CORRECTIVE ACTION PLAN

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

NYSDEC Spills #0070043 & #0070044

Prepared for:	The City of Rochester 30 Church Street Rochester, New York 14614
Prepared by:	Day Environmental, Inc. 2144 Brighton-Henrietta Town Line Road Rochester, New York 14623
Project No.:	2485R-00
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APPENDICES

1.0 INTRODUCTION

Day Environmental, Inc. (DAY) prepared this report summarizing a Corrective Action Plan (CAP) to be implemented at the 14-60 Charlotte Street parcel, City of Rochester, County of Monroe, New York (Site). The location of the Site is shown on Figure 1 (Project Locus Map) and Figure 2 (Site Plan) that are included in Appendix A.

1.1 Background

A two-story vacant residential dwelling on the parcel addressed as 26 Charlotte Street and an approximately 1,800-square foot one-story vacant commercial concrete block garage located on the parcel addressed as 42 Charlotte Street were demolished in September 2001. The 48-60 Charlotte Street parcel is actively used as an open parking lot and the remainder of the Site is vacant or unused. The City of Rochester is the current owner of the Site.

Under current City of Rochester plans, the Site will be redeveloped for residential use. It is currently anticipated that the residential redevelopment will consist of construction of a condominium or apartment complex. The complex will have a parking garage on the first floor with living quarters on higher floors.

DAY previously completed various environmental studies at the Site and in the right-of-ways of Haags Alley and Charlotte Street. These studies that are summarized in reports prepared by DAY titled "Supplemental Phase II Environmental Studies, 14-60 Charlotte Street, Rochester, New York" dated November 2000 and "Supplemental Environmental Studies" dated February 2001. These reports identified and documented the existence of soil and groundwater contamination at the Site and in the right-of-way of Haags Alley north of the Site. In addition, light non-aqueous phase liquid (LNAPL) was detected in monitoring well MW-7 located on the southeast portion of the 14-16 Charlotte Street parcel. The LNAPL appears to consist of diesel fuel and it may be attributable to an on-site or off-site source. Some contaminants detected (e.g., light-weight total petroleum hydrocarbon (TPH) identified as mineral spirits and chlorinated volatile organic compounds) appear attributable to an off-site source located north of Haags Alley. Properties that could be considered as potential off-site sources of contamination (e.g., historic dry cleaning operations, historic auto painting operations, etc.) are depicted on Figure 2 included in Appendix A. In addition, figures from a previous Microsoft Powerpoint presentation that depict sample locations where detected TPH, VOCs or SVOCs exceeded soil or groundwater criteria are included in Appendix B.

In April 2000, the City of Rochester notified the New York State Department of Environmental Conservation (NYSDEC) of the preliminary field findings of the environmental studies that were being performed on the Site. The NYSDEC subsequently assigned spill number NYSDEC Spill #0070043 to the parcels addressed as 26-60 Charlotte Street. A separate spill number NYSDEC Spill #0070044 was assigned to the parcel addressed as 14-16 Charlotte Street. These spills currently have an "active" status.

An exposure assessment was performed using the available site data obtained during previous environmental work. The exposure assessment report dated June 2001 (included in Appendix C) concluded that a combination of remedial actions and environmental engineering controls should be

implemented if the Site is to be redeveloped for residential and/or commercial uses. Based on this exposure assessment, the site specific target levels (SSTLs) for the highest ("worst case") concentrations of various constituents detected in soil, fill or groundwater at the Site and/or their respective cumulative baseline risk factors were exceeded for one or more of the following exposure pathways:

- surface soil inhalation, ingestion, and dermal contact;
- soil volatilization to indoor air;
- soil volatilization and surface soil particulates to outdoor air; and
- groundwater volatilization to indoor air.

In order to address regulatory cleanup criteria for contamination attributable to on-site sources and mitigate complete exposure pathways to residual contamination at the Site attributable to on-site or off-site sources, the following items are included as part of this CAP so that the Site can be redeveloped as identified herein:

- Removing the known on-site sources of petroleum contamination as an interim remedial measure (IRM). Subsurface conditions beneath the existing buildings will be characterized and addressed during their demolition;
- Addressing the free product LNAPL encountered at monitoring well MW-7.
- Implementing an environmental management plan (EMP), including a health and safety plan (HASP) This would include performing environmental monitoring (air monitoring with a photoionization detector [PID] and particulate meter; visual observations; etc.) during activities that would potentially disturb contaminated media;
- Designing environmental engineering controls (i.e., vapor barriers, passive or active venting systems, etc. on proposed new buildings);
- Implementing institutional controls (e.g., City of Rochester flagging system); and
- Implementing a long-term monitoring program

1.2 Objectives

The objectives of the CAP are to identify remedial activities, environmental engineering controls, institutional controls, and environmental monitoring activities that allow for the redevelopment of the Site for the stated future use while satisfying regulatory agencies' cleanup criteria and concerns to human health and the environment. The CAP will mitigate each complete exposure pathway to site contaminants that were identified in the exposure assessment report dated June 2001.

2.0 INTERIM REMEDIAL MEASURE

As part of this project, it is anticipated that an interim remedial measure (IRM) will be completed. The IRM will include the removal and off-site disposal of contaminated soils from various areas at the Site, environmental monitoring, confirmatory soil sampling, application of ORC to selected excavations, and backfilling excavations.

2.1 Soil Removal, Disposal and Monitoring

As part of this project, it is anticipated that an interim remedial measure (IRM) consisting of the removal of a limited volume of soil and LNAPL will be completed at the Site. The removal areas are shown on Figure 3 included in Appendix A. It is anticipated that soil/fill in the excavation areas that exhibit PID readings greater than 10 ppm (PID) or 20 ppm (FID) above background, and/or staining, objectionable odors, sheen, etc. will be removed and disposed of off-site. This CAP assumes that a total of 1,260 tons of soil will be removed and disposed of from the parcels described below:

- AREA 1 (14-16 Charlotte Street) - Assume 360 cubic yards (about 610 tons) at three locations (former location of two gasoline USTs, location where diesel LNAPL has been documented, and former location of an in-ground lift that was previously removed.). It is anticipated that contaminated soil will be removed primarily from the saturated zone (i.e., within the groundwater table) at these locations. Subsequent to the removal of contaminated soil, a total of 500 pounds of oxygen release compound (ORC) will be placed into these three excavations to aid in the biodegradation of residual petroleum-contaminated soil or groundwater at these apparent source areas (refer to Section 2.2).

- AREA 2 (28-34 Charlotte Street) - Assume 183 cubic yards (about 310 tons) in proximity to MW-8 (north portion of these parcels) and TB-8 (south portion of these parcels).). It is anticipated that contaminated soil will be removed only from the unsaturated zone (i.e., above the groundwater table) at these two locations.

- AREA 3 (36-42 Charlotte Street) - Assume 130 cubic yards (about 220 tons) beneath the one-story concrete block building. It is anticipated that contaminated soil will be removed from the unsaturated, and possibly from the saturated zone, at this location.

- AREA 4 (48-60 Charlotte Street) -Assume 70 cubic yards (about 120 tons) at two locations northwest and/or central portions of this parcel. It is anticipated that contaminated soil will be removed from the unsaturated zone, and possibly from the saturated zone, at these locations.

Environmental air monitoring for VOCs and particulates will be conducted during the IRM as identified in the EMP and HASP included in Appendix D and Appendix E, respectively. The monitoring will serve two purposes: (1) protection of on-site personnel and the nearby community to exposures of Site contaminants; and (2) assist in segregation of contaminated soil or fill from uncontaminated soil. Field observations and measurements will be documented during air monitoring work, and will be available to regulatory authorities for their review, if requested.

In order to implement a "load-and-go" IRM, approvals from the landfill will be obtained prior to excavation work. As requested by Mr. Ed Harding at the Mill Seat Landfill, DAY will collect four samples to be tested at a New York State Department of Health (NYSDOH)-approved

analytical laboratory for ignitability and toxicity characteristic leaching procedure (TCLP) metals. The samples will be analyzed using a 5-day laboratory turnaround time. A backhoe and operator will be used to facilitate the collection of the required samples from the excavation areas. The analytical laboratory test results previously generated for this Site will also be furnished to the landfill.

A DAY representative will observe and document the soil removal work. The DAY representative will also screen the ambient air above the excavated soils during the removal work to assist in segregating soil that can be re-used on-site from contaminated soil that requires off-site disposal.

2.2 Confirmatory Sampling, ORC and Backfilling

Prior to backfilling the excavations, DAY will collect confirmatory soil samples from the excavations. For the purposes of this proposal, it is assumed that between two and four samples from walls and up to one sample from the bottom of each of the seven excavations will be collected for analytical laboratory testing. If excavations are terminated on bedrock, bottom samples will not be collected. DAY will retain a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory to test the samples for the following parameters:

- Target compound list (TCL) and NYSDEC Spill technology and remediation Series (STARS)-list VOCs using United States Environmental Protection Agency (USEPA) Method 8260.
- STARS-list SVOCs using USEPA Method 8270.
- TPH using NYSDOH Method 310.13.

Also, as a supplement to the IRM, up to 500 pounds of ORC will be added to the saturated zone of the two planned soil removal excavations on the 14-16 Charlotte Street parcel prior to backfilling the excavation. The ORC is intended to enhance the bioremediation of petroleum contamination in the saturated zone (i.e., saturated soils and groundwater). The amount of ORC to be applied is based on use of Regenesis' estimating software (Version 2a) for groundwater treatment in a tank excavation. A copy of the software output is included in Appendix F.

Subsequent to collection of the confirmatory soil samples (and placement of ORC at excavations on the 14-16 Charlotte Street Parcel), the excavations will be backfilled with soil/fill from the Site that is not contaminated with VOCs or petroleum at concentrations above regulatory criteria (e.g., NYSDEC STARS Memo #1 or TAGM 4046 criteria) or with select clean fill (e.g., crusher run) that will be compacted. Soil/fill from the Site will not be used as backfill below the groundwater table or between 0 and 1 foot from the ground surface. A geotechnical consultant will perform one proctor test on the select fill material and intermittent compaction testing during backfilling of excavations. The contaminated soil/fill that is removed will be transported by a NYSDEC Part 360 permitted waste hauler to Mill Seat Landfill for disposal as a non-hazardous waste in accordance with applicable regulations.

This IRM will be documented in a report that will include maps showing the IRM locations, tables summarizing field data and analytical laboratory data, analytical laboratory reports, waste transport and disposal documentation, etc.

3.0 LNAPL REMOVAL

LNAPL that appears attributable to diesel fuel is present at existing overburden/bedrock interface well MW-7 located on the 14-16 Charlotte Street parcel. Up to approximately two feet of LNAPL has been measured floating on groundwater in this well during previous environmental studies. In this area, the top of bedrock has been measured at approximately 10 feet below existing grade. In December 2000, the top of LNAPL and the top of the water table at MW-7 were measured at 8.04 feet and 10.11 feet respectively.

During the IRM described in Section 2.0 of this CAP, soil removal is planned for the area of well MW-7 and this well will be decommissioned at that time. If LNAPL is encountered during the soil removal work on this portion of the Site, it will be removed as best as practicable prior to backfilling the excavation. Depending upon the volume of LNAPL, it is anticipated that it will be removed with a vacuum truck or with absorbent pads. The removed LNAPL will be transported off-site and disposed of or recycled in accordance with applicable regulations. In addition, a new four-inch to six-inch inch diameter well will be installed in this excavation for future LNAPL recovery or in-situ treatment. Since this Site is to be redeveloped with a new residential complex that covers this portion of the Site, this new well may need to be incorporated into the plans for the new building so that LNAPL recovery can continue subsequent to redevelopment of the Site as deemed necessary.

4.0 ENVIRONMENTAL MANAGEMENT PLAN

An environmental management plan (EMP) for the Site is included in Appendix D. The purpose of this EMP is to address the handling, management, disposal or re-use of: (1) soil, fill and groundwater containing petroleum-type contamination, solvent/degreaser-type contamination (e.g., mineral spirits, Stoddard solvent, or paint thinner), etc.; (2) fill materials containing elevated heavy metals; and (3) petroleum LNAPL.

Specifically, the EMP addresses how to identify, characterize, handle, and dispose or re-use these media during construction or post-development activities. The EMP establishes goals, procedures, and appropriate response actions to be used by on-site personnel should petroleum-contaminated soil, fill, groundwater or LNAPL be encountered and disturbed.

5.0 HEALTH AND SAFETY PLAN

A site-specific health and safety plan (HASP) for the Site is included in Appendix E. This HASP outlines the policies and procedures necessary to protect workers and the public from potential environmental hazards posed during remedial activities, construction activities and maintenance activities at the Site.

6.0 ENVIRONMENTAL ENGINEERING CONTROLS

In order to mitigate exposure pathways to future residential occupants at the Site, environmental engineering controls are to be incorporated into the redevelopment of this Site. The purpose of the environmental engineering controls are to:

- Preclude the following contaminant exposure pathways:
  - surface soil inhalation, ingestion, and dermal contact;
  - soil volatilization to indoor air;
  - soil volatilization and surface soil particulates to outdoor air; and
  - groundwater volatilization to indoor air.

- Preclude further on-site migration of VOC vapor contamination from potential off-site sources generally located north, and possibly west and south, of the Site.

Currently, it is anticipated that the Site will be redeveloped with a residential condominium or apartment complex. It is anticipated that an approximately 38,050 square-foot building with a common foundation will be constructed and contain multiple residential units. The complex will have a parking garage on the first floor with living quarters on higher floors. It is likely that some existing fill generally within the building footprint will be disturbed and require management in accordance with the EMP included in Appendix D.

6.1 Planned Controls

The planned environmental engineering controls for the Site are depicted on Figure 4 included in Appendix A.

- In order to preclude exposure pathways to future Site occupants, the first floor of the building will be underlain with an active soil venting system with an associated vapor barrier. The system consists of two sets of horizontal perforated piping beneath the building that are set in porous crushed stone media and overlain by polyethylene sheeting, connecting to solid piping that is directed north of the building. The two sets of vertical piping then run vertical and are connected to two in-line fans that provide active ventilation. The vertical piping downstream from the in-line fans then discharge above the roofline of the building.

  Also, a vapor barrier will be installed beneath portions of the Site not covered by the building in order to preclude the exposure pathway of volatilization of contaminants to outdoor air. As such, it is anticipated that stormwater will require discharge to the combined sewer system through a system of catch basins, etc. and that infiltration of precipitation should not be considered for the handling of stormwater run-off.

- In order to preclude further migration of VOC vapor contamination from potential off-site sources, a passive perimeter vent system will be installed along portions of the north and west property boundaries.

6.2 Pre-Occupancy Air Sampling and Analysis

Prior to occupancy of the planned residential condominium or apartment complex, baseline air sampling and analytical laboratory testing will be performed inside the complex. It is anticipated that two air samples will be collected from first floor garage spaces and that two air samples will be collected from living spaces. Depending upon the completion date of the redevelopment activities, these samples may or may not be collected during the heating season.

The air samples will be collected using SUMMA canisters (or similar). The equipment will be set up in the area to be monitored, and then the valves on the SUMMA canisters will be opened. The valves will be equipped with a regulator to allow for the collection of the air samples over a minimum two-hour period. The canisters use negative pressure (e.g., vacuum) to capture the air samples. Once the negative pressure inside the canisters equilibrate with atmospheric pressure (e.g., within a few seconds), the valve on the SUMMA canisters will be closed. The samples will delivered under chain of custody (COC) control to an appropriate analytical laboratory.

Currently, it is anticipated that the analytical laboratory will analyze the air samples for VOCs and naphthalene by gas chromatography/mass spectrometry (GC/MS) using USEPA Method TO-14. The data will be compared to available OSHA permissible exposure limits (PELs) or other appropriate criteria, and submitted to the appropriate regulatory authorities (e.g., Monroe County Department of Health [MCDOH]) for review.

6.3 Monitoring of Environmental Engineering Controls

Subsequent to redevelopment activities at the Site, the permanent environmental engineering controls equipped with venting systems will be monitored monthly for a period of at least one year. The results of this monitoring will be presented in the Closure Report (refer to Section 9.0) or in a monitoring report that will be submitted to regulatory authorities.

The ambient air space within environmental engineering control vent system sampling port-holes will be screened with a PID and/or FID during each monitoring event. Also, if there is an incident where vapors or nuisance odors are detected in any on-site indoor space, the appropriate regulatory authorities will be notified, and the performance of the vapor barrier venting system in that area will be evaluated and upgraded as deemed necessary (i.e., installation of larger fan, etc.).

If subsequent to one year after redevelopment there has been no evidence of vapors or nuisance odors in the vapor barrier venting system(s) that present an unacceptable potential exposure, and there have been no reported on-site incidents involving the presence of vapors or nuisance odors in indoor spaces, then monitoring of the vapor barrier venting systems will be terminated. However, the vapor barrier venting systems will continue to operate.

7.0 INSTITUTIONAL CONTROLS

The City of Rochester will "flag" the Site on its building information system so that environmental conditions are evaluated and addressed prior to issuing new permits for this Site that involve potentially disturbing contaminated materials. This process identifies environmental conditions at the Site and ensures that these existing environmental conditions are considered prior to issuing a permit. Furthermore, this process ensures that the proposed permit action does not result in disturbances to the planned environmental engineering controls, and that the proposed permit does not result in an unacceptable exposure to Site contamination by on-site construction workers and occupants and the nearby community. This process also allows the City of Rochester and regulatory authorities the opportunity to require the implementation of a site-specific health and safety plan or environmental management plan for the proposed work; modifications to environmental monitoring points; modifications to environmental engineering controls; etc. prior to issuing the permit.

8.0 GROUNDWATER MONITORING PROGRAM

Since contaminated groundwater generally attributable to off-site sources is anticipated to exist at the Site after its redevelopment, a groundwater monitoring program will be implemented. The program involves decommissioning existing wells, installing new wells and monitoring groundwater quality.

8.1 Decommissioning Existing Groundwater Monitoring Wells

The existing on-site monitoring wells at the Site will require decommissioning as part of the redevelopment of the Site. In areas where soil will be removed down to bedrock (i.e., MW-6 and MW-7), the portion of the well in the overburden will be removed, and the portion of the well in the bedrock will be backfilled with sand. The remaining wells (i.e., in areas where overburden will not be excavated down to bedrock) will be closed in-place using the following procedures:

- The protective casing/curb-box will be removed;
- cored bedrock and/or screened intervals in the bedrock and/or overburden will be backfilled with sand; and
- the interior PVC solid riser will be backfilled with cement and/or grout.

8.2 New Groundwater Monitoring Wells

In order to monitor groundwater conditions subsequent to its redevelopment, six new overburden/bedrock interface groundwater monitoring wells will be installed at the Site or within the right-of-way of Charlotte Street and Haags Alley. The locations of these wells will be determined when final redevelopment plans become available; however, it is anticipated that the new wells will be placed around the perimeter of the new residential building complex. The new wells will be installed using a conventional truck-mounted drill-rig. DAY will observe and document the work that is completed. The installation of these new wells is further outlined below.

8.2.1 Installation

The drilling subcontractor will utilize a truck-mounted drill rig to advance hollow stem augers (HSAs) at these locations. Drilling equipment will be decontaminated (steam cleaned, or alconox/liquinox wash followed by a water rinse) prior to each use.

It is anticipated that continuous split spoon samples will be collected ahead of the augers in general accordance with ASTM 1586. These borings will be sampled to refusal (suspected top of rock). Soil/fill will be sampled using split spoon samplers driven by a 140-pound hammer free-falling 30 inches (Standard Penetration Test). The recovered split spoon samples will be visually examined for evidence of suspect contamination (e.g., staining, unusual odors). Portions of the recovered split spoon samples will also be screened with a PID and/or a FID in order to determine if VOCs are present in the samples.

Pertinent information for the test borings will be recorded in a field log book, whereupon portions of information will subsequently be transcribed onto a boring log. The recorded information will include:

- Date, boring/well identification, and project identification.
- Name of individual developing the log.
- Name of drilling company.
- Drill make and model, auger size, core barrel.
- Identification of alternative drilling methods used and justification thereof (e.g., rotary drilling with a specific bit type to remove a sand plug from within the hollow stem augers).
- Depths recorded in feet and fractions thereof (tenths of inches) referenced to ground surface.
- Standard penetration test (ASTM D-1586) blow counts.
- The length of the sample interval and the length of the sample recovered.
- The depth of the first encountered water table, along with the method of determination, referenced to ground surface.
- Drilling and borehole characteristics.
- Sequential stratigraphic boundaries.
- Visual and/or olfactory evidence of suspected impact (e.g., unusual odors, staining, etc.).
- Initial FID/PID screening results of split-spoon samples, and/or FID/PID screening results of ambient headspace air above selected samples.

Once top of bedrock is encountered, it is anticipated that approximately the first five feet of bedrock will be cored at each monitoring well location using an H-sized coring barrel in order to complete the advancement of the boring. The rock core collected will be observed and described.

Following the completion of the boring at each of the well locations, monitoring wells will be constructed within each boring. Each well will consist of a pre-cleaned five-foot long to ten-foot long, two-inch I.D., threaded, flush-jointed, No. 10 slot, schedule 40 PVC screen with attached riser casing of the same material. It is anticipated that the well screens will be installed within the fractured zone of the bedrock extending through the interface with the overburden. However, the field placement of the screen will be dependent upon subsurface conditions encountered. The well installations will include a washed and graded sand pack surrounding the screens and extending approximately one foot below it, and approximately one foot above it. An approximately two-foot bentonite seal will be placed above the sand pack and the remaining annulus will be filled with cement/bentonite grout. A steel flush-mounted curb box with a locking internal cap will be placed over each well and cemented in place. A rubber gasket will also be installed beneath each curb box access plate in order to minimize the release of volatile vapors from the wells.

8.2.2 Well Development

The new monitoring wells will be developed prior to sampling and/or measurement of static water levels. Well development will be performed utilizing either new disposable bailers with dedicated cord or a centrifugal pump and dedicated tubing. No fluids will be added to the wells

during development, and well development equipment will be decontaminated prior to development of each well. The well development procedure will be as follows:

- Obtain pre-development static water level readings.
- Calculate water/sediment volume in the well.
- Obtain groundwater sample for field analysis using bailer.
- Select development method and set up equipment depending on method used.
- Begin pumping or bailing.
- Obtain initial field water quality measurements (e.g., conductance, temperature, turbidity, and PID and/or FID readings). Record water quantities and rates removed.
- Obtain field water quality measurements for every 5 to ten gallons of water removed.
- Stop development when water quality criteria are met.
- Obtain post-development water level readings.
- Document development procedures, measurements, quantities, etc.

Development will continue until the following criteria is achieved:

- pH, specific conductance, temperature and turbidity are relatively stable for three consecutive measurements and/or,
- a minimum of five well volumes have been removed, or to dryness.

Note: During development, the purge water will be observed for the presence of LNAPL. A Heron Oil/Water Interface Meter Model HO1.L (or similar meter) will be used to detect LNAPL. The results of the LNAPL evaluation will be documented.

8.2.3 Groundwater Sampling and Analysis

Following development, and a suitable period of time to allow stabilization (a minimum of 7 days following development), one round of groundwater samples will be collected from the monitoring wells in order to establish baseline groundwater quality conditions. The wells will be sampled thereafter on a bi-annual basis for a period of three years. Prior to sampling, the depth to static water within each monitoring well will be measured. In addition, a Heron Oil/Water Interface Meter Model HO1.L, or equivalent, will be used to assess the presence of LNAPL within each well. If such materials are encountered, samples will be collected. Each well will then be purged prior to sampling by evacuating a minimum of three well casing volumes of water, or to dryness. Evacuation of the water from each well will be conducted using the same equipment utilized for well development.

In general, during each sampling event the wells will be allowed to recharge to a minimum of 90% of their static water level prior to sampling; however, regardless of recharge rate, the wells will be sampled within 24 hours of purging. Each well will be sampled using dedicated disposable bailers with dedicated nylon cord. In addition to the volume of groundwater necessary to satisfy the laboratory container requirements, an additional volume will be obtained at each well to obtain field measurements. Field measurements will be obtained for pH, specific conductivity, temperature, and turbidity. The field measurement data will be presented on Monitoring Well Sampling Logs.

LNAPL Sampling Protocol

During at least one sampling event, monitoring wells suspected to contain LNAPL will be sampled using a bottom-filled bailer. Samples of the LNAPL will be collected prior to purging water from these wells by slowly lowering the bailer through the entire thickness of the LNAPL layer to collect a sample. Care will be taken not to lower the bailer to a significant depth into the underlying groundwater. In the event wells contain more than one LNAPL layer, samples of progressively dense layers will also be obtained using a bottom loading bailer. Following completion of the LNAPL layer(s), the monitoring wells will be purged at least three well volumes and samples will be collected as discussed above.

Portions of the samples obtained will initially be scanned with a FID and/or a PID equipped with a 10.6 eV lamp in order to determine if VOCs are present in the samples.

Portions of the groundwater samples will be analyzed for USEPA TCL and NYSDEC STARS-listed VOCs using USEPA method 8260, possibly for NYSDEC STARS-listed SVOCs using USEPA Method 8270 and possibly for TPH using NYSDOH Method 310.13 as deemed necessary by regulatory authorities.

If LNAPL is encountered, LNAPL samples will be analyzed for TPH using NYSDOH Method 310.13.

8.2.4 Groundwater Potentiometric Maps

The top of each well casing, as well as the ground/floor elevation in proximity to each well location, will be surveyed by a Licensed Surveyor relative to an assumed datum of 100.00 feet. During each sampling event, static groundwater measurements will be collected from each monitoring well using an electronic static water level meter, the Heron Oil/Water Interface Meter Model HO1.L, or equivalent. Groundwater elevations will be calculated, and a potentiometric groundwater map will be prepared illustrating the approximate groundwater elevations and groundwater flow direction(s) for each groundwater sampling event.

9.0 CLOSURE REPORT

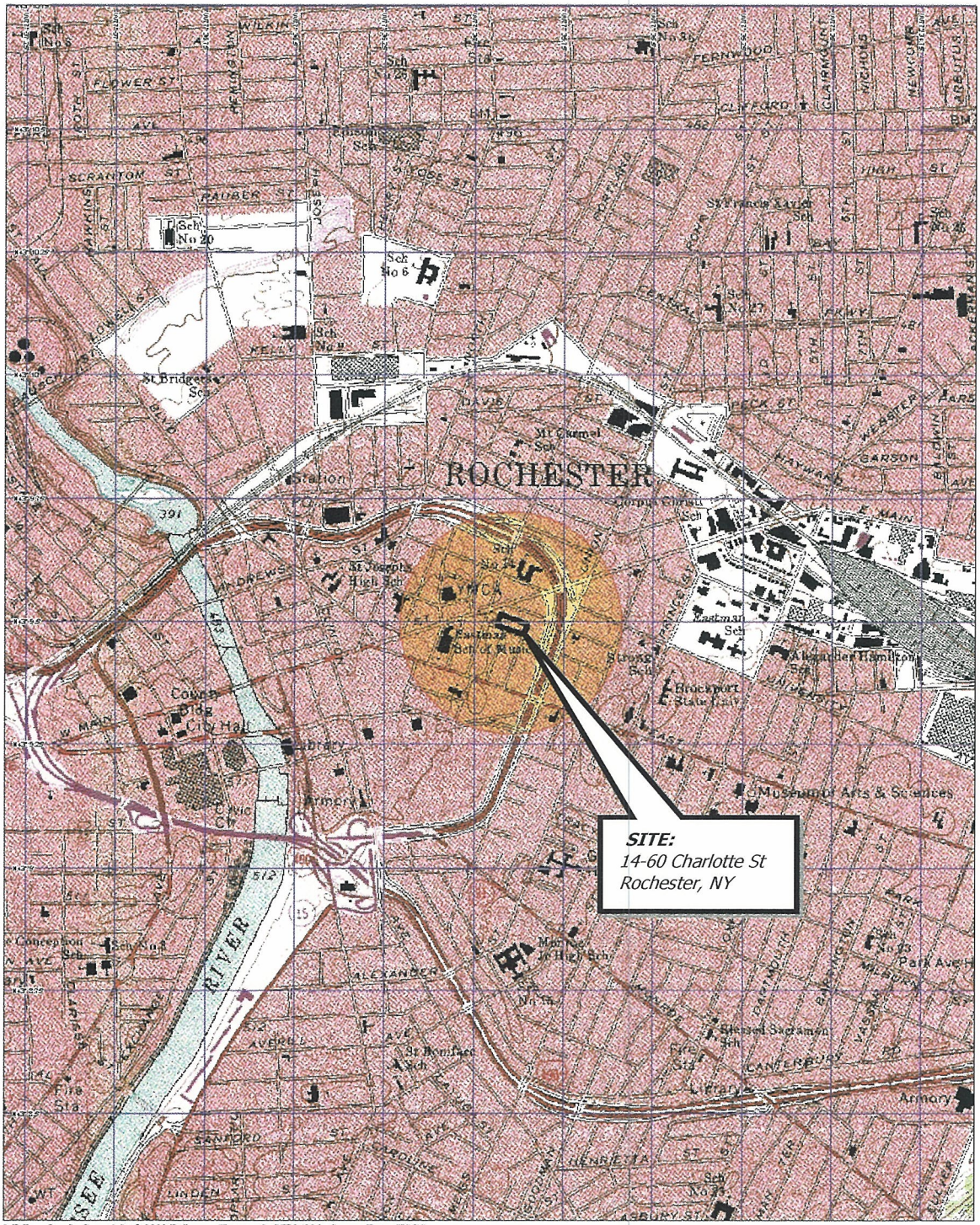
At the completion of the tasks described in this CAP, a Closure Report will be developed that summarizes the remedial work performed, the pertinent findings and conclusions of the remedial measures, and monitoring work. The Closure Report will be submitted to the appropriate regulatory authorities (i.e., NYSDEC, NYSDOH, and MCDOH), the City of Rochester, and the future owner of the Site.

10.0 ABBREVIATIONS

CAP	Corrective Action Plan
DAY	Day Environmental, Inc.
ELAP	Environmental Laboratory Approval Program
EMP	Environmental Management Plan
FID	Flame Ionization Detector
GC/MS	Gas Chromatography/Matrix Spectrometry
HASP	Health and Safety Plan
HSA	Hollow Stem Auger
IRM	Interim Remedial Measure
LNAPL	Light Non-Aqueous Phase Liquid
MCDOH	Monroe County Department of Health
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ORC	Oxygen Release Compound
PEL	Permissible Exposure Limit
PID	Photoionization Detector
ppm	Parts Per Million
RCRA	Resource Conservation and Recovery Act
SSTL	Site Specific Target Level
STARS	Spill Technology and Remediation Series
SVOC	Semi-Volatile Organic Compound
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

APPENDIX A

Figures



Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad map Rochester East (NY) 1995. Site Lat/Long: N43d-9.50' – W77d-35.90'

DATE 10/1/2001 DRAWN BY Jad SCALE 1" = 2000'	day DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008	PROJECT TITLE 14-60 CHARLOTTE STREET ROCHESTER, NEW YORK CORRECTIVE ACTION PLAN DRAWING TITLE PROJECT LOCUS MAP	PROJECT NO. 2485R-00 FIGURE 1

DayEnv_AnsiB
11x17

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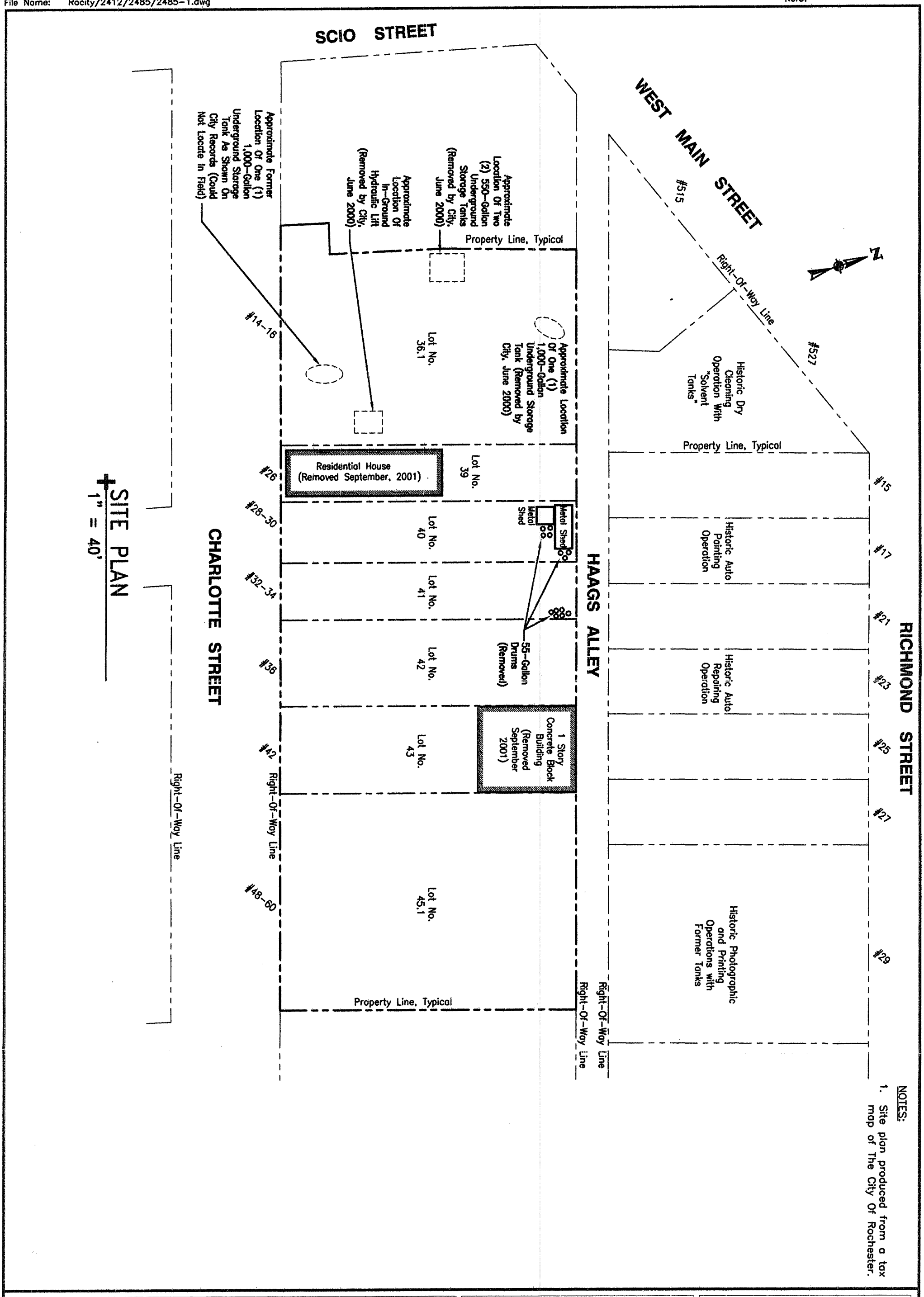

SITE PLAN
1" = 40'

NOTES:
1. Site plan produced from a tax map of The City Of Rochester.

FIGURE 2

PROJECT NO. 2485R-00

PROJECT TITLE
14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

CORRECTIVE ACTION PLAN

DRAWING TITLE
Site Plan

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14623-2700

FIELD VERIFIED BY	DATE
JAD	02/2001
DRAWN BY	DATE DRAWN
Tww	03/01/2001
SCALE	DATE ISSUED
1"=40'	03/02/2001

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Ref2: 2485-3.dwg
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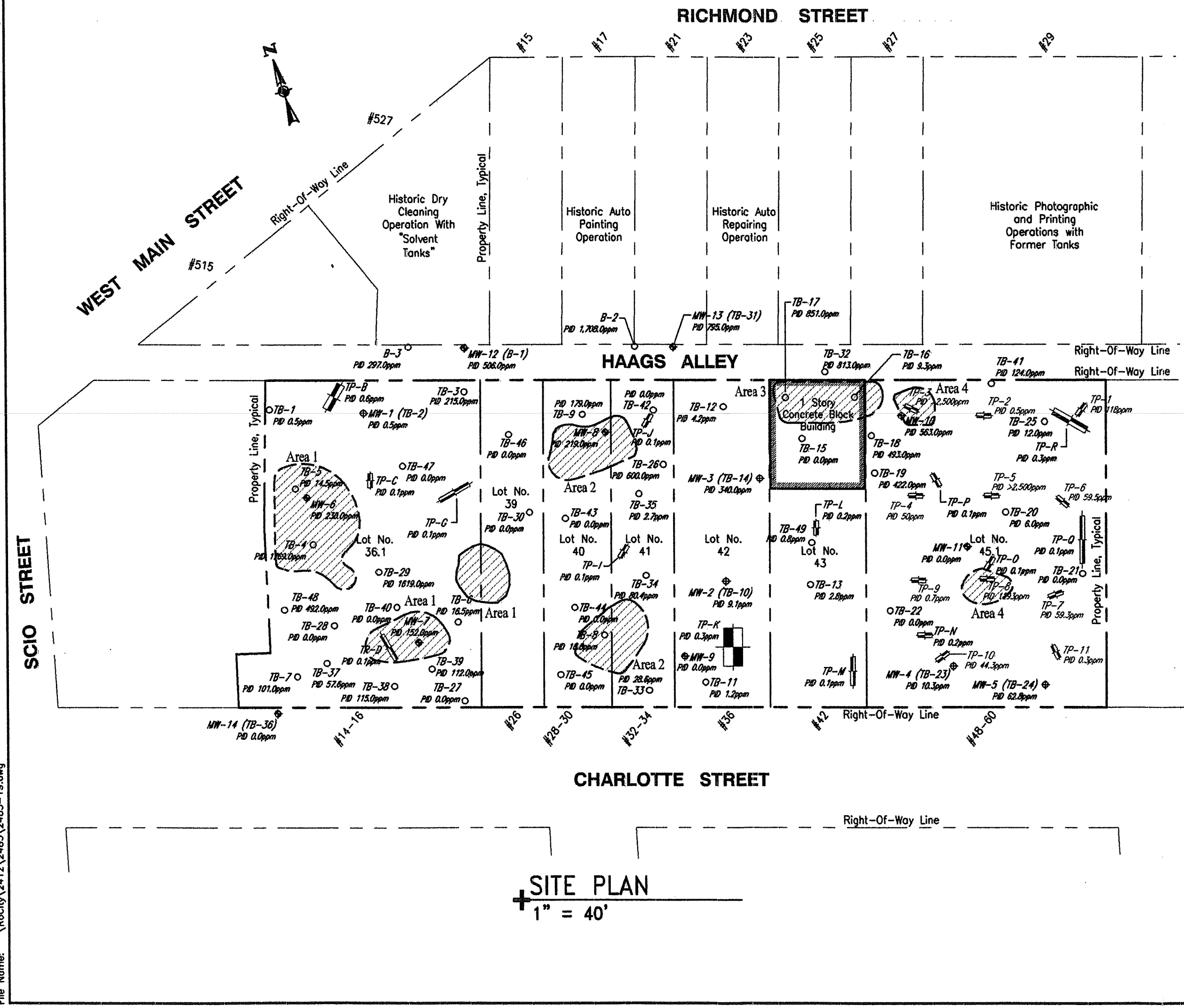

SITE PLAN
1" = 40'

NOTES:

1. Site plan produced from a tax map of The City Of Rochester.
2. Locations of test borings and wells tape-measured from existing site structures, and are considered accurate to the degree implied by the method used.

LEGEND:

- ⊕MW-1 (TB-2) PID 0.5ppm — Approximate Location Of Overburden Geoprobe Monitoring Well With Peak PID Reading Recorded In ppm
- ○TB-32 PID 813.0ppm — Approximate Location Of Geoprobe Test Boring With Peak PID Reading Recorded In ppm
- ⊕MW-13 (TB-31) PID 795.0ppm — Approximate Location Of Overburden/Bedrock Monitoring Well With Peak PID Reading Recorded In ppm
- TP-C PID 0.1ppm — Approximate Location Of Test Pit With Peak PID Reading Recorded In ppm
- Area 1 — Approximate Boundary Of Tentative Areas Of Soil Removal

FIELD VERIFIED BY	DATE	DRAWN BY	DATE DRAWN	SCALE	DATE ISSUED
JAD	05/2001	Tww	06/05/2001	1" = 40'	06/25/2001

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14623-2700

PROJECT TITLE
14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK
CORRECTIVE ACTION PLAN

DRAWING TITLE
Cumulative Test Locations With Peak PID Readings Depicting Tentative Areas Of Soil Removal

PROJECT NO.
2485R-00

FIGURE 3

SHEET 1 OF 1

DayEnv_AnsiB
11x17

Time Plotted: Mon June 25 09:20 2001
File Name: \RoCity\2412\2485\2485-19.dwg

APPENDIX B

Figures Depicting Sample Locations Where Detected TPH, VOCs or SVOCs Exceeded Soil or Groundwater Criteria

RICHMOND STREET

#15 #17 #21 #23 #25 #27 #29

N

#527

WEST MAIN STREET

#515

Right-Of-Way Line

Historic Dry Cleaning Operation With "Solvent Tanks"

Property Line, Typical

Historic Auto Painting Operation

Historic Auto Repairing Operation

Historic Photographic and Printing Operations with Former Tanks

TB-17

B-2

MW-12 (B-1)

HAAGS ALLEY

Right-Of-Way Line

Right-Of-Way Line

TB-3

TB-9

MW-8

1 Story Concrete Block Building

TP-3

TB-18

TP-1

TB-26

MW-3 (TB-14)

TP-5

Property Line, Typical

Lot No. 39

Lot No. 40

Lot No. 41

Lot No. 42

Lot No. 43

Lot No. 45.1

SCIO STREET

TB-4

Lot No. 36.1

TB-29

TB-6

TB-8

TB-21

TP-8

TP-7

Property Line, Typical

TB-7

TB-27

MW-5 (TB-24)

#14-16 #26 #28-30 #32-34 #36 #42 Right-Of-Way Line #48-60

CHARLOTTE STREET

Right-Of-Way Line

SITE PLAN
1" = 40'

NOTES:

1. Site plan produced from a tax map of The City Of Rochester.
2. Locations of test borings and wells tape-measured from existing site structures, and are considered accurate to the degree implied by the method used.

LEGEND:

- MW-1 (TB-2) PID 0.5ppm — Approximate Location Of Overburden Geoprobe Monitoring Well With Peak PID Reading Recorded In ppm
- TB-32 PID 813.0ppm — Approximate Location Of Geoprobe Test Boring With Peak PID Reading Recorded In ppm
- MW-13 (TB-31) PID 795.0ppm — Approximate Location Of Overburden/Bedrock Monitoring Well With Peak PID Reading Recorded In ppm
- TP-C PID 0.1ppm — Approximate Location Of Test Pit With Peak PID Reading Recorded In ppm
- Does Not Exceed TAGM 4046 Recommended Soil Cleanup Objectives For Specific VOCs and/or SVOCs
- 8260 STARS VOCs Exceed TAGM 4046 Recommended Soil Cleanup Objectives
- 8270 STARS VOCs Exceed TAGM 4046 Recommended Soil Cleanup Objectives For SVOCs

FIELD VERIFIED BY	DRAWN BY	SCALE	DATE
JAD	Tww	1" = 40'	02/2001

DATE DRAWN	DATE ISSUED
03/01/2001	03/01/2001

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14623-2700

PROJECT TITLE
14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK
CORRECTIVE ACTION PLAN

DRAWING TITLE
Cumulative VOCs & SVOCs Detected In Soil Samples In Comparison To NYSDEC TAGM 4046 Recm'd Cleanup Objectives

PROJECT NO.
2485R-00

FIGURE 4

SHEET 1 OF 1

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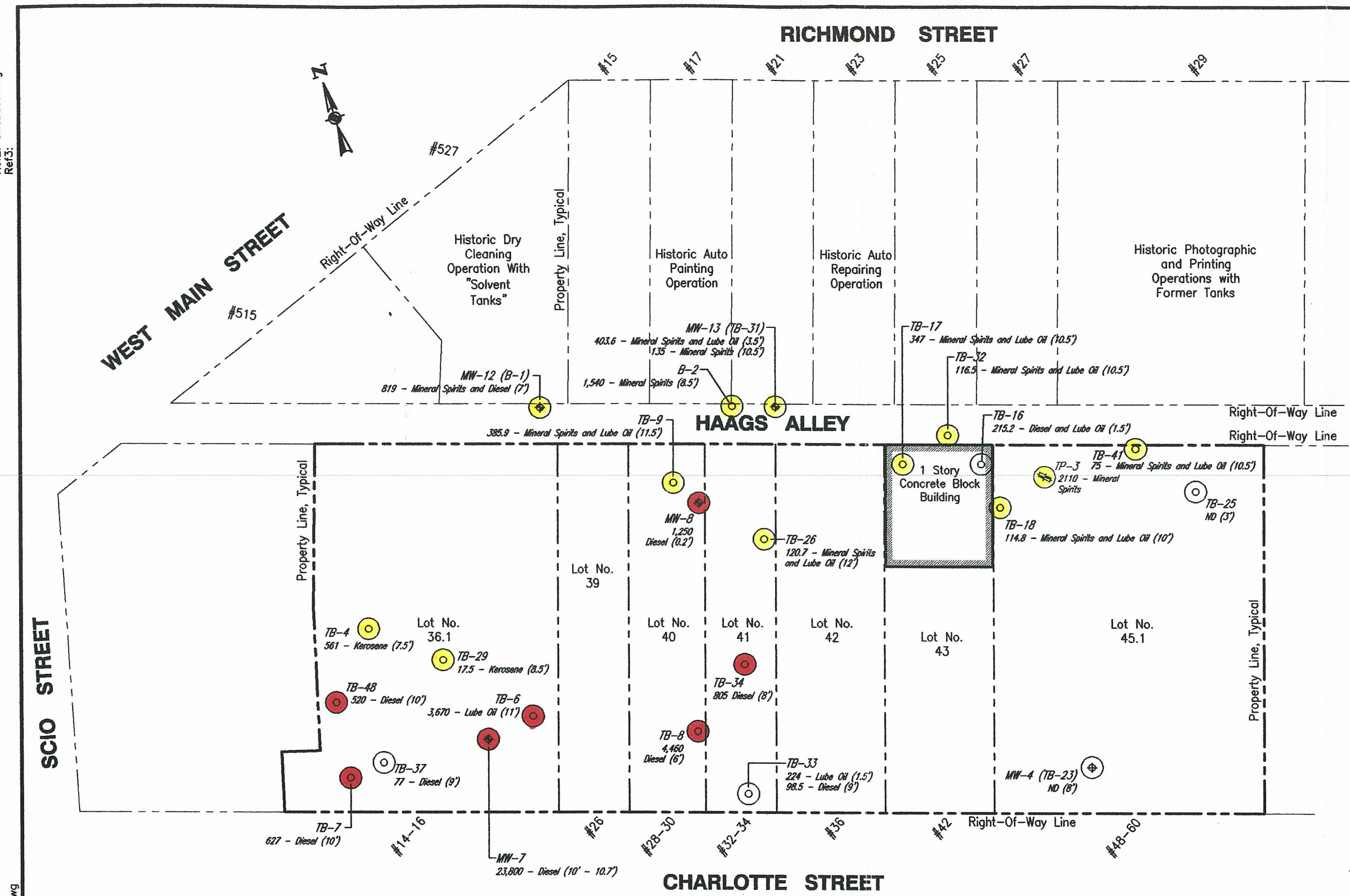

SITE PLAN
1" = 40'

NOTES:

1. Site plan produced from a tax map of The City Of Rochester.
2. Locations of test borings and wells tape-measured from existing site structures, and are considered accurate to the degree implied by the method used.

LEGEND:

ND	Not Detected Above Reported Analytical Laboratory Detection Limits
TB-37 77 - Diesel (9')	Approximate Geoprobe Test Boring Location With TPH Concentration In Soil Sample Recorded In Parts Per Million (ppm) With Depth In Parenthesis
MW-4 (TB-23) ND (8')	Approximate Overburden Geoprobe Monitoring Well Location With TPH Concentration In Soil Sample Recorded In ppm With Depth In Parenthesis
MW-8 1,250 - Diesel (0.2')	Approximate Overburden/ Bedrock Geoprobe Monitoring Well Location With TPH Concentration In Soil Sample Recorded In ppm With Depth In Parenthesis
TP-3 2110 - Mineral Spirits	Test Pit Installed In 1997
	TPH less Than TAGM 4046 criteria For Total VOC (> or =10ppm) and Total SVOCs (> or =500ppm)
	TPH Exceeds TAGM 4046 Criteria For Total VOCs (> or =10ppm)
	TPH Exceeds TAGM 4046 Criteria For Total SVOCs (> or =500ppm)

DATE	02/2001
FIELD VERIFIED BY	JAD
DATE DRAWN	03/02/2001
DRAWN BY	Tww
DATE ISSUED	03/02/2001
SCALE	1" = 40'

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14623-2700

PROJECT TITLE
14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK
CORRECTIVE ACTION PLAN

DRAWING TITLE
TPH Detected In Soil Samples In Comparison To NYSDEC TAGM 4046 Cleanup Objectives

PROJECT NO.
2485R-00

FIGURE 5

SHEET 1 OF 1

Time Plotted: Fri Mar 02 09:12 2001
File Name: \roCity\2415\2485\2485-9.dwg

Daytnv_Ansib
11x17

DayEnv_AnsiB
11x17

Time Plotted: Mon Mar 05 10:08 2001
File Name: \RoCity\2412\2485\2485-11.dwg

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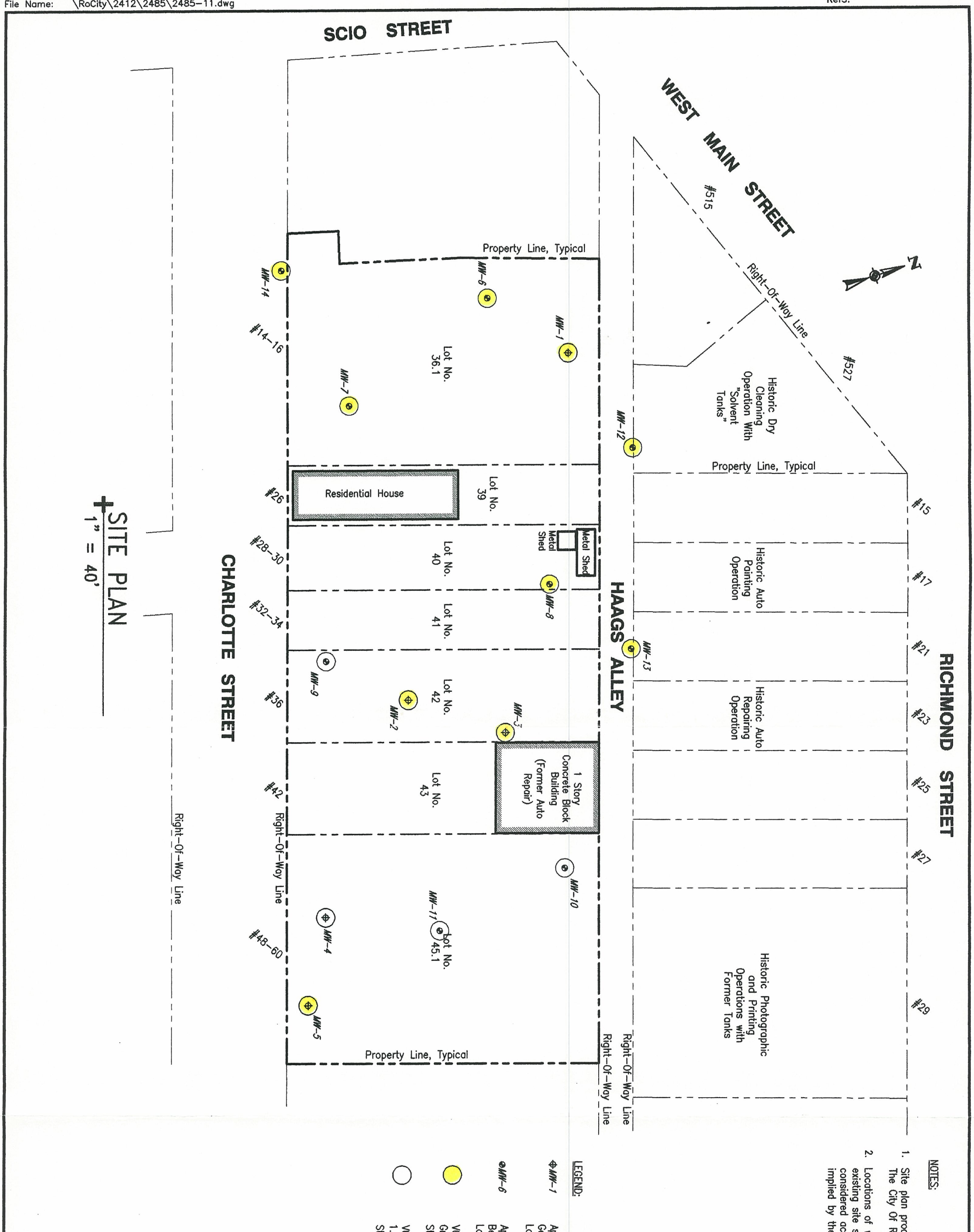
Ref2: SiteBase.dwg
Ref3:



SITE PLAN
1" = 40'

NOTES:

1. Site plan produced from a tax map of The City Of Rochester.
2. Locations of wells tape-measured from existing site structures, and are considered accurate to the degree implied by the method used.

LEGEND:

- ⊕ MW-1 — Approximate Overburden Geoprobe Monitoring Well Location
- ⊕ MW-6 — Approximate Overburden/ Bedrock Monitoring Well Location
- VOCs Exceed TOGS 1.1.1 Groundwater Standards/Guidance Values
- VOCs Do Not Exceed TOGS 1.1.1 Groundwater Standards/Guidance Values

PROJECT TITLE	14-60 CHARLOTTE STREET ROCHESTER, NEW YORK
	CORRECTIVE ACTION PLAN
DRAWING TITLE	VOCs Detected In Groundwater Samples In Comparison To NYSDEC TOGS 1.1.1 Groundwater Standards/Guidance Values

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14623-2700

FIELD VERIFIED BY: JAD	DATE: 02/2001
DRAWN BY: Tww	DATE DRAWN: 03/02/2001
SCALE: 1" = 40'	DATE ISSUED: 03/02/2001

PROJECT NO. 2485R-00
FIGURE 6
SHEET 1 OF 1

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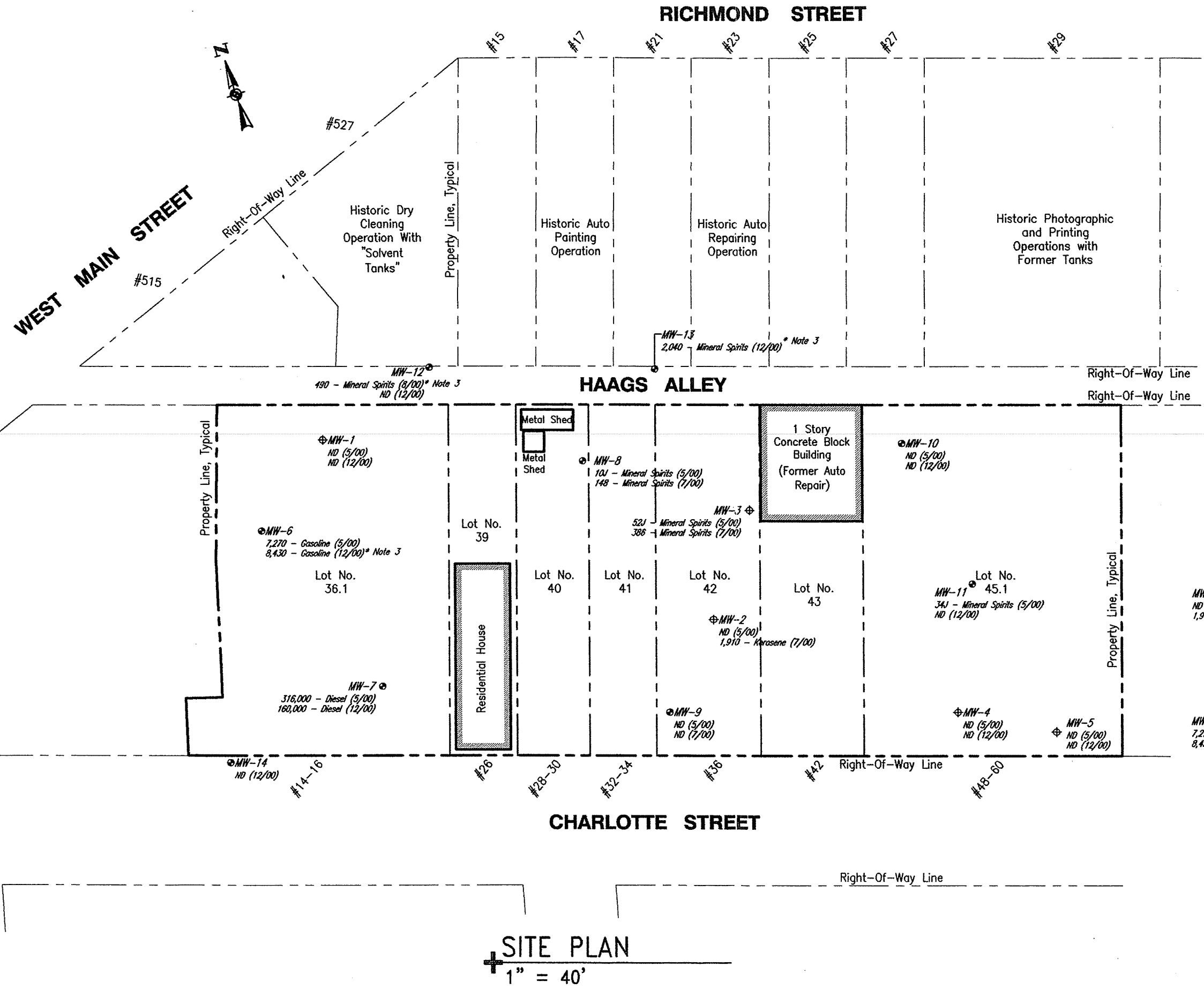
Ref2: SiteBase.dwg
Ref3:



SITE PLAN
1" = 40'

NOTES:

1. Site plan produced from a tax map of The City Of Rochester.
2. Locations of wells tape-measured from existing site structures, and are considered accurate to the degree implied by the method used.
3. The analytical laboratory reported the test results as light-weight TPH tenatively identified as gasoline and/or mineral spirits. Based on previous soil and groundwater data collected at or in proximity to well MW-6, and the fact that two leaking gasoline underground tanks were removed in proximity to MW-6, the TPH detected in the 12/2000 groundwater sample from MW-6 is likely attributable to gasoline. Based on previous soil data collected at wells MW-12 and MW-13, the TPH detected in the 12/2000 groundwater samples from MW-12 and MW-13 is likely attributable to mineral spirits.

LEGEND:

ND	Not Detected Above Reported Analytical Laboratory Detection Limits
J	Indicates An Estimated Value
MW-2 ND (5/00) 1,910 - Kerosene (7/00)	Approximate Overburden Geoprobe Monitoring Well Location With TPH Concentration In Groundwater Sample Recorded In Parts Per Billion (ppb) With Month/Year Sample Collected In Parenthesis
MW-6 7,270 - Gasoline (5/00) 8,430 - Gasoline (12/00) * Note 3	Approximate Overburden/ Bedrock Monitoring Well Location With TPH Concentration In Groundwater Sample Recorded In ppb With Month/Year Sample Collected In Parenthesis

FIELD VERIFIED BY	JAD
DATE	01/2001
DRAWN BY	RJM/Tw
DATE DRAWN	01/16/2001
SCALE	1" = 40'
DATE ISSUED	02/22/2001

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14623-2700

PROJECT TITLE
14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK
SUPPLEMENTAL ENVIRONMENTAL STUDIES

DRAWING TITLE
Cumulative TPH Test Results
For Groundwater Samples

PROJECT NO.
2412S-00

FIGURE 6

SHEET 1 OF 1

DayEnv_AnsiB
11x17

Time Plotted: Thur Feb 22 11:13 2001
File Name: \RoCity\2412\2412-54.dwg

APPENDIX C

Exposure Assessment Report

EXPOSURE ASSESSMENT

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

NYSDEC Spills #0070043 & #0070044

Prepared for:	The City of Rochester 30 Church Street Rochester, New York 14614
Prepared by:	Day Environmental, Inc. 2144 Brighton-Henrietta Town Line Road Rochester, New York 14623
Project No.:	2485R-00
Revised Date:	June 2001

TABLE OF CONTENTS

ATTACHMENTS

1.0 INTRODUCTION

Day Environmental, Inc. (DAY) prepared this report summarizing an exposure assessment conducted for the 14-60 Charlotte Street parcels, City of Rochester, County of Monroe, New York (Site). The location of the Site is shown on Figure 1 (Project Locus Map) and Figure 2 (Site Plan) that are included in Attachment A.

The Site is currently improved with a two-story residential dwelling with a basement on the parcel addressed as 26 Charlotte Street and an approximately 1,800-square foot one-story commercial concrete block slab-on-grade garage located on the parcel addressed as 42 Charlotte Street. The City of Rochester is the current owner of the Site and is planning to redevelop the Site for residential and/or commercial usage.

Under the current City of Rochester plans, the existing residential dwelling and commercial building are to be demolished. Proposed construction plans are currently not available; however, it is anticipated that residential redevelopment on at least part of the Site may consist of construction of a condominium or apartment complex. It is understood that these structures will be constructed without basements.

This exposure assessment included conducting a potential receptor survey. Also, existing soil and groundwater analytical laboratory data were entered into the *RBCA Tool Kit for Chemical Releases* software (Version 1.3) to evaluate potential exposure and associated risk in relation to site contaminants.

DAY previously completed various environmental studies at the Site and in the right-of-ways of Haags Alley and Charlotte Street. These studies are summarized in reports prepared by DAY titled "Supplemental Phase II Environmental Studies, 14-60 Charlotte Street, Rochester, New York" dated November 2000 and " Supplemental Environmental Studies, 14-60 Charlotte Street, Rochester, New York" dated February 2001. These reports identified and documented the existence of soil and groundwater contamination at the Site and in the right-of-way of Haags Alley north of the Site. The contamination identified included light non-aqueous phase liquid (LNAPL) detected in well MW-7 located on the 14-16 Charlotte Street parcel and some contaminants (e.g., light-weight TPH identified as mineral spirits and chlorinated volatile organic compounds) that appear attributable to an off-site source located north of Haags Alley. Properties that could be considered as potential off-site sources of contamination (e.g., historic dry cleaning operations, historic auto painting operations, etc.) are depicted on Figure 2 included in Attachment A.

In April 2000, the City of Rochester notified the New York State Department of Environmental Conservation (NYSDEC) of the preliminary field findings of the environmental studies that were being performed on the Site. The NYSDEC subsequently assigned active spill number NYSDEC Spill #0070043 to the parcels addressed as 26-60 Charlotte Street. A separate active spill number NYSDEC Spill #0070044 was assigned to the parcel addressed as 14-16 Charlotte Street.

2.0 POTENTIAL RECEPTOR SURVEY

On March 19, 2001, DAY representatives monitored the ambient air space within 18 available openings to buried utilities (i.e., sanitary sewer manholes, Rochester Gas & Electric Corp. (RG&E) utility manholes and hand holes (smaller access point to buried electric utility), water valve boxes, and stormwater catch basins) located in the right-of-way on Haags Alley, Charlotte Street and Pitkin Street (designated as locations R-1, R-2, R-4 through R-7, R-9, R-10, R-13, R-15 through R-20, and R-23 through R-25). Buried utility openings were not identified on the Site itself. The locations of these potential receptors are shown on Figure 3 included in Attachment A.

A MiniRae Model 2000 photoionization detector (PID) equipped with a 10.6 eV lamp, and a Gastech Model GT201 explosimeter (O_2/LEL meter) were used to monitor the air quality inside these potential receptors. The cover to each monitoring location (e.g., manhole cover, etc.) was cracked/jarred open and the air monitoring equipment probes were immediately inserted into interior air space. The purpose of the potential receptor survey was to provide an initial indication of whether volatile organic vapors, such as those found in petroleum products, solvents, etc. have impacted the buried utilities.

The locations of these potential receptors and the measured peak PID readings in parts per million (ppm), the measured oxygen (O_2) readings measured as a percentage (%) and the lower explosive limits (LEL) measured as a percentage (%) are shown on Figure 3 included in Attachment A and are summarized on Table 1 included in Attachment B. As shown, peak PID readings ranged between 0.0 ppm and 0.5 ppm, with the exception of 1.8 ppm, which was measured at location R-2. Location R-2 is a utility vault located hydraulically upgradient from the Site. Oxygen concentrations measured at the 18 locations ranged between approximately 21% and 22%. LEL concentrations, using the 5% gas range, were measured at 0% at each location.

Evidence of contamination (e.g., odors, free product, meter readings outside typical background ranges) attributable to an on-site (or off-site) source was not identified within the buried utilities located in proximity to the Site that were monitored during this receptor survey. Only the peak PID reading of 1.8 ppm measured in the utility vault in Haags Alley (i.e., location R-2) suggests the possibility of impact. Location R-2 is situated hydraulically upgradient from the Site.

3.0 TIER 2 EVALUATION

To assess various potential future uses and redevelopment of the Site, the Groundwater Services, Inc. (GSI) software program titled "RBCA Tool Kit for Chemical Releases, Version 1.3" (RBCA Tool Kit) was used to generate site-specific target levels (SSTLs) and evaluate potential exposure scenarios and risks posed by selected site contaminants in relation. The RBCA Tool Kit integrates risk assessment and exposure practices as suggested by the United States Environmental Protection Agency (USEPA). This software was used to perform "Tier 2" evaluations of various site-specific data sets.

The RBCA Tool Kit contains numerous default values. When available, NYSDEC default values for variables were used in lieu of the software program's default values. The NYSDEC default values used were obtained from the NYSDEC document titled "Guidelines for Spill Inactivation" dated February 23, 1998. In addition, site-specific actual values (e.g., average depth to top of water table, etc.) replaced program default values or NYSDEC default values when available.

The primary objectives of the Tier 2 evaluation were to:

- identify potential contaminant transport/migration pathways at the Site;
- identify potential contaminant exposure pathways and receptors; and
- evaluate the effects of the contamination present at the Site upon human health and the environment in relation to future proposed redevelopment and land uses in the absence of remedial activities or the implementation of environmental engineering controls.

3.1 General Information

The contamination at the Site appears attributable to:

- on-site and off-site sources of affected surface soils (i.e., under construction worker scenario);
- affected subsurface soils; and
- affected groundwater.

Likely transport mechanisms that lead to identified exposure media include:

- wind erosion; and
- volatilization that incur atmospheric dispersion or enclosed space accumulation.

Exposure media include:

- soil dermal contact and ingestion; and
- air inhalation of vapor and/or particulates.

Potential receptors that were evaluated during this exposure assessment include:

- on-site residential occupants;
- on-site or off-site commercial occupants; and
- construction workers.

Between 1997 and 2000, DAY completed various subsurface studies at the Site. The soil and groundwater quality data, and Site characteristics data obtained during the this work were used in this exposure assessment. Contaminated media encountered at the Site includes fill, subsurface soil and groundwater. Dissolved compounds were detected in the groundwater samples tested, and LNAPL was detected in well MW-7 on the 14-16 Charlotte Street parcel. Groundwater is not used as a potable water supply at, or in proximity to, the Site.

Constituents evaluated as part of this exposure assessment included detected heavy metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and total petroleum hydrocarbons (TPH). The highest detected concentrations of these constituents were used in the RBCA Tool Kit program. [Note: The following constituents detected at the Site are not included in the RBCA Tool Kit program library: n-propylbenzene; 1,3,5-trimethylbenzene; 1,2,4-trimethylbenzene; p-isopropylbenzene; sec-butylbenzene; isopropylbenzene; and tert-butylbenzene. As such, these constituents were not be evaluated during this exposure assessment.]

The RBCA Tool Kit program incorporates TPH into the RBCA framework by separating the TPH into representative fractions with similar physical, chemical and toxilogical characteristics. The laboratory director at Paradigm Environmental Services, Inc. (Paradigm) indicated that TPH is comprised of aliphatic and aromatic components. As suggested by the Paradigm laboratory director, the highest concentration of light-weight TPH detected in soil or groundwater samples from the area being evaluated was used in the RBCA Tool Kit program for aliphatic and aromatic TPH ranging between C05 and C12. The highest concentration of medium-weight TPH detected in soil or groundwater samples from the area being evaluated was used in the RBCA Tool Kit program for aliphatic and aromatic TPH ranging between C10 and C18. The highest concentration of heavy-weight TPH detected in soil or groundwater samples from the area being evaluated was used in the RBCA Tool Kit program for aliphatic and aromatic TPH ranging between C20 and higher. When there was overlap between light-weight, medium-weight or heavy-weight concentrations for the range of TPH (i.e., C10 to C12) being entered, the higher TPH concentration was used in the RBCA Tool Kit program.

The following scenarios for the Site were evaluated as part of this exposure assessment (refer to Sections 3.2, 3.3 and 3.4):

- exposure to inorganic contaminants (i.e., heavy metals) for the 14-60 Charlotte Street parcels with the receptors identified as on-site residential occupants and construction workers and off-site commercial occupants;
- exposure to organic contaminants (primarily petroleum-related compounds) for the 14-16 Charlotte Street parcel with the receptors identified as on-site residential occupants and construction workers and off-site commercial occupants;

- exposure to organic contaminants (primarily petroleum-related compounds) for the 14-16 Charlotte Street parcel with the receptors identified as on-site commercial occupants and construction workers and off-site commercial occupants;

- exposure to organic contaminants (primarily petroleum-related compounds) for the 26-60 Charlotte Street parcels with the receptors identified as on-site residential occupants and construction workers and off-site commercial occupants.

The findings of each scenario are further described in the subsections below. The following Tier 2 Output data sheets are included in Attachment C, Attachment D and Attachment E of this report for the four exposure scenarios that were evaluated.

- Exposure Pathway Flowchart. This flowchart depicts the source media, transport mechanisms, exposure media and receptors pathway for exposure to COCs detected in soil, fill or groundwater in the area being evaluated.

- Chemical Data for Selected COCs (physical property data table). This table depicts the physical property data for the COCs that were detected in the areas being evaluated.

- Chemical Data for Selected COCs (toxicity data table). This table depicts the toxicity data for the COCs that were detected in the area being evaluated.

- Chemical Data for Selected COCs (miscellaneous chemical data tables). These two tables depict miscellaneous chemical data for the COCs that were detected in the area being evaluated.
- Representative COC Concentrations in Source Media table. This table depicts the highest concentrations (i.e., worst case) of COCs detected in samples from the area being evaluated.

- RBCA Site Assessment (Baseline Risk Summary Table - All Pathways). This table depicts whether the baseline carcinogenic risk limits and baseline toxicity limits have been exceeded for the complete exposure pathways that are evaluated.

- RBCA Site Assessment (Soil SSTL Values Table). This table depicts whether the site-specific target levels that are calculated for various complete exposure pathways have been exceeded for the COCs in soil samples that are evaluated.

- RBCA Site Assessment (Groundwater SSTL Values Table). This table depicts whether the site-specific target levels (SSTLs) that are calculated for various complete exposure pathways have been exceeded for the COCs in groundwater samples that are evaluated.

3.2 Inorganic Metal Contaminants (14-60 Charlotte Street)

Under this Tier 2 evaluation, the highest concentrations of heavy metals detected in soil or fill samples from the 14-60 Charlotte Street parcels were entered into the program. Elevated concentrations of heavy metals appear attributable to the fill material at the Site (i.e., generally located from the ground surface to a depth of about four feet). Based on this distribution, SSTLs and exposure risks for on-site residential occupants, off-site commercial occupants and on-site construction workers were evaluated.

As shown on the Tier 2 Output data sheets included in Attachment C, the highest concentration of arsenic detected in soil or fill at the Site (i.e., 23 mg/Kg) exceeded its applicable SSTL for surface soil inhalation, ingestion, and dermal contact to future residential occupants (i.e., 11 mg/Kg). The baseline carcinogenic risk limit for the soil exposure pathway was exceeded. SSTLs were not exceeded for on-site construction workers or off-site commercial occupants.

3.3 Organic Contaminants (14-16 Charlotte Street)

Under this Tier 2 evaluation, the highest concentrations of organic constituents (i.e., VOCs, SVOCs and TPH) detected in soil, fill and groundwater samples from the 14-16 Charlotte Street parcels were entered into the program. Thereafter, the SSTLs and exposure risks for on-site residential occupants, off-site commercial occupants and on-site construction workers were evaluated. Also, SSTLs and exposure risks for on-site commercial occupants, off-site commercial occupants and on-site construction workers were evaluated. The two Tier 2 Output data sheet sets for these evaluations are included in Attachment D.

The highest detected concentrations of TPH entered as aliphatic C10-C16 and aromatic C05-C16 detected in soil or fill on the 14-16 Charlotte Street parcel exceeded their applicable SSTLs for:

- surface soil inhalation, ingestion, and dermal contact to future residential occupants, commercial occupants and construction workers; and
- soil volatilization to indoor air for residential or commercial occupants.

The C10-C16 TPH concentration (designated as diesel fuel) used in the model was detected in a saturated soil sample from well MW-7. The C05-C10 TPH concentration (designated as kerosene) used in the model was detected in an unsaturated soil sample from test boring TB-4 (located in proximity to former gasoline USTs that were removed by the City of Rochester).

The highest detected concentrations of benzene and TPH entered as aromatic C05-C07, Aromatic C10-C12 or Aliphatic C08-C10 detected in groundwater on the 14-16 Charlotte Street parcel exceeded their applicable SSTLs for:

- groundwater volatilization to indoor air for residential or commercial occupants.

The benzene concentration and C05-C10 TPH concentration (designated as gasoline) used in the model were detected in groundwater at well MW-6 (located in proximity to former gasoline USTs that were removed by the City of Rochester). The C10-C12 TPH concentration (designated as diesel fuel) used in the model was detected in groundwater at well MW-7.

With the exception of benzene in groundwater, concentrations of specific VOCs and SVOCs detected at the Site that were entered into the model did not exceed their applicable soil or groundwater SSTLs.

SSTLs were not exceeded for off-site commercial occupants.

The baseline carcinogenic risk limit for the indoor air exposure pathway was exceeded. The baseline toxicity limits for the outdoor air exposure pathway, the indoor air exposure pathway, and the soil exposure pathway were exceeded.

3.4 Organic Contaminants (26-60 Charlotte Street)

Under this Tier 2 evaluation, the highest concentrations of organic constituents (i.e., VOCs, SVOCs and TPH) detected in soil, fill and groundwater samples from the 26-60 Charlotte Street parcels were entered into the program. SSTLs and exposure risks for on-site residential occupants, off-site commercial occupants and on-site construction workers were evaluated. The Tier 2 Output data sheets for this evaluation are included in Attachment E.

The highest detected concentration of benzene in soil or fill on the 26-60 Charlotte Street parcels exceeded its applicable SSTL for:

- soil volatilization to indoor air for residential occupants.

The benzene concentration used in the model was detected in a saturated soil sample from test pit TP-8 on the 48-60 Charlotte Street parcel.

The highest detected concentration of TPH entered as aromatic C05-C10 detected in soil or fill on the 26-60 Charlotte Street parcels exceeded its applicable SSTL for:

- surface soil inhalation, ingestion, and dermal contact to future residential occupants and construction workers;
- soil volatilization to indoor air for residential occupants; and
- soil volatilization and surface soil particulates to outdoor air for residential occupants and off-site commercial occupants.

The C05-C10 TPH concentration (designated as paint thinner or Stoddard solvent) used in the model was detected in a saturated soil sample from test pit TP-3 on the 48-60 Charlotte Street parcel.

The highest detected concentration of TPH entered as aromatic C10-C12 detected in soil or fill on the 26-60 Charlotte Street parcels exceeded its applicable SSTL for:

- soil volatilization to indoor air for residential occupants.

The C10-C12 TPH concentration (designated as diesel fuel) used in the model was detected in an unsaturated soil sample from test boring TB-8 on the 28-30 Charlotte Street parcel.

The highest detected concentration of TPH entered as aliphatic C08-C10 detected in groundwater on the 26-60 Charlotte Street parcel exceeded its applicable SSTL for:

- groundwater volatilization to indoor air for residential occupants.

The C08-C10 TPH concentration (designated as mineral spirits) used in the model was detected in groundwater at well location MW-3.

With the exception of benzene in groundwater, concentrations of specific VOCs and SVOCs detected at the Site that were entered into the model did not exceed their applicable soil or groundwater SSTLs.

The baseline carcinogenic risk limit for the indoor air exposure pathway was exceeded. The baseline toxicity limits for the outdoor air exposure pathway, the indoor air exposure pathway, and the soil exposure pathway were also exceeded.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions of this exposure assessment and the recommendations in relation to mitigating exposures so that the Site can be redeveloped are provided in this section of the report.

Conclusions

The air quality of the ambient air within 18 available openings to buried utilities located in the right-of-ways of Haags Alley, Charlotte Street and Pitkin Street was monitored as part of a potential receptor survey. Buried utility openings were not identified on the Site itself. The ambient air at these locations was monitored with a PID meter and O_2/LEL meter. The test results appear to indicate that contaminants attributable to on-site or off-site sources are not impacting the ambient air inside the buried utilities that were monitored, with the possible exception the utility vault located in Haags Alley in proximity to location R-2 (i.e., peak PID reading of 1.8 ppm measured at this location, which is hydraulically upgradient of the Site).

Exposure risks for selected constituents detected at the Site were evaluated using the RBCA Tool Kit for Chemical Releases software program to evaluate whether there is a potential for unacceptable exposures to constituents if the Site were to be redeveloped without conducting remediation or implementing environmental engineering controls. Based on this exposure assessment, the SSTLs for the highest ("worst case") concentrations of various constituents in soil, fill or groundwater at the Site were exceeded for one or more of the following exposure pathways:

- surface soil inhalation, ingestion, and dermal contact;
- soil volatilization to indoor air;
- soil volatilization and surface soil particulates to outdoor air; and
- groundwater volatilization to indoor air.

The baseline carcinogenic risk limit for the indoor air exposure pathway was exceeded for some constituents. The baseline toxicity limits for: the outdoor air exposure pathway; the indoor air exposure pathway; and the soil exposure pathway were also exceeded for some constituents.

The specific contaminants detected in soil, fill or groundwater where exceedances were identified include:

- The heavy metal arsenic in fill potentially throughout the Site (i.e., impacts to future on-site residential occupants and/or construction workers). Arsenic appears to be attributable to the surficial fill present from the ground surface to a depth of about four feet at the Site.
- Benzene and various weights of TPH on the 14-16 Charlotte Street parcel (i.e., impacts to on-site residential or commercial occupants and/or construction workers). The benzene appears attributable to the former gasoline USTs that were removed from the Site. The TPH appears attributable to potential on-site and/or off-site sources that have not been fully identified.
- Benzene and various weights of TPH on the 26-60 Charlotte Street parcels (i.e., impacts to on-site residential occupants, constructions workers, or off-site commercial occupants). Some of the constituents (e.g., TPH identified as mineral spirits, Stoddard solvent and/or paint thinner) appear attributable to an off-site source(s) located north of Haags Alley.

Recommendations

Based on the findings of the exposure assessment work conducted, a combination of remedial actions and environmental engineering controls should be implemented if the Site is to be redeveloped for residential and/or commercial uses.

Under current City of Rochester plans, the existing residential dwelling and commercial building are to be demolished and the Site redeveloped for residential use. It is currently anticipated that the residential redevelopment will consist of construction of a condominium or apartment complex. This complex will be constructed without basements. Based upon the above considerations, the following recommendations are provided to eliminate or reduce exposure pathways to the contamination or remove areas of contamination at the Site that exceeds SSTLs:

- Removal of on-site sources of petroleum contamination generally in the unsaturated zone;
- Development of an environmental management plan (EMP), including a health and safety plan (HASP);
- Implementation of environmental engineering controls such as vapor barriers, passive or active venting systems, etc. on proposed new buildings and areas of the Site that are not covered by the new buildings;
- Implementation of institutional controls (e.g., City of Rochester flagging system);
- Evaluation of subsurface conditions beneath the existing buildings during their demolition;
- Performance of environmental monitoring (air monitoring with a PID and particulate meter; visual observations; etc.) during activities that would potentially disturb contaminated media;
- Implementation of a long-term monitoring program; and
- Removal of the free product encountered at well MW-7.

These recommendations are the same as those identified in the Supplemental Environmental Studies report (DAY File #2412S-00) dated February 2001. It is anticipated that these recommendations will be addressed further in a corrective action plan (CAP) for the Site.

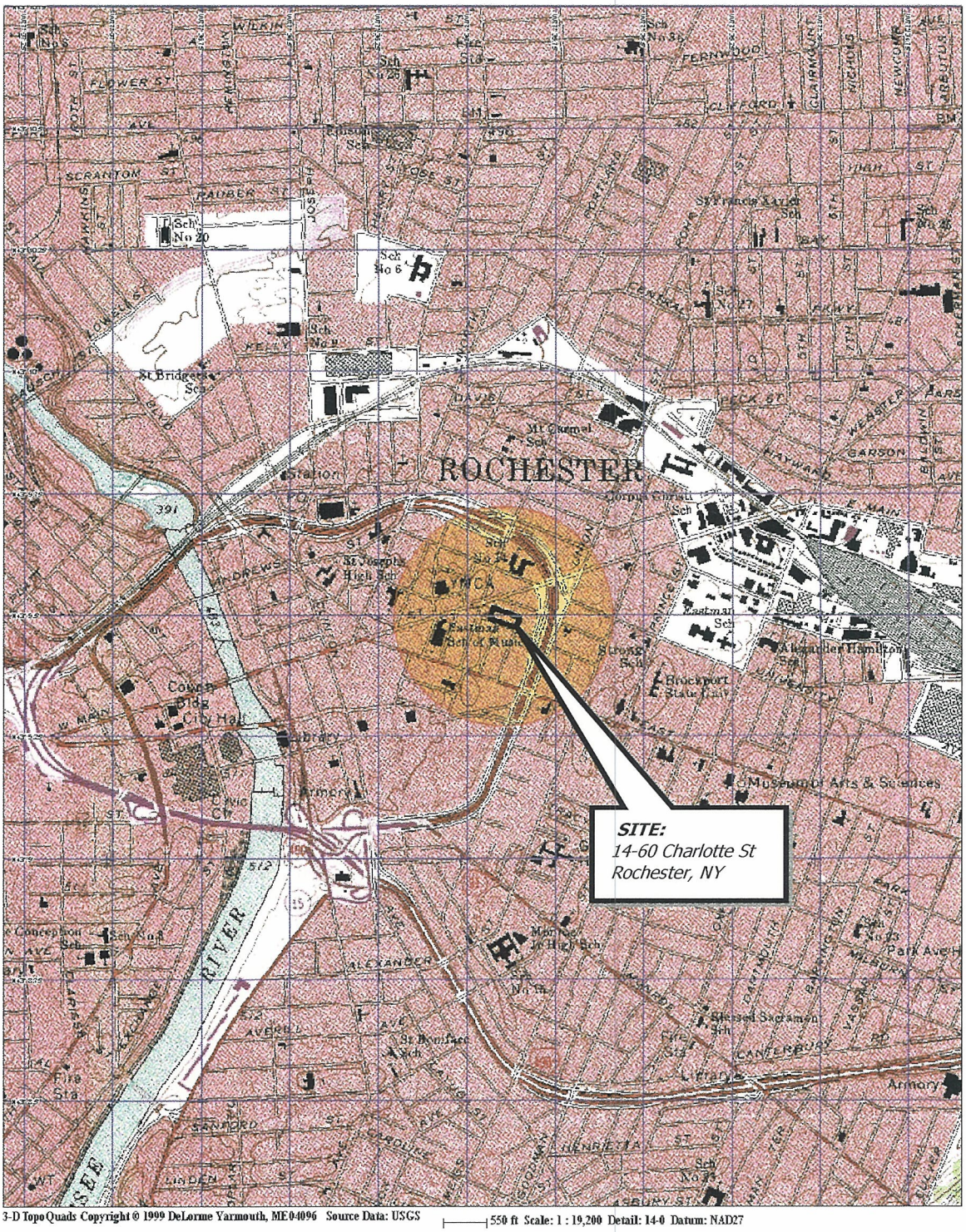
The NYSDEC and the Monroe County Department of Health (MCDOH) should continue to be involved with this project, and they should be provided a copy of this exposure assessment. The specific actions (i.e., remediation and elimination of complete exposure pathways through implementation of environmental engineering controls, etc.) required to address the contamination with the assumption that the Site will be redeveloped for residential use will be dependent upon NYSDEC and MCDOH input.

5.0 ABBREVIATIONS

CAP	Corrective Action Plan
DAY	Day Environmental, Inc.
EMP	Environmental Management Plan
GSI	Groundwater Services, Inc.
HASP	Health and Safety Plan
LEL	Lower Explosive Limit
LNAPL	Light Non-Aqueous Phase Liquid
mg/Kg	Milligrams Per Killigrams
MCDOH	Monroe County Department of Health
NYSDEC	New York State Department of Environmental Conservation
O_2	Oxygen
PID	Photoionization Detector
ppm	Parts Per Million
RG&E	Rochester Gas & Electric Corporation
SSTL	Site Specific Target Level
SVOC	Semi-Volatile Organic Compound
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

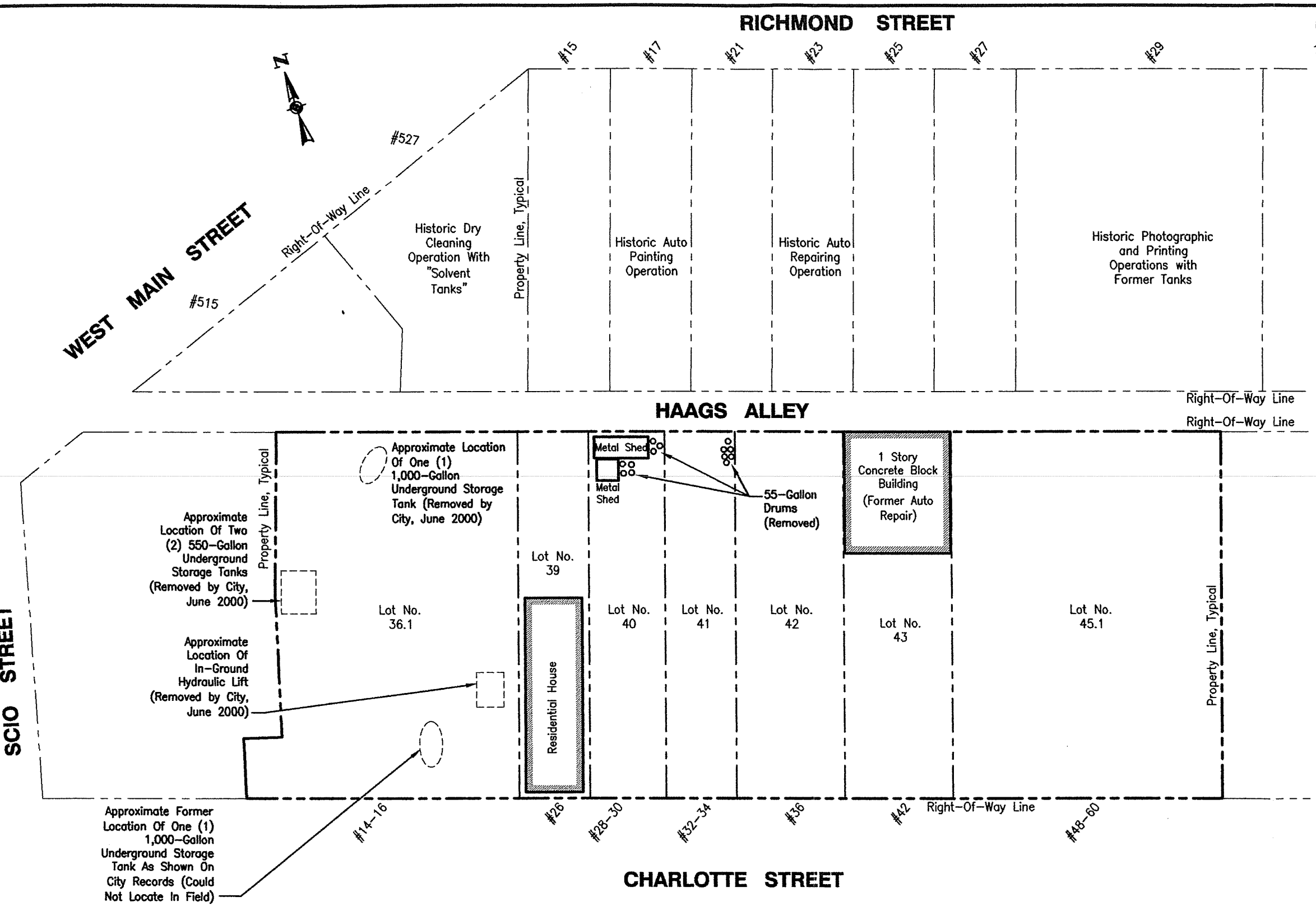
ATTACHMENT A

Figures



Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad map Rochester East (NY) 1995. Site Lat/Long: N43d-9.50' – W77d-35.90'

DATE 04/11/2001 DRAWN BY Jad SCALE 1" = 2000'	day DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008	PROJECT TITLE 14-60 CHARLOTTE STREET ROCHESTER, NEW YORK EXPOSURE ASSESSMENT DRAWING TITLE PROJECT LOCUS MAP	PROJECT NO. 2485R-00 FIGURE 1



SITE PLAN
1" = 40'

NOTES:

1. Site plan produced from a tax map of The City Of Rochester.

FIELD VERIFIED BY	DATE
JAD	02/2001
DRAWN BY	DATE DRAWN
Tww	04/12/2001
SCALE	DATE ISSUED
1" = 40'	04/12/2001

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14623-2700

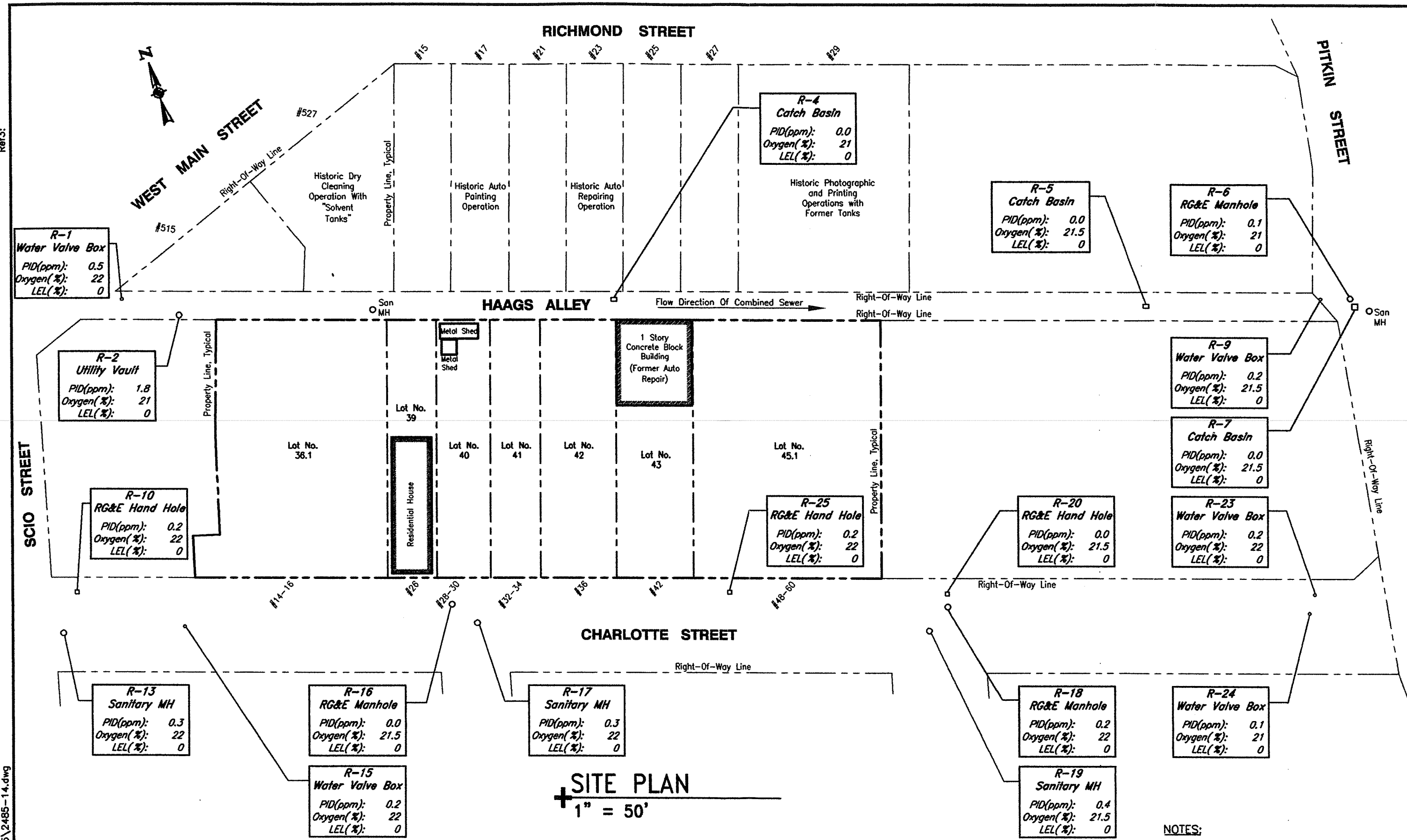
PROJECT TITLE
14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK
EXPOSURE ASSESSMENT

DRAWING TITLE
Site Plan

PROJECT NO.
2485R-00

FIGURE 2

SHEET 1 OF 1



SITE PLAN
1" = 50'

LEGEND:

PID(ppm) Photoionization Detector (PID) reading recorded in Parts Per Million (ppm) measured using a RAE Systems Minirae 2000 with a 10.6 eV lamp

Oxygen(%) Oxygen reading recorded in percent measured using a Gastec Model GT201

LEL(%) Lower Explosive Limit (LEL) reading recorded in percent measured using a Gastec Model GT201

NOTES:

1. Site plan produced from a tax map of The City Of Rochester.
2. Locations of receptor monitoring points tape-measured from existing site structures, and are considered accurate to the degree implied by the method used.

FIELD VERIFIED BY	ARF
DATE	03/2001
DRAWN BY	Tww
DATE DRAWN	03/23/2001
SCALE	1" = 50'
DATE ISSUED	06/19/2001

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14623-2700

PROJECT TITLE
14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK
EXPOSURE ASSESSMENT

DRAWING TITLE
Potential Receptor Monitoring Location Plan

PROJECT NO.
2485R-00

FIGURE 3

SHEET 2 OF 2

Ref1: SiteBase-2.dwg
Ref2: 2485-15.dwg
Ref3:

Time Plotted: Tue June 19 11:55 2001
File Name: \RoCity\2412\2485\2485-14.dwg

DayEnv_AnsiB
11x17

ATTACHMENT B

Table 1

Table 1

Potential Receptor Survey Results
14-60 Charlotte Street Project
Right-of-Ways for Haags Alley, Charlotte Street and Pitkin Street
Rochester, New York

Sample Location	Field Location	PID Test Results in ppm	Oxygen Test Results in %	LEL Test Results in %
R-1	water valve box	0.5	22	0
R-2	utility vault	1.8	21	0
R-4	stormwater catch basin	0.0	21	0
R-5	stormwater catch basin	0.0	21.5	0
R-6	RG&E utility manhole	0.1	21	0
R-7	stormwater catch basin	0.0	21.5	0
R-9	water valve box	0.2	21.5	0
R-10	RG&E utility manhole	0.2	22	0
R-13	sanitary manhole	0.3	22	0
R-15	water valve box	0.2	22	0
R-16	RG&E utility manhole	0.0	21.5	0
R-17	sanitary manhole	0.3	22	0
R-18	RG&E utility manhole	0.2	22	0
R-19	sanitary manhole	0.4	21.5	0
R-20	RG&E hand hole	0.0	21.5	0
R-23	water valve box	0.2	22	0
R-24	water valve box	0.1	21	0
R-25	RG&E hand hole	0.2	22	0

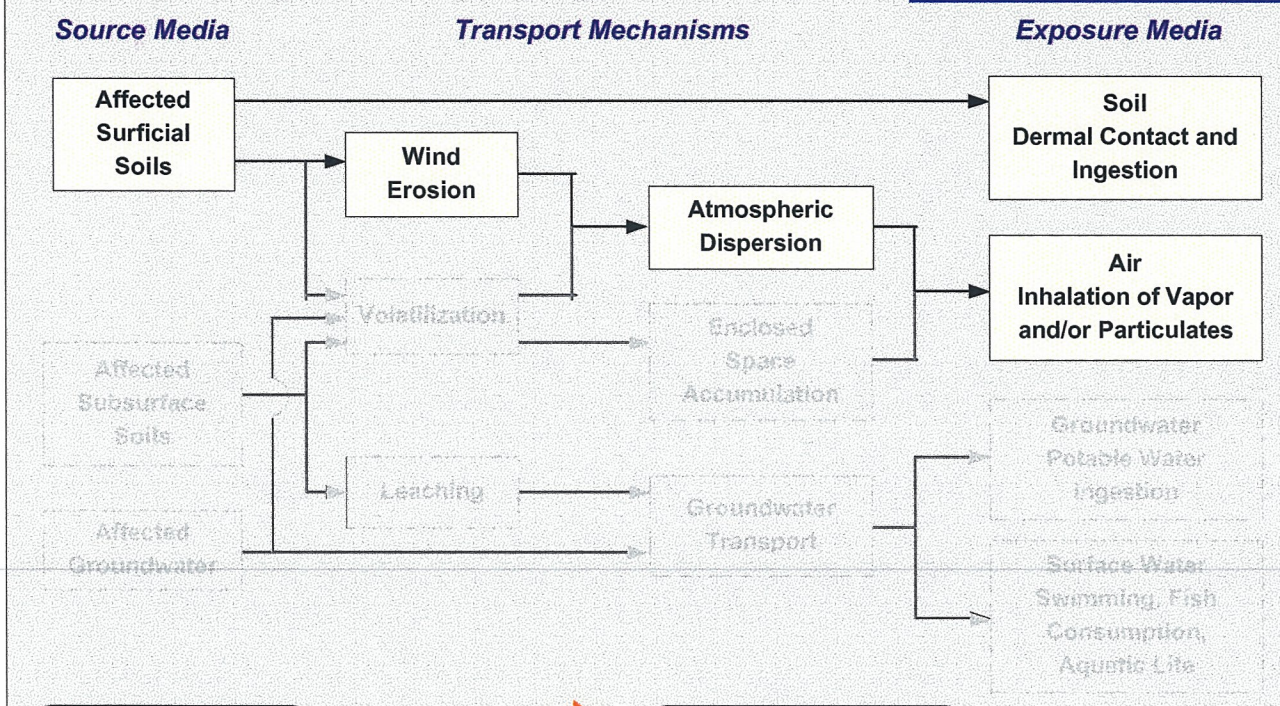
ATTACHMENT C

Tier 2 Output Data Sheets

Inorganic Metals (14-60 Charlotte Street)

Exposure Pathway Flowchart

Site Name: INORGANICS-Res. Use and Const. WorkerJob ID: 2485R-00
Location: 14-60 Charlotte Street, Rochester, New York Date: 15-Jun-01
Compl. By: Day Environmental, Inc.



Receptors	On-site	Off-site1	Off-site2
	Res./Constr.	*NA*	*NA*
Outdoor Air:	*Res./Constr.*	*Commercial*	*None*
Indoor Air	None	NA	NA
	None	None	None
	NA	NA	NA

SOURCE → TRANSPORT → RECEPTOR

Commands and Options

Main Screen | Print Sheet | Help

RBCA SITE ASSESSMENT

Site Name: INORGANICS-Res. Use and Const. Worker
Completed By: Day Environmental, Inc.
Job ID: 2485R-00
Site Location: 14-60 Charlotte Street, Rochester, New York
Date Completed: 15-Jun-01

SOIL (0 - 4.5 ft) SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-6
Target Hazard Quotient 1.0E+0
Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways ("X" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	Soil Leaching to Groundwater Ingestion / Discharge to Surface Water			Soil Vol. to Indoor Air	X Surface Soil Particulates to Outdoor Air				X Surface Soil Inhalation, Ingestion,Dermal Contact		Applicable SSTL	SSTL Exceeded ?	Required CRF
			On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)	On-site (0 ft)		Off-site 1 (15 ft)	Off-site 2 (0 ft)	On-site (0 ft)				Only if "yes" left
CAS No.	Name	(mg/kg)	None	None	None	None	Residential	Construction Worker	Commercial	None	Residential	Construction Worker	(mg/kg)	"■" if yes	
7440-38-2	Arsenic	2.3E+1	NA	NA	NA	NA	3.4E+4	3.6E+6	3.4E+4	NA	1.1E+1	5.1E+2	1.1E+1	■	2.1E+0
7440-39-3	Barium	1.8E+2	NA	NA	NA	NA	>1.5E+7	>1.5E+7	>1.5E+7	NA	5.0E+5	7.6E+5	5.0E+5	□	<1
7440-43-9	Cadmium	1.1E+1	NA	NA	NA	NA	8.3E+4	8.7E+6	8.3E+4	NA	3.6E+3	5.5E+3	3.6E+3	□	<1
16065-83-1	Chromium (III)	2.3E+1	NA	NA	NA	NA	NC	NC	NC	NA	NC	NC	NC	□	NA
7439-97-6	Mercury	5.8E-1	NA	NA	NA	NA	>4.3E+0	>4.3E+0	>4.3E+0	NA	2.2E+3	3.3E+3	2.2E+3	□	<1
7782-49-2	Selenium	1.4E+0	NA	NA	NA	NA	NC	NC	NC	NA	NC	NC	NC	□	NA

">" indicates risk-based target concentration greater than constituent residual saturation value. NA = Not applicable. NC = Not calculated.

RBCA SITE ASSESSMENT | **Baseline Risk Summary-All Pathways**

Site Name: INORGANICS-Res. Use and Const. Worker
Site Location: 14-60 Charlotte Street, Rochester, New York
Completed By: Day Environmental, Inc.
Date Completed: 15-Jun-01

TIER 2 BASELINE RISK SUMMARY TABLE

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk	Hazard Quotient		Hazard Index		Toxicity
EXPOSURE PATHWAY	Maximum Value	Target Risk	Total Value	Target Risk	Limit(s) Exceeded?	Maximum Value	Applicable Limit	Total Value	Applicable Limit	Limit(s) Exceeded?
OUTDOOR AIR EXPOSURE PATHWAYS										
Complete:	6.7E-10	1.0E-6	8.0E-10	1.0E-6	☐	5.8E-6	1.0E+0	5.8E-6	1.0E+0	☐
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
SOIL EXPOSURE PATHWAYS										
Complete:	2.1E-6	1.0E-6	2.1E-6	1.0E-6	■	1.1E-2	1.0E+0	1.4E-2	1.0E+0	☐
GROUNDWATER EXPOSURE PATHWAYS										
Complete:	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
SURFACE WATER EXPOSURE PATHWAYS										
Complete:	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)										
	2.1E-6	***1.0E-6***	***2.1E-6***	***1.0E-6***	■	***1.1E-2***	***1.0E+0***	***1.4E-2***	***1.0E+0***	☐
	Soil		***Soil***			***Soil***		***Soil***		

CHEMICAL DATA FOR SELECTED COCs

Physical Property Data

Constituent	CAS Number	type	Molecular Weight (g/mole) MW	ref	Diffusion Coefficients in air (cm2/s) Dair	ref	in water (cm2/s) Dwat	ref	log (Koc) or log(Kd) (@ 20 - 25 C) log(L/kg)	partition	ref	Henry's Law Constant (@ 20 - 25 C) (atm-m3) mol	(unitless)	ref	Vapor Pressure (@ 20 - 25 C) (mm Hg)	ref	Solubility (@ 20 - 25 C) (mg/L)	ref	acid pKa	base pKb	ref
Arsenic	7440-38-2	N	74.9	4	0.00E+00	-	0.00E+00	-	f(pH)	Kd	24	0.00E+00	0.00E+00	-	0.00E+00	14	4.41E+05	27	-	-	-
Barium	7440-39-3	N	137.33	31	0.00E+00	-	0.00E+00	-	f(pH)	Kd	30	0.00E+00	0.00E+00	-	0.00E+00	-	3.80E+05	23	-	-	-
Cadmium	7440-43-9	N	112.41	PS	0.00E+00	-	0.00E+00	-	1.88	Kd	PS	0.00E+00	0.00E+00	PS	0.00E+00	PS	6.51E+05	27	-	-	-
Chromium (III)	16065-83-1	N	52	-	0.00E+00	-	0.00E+00	-	f(pH)	Kd	30	0.00E+00	0.00E+00	-	0.00E+00	-	1.67E+05	27	-	-	-
Mercury	7439-97-6	N	200.59	PS	3.07E-02	PS	6.30E-06	PS	1.72	Kd	PS	1.14E-02	4.70E-01	PS	2.00E-03	PS	8.13E-02	PS	-	-	-
Selenium	7782-49-2	N	78.96	-	0.00E+00	-	0.00E+00	-	f(pH)	Kd	30	0.00E+00	0.00E+00	-	0.00E+00	14	3.41E+05	28	-	-	-

Site Name: INORGANICS-Res. Use and Const. Worker

Site Location: 14-60 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.

Date Completed: 15-Jun-01

Job ID: 2485R-00

CHEMICAL DATA FOR SELECTED COCs

Toxicity Data

Constituent	Reference Dose (mg/kg/day) Oral RfD_oral	ref	Reference Dose (mg/kg/day) Dermal RfD_dermal	ref	Reference Conc. (mg/m3) Inhalation RfC_inhal	ref	Slope Factors 1/(mg/kg/day) Oral SF_oral	ref	Slope Factors 1/(mg/kg/day) Dermal SF_dermal	ref	Unit Risk Factor 1/(µg/m3) Inhalation URF_inhal	ref	EPA Weight of Evidence	Is Constituent Carcinogenic ?
Arsenic	3.00E-04	R	-	-	-	-	1.50E+00	R	7.50E+00	TX	4.31E-03	R	A	TRUE
Barium	7.00E-02	R	4.90E-03	TX	4.90E-04	R	-	-	-	-	-	-	D	-
Cadmium	5.00E-04	PS	-	-	2.20E+01	31	-	-	-	-	1.80E-03	PS	B1	TRUE
Chromium (III)	1.50E+00	R	1.95E-02	TX	-	-	-	-	-	-	-	-	-	FALSE
Mercury	3.00E-04	PS	2.10E-05	TX	3.00E-04	PS	-	-	-	-	-	-	D	FALSE
Selenium	5.00E-03	R	2.50E-03	TX	-	-	-	-	-	-	-	-	D	FALSE

Site Name: INORGANICS-Res.

Site Location: 14-60 Charlott

Miscellaneous Chemical Data

Constituent	Maximum Contaminant Level MCL (mg/L)	ref	Time-Weighted Average Workplace Criteria TWA (mg/m3)	ref	Aquatic Life Prot. Criteria AQL (mg/L)	ref	Biocon-centration Factor (L-wat/kg-fish)
Arsenic	5.00E-02	50 FR 46936 (13 Nov 85)	2.00E-03	NIOSH	3.60E-01	33	1
Barium	2.00E+00	-	5.00E-01	NIOSH	-	-	1
Cadmium	5.00E-03	56 FR 3526 (30 Jan 91)	2.00E-01	PS	3.70E-03	33	1
Chromium (III)	1.00E-01	56 FR 3526 (30 Jan 91)	5.00E-01	NIOSH	5.50E-01	33	1
Mercury	2.00E-03	56 FR 3526 (30 Jan 91)	2.50E-02	PS	2.10E-03	33	1
Selenium	5.00E-02	56 FR 3526 (30 Jan 91)	2.00E-01	OSHA	2.00E-02	33	1

Site Name: INORGANICS-Res.

Site Location: 14-60 Charlott

CHEMICAL DATA FOR SELECTED COCs

Miscellaneous Chemical Data

Constituent	Dermal Relative Absorp. Factor (unitless)	Water Dermal Permeability Data: Dermal Permeability Coeff. (cm/hr)	Lag time for Dermal Exposure (hr)	Critical Exposure Time (hr)	Relative Contr of Derm Perm Coeff (unitless)	Water/Skin Derm Adsorp Factor (cm/event)	ref	Detection Limits: Groundwater (mg/L)	ref	Soil (mg/kg)	ref	Half Life (First-Order Decay) (days): Saturated	Unsaturated	ref
Arsenic	0	0.001	-	-	-	3.0E-3	D	0.01	S	0.053	S	-	-	-
Barium	0	-	-	-	-	-	-	0.1	34	-	-	-	-	-
Cadmium	0	0.001	-	-	-	3.0E-3	D	0.001	S	0.004	S	-	-	-
Chromium (III)	0	0.001	-	-	-	3.0E-3	D	0.01	S	0.007	S	-	-	-
Mercury	0	-	-	-	-	-	-	0.0002	34	-	-	-	-	-
Selenium	0	0.001	-	-	-	3.0E-3	D	0.02	S	0.075	S	-	-	-

Site Name: INORGANICS-Res.

Site Location: 14-60 Charlott

RBCA SITE ASSESSMENT

Input Parameter Summary

Site Name: INORGANICS-Res. Use and Const. Worker
Site Location: 14-60 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.
Date Completed: 15-Jun-01

Job ID: 2485R-00

Exposure Parameters		Residential			Commercial/Industrial	
		Adult	(1-6yrs)	(1-16 yrs)	Chronic	Construc.
AT_c	Averaging time for carcinogens (yr)	70				
AT_n	Averaging time for non-carcinogens (yr)	30			25	1
BW	Body weight (kg)	70	15	35	70	
ED	Exposure duration (yr)	30	6	16	25	1
τ	Averaging time for vapor flux (yr)	30			25	1
EF	Exposure frequency (days/yr)	350			250	100
EF_D	Exposure frequency for dermal exposure	350			250	
IR_w	Ingestion rate of water (L/day)	2			1	
IR_s	Ingestion rate of soil (mg/day)	10.15	69.7		58.6	23.4
SA	Skin surface area (dermal) (cm^2)	1700		2023	1700	1700
M	Soil to skin adherence factor	0.5				
ET_{swim}	Swimming exposure time (hr/event)	3				
EV_{swim}	Swimming event frequency (events/yr)	12	12	12		
IR_{swim}	Water ingestion while swimming (L/hr)	0.05	0.5			
SA_{swim}	Skin surface area for swimming (cm^2)	23000		8100		
IR_{fish}	Ingestion rate of fish (kg/yr)	0.025				
FI_{fish}	Contaminated fish fraction (unitless)	1				

Complete Exposure Pathways and Receptors	On-site	Off-site 1	Off-site 2
Groundwater:			
Groundwater Ingestion	None	None	None
Soil Leaching to Groundwater Ingestion	None	None	None
Applicable Surface Water Exposure Routes:			
Swimming			NA
Fish Consumption			NA
Aquatic Life Protection			NA
Soil:			
Direct Ingestion and Dermal Contact	Res./Constr.		
Outdoor Air:			
Particulates from Surface Soils	Res./Constr.	Commercial	None
Volatilization from Soils	None	None	None
Volatilization from Groundwater	None	None	None
Indoor Air:			
Volatilization from Subsurface Soils	None	NA	NA
Volatilization from Groundwater	None	NA	NA

Receptor Distance from Source Media	On-site	Off-site 1	Off-site 2	(Units)
Groundwater receptor	NA	NA	NA	(ft)
Soil leaching to groundwater receptor	NA	NA	NA	(ft)
Outdoor air inhalation receptor	0	15	NA	(ft)

Target Health Risk Values		Individual	Cumulative
TR_{ab}	Target Risk (class A&B carcinogens)	1.0E-6	1.0E-6
TR_c	Target Risk (class C carcinogens)	1.0E-6	
THQ	Target Hazard Quotient (non-carcinogenic risk)	1.0E+0	1.0E+0

Modeling Options	
RBCA tier	Tier 2
Outdoor air volatilization model	NA
Indoor air volatilization model	NA
Soil leaching model	NA
Use soil attenuation model (SAM) for leachate?	NA
Air dilution factor	3-D Gaussian dispersion
Groundwater dilution-attenuation factor	NA

NOTE: NA = Not applicable

Surface Parameters		General	Construction	(Units)
A	Source zone area	4.8E+4	4.8E+4	(ft^2)
W	Length of source-zone area parallel to wind	3.5E+2	3.5E+2	(ft)
W_{gw}	Length of source-zone area parallel to GW flow	NA		(ft)
U_{air}	Ambient air velocity in mixing zone	7.4E+0		(ft/s)
δ_{air}	Air mixing zone height	6.6E+0		(ft)
P_a	Areal particulate emission rate	6.9E-14		(g/cm^2/s)
L_{ss}	Thickness of affected surface soils	NA		(ft)

Surface Soil Column Parameters		Value			(Units)
h_{cap}	Capillary zone thickness	NA			(ft)
h_v	Vadose zone thickness	NA			(ft)
ρ_s	Soil bulk density	NA			(g/cm^3)
f_{oc}	Fraction organic carbon	NA			(-)
θ_T	Soil total porosity	NA			(-)
K_{vs}	Vertical hydraulic conductivity	NA			(ft/yr)
k_v	Vapor permeability	NA			(ft^2)
L_{gw}	Depth to groundwater	NA			(ft)
L_s	Depth to top of affected soils	NA			(ft)
L_{base}	Depth to base of affected soils	NA			(ft)
L_{subs}	Thickness of affected soils	NA			(ft)
pH	Soil/groundwater pH	NA			(-)
		capillary	vadose	foundation	
θ_w	Volumetric water content	NA	NA	NA	(-)
θ_a	Volumetric air content	NA	NA	NA	(-)

Building Parameters		Residential	Commercial	(Units)
L_b	Building volume/area ratio	NA	NA	(ft)
A_b	Foundation area	NA	NA	(ft^2)
X_{crk}	Foundation perimeter	NA	NA	(ft)
ER	Building air exchange rate	NA	NA	(1/s)
L_{crk}	Foundation thickness	NA	NA	(ft)
Z_{crk}	Depth to bottom of foundation slab	NA	NA	(ft)
η	Foundation crack fraction	NA	NA	(-)
dP	Indoor/outdoor differential pressure	NA	NA	(g/cm/s^2)
Q_s	Convective air flow through slab	NA	NA	(ft^3/s)

Groundwater Parameters		Value	(Units)
δ_{gw}	Groundwater mixing zone depth	NA	(ft)
I_f	Net groundwater infiltration rate	NA	(in/yr)
U_{gw}	Groundwater Darcy velocity	NA	(ft/yr)
V_{gw}	Groundwater seepage velocity	NA	(ft/yr)
K_s	Saturated hydraulic conductivity	NA	(ft/yr)
i	Groundwater gradient	NA	(-)
S_w	Width of groundwater source zone	NA	(ft)
S_d	Depth of groundwater source zone	NA	(ft)
θ_{eff}	Effective porosity in water-bearing unit	NA	(-)
$f_{oc\text{-}sat}$	Fraction organic carbon in water-bearing unit	NA	(-)
pH_{sat}	Groundwater pH	NA	(-)
	Biodegradation considered?	NA	

Transport Parameters		Off-site 1	Off-site 2	Off-site 1	Off-site 2	(Units)
Lateral Groundwater Transport		Groundwater Ingestion		Soil Leaching to GW		
α_x	Longitudinal dispersivity	NA	NA	NA	NA	(ft)
α_y	Transverse dispersivity	NA	NA	NA	NA	(ft)
α_z	Vertical dispersivity	NA	NA	NA	NA	(ft)
Lateral Outdoor Air Transport		Soil to Outdoor Air Inhal.		GW to Outdoor Air Inhal.		
σ_y	Transverse dispersion coefficient	1.9E+0	NA	NA	NA	(ft)
σ_z	Vertical dispersion coefficient	1.3E+0	NA	NA	NA	(ft)
ADF	Air dispersion factor	1.0E+0	NA	NA	NA	(-)

Surface Water Parameters		Off-site 2	(Units)
Q_{sw}	Surface water flowrate	NA	(ft^3/s)
W_{pl}	Width of GW plume at SW discharge	NA	(ft)
δ_{pl}	Thickness of GW plume at SW discharge	NA	(ft)
DF_{sw}	Groundwater-to-surface water dilution factor	NA	(-)

RBCA SITE ASSESSMENT | **User-Specified COC Data**

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	Representative COC Concentration			
	Groundwater		Soils (0 - 4.5 ft)	
	value (mg/L)	note	value (mg/kg)	note
Arsenic	0.0E+0		2.3E+1	
Barium	0.0E+0		1.8E+2	
Cadmium	0.0E+0		1.1E+1	
Chromium (III)	0.0E+0		2.3E+1	
Mercury	0.0E+0		5.8E-1	
Selenium	0.0E+0		1.4E+0	

Site Name: INORGANICS-Res. Use and Const. Worker
Site Location: 14-60 Charlotte Street, Rochester, New York
Completed By: Day Environmental, Inc.

Date Completed: 15-Jun-01
Job ID: 2485R-00

ATTACHMENT D

Tier 2 Output Data Sheets

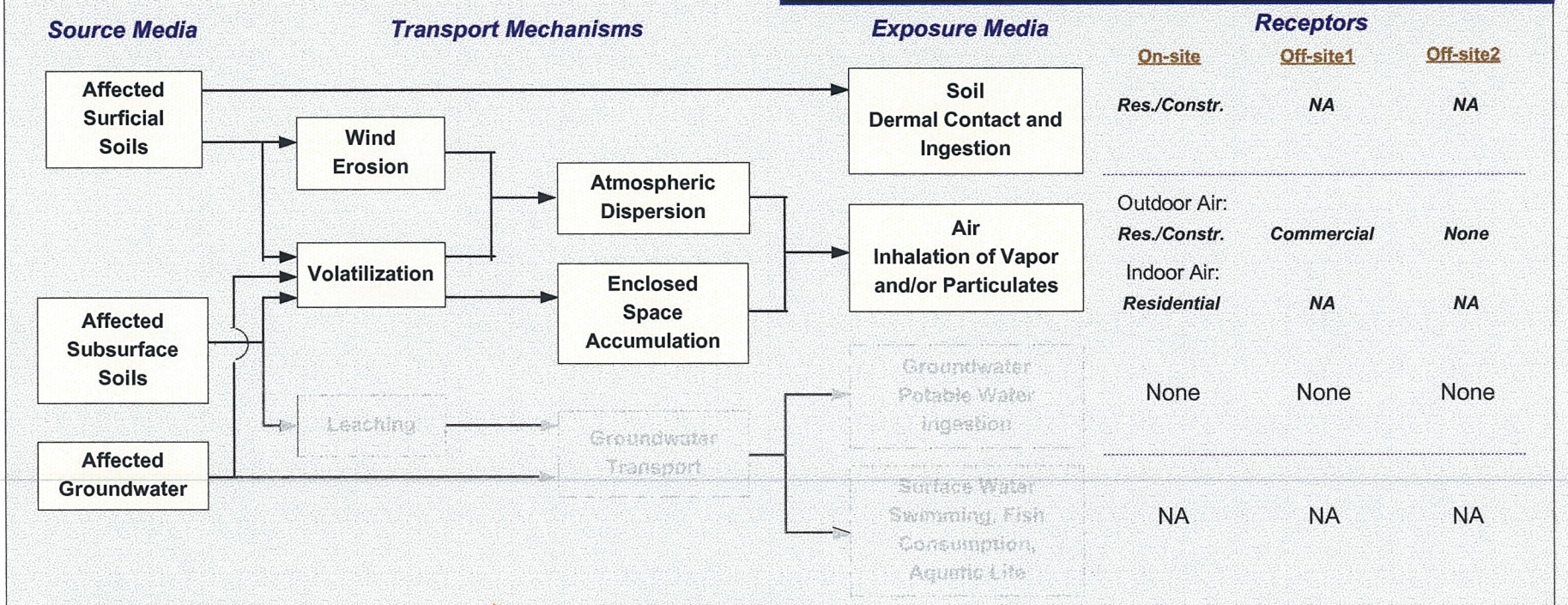
Organic Contaminants (14-60 Charlotte Street)

Residential Use and Construction Worker

Organic Contaminants (14-16 Charlotte Street)

Exposure Pathway Flowchart

Site Name: ORGANICS-Res. Use and Const. Worker Job ID: 2485R-00
Location: 14-16 Charlotte Street, Rochester, New York Date: 18-Jun-01
Compl. By: Day Environmental, Inc.



Commands and Options

Main Screen | Print Sheet | Help

RBCA SITE ASSESSMENT

Site Name: ORGANICS-Res. Use and Const. Worker
Site Location: 14-16 Charlotte Street, Rochester, New York
Completed By: Day Environmental, Inc.
Date Completed: 18-Jun-01
Job ID: 2485R-00

SOIL (8.1 - 10 ft) SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-6
Target Hazard Quotient 1.0E+0
Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways ("X" if Complete)

			Soil Leaching to Groundwater Ingestion / Discharge to Surface Water			X	Soil Vol. to Indoor Air	X	Soil Volatilization and Surface Soil Particulates to Outdoor Air				X	Surface Soil Inhalation, Ingestion,Dermal Contact		Applicable SSTL	SSTL Exceeded ?	Required CRF
CONSTITUENTS OF CONCERN		Representative Concentration	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)		On-site (0 ft)		On-site (0 ft)		Off-site 1 (15 ft)	Off-site 2 (0 ft)		On-site (0 ft)				Only if "yes" left
CAS No.	Name	(mg/kg)	None	None	None		Residential		Residential	Construction Worker	Commercial	None		Residential	Construction Worker	(mg/kg)	"■" if yes	
71-43-2	Benzene	0.0E+0	NA	NA	NA		8.1E-2		4.3E+1	>7.1E+2	3.5E+1	NA		1.3E+1	1.3E+3	8.1E-2	□	<1
108-88-3	Toluene	1.6E+1	NA	NA	NA		1.1E+2		>4.1E+2	>4.1E+2	>4.1E+2	NA		2.7E+4	9.2E+4	1.1E+2	□	<1
100-41-4	Ethylbenzene	9.0E+0	NA	NA	NA		2.9E+2		>3.3E+2	>3.3E+2	>3.3E+2	NA		1.6E+4	5.5E+4	2.9E+2	□	<1
1330-20-7	Xylene (mixed isomers)	5.1E+1	NA	NA	NA		>2.6E+2		>2.6E+2	>2.6E+2	>2.6E+2	NA		3.1E+5	1.0E+6	3.1E+5	□	<1
75-09-2	Methylene chloride	0.0E+0	NA	NA	NA		1.5E+0		7.7E+2	>1.9E+3	6.4E+2	NA		5.0E+1	5.1E+3	1.5E+0	□	<1
127-18-4	Tetrachloroethene	0.0E+0	NA	NA	NA		1.2E+0		>1.9E+2	>1.9E+2	>1.9E+2	NA		7.5E+0	7.7E+2	1.2E+0	□	<1
83-32-9	Acenaphthene	4.3E-1	NA	NA	NA		NC		NC	NC	NC	NA		NC	NC	NC	□	NA
86-73-7	Fluorene	5.8E-1	NA	NA	NA		NC		NC	NC	NC	NA		NC	NC	NC	□	NA
91-20-3	Naphthalene	6.8E+0	NA	NA	NA		>3.1E+2		>3.1E+2	>3.1E+2	>3.1E+2	NA		5.0E+5	1.0E+6	5.0E+5	□	<1
85-01-8	Phenanthrene	1.7E+0	NA	NA	NA		NC		NC	NC	NC	NA		NC	NC	NC	□	NA
129-00-0	Pyrene	3.1E-1	NA	NA	NA		NC		NC	NC	NC	NA		NC	NC	NC	□	NA
0-00-0	TPH - Aliph >C05-C06	5.6E+2	NA	NA	NA		>3.4E+2		>3.4E+2	>3.4E+2	>3.4E+2	NA		8.4E+5	1.0E+6	8.4E+5	□	<1
0-00-0	TPH - Aliph >C06-C08	5.6E+2	NA	NA	NA		>1.5E+2		>1.5E+2	>1.5E+2	>1.5E+2	NA		8.4E+5	1.0E+6	8.4E+5	□	<1
0-00-0	TPH - Aliph >C08-C10	5.6E+2	NA	NA	NA		>7.4E+1		>7.4E+1	>7.4E+1	>7.4E+1	NA		1.7E+4	5.7E+4	1.7E+4	□	<1
0-00-0	TPH - Aliph >C10-C12	2.4E+4	NA	NA	NA		>4.3E+1		>4.3E+1	>4.3E+1	>4.3E+1	NA		1.7E+4	5.7E+4	1.7E+4	■	1.4E+0
0-00-0	TPH - Aliph >C12-C16	2.4E+4	NA	NA	NA		>1.9E+1		>1.9E+1	>1.9E+1	>1.9E+1	NA		1.7E+4	5.7E+4	1.7E+4	■	1.4E+0
0-00-0	TPH - Aliph >C16-C21	2.4E+4	NA	NA	NA		NC		NC	NC	NC	NA		NC	NC	NC	□	NA
0-00-0	TPH - Aliph >C21-C34	3.7E+3	NA	NA	NA		NC		NC	NC	NC	NA		NC	NC	NC	□	NA
0-00-0	TPH - Arom >C05-C07	5.6E+2	NA	NA	NA		1.7E+0		9.0E+2	>9.1E+2	7.5E+2	NA		5.0E+2	1.7E+3	1.7E+0	■	3.3E+2
0-00-0	TPH - Arom >C07-C08	5.6E+2	NA	NA	NA		1.1E+2		>7.1E+2	>7.1E+2	>7.1E+2	NA		3.4E+4	1.1E+5	1.1E+2	■	4.9E+0
0-00-0	TPH - Arom >C08-C10	5.6E+2	NA	NA	NA		5.7E+1		>5.2E+2	>5.2E+2	>5.2E+2	NA		6.7E+3	2.3E+4	5.7E+1	■	9.8E+0
0-00-0	TPH - Arom >C10-C12	2.4E+4	NA	NA	NA		1.2E+2		>3.2E+2	>3.2E+2	>3.2E+2	NA		6.7E+3	2.3E+4	1.2E+2	■	2.0E+2
0-00-0	TPH - Arom >C12-C16	2.4E+4	NA	NA	NA		>1.5E+2		>1.5E+2	>1.5E+2	>1.5E+2	NA		6.7E+3	2.3E+4	6.7E+3	■	3.5E+0
0-00-0	TPH - Arom >C16-C21	2.4E+4	NA	NA	NA		NC		NC	NC	NC	NA		NC	NC	NC	□	NA
0-00-0	TPH - Arom >C21-C35	3.7E+3	NA	NA	NA		NC		NC	NC	NC	NA		NC	NC	NC	□	NA

">" indicates risk-based target concentration greater than constituent residual saturation value. NA = Not applicable. NC = Not calculated.

RBCA SITE ASSESSMENT

Site Name: ORGANICS-Res. Use and Const. Worker
Site Location: 14-16 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.
Date Completed: 18-Jun-01

Job ID: 2485R-00

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-6
Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways ("X" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	Groundwater Ingestion / Discharge to Surface Water			X	GW Vol. to Indoor Air	X	Groundwater Volatilization to Outdoor Air			Applicable SSTL	SSTL Exceeded ?	Required CRF
			On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)		On-site (0 ft)		On-site (0 ft)	Off-site 1 (15 ft)	Off-site 2 (0 ft)			Only if "yes"
CAS No.	Name	(mg/L)	None	None	None		Residential		Residential	Commercial	None	(mg/L)	"■" if yes	left
71-43-2	Benzene	1.1E-1	NA	NA	NA		2.4E-2		6.1E+0	6.1E+0	NA	2.4E-2	■	4.6E+0
108-88-3	Toluene	2.4E+0	NA	NA	NA		3.2E+1		>5.2E+2	>5.2E+2	NA	3.2E+1	□	<1
100-41-4	Ethylbenzene	1.4E+0	NA	NA	NA		7.7E+1		>1.7E+2	>1.7E+2	NA	7.7E+1	□	<1
1330-20-7	Xylene (mixed isomers)	5.4E+0	NA	NA	NA		>2.0E+2		>2.0E+2	>2.0E+2	NA	>2.0E+2	□	NA
75-09-2	Methylene chloride	1.3E-1	NA	NA	NA		7.1E-1		1.5E+2	1.5E+2	NA	7.1E-1	□	<1
127-18-4	Tetrachloroethene	1.7E-2	NA	NA	NA		1.6E-1		4.5E+1	4.5E+1	NA	1.6E-1	□	<1
83-32-9	Acenaphthene	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
86-73-7	Fluorene	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
91-20-3	Naphthalene	2.2E+0	NA	NA	NA		>3.1E+1		>3.1E+1	>3.1E+1	NA	>3.1E+1	□	NA
85-01-8	Phenanthrene	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
129-00-0	Pyrene	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
0-00-0	TPH - Aliph >C05-C06	8.4E+0	NA	NA	NA		1.4E+1		>3.6E+1	>3.6E+1	NA	1.4E+1	□	<1
0-00-0	TPH - Aliph >C06-C08	8.4E+0	NA	NA	NA		>5.4E+0		>5.4E+0	>5.4E+0	NA	>5.4E+0	□	NA
0-00-0	TPH - Aliph >C08-C10	8.4E+0	NA	NA	NA		3.1E-1		>4.3E-1	>4.3E-1	NA	3.1E-1	■	2.7E+1
0-00-0	TPH - Aliph >C10-C12	3.2E+2	NA	NA	NA		>3.4E-2		>3.4E-2	>3.4E-2	NA	>3.4E-2	□	NA
0-00-0	TPH - Aliph >C12-C16	3.2E+2	NA	NA	NA		>7.6E-4		>7.6E-4	>7.6E-4	NA	>7.6E-4	□	NA
0-00-0	TPH - Aliph >C16-C21	3.2E+2	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
0-00-0	TPH - Aliph >C21-C34	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
0-00-0	TPH - Arom >C05-C07	8.4E+0	NA	NA	NA		4.5E-1		1.2E+2	1.2E+2	NA	4.5E-1	■	1.9E+1
0-00-0	TPH - Arom >C07-C08	8.4E+0	NA	NA	NA		2.6E+1		>5.2E+2	>5.2E+2	NA	2.6E+1	□	<1
0-00-0	TPH - Arom >C08-C10	8.4E+0	NA	NA	NA		8.5E+0		>6.5E+1	>6.5E+1	NA	8.5E+0	□	<1
0-00-0	TPH - Arom >C10-C12	3.2E+2	NA	NA	NA		2.2E+1		>2.5E+1	>2.5E+1	NA	2.2E+1	■	1.4E+1
0-00-0	TPH - Arom >C12-C16	3.2E+2	NA	NA	NA		>5.8E+0		>5.8E+0	>5.8E+0	NA	>5.8E+0	□	NA
0-00-0	TPH - Arom >C16-C21	3.2E+2	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
0-00-0	TPH - Arom >C21-C35	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA

">" indicates risk-based target concentration greater than constituent solubility value. NA = Not applicable. NC = Not calculated.

RBCA SITE ASSESSMENT | **Baseline Risk Summary-All Pathways**

Site Name: ORGANICS-Res. Use and Const. Worker
Site Location: 14-16 Charlotte Street, Rochester, New York
Completed By: Day Environmental, Inc.
Date Completed: 18-Jun-01

TIER 2 BASELINE RISK SUMMARY TABLE

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk	Hazard Quotient		Hazard Index		Toxicity
EXPOSURE PATHWAY	Maximum Value	Target Risk	Total Value	Target Risk	Limit(s) Exceeded?	Maximum Value	Applicable Limit	Total Value	Applicable Limit	Limit(s) Exceeded?
OUTDOOR AIR EXPOSURE PATHWAYS										
Complete:	1.8E-8	1.0E-6	1.9E-8	1.0E-6	☐	2.3E+1	1.0E+0	3.0E+1	1.0E+0	■
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	4.6E-6	1.0E-6	4.9E-6	1.0E-6	■	6.7E+3	1.0E+0	9.0E+3	1.0E+0	■
SOIL EXPOSURE PATHWAYS										
Complete:	NC	1.0E-6	NC	1.0E-6	☐	3.5E+0	1.0E+0	1.2E+1	1.0E+0	■
GROUNDWATER EXPOSURE PATHWAYS										
Complete:	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
SURFACE WATER EXPOSURE PATHWAYS										
Complete:	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)										
	4.6E-6	***1.0E-6***	***4.9E-6***	***1.0E-6***	■	***6.7E+3***	***1.0E+0***	***9.0E+3***	***1.0E+0***	■
	Indoor Air		***Indoor Air***			***Indoor Air***		***Indoor Air***		

CHEMICAL DATA FOR SELECTED COCs

Physical Property Data

Constituent	CAS Number	type	Molecular Weight (g/mole) MW	ref	Diffusion Coefficients in air (cm2/s) Dair	ref	in water (cm2/s) Dwat	ref	log (Koc) or log(Kd) (@ 20 - 25 C) log(L/kg) partition		ref	Henry's Law Constant (@ 20 - 25 C) (atm-m3) mol	(unitless)	ref	Vapor Pressure (@ 20 - 25 C) (mm Hg)	ref	Solubility (@ 20 - 25 C) (mg/L)	ref	acid pKa	base pKb	ref
Benzene	71-43-2	A	78.1	PS	8.80E-02	PS	9.80E-06	PS	1.77	Koc	PS	5.55E-03	2.29E-01	PS	9.52E+01	PS	1.75E+03	PS	-	-	-
Toluene	108-88-3	A	92.4	5	8.50E-02	A	9.40E-06	A	2.13	Koc	A	6.30E-03	2.60E-01	A	3.00E+01	4	5.15E+02	29	-	-	-
Ethylbenzene	100-41-4	A	106.2	PS	7.50E-02	PS	7.80E-06	PS	2.56	Koc	PS	7.88E-03	3.25E-01	PS	1.00E+01	PS	1.69E+02	PS	-	-	-
Xylene (mixed isomers)	1330-20-7	A	106.2	5	7.20E-02	A	8.50E-06	A	2.38	Koc	A	7.03E-03	2.90E-01	A	7.00E+00	4	1.98E+02	5	-	-	-
Methylene chloride	75-09-2	C	85	PS	1.01E-01	PS	1.17E-05	PS	1.07	Koc	PS	2.19E-03	9.03E-02	PS	4.38E+02	PS	1.30E+04	PS	-	-	-
Tetrachloroethene	127-18-4	C	165.83	PS	7.20E-02	PS	8.20E-06	PS	2.19	Koc	PS	1.84E-02	7.59E-01	PS	1.90E+01	PS	2.00E+02	PS	-	-	-
Acenaphthene	83-32-9	PAH	154.21	4	4.21E-02	4	7.69E-06	4	3.85	Koc	4	7.71E-03	3.18E-01	4	5.00E-03	4	3.93E+00	29	-	-	-
Fluorene	86-73-7	PAH	166	4	3.63E-02	4	7.88E-06	4	3.86	Koc	4	1.17E-04	4.83E-03	4	1.70E-02	4	1.69E+00	5	-	-	-
Naphthalene	91-20-3	PAH	128.2	PS	5.90E-02	PS	7.50E-06	PS	3.30	Koc	PS	4.83E-04	1.99E-02	PS	2.30E-01	PS	3.10E+01	PS	-	-	-
Phenanthrene	85-01-8	PAH	178.22	4	3.33E-02	4	7.47E-06	4	4.15	Koc	4	6.05E-03	2.50E-01	4	2.10E-04	4	1.60E+00	5	-	-	-
Pyrene	129-00-0	PAH	202.3	4	2.72E-02	4	7.24E-06	4	4.58	Koc	4	7.00E-09	2.89E-07	4	4.20E-08	4	1.60E-01	5	-	-	-
TPH - Aliph >C05-C06	0-00-0	T	81	T	1.00E-01	T	1.00E-05	T	2.90	Koc	T	7.88E-01	3.25E+01	T	2.66E+02	-	3.60E+01	T	-	-	-
TPH - Aliph >C06-C08	0-00-0	T	100	T	1.00E-01	T	1.00E-05	T	3.60	Koc	T	1.17E+00	4.81E+01	T	4.79E+01	-	5.40E+00	T	-	-	-
TPH - Aliph >C08-C10	0-00-0	T	130	T	1.00E-01	T	1.00E-05	T	4.50	Koc	T	1.90E+00	7.85E+01	T	4.79E+00	-	4.30E-01	T	-	-	-
TPH - Aliph >C10-C12	0-00-0	T	160	T	1.00E-01	T	1.00E-05	T	5.40	Koc	T	2.96E+00	1.22E+02	T	4.79E-01	-	3.40E-02	T	-	-	-
TPH - Aliph >C12-C16	0-00-0	T	200	T	1.00E-01	T	1.00E-05	T	6.70	Koc	T	1.26E+01	5.21E+02	T	3.65E-02	-	7.60E-04	T	-	-	-
TPH - Aliph >C16-C21	0-00-0	T	270	T	1.00E-01	T	1.00E-05	T	8.80	Koc	T	1.19E+02	4.90E+03	T	8.36E-04	-	2.50E-06	T	-	-	-
TPH - Aliph >C21-C34	0-00-0	T	400	-	1.00E-01	-	1.00E-05	-	8.80	Koc	-	1.76E+02	7.26E+03	-	8.36E-04	-	2.50E-06	-	-	-	-
TPH - Arom >C05-C07	0-00-0	T	78	T	1.00E-01	T	1.00E-05	T	1.90	Koc	T	5.63E-03	2.32E-01	T	9.88E+01	-	1.80E+03	T	-	-	-
TPH - Arom >C07-C08	0-00-0	T	92	T	1.00E-01	T	1.00E-05	T	2.40	Koc	T	6.72E-03	2.77E-01	T	2.89E+01	-	5.20E+02	T	-	-	-
TPH - Arom >C08-C10	0-00-0	T	120	T	1.00E-01	T	1.00E-05	T	3.20	Koc	T	1.16E-02	4.80E-01	T	4.79E+00	-	6.50E+01	T	-	-	-
TPH - Arom >C10-C12	0-00-0	T	130	T	1.00E-01	T	1.00E-05	T	3.40	Koc	T	3.28E-03	1.35E-01	T	4.79E-01	-	2.50E+01	T	-	-	-
TPH - Arom >C12-C16	0-00-0	T	150	T	1.00E-01	T	1.00E-05	T	3.70	Koc	T	1.24E-03	5.12E-02	T	3.65E-02	-	5.80E+00	T	-	-	-
TPH - Arom >C16-C21	0-00-0	T	190	T	1.00E-01	T	1.00E-05	T	4.20	Koc	T	3.22E-04	1.33E-02	T	8.36E-04	-	6.50E-01	T	-	-	-
TPH - Arom >C21-C35	0-00-0	T	240	T	1.00E-01	T	1.00E-05	T	5.10	Koc	T	1.60E-05	6.60E-04	T	3.34E-07	-	6.60E-03	T	-	-	-

Site Name: ORGANICS-Res. Use and Const. Worker

Site Location: 14-16 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.

Date Completed: 18-Jun-01

Job ID: 2485R-00

CHEMICAL DATA FOR SELECTED COCs

Toxicity Data

	Reference Dose (mg/kg/day)				Reference Conc. (mg/m3)		Slope Factors 1/(mg/kg/day)				Unit Risk Factor 1/(µg/m3)			
			(mg/kg/day)						1/(mg/kg/day)					
Constituent	Oral RfD_oral	ref	Dermal RfD_dermal	ref	Inhalation RfC_inhal	ref	Oral SF_oral	ref	Dermal SF_dermal	ref	Inhalation URF_inhal	ref	EPA Weight of Evidence	Is Constituent Carcinogenic ?
Benzene	3.00E-03	R	-	-	5.95E-03	R	2.90E-02	PS	2.99E-02	TX	8.29E-06	PS	A	TRUE
Toluene	2.00E-01	A,R	1.60E-01	TX	4.00E-01	A,R	-	-	-	-	-	-	D	FALSE
Ethylbenzene	1.00E-01	PS	9.70E-02	TX	1.00E+00	PS	-	-	-	-	-	-	D	FALSE
Xylene (mixed isomers)	2.00E+00	A,R	1.84E+00	TX	7.00E+00	A	-	-	-	-	-	-	D	FALSE
Methylene chloride	6.00E-02	PS	-	-	3.00E+00	PS	7.50E-03	PS	7.89E-03	TX	4.57E-07	PS	B2	TRUE
Tetrachloroethene	1.00E-02	PS	-	-	3.50E-02	PS	5.20E-02	PS	5.20E-02	TX	5.80E-07	PS	C-B2	TRUE
Acenaphthene	6.00E-02	R	5.34E-02	TX	-	-	-	-	-	-	-	-	-	FALSE
Fluorene	4.00E-02	A,R	3.56E-02	TX	-	-	-	-	-	-	-	-	D	FALSE
Naphthalene	4.00E-01	PS	3.56E-01	TX	1.40E+00	PS	-	-	-	-	-	-	D	FALSE
Phenanthrene	3.00E-02	31	2.67E-02	TX	-	-	-	-	-	-	-	-	D	FALSE
Pyrene	3.00E-02	R	2.67E-02	TX	-	-	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C05-C06	5.00E+00	T	-	-	1.84E+01	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C06-C08	5.00E+00	T	-	-	1.84E+01	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C08-C10	1.00E-01	T	-	-	1.00E+00	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C10-C12	1.00E-01	T	-	-	1.00E+00	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C12-C16	1.00E-01	T	-	-	1.00E+00	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C16-C21	2.00E+00	T	-	-	-	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C21-C34	2.00E+00	T	-	-	-	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C05-C07	3.00E-03	R	-	-	5.95E-03	R	-	-	-	-	-	-	D	FALSE
TPH - Arom >C07-C08	2.00E-01	T	-	-	4.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C08-C10	4.00E-02	T	-	-	2.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C10-C12	4.00E-02	T	-	-	2.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C12-C16	4.00E-02	T	-	-	2.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C16-C21	3.00E-02	T	-	-	-	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C21-C35	3.00E-02	T	-	-	-	T	-	-	-	-	-	-	D	FALSE

Site Name: ORGANICS-Res. U

Site Location: 14-16 Charlott

Miscellaneous Chemical Data

Constituent	Maximum Contaminant Level MCL (mg/L)	ref	Time-Weighted Average Workplace Criteria TWA (mg/m3)	ref	Aquatic Life Prot. Criteria AQL (mg/L)	ref	Biocon-centration Factor (L-wat/kg-fish)
Benzene	5.00E-03	52 FR 25690	3.25E+00	PS	-	-	12.6
Toluene	1.00E+00	56 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	-	-	70
Ethylbenzene	7.00E-01	56 FR 3526 (30 Jan 91)	4.35E+02	PS	-	-	1
Xylene (mixed isomers)	1.00E+01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	-	-	1
Methylene chloride	5.00E-03	57 FR 31776 (17 Jul 92)	1.74E+03	PS	-	-	1
Tetrachloroethene	5.00E-03	56 FR 3526 (30 Jan 91)	6.80E+02	PS	-	-	49
Acenaphthene	-	-	-	-	-	-	384
Fluorene	-	-	-	-	-	-	1300
Naphthalene	-	-	5.00E+01	PS	-	-	430
Phenanthrene	-	-	-	-	-	-	2630
Pyrene	-	-	-	-	-	-	2700
TPH - Aliph >C05-C06	-	-	-	-	-	-	1
TPH - Aliph >C06-C08	-	-	-	-	-	-	1
TPH - Aliph >C08-C10	-	-	-	-	-	-	1
TPH - Aliph >C10-C12	-	-	-	-	-	-	1
TPH - Aliph >C12-C16	-	-	-	-	-	-	1
TPH - Aliph >C16-C21	-	-	-	-	-	-	1
TPH - Aliph >C21-C34	-	-	-	-	-	-	1
TPH - Arom >C05-C07	-	-	-	-	-	-	1
TPH - Arom >C07-C08	-	-	-	-	-	-	1
TPH - Arom >C08-C10	-	-	-	-	-	-	1
TPH - Arom >C10-C12	-	-	-	-	-	-	1
TPH - Arom >C12-C16	-	-	-	-	-	-	1
TPH - Arom >C16-C21	-	-	-	-	-	-	1
TPH - Arom >C21-C35	-	-	-	-	-	-	1

CHEMICAL DATA FOR SELECTED COCs

Miscellaneous Chemical Data

Constituent	Dermal Relative Absorp. Factor (unitless)	Water Dermal Permeability Data: Dermal Permeability Coeff. (cm/hr)	Lag time for Dermal Exposure (hr)	Critical Exposure Time (hr)	Relative Contr of Derm Perm Coeff (unitless)	Water/Skin Derm Adsorp Factor (cm/event)	ref	Detection Limits: Groundwater (mg/L)	ref	Soil (mg/kg)	ref	Half Life (First-Order Decay) (days): Saturated	Unsaturated	ref
Benzene	0.5	0.021	0.26	0.63	0.013	7.3E-2	D	0.002	S	0.005	S	720	720	H
Toluene	0.5	0.045	0.32	0.77	0.054	1.6E-1	D	0.002	S	0.005	S	28	28	H
Ethylbenzene	0.5	0.074	0.39	1.3	0.14	2.7E-1	D	0.002	S	0.005	S	228	228	H
Xylene (mixed isomers)	0.5	0.08	0.39	1.4	0.16	2.9E-1	D	0.005	S	0.005	S	360	360	H
Methylene chloride	0.5	0.0045	0.29	0.69	0.0018	1.6E-2	D	0.005	S	0.005	S	56	56	H
Tetrachloroethene	0.5	0.048	0.9	4.3	0.25	2.2E-1	D	0.0005	S	-	-	720	720	H
Acenaphthene	0.05	-	-	-	-	-	-	0.01	32	0.66	32	204	204	H
Fluorene	0.05	-	-	-	-	-	-	0.01	32	0.66	32	120	120	H
Naphthalene	0.05	0.069	0.53	2.2	0.2	2.7E-1	D	0.01	32	0.01	32	258	258	H
Phenanthrene	0.05	0.23	1.1	5.6	2.9	1.2E+0	D	0.01	32	0.66	32	400	400	H
Pyrene	0.05	-	-	-	-	-	-	0.01	32	0.66	32	3800	3800	H
TPH - Aliph >C05-C06	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C06-C08	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C08-C10	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C10-C12	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C12-C16	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C16-C21	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C21-C34	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C05-C07	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C07-C08	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C08-C10	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C10-C12	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C12-C16	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C16-C21	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C21-C35	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-

RBCA SITE ASSESSMENT

Input Parameter Summary

Site Name: ORGANICS-Res. Use and Const. Worker
Site Location: 14-16 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.
Date Completed: 18-Jun-01

Job ID: 2485R-00

Exposure Parameters		Residential			Commercial/Industrial	
		Adult	(1-6yrs)	(1-16 yrs)	Chronic	Construc.
AT_c	Averaging time for carcinogens (yr)	70				
AT_n	Averaging time for non-carcinogens (yr)	30			25	1
BW	Body weight (kg)	70	15	35	70	
ED	Exposure duration (yr)	30	6	16	25	1
τ	Averaging time for vapor flux (yr)	30			25	1
EF	Exposure frequency (days/yr)	350			250	100
EF_D	Exposure frequency for dermal exposure	350			250	
IR_w	Ingestion rate of water (L/day)	2			1	
IR_s	Ingestion rate of soil (mg/day)	10.15	69.7		58.6	23.4
SA	Skin surface area (dermal) (cm^2)	1700		2023	1700	1700
M	Soil to skin adherence factor	0.5				
ET_{swim}	Swimming exposure time (hr/event)	3				
EV_{swim}	Swimming event frequency (events/yr)	12	12	12		
IR_{swim}	Water ingestion while swimming (L/hr)	0.05	0.5			
SA_{swim}	Skin surface area for swimming (cm^2)	23000		8100		
IR_{fish}	Ingestion rate of fish (kg/yr)	0.025				
FI_{fish}	Contaminated fish fraction (unitless)	1				

Complete Exposure Pathways and Receptors	On-site	Off-site 1	Off-site 2
Groundwater:			
Groundwater Ingestion	None	None	None
Soil Leaching to Groundwater Ingestion	None	None	None
Applicable Surface Water Exposure Routes:			
Swimming			NA
Fish Consumption			NA
Aquatic Life Protection			NA
Soil:			
Direct Ingestion and Dermal Contact	Res./Constr.		
Outdoor Air:			
Particulates from Surface Soils	Res./Constr.	Commercial	None
Volatilization from Soils	Res./Constr.	Commercial	None
Volatilization from Groundwater	Residential	Commercial	None
Indoor Air:			
Volatilization from Subsurface Soils	Residential	NA	NA
Volatilization from Groundwater	Residential	NA	NA

Receptor Distance from Source Media	On-site	Off-site 1	Off-site 2	(Units)
Groundwater receptor	NA	NA	NA	(ft)
Soil leaching to groundwater receptor	NA	NA	NA	(ft)
Outdoor air inhalation receptor	0	15	NA	(ft)

Target Health Risk Values		Individual	Cumulative
TR_{ca}	Target Risk (class A&B carcinogens)	1.0E-6	1.0E-6
TR_c	Target Risk (class C carcinogens)	1.0E-6	
THQ	Target Hazard Quotient (non-carcinogenic risk)	1.0E+0	1.0E+0

Modeling Options	
RBCA tier	Tier 2
Outdoor air volatilization model	Surface & subsurface models
Indoor air volatilization model	Johnson & Ettinger model
Soil leaching model	NA
Use soil attenuation model (SAM) for leachate?	NA
Air dilution factor	3-D Gaussian dispersion
Groundwater dilution-attenuation factor	NA

NOTE: NA = Not applicable

Surface Parameters		General	Construction	(Units)
A	Source zone area	1.4E+4	1.4E+4	(ft^2)
W	Length of source-zone area parallel to wind	1.0E+2	1.0E+2	(ft)
W_{gw}	Length of source-zone area parallel to GW flow	NA		(ft)
U_{air}	Ambient air velocity in mixing zone	7.4E+0		(ft/s)
δ_{air}	Air mixing zone height	6.6E+0		(ft)
P_a	Areal particulate emission rate	6.9E-14		(g/cm^2/s)
L_{ss}	Thickness of affected surface soils	5.0E-1		(ft)

Surface Soil Column Parameters		Value			(Units)
h_{cap}	Capillary zone thickness	3.0E-1			(ft)
h_v	Vadose zone thickness	7.9E+0			(ft)
ρ_s	Soil bulk density	1.7E+0			(g/cm^3)
f_{oc}	Fraction organic carbon	5.0E-3			(-)
θ_T	Soil total porosity	4.1E-1			(-)
K_{vs}	Vertical hydraulic conductivity	8.6E+1			(cm/d)
k_v	Vapor permeability	1.1E-12			(ft^2)
L_{gw}	Depth to groundwater	8.2E+0			(ft)
L_s	Depth to top of affected soils	8.1E+0			(ft)
L_{base}	Depth to base of affected soils	1.0E+1			(ft)
L_{subs}	Thickness of affected soils	1.9E+0			(ft)
pH	Soil/groundwater pH	6.7E+0			(-)
		capillary	vadose	foundation	
θ_w	Volumetric water content	0.369	0.12	0.12	(-)
θ_a	Volumetric air content	0.041	0.29	0.26	(-)

Building Parameters		Residential	Commercial	(Units)
L_b	Building volume/area ratio	6.56E+0	NA	(ft)
A_b	Foundation area	3.84E+4	NA	(ft^2)
X_{crk}	Foundation perimeter	7.79E+2	NA	(ft)
ER	Building air exchange rate	1.40E-4	NA	(1/s)
L_{crk}	Foundation thickness	4.92E-1	NA	(ft)
Z_{crk}	Depth to bottom of foundation slab	4.00E+0	NA	(ft)
η	Foundation crack fraction	1.00E-2	NA	(-)
dP	Indoor/outdoor differential pressure	0.00E+0	NA	(g/cm/s^2)
Q_s	Convective air flow through slab	0.00E+0	NA	(ft^3/s)

Groundwater Parameters		Value	(Units)
δ_{gw}	Groundwater mixing zone depth	NA	(ft)
I_f	Net groundwater infiltration rate	NA	(cm/yr)
U_{gw}	Groundwater Darcy velocity	NA	(cm/d)
V_{gw}	Groundwater seepage velocity	NA	(cm/d)
K_s	Saturated hydraulic conductivity	NA	(cm/d)
i	Groundwater gradient	NA	(-)
S_w	Width of groundwater source zone	NA	(ft)
S_d	Depth of groundwater source zone	NA	(ft)
θ_{eff}	Effective porosity in water-bearing unit	NA	(-)
$f_{oc\text{-}sat}$	Fraction organic carbon in water-bearing unit	NA	(-)
pH_{sat}	Groundwater pH	NA	(-)
	Biodegradation considered?	NA	

Transport Parameters		Off-site 1	Off-site 2	Off-site 1	Off-site 2	(Units)
Lateral Groundwater Transport		Groundwater Ingestion		Soil Leaching to GW		
α_x	Longitudinal dispersivity	NA	NA	NA	NA	(ft)
α_y	Transverse dispersivity	NA	NA	NA	NA	(ft)
α_z	Vertical dispersivity	NA	NA	NA	NA	(ft)
Lateral Outdoor Air Transport		Soil to Outdoor Air Inhal.		GW to Outdoor Air Inhal.		
σ_y	Transverse dispersion coefficient	1.9E+0	NA	1.9E+0	NA	(ft)
σ_z	Vertical dispersion coefficient	1.3E+0	NA	1.3E+0	NA	(ft)
ADF	Air dispersion factor	1.0E+0	NA	1.0E+0	NA	(-)

Surface Water Parameters		Off-site 2	(Units)
Q_{sw}	Surface water flowrate	NA	(ft^3/s)
W_{pl}	Width of GW plume at SW discharge	NA	(ft)
δ_{pl}	Thickness of GW plume at SW discharge	NA	(ft)
DF_{sw}	Groundwater-to-surface water dilution factor	NA	(-)

RBCA SITE ASSESSMENT | **User-Specified COC Data**

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	Representative COC Concentration			
	Groundwater		Soils (8.1 - 10 ft)	
	value (mg/L)	note	value (mg/kg)	note
Benzene	1.1E-1		0.0E+0	
Toluene	2.4E+0		1.6E+1	
Ethylbenzene	1.4E+0		9.0E+0	
Xylene (mixed isomers)	5.4E+0		5.1E+1	
Methylene chloride	1.3E-1		0.0E+0	
Tetrachloroethene	1.7E-2		0.0E+0	
Acenaphthene	0.0E+0		4.3E-1	
Fluorene	0.0E+0		5.8E-1	
Naphthalene	2.2E+0		6.8E+0	
Phenanthrene	0.0E+0		1.7E+0	
Pyrene	0.0E+0		3.1E-1	
TPH - Aliph >C05-C06	8.4E+0		5.6E+2	
TPH - Aliph >C06-C08	8.4E+0		5.6E+2	
TPH - Aliph >C08-C10	8.4E+0		5.6E+2	
TPH - Aliph >C10-C12	3.2E+2		2.4E+4	
TPH - Aliph >C12-C16	3.2E+2		2.4E+4	
TPH - Aliph >C16-C21	3.2E+2		2.4E+4	
TPH - Aliph >C21-C34	0.0E+0		3.7E+3	
TPH - Arom >C05-C07	8.4E+0		5.6E+2	
TPH - Arom >C07-C08	8.4E+0		5.6E+2	
TPH - Arom >C08-C10	8.4E+0		5.6E+2	
TPH - Arom >C10-C12	3.2E+2		2.4E+4	
TPH - Arom >C12-C16	3.2E+2		2.4E+4	
TPH - Arom >C16-C21	3.2E+2		2.4E+4	
TPH - Arom >C21-C35	0.0E+0		3.7E+3	

Site Name: ORGANICS-Res. Use and Const. Worker
Site Location: 14-16 Charlotte Street, Rochester, New York
Completed By: Day Environmental, Inc.

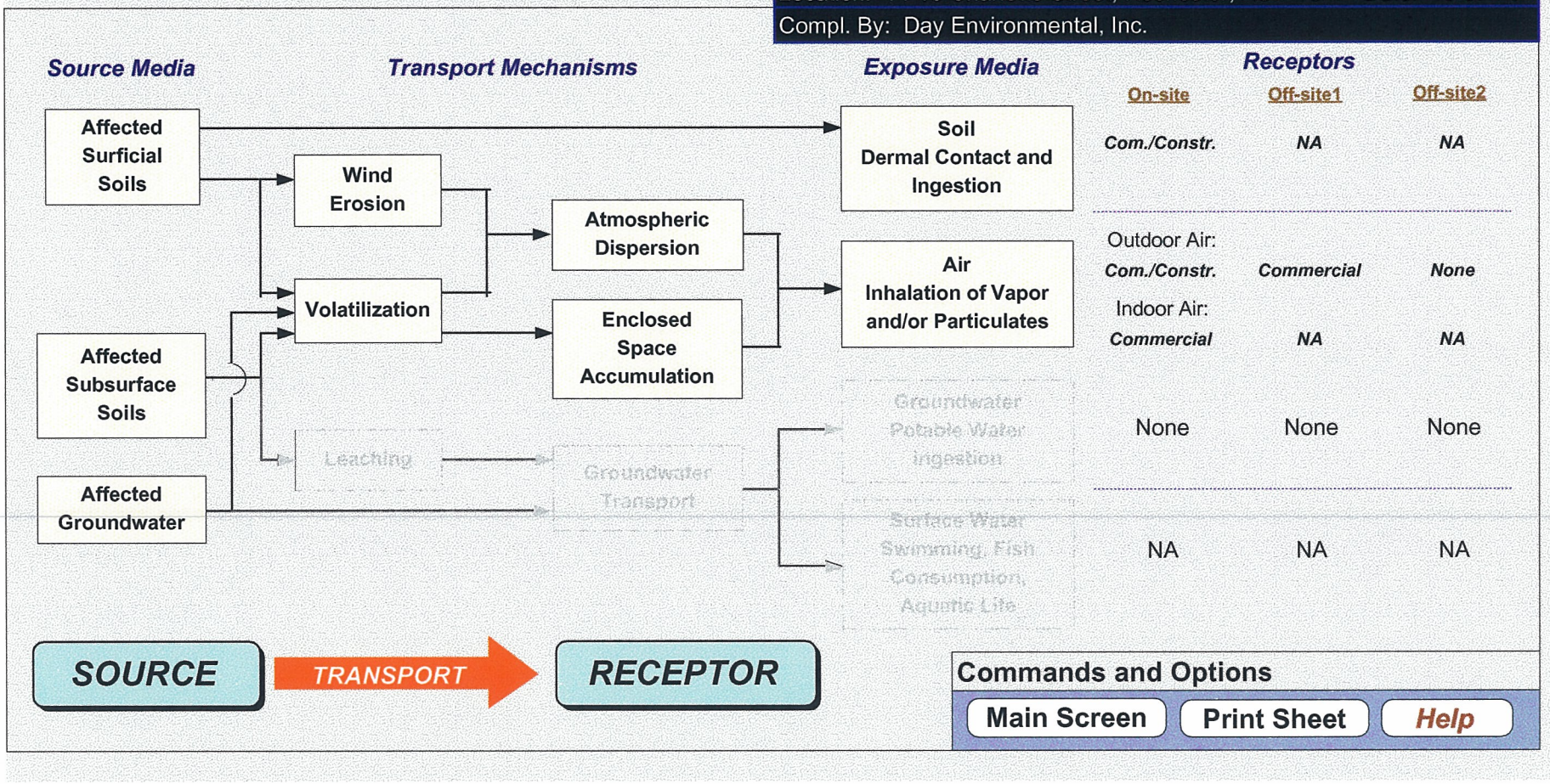
Date Completed: 18-Jun-01
Job ID: 2485R-00

Commercial Use and Construction Worker

Organic Contaminants (14-16 Charlotte Street)

Exposure Pathway Flowchart

Site Name: ORGANICS-Comm. Use and Const. WorkerJob ID: 2485R-00
Location: 14-16 Charlotte Street, Rochester, New York Date: 18-Jun-01
Compl. By: Day Environmental, Inc.



RBCA SITE ASSESSMENT

Site Name: ORGANICS-Comm. Use and Const. Worker
Completed By: Day Environmental, Inc.
Job ID: 2485R-00
Site Location: 14-16 Charlotte Street, Rochester, New York
Date Completed: 18-Jun-01

SOIL (8.1 - 10 ft) SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-6
Target Hazard Quotient 1.0E+0
Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways ("X" if Complete)

			Soil Leaching to Groundwater Ingestion / Discharge to Surface Water			X Soil Vol. to Indoor Air	X Soil Volatilization and Surface Soil Particulates to Outdoor Air				X Surface Soil Inhalation, Ingestion,Dermal Contact		Applicable SSTL	SSTL Exceeded ?	Required CRF
CONSTITUENTS OF CONCERN		Representative Concentration	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)	On-site (0 ft)		Off-site 1 (15 ft)	Off-site 2 (0 ft)	On-site (0 ft)				Only if "yes" left
CAS No.	Name	(mg/kg)	None	None	None	Commercial	Commercial	Construction Worker	Commercial	None	Commercial	Construction Worker	(mg/kg)	"■" if yes	
71-43-2	Benzene	0.0E+0	NA	NA	NA	2.8E-1	6.0E+1	>7.1E+2	6.0E+1	NA	2.0E+1	1.3E+3	2.8E-1	□	<1
108-88-3	Toluene	1.6E+1	NA	NA	NA	3.3E+2	>4.1E+2	>4.1E+2	>4.1E+2	NA	3.5E+4	9.2E+4	3.3E+2	□	<1
100-41-4	Ethylbenzene	9.0E+0	NA	NA	NA	>3.3E+2	>3.3E+2	>3.3E+2	>3.3E+2	NA	2.1E+4	5.5E+4	2.1E+4	□	<1
1330-20-7	Xylene (mixed isomers)	5.1E+1	NA	NA	NA	>2.6E+2	>2.6E+2	>2.6E+2	>2.6E+2	NA	3.9E+5	1.0E+6	3.9E+5	□	<1
75-09-2	Methylene chloride	0.0E+0	NA	NA	NA	5.0E+0	1.1E+3	>1.9E+3	1.1E+3	NA	7.5E+1	5.1E+3	5.0E+0	□	<1
127-18-4	Tetrachloroethene	0.0E+0	NA	NA	NA	4.0E+0	>1.9E+2	>1.9E+2	>1.9E+2	NA	1.1E+1	7.7E+2	4.0E+0	□	<1
83-32-9	Acenaphthene	4.3E-1	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA
86-73-7	Fluorene	5.8E-1	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA
91-20-3	Naphthalene	6.8E+0	NA	NA	NA	>3.1E+2	>3.1E+2	>3.1E+2	>3.1E+2	NA	3.8E+5	1.0E+6	3.8E+5	□	<1
85-01-8	Phenanthrene	1.7E+0	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA
129-00-0	Pyrene	3.1E-1	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA
0-00-0	TPH - Aliph >C05-C06	5.6E+2	NA	NA	NA	>3.4E+2	>3.4E+2	>3.4E+2	>3.4E+2	NA	1.0E+6	1.0E+6	1.0E+6	□	<1
0-00-0	TPH - Aliph >C06-C08	5.6E+2	NA	NA	NA	>1.5E+2	>1.5E+2	>1.5E+2	>1.5E+2	NA	1.0E+6	1.0E+6	1.0E+6	□	<1
0-00-0	TPH - Aliph >C08-C10	5.6E+2	NA	NA	NA	>7.4E+1	>7.4E+1	>7.4E+1	>7.4E+1	NA	2.1E+4	5.7E+4	2.1E+4	□	<1
0-00-0	TPH - Aliph >C10-C12	2.4E+4	NA	NA	NA	>4.3E+1	>4.3E+1	>4.3E+1	>4.3E+1	NA	2.1E+4	5.7E+4	2.1E+4	■	1.1E+0
0-00-0	TPH - Aliph >C12-C16	2.4E+4	NA	NA	NA	>1.9E+1	>1.9E+1	>1.9E+1	>1.9E+1	NA	2.1E+4	5.7E+4	2.1E+4	■	1.1E+0
0-00-0	TPH - Aliph >C16-C21	2.4E+4	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA
0-00-0	TPH - Aliph >C21-C34	3.7E+3	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA
0-00-0	TPH - Arom >C05-C07	5.6E+2	NA	NA	NA	4.9E+0	>9.1E+2	>9.1E+2	>9.1E+2	NA	6.3E+2	1.7E+3	4.9E+0	■	1.1E+2
0-00-0	TPH - Arom >C07-C08	5.6E+2	NA	NA	NA	3.3E+2	>7.1E+2	>7.1E+2	>7.1E+2	NA	4.2E+4	1.1E+5	3.3E+2	■	1.7E+0
0-00-0	TPH - Arom >C08-C10	5.6E+2	NA	NA	NA	1.6E+2	>5.2E+2	>5.2E+2	>5.2E+2	NA	8.5E+3	2.3E+4	1.6E+2	■	3.4E+0
0-00-0	TPH - Arom >C10-C12	2.4E+4	NA	NA	NA	>3.2E+2	>3.2E+2	>3.2E+2	>3.2E+2	NA	8.5E+3	2.3E+4	8.5E+3	■	2.8E+0
0-00-0	TPH - Arom >C12-C16	2.4E+4	NA	NA	NA	>1.5E+2	>1.5E+2	>1.5E+2	>1.5E+2	NA	8.5E+3	2.3E+4	8.5E+3	■	2.8E+0
0-00-0	TPH - Arom >C16-C21	2.4E+4	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA
0-00-0	TPH - Arom >C21-C35	3.7E+3	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA

">" indicates risk-based target concentration greater than constituent residual saturation value. NA = Not applicable. NC = Not calculated.

RBCA SITE ASSESSMENT

Site Name: ORGANICS-Comm. Use and Const. Worker
Site Location: 14-16 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.
Date Completed: 18-Jun-01

Job ID: 2485R-00

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-6
Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways ("X" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	Groundwater Ingestion / Discharge to Surface Water			X	GW Vol. to Indoor Air	X	Groundwater Volatilization to Outdoor Air			Applicable SSTL	SSTL Exceeded ?	Required CRF
			On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)		On-site (0 ft)		On-site (0 ft)	Off-site 1 (15 ft)	Off-site 2 (0 ft)			Only if "yes"
CAS No.	Name	(mg/L)	None	None	None		Commercial		Commercial	Commercial	None	(mg/L)	"■" if yes	left
71-43-2	Benzene	1.1E-1	NA	NA	NA		9.8E-2		1.0E+1	1.0E+1	NA	9.8E-2	■	1.1E+0
108-88-3	Toluene	2.4E+0	NA	NA	NA		1.1E+2		>5.2E+2	>5.2E+2	NA	1.1E+2	□	<1
100-41-4	Ethylbenzene	1.4E+0	NA	NA	NA		>1.7E+2		>1.7E+2	>1.7E+2	NA	>1.7E+2	□	NA
1330-20-7	Xylene (mixed isomers)	5.4E+0	NA	NA	NA		>2.0E+2		>2.0E+2	>2.0E+2	NA	>2.0E+2	□	NA
75-09-2	Methylene chloride	1.3E-1	NA	NA	NA		2.9E+0		2.5E+2	2.5E+2	NA	2.9E+0	□	<1
127-18-4	Tetrachloroethene	1.7E-2	NA	NA	NA		6.5E-1		7.5E+1	7.5E+1	NA	6.5E-1	□	<1
83-32-9	Acenaphthene	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
86-73-7	Fluorene	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
91-20-3	Naphthalene	2.2E+0	NA	NA	NA		>3.1E+1		>3.1E+1	>3.1E+1	NA	>3.1E+1	□	NA
85-01-8	Phenanthrene	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
129-00-0	Pyrene	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
0-00-0	TPH - Aliph >C05-C06	8.4E+0	NA	NA	NA		>3.6E+1		>3.6E+1	>3.6E+1	NA	>3.6E+1	□	NA
0-00-0	TPH - Aliph >C06-C08	8.4E+0	NA	NA	NA		>5.4E+0		>5.4E+0	>5.4E+0	NA	>5.4E+0	□	NA
0-00-0	TPH - Aliph >C08-C10	8.4E+0	NA	NA	NA		>4.3E-1		>4.3E-1	>4.3E-1	NA	>4.3E-1	□	NA
0-00-0	TPH - Aliph >C10-C12	3.2E+2	NA	NA	NA		>3.4E-2		>3.4E-2	>3.4E-2	NA	>3.4E-2	□	NA
0-00-0	TPH - Aliph >C12-C16	3.2E+2	NA	NA	NA		>7.6E-4		>7.6E-4	>7.6E-4	NA	>7.6E-4	□	NA
0-00-0	TPH - Aliph >C16-C21	3.2E+2	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
0-00-0	TPH - Aliph >C21-C34	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
0-00-0	TPH - Arom >C05-C07	8.4E+0	NA	NA	NA		1.5E+0		1.6E+2	1.6E+2	NA	1.5E+0	■	5.5E+0
0-00-0	TPH - Arom >C07-C08	8.4E+0	NA	NA	NA		9.1E+1		>5.2E+2	>5.2E+2	NA	9.1E+1	□	<1
0-00-0	TPH - Arom >C08-C10	8.4E+0	NA	NA	NA		2.9E+1		>6.5E+1	>6.5E+1	NA	2.9E+1	□	<1
0-00-0	TPH - Arom >C10-C12	3.2E+2	NA	NA	NA		>2.5E+1		>2.5E+1	>2.5E+1	NA	>2.5E+1	□	NA
0-00-0	TPH - Arom >C12-C16	3.2E+2	NA	NA	NA		>5.8E+0		>5.8E+0	>5.8E+0	NA	>5.8E+0	□	NA
0-00-0	TPH - Arom >C16-C21	3.2E+2	NA	NA	NA		NC		NC	NC	NA	NC	□	NA
0-00-0	TPH - Arom >C21-C35	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	□	NA

">" indicates risk-based target concentration greater than constituent solubility value. NA = Not applicable. NC = Not calculated.

RBCA SITE ASSESSMENT | **Baseline Risk Summary-All Pathways**

Site Name: ORGANICS-Comm. Use and Const. Worker
Site Location: 14-16 Charlotte Street, Rochester, New York
Completed By: Day Environmental, Inc.
Date Completed: 18-Jun-01

TIER 2 BASELINE RISK SUMMARY TABLE

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk	Hazard Quotient		Hazard Index		Toxicity
EXPOSURE PATHWAY	Maximum Value	Target Risk	Total Value	Target Risk	Limit(s) Exceeded?	Maximum Value	Applicable Limit	Total Value	Applicable Limit	Limit(s) Exceeded?
OUTDOOR AIR EXPOSURE PATHWAYS										
Complete:	1.1E-8	1.0E-6	1.1E-8	1.0E-6	☐	1.6E+1	1.0E+0	2.2E+1	1.0E+0	■
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	1.1E-6	1.0E-6	1.2E-6	1.0E-6	■	2.0E+3	1.0E+0	2.6E+3	1.0E+0	■
SOIL EXPOSURE PATHWAYS										
Complete:	NC	1.0E-6	NC	1.0E-6	☐	2.8E+0	1.0E+0	9.8E+0	1.0E+0	■
GROUNDWATER EXPOSURE PATHWAYS										
Complete:	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
SURFACE WATER EXPOSURE PATHWAYS										
Complete:	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)										
	1.1E-6	***1.0E-6***	***1.2E-6***	***1.0E-6***	■	***2.0E+3***	***1.0E+0***	***2.6E+3***	***1.0E+0***	■
	Indoor Air		***Indoor Air***			***Indoor Air***		***Indoor Air***		

CHEMICAL DATA FOR SELECTED COCs

Physical Property Data

Constituent	CAS Number	type	Molecular Weight (g/mole) MW	ref	Diffusion Coefficients in air (cm2/s) Dair	ref	in water (cm2/s) Dwat	ref	log (Koc) or log(Kd) (@ 20 - 25 C) log(L/kg) partition		ref	Henry's Law Constant (@ 20 - 25 C) (atm-m3) mol	(unitless)	ref	Vapor Pressure (@ 20 - 25 C) (mm Hg)	ref	Solubility (@ 20 - 25 C) (mg/L)	ref	acid pKa	base pKb	ref
Benzene	71-43-2	A	78.1	PS	8.80E-02	PS	9.80E-06	PS	1.77	Koc	PS	5.55E-03	2.29E-01	PS	9.52E+01	PS	1.75E+03	PS	-	-	-
Toluene	108-88-3	A	92.4	5	8.50E-02	A	9.40E-06	A	2.13	Koc	A	6.30E-03	2.60E-01	A	3.00E+01	4	5.15E+02	29	-	-	-
Ethylbenzene	100-41-4	A	106.2	PS	7.50E-02	PS	7.80E-06	PS	2.56	Koc	PS	7.88E-03	3.25E-01	PS	1.00E+01	PS	1.69E+02	PS	-	-	-
Xylene (mixed isomers)	1330-20-7	A	106.2	5	7.20E-02	A	8.50E-06	A	2.38	Koc	A	7.03E-03	2.90E-01	A	7.00E+00	4	1.98E+02	5	-	-	-
Methylene chloride	75-09-2	C	85	PS	1.01E-01	PS	1.17E-05	PS	1.07	Koc	PS	2.19E-03	9.03E-02	PS	4.38E+02	PS	1.30E+04	PS	-	-	-
Tetrachloroethene	127-18-4	C	165.83	PS	7.20E-02	PS	8.20E-06	PS	2.19	Koc	PS	1.84E-02	7.59E-01	PS	1.90E+01	PS	2.00E+02	PS	-	-	-
Acenaphthene	83-32-9	PAH	154.21	4	4.21E-02	4	7.69E-06	4	3.85	Koc	4	7.71E-03	3.18E-01	4	5.00E-03	4	3.93E+00	29	-	-	-
Fluorene	86-73-7	PAH	166	4	3.63E-02	4	7.88E-06	4	3.86	Koc	4	1.17E-04	4.83E-03	4	1.70E-02	4	1.69E+00	5	-	-	-
Naphthalene	91-20-3	PAH	128.2	PS	5.90E-02	PS	7.50E-06	PS	3.30	Koc	PS	4.83E-04	1.99E-02	PS	2.30E-01	PS	3.10E+01	PS	-	-	-
Phenanthrene	85-01-8	PAH	178.22	4	3.33E-02	4	7.47E-06	4	4.15	Koc	4	6.05E-03	2.50E-01	4	2.10E-04	4	1.60E+00	5	-	-	-
Pyrene	129-00-0	PAH	202.3	4	2.72E-02	4	7.24E-06	4	4.58	Koc	4	7.00E-09	2.89E-07	4	4.20E-08	4	1.60E-01	5	-	-	-
TPH - Aliph >C05-C06	0-00-0	T	81	T	1.00E-01	T	1.00E-05	T	2.90	Koc	T	7.88E-01	3.25E+01	T	2.66E+02	-	3.60E+01	T	-	-	-
TPH - Aliph >C06-C08	0-00-0	T	100	T	1.00E-01	T	1.00E-05	T	3.60	Koc	T	1.17E+00	4.81E+01	T	4.79E+01	-	5.40E+00	T	-	-	-
TPH - Aliph >C08-C10	0-00-0	T	130	T	1.00E-01	T	1.00E-05	T	4.50	Koc	T	1.90E+00	7.85E+01	T	4.79E+00	-	4.30E-01	T	-	-	-
TPH - Aliph >C10-C12	0-00-0	T	160	T	1.00E-01	T	1.00E-05	T	5.40	Koc	T	2.96E+00	1.22E+02	T	4.79E-01	-	3.40E-02	T	-	-	-
TPH - Aliph >C12-C16	0-00-0	T	200	T	1.00E-01	T	1.00E-05	T	6.70	Koc	T	1.26E+01	5.21E+02	T	3.65E-02	-	7.60E-04	T	-	-	-
TPH - Aliph >C16-C21	0-00-0	T	270	T	1.00E-01	T	1.00E-05	T	8.80	Koc	T	1.19E+02	4.90E+03	T	8.36E-04	-	2.50E-06	T	-	-	-
TPH - Aliph >C21-C34	0-00-0	T	400	-	1.00E-01	-	1.00E-05	-	8.80	Koc	-	1.76E+02	7.26E+03	-	8.36E-04	-	2.50E-06	-	-	-	-
TPH - Arom >C05-C07	0-00-0	T	78	T	1.00E-01	T	1.00E-05	T	1.90	Koc	T	5.63E-03	2.32E-01	T	9.88E+01	-	1.80E+03	T	-	-	-
TPH - Arom >C07-C08	0-00-0	T	92	T	1.00E-01	T	1.00E-05	T	2.40	Koc	T	6.72E-03	2.77E-01	T	2.89E+01	-	5.20E+02	T	-	-	-
TPH - Arom >C08-C10	0-00-0	T	120	T	1.00E-01	T	1.00E-05	T	3.20	Koc	T	1.16E-02	4.80E-01	T	4.79E+00	-	6.50E+01	T	-	-	-
TPH - Arom >C10-C12	0-00-0	T	130	T	1.00E-01	T	1.00E-05	T	3.40	Koc	T	3.28E-03	1.35E-01	T	4.79E-01	-	2.50E+01	T	-	-	-
TPH - Arom >C12-C16	0-00-0	T	150	T	1.00E-01	T	1.00E-05	T	3.70	Koc	T	1.24E-03	5.12E-02	T	3.65E-02	-	5.80E+00	T	-	-	-
TPH - Arom >C16-C21	0-00-0	T	190	T	1.00E-01	T	1.00E-05	T	4.20	Koc	T	3.22E-04	1.33E-02	T	8.36E-04	-	6.50E-01	T	-	-	-
TPH - Arom >C21-C35	0-00-0	T	240	T	1.00E-01	T	1.00E-05	T	5.10	Koc	T	1.60E-05	6.60E-04	T	3.34E-07	-	6.60E-03	T	-	-	-

Site Name: ORGANICS-Comm. Use and Const. Worker

Site Location: 14-16 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.

Date Completed: 18-Jun-01

Job ID: 2485R-00

CHEMICAL DATA FOR SELECTED COCs

Toxicity Data

Constituent	Reference Dose (mg/kg/day) Oral RfD_oral	ref	Reference Dose (mg/kg/day) Dermal RfD_dermal	ref	Reference Conc. (mg/m3) Inhalation RfC_inhal	ref	Slope Factors 1/(mg/kg/day) Oral SF_oral	ref	Slope Factors 1/(mg/kg/day) Dermal SF_dermal	ref	Unit Risk Factor 1/(µg/m3) Inhalation URF_inhal	ref	EPA Weight of Evidence	Is Constituent Carcinogenic ?
Benzene	3.00E-03	R	-	-	5.95E-03	R	2.90E-02	PS	2.99E-02	TX	8.29E-06	PS	A	TRUE
Toluene	2.00E-01	A,R	1.60E-01	TX	4.00E-01	A,R	-	-	-	-	-	-	D	FALSE
Ethylbenzene	1.00E-01	PS	9.70E-02	TX	1.00E+00	PS	-	-	-	-	-	-	D	FALSE
Xylene (mixed isomers)	2.00E+00	A,R	1.84E+00	TX	7.00E+00	A	-	-	-	-	-	-	D	FALSE
Methylene chloride	6.00E-02	PS	-	-	3.00E+00	PS	7.50E-03	PS	7.89E-03	TX	4.57E-07	PS	B2	TRUE
Tetrachloroethene	1.00E-02	PS	-	-	3.50E-02	PS	5.20E-02	PS	5.20E-02	TX	5.80E-07	PS	C-B2	TRUE
Acenaphthene	6.00E-02	R	5.34E-02	TX	-	-	-	-	-	-	-	-	-	FALSE
Fluorene	4.00E-02	A,R	3.56E-02	TX	-	-	-	-	-	-	-	-	D	FALSE
Naphthalene	4.00E-01	PS	3.56E-01	TX	1.40E+00	PS	-	-	-	-	-	-	D	FALSE
Phenanthrene	3.00E-02	31	2.67E-02	TX	-	-	-	-	-	-	-	-	D	FALSE
Pyrene	3.00E-02	R	2.67E-02	TX	-	-	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C05-C06	5.00E+00	T	-	-	1.84E+01	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C06-C08	5.00E+00	T	-	-	1.84E+01	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C08-C10	1.00E-01	T	-	-	1.00E+00	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C10-C12	1.00E-01	T	-	-	1.00E+00	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C12-C16	1.00E-01	T	-	-	1.00E+00	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C16-C21	2.00E+00	T	-	-	-	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C21-C34	2.00E+00	T	-	-	-	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C05-C07	3.00E-03	R	-	-	5.95E-03	R	-	-	-	-	-	-	D	FALSE
TPH - Arom >C07-C08	2.00E-01	T	-	-	4.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C08-C10	4.00E-02	T	-	-	2.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C10-C12	4.00E-02	T	-	-	2.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C12-C16	4.00E-02	T	-	-	2.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C16-C21	3.00E-02	T	-	-	-	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C21-C35	3.00E-02	T	-	-	-	T	-	-	-	-	-	-	D	FALSE

Site Name: ORGANICS-Comm.

Site Location: 14-16 Charlott

Miscellaneous Chemical Data

Constituent	Maximum Contaminant Level MCL (mg/L)	ref	Time-Weighted Average Workplace Criteria TWA (mg/m3)	ref	Aquatic Life Prot. Criteria AQL (mg/L)	ref	Biocon-centration Factor (L-wat/kg-fish)
Benzene	5.00E-03	52 FR 25690	3.25E+00	PS	-	-	12.6
Toluene	1.00E+00	56 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	-	-	70
Ethylbenzene	7.00E-01	56 FR 3526 (30 Jan 91)	4.35E+02	PS	-	-	1
Xylene (mixed isomers)	1.00E+01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	-	-	1
Methylene chloride	5.00E-03	57 FR 31776 (17 Jul 92)	1.74E+03	PS	-	-	1
Tetrachloroethene	5.00E-03	56 FR 3526 (30 Jan 91)	6.80E+02	PS	-	-	49
Acenaphthene	-	-	-	-	-	-	384
Fluorene	-	-	-	-	-	-	1300
Naphthalene	-	-	5.00E+01	PS	-	-	430
Phenanthrene	-	-	-	-	-	-	2630
Pyrene	-	-	-	-	-	-	2700
TPH - Aliph >C05-C06	-	-	-	-	-	-	1
TPH - Aliph >C06-C08	-	-	-	-	-	-	1
TPH - Aliph >C08-C10	-	-	-	-	-	-	1
TPH - Aliph >C10-C12	-	-	-	-	-	-	1
TPH - Aliph >C12-C16	-	-	-	-	-	-	1
TPH - Aliph >C16-C21	-	-	-	-	-	-	1
TPH - Aliph >C21-C34	-	-	-	-	-	-	1
TPH - Arom >C05-C07	-	-	-	-	-	-	1
TPH - Arom >C07-C08	-	-	-	-	-	-	1
TPH - Arom >C08-C10	-	-	-	-	-	-	1
TPH - Arom >C10-C12	-	-	-	-	-	-	1
TPH - Arom >C12-C16	-	-	-	-	-	-	1
TPH - Arom >C16-C21	-	-	-	-	-	-	1
TPH - Arom >C21-C35	-	-	-	-	-	-	1

Site Name: ORGANICS-Comm.

Site Location: 14-16 Charlott

CHEMICAL DATA FOR SELECTED COCs

Miscellaneous Chemical Data

Constituent	Dermal Relative Absorp. Factor (unitless)	Water Dermal Permeability Data: Dermal Permeability Coeff. (cm/hr)	Lag time for Dermal Exposure (hr)	Critical Exposure Time (hr)	Relative Contr of Derm Perm Coeff (unitless)	Water/Skin Derm Adsorp Factor (cm/event)	ref	Detection Limits: Groundwater (mg/L)	ref	Soil (mg/kg)	ref	Half Life (First-Order Decay) (days): Saturated	Unsaturated	ref
Benzene	0.5	0.021	0.26	0.63	0.013	7.3E-2	D	0.002	S	0.005	S	720	720	H
Toluene	0.5	0.045	0.32	0.77	0.054	1.6E-1	D	0.002	S	0.005	S	28	28	H
Ethylbenzene	0.5	0.074	0.39	1.3	0.14	2.7E-1	D	0.002	S	0.005	S	228	228	H
Xylene (mixed isomers)	0.5	0.08	0.39	1.4	0.16	2.9E-1	D	0.005	S	0.005	S	360	360	H
Methylene chloride	0.5	0.0045	0.29	0.69	0.0018	1.6E-2	D	0.005	S	0.005	S	56	56	H
Tetrachloroethene	0.5	0.048	0.9	4.3	0.25	2.2E-1	D	0.0005	S	-	-	720	720	H
Acenaphthene	0.05	-	-	-	-	-	-	0.01	32	0.66	32	204	204	H
Fluorene	0.05	-	-	-	-	-	-	0.01	32	0.66	32	120	120	H
Naphthalene	0.05	0.069	0.53	2.2	0.2	2.7E-1	D	0.01	32	0.01	32	258	258	H
Phenanthrene	0.05	0.23	1.1	5.6	2.9	1.2E+0	D	0.01	32	0.66	32	400	400	H
Pyrene	0.05	-	-	-	-	-	-	0.01	32	0.66	32	3800	3800	H
TPH - Aliph >C05-C06	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C06-C08	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C08-C10	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C10-C12	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C12-C16	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C16-C21	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C21-C34	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C05-C07	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C07-C08	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C08-C10	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C10-C12	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C12-C16	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C16-C21	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C21-C35	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-

Site Name: ORGANICS-Comm.

Site Location: 14-16 Charlott

RBCA SITE ASSESSMENT

Input Parameter Summary

Site Name: ORGANICS-Comm. Use and Const. Worker
Site Location: 14-16 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.
Date Completed: 18-Jun-01

Job ID: 2485R-00

Exposure Parameters		Residential			Commercial/Industrial	
		Adult	(1-6yrs)	(1-16 yrs)	Chronic	Construc.
AT_c	Averaging time for carcinogens (yr)	70				
AT_n	Averaging time for non-carcinogens (yr)	30			25	1
BW	Body weight (kg)	70	15	35	70	
ED	Exposure duration (yr)	30	6	16	25	1
τ	Averaging time for vapor flux (yr)	30			25	1
EF	Exposure frequency (days/yr)	350			250	100
EF_D	Exposure frequency for dermal exposure	350			250	
IR_w	Ingestion rate of water (L/day)	2			1	
IR_s	Ingestion rate of soil (mg/day)	10.15	69.7		58.6	23.4
SA	Skin surface area (dermal) (cm^2)	1700		2023	1700	1700
M	Soil to skin adherence factor	0.5				
ET_{swim}	Swimming exposure time (hr/event)	3				
EV_{swim}	Swimming event frequency (events/yr)	12	12	12		
IR_{swim}	Water ingestion while swimming (L/hr)	0.05	0.5			
SA_{swim}	Skin surface area for swimming (cm^2)	23000		8100		
IR_{fish}	Ingestion rate of fish (kg/yr)	0.025				
FI_{fish}	Contaminated fish fraction (unitless)	1				

Complete Exposure Pathways and Receptors	On-site	Off-site 1	Off-site 2
Groundwater:			
Groundwater Ingestion	None	None	None
Soil Leaching to Groundwater Ingestion	None	None	None
Applicable Surface Water Exposure Routes:			
Swimming			NA
Fish Consumption			NA
Aquatic Life Protection			NA
Soil:			
Direct Ingestion and Dermal Contact	Com./Constr.		
Outdoor Air:			
Particulates from Surface Soils	Com./Constr.	Commercial	None
Volatilization from Soils	Com./Constr.	Commercial	None
Volatilization from Groundwater	Commercial	Commercial	None
Indoor Air:			
Volatilization from Subsurface Soils	Commercial	NA	NA
Volatilization from Groundwater	Commercial	NA	NA

Receptor Distance from Source Media	On-site	Off-site 1	Off-site 2	(Units)
Groundwater receptor	NA	NA	NA	(ft)
Soil leaching to groundwater receptor	NA	NA	NA	(ft)
Outdoor air inhalation receptor	0	15	NA	(ft)

Target Health Risk Values		Individual	Cumulative
TR_{ab}	Target Risk (class A&B carcinogens)	1.0E-6	1.0E-6
TR_c	Target Risk (class C carcinogens)	1.0E-6	
THQ	Target Hazard Quotient (non-carcinogenic risk)	1.0E+0	1.0E+0

Modeling Options	
RBCA tier	Tier 2
Outdoor air volatilization model	Surface & subsurface models
Indoor air volatilization model	Johnson & Ettinger model
Soil leaching model	NA
Use soil attenuation model (SAM) for leachate?	NA
Air dilution factor	3-D Gaussian dispersion
Groundwater dilution-attenuation factor	NA

NOTE: NA = Not applicable

Surface Parameters		General	Construction	(Units)
A	Source zone area	1.4E+4	1.4E+4	(ft^2)
W	Length of source-zone area parallel to wind	1.0E+2	1.0E+2	(ft)
W_{gw}	Length of source-zone area parallel to GW flow	NA		(ft)
U_{air}	Ambient air velocity in mixing zone	7.4E+0		(ft/s)
δ_{air}	Air mixing zone height	6.6E+0		(ft)
P_a	Areal particulate emission rate	6.9E-14		(g/cm^2/s)
L_{ss}	Thickness of affected surface soils	5.0E-1		(ft)

Surface Soil Column Parameters		Value			(Units)
h_{cap}	Capillary zone thickness	3.0E-1			(ft)
h_v	Vadose zone thickness	7.9E+0			(ft)
ρ_s	Soil bulk density	1.7E+0			(g/cm^3)
f_{oc}	Fraction organic carbon	5.0E-3			(-)
θ_T	Soil total porosity	4.1E-1			(-)
K_{vs}	Vertical hydraulic conductivity	8.6E+1			(cm/d)
k_v	Vapor permeability	1.1E-12			(ft^2)
L_{gw}	Depth to groundwater	8.2E+0			(ft)
L_s	Depth to top of affected soils	8.1E+0			(ft)
L_{base}	Depth to base of affected soils	1.0E+1			(ft)
L_{subs}	Thickness of affected soils	1.9E+0			(ft)
pH	Soil/groundwater pH	6.7E+0			(-)
		capillary	vadose	foundation	
θ_w	Volumetric water content	0.369	0.12	0.12	(-)
θ_a	Volumetric air content	0.041	0.29	0.26	(-)

Building Parameters		Residential	Commercial	(Units)
L_b	Building volume/area ratio	NA	9.84E+0	(ft)
A_b	Foundation area	NA	7.53E+2	(ft^2)
X_{crk}	Foundation perimeter	NA	1.12E+2	(ft)
ER	Building air exchange rate	NA	2.30E-4	(1/s)
L_{crk}	Foundation thickness	NA	4.92E-1	(ft)
Z_{crk}	Depth to bottom of foundation slab	NA	4.92E-1	(ft)
η	Foundation crack fraction	NA	1.00E-2	(-)
dP	Indoor/outdoor differential pressure	NA	0.00E+0	(g/cm/s^2)
Q_s	Convective air flow through slab	NA	0.00E+0	(ft^3/s)

Groundwater Parameters		Value	(Units)
δ_{gw}	Groundwater mixing zone depth	NA	(ft)
I_f	Net groundwater infiltration rate	NA	(cm/yr)
U_{gw}	Groundwater Darcy velocity	NA	(cm/d)
V_{gw}	Groundwater seepage velocity	NA	(cm/d)
K_s	Saturated hydraulic conductivity	NA	(cm/d)
i	Groundwater gradient	NA	(-)
S_w	Width of groundwater source zone	NA	(ft)
S_d	Depth of groundwater source zone	NA	(ft)
θ_{eff}	Effective porosity in water-bearing unit	NA	(-)
f_{oc-sat}	Fraction organic carbon in water-bearing unit	NA	(-)
pH_{sat}	Groundwater pH	NA	(-)
	Biodegradation considered?	NA	

Transport Parameters		Off-site 1	Off-site 2	Off-site 1	Off-site 2	(Units)
Lateral Groundwater Transport		Groundwater Ingestion		Soil Leaching to GW		
α_x	Longitudinal dispersivity	NA	NA	NA	NA	(ft)
α_y	Transverse dispersivity	NA	NA	NA	NA	(ft)
α_z	Vertical dispersivity	NA	NA	NA	NA	(ft)
Lateral Outdoor Air Transport		Soil to Outdoor Air Inhal.		GW to Outdoor Air Inhal.		
σ_y	Transverse dispersion coefficient	1.9E+0	NA	1.9E+0	NA	(ft)
σ_z	Vertical dispersion coefficient	1.3E+0	NA	1.3E+0	NA	(ft)
ADF	Air dispersion factor	1.0E+0	NA	1.0E+0	NA	(-)

Surface Water Parameters		Off-site 2	(Units)
Q_{sw}	Surface water flowrate	NA	(ft^3/s)
W_{pl}	Width of GW plume at SW discharge	NA	(ft)
δ_{pl}	Thickness of GW plume at SW discharge	NA	(ft)
DF_{sw}	Groundwater-to-surface water dilution factor	NA	(-)

RBCA SITE ASSESSMENT | User-Specified COC Data

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	Representative COC Concentration			
	Groundwater		Soils (8.1 - 10 ft)	
	value (mg/L)	note	value (mg/kg)	note
Benzene	1.1E-1		0.0E+0	
Toluene	2.4E+0		1.6E+1	
Ethylbenzene	1.4E+0		9.0E+0	
Xylene (mixed isomers)	5.4E+0		5.1E+1	
Methylene chloride	1.3E-1		0.0E+0	
Tetrachloroethene	1.7E-2		0.0E+0	
Acenaphthene	0.0E+0		4.3E-1	
Fluorene	0.0E+0		5.8E-1	
Naphthalene	2.2E+0		6.8E+0	
Phenanthrene	0.0E+0		1.7E+0	
Pyrene	0.0E+0		3.1E-1	
TPH - Aliph >C05-C06	8.4E+0		5.6E+2	
TPH - Aliph >C06-C08	8.4E+0		5.6E+2	
TPH - Aliph >C08-C10	8.4E+0		5.6E+2	
TPH - Aliph >C10-C12	3.2E+2		2.4E+4	
TPH - Aliph >C12-C16	3.2E+2		2.4E+4	
TPH - Aliph >C16-C21	3.2E+2		2.4E+4	
TPH - Aliph >C21-C34	0.0E+0		3.7E+3	
TPH - Arom >C05-C07	8.4E+0		5.6E+2	
TPH - Arom >C07-C08	8.4E+0		5.6E+2	
TPH - Arom >C08-C10	8.4E+0		5.6E+2	
TPH - Arom >C10-C12	3.2E+2		2.4E+4	
TPH - Arom >C12-C16	3.2E+2		2.4E+4	
TPH - Arom >C16-C21	3.2E+2		2.4E+4	
TPH - Arom >C21-C35	0.0E+0		3.7E+3	

Site Name: ORGANICS-Comm. Use and Const. Worker
Site Location: 14-16 Charlotte Street, Rochester, New York
Completed By: Day Environmental, Inc.

Date Completed: 18-Jun-01
Job ID: 2485R-00

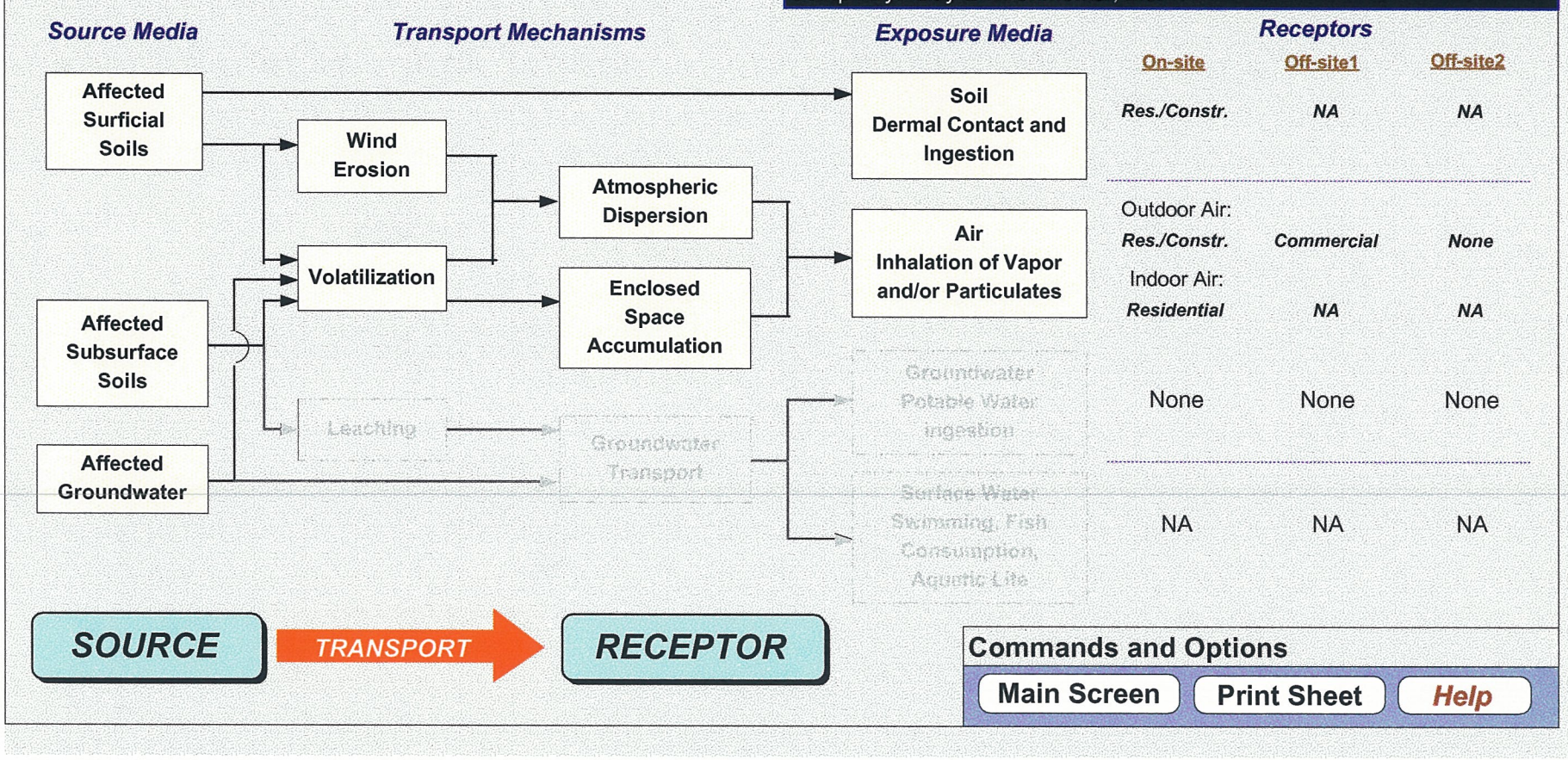
ATTACHMENT E

Tier 2 Output Data Sheets

Organic Contaminants (26-60 Charlotte Street)

Exposure Pathway Flowchart

Site Name: ORGANICS-Res. Use and Const. Worker Job ID: 2485R-00
Location: 26-60 Charlotte Street, Rochester, New York Date: 19-Jun-01
Compl. By: Day Environmental, Inc.



RBCA SITE ASSESSMENT

Site Name: ORGANICS-Res. Use and Const. Worker
Site Location: 26-60 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.
Date Completed: 19-Jun-01

Job ID: 2485R-00

SOIL (8.1 - 10 ft) SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-6
Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways ("X" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	Soil Leaching to Groundwater Ingestion / Discharge to Surface Water			X Soil Vol. to Indoor Air	X Soil Volatilization and Surface Soil Particulates to Outdoor Air				X Surface Soil Inhalation, Ingestion,Dermal Contact		Applicable SSTL	SSTL Exceeded ?	Required CRF
			On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)	On-site (0 ft)		Off-site 1 (15 ft)	Off-site 2 (0 ft)	On-site (0 ft)				Only if "yes" left
CAS No.	Name	(mg/kg)	None	None	None	Residential	Residential	Construction Worker	Commercial	None	Residential	Construction Worker	(mg/kg)	"■" if yes	
71-43-2	Benzene	5.9E-1	NA	NA	NA	8.1E-2	1.7E+1	>7.1E+2	1.4E+1	NA	1.3E+1	1.3E+3	8.1E-2	■	7.3E+0
108-88-3	Toluene	6.1E-1	NA	NA	NA	1.1E+2	>4.1E+2	>4.1E+2	>4.1E+2	NA	2.7E+4	9.2E+4	1.1E+2	□	<1
100-41-4	Ethylbenzene	6.3E-3	NA	NA	NA	2.9E+2	>3.3E+2	>3.3E+2	>3.3E+2	NA	1.6E+4	5.5E+4	2.9E+2	□	<1
1330-20-7	Xylene (mixed isomers)	9.7E-1	NA	NA	NA	>2.6E+2	>2.6E+2	>2.6E+2	>2.6E+2	NA	3.1E+5	1.0E+6	3.1E+5	□	<1
67-64-1	Acetone	0.0E+0	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA
108-90-7	Chlorobenzene	0.0E+0	NA	NA	NA	5.7E+0	>5.6E+2	>5.6E+2	>5.6E+2	NA	1.1E+3	3.7E+3	5.7E+0	□	<1
0-00-0	TPH - Aliph >C05-C06	2.1E+3	NA	NA	NA	>3.4E+2	>3.4E+2	>3.4E+2	>3.4E+2	NA	8.4E+5	1.0E+6	8.4E+5	□	<1
0-00-0	TPH - Aliph >C06-C08	2.1E+3	NA	NA	NA	>1.5E+2	>1.5E+2	>1.5E+2	>1.5E+2	NA	8.4E+5	1.0E+6	8.4E+5	□	<1
0-00-0	TPH - Aliph >C08-C10	2.1E+3	NA	NA	NA	>7.4E+1	>7.4E+1	>7.4E+1	>7.4E+1	NA	1.7E+4	5.7E+4	1.7E+4	□	<1
0-00-0	TPH - Aliph >C10-C12	4.7E+3	NA	NA	NA	>4.3E+1	>4.3E+1	>4.3E+1	>4.3E+1	NA	1.7E+4	5.7E+4	1.7E+4	□	<1
0-00-0	TPH - Aliph >C12-C16	4.7E+3	NA	NA	NA	>1.9E+1	>1.9E+1	>1.9E+1	>1.9E+1	NA	1.7E+4	5.7E+4	1.7E+4	□	<1
0-00-0	TPH - Aliph >C16-C21	4.7E+3	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA
0-00-0	TPH - Aliph >C21-C34	2.2E+2	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA
0-00-0	TPH - Arom >C05-C07	2.1E+3	NA	NA	NA	1.7E+0	3.6E+2	>9.1E+2	3.0E+2	NA	5.0E+2	1.7E+3	1.7E+0	■	1.2E+3
0-00-0	TPH - Arom >C07-C08	2.1E+3	NA	NA	NA	1.1E+2	>7.1E+2	>7.1E+2	>7.1E+2	NA	3.4E+4	1.1E+5	1.1E+2	■	1.8E+1
0-00-0	TPH - Arom >C08-C10	2.1E+3	NA	NA	NA	5.7E+1	>5.2E+2	>5.2E+2	>5.2E+2	NA	6.7E+3	2.3E+4	5.7E+1	■	3.7E+1
0-00-0	TPH - Arom >C10-C12	4.7E+3	NA	NA	NA	1.2E+2	>3.2E+2	>3.2E+2	>3.2E+2	NA	6.7E+3	2.3E+4	1.2E+2	■	3.9E+1
0-00-0	TPH - Arom >C12-C16	4.7E+3	NA	NA	NA	>1.5E+2	>1.5E+2	>1.5E+2	>1.5E+2	NA	6.7E+3	2.3E+4	6.7E+3	□	<1
0-00-0	TPH - Arom >C16-C21	4.7E+3	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA
0-00-0	TPH - Arom >C21-C35	2.2E+2	NA	NA	NA	NC	NC	NC	NC	NA	NC	NC	NC	□	NA

">" indicates risk-based target concentration greater than constituent residual saturation value. NA = Not applicable. NC = Not calculated.

RBCA SITE ASSESSMENT

Site Name: ORGANICS-Res. Use and Const. Worker
Site Location: 26-60 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.
Date Completed: 19-Jun-01

Job ID: 2485R-00

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-6
Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways ("X" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	Groundwater Ingestion / Discharge to Surface Water			X	GW Vol. to Indoor Air	X	Groundwater Volatilization to Outdoor Air			Applicable SSTL	SSTL Exceeded ?	Required CRF
			On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)		On-site (0 ft)		On-site (0 ft)	Off-site 1 (15 ft)	Off-site 2 (0 ft)			Only if "yes" left
CAS No.	Name	(mg/L)	None	None	None		Residential		Residential	Commercial	None	(mg/L)	"■" if yes	
71-43-2	Benzene	1.5E-2	NA	NA	NA		2.4E-2		6.1E+0	6.1E+0	NA	2.4E-2	☐	<1
108-88-3	Toluene	3.8E-3	NA	NA	NA		3.2E+1		>5.2E+2	>5.2E+2	NA	3.2E+1	☐	<1
100-41-4	Ethylbenzene	5.8E-3	NA	NA	NA		7.7E+1		>1.7E+2	>1.7E+2	NA	7.7E+1	☐	<1
1330-20-7	Xylene (mixed isomers)	6.6E-2	NA	NA	NA		>2.0E+2		>2.0E+2	>2.0E+2	NA	>2.0E+2	☐	NA
67-64-1	Acetone	2.1E-2	NA	NA	NA		NC		NC	NC	NA	NC	☐	NA
108-90-7	Chlorobenzene	2.2E-2	NA	NA	NA		2.7E+0		>4.7E+2	>4.7E+2	NA	2.7E+0	☐	<1
0-00-0	TPH - Aliph >C05-C06	3.9E-1	NA	NA	NA		1.4E+1		>3.6E+1	>3.6E+1	NA	1.4E+1	☐	<1
0-00-0	TPH - Aliph >C06-C08	3.9E-1	NA	NA	NA		>5.4E+0		>5.4E+0	>5.4E+0	NA	>5.4E+0	☐	NA
0-00-0	TPH - Aliph >C08-C10	3.9E-1	NA	NA	NA		3.1E-1		>4.3E-1	>4.3E-1	NA	3.1E-1	■	1.2E+0
0-00-0	TPH - Aliph >C10-C12	1.9E+0	NA	NA	NA		>3.4E-2		>3.4E-2	>3.4E-2	NA	>3.4E-2	☐	NA
0-00-0	TPH - Aliph >C12-C16	1.9E+0	NA	NA	NA		>7.6E-4		>7.6E-4	>7.6E-4	NA	>7.6E-4	☐	NA
0-00-0	TPH - Aliph >C16-C21	1.9E+0	NA	NA	NA		NC		NC	NC	NA	NC	☐	NA
0-00-0	TPH - Aliph >C21-C34	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	☐	NA
0-00-0	TPH - Arom >C05-C07	3.9E-1	NA	NA	NA		4.5E-1		1.2E+2	1.2E+2	NA	4.5E-1	☐	<1
0-00-0	TPH - Arom >C07-C08	3.9E-1	NA	NA	NA		2.6E+1		>5.2E+2	>5.2E+2	NA	2.6E+1	☐	<1
0-00-0	TPH - Arom >C08-C10	3.9E-1	NA	NA	NA		8.5E+0		>6.5E+1	>6.5E+1	NA	8.5E+0	☐	<1
0-00-0	TPH - Arom >C10-C12	1.9E+0	NA	NA	NA		2.2E+1		>2.5E+1	>2.5E+1	NA	2.2E+1	☐	<1
0-00-0	TPH - Arom >C12-C16	1.9E+0	NA	NA	NA		>5.8E+0		>5.8E+0	>5.8E+0	NA	>5.8E+0	☐	NA
0-00-0	TPH - Arom >C16-C21	1.9E+0	NA	NA	NA		NC		NC	NC	NA	NC	☐	NA
0-00-0	TPH - Arom >C21-C35	0.0E+0	NA	NA	NA		NC		NC	NC	NA	NC	☐	NA

">" indicates risk-based target concentration greater than constituent solubility value. NA = Not applicable. NC = Not calculated.

RBCA SITE ASSESSMENT | **Baseline Risk Summary-All Pathways**

Site Name: ORGANICS-Res. Use and Const. Worker
Site Location: 26-60 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.
Date Completed: 19-Jun-01

TIER 2 BASELINE RISK SUMMARY TABLE

EXPOSURE PATHWAY	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
Complete:	3.7E-8	1.0E-6	3.7E-8	1.0E-6	☐	5.9E+0	1.0E+0	7.2E+0	1.0E+0	■
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	7.9E-6	1.0E-6	7.9E-6	1.0E-6	■	1.2E+3	1.0E+0	1.4E+3	1.0E+0	■
SOIL EXPOSURE PATHWAYS										
Complete:	4.5E-8	1.0E-6	4.5E-8	1.0E-6	☐	4.2E+0	1.0E+0	6.8E+0	1.0E+0	■
GROUNDWATER EXPOSURE PATHWAYS										
Complete:	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
SURFACE WATER EXPOSURE PATHWAYS										
Complete:	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)										
	7.9E-6	***1.0E-6***	***7.9E-6***	***1.0E-6***	■	***1.2E+3***	***1.0E+0***	***1.4E+3***	***1.0E+0***	■
	Indoor Air		***Indoor Air***			***Indoor Air***		***Indoor Air***		

RBCA Tool Kit for Chemical Releases, Version 1.0

CHEMICAL DATA FOR SELECTED COCs

Physical Property Data

Constituent	CAS Number	type	Molecular Weight (g/mole) MW	ref	Diffusion Coefficients in air (cm2/s) Dair	ref	in water (cm2/s) Dwat	ref	log (Koc) or log(Kd) (@ 20 - 25 C) log(L/kg) partition		ref	Henry's Law Constant (@ 20 - 25 C) (atm-m3) mol	(unitless)	ref	Vapor Pressure (@ 20 - 25 C) (mm Hg)	ref	Solubility (@ 20 - 25 C) (mg/L)	ref	acid pKa	base pKb	ref
Benzene	71-43-2	A	78.1	PS	8.80E-02	PS	9.80E-06	PS	1.77	Koc	PS	5.55E-03	2.29E-01	PS	9.52E+01	PS	1.75E+03	PS	-	-	-
Toluene	108-88-3	A	92.4	5	8.50E-02	A	9.40E-06	A	2.13	Koc	A	6.30E-03	2.60E-01	A	3.00E+01	4	5.15E+02	29	-	-	-
Ethylbenzene	100-41-4	A	106.2	PS	7.50E-02	PS	7.80E-06	PS	2.56	Koc	PS	7.88E-03	3.25E-01	PS	1.00E+01	PS	1.69E+02	PS	-	-	-
Xylene (mixed isomers)	1330-20-7	A	106.2	5	7.20E-02	A	8.50E-06	A	2.38	Koc	A	7.03E-03	2.90E-01	A	7.00E+00	4	1.98E+02	5	-	-	-
Acetone	67-64-1	O	58.08	4	1.24E-01	4	1.14E-05	4	-0.24	Koc	4	2.50E-05	1.03E-03	4	2.66E+02	4	1.00E+06	10	-	-	-
Chlorobenzene	108-90-7	AC	112.6	PS	7.30E-02	PS	8.70E-06	PS	2.34	Koc	PS	3.70E-03	1.53E-01	PS	1.18E+01	PS	4.72E+02	PS	-	-	-
TPH - Aliph >C05-C06	0-00-0	T	81	T	1.00E-01	T	1.00E-05	T	2.90	Koc	T	7.88E-01	3.25E+01	T	2.66E+02	-	3.60E+01	T	-	-	-
TPH - Aliph >C06-C08	0-00-0	T	100	T	1.00E-01	T	1.00E-05	T	3.60	Koc	T	1.17E+00	4.81E+01	T	4.79E+01	-	5.40E+00	T	-	-	-
TPH - Aliph >C08-C10	0-00-0	T	130	T	1.00E-01	T	1.00E-05	T	4.50	Koc	T	1.90E+00	7.85E+01	T	4.79E+00	-	4.30E-01	T	-	-	-
TPH - Aliph >C10-C12	0-00-0	T	160	T	1.00E-01	T	1.00E-05	T	5.40	Koc	T	2.96E+00	1.22E+02	T	4.79E-01	-	3.40E-02	T	-	-	-
TPH - Aliph >C12-C16	0-00-0	T	200	T	1.00E-01	T	1.00E-05	T	6.70	Koc	T	1.26E+01	5.21E+02	T	3.65E-02	-	7.60E-04	T	-	-	-
TPH - Aliph >C16-C21	0-00-0	T	270	T	1.00E-01	T	1.00E-05	T	8.80	Koc	T	1.19E+02	4.90E+03	-	8.36E-04	-	2.50E-06	T	-	-	-
TPH - Aliph >C21-C34	0-00-0	T	400	-	1.00E-01	-	1.00E-05	T	8.80	Koc	-	1.76E+02	7.26E+03	-	8.36E-04	-	2.50E-06	-	-	-	-
TPH - Arom >C05-C07	0-00-0	T	78	T	1.00E-01	T	1.00E-05	-	1.90	Koc	T	5.63E-03	2.32E-01	T	9.88E+01	-	1.80E+03	T	-	-	-
TPH - Arom >C07-C08	0-00-0	T	92	T	1.00E-01	T	1.00E-05	T	2.40	Koc	T	6.72E-03	2.77E-01	T	2.89E+01	-	5.20E+02	T	-	-	-
TPH - Arom >C08-C10	0-00-0	T	120	T	1.00E-01	T	1.00E-05	T	3.20	Koc	T	1.16E-02	4.80E-01	T	4.79E+00	-	6.50E+01	T	-	-	-
TPH - Arom >C10-C12	0-00-0	T	130	T	1.00E-01	T	1.00E-05	T	3.40	Koc	T	3.28E-03	1.35E-01	T	4.79E-01	-	2.50E+01	T	-	-	-
TPH - Arom >C12-C16	0-00-0	T	150	T	1.00E-01	T	1.00E-05	T	3.70	Koc	T	1.24E-03	5.12E-02	T	3.65E-02	-	5.80E+00	T	-	-	-
TPH - Arom >C16-C21	0-00-0	T	190	T	1.00E-01	T	1.00E-05	T	4.20	Koc	T	3.22E-04	1.33E-02	T	8.36E-04	-	6.50E-01	T	-	-	-
TPH - Arom >C21-C35	0-00-0	T	240	T	1.00E-01	T	1.00E-05	T	5.10	Koc	T	1.60E-05	6.60E-04	T	3.34E-07	-	6.60E-03	T	-	-	-

Site Name: ORGANICS-Res. Use and Const. Worker

Site Location: 26-60 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.

Date Completed: 19-Jun-01

Job ID: 2485R-00

CHEMICAL DATA FOR SELECTED COCs

Toxicity Data

Constituent	Reference Dose (mg/kg/day) Oral RfD_oral	ref	(mg/kg/day) Dermal RfD_dermal	ref	Reference Conc. (mg/m3) Inhalation RfC_inhal	ref	Slope Factors 1/(mg/kg/day) Oral SF_oral	ref	1/(mg/kg/day) Dermal SF_dermal	ref	Unit Risk Factor 1/(µg/m3) Inhalation URF_inhal	ref	EPA Weight of Evidence	Is Constituent Carcinogenic ?
Benzene	3.00E-03	R	-	-	5.95E-03	R	2.90E-02	PS	2.99E-02	TX	8.29E-06	PS	A	TRUE
Toluene	2.00E-01	A,R	1.60E-01	TX	4.00E-01	A,R	-	-	-	-	-	-	D	FALSE
Ethylbenzene	1.00E-01	PS	9.70E-02	TX	1.00E+00	PS	-	-	-	-	-	-	D	FALSE
Xylene (mixed isomers)	2.00E+00	A,R	1.84E+00	TX	7.00E+00	A	-	-	-	-	-	-	D	FALSE
Acetone	1.00E-01	PS	8.30E-02	TX	-	-	-	-	-	-	-	-	D	FALSE
Chlorobenzene	2.00E-02	PS	6.20E-03	TX	2.00E-02	PS	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C05-C06	5.00E+00	T	-	-	1.84E+01	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C06-C08	5.00E+00	T	-	-	1.84E+01	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C08-C10	1.00E-01	T	-	-	1.00E+00	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C10-C12	1.00E-01	T	-	-	1.00E+00	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C12-C16	1.00E-01	T	-	-	1.00E+00	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C16-C21	2.00E+00	T	-	-	-	T	-	-	-	-	-	-	D	FALSE
TPH - Aliph >C21-C34	2.00E+00	T	-	-	-	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C05-C07	3.00E-03	R	-	-	5.95E-03	R	-	-	-	-	-	-	D	FALSE
TPH - Arom >C07-C08	2.00E-01	T	-	-	4.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C08-C10	4.00E-02	T	-	-	2.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C10-C12	4.00E-02	T	-	-	2.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C12-C16	4.00E-02	T	-	-	2.00E-01	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C16-C21	3.00E-02	T	-	-	-	T	-	-	-	-	-	-	D	FALSE
TPH - Arom >C21-C35	3.00E-02	T	-	-	-	T	-	-	-	-	-	-	D	FALSE

Site Name: ORGANICS-Res. U

Site Location: 26-60 Charlott

Miscellaneous Chemical Data

Constituent	Maximum Contaminant Level MCL (mg/L)	ref	Time-Weighted Average Workplace Criteria TWA (mg/m3)	ref	Aquatic Life Prot. Criteria AQL (mg/L)	ref	Biocon-centration Factor (L-wat/kg-fish)
Benzene	5.00E-03	52 FR 25690	3.25E+00	PS	-	-	12.6
Toluene	1.00E+00	56 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	-	-	70
Ethylbenzene	7.00E-01	56 FR 3526 (30 Jan 91)	4.35E+02	PS	-	-	1
Xylene (mixed isomers)	1.00E+01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	-	-	1
Acetone	-	-	5.90E+02	NIOSH	-	-	1
Chlorobenzene	1.00E-01	56 FR 3526 (30 Jan 91)	3.50E+02	PS	-	-	450
TPH - Aliph >C05-C06	-	-	-	-	-	-	1
TPH - Aliph >C06-C08	-	-	-	-	-	-	1
TPH - Aliph >C08-C10	-	-	-	-	-	-	1
TPH - Aliph >C10-C12	-	-	-	-	-	-	1
TPH - Aliph >C12-C16	-	-	-	-	-	-	1
TPH - Aliph >C16-C21	-	-	-	-	-	-	1
TPH - Aliph >C21-C34	-	-	-	-	-	-	1
TPH - Arom >C05-C07	-	-	-	-	-	-	1
TPH - Arom >C07-C08	-	-	-	-	-	-	1
TPH - Arom >C08-C10	-	-	-	-	-	-	1
TPH - Arom >C10-C12	-	-	-	-	-	-	1
TPH - Arom >C12-C16	-	-	-	-	-	-	1
TPH - Arom >C16-C21	-	-	-	-	-	-	1
TPH - Arom >C21-C35	-	-	-	-	-	-	1

Site Name: ORGANICS-Res. U

Site Location: 26-60 Charlott

CHEMICAL DATA FOR SELECTED COCs

Miscellaneous Chemical Data

Constituent	Dermal Relative Absorp. Factor (unitless)	Water Dermal Permeability Data: Dermal Permeability Coeff. (cm/hr)	Lag time for Dermal Exposure (hr)	Critical Exposure Time (hr)	Relative Contr of Derm Perm Coeff (unitless)	Water/Skin Derm Adsorp Factor (cm/event)	ref	Detection Limits: Groundwater (mg/L)	ref	Soil (mg/kg)	ref	Half Life (First-Order Decay) (days): Saturated	Unsaturated	ref
Benzene	0.5	0.021	0.26	0.63	0.013	7.3E-2	D	0.002	S	0.005	S	720	720	H
Toluene	0.5	0.045	0.32	0.77	0.054	1.6E-1	D	0.002	S	0.005	S	28	28	H
Ethylbenzene	0.5	0.074	0.39	1.3	0.14	2.7E-1	D	0.002	S	0.005	S	228	228	H
Xylene (mixed isomers)	0.5	0.08	0.39	1.4	0.16	2.9E-1	D	0.005	S	0.005	S	360	360	H
Acetone	0.5	-	-	-	-	-	-	0.1	S	0.1	S	14	14	H
Chlorobenzene	0.5	0.041	0.43	1	0.069	1.5E-1	D	0.002	S	0.005	S	300	300	H
TPH - Aliph >C05-C06	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C06-C08	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C08-C10	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C10-C12	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C12-C16	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C16-C21	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Aliph >C21-C34	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C05-C07	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C07-C08	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C08-C10	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C10-C12	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C12-C16	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C16-C21	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH - Arom >C21-C35	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-

Site Name: ORGANICS-Res. U

Site Location: 26-60 Charlott

RBCA SITE ASSESSMENT

Input Parameter Summary

Site Name: ORGANICS-Res. Use and Const. Worker
Site Location: 26-60 Charlotte Street, Rochester, New York

Completed By: Day Environmental, Inc.
Date Completed: 19-Jun-01

Job ID: 2485R-00

Exposure Parameters		Residential			Commercial/Industrial	
		Adult	(1-6yrs)	(1-16 yrs)	Chronic	Construc.
AT_c	Averaging time for carcinogens (yr)	70				
AT_n	Averaging time for non-carcinogens (yr)	30			25	1
BW	Body weight (kg)	70	15	35	70	
ED	Exposure duration (yr)	30	6	16	25	1
τ	Averaging time for vapor flux (yr)	30			25	1
EF	Exposure frequency (days/yr)	350			250	100
EF_D	Exposure frequency for dermal exposure	350			250	
IR_w	Ingestion rate of water (L/day)	2			1	
IR_s	Ingestion rate of soil (mg/day)	10.15	69.7		58.6	23.4
SA	Skin surface area (dermal) (cm^2)	1700		2023	1700	1700
M	Soil to skin adherence factor	0.5				
ET_{swim}	Swimming exposure time (hr/event)	3				
EV_{swim}	Swimming event frequency (events/yr)	12	12	12		
IR_{swim}	Water ingestion while swimming (L/hr)	0.05	0.5			
SA_{swim}	Skin surface area for swimming (cm^2)	23000		8100		
IR_{fish}	Ingestion rate of fish (kg/yr)	0.025				
FI_{fish}	Contaminated fish fraction (unitless)	1				

Complete Exposure Pathways and Receptors	On-site	Off-site 1	Off-site 2
Groundwater:			
Groundwater Ingestion	None	None	None
Soil Leaching to Groundwater Ingestion	None	None	None
Applicable Surface Water Exposure Routes:			
Swimming			NA
Fish Consumption			NA
Aquatic Life Protection			NA
Soil:			
Direct Ingestion and Dermal Contact	Res./Constr.		
Outdoor Air:			
Particulates from Surface Soils	Res./Constr.	Commercial	None
Volatilization from Soils	Res./Constr.	Commercial	None
Volatilization from Groundwater	Residential	Commercial	None
Indoor Air:			
Volatilization from Subsurface Soils	Residential	NA	NA
Volatilization from Groundwater	Residential	NA	NA

Receptor Distance from Source Media	On-site	Off-site 1	Off-site 2	(Units)
Groundwater receptor	NA	NA	NA	(ft)
Soil leaching to groundwater receptor	NA	NA	NA	(ft)
Outdoor air inhalation receptor	0	15	NA	(ft)

Target Health Risk Values		Individual	Cumulative
TR_{ab}	Target Risk (class A&B carcinogens)	1.0E-6	1.0E-6
TR_c	Target Risk (class C carcinogens)	1.0E-6	
THQ	Target Hazard Quotient (non-carcinogenic risk)	1.0E+0	1.0E+0

Modeling Options	
RBCA tier	Tier 2
Outdoor air volatilization model	Surface & subsurface models
Indoor air volatilization model	Johnson & Ettinger model
Soil leaching model	NA
Use soil attenuation model (SAM) for leachate?	NA
Air dilution factor	3-D Gaussian dispersion
Groundwater dilution-attenuation factor	NA

NOTE: NA = Not applicable

Surface Parameters		General	Construction	(Units)
A	Source zone area	3.4E+4	3.4E+4	(ft^2)
W	Length of source-zone area parallel to wind	2.5E+2	2.5E+2	(ft)
W_{gw}	Length of source-zone area parallel to GW flow	NA		(ft)
U_{air}	Ambient air velocity in mixing zone	7.4E+0		(ft/s)
δ_{air}	Air mixing zone height	6.6E+0		(ft)
P_a	Areal particulate emission rate	6.9E-14		(g/cm^2/s)
L_{ss}	Thickness of affected surface soils	5.0E-1		(ft)

Surface Soil Column Parameters		Value			(Units)
h_{cap}	Capillary zone thickness	3.0E-1			(ft)
h_v	Vadose zone thickness	7.9E+0			(ft)
ρ_s	Soil bulk density	1.7E+0			(g/cm^3)
f_{oc}	Fraction organic carbon	5.0E-3			(-)
θ_T	Soil total porosity	4.1E-1			(-)
K_{vs}	Vertical hydraulic conductivity	2.8E+0			(ft/d)
k_v	Vapor permeability	1.1E-12			(ft^2)
L_{gw}	Depth to groundwater	8.2E+0			(ft)
L_s	Depth to top of affected soils	8.1E+0			(ft)
L_{base}	Depth to base of affected soils	1.0E+1			(ft)
L_{subs}	Thickness of affected soils	1.9E+0			(ft)
pH	Soil/groundwater pH	6.7E+0			(-)
		capillary	vadose	foundation	
θ_w	Volumetric water content	0.369	0.12	0.12	(-)
θ_a	Volumetric air content	0.041	0.29	0.26	(-)

Building Parameters		Residential	Commercial	(Units)
L_b	Building volume/area ratio	6.56E+0	NA	(ft)
A_b	Foundation area	3.84E+4	NA	(ft^2)
X_{crk}	Foundation perimeter	7.79E+2	NA	(ft)
ER	Building air exchange rate	1.40E-4	NA	(1/s)
L_{crk}	Foundation thickness	4.92E-1	NA	(ft)
Z_{crk}	Depth to bottom of foundation slab	4.00E+0	NA	(ft)
η	Foundation crack fraction	1.00E-2	NA	(-)
dP	Indoor/outdoor differential pressure	0.00E+0	NA	(g/cm/s^2)
Q_s	Convective air flow through slab	0.00E+0	NA	(ft^3/s)

Groundwater Parameters		Value	(Units)
δ_{gw}	Groundwater mixing zone depth	NA	(ft)
I_f	Net groundwater infiltration rate	NA	(cm/yr)
U_{gw}	Groundwater Darcy velocity	NA	(ft/d)
V_{gw}	Groundwater seepage velocity	NA	(ft/d)
K_s	Saturated hydraulic conductivity	NA	(ft/d)
i	Groundwater gradient	NA	(-)
S_w	Width of groundwater source zone	NA	(ft)
S_d	Depth of groundwater source zone	NA	(ft)
θ_{eff}	Effective porosity in water-bearing unit	NA	(-)
$f_{oc\text{-}sat}$	Fraction organic carbon in water-bearing unit	NA	(-)
pH_{sat}	Groundwater pH	NA	(-)
	Biodegradation considered?	NA	

Transport Parameters		Off-site 1	Off-site 2	Off-site 1	Off-site 2	(Units)
Lateral Groundwater Transport		Groundwater Ingestion		Soil Leaching to GW		
α_x	Longitudinal dispersivity	NA	NA	NA	NA	(ft)
α_y	Transverse dispersivity	NA	NA	NA	NA	(ft)
α_z	Vertical dispersivity	NA	NA	NA	NA	(ft)
Lateral Outdoor Air Transport		Soil to Outdoor Air Inhal.		GW to Outdoor Air Inhal.		
σ_y	Transverse dispersion coefficient	1.9E+0	NA	1.9E+0	NA	(ft)
σ_z	Vertical dispersion coefficient	1.3E+0	NA	1.3E+0	NA	(ft)
ADF	Air dispersion factor	1.0E+0	NA	1.0E+0	NA	(-)

Surface Water Parameters		Off-site 2	(Units)
Q_{sw}	Surface water flowrate	NA	(ft^3/s)
W_{pl}	Width of GW plume at SW discharge	NA	(ft)
δ_{pl}	Thickness of GW plume at SW discharge	NA	(ft)
DF_{sw}	Groundwater-to-surface water dilution factor	NA	(-)

RBCA SITE ASSESSMENT | **User-Specified COC Data**

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	Representative COC Concentration			
	Groundwater		Soils (8.1 - 10 ft)	
	value (mg/L)	note	value (mg/kg)	note
Benzene	1.5E-2		5.9E-1	
Toluene	3.8E-3		6.1E-1	
Ethylbenzene	5.8E-3		6.3E-3	
Xylene (mixed isomers)	6.6E-2		9.7E-1	
Acetone	2.1E-2		0.0E+0	
Chlorobenzene	2.2E-2		0.0E+0	
TPH - Aliph >C05-C06	3.9E-1		2.1E+3	
TPH - Aliph >C06-C08	3.9E-1		2.1E+3	
TPH - Aliph >C08-C10	3.9E-1		2.1E+3	
TPH - Aliph >C10-C12	1.9E+0		4.7E+3	
TPH - Aliph >C12-C16	1.9E+0		4.7E+3	
TPH - Aliph >C16-C21	1.9E+0		4.7E+3	
TPH - Aliph >C21-C34	0.0E+0		2.2E+2	
TPH - Arom >C05-C07	3.9E-1		2.1E+3	
TPH - Arom >C07-C08	3.9E-1		2.1E+3	
TPH - Arom >C08-C10	3.9E-1		2.1E+3	
TPH - Arom >C10-C12	1.9E+0		4.7E+3	
TPH - Arom >C12-C16	1.9E+0		4.7E+3	
TPH - Arom >C16-C21	1.9E+0		4.7E+3	
TPH - Arom >C21-C35	0.0E+0		2.2E+2	

Site Name: ORGANICS-Res. Use and Const. Worker
Site Location: 26-60 Charlotte Street, Rochester, New York
Completed By: Day Environmental, Inc.

Date Completed: 19-Jun-01
Job ID: 2485R-00

APPENDIX D

Environmental Management Plan

ENVIRONMENTAL MANAGEMENT PLAN

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

Prepared for:	City of Rochester 30 Church Street Rochester, New York 14614
Prepared by:	Day Environmental, Inc 2144 Brighton-Henrietta Town Line Road Rochester, New York 14623
Project No.:	2485R-00
Date:	October 2001

TABLE OF CONTENTS

ATTACHMENTS

1.0 INTRODUCTION

This site-specific Environmental Management Plan (EMP) has been developed for the property located at 14-60 Charlotte Street, City of Rochester, County of Monroe, New York (Site). The general location of the Site is depicted on Figure 1 (Project Locus Map) included in Attachment A. This EMP should be implemented when work performed at the Site has the potential to disturb contaminated soil, fill or groundwater. Further details regarding the EMP are provided below.

1.1 Statement of Purpose

The purpose of this EMP is to address the handling of: (1) soil, fill and groundwater containing petroleum-type contamination, solvent/degreaser-type contamination (e.g., mineral spirits, Stoddard solvent, or paint thinner); (2) fill materials containing elevated concentrations of heavy metals; and/or (3) free petroleum product.

Specifically, this EMP addresses how to identify, characterize, handle, and dispose or re-use these media during construction or post-development activities. The EMP establishes goals, procedures, and appropriate response actions to be used by on-site personnel should contaminated material be encountered and disturbed.

1.2 Site Description

The Site consists of seven contiguous parcels currently owned by the City of Rochester (refer to Figure 2 in Attachment A) totaling approximately 1.1 acres. A two-story residential dwelling on the parcel addressed as 26 Charlotte Street and an approximately 1,800-square foot one-story commercial concrete block garage located on the parcel addressed as 42 Charlotte Street were demolished in September 2001 (refer to Figure 2 in Attachment A). The 48-60 Charlotte Street parcel is actively used as an open parking lot and the remainder of the Site is vacant or unused.

Under current City of Rochester plans, the Site will be redeveloped for residential use. It is currently anticipated that the residential redevelopment will consist of construction of a condominium or apartment complex. It is anticipated that the complex will have a parking garage on the first floor with living quarters on higher floors.

2.0 SUMMARY OF SITE CONDITIONS

Various supplemental environmental studies were performed in an effort to evaluate environmental conditions on the Site and on portions of the adjoining right-of-ways of Haags Alley and Charlotte Street. These studies included: advancement of test borings; installation of groundwater monitoring wells; field observations and PID screening on soil and groundwater samples; analytical laboratory testing of soil and groundwater samples; development of groundwater potentiometric maps; and evaluation of the data collected.

Petroleum contamination fingerprinted as consisting of kerosene, gasoline, diesel fuel, lube oil, mineral spirits or a combination of these petroleum products was detected in soil and groundwater samples at the Site and in the right-of-way of Haags Alley. The majority of VOCs and SVOCs detected in soil and groundwater samples appear to be associated with petroleum products; however, some chlorinated VOCs (e.g., vinyl chloride) that may be associated with dry cleaning solvents and degreasers (and potentially associated with biodegradation of these products) or other activities, were detected in the groundwater in several locations along the northern portion of the Site and in Haags Alley. Free petroleum product identified as diesel fuel was encountered on groundwater in one well located on the 14-16 Charlotte Street parcel. The approximate portion of the Site where known and/or suspected petroleum or other VOC contamination exists is depicted on Figure 3 included in Attachment A.

Fill material generally consisting of sand, gravel and silt with lesser amounts of clay, brick, ash, cobbles, asphalt, metal, coal, rock fragments, cinders, and organics (wood and roots) was generally encountered near the ground surface over most of the Site. Some of the fill material has been determined to contain elevated levels of the heavy metals e.g., arsenic, arsenic, mercury).

Three underground storage tanks (USTs) and the in-ground portion of one hydraulic lift were also identified on the 14-16 Charlotte Street parcel and closed (i.e., removed) in accordance with applicable regulations (refer to Figure 2 included in Attachment A).

Based upon the findings of the previous Phase II Environmental Studies, the contaminated media at the Site are considered non-hazardous material for the parameters tested. However, if this material is disturbed, the New York State Department of Environmental Conservation (NYSDEC) requires that the material be handled, treated or disposed of, in accordance with applicable regulations.

3.0 ENVIRONMENTAL MANAGEMENT PLAN

This EMP assumes the Site will be re-developed with an apartment or townhouse complex that will have a parking garage on the first floor with living quarters on higher floors. Initially, a limited amount of petroleum-contaminated soil/fill will be removed and disposed of off-site in accordance with applicable regulations.

As indicated in NYCRR Part 360, Section 360-1.15 (b)(8), non-hazardous soil, ceases to be solid waste when it is excavated as part of a construction project (e.g., re-development project), other than a department-approved or undertaken inactive hazardous waste disposal site remediation program, and the material is used as backfill for the same excavation or excavations containing similar contaminants at the same site. As such, non-hazardous soil/fill at the Site that is excavated during re-development, is not a solid waste if re-used on-site in areas where similar material already exists. However, criteria for re-use established in this EMP (e.g., petroleum soil guidance values listed in the August, 1992 NYSDEC STARS Memo #1, etc.) must be achieved.

This EMP provides options regarding the disposal and/or re-use of petroleum-contaminated media, fill material potentially containing elevated concentrations of heavy metals, and/or free product/contaminated groundwater. This EMP also provides a protocol for preventing fugitive emissions during disturbance of these materials, and reducing future impacts associated with these materials. The EMP also describes the procedures to be implemented in order to manage these materials if encountered and/or disturbed during re-development activities, in accordance with applicable regulations. The procedures presented are intended to reduce potential exposure to construction workers and nearby residents during re-development; and Site workers, Site residents, and nearby workers and residents during future operation and/or occupation of the Site. The Summary Flow Chart included in Attachment B provides recommended handling and disposal options for materials covered by this EMP.

As part of this EMP, the City of Rochester and appropriate regulatory authorities (i.e., NYSDEC, NYSDOH and MCDOH) must be notified at least two business days prior to performing Site activities that have the potential to disturb contaminated material.

3.1 Potentially-Contaminated Media

This section describes the types of contaminated media documented at the Site and provides information on the identification, handling, analytical laboratory testing, disposal or re-use of these materials.

3.1.1 In-Field Identification

Based on the previous studies completed at the Site, the petroleum impact identified consists primarily of mineral spirits, lube oil, diesel, kerosene and gasoline. Contaminated soil and/or fill may appear stained black and/or gray and petroleum-like odors may be detected on the material. Visual and olfactory observations will be made on excavated material for indication of petroleum-related impact or other impact. As part of the corrective action plan (CAP), a planned interim

remedial measure (IRM) will be implemented to remove and dispose of known areas of near surface petroleum-contaminated soil or fill. However, this type of impact is also located at or immediately above the groundwater table over most of the Site. This deeper contamination is likely attributable to on-site and/or off-site sources depending upon the location of the Site.

In conjunction with conducting the visual and olfactory observations, a photoionization detector (PID) and/or flame ionization detector (FID) will be used during intrusive work to assist in detecting total VOC vapors on the excavated material. The PID and FID can detect many VOCs typically present in petroleum products. If PID and/or FID readings exceed typical upwind air background measurements by 10.0 parts per million (ppm) or more, it will be presumed that petroleum contamination is present, and that the material will require off-site disposal or treatment, unless laboratory data suggests otherwise.

Free petroleum product may: emanate petroleum-type odor; appear black, light brown, gold, or dark brown in color; and a PID or FID will likely indicate a response on ambient air above this material. The free petroleum product at this Site is a light non-aqueous phase liquid (LNAPL) that floats on water.

A layer of fill material is located from the ground surface to average depths of between 3 and 4 feet over most of the Site. The fill at the Site generally consists of sand, gravel and silt with lesser amounts of clay, brick, ash, cobbles, asphalt, metal, coal, rock fragments, cinders, organics (wood and roots), etc. Previous analytical laboratory testing indicates this fill material contains elevated concentrations of heavy metals. In addition, it is possible that fill material my be contaminated with pockets of near-surface petroleum-related contamination.

3.1.2 Handling

Materials that are excavated, disturbed, etc. and appear to be contaminated by petroleum-related compounds or other VOCs (e.g., based on visual and olfactory assessment, PID/FID readings, etc.) will be removed, segregated from non-contaminated media, and be placed on, and covered with, plastic sheeting that is at least 10 mil thick. If contaminated soil or fill is encountered in the unsaturated zone (i.e., above the water table) and it contains concentrations of constituents above recommended soil cleanup objectives listed in the January 24, 1994 NYSDEC TAGM 4046 as amended by the NYSDEC's Table 1 dated 1998 (copy included in Attachment C), it will be removed. The contaminated material's location, appearance, and quantity (if possible) will be documented. The appropriate regulatory authorities (e.g., NYSDEC, MCDOH) and the City of Rochester must be notified regarding the contamination. If contaminated material is to be staged on-site, any disposal, treatment, etc. will be conducted within 60 days, unless otherwise authorized by the NYSDEC.

Along off-site street right-of-ways, etc. (e.g., specifically Haags Alley), it is likely that removal of contaminated material to concentrations below NYSDEC TAGM 4046 recommended soil cleanup objectives may not be possible since off-site sources of contamination appear present. However, the planned environmental engineering controls (e.g., soil venting systems, vapor barriers, etc.) will mitigate exposures to site occupants under normal use of the property.

When fill material is disturbed, dust suppression measures will be implemented. If fill material that differs from that identified above is encountered, it will be removed, segregated from other material, and placed on, and covered with, plastic sheeting. The unknown fill material's location, appearance, and quantity (if possible) will be documented. The appropriate regulatory authorities and the City of Rochester will be notified regarding the unknown fill material. This fill will be addressed (e.g., characterized, disposed of off-site, etc.) in accordance with applicable regulations within 60 days, unless otherwise authorized by the NYSDEC.

3.1.3 Analytical Laboratory Testing

Samples of material contaminated with petroleum-related compounds or other VOCs will be tested for NYSDEC STARS-list VOCs, semi-volatile organic compounds (SVOCs) and total petroleum hydrocarbons (TPH) (refer to Table 1 included in Attachment D). The analytical laboratory test results for in-situ confirmatory soil samples will be compared to the recommended soil cleanup objectives as referenced in TAGM 4046 (refer to Table 2 included in Attachment D). The actual parameters tested for must be approved by the appropriate regulatory authorities and the City of Rochester, and these parameters may also be dependant upon the field observations, PID/FID readings measured, and potential testing requirements of a NYSDEC-approved disposal facility (i.e., landfill). The laboratory testing will also be used to assist in determining whether this type of contaminated material can be re-used on-site or require off-site disposal; and assist in characterizing the contaminated media as hazardous or non-hazardous.

In order to determine if the excavated/staged/disturbed contaminated soil/fill can be re-used on-site or requires off-site disposal, it will be required that the analytical laboratory test results for petroleum-type constituents (e.g., benzene, trimethylbenzenes, naphthalene, etc.) be compared to petroleum soil guidance values listed in the August, 1992 NYSDEC STARS Memo #1 (copy included in Attachment C) and the analytical laboratory test results for non-petroleum-type constituents (e.g., arsenic, trichloroethene, TPH, etc.) be compared to recommended soil cleanup objectives listed in the January 24, 1994 NYSDEC TAGM 4046 as amended by the NYSDEC's Table 1 dated 1998 (refer to Table 3 included in Attachment D).

3.1.4 Disposal of Contaminated Media

Contaminated soil and/or fill encountered during the re-development activities will likely require disposal off-site in accordance with applicable regulations. Depending upon field observation and monitoring and analytical laboratory test results, the fill material and contaminated soil will likely be characterized as non-hazardous petroleum-impacted waste, industrial waste or construction and demolition debris. Transporters of petroleum-contaminated media must have the appropriate NYSDEC Part 360 permits, etc. The disposal facility (e.g., landfill) for fill material or contaminated soil must be approved by the NYSDEC. This includes contaminated material that may be defined as hazardous waste and non-hazardous waste.

During the installation of new wells at the Site, it is anticipated that soil cuttings will be generated. If the soil cuttings require disposal, then they will be placed in NYSDOT-approved 55-gallon drums, or staged with other contaminated soils, and will ultimately be transported and disposed of off-site in accordance with applicable regulations. If soil cuttings are tested and are determined to not require disposal, then they can be re-used on-site, if desired.

Decontamination water, drilling water, and water removed from wells during their development and sampling may require off-site disposal, treatment, or discharge to the public sanitary sewer system subsequent to receiving Monroe County Pure Water's approval.

3.1.5 Contingency Option for Re-Use of Contaminated Soil/Fill

As a contingency option, if the detected concentrations of constituents of concern (i.e., VOCs, SVOCs, TPH, and heavy metals) in samples of the contaminated soil/fill are below the NYSDEC STARS Memo #1 petroleum soil guidance values and/or TAGM 4046 recommended soil cleanup objectives, then the material can be deemed as "suitable" for re-use on-site with the permission of the appropriate regulatory authorities and the City of Rochester. However, media containing any detectable concentrations of VOCs, SVOCs or TPH can not be located in the vicinity of any existing or planned residential buildings, or other subsurface structures where the potential for human exposure, vapor accumulation, or nuisance odors could arise. Acceptable uses of contaminated soil/fill designated as suitable for re-use may include backfill under parking lots, grading, etc. With authorization from the appropriate regulatory authorities, soil or fill material that potentially contains elevated concentrations of heavy metals, but does not contain VOCs, SVOCs or TPH, may also be acceptable for re-use in the vicinity of existing or planned residential buildings, or other subsurface structures; however, this fill material can not be re-used below the groundwater table or between 0 and 1 foot below the ground surface of the final planned grade unless covered with an impervious material (e.g., asphalt pavement). Contaminated soil/fill that is re-used on-site must be covered with a minimum one-foot layer of clean soil or impervious material and can not be re-used on-site in planters, landscaping beds or in areas that may be used as gardens. Prior to re-using contaminated soil or fill on-site, its effect on geotechnical requirements associated with the redevelopment plans for the Site must be evaluated.

3.2 Air Monitoring

During activities that have the potential to disturb contaminated media (e.g., soil, fill and groundwater), air monitoring must be conducted. This includes during IRM activities, re-development activities, and during post-development activities as they arise (e.g., repairs to buried utilities, etc.). The type of air monitoring performed will depend on the type of activity and its location on the Site.

3.2.1 Particulate Monitoring

During activities that disturb fill that is confirmed or suspected to contain elevated heavy metals, air monitoring for particulates using a real-time aerosol monitor (RTAM) will be implemented. This will ensure that respiratory protection is adequate to protect Site workers, occupants and the

nearby community against potential contaminants in the fill, and to ensure that the potential contaminants are not migrating off-site through the air. The particulate monitoring measurements will be compared to action levels specified in NYSDEC TAGM 4031 (copy included in Attachment 3) and also identified in the August 2001 Health and Safety Plan (HASP) for the Site. If the action level is exceeded (i.e., 150 ug/m^3 over an integrated period not to exceed 15 minutes), or if visible dust is encountered, then work shall be discontinued until corrective actions are implemented and subsequent readings indicate particulate levels are within the acceptable range. The party conducting the air monitoring will have the authority to halt the disturbance of fill material until appropriate actions are taken. Corrective actions may include dust suppression, change in the way work is performed, upgrade of personal protective equipment, etc. Readings will be recorded and available for review.

3.2.2 VOC Monitoring

Since it is anticipated that contamination comprised of petroleum-related compounds and other VOCs may be encountered during re-development activities, air monitoring will include monitoring for VOCs using a real-time PID meter. This will ensure that respiratory protection is adequate to protect Site workers against potential contaminants in the fill or contaminated media, and to ensure that the potential contaminants are not migrating off-site.

The air monitoring measurements will be compared to the corrective action levels that are specified in the HASP, which is included as part of the CAP. If action levels are exceeded, then work shall be discontinued until corrective actions are implemented and subsequent readings indicate VOC concentrations are within the acceptable range. The party conducting the air monitoring will have the authority to halt the disturbance of contaminated media (e.g., excavation activities, etc.) until appropriate actions are taken. Corrective actions may include change in the way work is performed, upgrade of personal protective equipment, etc. Readings will be recorded and available for review.

3.3 Dust Suppression

If dust suppression is required during site activities, the following techniques may be implemented: applying water to haul roads; wetting equipment and excavation faces; spraying water on buckets during excavation and dumping; covering materials that are being hauled; restricting equipment speeds; and covering excavated areas and exposed areas of fill and/or petroleum-contaminated material. Dust suppression techniques will be utilized until air monitoring indicates that particulate levels are within an acceptable range.

3.4 Site Controls

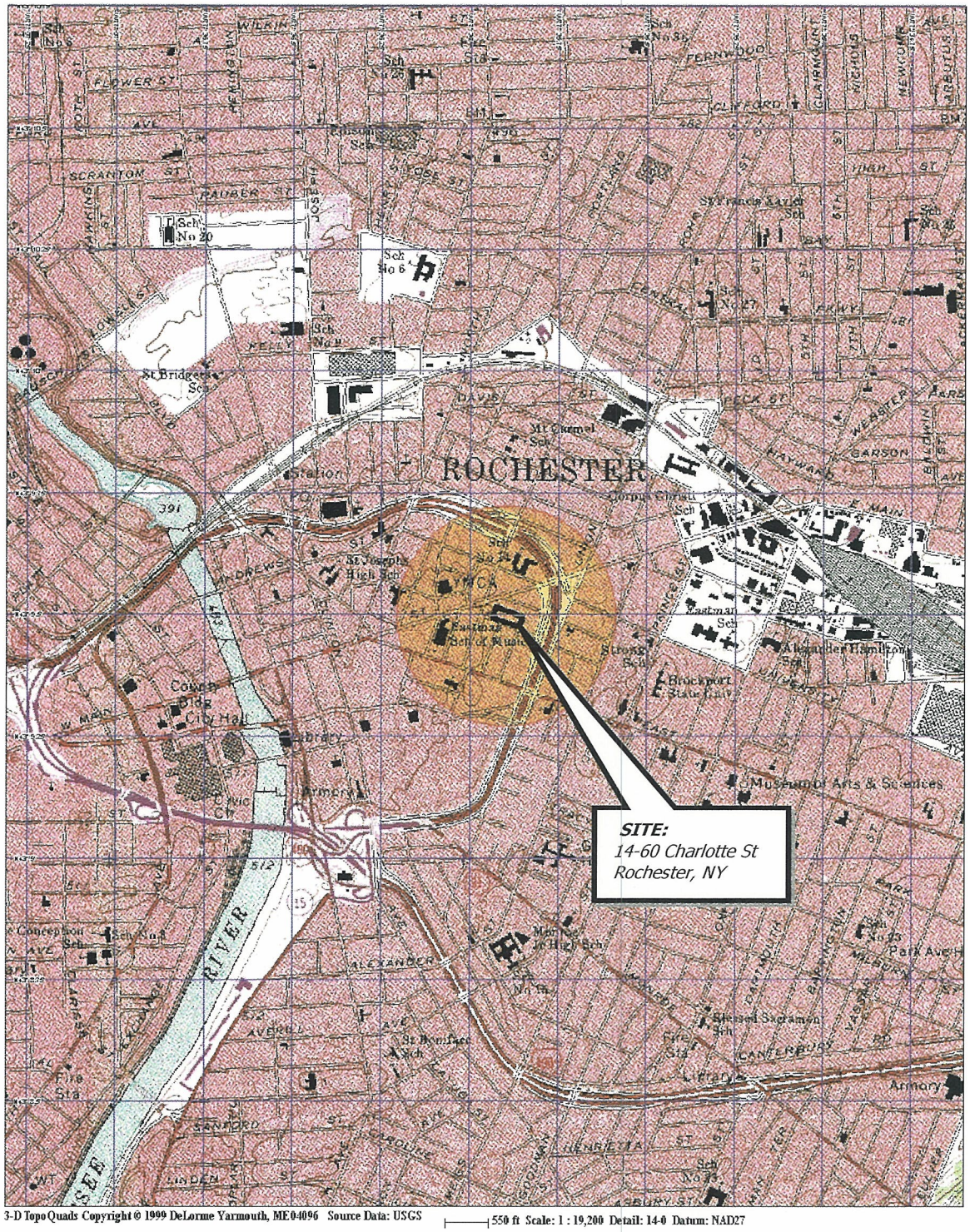
If contaminated media of unknown type is encountered, a fence will be placed around its location in order to restrict access and exposure. Fencing will also be placed around excavations into contaminated materials that are to be left open over night, the weekend, or for any other extended periods of time.

3.5 Management of Potential Future Disturbances

Workers involved with future on-site work (i.e., placing/repairing plantings, new installation/repair of buried utilities, etc.) that have the potential to disturb contaminated media should be made aware of the potential exposure hazards. The property manager and/or the owner of the Site will be responsible for notifying future on-site workers of potential exposure hazards. The owner will be in possession of the previous reports, this EMP, and the HASP included as part of the CAP. These documents contain information on the type and location of contaminants at the Site, and address how to handle, treat, transport and dispose of impacted materials in a manner that precludes exposure. Precautions should be implemented to minimize disturbance of soil or fill that result in air-borne release of particulates. Areas where work has been completed should be repaired (e.g., clean soil/fill re-applied, paved, etc.).

ATTACHMENT A

Figures



Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad map Rochester East (NY) 1995. Site Lat/Long: N43d-9.50' – W77d-35.90'

DATE 10/1/2001 DRAWN BY Jad SCALE 1" = 2000'	day DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008	PROJECT TITLE 14-60 CHARLOTTE STREET ROCHESTER, NEW YORK ENVIRONMENTAL MANAGEMENT PLAN DRAWING TITLE PROJECT LOCUS MAP	PROJECT NO. 2485R-00 FIGURE 1

RICHMOND STREET

#15 #17 #21 #23 #25 #27 #29

N

#527

WEST MAIN STREET

#515

Right-Of-Way Line

Historic Dry Cleaning Operation With "Solvent Tanks"

Property Line, Typical

Historic Auto Painting Operation

Historic Auto Repairing Operation

Historic Photographic and Printing Operations with Former Tanks

HAAGS ALLEY

Right-Of-Way Line

Right-Of-Way Line

Approximate Location Of One (1) 1,000-Gallon Underground Storage Tank (Removed by City, June 2000)

Metal Shed

Metal Shed

55-Gallon Drums (Removed)

1 Story Concrete Block Building (Removed September 2001)

Property Line, Typical

Approximate Location Of Two (2) 550-Gallon Underground Storage Tanks (Removed by City, June 2000)

Lot No. 39

Lot No. 36.1

Lot No. 40

Lot No. 41

Lot No. 42

Lot No. 43

Lot No. 45.1

Property Line, Typical

SCIO STREET

Approximate Location Of In-Ground Hydraulic Lift (Removed by City, June 2000)

Residential House (Removed September, 2001)

Approximate Former Location Of One (1) 1,000-Gallon Underground Storage Tank As Shown On City Records (Could Not Locate In Field)

#14-16 #26 #28-30 #32-34 #36 #42 Right-Of-Way Line #48-60

CHARLOTTE STREET

Right-Of-Way Line

SITE PLAN
1" = 40'

NOTES:

1. Site plan produced from a tax map of The City Of Rochester.

FIELD VERIFIED BY	DATE
JAD	02/2001
DRAWN BY	DATE DRAWN
Tww	03/01/2001
SCALE	DATE ISSUED
1"=40'	03/02/2001

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14623-2700

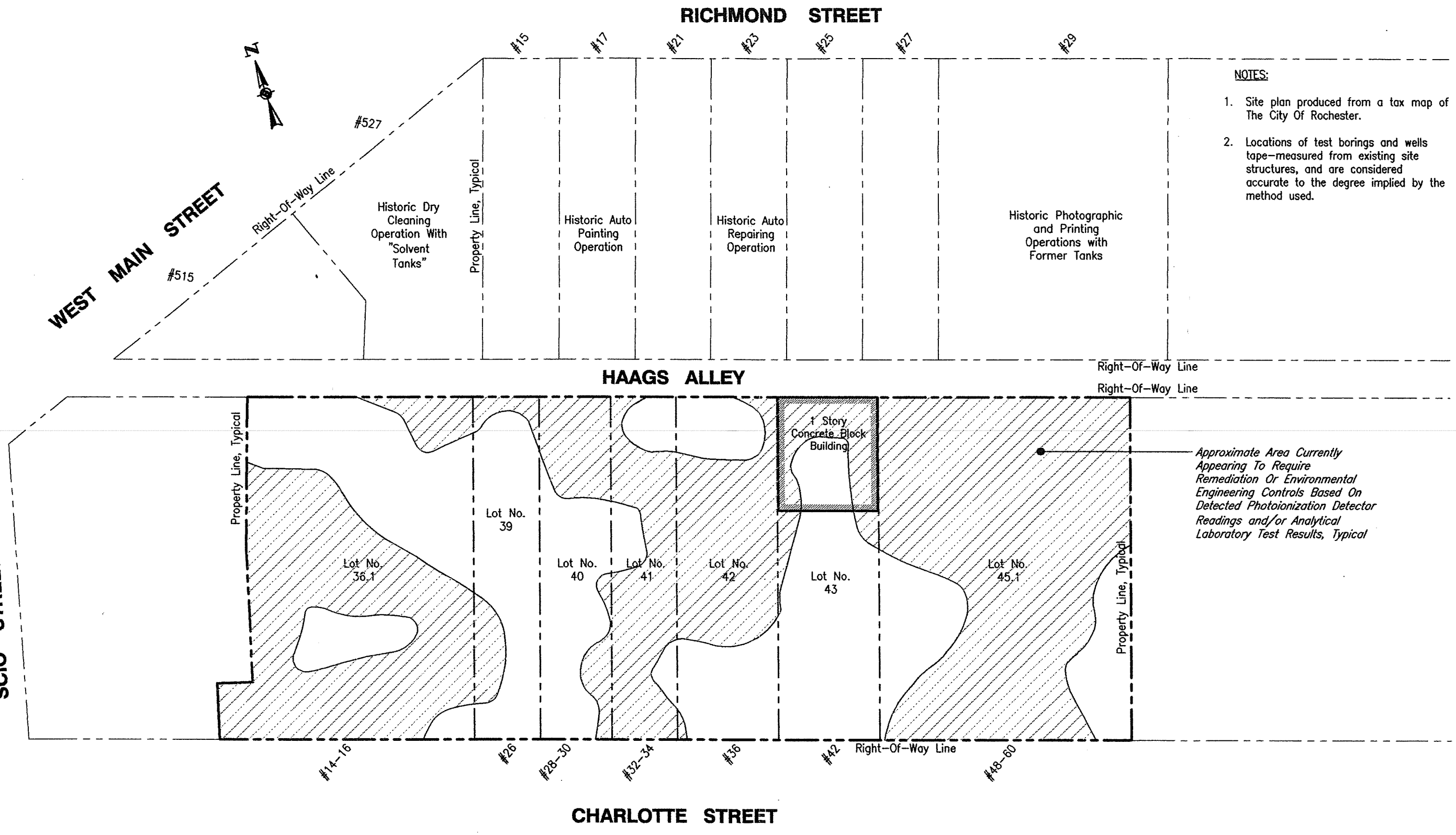
PROJECT TITLE
14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

ENVIRONMENTAL MANAGEMENT PLAN

DRAWING TITLE
Site Plan

PROJECT NO.
2485R-00

FIGURE 2



NOTES:

1. Site plan produced from a tax map of The City Of Rochester.
2. Locations of test borings and wells tape-measured from existing site structures, and are considered accurate to the degree implied by the method used.

SITE PLAN
1" = 40'

FIELD VERIFIED BY	DATE	DRAWN BY	DATE DRAWN	SCALE	DATE ISSUED
JAD	02/2001	Tww	03/02/2001	1" = 40'	03/02/2001

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14623-2700

PROJECT TITLE
14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

ENVIRONMENTAL MANAGEMENT PLAN

DRAWING TITLE
On-Site Area Currently Appearing To Require Remediation Or Environmental Engineering Controls

PROJECT NO.
2485R-00

FIGURE 3

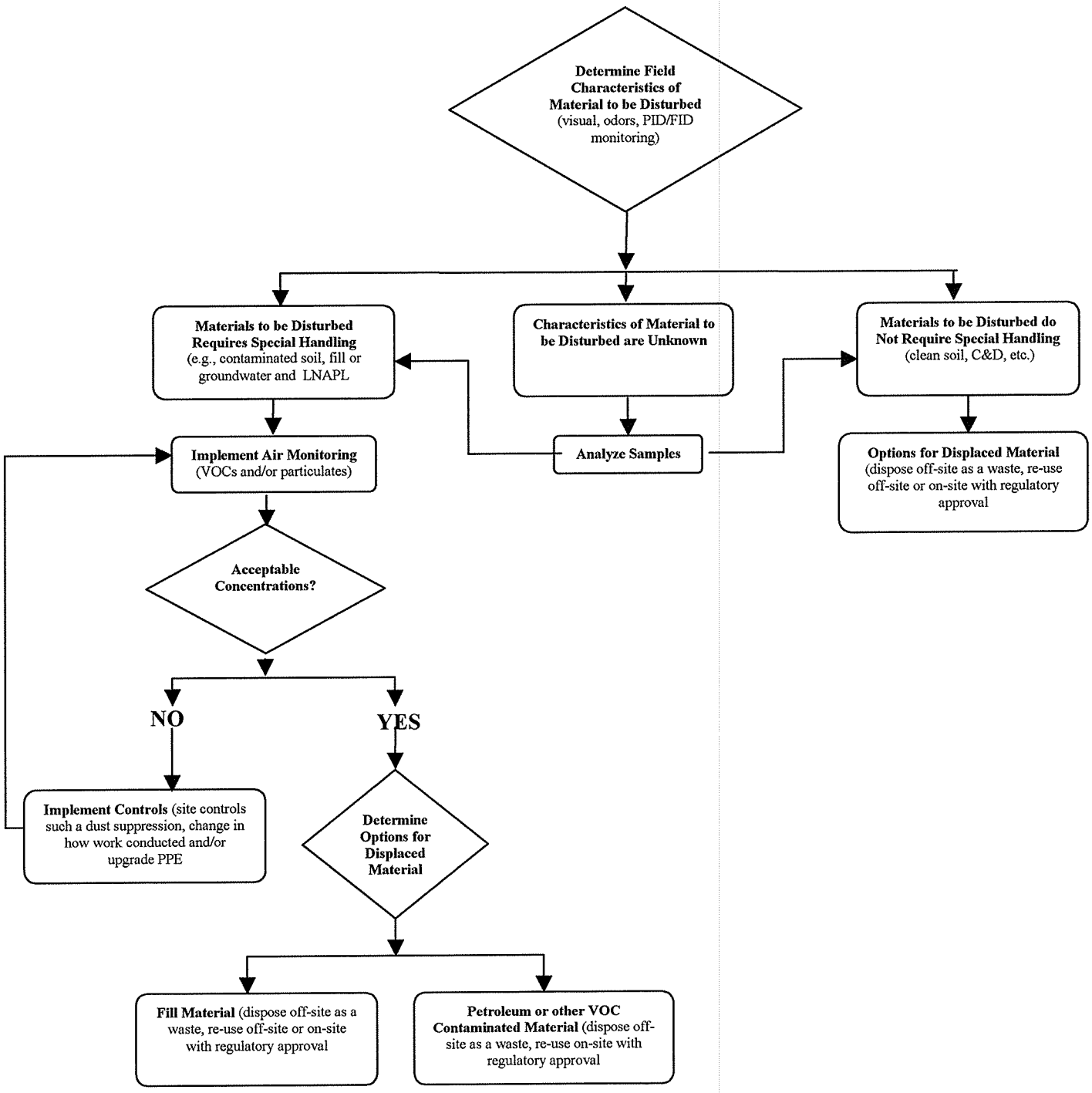
SHEET 1 OF 1

ATTACHMENT B

Summary Flow Chart for EMP

SUMMARY FLOW CHART

ENVIRONMENTAL MANAGEMENT PLAN
14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK



ATTACHMENT C

Regulatory Guidance Documents

TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM #4046

DETERMINATION OF SOIL CLEANUP OBJECTIVES AND CLEANUP LEVELS

TO: Regional Haz. Waste Remediation Engineers, Bureau Directors, and Section Chiefs

FROM: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation

SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM: DETERMINATION OF SOIL CLEANUP OBJECTIVES AND CLEANUP LEVELS

DATE: JAN 24, 1994

Michael J. O'Toole, Jr. (signed)

The cleanup goal of the Department is to restore inactive hazardous waste sites to predisposal conditions, to the extent feasible and authorized by law. However, it is recognized that restoration to predisposal conditions will not always be feasible.

1. INTRODUCTION:

This TAGM provides a basis and procedure to determine soil cleanup levels at individual Federal Superfund, State Superfund, 1986 EQBA Title 3 and Responsible Party (RP) sites, when the Director of the DHWR determines that cleanup of a site to predisposal conditions is not possible or feasible.

The process starts with development of soil cleanup objectives by the Technology Section for the contaminants identified by the Project Managers. The Technology Section uses the procedure described in this TAGM to develop soil cleanup objectives. Attainment ofthese generic soil cleanup objectives will, at a minimum, eliminate all significant threats to human health and/or the environment posed by the inactive hazardous waste site. Project Managers should use these cleanup objectives in selecting alternatives in the Feasibility Study (FS). Based on the proposed selected remedial technology (outcome of FS), final site specific soil cleanup levels are established in the Record of Decision (ROD) for these sites.

It should be noted that even after soil cleanup levels are established in the ROD, these

levels may prove to be unattainable when remedial construction begins. In that event, alternative remedial actions or institutional controls may be necessary to protect the environment.

2. BASIS FOR SOIL CLEANUP OBJECTIVES:

The following alternative bases are used to determine soil cleanup objectives:

1. Human health based levels that correspond to excess lifetime cancer risks of one in a million for Class A[1] and B[2] carcinogens, or one in 100,000 for Class C[3] carcinogens. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;

2. Human health based levels for systemic toxicants, calculated from Reference Doses (RfDs). RfDs are an estimate of the daily exposure an individual (including sensitive individuals) can experience without appreciable risk of health effects during a lifetime. An average scenario of exposure in which children ages one to six (who exhibit the greatest tendency to ingest soil) is assumed. An intake rate of 0.2 gram/day for a five-year exposure period for a 16-kg child is assumed. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;

3. Environmental concentrations which are protective of groundwater/drinking water quality; based on promulgated or proposed New York State Standards;

4. Background values for contaminants; and

5. Detection limits.

A recommendation on the appropriate cleanup objective is based on the criterion that produces the most stringent cleanup level using criteria a, b, and c for organic chemicals, and criteria a, b, and d for heavy metals. If criteria a and/or b are below criterion d for a contaminant, its background value should be used as the cleanup objective. However, cleanup objectives developed using this approach must be, at a minimum, above the method detection limit (MDL) and it is preferable to have the soil cleanup objectives above the Contract Required Quantitation Limit (CRQL) as defined by NYSDEC. If the cleanup objective of a compound is "non-detectable", it should mean that it is not detected at the MDL. Efforts should be made to obtain the best MDL detection possible when selecting a laboratory and analytical protocol.

3. DETERMINATION OF SOIL CLEANUP GOALS FOR ORGANICS IN SOIL FOR PROTECTION OF WATER QUALITY

The water/soil partitioning theory is used to determine soil cleanup objectives which would be protective of groundwater/drinking water quality for its best use. This theory is conservative in nature and assumes that contaminated soil and groundwater are in direct contact. This theory is

based upon the ability of organic matter in soil to adsorb organic chemicals. The approach predicts the maximum amount of contamination that may remain in soil so that leachate from the contaminated soil will not violate groundwater and/or drinking water standards.

This approach is not used for heavy metals, which do not partition appreciably into soil organic matter. For heavy metals, eastern USA or New York State soil background values may be used as soil cleanup objectives. A list of values that have been tabulated is attached. Soil background data near the site, if available, is preferable and should be used as the cleanup objective for such metals. Background samples should be free from the influences of this site and any other source of contaminants. Ideal background samples may be obtained from uncontaminated upgradient and upwind locations.

Protection of water quality from contaminated soil is a two-part problem. The first is predicting the amount of contamination that will leave the contaminated media as leachate. The second part of the problem is to determine how much of that contamination will actually contribute to a violation of groundwater standards upon reaching and dispersing into groundwater. Some of the contamination which initially leaches out of soil will be absorbed by other soil before it reaches groundwater. Some portion will be reduced through natural attenuation or other mechanism.

PART A: PARTITION THEORY MODEL

There are many test and theoretical models which are used to predict leachate quality given a known value of soil contamination. The Water-Soil Equilibrium Partition Theory is used as a basis to determine soil standard or contamination limit for protection of water quality by most of the models currently in use. It is based on the ability of organic carbon in soil to adsorb contamination. Using a water quality value which may not be exceeded in leachate and the partition coefficient method, the equilibrium concentration (Cs) will be expressed in the same units as the water standards. The following expression is used:

Allowable Soil Concentration $Cs = f \times Koc \times Cw$ . . . . (1)

Where: f = fraction of organic carbon of the natural soil medium.

Koc = partition coefficient between water and soil media. Koc can be estimated by the following equation:

$\log Koc = 3.64 - 0.55 \log S$

S = water solubility in ppm
Cw = appropriate water quality value from TOGS 1.1.1

Most Koc and S values are listed in the Exhibit A-1 of the USEPA Superfund Public Health Evaluation Manual (EPA/540/1-86/060). The Koc values listed in this manual

should be used for the purpose. If the Koc value for a contaminant is not listed, it should be estimated using the above mentioned equation.

PART B: PROCEDURE FOR DETERMINATION OF SOIL CLEANUP OBJECTIVES

When the contaminated soil is in the unsaturated zone above the water table, many mechanisms are at work that prevent all of the contamination that would leave the contaminated soil from impacting groundwater. These mechanisms occur during transport and may work simultaneously. They include the following: (1) volatility, (2) sorption and desorption, (3) leaching and diffusion, (4) transformation and degradation, and (5) change in concentration of contaminants after reaching and/or mixing with the groundwater surface. To account for these mechanisms, a correction factor of 100 is used to establish soil cleanup objectives. This value of 100 for the correction is consistent with the logic used by EPA in its Dilution Attenuation Factor (DAF) approach for EP Toxicity and TCLP. (Federal Register/Vol. 55, No. 61, March 29, 1990/Pages 11826-27). Soil cleanup objectives are calculated by multiplying the allowable soil concentration by the correction factor. If the contaminated soil is very close (<3' - 5') to the groundwater table or in the groundwater, extreme caution should be exercised when using the correction factor of 100 (one hundred) as this may not give conservative cleanup objectives. For such situations the Technology Section should be consulted for site-specific cleanup objectives.

Soil cleanup objectives are limited to the following maximum values. These values are consistent with the approach promulgated by the States of Washington and Michigan.

1. Total VOCs < 10 ppm.
2. Total Semi VOCs < 500 ppm.
3. Individual Semi VOCs < 50 ppm.
4. Total Pesticides < 10 ppm.

One concern regarding the semi-volatile compounds is that some of these compounds are so insoluble that their Cs values are fairly large. Experience (Draft TOGS on Petroleum Contaminated Soil Guidance) has shown that soil containing some of these insoluble substances at high concentrations can exhibit a distinct odor even though the substance will not leach from the soil. Hence any time a soil exhibits a discernible odor nuisance, it shall not be considered clean even if it has met the numerical criteria.

4. DETERMINATION OF FINAL CLEANUP LEVELS:

Recommended soil cleanup objectives should be utilized in the development of final cleanup levels through the Feasibility Study (FS) process. During the FS, various alternative remedial actions developed during the Remedial Investigation (RI) are initially screened and narrowed down to the list of potential alternative remedial actions that will be evaluated in detail. These alternative remedial actions are evaluated using the criteria discussed in TAGM 4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, revised May 15, 1990, and the preferred remedial action will be selected. After the detailed evaluation of the preferred remedial action, the final cleanup levels which can be actually achieved using the preferred remedial action must

be established. Remedy selection, which will include final cleanup levels, is the subject of TAGM 4030.

Recommended soil cleanup objectives that have been calculated by the Technology Section are presented in Appendix A. These objectives are based on a soil organic carbon content of 1% (0.01) and should be adjusted for the actual organic carbon content if it is known. For determining soil organic carbon content, use attached USEPA method (Appendix B). Please contact the Technology Section, Bureau of Program Management for soil cleanup objectives not included in Appendix A.

TAGM 4046 Footnotes:

1. Class A are proved human carcinogens
2. Class B are probable human carcinogens
3. Class C are possible human carcinogens

Appendix A - Recommended Soil Cleanup Objectives:

Appendix B - Total Organic Carbon (TOC)

APPENDIX B TO TAGM 4046

Conventional Sediment Variables
Total Organic Carbon (TOC)
March 1986

TOTAL ORGANIC CARBON (TOC)

USE AND LIMITATIONS

Total organic carbon is a measure of the total amount of nonvolatile, volatile, partially volatile, and particulate organic compounds in a sample. Total organic carbon is independent of the oxidation state of the organic compounds and is not a measure of the organically bound and inorganic elements that can contribute to the biochemical and chemical oxygen demand tests.

Because inorganic carbon (e.g., carbonates, bicarbonates, free CO_2) will interfere with total organic carbon determinations, samples should be treated to remove inorganic carbon before being analyzed.

FIELD PROCEDURES

Collection

Samples can be collected in glass or plastic containers. A minimum sample size of 25 g is recommended. If unrepresentative material is to be removed from the sample, it should be removed in the field under the supervision of the chief scientist and noted on the field log sheet.

Processing

Samples should be stored frozen and can be held for up to 6 months under that condition. Excessive temperatures should not be used to thaw samples.

LABORATORY PROCEDURES

Analytical Procedures

- Equipment
  - Induction furnace

    e.g., Leco WR-12, Dohrmann DC-50, Coleman CH analyzer, Perkin Elmer 240 elemental analyzer, Carlo-Erba 1106

  - Analytical balance

    0.1 mg accuracy

  - Desiccator
  - Combustion boats
  - 10 percent hydrochloric acid (HCL)
  - Cupric oxide fines (or equivalent material)
  - Benzoic acid or other carbon source as a standard.

- Equipment preparation
  - Clean combustion boats by placing them in the induction furnace at 950° C. After being cleaned, combustion boats should not be touched with bare hands.
  - Cool boats to room temperature in a desiccator.
  - Weigh each boat to the nearest 0.1 mg.

- Sample preparation
  - Allow frozen samples to warm to room temperature.
  - Homogenize each sample mechanically, incorporating any overlying water.
  - Transfer a representative aliquot (5-10 g) to a clean container.

- Analytical procedures
  - Dry samples to constant weight at 70 + 2°C. The drying temperature is relatively low to minimize loss of volatile organic compounds.
  - Cool dried samples to room temperature in a desiccator.

- Grind sample using a mortar and pestle to break up aggregates.
- Transfer a representative aliquot (0.2-0.5 g) to a clean, preweighed combustion boat.
- Determine sample weight to the nearest 0.1 mg.
- Add several drops of HCL to the dried sample to remove carbonates. Wait until the effervescing is completed and add more acid. Continue this process until the incremental addition of acid causes no further effervescence. Do not add too much acid at one time as this may cause loss of sample due to frothing. Exposure of small samples (i.e., 1-10 mg) having less than 50 percent carbonate to an HCL atmosphere for 24-48 h has been shown to be an effective means of removing carbonates (Hedges and Stern 1984). If this method is used for sample sizes greater than 10 mg, its effectiveness should be demonstrated by the user.
- Dry the HCL-treated sample to constant weight at 70 + 2° C.
- Cool to room temperature in a desiccator.
- Add previously ashed cupric oxide fines or equivalent material (e.g., alumina oxide) to the sample in the combustion boat.
- Combust the sample in an induction furnace at a minimum temperature of 950 + 10° C.

o Calculations

- If an ascarite-filled tube is used to capture CO_2, the carbon content of the sample can be calculated as follows:

$$\text{Percent carbon} = \frac{A\ (0.2729)\ (100)}{B}$$

Where:

A = the weight (g) of CO_2 determined by weighing the ascarite tube before and after combustion

B = dry weight (g) of the unacidified sample in the combustion boat

0.2729 = the ratio of the molecular weight of carbon to the molecular weight of carbon dioxide

A silica gel trap should be placed before the ascarite tube to catch any moisture driven off during sample combustion. Additional silica gel should be placed at the exit end of the ascarite tube to trap any water that might be formed by reaction of the trapped CO_2 with the NaOH in the ascarite.

- If an elemental analyzer is used, the amount of CO_2 will be measured by a thermal conductivity detector. The instrument should be calibrated daily using an empty boat blank as the zero point and at least two standards. Standards should bracket the expected range of carbon concentrations in the samples.

QA/QC Procedures

It is critical that each sample be thoroughly homogenized in the laboratory before a subsample is taken for analysis. Laboratory homogenization should be conducted even if samples were homogenized in the field.

Dried samples should be cooled in a desiccator and held there until they are weighed. If a desiccator is not used, the sediment will accumulate ambient moisture and the sample weight will be overestimated. A color-indicating desiccant is recommended so that spent desiccant can be detected easily. Also, the seal on the desiccator should be checked periodically and, if necessary, the ground glass rims should be greased or the "O" rings should be replaced.

It is recommended that triplicate analyses be conducted on one of every 20 samples, or on one sample per batch if less than 20 samples are analyzed. A method blank should be analyzed at the same frequency as the triplicate analyses. The analytical balance should be inspected daily and calibrated at least once per week. The carbon analyzer should be calibrated daily with freshly prepared standards. A standard reference material should be analyzed at least once for each major survey.

DATA REPORTING REQUIREMENTS

Total organic carbon should be reported as a percentage of the dry weight of the unacidified sample to the nearest 0.1 unit. The laboratory should report the results of all samples (including QA replicates, method blanks, and standard reference measurements) and should note any problems that may have influenced sample quality. The laboratory should also provide a summary of the calibration procedure and results (e.g., range covered, regression equation, coefficient of determination).

APPENDIX A of TAGM #4046

TABLE 1
Recommended soil cleanup objectives (mg/kg or ppm)
Volatile Organic Contaminants

Shortcut to TAGM 4046 Tables for SVOCs | Pesticides/PCBs | Heavy Metals

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin-ogens	Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
Acetone	2.2	50	0.0011	0.11	N/A	8,000	10	0.2
Benzene	83	0.7	0.0006	0.06	24	N/A	5	0.06
Benzoic Acid	54 *	50	0.027	2.7	N/A	300,000	5	2.7
2-Butanone	4.5 *	50	0.003	0.3	N/A	4,000	10	0.3
Carbon Disulfide	54 *	50	0.027	2.7	N/A	8,000	5	2.7
Carbon Tetrachloride	110 *	5	0.006	0.6	5.4	60	5	0.6
Chlorobenzene	330	5	0.017	1.7	N/A	2,000	5	1.7
Chloroethane	37 *	50	0.019	1.9	N/A	N/A	10	1.9
Chloroform	31	7	0.003	0.30	114	800	5	0.3
Dibromochloromethane	N/A	50	N/A	N/A	N/A	N/A	5	N/A
1,2-Dichlorobenzene	1,700	4.7	0.079	7.9	N/A	N/A	330	7.9
1,3-Dichlorobenzene	310 *	5	0.0155	1.55	N/A	N/A	330	1.6
1,4-Dichlorobenzene	1,700	5	0.085	8.5	N/A	N/A	330	8.5
1,1-Dichloroethane	30	5	0.002	0.2	N/A	N/A	5	0.2
1,2-Dichloroethane	14	5	0.001	0.1	7.7	N/A	5	0.1
1,1-Dichloroethene	65	5	0.004	0.4	12	700	5	0.4
1,2-Dichloroethene (trans)	59	5	0.003	0.3	N/A	2,000	5	0.3
1-3 dichloropropane	51	5	0.003	0.3	N/A	N/A	5	0.3
Ethylbenzene	1,100	5	0.055	5.5	N/A	8,000	5	5.5
113 Freon (1,1,2 Trichloro-1,2,2 Trifluoroethane)	1,230 *	5	0.060	6.0	N/A	200,000	5	6.0

Methylene chloride	21	5	0.001	0.1	93	5,000	5	0.1
4-Methyl-2-Pentanone	19 *	50	0.01	1.0	N/A	N/A	10	1.0
Tetrachloroethene	277	5	0.014	1.4	14	800	5	1.4
1,1,1-Trichloroethane	152	5	0.0076	0.76	N/A	7,000	5	0.8
1,1,2,2-Tetrachloroethane	118	5	0.006	0.6	35	N/A	5	0.6
1,2,3-trichloropropane	68	5	0.0034	0.34	N/A	80	5	0.4
1,2,4-trichlorobenzene	670 *	5	0.034	3.4	N/A	N/A	330	3.4
Toluene	300	5	0.015	1.5	N/A	20,000	5	1.5
Trichloroethene	126	5	0.007	0.70	64	N/A	5	0.7
Vinyl chloride	57	2	0.0012	0.12	N/A	N/A	10	0.2
Xylenes	240	5	0.012	1.2	N/A	200,000	--	1.2

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
All other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1%, and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A of TAGM #4046

TABLE 2
Recommended soil cleanup objectives (mg/kg or ppm)
Semi-Volatile Organic Contaminants

Shortcut to TAGM 4046 Tables for VOCs | Pesticides/PCBs | Heavy Metals

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin-ogens	Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
Acenaphthene	4,600	20	0.9	90.0	N/A	5,000	330	50.0 ***
Acenaphthylene	2,056 *	20	0.41	41.0	N/A	N/A	330	41.0
Aniline	13.8	5	0.001	0.1	123	N/A	330	0.1
Anthracene	14,000	50	7.00	700.0	N/A	20,000	330	50.0 ***
Benzo(a)anthracene	1,380,000	0.002	0.03	3.0	0.224	N/A	330	0.224 or MDL
Benzo (a) pyrene	5,500,000	0.002 (ND)	0.110	11.0	0.0609	N/A	330	0.061 or MDL
Benzo (b) fluoranthene	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
Benzo (g,h,i) perylene	1,600,000	5	8.0	800	N/A	N/A	330	50.0 ***
Benzo (k) fluoranthene	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
bis(2-ethylhexyl) phthalate	8,706 *	50	4.35	435.0	50	2,000	330	50.0 ***
Butylbenzylphthlate	2,430	50	1.215	122.0	N/A	20,000	330	50.0 ***
Chrysene	200,000	0.002	0.004	0.4	N/A	N/A	330	0.4
4- Chloroaniline	43 ****	5	0.0022	0.22	200	300	330	0.220 or MDL

4-Chloro-3-methylphenol	47	5	0.0024	0.24	N/A	N/A	330	0.240 or MDL
2-Chlorophenol	15 *	50	0.008	0.8	N/A	400	330	0.8
Dibenzofuran	1,230 *	5	0.062	6.2	N/A	N/A	330	6.2
Dibenzo(a,h) anthracene	33,000,000	50	1,650	165,000	0.0143	N/A	330	0.014 or MDL
3,3'-Dichlorobenzidine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dichlorophenol	380	1	0.004	0.4	N/A	200	330	0.4
2,4-Dinitrophenol	38	5	0.002	0.2	N/A	200	1,600	0.200 or MDL
2,6 Dinitrotoluene	198*	5	0.01	1.0	1.03	N/A	330	1.0
Diethylphthlate	142	50	0.071	7.1	N/A	60,000	330	7.1
Dimethylphthlate	40	50	0.020	2.0	N/A	80,000	330	2.0
Di-n-butyl phthalate	162*	50	0.081	8.1	N/A	8,000	330	8.1
Di-n-octyl phthlate	2,346 *	50	1.2	120.0	N/A	2,000	330	50.0 ***
Fluoranthene	38,000	50	19	1900.0	N/A	3,000	330	50.0 ***
Fluorene	7,300	50	3.5	350.0	N/A	3,000	330	50.0 ***
Hexachlorobenzene	3,900	0.35	0.014	1.4	0.41	60	330	0.41
Indeno (1,2,3-cd) pyrene	1,600,000	0.002	0.032	3.2	N/A	N/A	330	3.2
Isophorone	88.31 *	50	0.044	4.40	1,707	20,000	330	4.40
2-methylnaphthalene	727 *	50	0.364	36.4	N/A	N/A	330	36.4
2-Methylphenol	15	5	0.001	0.1	N/A	N/A	330	0.100 or MDL
4-Methylphenol	17	50	0.009	0.9	N/A	4,000	330	0.9
Naphthalene	1,300	10	0.130	13.0	N/A	300	330	13.0
Nitrobenzene	36	5	0.002	0.2	N/A	40	330	0.200 or MDL
								0.430

2-Nitroaniline	86	5	0.0043	0.43	N/A	N/A	1,600	or MDL
2-Nitrophenol	65	5	0.0033	0.33	N/A	N/A	330	0.330 or MDL
4-Nitrophenol	21	5	0.001	0.1	N/A	N/A	1,600	0.100 or MDL
3-Nitroaniline	93	5	0.005	0.5	N/A	N/A	1,600	0.500 or MDL
Pentachlorophenol	1,022	1	0.01	1.0	N/A	2,000	1,600	1.0 or MDL
Phenanthrene	4,365 *	50	2.20	220.0	N/A	N/A	330	50.0 ***
Phenol	27	1	0.0003	0.03	N/A	50,000	330	0.03 or MDL
Pyrene	13,295 *	50	6.65	665.0	N/A	2,000	330	50.0 ***
2,4,5-Trichlorophenol	89 *	1	0.001	0.1	N/A	8,000	330	0.1

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available
MDL is Method Detection Limit

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
Other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm., Total Semi- VOCs < 500ppm. and Individual Semi-VOCs < 50 ppm.

**** Koc is derived from the correlation Koc = 0.63 Kow (Determining Soil Response Action Levels..... EPA/540/2-89/057). Kow is obtained from the USEPA computer database 'MAIN'.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1%, and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A of TAGM #4046

TABLE 3
Recommended soil cleanup objectives (mg/kg or ppm)
Organic Pesticides / Herbicides and PCBs

Shortcut to TAGM 4046 Tables for VOCs | SVOCs | Heavy Metals

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin-ogens	Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
Aldrin	96,000	ND (<0.01)	0.005	0.5	0.041	2	8	0.041
alpha- BHC	3,800	ND (<0.05)	0.002	0.2	0.111	N/A	8	0.11
beta - BHC	3,800	ND (<0.05)	0.002	0.2	3.89	N/A	8	0.2
delta - BHC	6,600	ND (<0.05)	0.003	0.3	N/A	N/A	8	0.3
Chlordane	21,305 *	0.1	0.02	2.0	0.54	50	80	0.54
2,4-D	104 *	4.4	0.005	0.5	N/A	800	800	0.5
4,4'- DDD	770,000 *	ND (<0.01)	0.077	7.7	2.9	N/A	16	2.9
4,4'-DDE	440,000 *	ND (<0.01)	0.0440	4.4	2.1	N/A	16	2.1
4,4'-DDT	243,000 *	ND (<0.01)	0.025	2.5	2.1	40	16	2.1
Dibenzo-P-dioxins (PCDD) 2,3,7,8 TCDD	1709800	0.000035	0.0006	0.06	N/A	N/A	N/A	N/A
Dieldrin	10,700 *	ND (< 0.01)	0.0010	0.1	0.044	4	16	0.044
Endosulfan I	8,168 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan II	8,031 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan Sulfate	10,038 *	0.1	0.01	1.0	N/A	N/A	16	1.0

Endrin	9,157 *	ND (<0.01)	0.001	0.1	N/A	20	8	0.10
Endrin keytone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gamma - BHC (Lindane)	1,080	ND (<0.05)	0.0006	0.06	5.4	20	8	0.06
gamma - chlordane	140,000	0.1	0.14	14.0	0.54	5	80	0.54
Heptachlor	12,000	ND (<0.01)	0.0010	0.1	0.16	40	8	0.10
Heptachlor epoxide	220	ND (<0.01)	0.0002	0.02	0.077	0.8	8	0.02
Methoxychlor	25,637	35.0	9.0	900	N/A	400	80	***
Mitotane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Parathion	760	1.5	0.012	1.2	N/A	500	8	1.2
PCBs	17,510 *	0.1	0.1	10.0	1.0	N/A	160	1.0 (Surface) 10 (sub-surf)
Polychlorinated dibenzo-furans (PCDF)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silvex	2,600	0.26	0.007	0.7	N/A	600	330	0.7
2,4,5-T	53	35	0.019	1.9	N/A	200	330	1.9

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
All other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1% (5% for PCBs as per PCB Guidance Document), and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A of TAGM #4046

TABLE 4
Recommended soil cleanup objectives (mg/kg or ppm)
Heavy Metals

Shortcut to TAGM 4046 Tables for VOCs | SVOCs | Pesticides / PCBs

Contaminants	Protect Water Quality (ppm)	Eastern USA Background (ppm)	* CRDL (mg/kg or ppm)	***** Rec. Soil Cleanup Objective (ppm)
Aluminum	N/A	33,000	2.0	SB
Antimony	N/A	N/A	0.6	SB
Arsenic	N/A	3-12 **	0.1	7.5 or SB
Barium	N/A	15-600	2.0	300 or SB
Beryllium	N/A	0-1.75	0.05	0.16 (HEAST) or SB
Cadmium	N/A	0.1-1	0.05	1 or SB
Calcium	N/A	130 - 35,000 ***	50.0	SB
Chromium	N/A	1.5 - 40 **	0.1	10 or SB
Cobalt	N/A	2.5 - 60 **	0.5	30 or SB
Copper	N/A	1 - 50	0.25	25 or SB
Cyanide	N/A	N/A	0.1	***
Iron	N/A	2,000 - 550,000	1.0	2,000 or SB
Lead	N/A	****	0.03	SB ****
Magnesium	N/A	100 - 5,000	50.0	SB
Manganese	N/A	50 - 5,000	0.15	SB
Mercury	N/A	0.001 - 0.2	0.002	0.1
Nickel	N/A	0.5 -25	0.4	13 or SB
Potassium	N/A	8,500 - 43,000 **	50.0	SB
Selenium	N/A	0.1 - 3.9	0.05	2 or SB
Silver	N/A	N/A	0.1	SB
Sodium	N/A	6,000 - 8,000	50.0	SB
Thallium	N/A	N/A	0.1	SB
Vanadium	N/A	1-300	0.5	150 or SB
Zinc	N/A	9-50	0.2	20 or SB

Note: Some forms of metal salts such as Aluminum Phosphide, Calcium Cyanide, Potassium Cyanide, Copper cyanide, Silver cyanide, Sodium cyanide, Zinc phosphide, Thallium salts, Vanadium pentoxide and Chromium (VI) compounds are more toxic in nature. Please refer to the USEPA HEASTs database to find cleanup objectives if such metals are present in soil.

SB is site background
N/A is not available

* CRDL is contract required detection limit which is approx. 10 times the CRDL for water.

** New York State background

*** Some forms of Cyanide are complex and very stable while other forms are pH dependent and hence are very unstable. Site-specific form(s) of Cyanide should be taken into consideration when establishing soil cleanup objective.

**** Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.

***** Recommended soil cleanup objectives are average background concentrations as reported in a 1984 survey of reference material by E. Carol McGovern, NYSDEC.

TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM #4031

FUGITIVE DUST SUPPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES

TO: Regional Hazardous Waste Remediation Engrs., Bur. Directors & Section Chiefs

FROM: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation

SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM -- FUGITIVE DUST SUPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES

DATE: Oct 27, 1989

Michael J. O'Toole, Jr. (signed)

1. Introduction

Fugitive dust suppression, particulate monitoring, and subsequent action levels for such must be used and applied consistently during remedial activities at hazardous waste sites. This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2. Background

Fugitive dust is particulate matter--a generic term for a broad class of chemically and physically diverse substances that exist as discrete particles, liquid droplets or solids, over a wide range of sizes--which becomes airborne and contributes to air quality as a nuisance and threat to human health and the environment.

On July 1, 1987, the United States Environmental Protection Agency (USEPA) revised the ambient air quality standard for particulates so as to reflect direct impact on human health by setting the standard for particulate matter less than ten microns in diameter (PM_{10}); this involves fugitive dust whether contaminated or not. Based upon an examination of air quality composition, respiratory tract deposition, and health effects, PM_{10} is considered conservative for the primary standard--that requisite to protect public health with an adequate margin of safety. The primary standards are 150 ug/m^3 over a 24-hour averaging time and 50 ug/m^3 over an annual averaging time. Both of these standards are to be averaged arithmetically.

There exists real-time monitoring equipment available to measure PM_{10} and capable of integrating over a period of six seconds to ten hours. Combined with an adequate fugitive dust suppression program, such equipment will aid in preventing the off-site migration of

contaminated soil. It will also protect both on-site personnel from exposure to high levels of dust and the public around the site from any exposure to any dust. While specifically intended for the protection of on-site personnel as well as the public, this program is not meant to replace long-term monitoring which may be required given the contaminants inherent to the site and its air quality.

3. Guidance

A program for suppressing fugitive dust and monitoring particulate matter at hazardous waste sites can be developed without placing an undue burden on remedial activities while still being protective of health and environment. Since the responsibility for implementing this program ultimately will fall on the party performing the work, these procedures must be incorporated into appropriate work plans. The following fugitive dust suppression and particulate monitoring program will be employed at hazardous waste sites during construction and other activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Such activities shall also include the excavation, grading, or placement of clean fill, and control measures therefore should be considered.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM_{10}) with the following minimum performance standards:

   Object to be measured: Dust, Mists, Aerosols
   Size range: <0.1 to 10 microns
   Sensitivity: 0.001 mg/m^3
   Range: 0.001 to 10 mg/m^3
   Overall Accuracy: ±10% as compared to gravimetric analysis of stearic acid or reference dust

   Operating Conditions:
   Temperature: 0 to 40°C
   Humidity: 10 to 99% Relative Humidity

   Power: Battery operated with a minimum capacity of eight hours continuous operation

   Automatic alarms are suggested.

   Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. Consequently, instrumentation shall require necessary averaging hardware to accomplish this task; the P-5 Digital Dust Indicator as manufactured by MDA Scientific, Inc. or similar is appropriate.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the entity operating the equipment to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping

plan.

5. The action level will be established at 150 ug/m^3 over the integrated period not to exceed 15 minutes. While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m^3, the upwind background level must be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 ug/m^3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see Paragraph 7). Should the action level of 150 ug/m^3 be exceeded, the Division of Air Resources must be notified in writing within five working days; the notification shall include a description of the control measures implemented to prevent further exceedences.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM_{10} at or above the action level. Since this situation has the potential to migrate contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

    1. Applying water on haul roads.
    2. Wetting equipment and excavation faces.
    3. Spraying water on buckets during excavation and dumping.
    4. Hauling materials in properly tarped or watertight containers.
    5. Restricting vehicle speeds to 10 mph.
    6. Covering excavated areas and material after excavation activity ceases.
    7. Reducing the excavation size and/or number of excavations.

    Experience has shown that utilizing the above-mentioned dust suppression techniques, within reason as not to create excess water which would result in unacceptable wet conditions, the chance of exceeding the 150 ug/m^3 action level at hazardous waste site remediations is remote. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. If the dust suppression techniques being utilized at the site do not lower particulates to an acceptable level (that is, below 150 ug/m^3 and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be necessary for proper fugitive dust control--when extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended.

There may be situations that require fugitive dust suppression and particulate monitoring

requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require appropriate toxics monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

Spill Technology and Remediation Series (STARS)
STARS MEMO #1

Petroleum-Contaminated Soil Guidance Policy
(Last Revised, August 1992)

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SECTION I - PURPOSE AND APPLICABILITY

The goal at each petroleum spill site is to remove the spilled petroleum product from the soil in the most efficient and safe manner in order that the soil may be returned to a reusable product. When complete removal is not possible, practical, or cost effective, the objective is to remediate the contaminated media to concentration levels which will protect groundwater, human health and the environment.

The Petroleum-Contaminated Soil Guidance Policy is intended to provide direction on the handling, disposal and/or reuse of non-hazardous petroleum-contaminated soils. The reuse or disposal options for excavated soils vary depending on the level of treatment provided consistent with protecting the public health and the environment. While this document does not establish standards, it is intended as guidance in determining whether soils have been contaminated to levels which require investigation and remediation.

This document also constitutes a determination of beneficial use by the Department, as defined in Solid Waste Regulation NYCRR Part 360. Petroleum-contaminated soil, if determined to satisfy the criteria herein, can be reused or disposed of as directed in this guidance. Therefore, soils which meet beneficial use conditions are no longer a solid waste in accordance with NYCRR Part 360-1.2(a)(4).

This guidance is intended for Regional Spill Investigators, Regional Solid Waste staff and responsible parties to assist them in determining the acceptability of remedial activities at a petroleum spill site or in determining the acceptability of a site assessment. It may be applied to both excavated and non-excavated material. The evaluation method and guidance values included in this guidance may be used to determine the limits of contamination, such as defining the extent of contamination in an excavation which contains contaminated material. Situations may exist where results of sampling analysis will require interpretations or subjective judgment, as with certain nuisance characteristics such as odors. These interpretations and judgments will be made solely by the DEC representative on site. There may be instances where the DEC will opt to digress from this guidance to establish cleanup goals reflecting site-specific circumstances at a particular petroleum spill site.

The guidance may also be used by responsible parties to develop corrective action plans which will achieve the criteria set forth in this document.

Robert G. Hampston (signature)	Norman H. Nosenchuck (signature)
Director	Director
Division of Construction Management	Division of Solid Waste

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SECTION II - HAZARDOUS WASTE DETERMINATION

An initial determination (1) must be made on all excavated petroleum-contaminated soil as to whether or not it is a hazardous waste. The hazardous waste determination typically involves laboratory analysis to quantify contaminant concentrations in the waste material. The DEC and EPA regulations, however, allow the generator of the waste to use knowledge of the waste and/or laboratory analysis to make a hazardous waste determination. Petroleum-contaminated soils are generally stored on site while laboratory analysis results are obtained and evaluated. As long as the material is segregated from the environment by impervious material, such as polyethylene sheeting, the petroleum-contaminated soil may remain on site until appropriate laboratory results are available and interpreted.

A petroleum-contaminated soil is considered a characteristic hazardous waste when it exhibits any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity, as defined in 6NYCRR Part 371, Section 371.3, or 40 CFR Section 261. Knowledge of soils contaminated with virgin petroleum products indicates that those waste materials do not demonstrate ignitability, corrosivity, or reactivity characteristics. Therefore, the only characteristic of concern for virgin petroleum-contaminated soil is toxicity. The Toxicity Characteristic (TC) Rule identifies benzene and lead as compounds which may cause petroleum-contaminated waste to be hazardous. Analysis of additional parameters may be necessary for petroleum-contaminated soil located at sites where other contaminants may be present. Refer to Appendix A for more specific information regarding the procedures for hazardous waste determination, and the TC Rule regulatory levels.

If the contaminated soil has been excavated and if the hazardous waste criteria apply, then the contaminated soil is classified as a hazardous waste. Excavated soil which is hazardous due to any non-petroleum component will be referred to the Division of Hazardous Waste Remediation, and the Division of Hazardous Substances Regulation to determine appropriate remedial actions.

If in-situ soil is contaminated by a petroleum product, and if the above hazardous waste criteria are met, the site will be remediated under the direction of the Bureau of Spill Prevention and Response to provide for protection of human health and environmental quality. In-situ soil, which violates any of the hazardous waste criteria due to any non-petroleum component, will be referred to the Division of Hazardous Waste Remediation, and the Division of Hazardous Substances Regulation to determine appropriate remedial actions.

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[1] *In-situ or excavated soils which could contain contaminants other than petroleum products, by virtue of laboratory analysis, site history, visual observations, etc., will be sampled and analyzed by either the responsible party or by the Bureau of Spill Prevention and Response (BSPR). The Division of Hazardous Substance Regulation (DHSR) will provide assistance to BSPR staff (for state-funded projects) and responsible parties in making hazardous waste determination for their generated waste.*

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SECTION III - SOIL CLEANUP GUIDELINES

There are four essential guidelines which must be satisfied in order for soil to be considered acceptably remediated or not sufficiently contaminated. These are: A) protection of the groundwater; B) protection of human health; C) protection of fish and wildlife and the environment in which they live; and D) protection against objectionable nuisance characteristics. Compliance with these guidelines is satisfied by analysis of soil samples for contaminant concentrations and leachability, and subsequent comparison of the sampling results to guidance values, values which have been determined to be acceptable by DEC.

Contaminant concentrations are determined using EPA standard Methods 8021 or 8270. Leachability is determined using a procedure known as the Toxicity Characteristic Leaching Procedure (TCLP). Satisfactory protection of groundwater is indicated by TCLP Extraction Guidance Values or by TCLP Alternative Guidance Values. Satisfactory protection of human health is indicated by Human Health Guidance Values. Satisfactory protection of water body sediment is indicated by Sediment Guidance Values. Finally, satisfactory protection against objectionable nuisance characteristics is indicated by the lack of odor and by each contaminant concentration being less than 10,000 ppb. Tables 1 and 2 in Section VIII list the contaminants of concern and their corresponding guidance values for acceptable soil concentrations for components of gasoline and fuel oil, respectively. Analysis of additional parameters may be necessary for petroleum-contaminated soil located at sites where other contaminants may be present.

The procedures used when evaluating soil samples to satisfy these guidelines are discussed further in this section.

A. Protection of Groundwater

The presence of a contaminant in the soil does not determine its potential for groundwater contamination. Soil particles can adsorb contaminants which will not be released through infiltration and groundwater recharge mechanisms. Therefore, it is the leachability of the soil which must be measured. To be protective of groundwater quality, the soil must not leach contaminants to the groundwater at concentrations which violate groundwater standards. The **Toxicity Characteristic Leaching Procedure (TCLP)** has been accepted by the Department (2) as a method of determining leachability of petroleum-contaminated soil.

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2 Accepted by NYSDEC Cleanup Standards Task Force.

The Toxicity Characteristic Leaching Procedure (TCLP) is an extraction process designed to address the leaching potential of organic and inorganic contaminants. It is used to simulate the actual site-specific leaching potential of individual contaminants present in the soil. In the extraction process, the soil sample is mixed with an acid solution and shaken for approximately eighteen hours. For non-volatile organic and inorganic compounds, the soil/acid solution is filtered to produce an extract liquid. For volatile organic compounds, the soil/acid solution is held in a Zero Headspace Extractor (ZHE), preventing the escape of volatile organics, and a liquid extract is squeezed out of the soil/acid solution. The extracted liquid is then analyzed to determine the concentration of the petroleum compounds in question. If the concentrations in the extract are less than or equal to the groundwater standards, then the soil may be considered environmentally acceptable for groundwater protection. Tables 1 and 2 in Appendix B identify the TCLP Extraction Guidance Values for the primary components of gasoline and fuel oil. The tabulated TCLP Extraction Guidance Values are equal to the NYSDEC groundwater standards or the NYSDOH drinking water standards, whichever is more stringent.

An alternative approach to the actual extraction process of the TCLP laboratory procedure which may be a cost-saving shortcut is to evaluate the concentration of the contaminant in the soil and mathematically determine if it will satisfy the leachate criteria. The TCLP laboratory procedure requires the soil sample to be diluted by a ratio of 20:1 when preparing the sample for the acidic extraction, and subsequent leachate analysis. Assuming that the entire mass of the contaminants present in the soil will leach out during the extraction process, the dilution factor of 20 can be applied to the actual soil contaminant concentration to give a maximum possible contaminant concentration obtainable in the leachate.

If a contaminant concentration in the soil is known, then the maximum possible contaminant concentration in the TCLP extract can be determined by the following equation:

Contaminant Concentration in Soil (ug/kg or ppb)	$\div 20 =$	Maximum Possible Contaminant Concentration in Extract Liquid (ug/l pr ppb)

If the maximum possible contaminant concentration in the extract liquid, as determined by the above equation, is less than or equal to the contaminant's TCLP Extraction Guidance Value, then the contaminant satisfies the groundwater quality protection criterion. If the calculated maximum possible contaminant concentration in the extract liquid is greater than the TCLP Extraction Guidance Value, then no conclusion can be drawn and groundwater quality protection must be confirmed by actually performing the TCLP extraction for that contaminant.

Example:

If the total concentration of Toluene in the soil as determined by Method 8021 is 100 ug/kg or 100 ppb for Sample A and 140 ug/kg or 140 ppb for Sample B, and the groundwater standard is 5 ppb then:

Sample A is: 100 ug/kg ÷ 20 = 5 ug/l = 5 ppb

Sample B is: 140 ug/kg ÷ 20 = 7 ug/l > 5 ppb

Sample A is considered to have satisfied groundwater protection by the TCLP extraction test for Toluene at 5 ppb. In Sample B, the calculated extract value is greater than 5 ug/l, therefore, no conclusion can be drawn from the calculation, and an actual TCLP extraction test must be performed.

To simplify this alternative approach, TCLP Alternative Guidance Values, which are equal to 20 times the TCLP Extraction Guidance Values, have been included in Tables 1 and 2. Therefore, if a contaminant's soil concentration is known, it can simply be compared to the TCLP Alternative Guidance Values.

The above methodology can also be used to make the hazardous waste determination, with the soil or sediment concentration compared to the respective hazardous waste limit for the leachate. A considerable decrease in analytical costs may be realized if the above equation is used to evaluate contaminant concentration acceptability.

In summary, if the contaminant concentrations in the soil are less than or equal to the TCLP Alternative Guidance Values, or if the contaminant concentrations in the soil extract are less than or equal to the TCLP Extraction Guidance Values, then the soil is considered environmentally acceptable for groundwater quality protection.

B. Protection of Human Health

Protection of human health is an essential requirement of both treatment and

reuse of petroleum-contaminated soil. EPA has published health-based standards for many contaminants in soil. The standards are contained in the Health Effects Assessment Summary Table (HEAST REPORT). These standards were derived from methodologies based on soil ingestion values for carcinogens and systemic toxicants.

The appropriate health-based soil Guidance Values are listed in Tables 1 and 2 for the primary components of gasoline and fuel oil.

If the contaminant concentrations in the soil are less than or equal to the Human Health Guidance Values, then the soil is considered safe for human health concerns.

C. Protection of Fish and Wildlife

Protection of fish and wildlife must be satisfied when dealing with contaminated sediment. Some Sediment Guidance Values for protection of aquatic life and animals which consume aquatic life, have been developed and are noted in Tables 1 and 2. Where sediments are contaminated, these Guidance Values should be used. The appropriate natural resource division (eg. Marine, Fish & Wildlife, etc.) should be contacted for situations involving sediment contaminants which do not have tabulated Sediment Guidance Values. If a spill has occurred at a location that may be sensitive to wildlife (eg. wetlands), the Division of Fish and Wildlife should be consulted to determine whether the soil cleanup levels are adequate for natural resource protection.

If the contaminant concentrations in the sediment are less than or equal to the tabulated Sediment Guidance Values, then the sediment is considered environmentally acceptable for fish and wildlife concerns.

D. Protection Against Objectionable Nuisance Characteristics

Petroleum-contaminated soil must not exhibit objectionable nuisance characteristics to be eligible for some reuse options described later in this guidance and listed in Table 3.

1) *Petroleum-Type Odors*

The soil must not exhibit any discernible petroleum-type odors in order to be considered for the reuse options identified later in this guidance. Odor determinations for state-funded spill projects will be made by the Regional Spill Investigator. Odor determinations for responsible party (RP) sites are the responsibility of the RP. The Regional Spill Investigator may or may not be available to assess the odor criteria at all sites. When the Regional Spill Investigator is on-site, he/she may override the decision of the RP if, in the investigator's opinion, sufficient odors still persist. Determinations by DEC Spill Investigators do not relinquish a responsible party's responsibilities or liabilities under the law.

2) ***Contaminant Concentrations***

The soil shall not contain any contaminant at a concentration above **10,000 ug/kg (10,000 ppb).** This maximum individual contaminant concentration should support the above odor determination, since some petroleum constituents will not leach at high concentrations but may exhibit odors.

If the soil does not exhibit petroleum-type odors and does not contain any individual contaminant at greater than 10,000 ppb, then the soil is considered acceptable for nuisance characteristics.

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SECTION IV - GUIDANCE VALUES

A. Gasoline-Contaminated Soils

Table 1 lists the primary gasoline components of concern. The table identifies the compound names, the preferred EPA laboratory methods for determining contaminant concentration, the detection limits for a liquid matrix (water), the detection limits for a solid matrix (soil), the TCLP Extraction Guidance Values (C_w), the TCLP Alternative Guidance Values (C_a), the Human Health Guidance Values (C_h), and the Sediment Guidance Values (C_s).

Although EPA Method 8021 is preferred, other laboratory methods may be used with prior approval from the DEC Regional Spill Investigator. Other proposed methods should be evaluated on their ability to quantify the compounds of concern at acceptable detection levels.

The tabulated detection limits are the practical quantitation limits (PQLs). The PQL is the lowest level that can be measured within specified limits of precision during routine laboratory operations on most matrices. Efforts should be made to obtain the best detection possible when selecting a laboratory.

To demonstrate groundwater quality protection via the TCLP Extraction Method, the concentration of the hydrocarbon compound in the TCLP extract, as determined by EPA Method 8021 for a liquid matrix, must be less than or equal to the TCLP Extraction Guidance Value, C_w.

-or-

To demonstrate groundwater quality protection via the TCLP Alternative Method, the concentration of the hydrocarbon compound in the soil, as determined by EPA Method 8021 for a solid matrix, must be less than or equal to the TCLP Alternative Guidance Value, C_a.

To demonstrate human health protection, the concentration of the hydrocarbon compound in the soil, as determined by EPA Method 8021 for a solid matrix, must be less than or equal to the Human Health Guidance Value, C_h.

To demonstrate fish and wildlife protection, the concentration of the hydrocarbon compound in the soil, as determined by EPA Method 8021 for a solid matrix, must be less than or equal to the Sediment Guidance Value C_s. Meeting this requirement is only necessary when dealing with contaminated sediment.

To demonstrate nuisance protection, the soil must not exhibit petroleum-type odors, and must not contain any contaminant at greater than 10,000 ppb, as determined by EPA Method 8021 for a solid matrix.

When the Guidance Value or standard is below the detection limit, achieving the detection limit will be considered acceptable for meeting the Guidance Value or standard, as long as the reported laboratory detection limits are reasonably close to the listed PQLs.

B. Fuel Oil-Contaminated Soil

Table 2 lists the primary fuel oil components of concern. As with Table 1, Table 2 identifies compound names, preferred EPA laboratory methods, detection limits, and Guidance Values.

Although EPA Methods 8021 and 8270 are preferred for identifying compounds of concern for gasoline and fuel oil, other laboratory methods may be used with prior approval from the DEC Regional Spill Investigator. Other proposed methods should be evaluated on their ability to quantify the compounds of interest at acceptable detection levels.

Since there is no single laboratory method which will analyze for all of the volatile and semi-volatile compounds of concern, it is generally necessary to use more than one laboratory method for fuel oil analysis. Both volatile and semi-volatile compounds must be addressed initially, but a reduced list of analytes may be acceptable for subsequent sampling depending upon the initial results.

As with Table 1, the detection limits in Table 2 are PQLs. Efforts should be made to obtain the best detection possible when selecting a laboratory.

Experience has shown that soil containing some of the insoluble semi-volatile compounds at high concentrations can exhibit a distinct odor even though the substances will not leach from the soil. Therefore, the maximum individual contaminant concentration of 10,000 ppb is instituted to help address this problem. In addition, anytime a soil exhibits discernible petroleum odors, even if it has met the numerical criteria, it shall not be considered clean enough for some

reuse options under 6NYCRR Part 360, as described later in this document.

Odor determination is subjective. Since there is no recognized odor measuring device, some discrepancies may arise between responsible parties and the DEC on this subject. In order to document odor determinations and to address the need for remediation due to odors, the following approaches may be considered: (1) direct the laboratory to identify and quantify all pollutants present in the soil and/or leachate samples instead of just the method's target compounds; and (2) establish site-specific conditions based on an evaluation of the characteristics of the site. The determination and evaluation of odors remains a subject requiring further research and policy development.

Some of the semi-volatiles are carcinogens, and subsequently have groundwater quality Guidance Values of 0.002 ppb. The TCLP Extraction Guidance Values are 0.002 ppb, and the TCLP Alternative Guidance Values are 0.04 ppb. The solid matrix detection limit does not approach this low value. Therefore, when these compounds are determined to be present, the TCLP Extraction Method and the Alternative Guidance Values must be satisfied to demonstrate groundwater quality protection for these particular contaminants. The following compounds listed in Table 2 are affected by this limitation: benzo (a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; benzo(a)pyrene; chrysene; benzo(ghi)perylene; and indeno(1,2,3-cd)pyrene.

Particular attention should be paid to the Human Health Guidance Values for fuel oil-contaminated soil. While the majority of the semi-volatiles have health Guidance Values considerably higher than the contaminant concentration generally encountered at spill sites, there are seven compounds listed in Table 2 which have Human Health Guidance Values lower than the detection limits. When any of these compounds (benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene and dibenz(a,h)anthracene) are present, the Human Health Guidance Value most likely will be the limiting factor for achieving acceptable cleanup levels.

To demonstrate groundwater quality protection via the TCLP Extraction Method, the concentrations of the hydrocarbon compounds in the TCLP extract, as determined by EPA Methods 8021 and 8270 Base/Neutral for a liquid matrix, must be less than or equal to the TCLP Extraction Guidance Value, C_w;

-or-

To demonstrate groundwater quality protection via the TCLP Alternative Method, the concentrations of the hydrocarbon compounds in the soil, as determined by EPA Methods 8021 and 8270 Base/Neutral for a solid matrix, must be less than or equal to the TCLP Alternative Guidance Value, C_a. As described above, the TCLP Alternative Method is not a sufficient demonstration of groundwater protection for some contaminants.

To demonstrate human health protection, the concentrations of the

hydrocarbon compounds in the soil, as determined by EPA Methods 8021 and 8270 Base/Neutral for a solid matrix, must be less than or equal to the Human Health Guidance Value, C_h.

To demonstrate fish and wildlife protection, the concentrations of the hydrocarbon compounds in the soil, as determined by EPA Methods 8021 and 8270 Base/Neutral for a solid matrix, must be less than or equal to the Sediment Guidance Value, C_s. Meeting this requirement is only necessary when dealing with contaminated sediment.

To demonstrate nuisance protection, the soil must not exhibit petroleum-type odors, and must not contain any contaminant at greater than 10,000 ppb, as determined by EPA Methods 8021 and 8270 Base/Neutral for a solid matrix.

When the Guidance Value or standard is below the .detection limit, achieving the detection limit will be considered acceptable for meeting the Guidance Value or standard, as long as the reported laboratory detection limits are reasonably close to the listed PQLs.

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SECTION V - LABORATORY ANALYSIS

There are a variety of laboratory methods, established by the USEPA and the NYS Department of Health (DOH), which can be used to analyze petroleum-contaminated soils. The selection of appropriate laboratory methods depends on the compounds of concern, the detection limits for each compound, the nature of the samples to be analyzed, the capabilities of the laboratory, and the regulatory limits or Guidance Values to be achieved. The methods recommended and most often used for petroleum-contaminated soils are EPA Standard Methods 8021, 8270 (Base/Neutrals) and the TCLP extraction process. In every case, the NYSDEC will evaluate laboratory results from NYSDOH-approved laboratories only.

Each laboratory method identifies compounds which can be quantified with an acceptable degree of precision and accuracy. Many laboratory methods have petroleum compounds as target compounds, along with non-petroleum compounds. Method 8270, for example, identifies acid extractable hydrocarbons and base/neutral extractable hydrocarbons. The semi-volatile constituents of petroleum products are a sub-set of the base/neutral extractable compounds under Method 8270. Therefore, when requesting this analysis, base/neutrals only should be specified.

Some laboratories may be able to quantify non-target compounds of concern with particular methods. For example, there is no laboratory method which lists MTBE (methyl t-butyl ether) as a target compound; however, laboratories can include MTBE in their analysis using Method 8021. Therefore, when requesting this analysis, Method 8021 plus MTBE should be specified.

Each laboratory method establishes minimum concentrations of the target compounds which can be detected under ideal conditions using that particular procedure. These Method Detection Limits (MDLs) are rarely achievable under actual conditions in an analytical laboratory. Laboratories report their actual detection limits as Practical Quantitation Limits (PQLs). The PQLs for analysis on a liquid matrix are generally four times the MDLs. With a solid matrix, the PQLs will be affected by the quantity of contamination present, categorized as low, medium or high concentrations. Lower PQLs are generally possible with low level soil contamination. Laboratories must identify their PQLs when reporting analytical results.

Laboratories and methods to be utilized should be selected according to the best detection possible for the compounds of interest, and the regulatory or guidance levels needed to be achieved. For example, Table 2 indicates that naphthalene is a target compound for Method 8021 and Method 8270. Both of these methods can provide detection levels in a liquid matrix below the TCLP Extraction Guidance Value of 10 ppb. Therefore, either method could be used for analysis of a liquid matrix of naphthalene. However, for a solid matrix, Method 8021 is capable of providing much better detection of naphthalene than Method 8270. If the soil concentrations for naphthalene will be compared to the TCLP Alternative Guidance Value of 200 ppb, then Method 8021 should be used instead of Method 8270. If the soil concentrations for naphthalene will be compared only with the nuisance protection level of 10,000 ppb, or the Human Health Guidance Value of 300,000 ppb, then both Method 8021 and Method 8270 are capable of providing satisfactory detection levels for naphthalene.

Initial laboratory analysis should address the full range of compounds which may be present, considering the petroleum products involved. In consideration of prior laboratory results, potential contaminants may be eliminated from subsequent sampling analysis lists. As the contaminants are identified or eliminated, it may be appropriate to change laboratory methods during a project, to avoid unnecessary laboratory expenses. In addition, it may be appropriate to discuss analytical work with the laboratory in terms of the actual compounds of interest rather than method numbers and their defined target compounds. The final laboratory results for a project, however, should address the same full range of compounds as the initial sampling results, to confirm that the interim results did not overlook the appearance of other compounds. For example, gasoline-contaminated soil which is undergoing on-site bioremediation should be analyzed initially using Method 8021 plus MTBE. If only benzene, toluene, ethyl benzene and xylenes are detected, then Method 8020 could be used for interim sampling events. Upon completion of the bioremediation project, the soil should be analyzed using Method 8021 plus MTBE, to demonstrate the satisfaction of the Guidance Values applicable to the selected reuse option.

A detailed description of analytical protocols and procedures is .available in the DEC ***Sampling Guidelines and Protocols*** manual.

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SECTION VI - SAMPLING

Samples should be collected in such a manner so as to best characterize the extent of

contamination of the soil in question. There is no specific number or type of samples which will apply to all situations and best engineering judgment will have to be used. The type of sample, grab or composite, will vary depending upon the constituent being identified. While grab samples come from one location, composites come from several locations and are joined to form one sample. When volatiles are in question, care must be taken when collecting composite samples to minimize the loss of volatiles during handling. In order to minimize handling of volatiles, several grab samples are preferred, with confirmatory composite samples. When sampling for semi-volatiles, several composite samples are preferred, with confirmatory grab samples.

The treatment process (if any) will also have a bearing as to how well a soil may be characterized. Low temperature thermal treatment units (e.g. rotary kiln dryers) process soil resulting in a more homogeneous mixture than would be obtained from a stationary pile. The following guidance is offered to assist the Regional Spill Investigator in determining the number and types of samples which should be requested for various treatment scenarios. More comprehensive samples may be required depending on the reuse or disposal alternative to be used.

The responsible party and the Regional Spill Investigator should agree on a sampling plan and review procedure before the samples are collected. All sample results submitted for regulatory compliance must be analyzed by New York State Department of Health approved laboratories.

A detailed description of soil sampling protocols and procedures is available in the DEC ***Sampling Guidelines and Protocols*** manual.

A. Tank Pit

If there is a question as to the extent of residual contamination, or if comprehensive documentation is necessary, a tank pit may be sampled for laboratory analysis.

A total of five samples should be taken from the excavation. One composite sample from each of the side walls at a distance approximately one third up from the bottom of the pit. Several samples should also be collected to form one composite sample from the bottom of the pit. Any remaining samples should be grab samples from areas with greater potential for contamination such as stained soils, adjacent to a corrosion hole, opposite a manway, or opposite a tank opening. All samples shall be taken no less than six inches below the exposed surface being sampled. Samples for compositing should be taken from random locations on the floor and walls of the tank pit.

B. Soil Pile

The number of samples required for an excavated pile will be related to the quantity of soil stockpiled. The table below can be used as a guide in determining the appropriate number of samples. If, in the opinion of the

Regional Spill Investigator, additional samples are warranted, they should be requested.

Recommended Number of Soil Pile Samples

CONTAMINANT:	SEMI-VOLATILES		VOLATILES	
SAMPLE TYPE:	Grab	Composite	Grab	Composite
SOIL QUANTITY (yd^3):				
0-50	1	1	1	1
50-100	1	2	2	1
100-200	1	3	3	1
200-300	1	4	4	1
300-400	2	4	4	2
400-500	2	5	5	2
500-800	2	6	6	2
800-1000	2	7	7	2
>1000 - Proposed Sampling plan shall be submitted for approval on site specific basis				

Best engineering judgment is needed to determine the most appropriate sampling locations. The objective of the sampling is to characterize the extent of contamination of the pile. Consideration should be given to how the soil was stockpiled. Is the most contaminated soil toward the top? Are areas visibly contaminated? How high and how long is the pile? It may be preferable to divide the pile into manageable segments. Samples should be taken from within the pile. Surface soil should not be used as sampling material. Samples shall be collected in accordance with proper sample collection techniques. All samples must be collected in glass containers with air-tight sealable tops.

Using the above sampling table, considering the factors mentioned above, and applying best engineering judgment, an acceptable evaluation of the contaminant concentrations in the soil can be made.

C. Processed Soil

Processed soil is soil which undergoes physical handling during a treatment process. Examples of treatment processes are rotary kiln dryers (low temperature thermal treatment units) or soil washing units. Soil under these conditions are more homogeneously mixed; therefore, individual samples are more likely to characterize the entire lot. Since these processes are continuous in nature, the samples should be collected over a period of time similar to that described below:

1. A sample may be collected every twenty minutes for a period of two hours. The samples are then mixed to form one composite sample. This frequency will continue until all soils are processed. The twenty minute composite interval is a guideline which can be adjusted based on the amount of soil processed and the processing period. Testing protocols are specifically defined in the treatment unit's operating permit.
2. At least one grab sample should be taken for every two sets of composites.

3. A minimum of two samples (1 grab, 1 composite) should be taken for any treated soil batch.

D. Aboveground (Ex-Situ) Treatment

Typical aboveground treatment technologies are bioremediation and soil vapor extraction. Soil remediated under these conditions will be mixed (tilled) and spread evenly over a wide area. The soil will be spread to a uniform thickness, usually no higher than two feet, although depths may be higher for soil vapor extraction treatment. The shallow depth makes sample collection an easy process. The number of required samples can be based on the quantity of soil being treated (see above table). Depth of the sample can be anywhere from six inches to the bottom of the treatment layer. Care must be taken not to penetrate the liner material. The sampling locations and depths must be randomized.

E. Non-Excavated (In-Situ) Treatment

Treatment of non-excavated soil is similar to .aboveground treatment in that the contamination is spread over a wide area. It differs, however, in that the depths of the contaminated zone are varied and usually extend much deeper. Once the volume of contaminated material is determined, the above table can be used to determine the number of required samples. The sampling locations and depths must be randomized.

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SECTION VII - MANAGEMENT OF EXCAVATED (EX-SITU) CONTAMINATED SOILS

Once non-hazardous petroleum-contaminated soil is moved from its original state, it is by definition a solid industrial waste and must be managed in accordance with Part 360 and transported in accordance with Part 364 regulations. There are several alternatives available to properly handle this contaminated soil.

A. Soils Which Do Not Meet Guidance Values

Soils which do not meet the guidance values can be processed under a specific DEC Beneficial Use Determination (BUD), such as at an approved hot-

mix asphalt batching plant or at a cold-mix asphalt plant, disposed of at a DEC authorized landfill, or treated on site.

1) Reuse Under Specific Beneficial Use Determinations

The DEC Division of Solid Waste has made Beneficial Use Determinations (BUD's) under 6 NYCRR Part 360, identifying recycling or re-use activities which are not subject to Part 360 regulations. The use of petroleum-contaminated soil in a manufacturing process to produce a marketable product may be eligible for BUD issuance. Each manufacturing process operator must maintain compliance with the specific requirements of the issued BUD. Hot-mix and cold-mix asphalt manufacturing are two examples of processes which have received BUD's, and other processes may be approved by the Division of Solid Waste in the future.

a. Reuse at an Approved Asphalt Batching Plant

Several asphalt plants have been authorized to accept non-hazardous contaminated soil, for use as aggregate, provided the plant is in compliance with any other DEC regulations which may apply to the facility. For example, the use of petroleum-contaminated soil may require a modification of the facility's air emission permit.

b. Production of Cold-Mix Asphalt

A Beneficial Use Determination (BUD) has been issued to the process which combines liquid asphalt emulsion with the contaminated soil to produce a cold-mix asphalt. Approval to process petroleum-contaminated soil to produce a cold-mix asphalt is issued by the Spill Response Program. The applicant must satisfy specific testing requirements prior to receiving approval to process. Each BUD identifies allowable uses for the manufactured cold-mix asphalt and any qualifying conditions and post-treatment testing protocols.

These asphalt products, if being stockpiled or transported for disposal rather than reuse, no longer meet the requirements for these BUDs and are subject to all applicable regulatory provisions of 6NYCRR Parts 360 and 364.

PCS containing asphalt products, which are left in a stockpile and are not being beneficially used, remain a solid waste until such use is accomplished. ***These materials shall be removed from the stockpile for beneficial use in accordance with their beneficial use approval requirements, or disposal if necessary, as rapidly as possible.***

2) Disposal at an Authorized Landfill

A DEC-authorized landfill is one which either has an operating

permit or is under a consent order. While this is not the preferred method of dealing with contaminated soil, it may be the most economical or, due to site constraints, the only alternative. Additional restrictions may be required by the landfill operators prior to accepting materials at their facilities.

3) Treatment On Site

Non-hazardous petroleum-contaminated soil may be treated on the site of generation without a DEC Part 360 Permit. Depending on the treatment technologies being utilized, other DEC permits may be required for air emissions and water discharges.The soil treatment processes may involve excavation of soils, securely stockpiling the soils until treatment is initiated, aboveground treatment of the soils, and/or placement of soils back into an excavation for treatment. The Regional Spill Investigator should require a remedial plan, signed by the responsible party, prior to the placement of contaminated soils into an excavation for treatment.

If the soil is to be placed back in an excavation for treatment, and if the excavation is determined to be uncontaminated, the excavation must be prepared and lined in such a manner to protect it against contamination from the soil which will be treated. However, if the excavation is contaminated it shall be the decision of the Regional Spill Investigator as to whether a liner is necessary.

All excavated soil shall be placed on an impervious material (eg: polyethylene sheeting) with the sides banked so as to control and contain run-off. During periods when no treatment is on-going, the surface of the pile(s) must also be covered with an impervious material.

The site may have to be evaluated for its impact to the ambient air. Cross media contamination shall be minimized and aesthetic or nuisance issues shall be addressed. If space on the site is limited, or if the protection of the public health is in jeopardy, then on-site treatment will not be allowed and soil must be removed to a permitted location for treatment or disposal.

There are several methods of on-site soil treatment. Typical among these are soil venting, bioremediation, soil washing and low temperature thermal treatment. All treatment should be evaluated based on its ability to achieve the desired result in the most economical and efficient manner.

B. Soils Which Meet Guidance Values

The reuse options available for de-contaminated soil depends upon which particular Guidance Values are satisfied by the soil.

Table 3 identifies the reuse options and the Guidance Values which must be met to use each reuse option.

As described earlier, the DEC Division of Solid Waste (DSW) has issued a Generic Beneficial Use Determination (BUD) which exempts petroleum-contaminated soils, which have been successfully incorporated into an asphalt product by a Bureau of Spill Prevention and Response (BSPR) approved producer and which will be utilized in a bonified paving project.

In addition, the DSW has determined that soils which satisfy the appropriate Guidance Values and which will be reused as highway sub-base material, fill for the original excavation, fill elsewhere on the site of generation, or fill off-site at pre-approved locations, are being beneficially used and are exempt from the provisions of 6NYCRR Part 360. These soils are also exempt from 6NYCRR Part 364 since they no longer meet the Part 364 definition of "solid waste".

The reuse options are not listed as a hierarchy; however, off-site reuse is generally less desirable. The Regional Spill Supervisor or his/her designee will review all appropriate soil sampling data to determine if the criteria has been met for the requested reuse option. Upon request from the responsible party, the evaluation of the submitted data shall be documented with a statement from the Regional Spill Supervisor that the soil does or does not meet the criteria for the desired reuse option. **The DEC and its designee assume no liability when evaluating data for a responsible party with regard to the reuse or disposal of the soil in question.** The generator of the soil has the ultimate responsibility for the accurate and precise characterization, and the safe and proper reuse or disposal of the material. In addition, soil which is being reused off site shall not be allowed to be transported prior to the receipt of the laboratory reports confirming that the soil has satisfied the appropriate Guidance Values of this guidance document. **The responsible party shall maintain all field data, laboratory results, and final disposition records for three years.**

The possible reuse options are presented below. Additional uses of decontaminated petroleum-contaminated soil may be identified in a Part 360 Permit or BUD for a specific facility.

1) Reuse as a Construction Material

Soil which satisfies the Guidance Values for groundwater protection, human health protection and nuisance characteristics can be reused as construction material. Construction material can include hot asphalt, cold-mix asphalt, concrete, roadway sub-base, etc. Final destination of the soil shall be identified prior to removal

from the site.

2) Returned to the Original Excavation

Soil which satisfies the Guidance Values for groundwater protection, human health protection, and nuisance characteristics, can be placed back in the hole from which it was excavated.

3) Placed Elsewhere on Site

Soil which satisfies the Guidance Values for groundwater protection, human health protection, and nuisance characteristics, can be placed anywhere within the confines of the contiguously-owned property from which it originated.

4) Reuse Off-Site at a Pre-Approved Location

The Regional Spill Engineer and Regional Solid Waste Engineer may .approve a request for an off-site reuse location for remediated soil which satisfies the Guidance Values for groundwater protection, human health protection, and nuisance characteristics. Sites which may be considered for this option are industrial sites, authorized construction and demolition debris landfills, petroleum storage facilities, authorized landfills, or other locations where public access is limited. Written approval must be received from the property owner(s) prior to exercising this reuse option. The responsible party may submit such a request to the Regional Spill Engineer who will coordinate with the Regional Solid Waste Engineer to approve or disapprove the request.

C. Rock Debris

Rock debris, for purposes of this policy, is defined as those rocks which are four (4) inches or greater in diameter. They shall be cleaned of any packed-on petroleum-contaminated soil. These rocks are not treated as a solid waste and can be disposed of as construction and demolition debris.

If rock debris cannot be separated from the petroleum-contaminated soil, it shall be handled as a solid waste in accordance with NYCRR Part 360 and/or Part 364 requirements.

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SECTION VIII - MANAGEMENT OF NON-EXCAVATED (IN-SITU) CONTAMINATED SOIL

In-situ contaminated soil may pose a threat to the groundwater, human health and the environment. These sites must be evaluated to determine the extent of contamination and the appropriate investigative or remedial actions necessary. The soil may be treated in-situ and evaluated by the same guidelines as excavated soil, while taking into account site-specific considerations and conditions.

Additional guidance will be developed to establish procedures for .evaluating the potential impacts of non-excavated (in-situ) contaminated soils. Issues which should be considered when evaluating in-situ contaminated soil are environmental sensitivity of the site, level of residual contamination, soil characteristics, depth to groundwater, present and potential land use. A proper sampling plan will be necessary to determine the number, quantity and depth of samples to properly characterize the site.

SECTION IX - REFERENCES

NYS Department of Environmental Conservation, Cleanup Standards Task Force, ***DRAFT Cleanup Policy and Guidelines***, October 1991.

NYS Department of Environmental Conservation, Division of Hazardous Substances Regulation, ***6NYCRR Part 364, Waste Transporter Permits***, January 12, 1990.

NYS Department of Environmental Conservation, Division of Hazardous Substances Regulation, ***6NYCRR Part 371 Identification and Listing of Hazardous Wastes,*** December 25, 1988.

NYS Department of Environmental Conservation, Division of Solid Waste, ***6NYCRR Part 60 Solid Waste Management Facilities, May 28, 1991.***

NYS Department of Environmental Conservation, Division of Water, ***Sampling Guidelines and Protocols,*** March 1991.

NYS Department of Environmental Conservation, Division of Water, ***Spill Response Guidance Manual*** , January 1990.

NYS Department of Environmental Conservation, Division of Water, Technical and Operation Guidance Series (1.1.1), ***Ambient Water Quality Standards and Guidance Values,*** November 15, 1991.

US Environmental Protection Agency, ***40 CFR Part 261 Identification and Listing of Hazardous Wastes***, June 29, 1990.

US Environmental Protection Agency, ***Health Effects Assessment Summary .Table***, April 4, 1991.

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APPENDIX A
HAZARDOUS WASTE DETERMINATION AND REGULATORY LEVELS

In accordance with DEC and EPA regulations, the generator of a waste material must determine if the material is a hazardous waste or a non-hazardous waste. The generator can make this determination using knowledge of the waste and/or laboratory analyses.

A waste material can be a hazardous waste due to its origin, its listed waste content, or its characteristics.

Soil contaminated with virgin petroleum products is a hazardous waste if it exhibits a characteristic of a hazardous waste, namely, ignitability, corrosivity, reactivity, and toxicity. The hazardous waste characteristics, defined in 6NYCRR Part 371, Section 371.3, and 40 CFR Section 261, are described below.

A. Ignitability:

A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:

1. Is not a liquid and is capable under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.
2. It is a liquid, other than an aqueous solution containing less than 24 percent ethyl alcohol by volume, and has a flash point less than 60 °C (140 °F).
3. It is an ignitable compressed gas.
4. It is an oxidizer.

In accordance with guidance from the DEC Division of Hazardous Substances Regulation and based on knowledge of the waste, soils contaminated with virgin petroleum products do not exhibit the above properties and do not have to be tested for the ignitability characteristic.

B. Corrosivity:

A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

1. It is aqueous and has pH less than or equal to 2 or greater than or equal to 12.5.
2. It is a liquid and corrodes steel at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55 °C (130 ° F).

Based on knowledge of the waste, soils contaminated with virgin petroleum products do not exhibit the above properties, and do not have to be tested

for the corrosivity characteristic.

C. Reactivity:

A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:

1. It is normally unstable and readily undergoes violent change without detonating.
2. It reacts violently with water.
3. It forms potentially explosive mixtures with water.
4. When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.
5. It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in quantity sufficient to present a danger to human health or the environment.
6. It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.
7. It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.
8. It is a forbidden explosive, a Class A explosive or a Class B explosive.

Based on knowledge of the waste, soils contaminated with virgin petroleum products do not exhibit the above properties, and do not have to be tested for the reactivity characteristic.

D. Toxicity:

If the Toxicity Characteristic Leaching Procedure (TCLP) extract from a representative sample of the waste contain any of the contaminants identified in the attached listing of Hazardous Waste Regulatory levels at concentrations equal to or greater than the values listed, it is a hazardous waste.

With respect to petroleum-contaminated soil, the primary compound of concern is benzene. If the benzene concentration in a TCLP extract is equal to or greater than 500 ppb, the contaminated material is a characteristic hazardous waste. For gasoline contaminated soil, toxicity for lead must also be evaluated.

The regulatory level of benzene in the soil is determined by analyzing the soil using the TCLP extraction method and determining the concentration in the extract.

A second method of determination is to identify the total concentration of the contaminant in the soil. If the total concentration is less than the regulatory level, then the leachate level could not possibly exceed the standard. This approach would save laboratory costs because the TCLP would not have to be run. If the total concentration in the soil exceeds the regulatory level required in the extract, no conclusion can be drawn from these results and a complete TCLP must be

run.

Additional Information on Toxicity Characteristics

On March 29, 1990, the U.S. Environmental Protection Agency established the Toxicity Characteristic (TC) Rule. The TC Rule expands the list of contaminants by which a waste can be classified as hazardous due to toxicity, and it replaces the Extraction Procedure Toxicity (EP Tox) with the Toxicity Characteristic Leaching Procedure (TCLP). The TC Rule's specified contaminant list includes the same 14 metals and pesticides as the original toxicity list, plus 25 additional organic chemicals. Each of the 39 listed contaminants has the potential for rendering a particular material a characteristic hazardous waste due to toxicity. Since benzene is one of the 25 organic compounds added to the toxicity list, and since benzene is commonly found in petroleum products, it is possible that petroleum-contaminated soil may classify as a hazardous waste. Limited relief from these hazardous waste regulations is currently available because the TC Rule has specifically deferred petroleum-contaminated soil, groundwater, and debris generated from underground storage tank (UST) releases, until the impact of the regulation is further evaluated.

UST sites are essentially those sites which have underground storage tanks containing transportation fuels, such as gasoline, jet fuel, aviation gas, and diesel fuel. (See 40 CFR Section 280.12 for a more complete definition). The TC Rule does not apply to petroleum-contaminated media produced by a leak from an UST, including associated underground piping. However, DEC regulations state that the materials contaminated by transportation fuels can be hazardous wastes if they exhibit other hazardous waste characteristics, such as toxicity due to lead.

The TC Rule, as published on March 29, 1990, became effective on .September 25, 1990, for large-quantity generators, and March 29, 1991, for small quantity generators. Large quantity generators are defined as those parties who generate 2,200 pounds or more of hazardous waste in any month. Small quantity generators are those parties who generate between 220 and 2,200 pounds of hazardous waste in any month. Until the DEC adopts the TC Rule, waste generators must comply with both the EPA and DEC waste regulations. Refer to the specific regulations of interest for more information.

HAZARDOUS WASTE REGULATORY LEVELS FOR TOXICITY CHARACTERISTIC

CONSTITUENT	REGULATORY LEVEL (mg/L)
Arsenic	5.0
Barium	100.0
Benzene	0.5*
Cadmium	1.0
Carbon tetrachloride	0.5*
Chlordane	0.03*

Chlorobenzene	100.0*
Chloroform	6.0*
Chromium	5.0
o-Cresol	200.0*
m-Cresol	200.0*
Cresol (TOTAL)	200.0*
2,4-D	10.0
1,4-Dichlorobenzene	7.5*
1,2-Dichloroethane	0.5*
1,1-Dichloroethylene	0.7*
2,4-Dinitrotoluene	0.13*
Endrin	0.02
Heptachlor (and its epoxide)	0.008*
Hexachlorobenzene	0.13*
Hexachloro-1,3butadience	0.5*
Hexachloroethane	3.0*
Lead	5.0*
Lindane	0.4
Mercury	0.2
Methoxychlor	10.0
Methyl ethyl ketone	200.0*
Nitrobenzene	2.0*
Pentachlorophenol	100.0*
Pyridine	5.0*
Selenium	1.0
Silver	5.0
Tetrachloroethylene	0.7*
Toxaphene	0.5
Trichloroethylene	0.5*
2,4,5-Trichlorophenol	400.0*
2,4,6-Trichlorophenol	2.0*
2,4,5-TP (Silvex)	1.0
Vinyl chloride	0.2*

*New Toxicity Characteristics Effective 9/25/90

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APPENDIX B
GUIDANCE VALUES AND REUSE OPTIONS

TABLE 1

Guidance Values For Gasoline Contaminated Soil*

Compound	EPA Method	Detection Limit (1) (ppb)		TCLP Extraction Guidance Value (2) C_w (ppb)	TCLP Alternative Guidance Value C_a (ppb)	Human Health Guidance Value C_h (ppb)	Sediment Guidance Value C_s (ppb)
		Liquid	Solid				
Benzene	8021 (8020)	1	2	0.7	14	2.4×10^4	
Ethylbenzene	8021 (8020)	1	2	5	100	8.0×10^6	
Toluene	8021 (8020)	1	2	5	100	2.0×10^7	
o-Xylene	8021 (8020)	2	2	5	100	2.0×10^8	
m-Xylene	8021 (8020)	2	2	5	100	2.0×10^8	
p-Xylene	8021 (8020)	2	2	5	100	* * *	
Mixed Xylenes	8021 (8020)	2	2	5	100	2.0×10^8	
Isopropylbenzene	8021	1	1	5	100	* * *	
n-Propylbenzene	8021	1	1	5	100	* * *	
p-Isopropyltoluene	8021	1	1	5	100	* * *	
1,2,4-Trimethylbenzene	8021	1	1	5	100	* * *	
1,3,5-Trimethylbenzene	8021	1	1	5	100	* * *	
n-Butylbenzene	8021	1	1	5	100	* * *	
sec-Butylbenzene	8021	1	1	5	100	* * *	
Naphthalene	8021	1	1	10	200	3.0×10^5	
Methyl t-butyl ether (MTBE) (3)	8021 (8020)	1	1	50	1,000	* * *	

***Nuisance Characteristics Guidance:**
No petroleum-type odors.
No individual contaminant in soil at greater than 10,000 ppb.

(1) The listed Detection Limits are Practical Quantitation Limits (PQLs). The Method Detection Limit (MDL) is the best possible detection. Laboratories report the Practical Quantitation Limit (PQL), which is generally 4 times the MDL. Efforts should be made to obtain the best detection possible when selecting a laboratory. When the Guidance Value or standard is below the detection limit, achieving the detection limit will be considered acceptable for meeting the Guidance Value or standard.

(2) The TCLP Extraction Guidance Values are equal to the NYSDEC groundwater quality standards or Guidance Values, or the NYSDOH drinking water quality standards or Guidance Values, whichever is more stringent.

(3) Methyl t-butyl ether (MTBE) is not a target compound of Methods 8021 and 8020, but MTBE may be determined using these methods with appropriate quality assurance and quality control measures.

*** No Guidance Value identified in EPA HEAST Report.

TABLE 2
Guidance Values for Fuel Oil Contaminated Soil*

Compound	EPA Method	Detection Limit (ppb) (1)		TCLP Extraction Guidance Value(2) C_w (ppb)	TCLP Alternative Guidance Value C_a (ppb)	Human Health Guidance Value C_h (ppb)	Sediment Guidance Value C_s (ppb)	
		Liquid	Solid				Fresh	Marine
Benzene	8021 (8020)	1	2	0.7	14	2.4×10^4		
Ethylbenzene	8021 (8020)	1	2	5	100	8.0×10^6		
Toluene	8021 (8020)	1	2	5	100	2.0×10^7		
o-Xylene	8021 (8020)	2	2	5	100	2.0×10^8		
m-Xylene	8021 (8020)	2	2	5	100	2.0×10^8		
p-Xylene	8021 (8020)	2	2	5	100	* * *		
Mixed Xylenes	8021 (8020)	2	2	5	100	2.0×10^8		
Isopropylbenzene	8021	1	1	5	100	* * *		

n-Propylbenzene	8021	1	1	5	100	* * *		
p-Isopropyltoluene	8021	1	1	5	100	* * *		
1,2,4-Trimethylbenzene	8021	1	1	5	100	* * *		
1,3,5-Trimethylbenzene	8021	1	1	5	100	* * *		
n-Butylbenzene	8021	1	1	5	100	* * *		
sec-Butylbenzene	8021	1	1	5	100	* * *		
t-Butyl benzene	8021	1	1	5	100	* * *		
Naphthalene (3)	8021 (8270)	1 (6)	1 (330)	10	200	3.0×10^5		
Anthracene	8270	8	330	50	1,000	2.0×10^7		
Fluorene	8270	8	330	50	1,000	3.0×10^6		
Phenanthrene	8270	22	330	50	1,000	* * *		
Pyrene	8270	8	330	50	1,000	2.0×10^6		
Acenaphthene	8270	8	330	20	400	5.0×10^6		
Benzo(a) anthracene	8270	31	330	.002	.04 (4)	220	33	18
Fluoranthene	8270	9	330	50	1,000	3.0×10^6		
Benzo(b) fluoranthene	8270	19	330	.002	.04 (4)	220	33	18
Benzo(k) fluoranthene	8270	10	330	.002	.04 (4)	220	33	18
Chrysene	8270	10	330	.002	.04 (4)	* * *	33	18
Benzo(a)pyrene	8270	10	330	.002	.04 (4)	61	33	18
Benzo(g.h,i) perylene	8270	10	330	.002	.04 (4)	* * *		
Indeno (1,2,3-cd) pyrene	8270	10	330	.002	.04 (4)	* * *		
Dibenz(a,h) anthracene	8270	10	330	50	1,000	14		

***Nuisance Characteristics Guidance:**
No Petroleum-type odors.
No individual contaminant in soil at greater than 10,000 ppb.

(1) The listed Detection Limits are Practical Quantitation Limits (PQL's). The Method Detection Limit (MDL) is the best possible detection. Laboratories report the Practical Quantitation Limit (PQL), which is generally 4 times the MDL. Efforts should be made to obtain the best detection possible when selecting a laboratory. When the Guidance Value or standard is below the detection limit, achieving the detection limit will be considered

acceptable for meeting the Guidance Value or standard.

(2) The TCLP Extraction Guidance Values are equal to the NYSDEC groundwater quality tandards or Guidance Values, or the NYSDOH drinking water quality standards or Guidance Values, whichever is more stringent.

(3) For naphthalene analysis in a liquid matrix, both Method 8021 and Method 8270 can provide satisfactory levels for comparison to the Cw of 10 ppb.

For naphthalene analysis in a solid matrix, Method 8021 is preferred over Method 8270 for comparison to the Ca of 200 ppb. If the Ca Guidance Value is not being used in the soil evaluation, then both Method 8021 and 8270 can provide satisfactory detection levels for comparison to the Ch of 3.0 x 105, and nuisance characteristic of 10,000 ppb.

(4) Due to the high detection limit for a solid matrix, the TCLP Extraction Method must be used to demonstrate groundwater quality protection for these compounds.

*** No Guidance Value identified in EPA HEAST Report.

TABLE 3

Soil Reuse Options

	Minimum Criteria To Be Met (1)		
Reuse Option	**Protection of Groundwater**	**Protection of Human Health**	**Protection Against Nuisance Characteristics**
Asphalt (2) or Concrete Manufacturing			
Cold-Mix Asphalt (2)			
Construction Material	x	x	x
Fill for Original Excavation	x	x	x
Fill Elsewhere On-site	x	x	x
Off-Site at Pre-Approved Location	x	x	x

(1) In addition, the criteria for protection of fish and wildlife must be met when sediments are the waste materials being handled, and when these soils or sediments are being disposed in surface waters, marine waters, or wetland areas.

(2) The soils must satisfy the criteria established under the particular BUD issuance.

ATTACHMENT D

Tables

TABLE 1

RECOMMENDED ANALYTICAL PROGRAM

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

TYPE OF MATERIAL	ANALYTICAL PARAMETERS						
	TCL and STARS VOCs EPA Method 8260 and/or STARS VOCs EPA Method 8021	STARS MEMO #1 SVOCs EPA Method 8270	TPH NYSDOH Method 310.13	Total RCRA Metals	TCLP VOCs and/or Metals	pH, Reactivity, ignitability[1]	No Testing Recommended
Soil/fill with suspect petroleum-related constituents and/or other VOCs	X	X	X		X[2]		
Free Petroleum Product	X	X	X	X		X	
Fill suspected of containing heavy metals				X	X[3]		
Unanticipated contamination of unknown type	X	X	X	X	X[3]	X	
C&D fill							X[5]
solid waste							X[5]

Footnotes:

(1) Ignitability and corrosivity for liquid wastes only.

(2) Required if previous testing results indicate total VOCs are anticipated to exceed TCLP regulatory levels, or is required by disposal facility.

(3) Required only if previous test results indicate that total metals exceed TAGM #4046 cleanup objectives or above typical background ranges for naturally occurring metals, or if required by disposal facility.

(4) Upon request by disposal facility.

(5) In accordance with Part 360, treat as uncontaminated unless suspected and proven otherwise via analytical testing. Disposal facilities may require some analytical testing.

TABLE 2

CLEANUP OBJECTIVES

14-60 CHARLOTE STREET
ROCHESTER, NEW YORK

TYPE OF SOIL/FILL MATERIAL ANALYZED	NYSDEC TAGM #4046 Soil Cleanup Objectives for VOCs and SVOCS [1]	NYSDEC TAGM #4046 Soil Cleanup Objectives and/or background ranges for Metals	NYSDEC Part 373 Solid Waste Criteria
Specific petroleum constituents in soil/fill	X		X
TPH, heavy metals and specific non-petroleum constituents in soil/fill	X	X	X

Footnotes: (1) Recommended soil cleanup objectives as referenced in the January 24, 1994 NYSDEC TAGM 4046 as amended by the NYSDEC's Table 1 dated 1998.

TABLE 3

RE-USE OBJECTIVES

14-60 CHARLOTE STREET
ROCHESTER, NEW YORK

TYPE OF SOIL/FILL MATERIAL ANALYZED	STARS MEMO #1 Soil Guidance Values for VOCs and SVOCs [1]	NYSDEC TAGM #4046 Soil Cleanup Objectives for VOCs and SVOCS [2]	NYSDEC TAGM #4046 Soil Cleanup Objectives and/or background ranges for Metals [2]
Specific petroleum constituents in soil/fill	X		
TPH, heavy metals and specific non-petroleum constituents in soil/fill		X	X

Footnotes: (1) If petroleum impacted material is proposed for re-use on-site, compare to petroleum soil guidance values a referenced in the August 1992 NYSDEC STARS Memo #1

(2) If non-petroleum impacted material is proposed for re-use on-site, compare to recommended soil cleanup objectives and/or background ranges as referenced in the January 24, 1994 NYSDEC TAGM 4046 as amended by the NYSDEC's Table 1 dated 1998

APPENDIX E

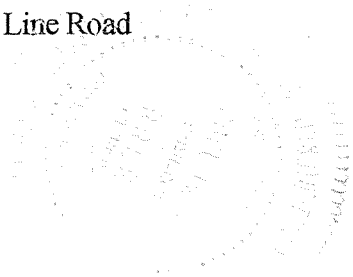
Health and Safety Plan

HEALTH AND SAFETY PLAN

14 - 60 CHARLOTTE STREET
ROCHESTER, NEW YORK

Prepared by: Day Environmental, Inc.
2144 Brighton-Henrietta Town Line Road
Rochester, New York 14623

Approved by: Davis E. Frederiksen, CIH
Certification #3388



Project No.: 2485R-00

Date: August 2001

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Figure 1 - Route for Emergency Service
Figure 3 (Cumulative Test Locations with Peak PID Readings)

Attachment 2 Tables Summarizing Previous Analytical Laboratory Data

1.0 INTRODUCTION

This Health and Safety Plan (HASP) outlines the policies and procedures necessary to protect workers and the public from potential environmental hazards posed during remedial activities, construction activities and maintenance activities at the subject property (Site) addressed as 14-60 Charlotte Street, Rochester, New York (refer to Figure 1 included in Attachment 1). The Site consists of seven contiguous parcels totaling approximately 1.1 acres (refer to Figure 3 included in Attachment 1). As outlined in this HASP, the above activities shall be conducted in a manner to minimize the probability of injury, accident, or incident occurrence.

Although the HASP focuses on the specific work activities planned for this Site, it must remain flexible because of the nature of this work. Conditions may change and unforeseen situations can arise that require deviations from the original HASP.

1.1 Site History/Overview

A two-story vacant residential dwelling on the parcel addressed as 26 Charlotte Street and an approximately 1,800-square foot one-story vacant commercial concrete block garage located on the parcel addressed as 42 Charlotte Street were demolished in September 2001. The 48-60 Charlotte Street parcel is actively used as an open parking lot and the remainder of the Site is vacant or unused. The City of Rochester is the current owner of the Site.

Under current City of Rochester plans, the existing residential dwelling and commercial building are to be demolished and the Site will be redeveloped for residential use. It is currently anticipated that the residential redevelopment will consist of construction of a condominium or apartment complex.

DAY previously completed various environmental studies at the Site and in the right-of-ways of Haags Alley and Charlotte Street. These studies that are summarized in reports prepared by DAY titled "Supplemental Phase II Environmental Studies" dated November 2000 and " Supplemental Environmental Studies" dated February 2001. These reports identified and documented the existence of soil and groundwater contamination at the Site and in the right-of-way of Haags Alley north of the Site. Light non-aqueous phase liquid (LNAPL) was detected in well MW-7 located on the 14-16 Charlotte Street parcel. Some contaminants detected (e.g., light-weight TPH identified as mineral spirits and chlorinated volatile organic compounds) appear attributable to an off-site source located north of Haags Alley. Properties that could be considered as potential off-site sources of contamination (e.g., historic dry cleaning operations, historic auto painting operations, etc.) are depicted on Figure 3 included in Attachment 1. Analytical laboratory test data for soil and groundwater samples collected during previous environmental studies are summarized on tables included in Attachment 2, and the test locations are depicted on Figure 3 in Attachment 1.

In April 2000, the City of Rochester notified the New York State Department of Environmental Conservation (NYSDEC) of the preliminary field findings of the environmental studies that were being performed on the Site. The NYSDEC subsequently assigned active spill number NYSDEC Spill #0070043 to the parcels addressed as 26-60 Charlotte Street. A separate active spill number NYSDEC Spill #0070044 was assigned to the parcel addressed as 14-16 Charlotte Street.

An exposure assessment was performed using the available site data obtained during previous environmental work. The exposure assessment report dated June 2001 concluded that a combination of remedial actions and environmental engineering controls should be implemented if the Site is to be redeveloped for residential and/or commercial uses. Based on this exposure assessment, the site specific target levels (SSTLs) for the highest ("worst case") concentrations of various constituents detected in soil, fill or groundwater at the Site and/or their respective cumulative baseline risk factors were exceeded for one or more of the following exposure pathways:

- surface soil inhalation, ingestion, and dermal contact;
- soil volatilization to indoor air;
- soil volatilization and surface soil particulates to outdoor air; and
- groundwater volatilization to indoor air.

1.2 Planned Activities Covered by HASP

This HASP is to be implemented during activities that are associated with performing remedial activities, construction activities and maintenance activities at the Site. These activities include:

- Removing the on-site sources of petroleum contamination as an interim remedial measure (IRM).
- Demolishing existing Site structures (i.e., a residential house, a one-story commercial building and some metals sheds) and evaluating subsurface conditions;
- Recovery of free petroleum product on the southern portion of the 14-16 Charlotte Street parcel.
- Implementing an environmental management plan (EMP), including a health and safety plan (HASP);
- Implementing a long-term monitoring program
- Installing, operating and monitoring environmental engineering controls;
- Constructing a new residential development
- Installation, sampling, and surveying of new groundwater monitoring wells;
- Miscellaneous on-site work as may arise that involves disturbance of potentially contaminated soil, fill, groundwater or free product.

This HASP can be modified to cover other site activities (e.g., subsurface utility repairs, etc.) when appropriate. The owner of the property, its contractors, and other site workers will be responsible for the development and/or implementation of health and safety provisions associated with normal construction activities or site activities.

2.0 KEY PERSONNEL AND MANAGEMENT

The Project Manager (PM), Certified Industrial Hygienist (CIH) and Site Safety Officer (SSO) are responsible for formulating and enforcing health and safety requirements, and implementing the HASP.

2.1 Certified Industrial Hygienist

The CIH or designated health and safety specialist is responsible for the contents of the HASP and ensures that the HASP complies with federal, state and local health and safety requirements. If necessary, the CIH can modify the HASP to adjust for on-site changes that affect safety. The CIH will coordinate with the SSO on modifications to the HASP and will be available for consultation when required. The CIH will not necessarily be on site during the field activities.

2.2 Project Manager

The PM has the overall responsibility for the project and to assure that the goals of the investigative program are attained in a manner consistent with the HASP requirements. The PM will coordinate with the SSO to ensure that the project goals are completed in a manner consistent with the HASP.

2.3 Site Safety Officer

The SSO has responsibility for administering the HASP relative to site activities, and will be in the field full-time while site activities are in progress. The SSO's operational responsibilities will be monitoring, including personal and environmental monitoring, ensuring personal protective equipment maintenance, and assignment of protection levels. The SSO will be the main contact in any on-site emergency situation. The SSO will direct field activities involved with safety and be responsible for stopping work when unacceptable health or safety risks exist. The SSO is responsible for ensuring that on-site personnel understand and comply with safety requirements.

2.4 Employee Safety Responsibility

Each employee is responsible for personal safety as well as the safety of others in the area. The employee will use the equipment provided in a safe and responsible manner as directed by the SSO.

2.5 OSHA Records

Required records are to be maintained at the offices of the parties (e.g., consultants, contractors, owner, etc.) that utilize this HASP.

3.0 SAFETY RESPONSIBILITY

Contractors, consultants, state or local agencies, or other parties, and their employees, involved with this environmental restoration project will be responsible for their own safety while on-site. Their employees will be required to understand the information contained in this HASP, and must follow the recommendations that are made in this document.

4.0 JOB HAZARD ANALYSIS

This HASP discusses some of the anticipated hazards for this Site. The hazards listed below deal specifically with those hazards associated with the management of the contaminated material (e.g., soil, groundwater, fill, etc.).

4.1 Chemical Hazards

Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage to the point of contact or can act systemically, causing a toxic effect at a part of the body distant from the point of initial contact.

A list of selected site-specific volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals that have been detected at the Site are presented in the table included in this section of the HASP. This list also presents the permissible exposure limits (PELs) and levels that are considered immediately dangerous to life and health (IDLH).

- The VOCs and SVOCs detected at the Site are most likely attributable to past commercial use of the Site (i.e., petroleum bulk storage facility).

- The metals detected may be attributable to naturally occurring concentrations in soil, fill material used at the Site, or past uses of the Site.

In addition to the VOCs, SVOCs, and metals listed in the table, light, medium and heavy weight total petroleum hydrocarbons (TPH) has been detected in soil and groundwater sample at the Site. These TPH have been tentatively identified as mineral spirits (i.e., could also represent Stoddard solvent or paint thinner), gasoline, kerosene, diesel fuel an lube oil.

The potential routes of exposure for these analytes and chemicals include inhalation, ingestion, skin absorption and skin/eye contact. The potential for exposure through any one of these routes will depend on the activity conducted. The more likely routes of exposure for the activities that are performed at the Site include inhalation and skin contact.

If other chemicals are encountered during remedial activities, construction activities or maintenance activities, this HASP may need to be modified to include those chemicals.

Table Listing Constituents Previously Detected at the Site and Applicable Health Exposure Criteria

CONSTITUENT	OSHA PEL	IDLH
Acetone	1,000 ppm	2,500 ppm
Benzene	1 ppm	500 ppm
Toluene	200 ppm	500 ppm~
Ethylbenzene	100 ppm	800 ppm
Mixed xylenes	100 ppm	900 ppm
1,2,4-Trimethylbenzene	25 ppm	NA
1,3,5-Trimethylbenzene	25 ppm	NA
Tetrachloroethene	100 ppm	150 ppm
Cis-1,2-Dichloroethene	200 ppm	1,000 ppm
Vinyl chloride	1 ppm	NA
Chlorobenzene	75 ppm	1,000 ppm
Methylene chloride	25 ppm	2,300 ppm
Naphthalene	10 ppm	250 ppm
Fluorene	0.1 ppm	NA
Anthracene	0.2 mg/m^3	NA
Arsenic	0.01 mg/m^3	NA
Barium	0.5 mg/m^3	NA
Cadmium	0.005 mg/m^3	9 mg/m^3
Chromium	1 mg/m^3	250 mg/m^3
Lead	0.05 mg/m^3	100 mg/m^3
Mercury	0.025 mg/m^3*	10 mg/m^3
Selenium	0.2 mg/m^3	1 mg/m^3
Stoddard solvent	500 ppm (2,900 mg/m^3)	20,000 mg/m^3

Notes:
PEL = OSHA Permissible Exposure Limits (TWA for 8-hour day) NA = Not Available
IDLH = Immediate Dangerous to Life or Health Concentration (1) = As coal tar pitch
* = Threshold Limit Value (TLV) listed - PEL is not available

4.2 Physical Hazards

There are physical hazards associated with this project, which might compound the chemical hazards. Hazard identification, training, adherence to the planned remedial, construction and maintenance measures, and careful housekeeping can prevent many problems or accidents arising from physical hazards. Potential physical hazards associated with this project and suggested preventative measures include:

- Slip/Trip/Fall Hazards - Some areas may have wet surfaces that will greatly increase the possibility of inadvertent slips. Caution must be exercised when using steps and stairs due to slippery surfaces in conjunction with the fall hazard. Good housekeeping practices are essential to minimize the trip hazards.

- Small Quantity Flammable Liquids - Small quantities of flammable liquids will be stored in "safety" cans and labeled according to contents.

- Electrical Hazards - Electrical devices and equipment shall be de-energized prior to working near them. All extension cords will be kept out of water, protected from crushing, and inspected regularly to ensure structural integrity. Temporary electrical circuits will be protected with ground fault circuit interrupters. Only qualified electricians are authorized to work on electrical circuits. Heavy equipment (e.g., backhoe, drill rig) shall not be operated within 10 feet of high voltage lines, unless proper protection from the high voltage lines is provided by the appropriate utility company.

- Noise - Work around large equipment often creates excessive noise. The effects of noise can include:

  - Workers being startled, annoyed, or distracted.

  - Physical damage to the ear resulting in pain, or temporary and/or permanent hearing loss.

  - Communication interference that may increase potential hazards due to the inability to warn of danger and proper safety precautions to be taken.

  Proper hearing protection will be worn as deemed necessary. In general, feasible administrative or engineering controls shall be utilized when on-site personnel are subjected to noise exceeding an 8-hour time weighted average sound level of 90 d(B)A (decibels on the A-weighted scale). In addition, whenever employee noise exposures equal or exceed an 8-hour, time weighted average sound level of 85 d(B)A, employers shall administer a continuing, effective hearing conservation program as described in OSHA Regulation 29 CFR Part 1910.95.

  Heavy Equipment - Each morning before start-up, heavy equipment will be inspected to ensure safety equipment and devices are operational and ready for immediate use.

  Subsurface and Overhead Hazards - Before any excavation activity, efforts will be made to determine whether underground utilities and potential overhead hazards will be encountered. Underground utility clearance must be obtained prior to subsurface work.

4.3 Environmental Hazards

Environmental factors such as weather, wild animals, insects, and irritant plants can pose a hazard when performing outdoor tasks. The SSO shall make every reasonable effort to alleviate these hazards should they arise.

4.3.1 Heat Stress

The combination of warm ambient temperature and protective clothing increases the potential for heat stress. In particular:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke

Site workers will be encouraged to increase consumption of water or electrolyte-containing beverages such as Gatorade when the potential for heat stress exists. In addition, workers are encouraged to take rests whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased upon worker recommendation to the SSO.

4.3.2 Exposure to Cold

With outdoor work in the winter months, the potential exists for hypothermia and frostbite.

Protective clothing greatly reduces the possibility of hypothermia in workers. However, personnel will be instructed to wear warm clothing and to stop work to obtain more clothing if they become too cold. Employees will also be advised to change into dry clothes if their clothing becomes wet from perspiration or from exposure to precipitation.

5.0 SITE CONTROLS

To prevent migration of contamination caused through tracking by personnel or equipment, work areas, and personal protective equipment staging/decontamination areas will be specified prior to beginning operations.

5.1 Site Zones

In the area where contaminated material present the potential for worker exposure (work zone), personnel entering the area must wear the mandated level of protection for the area. A "transition zone" shall be established where personnel can begin personal and equipment decontamination procedures. This can reduce potential off-site migration of impacted media. Contaminated equipment or clothing will not be allowed outside the transition zone (e.g., on clean portions of the Site) unless properly containerized for disposal. Operational support facilities will be located outside the transition zone (i.e., in a "support zone"), and normal work clothing and support equipment are appropriate in this area. If possible, the support zone should be located upwind of remedial activities, construction activities and maintenance activities.

5.2 General

The following items will be requirements to protect the health and safety of workers during implementation of remedial activities, construction activities and maintenance activities that disturb contaminated material.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination shall not occur in the work zone and/or transition zone during disturbance of contaminated material.
- Personnel admitted in the work zone shall be properly trained in health and safety techniques and equipment usage.
- No personnel shall be admitted in the work zone without the proper safety equipment.
- Proper decontamination procedures shall be followed before leaving the Site.

6.0 PROTECTIVE EQUIPMENT

This section addresses the various levels of PPE that are, or may be, required at this job site. Personnel entering the work zone and transition zone shall be trained in the use of the anticipated PPE to be utilized.

6.1 Anticipated Protection Levels

TASK	PROTECTION LEVEL	COMMENTS/MODIFICATIONS
Site mobilization	D	
Site prep/aboveground building demolition	D	
Extrusive work (e.g., surveying, etc.)	D	
Intrusive work (e.g., soil removal, , etc.)	C/Modified D/D	Based on air monitoring, and SSO discretion
Support zone	D	
Site breakdown and demobilization	D	

If visible dust is observed during remedial activities, construction activities or maintenance activities, then dust suppression will be implemented.

It is anticipated that work conducted as part of this project will be performed in Level D or modified Level D PPE. If conditions are encountered that require higher levels of PPE (e.g., Level C, B, or A), the work will immediately be stopped. The appropriate government agencies (e.g., NYSDEC, NYSDOH, etc.) will be notified, and the proper health and safety measures will be implemented (e.g., develop and implement engineering controls, upgrade in PPE, etc.).

6.2 Protection Level Descriptions

This section lists the minimum requirements for each protection level. Modifications to these requirements can be made upon approval of the SSO. If Level A, Level B, and/or Level C PPE is required, Site personnel that enter the work zone and/or transition zone must be properly trained and certified in the use of those levels of PPE.

6.2.1 Level D

Level D consists of the following:

- Safety glasses
- Hard hat when working with heavy equipment
- Steel-toed work boots
- Protective gloves during sampling or handling of potentially contaminated media
- Work clothing as prescribed by weather

6.2.2 Modified Level D

Modified Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work gloves
- Outer protective wear, such as Tyvek coverall [Tyveks (Sarans) and PVC acid gear will be required when workers have a potential to be exposed to impacted liquids or impacted particulates].

6.2.3 Level C

Level C consists of the following:

- Air-purifying respirator with appropriate cartridges for organic vapors and particulates (i.e., dusts, fumes and mists).
- Outer protective wear, such as Tyvek coverall [Tyveks (Sarans) and PVC acid gear will be required when workers have a potential to be exposed to impacted liquids or particulates].
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, or PVC overboots, if appropriate
- Nitrile, neoprene, or PVC gloves, if appropriate
- Face shield (when projectiles or splashes pose a hazard)

6.2.4 Level B

Level B protection consists of the items required for Level C protection with the exception that an air-supplied respirator is used in place of the air-purifying respirator. Level B PPE is not anticipated to be required during this project. If the need for level B PPE becomes evident, Site activities will be ceased until Site conditions are further evaluated, and any necessary modifications to the HASP have been approved by the Project Manager, CIH or SSO. Subsequently, the appropriate safety measures (including Level B PPE) must be implemented prior to commencing site activities.

6.2.5 Level A

Level A protection consists of the items required for Level B protection with the addition of a fully-encapsulating, vapor-proof suit capable of maintaining positive pressure. Level A PPE is not anticipated to be required during this project. If the need for level A PPE becomes evident, Site activities will be ceased until Site conditions are further evaluated, and any necessary modifications to the HASP have been approved by the Project Manager, CIH or SSO. Subsequently, the appropriate safety measures (including Level A PPE) must be implemented prior to commencing site activities.

6.3 Respiratory Protection

Any respirator used will meet the requirements of OSHA 29 CFR 1910.134. Both the respirator and cartridges specified shall be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910). Air purifying respirators shall not be worn if contaminant levels exceed designated use concentrations. The workers will wear respirators with approval for: organic vapors <1,000 parts per million (ppm); and dusts, fumes and mists with a TWA <0.05 mg/m^3.

No personnel who have facial hair, which interferes with the respirator's sealing surface, will be permitted to wear a respirator and will not be permitted to work in areas requiring respirator use.

Only workers who have been certified by a physician as being physically capable of respirator usage shall be issued a respirator. Personnel unable to pass a respiratory fit test or without medical clearance for respirator use will not be permitted to enter or work in areas on-site that require respirator protection.

7.0 DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work Site.

7.1 Personnel Decontamination

Personnel involved with remedial activities, construction activities and maintenance activities that involve disturbing contaminated material will follow the decontamination procedures described herein to ensure that material which workers may have contacted in the work zone and/or transition zone does not result in personal exposure and is not spread to clean areas of the Site. This sequence describes the general decontamination procedure. The specific stages can vary depending on the Site, the task, and the protection level, etc.

1. Leave work zone and go to transition zone
2. Remove soil/debris from boots and gloves
3. Remove boots
4. Remove gloves
5. Remove Tyvek suit and discard, if applicable
6. Remove and wash respirator, if applicable
7. Go to support zone

7.2 Equipment Decontamination

Contaminated equipment shall be decontaminated in the transition zone before leaving the Site. Decontamination procedures can vary depending upon the contaminant involved, but may include sweeping, wiping, scraping, hosing, or steam cleaning the exterior of the equipment. Personnel performing this task will wear the proper PPE.

7.3 Disposal

Disposable clothing will be treated as contaminated waste and be disposed of properly. Liquids (e.g., decontamination water, excavation waters, etc.) generated by remedial activities, construction activities and maintenance activities will be disposed of in accordance with applicable regulations.

8.0 AIR MONITORING

Air monitoring will be conducted in order to determine airborne particulate and contamination levels. This ensures that respiratory protection is adequate to protect personnel against the chemicals that may be encountered and that chemical contaminants are not migrating off-site. Additional air monitoring may be conducted at the discretion of the SSO.

The following chart describes the direct reading instrumentation that will be utilized and appropriate action levels.

Monitoring Device	Action level	Response/Level of PPE
PID Volatile Organic Compound Meter	< 1 ppm in breathing zone, sustained 5 minutes	Level D
	1-5 ppm in breathing zone, sustained 5 minutes; and vinyl chloride and benzene detector tubes below 1 ppm	Level D
	1-5 ppm in breathing zone, sustained 5 minutes; and vinyl chloride or benzene detector tubes between 1 and 5 ppm	Level C
	6-25 ppm in breathing zone, sustained 5 minutes; and vinyl chloride and benzene detector tube readings between 1 and 5 ppm	Level C
	26-250 ppm in breathing zone, sustained 5 minutes; or vinyl chloride or benzene detector tube readings above 5 ppm	Level B, Stop work, evaluate the use of engineering controls
	>250 ppm in breathing zone	Level A, Stop work, evaluate the use of engineering controls
RTAM Particulate Meter	< 150 ug/m^3 over an integrated period not to exceed 15 minutes.	Continue working
	> 150 ug/m^3	Cease work, implement dust suppression, change in way work performed, etc. If levels can not be brought below 150 ug/m^3, then upgrade PPE to Level C.

8.1 Particulate Monitoring

During implementation of remedial activities, construction activities and maintenance activities where contaminated materials may be disturbed, air monitoring will include real-time monitoring for particulates using a real-time particulate meter (RTAM) at the perimeter of the work zone in accordance with the 1989 NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4031, entitled "Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites. The TAGM uses an action level of 150 ug/m^3 (0.15 mg/m^3) over an integrated period not to exceed 15 minutes. If the action

level is exceeded, or if visible dust is encountered, then work shall be discontinued until corrective actions are implemented. Corrective actions may include dust suppression, change in the way work is performed, upgrade of personal protective equipment, etc. Readings will be recorded and be available for review.

8.2 Volatile Organic Compound Monitoring

During implementation of remedial activities, construction activities and maintenance activities where impacted materials may be disturbed, a PID will be used to monitor total volatile organic content of the ambient air. The PID will prove useful as a direct reading instrument to aid in determining if current respiratory protection is adequate or needs to be upgraded. The SSO will take measurements before operations begin in an area to determine the amount of VOCs naturally occurring in the air. This is referred to as a background level. Levels of VOCs will periodically be measured in the air at active work sites, and at the transition zone when levels are detected above background in the work zone.

8.3 Community Air Monitoring Program

The purpose of the Community Air Monitoring Program is to protect the general public from the potential release of volatile organic vapors. Such a release is not anticipated during the performance of the development work covered by this HASP.

8.3.1 Vapor Emission Response Plan

VOCs will be monitored at the downwind perimeter of the work area. VOCs will be monitored daily at one-hour intervals at the work zone and transition zone. The readings will be recorded in a field logbook by the SSO. If the ambient air concentration of VOC vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the VOC vapor level decreases below 5 ppm above background, work activities will resume. During the work activities, if the VOC vapor levels are greater than 5 ppm but less than 25 ppm over background at the perimeter of the work area, activities will resume provided the VOC vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm above background.

If the VOC vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown. When work shutdown occurs, downwind air monitoring as directed by the SSO will be implemented to ensure the VOC emissions do not impact the building tenants, or the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section described below.

8.3.2 Major Vapor Emission

If VOC levels greater than 5 ppm above background are identified 200 feet downwind from the work area, half the distance to the nearest residential or commercial structure, or in areas in the immediate vicinity where tenants may be exposed, work activities will be halted. If following the cessation of the work activities, or as the result of an emergency, VOC levels persist above 5 ppm above background then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 foot zone), or in areas in

the immediate vicinity where tenants are working. If efforts to abate the emission source are unsuccessful, and if VOC levels of 5 ppm above background or greater persist for more than 30 minutes in the 20 foot zone, then the Major Emission Response Plan described below shall automatically be placed into effect. If VOC vapor levels greater than 10 ppm above background are measured 200 feet downwind from the work area or half the distance to the nearest residential or commercial structure, whichever is less, the Major Emission Response Plan shall immediately be placed into effect.

8.3.3 Major Emission Response Plan

Upon activation, the following activities will be undertaken:

1. Emergency response contacts listed in Section 9.1 of this HASP will go into effect.

2. Frequent air monitoring will be conducted at 30 minute intervals within the 20 foot zone. If two successive readings below action levels are measured, the air monitoring may be halted or modified by the SSO.

9.0 EMERGENCY RESPONSE

To provide first-line assistance to field personnel in the case of illness or injury, the following items will be made immediately available on the Site:

- First-aid kit
- Portable emergency eye wash
- Supply of clean water

9.1 Emergency Telephone Numbers

The following telephone numbers are listed in case there is an emergency at the Site:

Fire/Police Department:	911
Poison Control Center:	275-3232
NYSDEC Spills	226-2466
NYSDOH (David Napier)	423-8071
City of Rochester (Joseph Biondolillo)	428-6649
MCDOH (Joseph Albert)	274-6904
Nearest Hospital:	Highland Hospital 1000 South Avenue Rochester, New York
Hospital Phone Number:	(716) 341-6880
Directions to the Hospital (refer to Figure 1 in Attachment 1):	Turn west onto Charlotte St. and travel approx. 0.1 mile or less; turn left (south) onto Scio St. and travel approx. 0.7 miles [Note: Scio St. turns into Broadway, which turns into Manhattan Square Drive, which turns into Woodbury Drive]; turn left (south) onto South Ave. and travel approx. 1.3 miles; turn left (east) onto Belleview Dr. and travel less than 0.1 mile; turn left (north) into the Hospital Emergency Dept.

9.2 Evacuation

A log of each individual entering and leaving the Site will be kept for emergency accounting practices. Although unlikely, it is possible that a site emergency could require evacuating all personnel from the site. If required, the SSO will give the appropriate signal for site evacuation (i.e., hand signals, alarms, etc.).

All personnel shall exit the site and shall congregate in an area designated by the SSO prior to the start of work. The SSO shall ensure that all personnel are accounted for. If someone is missing, the SSO will alert emergency personnel. The appropriate government agencies will be notified as soon as possible regarding the evacuation, and any necessary measures that may be required to mitigate the reason for the evacuation.

9.3 Medical Emergency

In the event of a medical emergency involving illness or injury to one of the on-site personnel, the site shall be shut-down and immediately secured. The appropriate government agencies shall be notified immediately. The area in which the injury or illness occurred shall not be entered until the cause of the illness or injury is known. The nature of injury or illness shall be assessed. If the victim appears to be critically injured, administer first aid and/or CPR as needed. Instantaneous real-time air monitoring shall be done in accordance with air monitoring outlined in Section 8.0 of this HASP as deemed necessary.

9.4 Contamination Emergency

It is unlikely that a contamination emergency will occur; however, if such a emergency does occur, the site shall be shut-down and immediately secured. If an emergency rescue is needed, notify, Police, Fire Department and EMS Units immediately. Advise them of the situation and request an expedient response. The appropriate government agencies shall be notified immediately. The area in which the contamination occurred shall not be entered until the arrival of trained personnel who are properly equipped with the appropriate PPE and monitoring instrumentation. (See also Section 8.0 of this HASP).

9.5 Fire Emergency

In the event of a fire on-site, the site shall be shut-down and immediately secured. The area in which the fire occurred shall not be entered until the cause can be determined. All non-essential site personnel shall be evacuated from the site to a safe, secure area. Notify the Fire Department immediately. Advise the Fire Department of the situation and the identify of any hazardous material involved. The appropriate government agencies shall be notified as soon as possible.

The four classes of fire along with their constituents are as follows:

- Class A: Wood, cloth, paper, rubber, many plastics, and ordinary combustible materials.
- Class B: Flammable liquids, gases and greases.
- Class C: Energized electrical equipment.
- Class D: Combustible metals such as magnesium, titanium, sodium, potassium.

Small fires on-site may be actively extinguished; however, extreme care shall be taken while in this operation. All approaches to the fire shall be done from the upwind side if possible. Distance from on-site personnel to the fire shall be close enough to ensure proper application of the extinguishing material, but far enough away to ensure that the personnel are safe. The proper extinguisher shall be utilized for the Class(s) of fire present on the site. If possible, the fuel source shall be cut off or separated from the fire. Care must be taken when performing operations involving the shut-off values and manifolds, if present.

Examples of proper extinguishing agent as follows:

Class A:	Water Water with 1% AFFF Foam (Wet Water) Water with 6% AFFF or Fluorprotein Foam ABC Dry Chemical
Class B:	ABC Dry Chemical Purple K Carbon Dioxide Water with 6% AFFF Foam
Class C:	ABC Dry Chemical Carbon Dioxide
Class D:	Metal-X Dry Powder

No attempt shall be made against large fires. These shall be handled by the Fire Department.

9.6 Spill or Air Release

In the event of a spill or air release of a hazardous material on-site, the Site shall be shut-down and immediately secured. The area in which the spill or release occurred shall not be entered until the cause can be determined and site safety can be evaluated. All non-essential site personnel shall be evacuated from the Site to a safe, secure area. The appropriate government agencies shall be notified as soon as possible. The spilled or released material shall be immediately identified and appropriate containment measures shall be implemented, if possible. Real-time air monitoring shall be implemented as outlined in Section 8.0 of this HASP as deemed necessary. If the material is unknown, Level B protection is mandatory. Samples of the material shall be acquired to facilitate identification of the material.

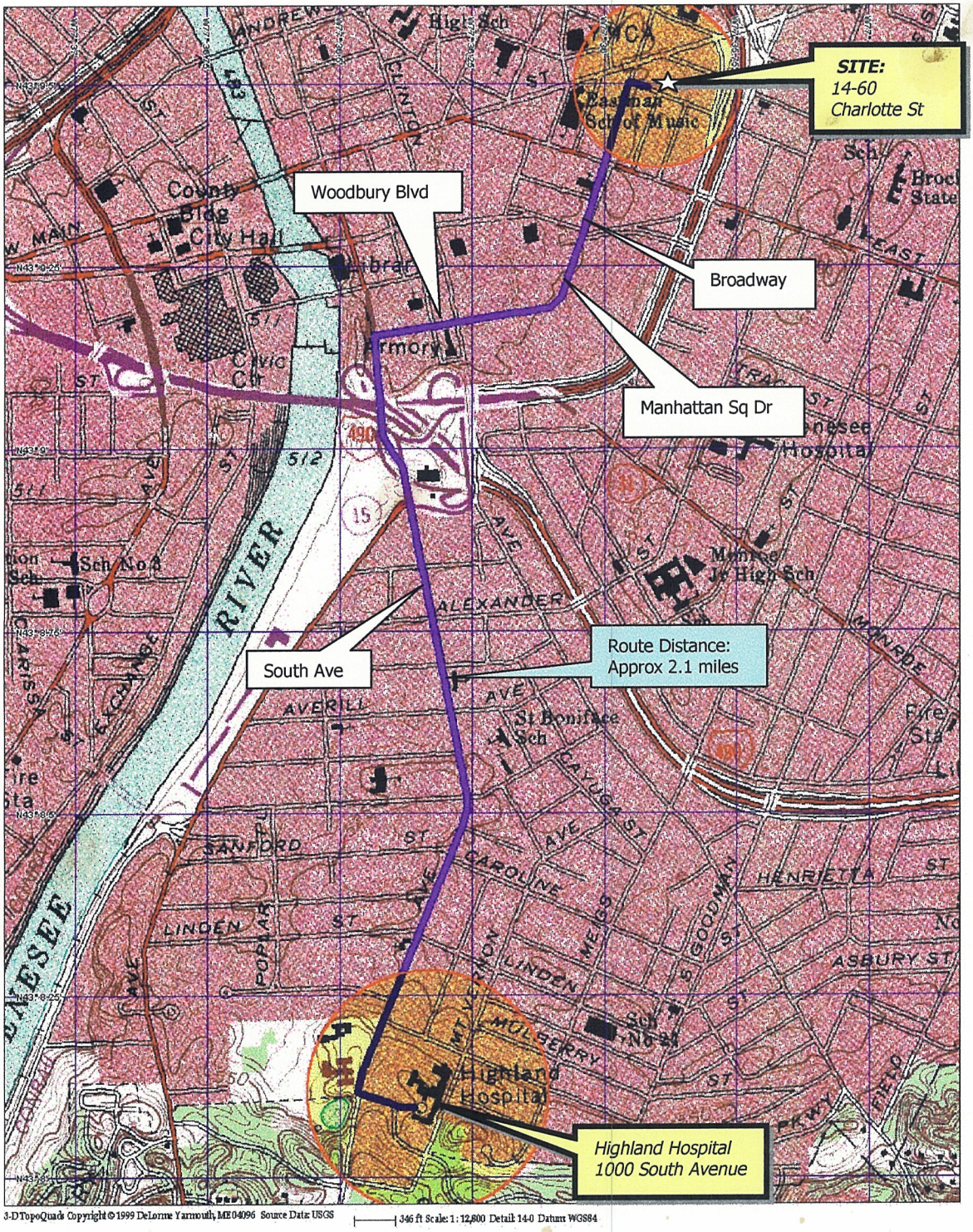
9.7 Locating Containerized Waste or Buried Tanks

In the event that containerized waste (e.g., drums) or buried tanks are located during remedial activities, construction activities and maintenance activities, the site shall be shut-down and immediately secured. The area in which containerized wastes and/or tanks are discovered shall not be entered until site safety can be evaluated. All non-essential site personnel shall be evacuated from the site to a safe, secure area. The appropriate government agencies shall be notified as soon as possible. The SSO shall monitor the area as outlined in Section 8.0 of this HASP.

Prior to any handling, containers and/or tanks will be visually assessed by the SSO to gain as much information as possible about their contents. As a precautionary measure, personnel shall assume that unlabelled containers contain hazardous materials until their contents are characterized. If the material is unknown, Level B protection is mandatory. To the extent possible based upon the nature of the containers encountered, actions may be taken to stabilize the area and prevent migration (e.g., placement of berms, etc.). Subsequent to initial visual assessment and any required stabilization, an environmental contractor will sample, test, remove, and dispose of any containers, tanks, and their contents.

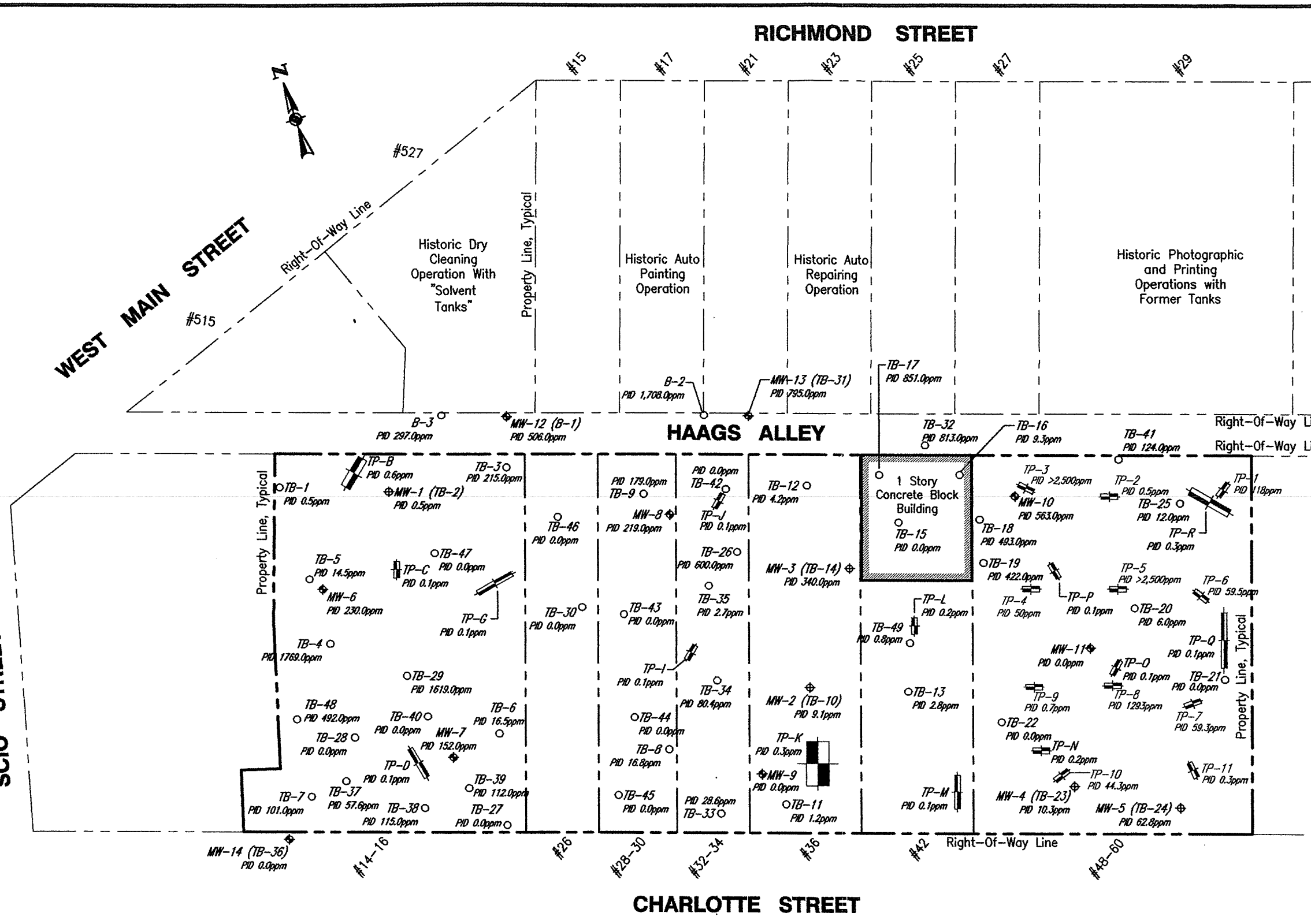
ATTACHMENT 1

Figures



Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad map Rochester East (NY) 1995.

DATE 10/1/2001	day DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14623-2700	PROJECT TITLE 14-60 CHARLOTTE STREET ROCHESTER, NY HEALTH AND SAFETY PLAN	PROJECT NO. 2485R-00
DRAWN BY Tww			
SCALE 1" = 2000'		DRAWING TITLE ROUTE FOR EMERGENCY SERVICE	FIGURE 1



SITE PLAN

1" = 40'

NOTES:

1. Site plan produced from a tax map of The City Of Rochester.
2. Locations of test borings and wells tape-measured from existing site structures, and are considered accurate to the degree implied by the method used.

LEGEND:

- MW-1 (TB-2) PID 0.5ppm — Approximate Location Of Overburden Geoprobe Monitoring Well With Peak PID Reading Recorded In ppm
- TB-32 PID 813.0ppm — Approximate Location Of Geoprobe Test Boring With Peak PID Reading Recorded In ppm
- MW-13 (TB-31) PID 795.0ppm — Approximate Location Of Overburden/Bedrock Monitoring Well With Peak PID Reading Recorded In ppm
- TP-C PID 0.1ppm — Approximate Location Of Test Pit With Peak PID Reading Recorded In ppm

FIELD VERIFIED BY	DATE	DRAWN BY	DATE DRAWN	SCALE	DATE ISSUED
JAD	02/2001	Tww	03/01/2001	1" = 40'	03/01/2001

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14623-2700

PROJECT TITLE
14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK
CORRECTIVE ACTION PLAN

DRAWING TITLE
Cumulative Test Locations With Peak Photolonization Detector Readings

PROJECT NO.
2485R-00

FIGURE 3

SHEET 1 OF 1

Ref1: 2485-2.dwg
Ref2: SiteBase.dwg
Ref3:

Time Plotted: Thur Mar 01 16:51 2001
File Name: \RoCity\2412\2485\2485-4.dwg

DayEnv_AnsiB
11x17

ATTACHMENT 2

Tables Summarizing Previous Analytical Laboratory Data

TABLE I

DETECTED VOLATILE ORGANIC COMPOUNDS ON SOIL SAMPLES

48-58 CHARLOTTE STREET ROCHESTER, NEW YORK

PARTS PER BILLION (PPB)

DETECTED COMPOUNDS	SOIL SAMPLE AND LOCATION					RECOMMENDED CLEANUP OBJECTIVE (1)	PETROLEUM GUIDANCE VALUE (2)
	1427-01 TP-1(8-9')	1427-03* TP-3(9')	1427-04* TP-5(7.5-8.5')	1427-05 TP-7(7.5-8.5')	1427-06 TP-8(7.5-8.5')		
benzene	ND	ND	ND	ND	594	60	14
toluene	ND	ND	ND	ND	614	1,500	100
ethylbenzene	ND	ND	ND	6.3	ND	5,500	100
m,p-xylene	ND	ND	ND	8.0	974	1,200	100
1,3,5-trimethylbenzene	ND	ND	ND	ND	2,714	NA	100
1,2,4-trimethylbenzene	ND	ND	ND	ND	2,699	NA	100
p-isopropyltoluene	ND	ND	ND	ND	327	NA	100
sec-butylbenzene	ND	453	ND	ND	ND	NA	100

ND = Not detected above laboratory detection limits.

NA = Not available.

PPB = Parts per billion.

(1) = Recommended Soil Cleanup Objective; January 24, 1994 NYSDEC TAGM #4046.

(2) = Petroleum-Contaminated Soil Guidance Value; August, 1992 NYSDEC STARS document.

* = Detection limits elevated by high level of non-target hydrocarbons.

TABLE 2

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

TOTAL PETROLEUM HYDROCARBONS (TPH)
IN MG/KG OR PARTS PER MILLION (PPM)

SOIL SAMPLES

SAMPLE DESIGNATION AND LOCATION	TPH TEST RESULTS (mg/kg or PPM)	
	TOTAL CONCENTRATION	CONCENTRATIONS BY HYDROCARBON WIEGHT
2412-01 (MW-13 @ 3.5')	403.6	364 - LW (mineral spirits*) 39.6 – HW (lube oil)
2412-02 (MW-13 @ 10.5')	135	135 - LW (mineral spirits*)
2412-03 (TB-32 @ 10.5')	116.5	73.8 - LW (mineral spirits*) 42.7 - HW (lube oil)
2412-04 (TB-33 @ 1.5')	224	224 - HW (lube oil)
2412-05 (TB-33 @ 9.0')	98.5	98.5 - MW (diesel)
2412-06 (TB-34 @ 8.0')	805	805 – MW (diesel)
2412-07 (TB-37 @ 9.0')	77	77 – MW (diesel)
2412-08 (TB-41 @ 10.5')	75	55.5 - LW (mineral spirits*) 19.5 - HW (lube oil)
2412-09 (TB-48 @ 10.0')	520	520 - MW (diesel)
Local regulatory TPH Guidance Value[(1)]	500	500

* = TPH identified as "mineral spirits" could also be Stoddard solvent or paint thinner.
LW = Light Weight
MW = Medium Weight
HW = Heavy Weight
(1) = Guidance value used by local regulatory agencies on similar sites in the Rochester, New York area that are being redeveloped for commercial purposes.

TABLE 3

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

SUMMARY OF DETECTED
VOLATILE ORGANIC COMPOUNDS (VOCs)
IN UG/KG OR PARTS PER BILLION (PPB)

SOIL SAMPLES

DETECTED VOCs	SAMPLE AND LOCATION						NYSDEC STARS MEMO #1 TCLP ALTERNATIVE GUIDANCE VALUES (PPB)
	2412-01 MW-13 @ 3.5'	2412-02 MW-13 @ 10.5'	2412-03 TB-32 @ 10.5'	2412-04 TB-33 @ 1.5'	2412-05 TB-33 @ 9.0'	2412-06 TB-34 @ 8.0'	
n-Propylbenzene	1,640	--	--	--	--	--	100
1,2,4-Trimethylbenzene	10,200	--	--	--	--	--	100
sec-Butylbenzene	1,970	290	--	--	--	145	100
n-Butylbenzene	1,490	--	--	--	--	--	100
Isopropylbenzene	570	--	--	--	--	--	100
p-Isopropyltoluene	--	292	--	--	--	--	100
Total VOCs	15,870	582	0	0	0	145	NA

DETECTED VOCs	SAMPLE AND LOCATION			NYSDEC STARS MEMO #1 TCLP ALTERNATIVE GUIDANCE VALUES (PPB)
	2412-07 TB-37 @ 9.0'	2412-08 TB-41 @ 10.5'	2412-09 TB-48 @ 10.0'	
n-Propylbenzene	--	--	86.9	100
1,2,4-Trimethylbenzene	--	--	269	100
sec-Butylbenzene	--	--	31.7	100
n-Butylbenzene	--	--	--	100
Isopropylbenzene	--	--	22.3	100
p-Isopropyltoluene	--	--	40.1	100
Total VOCs	0	0	450	NA

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

TABLE 5

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

TOTAL PETROLEUM HYDROCARBONS (TPH)
IN UG/l OR PARTS PER BILLION (PPB)

DECEMBER 6, 7, 8 & 11, 2000 GROUNDWATER SAMPLES

SAMPLE LOCATION	SAMPLE DESIGNATION	TPH TEST RESULTS (PPB)
MW-1	2412-01	--
MW-4	2412-010	--
MW-5	2412-02	--
MW-6	2412-03	8,430 - LW (gasoline)
MW-7	2412-04	160,000 - MW (diesel fuel)
MW-10	2412-05	--
MW-11	2412-06	--
MW-12	2412-07	--
MW-13	2412-08	2,040 - LW (gasoline)
MW-14	2412-09	--

-- = Not detected above reported laboratory detection limit values.
LW = Light Weight
MW = Medium Weight

TABLE II

DETECTED TOTAL PETROLEUM HYDROCARBONS (TPH) ON SOIL SAMPLES 1427-03

48-58 CHARLOTTE STREET ROCHESTER, NEW YORK

PARTS PER BILLION (PPB)

SOIL SAMPLE AND LOCATION	DETECTED CONCENTRATION AND TYPE
1427-03 TP-3(9')	2,110,321 paint thinner/stoddard solvent

PPB = Parts per billion.

TABLE III

DETECTED TOTAL RCRA METALS ON SOIL SAMPLE 1427-02

48-58 CHARLOTTE STREET ROCHESTER, NEW YORK

PARTS PER MILLION (PPM)

DETECTED ANALYTES	SAMPLE 1427-02 FROM TP-2(3')	TYPICAL BACKGROUND RANGE (1)
arsenic	23.4	3 - 12
barium	178	15 - 600
cadmium	11.2	0.1 - 1
chromium	19.4	1.5 - 40
lead	761	200 - 500 (2)
selenium	1.35	0.1 - 3.9

PPM = Parts per million.

(1) = Typical Background Range; January 24, 1994 NYSDEC TAGM #4046.

(2) = Average background range for lead in metropolitan or suburban areas or near highways.

TABLE IV

DETECTED VOLATILE ORGANIC COMPOUNDS ON WATER SAMPLES

48-58 CHARLOTTE STREET ROCHESTER, NEW YORK

PARTS PER BILLION (PPB)

DETECTED COMPOUNDS	SAMPLE AND LOCATION			PETROLEUM GUIDANCE VALUE (1)
	1427-W1 TP-1(8.25')	1427-W2 TP-3(8.5')	1427-W3 TP-4(7.25')	
benzene	ND	2.9	1.6	0.7
ethylbenzene	2.1	5.8	ND	5
toluene	ND	3.8	ND	5
m,p-xylene	2.4	4.6	ND	5
1,2,4-trimethylbenzene	ND	3.7	ND	5
sec-butylbenzene	ND	10.9	ND	5
n-butylbenzene	ND	10.4	ND	5
acetone	-	21.3	-	50

ND = Not detected above laboratory detection limits.

NA = Not available.

\- = Not tested for this compound.

PPB = Parts per billion.

(1) = Groundwater standards/guidance values; October, 1993 NYSDEC TOGS 1.1.1.

TABLE 3

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

TOTAL PETROLEUM HYDROCARBONS (TPH)
IN MG/KG OR PARTS PER MILLION (PPM)

SOIL SAMPLES

SAMPLE DESIGNATION AND LOCATION	TPH TEST RESULTS (mg/kg or PPM)	
	TOTAL CONCENTRATION	CONCENTRATIONS BY HYDROCARBON WIEGHT
2089-04 (TB-4 @ 7.5')	561	561 - LW (kerosene)
2089-07 (TB-7 @ 10')	627	627 - MW (diesel)
2089-16 (TB-16 @ 1.5')	215.2	10.2 - MW (diesel) 205 - HW (lube oil)
2089-17 (TB-17 @ 10.5')	347	169 - LW (mineral spirits*) 178 - HW (lube oil)
2089-18 (TB-18 @ 10')	114.8	92.8 - LW (mineral spirits*) 22 - HW (lube oil)
2089-23 (TB-23 @ 8')	--	--
2089-25 (TB-25 @ 3')	--	--
2089-26 (TB-26 @ 12')	120.7	98.2 - LW (mineral spirits*) 22.5 - HW (lube oil)
2089-29 (TB-29 @ 8.5')	17.5	17.5 - LW (kerosene)
MW-7 (10-10.7')	23,800	23,800 - MW (diesel)
MW-8 (0-2')	1,250	1,250 - MW (diesel)
2089-08R (TB-8 @ 6') **	4,660	4,660 - MW (diesel)
2089-09R (TB-9 @ 11.5') **	385.9	372 - LW (mineral spirits*) 13.9 - HW (lube oil)
2089-06R (TB-6 @ 11') **	3,670	3,670 - HW (lube oil)
Local regulatory TPH Guidance Value[1]	500	500

-- = Not detected above reported laboratory detection limit values.
* = Laboratory reported that TPH identified as "mineral spirits" or "stoddard solvent".
** = Samples was re-analyzed.
LW = Light Weight
MW = Medium Weight
HW = Heavy Weight
(1) = Guidance value used by local regulatory agencies on similar sites in the Rochester, New York area that are being redeveloped for commercial purposes.

TABLE 4A

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

SUMMARY OF DETECTED
VOLATILE ORGANIC COMPOUND (VOC) TEST RESULTS
IN UG/KG OR PARTS PER BILLION (PPB)

SOIL SAMPLES

DETECTED VOCs	SAMPLE AND LOCATION						NYSDEC STARS MEMO #1 TCLP ALTERNATIVE GUIDANCE VALUES (PPB)
	2089-04 TB-4 @ 7.5'	2089-03 TB-3 @ 9'	2089-06 TB-6 @ 11'	2089-07 TB-7 @ 10'	2089-08* TB-8 @ 6'	2089-09* TB-9 @ 11.5'	
Ethylbenzene	9,010	--	--	40	--	--	100
Toluene	15,600	--	--	--	--	--	100
Total Xylenes	50,600	--	--	140	--	--	100
n-Propylbenzene	4,600	--	440	330	--	--	100
1,3,5-Trimethylbenzene	10,800	--	57	610	--	--	100
1,2,4-Trimethylbenzene	35,100	--		620J	--	--	100
sec-Butylbenzene	--	--	97	350	--	--	100
n-Butylbenzene	--	--	420	1,100	--	--	100
Isopropylbenzene	--	--	110	120	--	--	100
p-Isopropyltoluene	--	--	48	440	--	--	100
tert-Butylbenzene	--	--	--	29	--	--	100
Naphthalene	--	--	--	1,100	--	-	200
Total VOCs	125,710	0	1,172	4,879	0*	0*	NA

J = Indicates an estimate value.
-- = Not detected above reported laboratory detection limit value.
NA = Not available.
* = Sample was analyzed at a high dilution factor; however, constituents were not detected above analytical laboratory detection limits.

TABLE 4B

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

SUMMARY OF DETECTED
VOLATILE ORGANIC COMPOUND (VOC) TEST RESULTS
IN UG/KG OR PARTS PER BILLION (PPB)

SOIL SAMPLES

DETECTED VOCs	SAMPLE AND LOCATION						NYSDEC STARS MEMO #1 TCLP ALTERNATIVE GUIDANCE VALUES (PPB)
	2089-14* TB-14 @ 11.5'	2089-21 TB-21 @ 7.5'	2089-24 TB-24 @ 9'	2089-27 TB-27 @ 8.5'	2089-29 TB-29 @ 8.5'	2089-18 TB-18 @ 10'	
Ethylbenzene	--	--	--	--	120	--	100
Toluene	--	--	--	--	--	--	100
Total Xylenes	--	--	--	--	522	11.8	100
n-Propylbenzene	--	--	--	--	78	--	100
1,3,5-Trimethylbenzene	--	--	--	--	150	--	100
1,2,4-Trimethylbenzene	--	--	--	--	450	--	100
sec-Butylbenzene	--	--	--	--	--	33.5	100
n-Butylbenzene	--	--	--	--	65	--	100
Isopropylbenzene	--	--	--	--	18	--	100
p-Isopropyltoluene	--	--	--	--	--	--	100
tert-Butylbenzene	--	--	--	--	--	--	100
Naphthalene	--	--	--	--	130	--	200
Total VOCs	0*	0	0	0	1,533	45.3	NA

J = Indicates an estimate value.
-- = Not detected above reported laboratory detection limit value.
NA = Not available.
* = Sample was analyzed at a high dilution factor; however constituents were not detected above analytical laboratory detection limits.

TABLE 4C

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

SUMMARY OF DETECTED
VOLATILE ORGANIC COMPOUND (VOC) TEST RESULTS
IN UG/KG OR PARTS PER BILLION (PPB)

SOIL SAMPLES

DETECTED VOCs	SAMPLE AND LOCATION					NYSDEC STARS MEMO #1 TCLP ALTERNATIVE GUIDANCE VALUES (PPB)
	2089-26 TB-26 @ 12'	MW-8 (0-2')	2089-08R** TB-8 @ 6'	2089-09R** TB-9 @ 11.5'	2089-14R** TB-14 @ 11.5'	
Ethylbenzene	--	--	--	--	--	100
Toluene	--	--	--	--	--	100
Total Xylenes	--	--	--	--	--	100
n-Propylbenzene	--	--	--	--	--	100
1,3,5-Trimethylbenzene	--	--	--	--	--	100
1,2,4-Trimethylbenzene	--	--	--	--	--	100
sec-Butylbenzene	17.3	--	--	50.9	--	100
n-Butylbenzene	--	--	--	--	--	100
Isopropylbenzene	--	--	--	--	--	100
p-Isopropyltoluene	--	--	--	--	--	100
tert-Butylbenzene	--	--	--	--	--	100
Naphthalene	--	--	--	--	--	200
Total VOCs	17.3	0	0**	50.9**	0**	NA

J = Indicates an estimate value.
-- = Not detected above reported laboratory detection limit value.
NA = Not available.
** = Samples was re-analyzed and test results are considered biased low.

TABLE 5

14-60 CHALOTTE STREET
ROCHESTER, NEW YORK

SUMMARY OF DETECTED
SEMI-VOLATILE ORGANIC COMPOUND (SVOC) TEST RESULTS
IN UG/KG OR PARTS PER BILLION (PPB)
SOIL SAMPLES

DETECTED SVOCs	SAMPLE AND LOCATION					NYSDEC STARS MEMO #1 TCLP ALTERNATIVE GUIDANCE VALUES (PPB)
	2089-04 TB-4 @ 7.5'	2089-07 TB-7 @ 10'	2089-08 TB-8 @ 6.0'	2089-09 TB-9 @ 11.5'	2089-17 TB-17 @ 10.5'	
Naphthalene	6,790	766	--	--	--	200
Acenaphthene	--	431	--	--	--	400
Fluorene	--	584	--	--	--	1000
Phenanthrene	--	1,700	--	--	--	1000
Anthracene	--	--	--	--	--	1000
Pyrene	--	--	--	--	--	1000
TOTAL SVOCs	6,790	3,481	0	0	0	NA

DETECTED SVOCs	SAMPLE AND LOCATION					NYSDEC STARS MEMO #1 TCLP ALTERNATIVE GUIDANCE VALUES (PPB)
	2089-03 TB-3 @ 9.0'	2089-06* TB-6 @ 11.0'	2089-06R** TB-6 @ 11.0'	2089-26 TB-26 @ 12.0'	2089-29 TB-29 @ 8.5'	
Naphthalene	--	--	--	--	--	200
Acenaphthene	--	--	--	--	--	400
Fluorene	--	--	--	--	--	1000
Phenanthrene	--	--	665	--	--	1000
Anthracene	--	--	--	--	--	1000
Pyrene	--	--	313	--	--	1000
TOTAL SVOCs	0	0*	978**	0	0	NA

-- = Not detected above reported laboratory detection limit value.
NA = Not available.
* = Sample was analyzed at a high dilution factor; however constituents were not detected above analytical laboratory detection limits.
** = Samples was re-analyzed.

TABLE 6

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

POLYCHLORINATED BIPHENYLS TEST RESULTS
IN UG/KG OR PARTS PER BILLION (PPB)

SOIL SAMPLES

CONSTITUENTS	SAMPLE DESIGNATION AND LOCATION		NYSDEC TAGM 4046 RECOMMNDED SOIL CLEANUP OBJECTIVES (PPB)
	2089-06 (TB-6 @ 11')	2089-17 (TB-17 @ 10.5')	
PCBs	--	--	10

PCBs = Polychlorinated Biphenyls
-- = Not detected above reported laboratory detection limit value.

TABLE 7

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

TOTAL RCRA METALS TEST RESULTS
IN MG/KG OR 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)
	2089-05 TB-5 @ 3'	2089-11 TB-11 @ 2'	2089-14 TB-14 @ 2'	2089-25 TB-25 @ 3'		
Arsenic	3.8	--	4.12	10	3-12	7.5 or SB
Barium	69.8	43	78.5	85.1	15-600	300 or SB
Cadmium	--	--	--	--	0.1-1	1 or SB (10)[1]
Chromium	8.16	4.72	9.22	23.2	1.5-40	10 or SB (50)[2]
Lead	141	69.3	223	102	200-500	SB
Mercury	0.395	0.192	0.580	0.104	0.001-0.2	0.1
Selenium	--	1.07	--	--	0.1-3.9	2 or SB
Silver	--	--	--	--	NA	SB

-- = 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 8

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

TOTAL PETROLEUM HYDROCARBONS (TPH)
IN UG/l OR PARTS PER BILLION (PPB)

MAY 15 & 16, 2000 GROUNDWATER SAMPLES

SAMPLE LOCATION	SAMPLE DESIGNATION	TPH TEST RESULTS (PPB)
MW-1	2089-W1-01	--
MW-2	2089-W2-01	--
MW-3	2089-W3-01	52 J - LW (mineral spirits)
MW-4	2089-W4-01	--
MW-5	2089-W5-01	--
MW-6	2089-W6-01	7,270 - LW (gasoline)
MW-7	2089-W7-01	316,000 - MW (diesel)
MW-8	2089-W8-01	10 J - LW (mineral spirits)
MW-9	2089-W9-01	--
MW-10	2089-W10-01	--
MW-11	2089-W11-01	34 J - LW (mineral spirits)

-- = Not detected above reported laboratory detection limit values.
J = Indicates an estimated value.
LW = Light Weight
MW = Medium Weight
HW = Heavy Weight

TABLE 9

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

SUMMARY OF DETECTED
VOLATILE ORGANIC COMPOUND (VOC) TEST RESULTS
IN UG/I OR PARTS PER BILLION (PPB)

MAY 15 & 16, 2000 GROUNDWATER SAMPLES

DETECTED VOCs	SAMPLE AND LOCATION						NYSDEC TOGS 1.1.1 GROUNDWATER STANDARDS AND GUIDANCE VALUES (PPB) (1)
	2089-W1-01 from MW-1	2089-W2-01 from MW-2	2089-W3-01 from MW-3	2089-W4-01 from MW-4	2089-W5-01 from MW-5	2089-W6-01 from MW-6	
Benzene	--	--	--	--	--	110	1
Ethylbenzene	--	--	--	--	--	1,400	5
Toluene	--	--	--	--	--	2,400	5
Total Xylenes	--	--	--	--	--	5,400	5
n-Propylbenzene	--	--	--	--	--	250	5
1,3,5-Trimethylbenzene	--	--	--	--	--	520	5
1,2,4-Trimethylbenzene	--	--	--	--	--	1,900	5
Naphthalene	--	--	--	--	--	140	10
Tetrachloroethene	17	--	--	--	--	--	5
Total VOCs	17	0	0	0	0	15,920	NA

DETECTED VOCs	SAMPLE AND LOCATION					NYSDEC TOGS 1.1.1 GROUNDWATER STANDARDS AND GUIDANCE VALUES (PPB) (1)
	2089-W7-01 from MW-7	2089-W8-01 from MW-8	2089-W9-01 from MW-9	2089-W10-01 from MW-10	2089-W11-01 from MW-11	
Benzene	--	--	--	--	--	1
Ethylbenzene	--	--	--	--	--	5
Toluene	--	--	--	--	--	5
Total Xylenes	--	--	--	--	--	5
n-Propylbenzene	--	--	--	--	--	5
1,3,5-Trimethylbenzene	--	--	--	--	--	5
1,2,4-Trimethylbenzene	260	--	--	--	--	5
Naphthalene	410	--	--	--	--	10
Tetrachloroethene	--	--	--	--	--	5
Total VOCs	670	0	0	0	0	NA

-- = Not detected above reported laboratory detection limit value.
NA = Not available.
(1) = June 1998 Division of Water TOGS (1.1.1) Ambient Groundwater Standards and Guidance Values.

TABLE 11

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

TOTAL PETROLEUM HYDROCARBONS (TPH)
IN µg/L OR PARTS PER BILLION (PPB)

JULY 26, 2000 GROUNDWATER SAMPLES

SAMPLE LOCATION	SAMPLE DESIGNATION	TPH TEST RESULTS (µg/L or PPB)
MW-2	MW-2-02	1,910 - MW (kerosene)
MW-3	MW-3-02	386 - LW (mineral spirits)
MW-8	MW-8-02	148 - LW (mineral spirits)
MW-9	MW-9-02	--

-- = Not detected above reported laboratory detection limit values.
J = Indicates an estimated value.
LW = Light Weight
MW = Medium Weight
HW = Heavy Weight

TABLE 12

14-60 CHARLOTTE STREET
ROCHESTER, NEW YORK

SUMMARY OF DETECTED
VOLATILE ORGANIC COMPOUND (VOC) TEST RESULTS
IN µg/L OR PARTS PER BILLION (PPB)

JULY 26, 2000 GROUNDWATER SAMPLES

DETECTED VOCs	SAMPLE AND LOCATION				NYSDEC TOGS 1.1.1 GROUNDWATER STANDARDS AND GUIDANCE VALUES (µg/L or PPB) [1]
	MW-2-02 from MW-2	MW-3-02 from MW-3	MW-8-02 from MW-8	MW-9-02 from MW-9	
Benzene	--	--	14.8	--	1
Chlorobenzene	--	--	22.3	--	5
Ethylbenzene	--	--	37.5	--	5
Total Xylenes	--	--	65.5	--	5
n-Propylbenzene	2.63	--	--	--	5
1,3,5-Trimethylbenzene	6.61	2.88	23.4	--	5
1,2,4-Trimethylbenzene	14.1	8.52	59.0	--	5
sec-Butylbenzene	4.11	--	--	--	5
p-Isopropyltoluene	7.47	--	--	--	5
Total VOCs	34.92	11.4	222.5	0	NA

-- = Not detected above reported laboratory detection limit value.
NA = Not available.
(1) = June 1998 Division of Water TOGS (1.1.1) Ambient Groundwater Standards and Guidance Values.

TABLE 13

HAAGS ALLEY
ROCHESTER, NEW YORK

TOTAL PETROLEUM HYDROCARBONS (TPH)
IN MG/KG OR PARTS PER BILLION (PPM)

AUGUST 10, 2000 SOIL SAMPLES

SAMPLE DESIGNATION AND LOCATION	TPH TEST RESULTS (mg/kg or PPM)	
	TOTAL CONCENTRATION	CONCENTRATIONS BY HYDROCARBON WIEGHT
2089-H1 (B-1/MW-12 @ 7')	819	324 - LW (mineral spirits) 495 - MW (diesel)
2089-H2 (B-2 @ 8.5')	1,540	1,540 - LW (mineral spirits)
Local regulatory TPH Guidance Value[1]	500	500

-- = Not detected above reported laboratory detection limit values.
* = Laboratory reported that TPH identified as "mineral spirits" could be "stoddard solvent".
LW = Light Weight
MW = Medium Weight
(1) = Guidance value used by local regulatory agencies on similar sites in the Rochester, New York area that are being redeveloped for commercial purposes.

TABLE 14

HAAGS ALLEY
ROCHESTER, NEW YORK

SUMMARY OF DETECTED
VOLATILE ORGANIC COMPOUND (VOC) TEST RESULTS
IN UG/KG OR PARTS PER BILLION (PPB)

AUGUST 10, 2000 SOIL SAMPLES

DETECTED VOCs	SAMPLE AND LOCATION		NYSDEC STARS MEMO #1 TCLP ALTERNATIVE GUIDANCE VALUES (ug/kg or PPB) [1]
	2089-H1 from B-1/MW-12 @ 7'	2089-H2 from B-2 @ 8.5'	
n-Propylbenzene	--	2,330	100
1,3,5-Trimethylbenzene	--	3,530	100
1,2,4-Trimethylbenzene	--	20,600	100
sec-Butylbenzene	460	3,630	100
Isopropylbenzene	--	787	100
p-Isopropyltoluene	--	4,060	100
Naphthalene	1,720	--	200
Total VOCs	2,180	34,937	NA

-- = Not detected above reported laboratory detection limit value.
NA = Not available.
* = Sample was analyzed at a high dilution factor; however, constituents were not detected above analytical laboratory detection limits.
(1) = NYSDEC TCLP Alternative Guidance Values as referenced in the August 1992 NYSDEC STARS Memo #1.

TABLE 15

HAAGS ALLEY RIGHT-OF-WAY
ROCHESTER, NEW YORK

SUMMARY OF DETECTED
VOLATILE ORGANIC COMPOUND (VOC) TEST RESULTS
AND TOTAL PETROLEUM HYDROCARBONS (TPH)
IN UG/L OR PARTS PER BILLION (PPB)

AUGUST 21, 2000 GROUNDWATER SAMPLE

DETECTED VOCs	SAMPLE MW-1-8-00 from MW-12	NYSDEC TOGS 1.1.1 GROUNDWATER STANDARDS AND GUIDANCE VALUES (µg/L or PPB) [1]
Benzene	2.13	1
Total Xylenes	3.32	5
Isopropylbenzene	5.03	5
n-Propylbenzene	4.84	5
1,3,5-Trimethylbenzene	22.4	5
1,2,4-Trimethylbenzene	124	5
sec-Butylbenzene	6.33	5
p-Isopropyltoluene	6.94	5
cis-1,2-Dichloroethene	62.6	5
Vinyl Chloride	30.8	2
Total VOCs	268.39	NA
Total Petroleum Hydrocarbons (TPH)	490-LW (gasoline)	NA

NA = Not available.
(1) = June 1998 Division of Water TOGS (1.1.1) Ambient Groundwater Standards and Guidance Values.
LW = Light Weight

APPENDIX F

ORC Software Output
Tank Excavation - Groundwater Treatment

14-16 Charlotte Street
Soil Removal Excavations

TANK EXCAVATION - GROUNDWATER TREATMENT

Excavation Length (ft)	50
Excavation Width (ft)	50
Thickness of Saturated Treatment Zone (ft)	4
Porosity	0.35
(sand = 0.3, silt = 0.35, clay = 0.4)	
Pore Volume (gallons)	26,166

FOR SOLUTE TRANSPORT MODEL ENTER VALUES BELOW

GW Velocity (ft / day)	0.3
Compliance Pt. (ft)	50
Ratio of O2 provided : O2 required (percent)	75%
HC Level at compliance point after selected ratio of O2 in ppm	1.080

Dissolved Phase Hydrocarbon Level (ppm)	9.3
(For gasoline sites use BTEX measurements)	
Dissolved Phase HC Mass (lbs)	2.0
Additional Demand Factor	8
(REGENESIS recommends a factor of about 8)	
Loaded HC Mass (lbs)	16
Oxygen Required (lbs)	48.0
ORC Required (lbs)	480
ORC Unit Cost	$ 10.00
Total Cost of ORC	$ 4,800