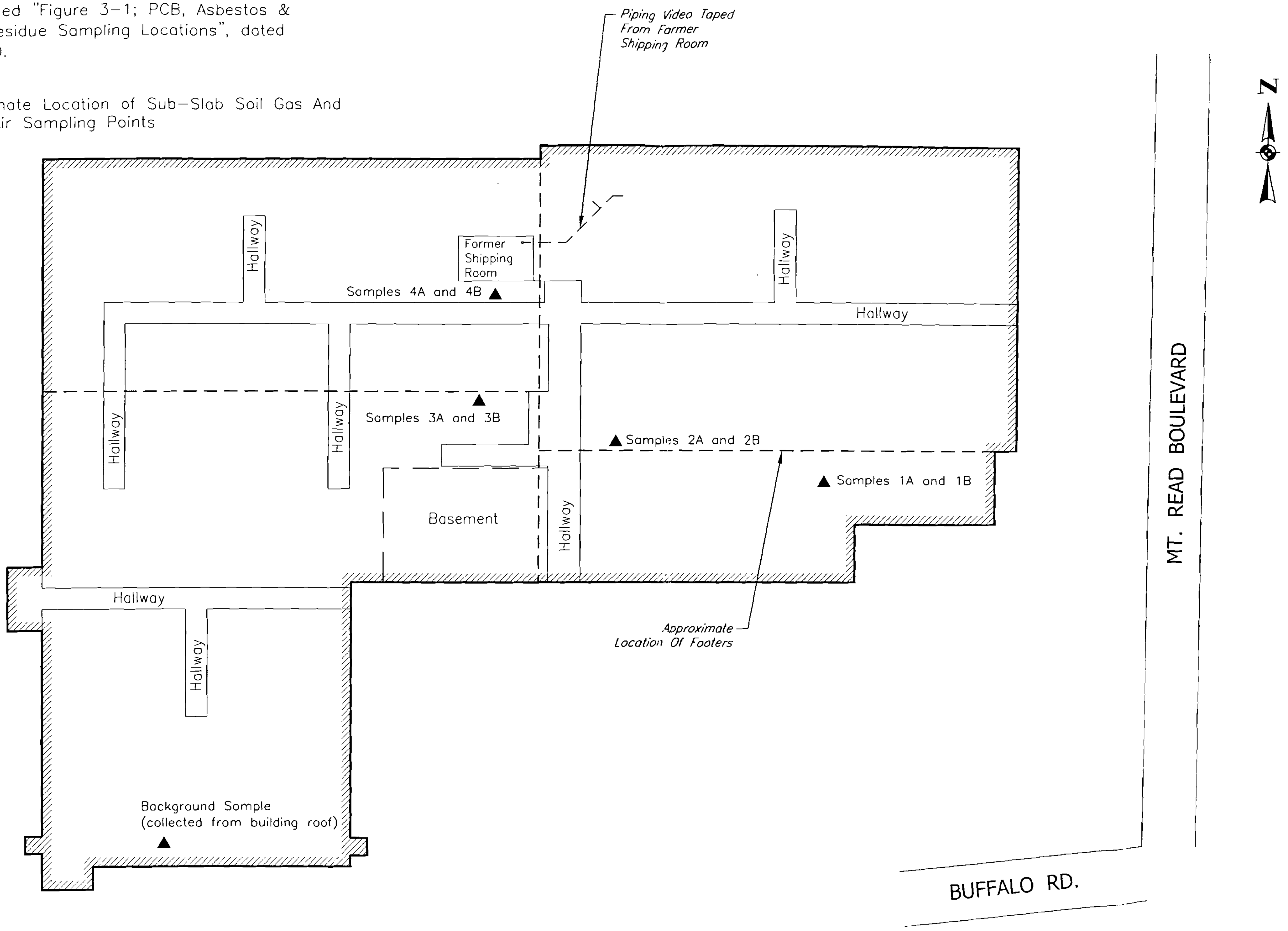
FIGURES

NOTE:

Site plan produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990.

LEGEND:

▲ Approximate Location of Sub-Slab Soil Gas And Indoor Air Sampling Points



SITE PLAN
1" = 50'

FIELD VERIFIED BY DPN
DATE 09-2003
DRAWN BY LRP
DATE DRAWN 04-07-2004
SCALE 1" = 50'
DATE ISSUED 04-07-2004

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY
SUB-SLAB SOIL GAS AND INDOOR AIR EVALUATION

DRAWING TITLE
Sub-Slab Soil Gas And Indoor Air Sampling Points

PROJECT NO
2712R-01

Figure 1

Time Plotted: Wed Apr 07 13:54 2004
File Name: Maguire\1506\FeasStudy2001\2712-30.dwg
Xerox230AnsiB-2; 11 x 17
Ref1:
Ref2:
Ref3:

ATTACHMENT B

SUMMA CANISTER SAMPLING LOGS

DAY ENVIRONMENTAL, INC.
SUMMA CANISTER SAMPLING LOG

SITE LOCATION: 95 Mt. Read Boulevard **JOB #:** 2712R-01

PROJECT NAME: Sub-slab Soil Gas and Indoor Air Evaluation **DATE :** 3/10/04

SAMPLE COLLECTOR(S): D. Noll

WEATHER CONDITIONS: N/A

SAMPLING LOCATION: BEK Marketing – Closet in Bathroom Area

SAMPLE TYPE: Sub-slab Soil Gas

SAMPLE DESIGNATION: 1A

CANISTER #: SC00157 **REGULATOR #:** FC00031

START: 0857 **END:** 1510

TIME	VACUUM GAGE READING (inches of Hg)
0857	-30+
0955	-30.0
1103	-26.0
1155	-22.0
1255	-17.5
1350	-14.0
1457	-9.0
1510	-8.0

DAY ENVIRONMENTAL, INC.
SUMMA CANISTER SAMPLING LOG

SITE LOCATION: 95 Mt. Read Boulevard **JOB #:** 2712R-01

PROJECT NAME: Sub-slab Soil Gas and Indoor Air Evaluation **DATE :** 3/10/04

SAMPLE COLLECTOR(S): D. Noll

WEATHER CONDITIONS: N/A

SAMPLING LOCATION: BEK Marketing – Closet in Bathroom Area

SAMPLE TYPE: Indoor Air

SAMPLE DESIGNATION: 1B

CANISTER #: AC00203 **REGULATOR #:** FC00316

START: 0857 **END:** 1510

TIME	VACUUM GAGE READING (inches of Hg)
0857	-27.0
0955	-24.0
1103	-19.5
1155	-15.5
1255	-12.0
1350	-8.0
1457	-4.5
1510	-3.5

DAY ENVIRONMENTAL, INC.
SUMMA CANISTER SAMPLING LOG

SITE LOCATION: 95 Mt. Read Boulevard **JOB #:** 2712R-01

PROJECT NAME: Sub-slab Soil Gas and Indoor Air Evaluation **DATE :** 3/10/04

SAMPLE COLLECTOR(S): D. Noll

WEATHER CONDITIONS: N/A

SAMPLING LOCATION: Room 114 (Hallway Area)

SAMPLE TYPE: Sub-slab Soil Gas

SAMPLE DESIGNATION: 2A

CANISTER #: SC00130 **REGULATOR #:** FC00082

START: 0904 **END:** 1504

TIME	VACUUM GAGE READING (inches of Hg)
0904	-29.0
1000	-25.0
1105	-20.0
1158	-16.0
1258	-11.5
1354	-7.5
1504	-4.0

DAY ENVIRONMENTAL, INC.
SUMMA CANISTER SAMPLING LOG

SITE LOCATION: 95 Mt. Read Boulevard **JOB #:** 2712R-01

PROJECT NAME: Sub-slab Soil Gas and Indoor Air Evaluation **DATE :** 3/10/04

SAMPLE COLLECTOR(S): D. Noll

WEATHER CONDITIONS: N/A

SAMPLING LOCATION: Room 114 (Hallway Area)

SAMPLE TYPE: Indoor Air

SAMPLE DESIGNATION: 2B

CANISTER #: AC00413 **REGULATOR #:** FC00334

START: 0904 **END:** 1504

TIME	VACUUM GAGE READING (inches of Hg)
0904	-30.0
1000	-27.0
1105	-24.0
1158	-21.0
1258	-16.5
1354	-13.5
1504	-9.0

DAY ENVIRONMENTAL, INC.
SUMMA CANISTER SAMPLING LOG

SITE LOCATION: 95 Mt. Read Boulevard **JOB #:** 2712R-01

PROJECT NAME: Sub-slab Soil Gas and Indoor Air Evaluation **DATE :** 3/10/04

SAMPLE COLLECTOR(S): D. Noll

WEATHER CONDITIONS: N/A

SAMPLING LOCATION: Room 126 (Vacant Room)

SAMPLE TYPE: Sub-slab Soil Gas

SAMPLE DESIGNATION: 3A

CANISTER #: SC00517 **REGULATOR #:** FC00026

START: 0908 **END:** 1526

TIME	VACUUM GAGE READING (inches of Hg)
0908	-30.0
1005	-26.0
1107	-23.5
1200	-20.5
1300	-17.0
1356	-14.5
1526	-9.7

DAY ENVIRONMENTAL, INC.
SUMMA CANISTER SAMPLING LOG

SITE LOCATION: 95 Mt. Read Boulevard **JOB #:** 2712R-01

PROJECT NAME: Sub-slab Soil Gas and Indoor Air Evaluation **DATE :** 3/10/04

SAMPLE COLLECTOR(S): D. Noll

WEATHER CONDITIONS: N/A

SAMPLING LOCATION: Room 126 (Vacant Room)

SAMPLE TYPE: Indoor Air

SAMPLE DESIGNATION: 3B

CANISTER #: AC00215 **REGULATOR #:** FC00233

START: 0908 **END:** 1526

TIME	VACUUM GAGE READING (inches of Hg)
0908	-29.0
1005	-25.0
1107	-19.5
1200	-14.0
1300	-9.5
1356	-7.5
1526	-6.0

DAY ENVIRONMENTAL, INC.
SUMMA CANISTER SAMPLING LOG

SITE LOCATION: 95 Mt. Read Boulevard **JOB #:** 2712R-01

PROJECT NAME: Sub-slab Soil Gas and Indoor Air Evaluation **DATE :** 3/10/04

SAMPLE COLLECTOR(S): D. Noll

WEATHER CONDITIONS: N/A

SAMPLING LOCATION: Room 117 (Former Compressor Room)

SAMPLE TYPE: Sub-slab Soil Gas

SAMPLE DESIGNATION: 4A

CANISTER #: SC00178 **REGULATOR #:** FC00166

START: 0912 **END:** 1513

TIME	VACUUM GAGE READING (inches of Hg)
0912	-29.0
1008	-26.0
1110	-23.0
1203	-19.0
1302	-15.5
1358	-12.0
1513	-7.5

DAY ENVIRONMENTAL, INC.
SUMMA CANISTER SAMPLING LOG

SITE LOCATION: 95 Mt. Read Boulevard **JOB #:** 2712R-01

PROJECT NAME: Sub-slab Soil Gas and Indoor Air Evaluation **DATE :** 3/10/04

SAMPLE COLLECTOR(S): D. Noll

WEATHER CONDITIONS: N/A

SAMPLING LOCATION: Room 117 (Former Compressor Room)

SAMPLE TYPE: Indoor Air

SAMPLE DESIGNATION: 4B

CANISTER #: AC00399 **REGULATOR #:** FC00204

START: 0912 **END:** 1513

TIME	VACUUM GAGE READING (inches of Hg)
0912	-28.5
1008	-25.5
1110	-21.5
1203	-17.5
1302	-13.0
1358	-9.5
1513	-5.0

DAY ENVIRONMENTAL, INC.
SUMMA CANISTER SAMPLING LOG

SITE LOCATION: 95 Mt. Read Boulevard **JOB #:** 2712R-01

PROJECT NAME: Sub-slab Soil Gas and Indoor Air Evaluation **DATE :** 3/10/04

SAMPLE COLLECTOR(S): D. Noll

WEATHER CONDITIONS: 40 – 50°F, Slight Wind generally from South to North.

SAMPLING LOCATION: Building Roof (Southwest Portion)

SAMPLE TYPE: Ambient Air (Background)

SAMPLE DESIGNATION: 5

CANISTER #: AC00340 **REGULATOR #:** FC00368

START: 0920 **END:** 1519

TIME	VACUUM GAGE READING (inches of Hg)
0920	-30.0
1015	-27.0
1115	-23.5
1206	-19.5
1305	-15.5
1402	-11.5
1519	-7.5

ATTACHMENT C

TABLE 1, ANALYTICAL LABORATORY REPORTS, AND CHAIN-OF-CUSTODY DOCUMENTATION

DETECTED VOCs	BEK MARKETING SUB-SLAB (SAMPLE-1A)	BEK MARKET INDOOR (SAMPLE	ARGET SHALLOW ONCENTRATION (µg/m³)$^{(2)}$	USEPA TARGET INDOOR AIR CONCENTRATION (µg/m³)$^{(1)}$
Acetone	48	**380**	3,500	350
Trichlorofluoromethane	21	9.2	7,000	700
Methylene Chloride	--	3.8	52	5.2
Carbon Disulfide	--	--	7,000	700
trans-1,2-Dichloroethene	--	--	700	70
Vinyl Acetate	--	--	2,000	200
2-Butanone (MEK)	5.7	--	10,000	1,000
cis-1,2-Dichloroethene	--	--	350	35
Chloroform	--	--	1.1	0.11
1,1,1-Trichloroethane	18	--	22,000	2,200
Benzene	--	--	3.1	0.31
1,2-Dichloropropane	--	--	40	4.0
Bromodichloromethane	--	--	1.4	0.14
Trichloroethene	--	--	0.22	0.022
4-Methyl-2-pentanone	--	--	800	80
Toluene	11	24	4,000	400
Tetrachloroethene	8.0	--	8.1	0.81
Chlorobenzene	--	--	600	60
Ethylbenzene	11	--	22	2.2
m,p-Xylenes	40	6.3	70,000*	7,000*
Styrene	--	--	10,000	1,000
o-Xylene	13	--	70,000	7,000
1,4-Dichlorobenzene	--	--	8,000	800

Samples analyzed by USEPA Method TO-15

(1) = Target Indoor Air Concentration from Table 2C (Ris *Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* dated November 20, 2002.

(2) = Target Shallow Soil Gas Concentration from Table 2C *rface Vapor Intrusion Guidance)* dated November 20, 2002.

-- = Not detected above the reported analytical laboratory

* = The USEPA Target Concentrations for m-xylene and

380 **= Bold denotes a concentration that exceeds either th**

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 (585) 647-2530 FAX (585) 647-3311

LABORATORY REPORT OF ANALYSIS

Client: Day Environmental, Inc

Lab Project No.: 04-0685
Lab Sample No.: 2944

Client Job Site: 95 Mt. Read Blvd., Rochester, NY

Sample Type: Sub-Slab Air

Client Job No.: 2712R-01

Date Sampled: 03/10/2004
Date Received: 03/11/2004

Field Location: Sample 1A

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Chloromethane	ND	3.0	ND	1.40
Vinyl Chloride	ND	3.0	ND	1.20
Bromomethane	ND	3.0	ND	0.76
Chloroethane	ND	3.0	ND	1.10
Acetone	**48.0**	15.0	**20.0**	6.20
Trichlorofluoromethane	**21.0**	3.0	**3.7**	0.53
1,1-Dichloroethene	ND	3.0	ND	0.75
Methylene Chloride	ND	3.0	ND	0.85
Trichlorotrifluoroethane	ND	3.0	ND	0.39
Carbon Disulfide	ND	3.0	ND	0.95
trans-1,2-Dichloroethene	ND	3.0	ND	0.75
1,1-Dichloroethane	ND	3.0	ND	0.73
Methyl tert-Butyl Ether	ND	3.0	ND	0.82
Vinyl Acetate	ND	3.0	ND	0.84
2-Butanone (MEK)	**5.7**	3.0	**1.9**	1.00
cis-1,2-Dichloroethane	ND	3.0	ND	0.75
Chloroform	ND	3.0	ND	0.61
1,2-Dichloroethane	ND	3.0	ND	0.73
1,1,1-Trichloroethane	**18.0**	3.0	**3.2**	0.54
Benzene	ND	3.0	ND	0.93
Carbon Tetrachloride	ND	3.0	ND	0.47
1,2-Dichloropropane	ND	3.0	ND	0.64

ELAP ID No.:10145

Comments: TR = Detected Below Indicated Reporting Limit
ND = Not Detected
Date Analyzed: 04/01/2004

Approved By Technical Director: ______________________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

File ID: TO1404-0685.xls

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Client: Day Environmental, Inc
Client Job Site: 95 Mt. Read Blvd., Rochester, NY
Client Job No.: 2712R-01
Field Location: Sample 1A

Lab Project No.: 04-0685
Lab Sample No.: 2944
Sample Type: Sub-Slab Air
Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Bromodichloromethane	ND	3.0	ND	0.44
Trichloroethene	ND	3.0	ND	0.55
cis-1,3-Dichloropropene	ND	3.0	ND	0.65
4-Methyl-2-pentanone	ND	3.0	ND	0.72
rans-1,3-Dichloropropen	ND	3.0	ND	0.65
1,1,2-Trichloroethane	ND	3.0	ND	0.54
Toluene	**11.0**	3.0	**2.9**	0.79
2-Hexanone	ND	3.0	ND	0.72
Dibromochloromethane	ND	3.0	ND	0.35
1,2-Dibromoethane	ND	3.0	ND	0.39
Tetrachloroethene	**8.0**	3.0	**1.2**	0.44
Chlorobenzene	ND	3.0	ND	0.64
Ethylbenzene	**11.0**	3.0	**2.5**	0.68
m,p-Xylenes	**40.0**	3.0	**9.2**	0.68
Bromoform	ND	3.0	ND	0.29
Styrene	ND	3.0	ND	0.70
o-Xylene	**13.0**	3.0	**3.1**	0.68
1,1,2,2-Tetrachloroethan	ND	3.0	ND	0.43
1,3-Dichlorobenzene	ND	3.0	ND	0.49
1,4-Dichlorobenzene	ND	3.0	ND	0.49
1,2-Dichlorobenzene	ND	3.0	ND	0.49

ELAP ID No.:10145

Comments:
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Date Analyzed: 04/01/2004

Approved By Technical Director: ______________________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

LABORATORY REPORT OF ANALYSIS

Client: Day Environmental, Inc

Client Job Site: 95 Mt. Read Blvd., Rochester, NY

Client Job No.: 2712R-01

Field Location: Sample 1B

Lab Project No.: 04-0685
Lab Sample No.: 2945

Sample Type: Indoor Air

Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Chloromethane	ND	3.0	ND	1.50
Vinyl Chloride	ND	3.0	ND	1.20
Bromomethane	ND	3.0	ND	0.77
Chloroethane	ND	3.0	ND	1.10
Acetone	**380**	15.0	**160**	6.30
Trichlorofluoromethane	**9.2**	3.0	**1.6**	0.53
1,1-Dichloroethene	ND	3.0	ND	0.76
Methylene Chloride	**3.8**	3.0	**1.1**	0.86
Trichlorotrifluoroethane	ND	3.0	ND	0.39
Carbon Disulfide	ND	3.0	ND	0.96
trans-1,2-Dichloroethene	ND	3.0	ND	0.76
1,1-Dichloroethane	ND	3.0	ND	0.74
Methyl tert-Butyl Ether	ND	3.0	ND	0.83
Vinyl Acetate	ND	3.0	ND	0.85
2-Butanone (MEK)	ND	3.0	ND	1.00
cis-1,2-Dichloroethane	ND	3.0	ND	0.76
Chloroform	ND	3.0	ND	0.61
1,2-Dichloroethane	ND	3.0	ND	0.74
1,1,1-Trichloroethane	ND	3.0	ND	0.55
Benzene	ND	3.0	ND	0.94
Carbon Tetrachloride	ND	3.0	ND	0.48
1,2-Dichloropropane	ND	3.0	ND	0.65

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Bruce Hoogesteger

Chain of Custody provides additional sample information.

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Client:	Day Environmental, Inc	**Lab Project No.:**	04-0685
		Lab Sample No.:	2945
Client Job Site:	95 Mt. Read Blvd., Rochester, NY	**Sample Type:**	Indoor Air
Client Job No.:	2712R-01	**Date Sampled:**	03/10/2004
Field Location:	Sample 1B	**Date Received:**	03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Bromodichloromethane	ND	3.0	ND	0.45
Trichloroethene	ND	3.0	ND	0.56
cis-1,3-Dichloropropene	ND	3.0	ND	0.66
4-Methyl-2-pentanone	ND	3.0	ND	0.73
rans-1,3-Dichloropropen	ND	3.0	ND	0.66
1,1,2-Trichloroethane	ND	3.0	ND	0.55
Toluene	**24**	3.0	**6.3**	0.80
2-Hexanone	ND	3.0	ND	0.73
Dibromochloromethane	ND	3.0	ND	0.35
1,2-Dibromoethane	ND	3.0	ND	0.39
Tetrachloroethene	ND	3.0	ND	0.44
Chlorobenzene	ND	3.0	ND	0.65
Ethylbenzene	ND	3.0	ND	0.69
m,p-Xylenes	**6.3**	3.0	**1.4**	0.69
Bromoform	ND	3.0	ND	0.29
Styrene	ND	3.0	ND	0.70
o-Xylene	ND	3.0	ND	0.69
1,1,2,2-Tetrachloroethan	ND	3.0	ND	0.44
1,3-Dichlorobenzene	ND	3.0	ND	0.50
1,4-Dichlorobenzene	ND	3.0	ND	0.50
1,2-Dichlorobenzene	ND	3.0	ND	0.50

ELAP ID No.:10145

Comments:
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Date Analyzed: 04/01/2004

Approved By Technical Director:
Bruce Hoogesteger

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 (585) 647-2530 FAX (585) 647-3311

LABORATORY REPORT OF ANALYSIS

Client: Day Environmental, Inc
Client Job Site: 95 Mt. Read Blvd., Rochester, NY
Client Job No.: 2712R-01
Field Location: Sample 2A

Lab Project No.: 04-0685
Lab Sample No.: 2946
Sample Type: Sub-Slab Air
Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Chloromethane	ND	1.3	ND	0.64
Vinyl Chloride	ND	1.3	ND	0.52
Bromomethane	ND	1.3	ND	0.34
Chloroethane	ND	1.3	ND	0.50
Acetone	**15.0**	6.6	**6.5**	2.8
Trichlorofluoromethane	**3.6**	1.3	**0.63**	0.24
1,1-Dichloroethene	ND	1.3	ND	0.33
Methylene Chloride	**4.7**	1.3	**1.3**	0.38
Trichlorotrifluoroethane	ND	1.3	ND	0.17
Carbon Disulfide	**5.6**	1.3	**1.8**	0.42
trans-1,2-Dichloroethene	ND	1.3	ND	0.33
1,1-Dichloroethane	ND	1.3	ND	0.33
Methyl tert-Butyl Ether	ND	1.3	ND	0.37
Vinyl Acetate	**2.6**	1.3	**0.75**	0.38
2-Butanone (MEK)	**4.9**	1.3	**1.7**	0.45
cis-1,2-Dichloroethane	ND	1.3	ND	0.33
Chloroform	**23.0**	1.3	**4.7**	0.27
1,2-Dichloroethane	ND	1.3	ND	0.33
1,1,1-Trichloroethane	**110.0**	1.3	**21**	0.24
Benzene	**1.8**	1.3	**0.55**	0.41
Carbon Tetrachloride	ND	1.3	ND	0.21
1,2-Dichloropropane	**2.0**	1.3	**0.43**	0.29

ELAP ID No.:10145

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Date Analyzed: 04/01/2004

Approved By Technical Director: ______________________
Bruce Hoogesteger

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Client:	Day Environmental, Inc	**Lab Project No.:**	04-0685
		Lab Sample No.:	2946
Client Job Site:	95 Mt. Read Blvd., Rochester, NY	**Sample Type:**	Sub-Slab Air
Client Job No.:	2712R-01	**Date Sampled:**	03/10/2004
Field Location:	Sample 2A	**Date Received:**	03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Bromodichloromethane	**2.5**	3.0	**0.37**	0.20
Trichloroethene	**6.4**	3.0	**1.2**	0.25
cis-1,3-Dichloropropene	ND	3.0	ND	0.29
4-Methyl-2-pentanone	ND	3.0	ND	0.32
rans-1,3-Dichloropropen	ND	3.0	ND	0.29
1,1,2-Trichloroethane	ND	3.0	ND	0.24
Toluene	**16**	3.0	**4.2**	0.35
2-Hexanone	ND	3.0	ND	0.32
Dibromochloromethane	ND	3.0	ND	0.16
1,2-Dibromoethane	ND	3.0	ND	0.17
Tetrachloroethene	**73**	3.0	**11**	0.19
Chlorobenzene	ND	3.0	ND	0.29
Ethylbenzene	**12**	3.0	**2.7**	0.30
m,p-Xylenes	**42**	3.0	**9.6**	0.30
Bromoform	ND	3.0	ND	0.13
Styrene	**2.3**	3.0	**0.53**	0.31
o-Xylene	**14**	3.0	**3.3**	0.30
1,1,2,2-Tetrachloroethan	ND	3.0	ND	0.19
1,3-Dichlorobenzene	ND	3.0	ND	0.22
1,4-Dichlorobenzene	ND	3.0	ND	0.22
1,2-Dichlorobenzene	ND	3.0	ND	0.22

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Bruce Hoogesteger

Chain of Custody provides additional sample information.

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 (585) 647-2530 FAX (585) 647-3311

LABORATORY REPORT OF ANALYSIS

Client: Day Environmental, Inc
Client Job Site: 95 Mt. Read Blvd., Rochester, NY
Client Job No.: 2712R-01
Field Location: Sample 2B

Lab Project No.: 04-0685
Lab Sample No.: 2947
Sample Type: Indoor Air
Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Chloromethane	ND	1.6	ND	0.64
Vinyl Chloride	ND	1.6	ND	0.52
Bromomethane	ND	1.6	ND	0.34
Chloroethane	ND	1.6	ND	0.50
Acetone	**240**	1.6	**100.0**	2.8
Trichlorofluoromethane	**5.8**	8.2	**1.0**	0.24
1,1-Dichloroethene	ND	1.6	ND	0.33
Methylene Chloride	**15**	1.6	**4.3**	0.38
Trichlorotrifluoroethane	ND	1.6	ND	0.17
Carbon Disulfide	ND	1.6	ND	0.42
trans-1,2-Dichloroethene	ND	1.6	ND	0.33
1,1-Dichloroethane	ND	1.6	ND	0.33
Methyl tert-Butyl Ether	ND	1.6	ND	0.37
Vinyl Acetate	ND	1.6	ND	0.38
2-Butanone (MEK)	ND	1.6	ND	0.45
cis-1,2-Dichloroethane	**2.8**	1.6	**1.0**	0.33
Chloroform	ND	1.6	ND	0.27
1,2-Dichloroethane	ND	1.6	ND	0.33
1,1,1-Trichloroethane	ND	1.6	ND	0.24
Benzene	**1.9**	1.6	**0.61**	0.41
Carbon Tetrachloride	ND	1.6	ND	0.21
1,2-Dichloropropane	ND	1.6	ND	0.29

ELAP ID No.:10145

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Date Analyzed: 04/01/2004

Approved By Technical Director: ____________________
Bruce Hoogesteger

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PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Client: Day Environmental, Inc

Client Job Site: 95 Mt. Read Blvd., Rochester, NY

Client Job No.: 2712R-01

Field Location: Sample 2B

Lab Project No.: 04-0685
Lab Sample No.: 2947

Sample Type: Indoor Air

Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m³	Reporting Limit ug/m³	Result ppbV	Reporting Limit ppbV
Bromodichloromethane	ND	1.6	ND	0.24
Trichloroethene	ND	1.6	ND	0.31
cis-1,3-Dichloropropene	ND	1.6	ND	0.36
4-Methyl-2-pentanone	ND	1.6	ND	0.40
rans-1,3-Dichloropropen	ND	1.6	ND	0.36
1,1,2-Trichloroethane	ND	1.6	ND	0.30
Toluene	**93**	1.6	**25**	0.44
2-Hexanone	ND	1.6	ND	0.40
Dibromochloromethane	ND	1.6	ND	0.19
1,2-Dibromoethane	ND	1.6	ND	0.21
Tetrachloroethene	**3.5**	1.6	**0.52**	0.24
Chlorobenzene	ND	1.6	ND	0.36
Ethylbenzene	**13**	1.6	**2.9**	0.38
m,p-Xylenes	**36**	1.6	**8.3**	0.38
Bromoform	ND	1.6	ND	0.16
Styrene	ND	1.6	ND	0.39
o-Xylene	**8.5**	1.6	**1.9**	0.38
1,1,2,2-Tetrachloroethan	ND	1.6	ND	0.24
1,3-Dichlorobenzene	ND	1.6	ND	0.27
1,4-Dichlorobenzene	**1.9**	1.6	**0.32**	0.27
1,2-Dichlorobenzene	ND	1.6	ND	0.27

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Bruce Hoogesteger

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File ID: TO1404-0685.xls

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 (585) 647-2530 FAX (585) 647-3311

LABORATORY REPORT OF ANALYSIS

Client: Day Environmental, Inc

Client Job Site: 95 Mt. Read Blvd., Rochester, NY

Client Job No.: 2712R-01

Field Location: Sample 3A

Lab Project No.: 04-0685
Lab Sample No. 2948

Sample Type: Sub-Air Slab

Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m³	Reporting Limit ug/m³	Result ppbV	Reporting Limit ppbV
Chloromethane	ND	580	ND	280
Vinyl Chloride	ND	580	ND	230
Bromomethane	ND	580	ND	150
Chloroethane	ND	580	ND	220
Acetone	ND	2,900	ND	1,200
Trichlorofluoromethane	ND	580	ND	100
1,1-Dichloroethene	ND	580	ND	150
Methylene Chloride	ND	580	ND	170
Trichlorotrifluoroethane	ND	580	ND	76
Carbon Disulfide	ND	580	ND	190
trans-1,2-Dichloroethene	**7,200**	580	**1,800**	150
1,1-Dichloroethane	ND	580	ND	140
Methyl tert-Butyl Ether	ND	580	ND	160
Vinyl Acetate	ND	580	ND	170
2-Butanone (MEK)	ND	580	ND	200
cis-1,2-Dichloroethane	**18,000**	580	**4,600**	150
Chloroform	**2,000**	580	400	120
1,2-Dichloroethane	ND	580	ND	140
1,1,1-Trichloroethane	ND	580	ND	110
Benzene	ND	580	ND	180
Carbon Tetrachloride	ND	580	ND	93
1,2-Dichloropropane	ND	580	ND	130

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Bruce Hoogesteger

Chain of Custody provides additional sample information.

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Client: Day Environmental, Inc

Client Job Site: 95 Mt. Read Blvd., Rochester, NY

Client Job No.: 2712R-01

Field Location: Sample 3A

Lab Project No.: 04-0685
Lab Sample No.: 2948

Sample Type: Sub-Air Slab

Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Bromodichloromethane	ND	580	ND	87
Trichloroethene	**160,000**	580	**30,000**	110
cis-1,3-Dichloropropene	ND	580	ND	130
4-Methyl-2-pentanone	ND	580	ND	140
rans-1,3-Dichloropropene	ND	580	ND	130
1,1,2-Trichloroethane	ND	580	ND	110
Toluene	ND	580	ND	150
2-Hexanone	ND	580	ND	140
Dibromochloromethane	ND	580	ND	69
1,2-Dibromoethane	ND	580	ND	76
Tetrachloroethene	**47,000**	580	**7,000**	86
Chlorobenzene	ND	580	ND	130
Ethylbenzene	ND	580	ND	130
m,p-Xylenes	ND	580	ND	130
Bromoform	ND	580	ND	56
Styrene	ND	580	ND	140
o-Xylene	ND	580	ND	130
1,1,2,2-Tetrachloroethane	ND	580	ND	85
1,3-Dichlorobenzene	ND	580	ND	97
1,4-Dichlorobenzene	ND	580	ND	97
1,2-Dichlorobenzene	ND	580	ND	97

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Bruce Hoogesteger

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 (585) 647-2530 FAX (585) 647-3311

LABORATORY REPORT OF ANALYSIS

Client: Day Environmental, Inc
Client Job Site: 95 Mt. Read Blvd., Rochester, NY
Client Job No.: 2712R-01
Field Location: Sample 3B

Lab Project No.: 04-0685
Lab Sample No.: 2949
Sample Type: Indoor Air
Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Chloromethane	ND	1.2	ND	0.60
Vinyl Chloride	ND	1.2	ND	0.49
Bromomethane	ND	1.2	ND	0.32
Chloroethane	ND	1.2	ND	0.47
Acetone	**110**	6.2	**47**	2.6
Trichlorofluoromethane	**4.9**	1.2	**0.87**	0.22
1,1-Dichloroethene	ND	1.2	ND	0.31
Methylene Chloride	**90**	1.2	**26**	0.36
Trichlorotrifluoroethane	ND	1.2	ND	0.16
Carbon Disulfide	ND	1.2	ND	0.40
trans-1,2-Dichloroethene	ND	1.2	ND	0.31
1,1-Dichloroethane	ND	1.2	ND	0.31
Methyl tert-Butyl Ether	ND	1.2	ND	0.34
Vinyl Acetate	ND	1.2	ND	0.35
2-Butanone (MEK)	**6.0**	1.2	**2.0**	0.42
cis-1,2-Dichloroethane	**4.2**	1.2	**1.1**	0.31
Chloroform	**1.6**	1.2	**0.32**	0.25
1,2-Dichloroethane	ND	1.2	ND	0.31
1,1,1-Trichloroethane	ND	1.2	ND	0.23
Benzene	**1.8**	1.2	**0.57**	0.39
Carbon Tetrachloride	ND	1.2	ND	0.20
1,2-Dichloropropane	ND	1.2	ND	0.27

ELAP ID No.:10145

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Bruce Hoogesteger

Chain of Custody provides additional sample information.

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Client: Day Environmental, Inc
Client Job Site: 95 Mt. Read Blvd., Rochester, NY
Client Job No.: 2712R-01
Field Location: Sample 3B

Lab Project No.: 04-0685
Lab Sample No.: 2949
Sample Type: Indoor Air
Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Bromodichloromethane	ND	1.2	ND	0.19
Trichloroethene	**5.9**	1.2	**1.1**	0.23
cis-1,3-Dichloropropene	ND	1.2	ND	0.27
4-Methyl-2-pentanone	**1.8**	1.2	**0.44**	0.30
rans-1,3-Dichloropropen	ND	1.2	ND	0.27
1,1,2-Trichloroethane	ND	1.2	ND	0.23
Toluene	**270**	1.2	**72**	0.33
2-Hexanone	ND	1.2	ND	0.30
Dibromochloromethane	ND	1.2	ND	0.15
1,2-Dibromoethane	ND	1.2	ND	0.16
Tetrachloroethene	**9.8**	1.2	**1.4**	0.18
Chlorobenzene	**1.3**	1.2	**0.29**	0.27
Ethylbenzene	**31**	1.2	**7.2**	0.29
m,p-Xylenes	**85**	1.2	**20**	0.29
Bromoform	ND	1.2	ND	0.12
Styrene	ND	1.2	ND	0.29
o-Xylene	**20**	1.2	**4.7**	0.29
1,1,2,2-Tetrachloroethan	ND	1.2	ND	0.18
1,3-Dichlorobenzene	ND	1.2	ND	0.21
1,4-Dichlorobenzene	**3.4**	1.2	**0.56**	0.21
1,2-Dichlorobenzene	ND	1.2	ND	0.21

ELAP ID No.:10145

Comments:
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Date Analyzed: 04/01/2004

Approved By Technical Director: ______________________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

File ID: TO1404-0685.xls

LABORATORY REPORT OF ANALYSIS

Client: Day Environmental, Inc
Lab Project No.: 04-0685
Lab Sample No.: 2950

Client Job Site: 95 Mt. Read Blvd., Rochester, NY

Sample Type: Sub-Slab Air

Client Job No.: 2712R-01

Date Sampled: 03/10/2004
Date Received: 03/11/2004

Field Location: Sample 4A

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Chloromethane	ND	770	ND	370
Vinyl Chloride	ND	770	ND	300
Bromomethane	ND	770	ND	200
Chloroethane	ND	770	ND	290
Acetone	ND	3,800	ND	1,600
Trichlorofluoromethane	ND	770	ND	140
1,1-Dichloroethene	ND	770	ND	190
Methylene Chloride	ND	770	ND	220
Trichlorotrifluoroethane	ND	770	ND	100
Carbon Disulfide	ND	770	ND	250
trans-1,2-Dichloroethene	**4,900**	770	**1,200**	190
1,1-Dichloroethane	ND	770	ND	190
Methyl tert-Butyl Ether	ND	770	ND	210
Vinyl Acetate	ND	770	ND	220
2-Butanone (MEK)	ND	770	ND	260
cis-1,2-Dichloroethane	**11,000**	770	**2,700**	190
Chloroform	**1,500**	770	**300**	160
1,2-Dichloroethane	ND	770	ND	190
1,1,1-Trichloroethane	ND	770	ND	140
Benzene	ND	770	ND	240
Carbon Tetrachloride	ND	770	ND	120
1,2-Dichloropropane	ND	770	ND	170

ELAP ID No.:10145

Comments:
TR = Detected Below Indicated Reporting Limit
ND = Not Detected
Date Analyzed: 04/01/2004

Approved By Technical Director: ______________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Client: Day Environmental, Inc

Client Job Site: 95 Mt. Read Blvd., Rochester, NY

Client Job No.: 2712R-01

Field Location: Sample 4A

Lab Project No.: 04-0685
Lab Sample No.: 2950

Sample Type: Sub-Slab Air

Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Bromodichloromethane	ND	770	ND	110
Trichloroethene	**360,000**	770	**67,000**	140
cis-1,3-Dichloropropene	ND	770	ND	170
4-Methyl-2-pentanone	ND	770	ND	190
rans-1,3-Dichloropropen	ND	770	ND	170
1,1,2-Trichloroethane	ND	770	ND	140
Toluene	ND	770	ND	200
2-Hexanone	ND	770	ND	190
Dibromochloromethane	ND	770	ND	90
1,2-Dibromoethane	ND	770	ND	100
Tetrachloroethene	**190,000**	770	**28,000**	110
Chlorobenzene	ND	770	ND	170
Ethylbenzene	ND	770	ND	180
m,p-Xylenes	ND	770	ND	180
Bromoform	ND	770	ND	74
Styrene	ND	770	ND	180
o-Xylene	ND	770	ND	180
1,1,2,2-Tetrachloroethan	ND	770	ND	110
1,3-Dichlorobenzene	ND	770	ND	130
1,4-Dichlorobenzene	ND	770	ND	130
1,2-Dichlorobenzene	ND	770	ND	130

ELAP ID No.:10145

Comments:
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ND = Not Detected
Date Analyzed: 04/01/2004

Approved By Technical Director: ______________________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 (585) 647-2530 FAX (585) 647-3311

LABORATORY REPORT OF ANALYSIS

Client:	Day Environmental, Inc	**Lab Project No.:**	04-0685
		Lab Sample No.:	2951
Client Job Site:	95 Mt. Read Blvd., Rochester, NY	**Sample Type:**	Indoor Air
Client Job No.:	2712R-01	**Date Sampled:**	03/10/2004
Field Location:	Sample 4B	**Date Received:**	03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Chloromethane	ND	3.1	ND	370
Vinyl Chloride	ND	3.1	ND	300
Bromomethane	ND	3.1	ND	200
Chloroethane	ND	3.1	ND	290
Acetone	**140**	15.0	**61**	1,600
Trichlorofluoromethane	**3.4**	3.1	**0.60**	140
1,1-Dichloroethene	ND	3.1	ND	190
Methylene Chloride	**62**	3.1	**18**	220
Trichlorotrifluoroethane	ND	3.1	ND	100
Carbon Disulfide	ND	3.1	ND	250
trans-1,2-Dichloroethene	ND	3.1	ND	190
1,1-Dichloroethane	ND	3.1	ND	190
Methyl tert-Butyl Ether	ND	3.1	ND	210
Vinyl Acetate	ND	3.1	ND	220
2-Butanone (MEK)	**4.3**	3.1	**1.5**	260
cis-1,2-Dichloroethane	ND	3.1	ND	190
Chloroform	ND	3.1	ND	160
1,2-Dichloroethane	ND	3.1	ND	190
1,1,1-Trichloroethane	ND	3.1	ND	140
Benzene	ND	3.1	ND	240
Carbon Tetrachloride	ND	3.1	ND	120
1,2-Dichloropropane	ND	3.1	ND	170

ELAP ID No.:10145

Comments:
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ND = Not Detected
Date Analyzed: 04/01/2004

Approved By Technical Director: ______________________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

File ID: TO1404-0685.xls

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Client:	Day Environmental, Inc	**Lab Project No.:**	04-0685
		Lab Sample No.:	2951
Client Job Site:	95 Mt. Read Blvd., Rochester, NY	**Sample Type:**	Indoor Air
Client Job No.:	2712R-01	**Date Sampled:**	03/10/2004
Field Location:	Sample 4B	**Date Received:**	03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Bromodichloromethane	ND	770	ND	0.46
Trichloroethene	**3.6**	770	**0.68**	0.57
cis-1,3-Dichloropropene	ND	770	ND	0.68
4-Methyl-2-pentanone	ND	770	ND	0.75
rans-1,3-Dichloropropen	ND	770	ND	0.68
1,1,2-Trichloroethane	ND	770	ND	0.56
Toluene	**430**	770	**110**	0.82
2-Hexanone	ND	770	ND	0.75
Dibromochloromethane	ND	770	ND	0.36
1,2-Dibromoethane	ND	770	ND	0.40
Tetrachloroethene	**7.1**	770	**1.0**	0.45
Chlorobenzene	ND	770	ND	0.67
Ethylbenzene	**35**	770	**8.0**	0.71
m,p-Xylenes	**98**	770	**23**	0.71
Bromoform	ND	770	ND	0.30
Styrene	ND	770	ND	0.72
o-Xylene	**23**	770	**5.2**	0.71
1,1,2,2-Tetrachloroethan	ND	770	ND	0.45
1,3-Dichlorobenzene	ND	770	ND	0.51
1,4-Dichlorobenzene	**5.4**	770	**0.90**	0.51
1,2-Dichlorobenzene	ND	770	ND	0.51

ELAP ID No.:10145

Comments:
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Date Analyzed: 04/01/2004

Approved By Technical Director: ______________________
Bruce Hoogesteger

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 (585) 647-2530 FAX (585) 647-3311

LABORATORY REPORT OF ANALYSIS

Client: Day Environmental, Inc

Client Job Site: 95 Mt. Read Blvd., Rochester, NY

Client Job No.: 2712R-01

Field Location: Sample 5

Lab Project No.: 04-0685
Lab Sample No.: 2952

Sample Type: Outside Air

Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Chloromethane	ND	1.5	ND	0.72
Vinyl Chloride	ND	1.5	ND	0.58
Bromomethane	ND	1.5	ND	0.38
Chloroethane	ND	1.5	ND	0.56
Acetone	**11**	7.5	**4.6**	3.1
Trichlorofluoromethane	ND	1.5	ND	0.27
1,1-Dichloroethene	ND	1.5	ND	0.38
Methylene Chloride	ND	1.5	ND	0.43
Trichlorotrifluoroethane	ND	1.5	ND	0.19
Carbon Disulfide	ND	1.5	ND	0.48
trans-1,2-Dichloroethene	ND	1.5	ND	0.38
1,1-Dichloroethane	ND	1.5	ND	0.37
Methyl tert-Butyl Ether	ND	1.5	ND	0.41
Vinyl Acetate	ND	1.5	ND	0.42
2-Butanone (MEK)	**1.5**	1.5	**0.51**	0.51
cis-1,2-Dichloroethane	ND	1.5	ND	0.38
Chloroform	ND	1.5	ND	0.31
1,2-Dichloroethane	ND	1.5	ND	0.37
1,1,1-Trichloroethane	ND	1.5	ND	0.27
Benzene	ND	1.5	ND	0.47
Carbon Tetrachloride	ND	1.5	ND	0.24
1,2-Dichloropropane	ND	1.5	ND	0.32

ELAP ID No.:10145

Comments:
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ND = Not Detected
Date Analyzed: 04/01/2004

Approved By Technical Director: ______________________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

PARADIGM 179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311
ENVIRONMENTAL SERVICES, INC.

Client:	Day Environmental, Inc	**Lab Project No.:**	04-0685
		Lab Sample No.:	2952
Client Job Site:	95 Mt. Read Blvd., Rochester, NY	**Sample Type:**	Outside Air
Client Job No.:	2712R-01	**Date Sampled:**	03/10/2004
Field Location:	Sample 5	**Date Received:**	03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Bromodichloromethane	ND	1.5	ND	0.22
Trichloroethene	ND	1.5	ND	0.28
cis-1,3-Dichloropropene	ND	1.5	ND	0.33
4-Methyl-2-pentanone	ND	1.5	ND	0.36
rans-1,3-Dichloropropen	ND	1.5	ND	0.33
1,1,2-Trichloroethane	ND	1.5	ND	0.27
Toluene	**4.4**	1.5	**1.2**	0.40
2-Hexanone	ND	1.5	ND	0.36
Dibromochloromethane	ND	1.5	ND	0.17
1,2-Dibromoethane	ND	1.5	ND	0.19
Tetrachloroethene	ND	1.5	ND	0.22
Chlorobenzene	ND	1.5	ND	0.32
Ethylbenzene	ND	1.5	ND	0.34
m,p-Xylenes	**1.6**	1.5	**0.37**	0.34
Bromoform	ND	1.5	ND	0.14
Styrene	ND	1.5	ND	0.35
o-Xylene	ND	1.5	ND	0.34
1,1,2,2-Tetrachloroethan	ND	1.5	ND	0.22
1,3-Dichlorobenzene	ND	1.5	ND	0.25
1,4-Dichlorobenzene	ND	1.5	ND	0.25
1,2-Dichlorobenzene	ND	1.5	ND	0.25

ELAP ID No.:10145

Comments:
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ND = Not Detected
Date Analyzed: 04/01/2004

Approved By Technical Director: ______________________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 (585) 647-2530 FAX (585) 647-3311

LABORATORY REPORT OF ANALYSIS

Client:	Day Environmental, Inc	**Lab Project No.:**	04-0685
		Lab Sample No.:	N/A
Client Job Site:	95 Mt. Read Blvd., Rochester, NY	**Sample Type:**	Method Blank
Client Job No.:	2712R-01	**Date Sampled:**	03/10/2004
Field Location:	N/A	**Date Received:**	03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Chloromethane	ND	1.0	ND	0.48
Vinyl Chloride	ND	1.0	ND	0.39
Bromomethane	ND	1.0	ND	0.26
Chloroethane	ND	1.0	ND	0.38
Acetone	ND	5.0	ND	2.1
Trichlorofluoromethane	ND	1.0	ND	0.18
1,1-Dichloroethene	ND	1.0	ND	0.25
Methylene Chloride	ND	1.0	ND	0.29
Trichlorotrifluoroethane	ND	1.0	ND	0.13
Carbon Disulfide	ND	1.0	ND	0.32
trans-1,2-Dichloroethene	ND	1.0	ND	0.25
1,1-Dichloroethane	ND	1.0	ND	0.25
Methyl tert-Butyl Ether	ND	1.0	ND	0.28
Vinyl Acetate	ND	1.0	ND	0.28
2-Butanone (MEK)	ND	1.0	ND	0.34
cis-1,2-Dichloroethane	ND	1.0	ND	0.25
Chloroform	ND	1.0	ND	0.20
1,2-Dichloroethane	ND	1.0	ND	0.25
1,1,1-Trichloroethane	ND	1.0	ND	0.18
Benzene	ND	1.0	ND	0.31
Carbon Tetrachloride	ND	1.0	ND	0.16
1,2-Dichloropropane	ND	1.0	ND	0.22

ELAP ID No.:10145

Comments:
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Date Analyzed: 03/31/2004

Approved By Technical Director: ______________________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Client: Day Environmental, Inc

Client Job Site: 95 Mt. Read Blvd., Rochester, NY

Client Job No.: 2712R-01

Field Location: N/A

Lab Project No.: 04-0685
Lab Sample No.: N/A

Sample Type: Method Blank

Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Bromodichloromethane	ND	1.0	ND	0.15
Trichloroethene	ND	1.0	ND	0.19
cis-1,3-Dichloropropene	ND	1.0	ND	0.22
4-Methyl-2-pentanone	ND	1.0	ND	0.24
rans-1,3-Dichloropropen	ND	1.0	ND	0.22
1,1,2-Trichloroethane	ND	1.0	ND	0.18
Toluene	ND	1.0	ND	0.27
2-Hexanone	ND	1.0	ND	0.24
Dibromochloromethane	ND	1.0	ND	0.12
1,2-Dibromoethane	ND	1.0	ND	0.13
Tetrachloroethene	ND	1.0	ND	0.15
Chlorobenzene	ND	1.0	ND	0.22
Ethylbenzene	ND	1.0	ND	0.23
m,p-Xylenes	ND	1.0	ND	0.23
Bromoform	ND	1.0	ND	0.097
Styrene	ND	1.0	ND	0.23
o-Xylene	ND	1.0	ND	0.23
1,1,2,2-Tetrachloroethan	ND	1.0	ND	0.15
1,3-Dichlorobenzene	ND	1.0	ND	0.17
1,4-Dichlorobenzene	ND	1.0	ND	0.17
1,2-Dichlorobenzene	ND	1.0	ND	0.17

ELAP ID No.:10145

Comments:
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Date Analyzed: 03/31/2004

Approved By Technical Director: ____________________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

File ID: T01404-0685.xls

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 (585) 647-2530 FAX (585) 647-3311

LABORATORY REPORT OF ANALYSIS

Client: Day Environmental, Inc

Client Job Site: 95 Mt. Read Blvd., Rochester, NY

Client Job No.: 2712R-01

Field Location: N/A

Lab Project No.: 04-0685
Lab Sample No.: N/A

Sample Type: Method Blank

Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Chloromethane	ND	1.0	ND	0.48
Vinyl Chloride	ND	1.0	ND	0.39
Bromomethane	ND	1.0	ND	0.26
Chloroethane	ND	1.0	ND	0.38
Acetone	ND	5.0	ND	2.1
Trichlorofluoromethane	ND	1.0	ND	0.18
1,1-Dichloroethene	ND	1.0	ND	0.25
Methylene Chloride	ND	1.0	ND	0.29
Trichlorotrifluoroethane	ND	1.0	ND	0.13
Carbon Disulfide	ND	1.0	ND	0.32
trans-1,2-Dichloroethene	ND	1.0	ND	0.25
1,1-Dichloroethane	ND	1.0	ND	0.25
Methyl tert-Butyl Ether	ND	1.0	ND	0.28
Vinyl Acetate	ND	1.0	ND	0.28
2-Butanone (MEK)	ND	1.0	ND	0.34
cis-1,2-Dichloroethane	ND	1.0	ND	0.25
Chloroform	ND	1.0	ND	0.20
1,2-Dichloroethane	ND	1.0	ND	0.25
1,1,1-Trichloroethane	ND	1.0	ND	0.18
Benzene	ND	1.0	ND	0.31
Carbon Tetrachloride	ND	1.0	ND	0.16
1,2-Dichloropropane	ND	1.0	ND	0.22

ELAP ID No.:10145

Comments:
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Date Analyzed: 04/01/2004

Approved By Technical Director: ______________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

File ID: TO1404-0685.xls

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Client: Day Environmental, Inc
Client Job Site: 95 Mt. Read Blvd., Rochester, NY
Client Job No.: 2712R-01
Field Location: N/A

Lab Project No.: 04-0685
Lab Sample No. N/A
Sample Type: Method Blank
Date Sampled: 03/10/2004
Date Received: 03/11/2004

Compound	Result ug/m^3	Reporting Limit ug/m^3	Result ppbV	Reporting Limit ppbV
Bromodichloromethane	ND	1.0	ND	0.15
Trichloroethene	ND	1.0	ND	0.19
cis-1,3-Dichloropropene	ND	1.0	ND	0.22
4-Methyl-2-pentanone	ND	1.0	ND	0.24
rans-1,3-Dichloropropen	ND	1.0	ND	0.22
1,1,2-Trichloroethane	ND	1.0	ND	0.18
Toluene	ND	1.0	ND	0.27
2-Hexanone	ND	1.0	ND	0.24
Dibromochloromethane	ND	1.0	ND	0.12
1,2-Dibromoethane	ND	1.0	ND	0.13
Tetrachloroethene	ND	1.0	ND	0.15
Chlorobenzene	ND	1.0	ND	0.22
Ethylbenzene	ND	1.0	ND	0.23
m,p-Xylenes	ND	1.0	ND	0.23
Bromoform	ND	1.0	ND	0.097
Styrene	ND	1.0	ND	0.23
o-Xylene	ND	1.0	ND	0.23
1,1,2,2-Tetrachloroethan	ND	1.0	ND	0.15
1,3-Dichlorobenzene	ND	1.0	ND	0.17
1,4-Dichlorobenzene	ND	1.0	ND	0.17
1,2-Dichlorobenzene	ND	1.0	ND	0.17

ELAP ID No.:10145

Comments:
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Date Analyzed: 04/01/2004

Approved By Technical Director: ______________________
Bruce Hoogesteger

Chain of Custody provides additional sample information.

Columbia Analytical Services™
An Employee - Owned Company

Air Quality Laboratory
2665 Park Center Drive, Suite D
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Page 1 of 1

Chain of Custody Record
Analytical Service Request

04-0685

Client/Address	DAY ENVIRONMENTAL, INC 40 Commercial St. Rochester NY 14614
Phone	(585) 454-0210
Fax	(585) 454-0210
Email	dnoll@daymail.net
Contact	DAN NOLL
Sampler (Signature)	
Project Name	95 MT. READ BLVD.
Project Number	2712R-01
Sampling Location	
P.O. #/Billing Information	
CAS Project No.	
Cooler / Blank Temp	

Client Sample ID	Date Collected	Time Collected	Lab Sample No.	Type of Sample	Container ID (Serial #)	Flow Controller (Serial #)	Sample Volume (Liters)	Analysis: USEPA VOCs METHOD TO-15	Analysis	Analysis	Analysis	Expected Turnaround Time 24 Hr 48 Hr 3Day 4Day 5Day Standard (10 Business Days)	Comments (e.g., preservative or specific instructions)
SAMPLE 1A	3/10/04	0857 to	2944	Sub-Slab Air	SC00157	FC00031	6						SERIAL #'s FOR THE CONTAINERS & THE FLOW CONTROLLERS ON COC are FROM BAR CODE STICKERS
SAMPLE 1B		0858 to	2945	Indoor Air	AC00203	FC00316							
SAMPLE 2A		0904 to	2946	Sub-Slab Air	SC00130	FC00082							
SAMPLE 2B		0905 to	2947	INDOOR AIR	AC00413	FC00334							
SAMPLE 3A		0908 to	2948	Sub-Slab AIR	SC00517	FC00026							
SAMPLE 3B		0908 to	2949	Indoor AIR	AC00215	FC00233							
SAMPLE 4A		0912 to	2950	Sub-Slab Air	SC00178	FC00166							
SAMPLE 4B		0912 to	2951	Indoor Air	AC00399	FC00204							
SAMPLE 5		0920 to	2952	Outside Air	AC00340	FC00288 [illegible]							

Relinquished by: (Signature)	Date: 3/10/04	Time: 1705	Received by: (Signature)	Date: 3/10/04	Time: 1705
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date: 3/11/04	Time: 1020

Additional Comments