Prepared for:

Photocircuits Corporation
31 Sea Cliff Avenue
Glen Cove, New York 11542

Prepared by:

McLaren/Hart Environmental Engineering Corporation
25 Independence Boulevard
Warren, New Jersey 07059

March 25, 1997

Remedial Investigation/Interim Remedial Measure Work Plan Photocircuits Corporation Glen Cove, New York

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

TABLE OF CONTENTS

LIST OF TABLES

1.0 INTRODUCTION TO RI/IRM WORK PLAN

1.1 BACKGROUND

The documents which comprise this Remedial Investigation/Interim Remedial Measure Work Plan (RI/IRM Work Plan) have been prepared by McLaren/Hart Environmental Engineering Corp. (McLaren/Hart) for Photocircuits Corporation, in accordance with New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memoranda (TAGMs) and other applicable guidance. This RI/IRM Work Plan is intended to define the activities to be conducted and the procedures to be followed during implementation of site investigation and remediation planning activities at Photocircuits' site located at 31 Sea Cliff Avenue ("Photocircuits Site") and the adjacent property owned by Alpha Forty Five L.L.C., located at 45A Sea Cliff Avenue ("45A Site") in Glen Cove, New York.

1.2 CONTENTS OF RI/IRM WORK PLAN

The RI/IRM Work Plan is divided into six Sections, consisting of this introduction, four separate plans which define and guide each of the site investigative and remediation planning activities, and an implementation schedule. Section numbers and corresponding titles are as follows:

Section I. Introduction to Remedial Investigation/Interim Remedial Measure Work Plan

Section II. Sampling and Analysis Plan (SAP)

Section III. Health and Safety Plan (HASP)

Section IV. Citizen Participation Plan (CPP)

Section V. Interim Remedial Measure Work Plan

Section VI. IRM Implementation Schedule

The SAP contains information relating to site background and area physical characteristics, in addition to a Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP). The FSP defines the scope of work and procedures to be utilized during implementation of the Remedial Investigation (RI), while the QAPP defines field and laboratory procedures to ensure that data of acceptable quality is generated during the RI.

The HASP provides an analysis of potential chemical and physical hazards associated with site investigation field activities and defines work procedures, monitoring protocol and personnel protective equipment requirements in order to reduce work-related risks to an acceptable level.

The CPP outlines site-specific strategies for enabling public interaction and participation during each stage of the site investigation and remediation planning process.

The IRM Work Plan defines the tasks to be undertaken as part of the remedial alternatives evaluation process which the IRM will incorporate. Implementation of the elements of the IRM Work Plan will collectively satisfy the requirements for conducting a Feasibility Study (FS), as set forth in the draft consent order.

The IRM Implementation Schedule defines anticipated timelines for initiating and completing each of the IRM tasks; shows expected task durations; and defines project milestones, such as receipt of analytical results and submittal of project deliverables.

2.0 SAMPLING AND ANALYSIS PLAN

2.1 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared to define and provide procedural guidance for field investigative activities to be conducted at the Photocircuits Corporation Site in Glen Cove, New York. The SAP contains information related to site background (Section 2.2) in addition to a Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP), presented in Sections 2.3 and 2.4, respectively.

2.2 SITE BACKGROUND

2.2.1 Site Location

The Photocircuits Site and the 45A Site are located on the south side of Sea Cliff Avenue in Glen Cove, New York. The Photocircuits Site is the site of Photocircuits present operations. The 45A Site was owned by Pass & Seymour Inc. and is currently owned by Alpha Forty-Five L.L.C. The Photocircuits Site is bordered by Pall Corporation to the north, Cedar Swamp Road to the east, the Glen Head Country Club to the south, and the former Pass & Seymour site to the west. The 45A Site is bordered by the Associated Drapery site to the north, Photocircuits to the east and south, and Planet Waste Removal to the west. A Site location map is provided as Figure 2-1. A Site Plan showing details of both the 31 and 45A Sea Cliff Avenue Sites is provided as Figure 2-5.

2.2.2 Site Geology

The Photocircuits and 45A sites are underlain by the following sequences, in descending order: the Upper Glacial Aquifer, the Port Washington confining unit, the Port Washington aquifer, the Lloyd Aquifer, and bedrock.

The Upper Glacial aquifer is composed of stratified beds of fine to coarse sand and gravel with some interbedded lenses of silt and clay and extends to a depth of approximately 200 feet below the sites. The Port Washington confining unit, which extends approximately 100 feet below the Upper Glacial aquifer, consists of silt and clay with some interbedded sand and gravel lenses. The Port Washington aquifer is composed of sand and gravel with variable amounts of interbedded clay and silt. The Port Washington aquifer is approximately 50 feet thick. The Lloyd aquifer, which is approximately 200 feet thick, consists of discontinuous layers of gravel, sand, sandy clay, silt, and clay. It roughly parallels the crystalline bedrock, which is present at a depth of approximately 550 feet below the site (Geraghty and Miller, 1989).

2.2.3 Site Hydrogeology

As discussed above, the uppermost hydrogeological unit beneath the Photocircuits and 45A Sea Cliff Sites is the Upper Glacial aquifer. Depth to water measurements collected during groundwater sampling by McLaren/Hart indicate that groundwater is present at 4 to 10 feet below ground surface beneath the Photocircuits site and at 8 to 25 feet beneath the 45A Site (McLaren/Hart Preliminary Site Investigation Report, November 11, 1996). Groundwater was encountered in soil borings drilled on the eastern portion of the 45A Site at 23 to 25 feet.

Groundwater contour maps were generated from depth to water measurements collected from the monitoring wells at the Photocircuits and 45A Sites on two separate occasions, once in conjunction with the groundwater sampling on August 7, 1996 and again on September 10, 1996. Measurements from deep wells clearly indicate that groundwater flow is to the northwest. Shallow groundwater also flows predominantly toward the northwest, however, water level measurements from each period reveal the presence of a groundwater depression on the Photocircuits property, near MW-7. Such anomalies are most likely the result of local variations in aquifer hydraulic conductivity which may cause a delay in movement of groundwater towards a well. Precipitation may also influence the

shallow groundwater and thus seasonal fluctuations may also be observable over a longer period. The anomalies observed may also be present only under certain precipitation and recharge conditions.

2.2.4 Site Descriptions

2.2.4.1 Photocircuits Site

The Photocircuits Site is an active facility which produces printed circuit boards. The facility is located at 31 Sea Cliff Avenue, in an industrialized area of Glen Cove, New York. The approximately eleven-acre site is located west of the Glen Cove - Massapequa Highway (Route 107), immediately south of Sea Cliff avenue and north of the Glen Head Country Club. A fifty-foot County easement containing the Cedar Swamp Creek runs in a northwesterly direction through the center of the property. The northern portion of the facility is located within the boundaries of the city of Glen Cove, while the rest of the site is outside the City boundaries, located in the Town of Oyster Bay.

The facility has a number of on-site buildings, providing approximately 158,000 square feet of office and manufacturing space. The facility is comprised of the following: Main Building (offices, engineering and printed circuit board production); Butler Building I (machine shop, receiving, warehousing and material testing); Butler Building II (wastewater treatment); Butler Building III (offices, administration and storage); and a one-story complex located north of Butler Building II, occupied by utilities, chemical recovery and maintenance.

A chemical storage area is present on the Photocircuits Site in the vicinity of MW-7, which contains approximately 20 above ground storage tanks with capacities ranging from 1,000 to 8,000 gallons. Drums of new and spent chemicals and treated sludge from on-site waste water treatment are also staged in the chemical storage area. A 20,000 gallon above ground fuel oil tank is present in the

parking area near the south side of the Photocircuits Site and an enclosed chemical storage building exists near the south perimeter.

2.2.4.2 45A Site

The 45A property is located at 45 Sea Cliff Avenue in Glen Cove, New York. The property is approximately 7.5 acres in size. There are eight (8) industrial buildings on the site which total 122,000 square feet in size. The main building is divided into four buildings and is 72,000 square feet in size. Manufacturing activities previously involved the production of injected molded plastic components for electronic applications.

Several above ground storage tanks were known to have existed on the 45A Site which have since been removed. The tanks were used for the storage of fuel, hydraulic oils and tetrachloroethane (PCE). One existing 20,000 gallon underground oil storage tank is present outside the northeast corner of building 7.

2.2.5 Site History

Industrial activities at the current Photocircuits Site have been ongoing since 1954, when the property was owned by Powers Chemco. Kollmorgen Corporation purchased the property in 1971 and manufactured printed circuit boards until 1986, when the property was purchased by Photocircuits Corporation.

The 45A property was owned by Pass & Seymour,which manufactured injection molded plastics, until the site was purchased by Alpha Forty-Five L.L.C. in April 1996, Pass & Seymour Legrande Inc. (now owned by ENAL Development Corporation) commenced operations at the property in 1988. Slater Electric (now known as Slater Development Corp.) owned the property prior to its

purchase by Pass & Seymour and produced similar products there for more than 20 years. The original building was constructed by Slater Electric in 1959 and additional buildings were added between 1970 and 1981. Operations at the property have included plastic injection molding, metal stamping, component assembly, packaging and shipping. Waste hydraulic oil from the injection molding machines and waste soluble oil from the stamping process was stored in metal drums in a drum storage area, where it was transferred into one of three 175 gallon above ground tanks, which were also used for waste oils from plant maintenance. Waste solvent from the metal punch press dies in the stamping department was stored in a drum storage area prior to off-site disposal.

2.2.6 Previous Investigations

2.2.6.1 Industrial Profile

An industrial profile was developed by the Nassau County Department of Health (NCDH) for the Sea Cliff Avenue Industrial Area to determine potential sources of groundwater contamination through a historical survey and inventory of chemical usage and storage.

The initial profile was completed in 1977 and subsequently updated in 1988 as part of the continued NCDH study. Each facility identified in the area was surveyed for chemical usage, storage, and waste disposal methods practiced between 1977 and 1988. Interviews were conducted by NCDH to determine the type of business, source of water supply, sewage disposal, annual chemical usage, annual chemical waste generation and waste disposal practices. A report entitled Investigation of Contaminated Aquifer Segment, City of Glen Cove, Nassau County, New York was published in June 1990 by the Health Department.

The industrial chemical profile for the former Slater Electric (45A Sea Cliff Ave.) Site indicated tetrachloroethylene (PCE) and 1,1,1-trichloroethane (1,1,1-TCA) as the primary solvents used. The

industrial chemical profile for the Photocircuits site indicated PCE was used in 1956 and 1,1,1-TCA and methylene chloride have been in use since 1966 (as indicated by NCDH study, 1988). (Photocircuits terminated its use and storage of 1,1,1-TCA in 1993).

Following is a list of documents summarizing previous environmental investigations of the Photocircuits and former Pass and Seymour Sites.

2.2.6.2 Photocircuits Site

(1) Environmental Audit Data, H2M Group, September 1986. Results of pre-acquisition sampling conducted in August and September 1986 of surface soil, subsurface soil, surface water (Cedar Swamp Creek), and groundwater (2 existing on-site water supply wells.) A total of 13 soil borings were completed to the depth of the water table.

(2) Status Report for Photocircuits, H2M Group, September 1987. Results of sampling initiated in May 1987. Six monitoring wells (MW 1-6) were installed. Except for MW-5, all of the wells are shallow, screened at top of water table. MW-5 is a deep well, screened at a depth of 100 feet.

(3) Status Report for Photocircuits, H2M Group, February 1988. Results of second round of groundwater sampling and continued groundwater level monitoring from existing monitoring wells conducted between August 1987 and November 1987.

(4) Report on Continued Site Investigations at Photocircuits, H2M Group, April 1989. Results of site investigations initiated in August 1988, including 2 new rounds of water sampling and performance of a soil gas survey. Five new groundwater monitoring wells (MW 7-11) were installed and sampled: MW-7, a shallow well, near the location of soil borings B-11-13; MW-8 a deep well, completes a couplet well at the pre-existing MW-3 location; MW 9-11, a cluster well at the pre-existing MW-3 location; MW-9-11, a cluster well screened at depths of 17 to 17 feet, 115 to 130 feet, and 155 to 170 feet on the downgradient side of the facility.

The soil gas survey, performed in July 1988, included screening of 135 locations on the eastern portion of site around building perimeters near MW-2 and MW-3.

(5) Source Area Investigation, Sea Cliff Avenue Industrial Area, Glen Cove, New York, H2M Group, September 1992. Results of groundwater sampling conducted by H2M Group from August 1991 to February 1992 at the following properties: Photocircuits, Pall Corporation, Enal/Pass & Seymour, Slater Electric, August Thomsen, Man Products, and the Carney Street Well field, as well as soil gas surveys and subsequent unsaturated soil sampling at each of these properties except Photocircuits. Eleven wells were installed on 4 facilities (5 at Pall, 3 at Slater, 2 at Thomsen, 1 at Man.) Report includes results from ten of the eleven Photocircuits monitoring wells (excluding MW-1, at which there were no detectable levels of VOCs in the prior sampling.)

(6) Engineering Investigations at Inactive Hazardous Waste Sites Preliminary Site Assessment - Sea Cliff Avenue Industrial Area, Nassau County Department of Public Works, March 1994. Soil and groundwater lab results for Photocircuits, Pall Corporation, Pass & Seymour, Thomsen, Man Products, and the Carney Street Well field.

(7) Results of Preliminary Site Investigation, 31 and 45A Sea Cliff Avenue Properties, Photocircuits Corporation, Glen Cove, New York, McLaren/Hart Environmental Engineering Corporation, November 14, 1996.

2.2.6.3 45A Site

In addition to the 1990 Nassau County report, the September 1992 Source Area Investigation, and the 1994 Preliminary Site Assessment identified above, studies of the 45A Site include a January 25, 1995 Report entitled "Response to March 1994 Nassau County Health Department Report," which was submitted to NYSDEC by Slater Development. Slater's 1995 report includes soil data collected at the 45A Site by Vollmuth & Brush on November 30, 1994.

2.3 FIELD SAMPLING PLAN (FSP)

2.3.1 Purpose of the FSP

The purpose of the FSP is to define the scope of work and field methodologies to be utilized by the project field team during the site investigation. To provide an understanding of the objectives of individual investigative tasks, rationale for each of the field activities is discussed in Section 2.3.2. Subsequent sections discuss the scope of work and field methodologies to be employed.

2.3.2 Rationale for Additional Field Activities

Information collected from the PSI suggests the need for further delineation of the soil and groundwater conditions in the area of the tank farm located on the Photocircuits Site and the former PCE above ground storage tank located at the 45A Site. The proposed field activities will incorporate a Geoprobe® for soil and groundwater sample collection and an on-site mobile laboratory to allow real-time analysis and interpretation of results. This approach involves the evaluation of data in the field followed by the integration of that data into the decision-making process for other sample collection activities. Specific additional data requirements are outlined in the following sections.

2.3.2.1 Soil Characterization

Based on the analytical results of the PSI, additional soil samples are proposed to be collected from the tank farm area located on the Photocircuits Site and the former PCE above ground storage tank area located on the 45A Site. Rationale for conducting each of these activities are discussed below.

Soil Sampling (Photocircuits Site) - Analytical results from the PSI indicated elevated detections of several targeted VOCs in the area of the Acid/Base/Solvent Tank Farm located east of the

Photocircuits Main Building. Additional soil samples are proposed in this area in order to determine the horizontal and vertical extent of the VOC impacted soil.

Soil Sampling (45A Site) - Analytical results from soil borings collected near of the former PCE above ground storage tank indicated detections of PCE ranging from 30 ppb (GP-26) to 23,000 ppb (GP-30). Based on the these analytical results, additional soil borings are proposed in this area in order to determine the horizontal and vertical extent of the PCE impacted soil in this area.

2.3.2.2 Groundwater Characterization

Additional groundwater characterization activities which have been identified for the Photocircuits Site and 45A Site include the collection of groundwater grab samples using a Geoprobe® sampling unit as well as groundwater sampling of monitoring wells. Rationale for conducting each of these activities is discussed below.

Groundwater Grab Sampling (Photocircuits Site) - One groundwater grab sample is proposed to be collected from the shallow groundwater in the vicinity of monitoring well MW-7. This proposed groundwater grab sample is intended to provide additional information to: 1) confirm the potentiometric surface in that area and 2) provide analytical data as to the groundwater quality downgradient of the Acid/Base/Solvent Tank Farm. The proposed grab sample location is shown in Figure 2-2.

Groundwater Grab Sampling (45A Site) - Analytical data collected from the PSI indicated an elevated detection of PCE (23,000 ppb) in soil sample GP-30 located adjacent to the former PCE above ground storage tank (potential source area). In order to determine if the groundwater has been impacted from past operating activities, several groundwater grab samples are proposed to be collected using the Geoprobe®.

Monitoring Well Installation (45A Site) - One additional shallow monitoring well is proposed for the 45A Site (Figure 2-3).

The proposed monitoring well at 45A Site is to be installed approximately 100 feet north of the former PCE above ground storage tank. This proposed monitoring well will provide information on the groundwater quality between the former PCE above ground storage tank and monitoring well MW-3S where no data is available.

Groundwater Sampling and Hydraulic Measurements - Additional monitoring of groundwater chemical and hydraulic conditions is necessary in order to define the groundwater potentiometric surface and attenuation or migration of the plume which may be occurring. The primary objectives of these activities are to delineate the plume, develop an understanding of potential groundwater flow directions and determine an average hydraulic conductivity for the aquifer.

2.3.2.3 Geotechnical Characterization

Since the site remedy may involve the installation of an insitu IRM such as air sparging wells and a soil vapor extraction system, it is important to define the geotechnical characteristics of the overburden which would support such a remedy. Geotechnical testing will therefore be conducted on selected soil samples to be collected during the site investigation. The specific geotechnical test methods to be performed are as follows:

- Permeability (laboratory)
- Grain size
- Bulk density
- Fraction organic carbon (if samples contain significant fine-grained material)
- Porosity (if samples contain significant fine-grained material)

2.3.4 Scope of Work

The following Scope of Work describes specific activities which are proposed for each area requiring further delineation or characterization. Specific methodologies to be followed during implementation of this Scope of Work are detailed in Section 2.3.5.

2.3.4.1 Soil Sampling

Photocircuits Site

Soil borings are proposed to be drilled north of soil boring GP-15 and south of soil boring GP-17 (Figure 2-2). Three soil samples are proposed to be collected from three different depth intervals (2-2.5' b.g., 4-4.5' b.g. and 6.5-7' b.g.) in each soil boring using a Geoprobe®. The soil samples will then be analyzed by McLaren/Hart's Mobile Laboratory for VOCs using EPA Method 8240. Soil samples collected from the shallowest depth interval will be analyzed first. If the analytical results indicate detections of VOCs in the first soil sample (shallowest sample) then the soil sample collected from the next depth interval will be analyzed. If analytical results indicate no detections of VOCs, then the soil samples collected at the deeper intervals will not be analyzed. If analytical results indicate detectable concentrations of VOCs throughout the soil boring, then additional soil borings may be drilled in order to further delineate the impacted soils.

Site 45A

Because access is limited in this area of the site, initially, one soil boring is proposed to be drilled approximately 10 feet north, 10 feet east and 10 feet south of soil boring GP-30 (Figure 2-3). Since the groundwater table in this area is significantly deeper on Site 45A as compared to the Photocircuits Site, soil samples will be collected from two foot depth intervals every five feet beginning from

existing grade to the top of the capillary fringe of the groundwater table (approximately 20 feet deep). Each soil sample will be field screened with the OVM to determine the presence or absence of volatile organic vapors. The collected soil samples will then be analyzed by McLaren/Hart's Mobile Laboratory for VOCs using EPA Method 8240. Soil samples collected from the shallowest depth interval will be analyzed first. If the analytical results indicate detections of VOCs in the first soil sample (shallowest sample) then the soil sample collected from the next depth interval will be analyzed. If analytical results indicate no detections of VOCs, then the soil samples collected at the deeper intervals will not be analyzed. If analytical results indicate detectable concentrations of VOCs throughout the soil boring, then additional soil borings may be drilled in order to further delineate the impacted soils.

2.3.4.2 Groundwater Grab Sampling

On the 45A Site, groundwater grab samples will be collected approximately 10 feet north of the potential source area, between the potential source area and monitoring well MW-2S, and downgradient from the potential source area (Figure 2-3) in order to determine the direction of the PCE plume in this area. Groundwater grab samples will be collected from first groundwater. Groundwater grab samples will be analyzed in McLaren/Hart's Mobile Laboratory in a 24-hour turnaround time frame for VOCs using EPA Method 8240. Analytical results will also provide information which will be used to locate the proposed monitoring well on this site.

One groundwater grab sample is proposed for the Photocircuits Site in the vicinity of existing well MW-7. The sample will be collected from first water encountered and will be obtained in conjunction with a soil boring drilled in the area north of MW-7 (Figure 2-2). The sample will be analyzed in accordance with the procedure detailed above.

2.3.4.3 Monitoring Well Installation - Site 45A

One additional monitoring well is proposed to be installed on the 45A Site as shown on Figure 2-3. The well will be installed to monitor the quality of the shallow groundwater downgradient from the potential source area. The monitoring well will be developed, and surveyed for horizontal and vertical location by a New York State licensed surveyor.

The proposed monitoring well at Site 45A will provide information as to the groundwater quality downgradient from the former PCE above ground storage tank.

2.3.4.4 Monitoring Well Sampling and Hydraulic Measurements

Following installation of the additional monitoring well, groundwater sampling of the newly installed as well as the existing monitoring wells at each site. Prior to groundwater sampling, one full round of water level measurements will be collected to assess groundwater hydraulic conditions.

Slug testing is proposed to be conducted in a minimum of six shallow monitoring wells to assist in determining the hydraulic characteristics of the overburden aquifer. This data will be necessary for the proper design of the IRM, and will be used in the ultimate development of a final remedy.

2.3.4.5 Geotechnical Sampling

Four soil samples of the overburden will be collected for geotechnical analysis of natural moisture content, and particle size distribution.

2.3.5 Field Method

Field methods for soil sampling, monitoring well installation, monitoring well sampling and development, surveying, water level measurements and slug testing are described in the following sections.

2.3.5.1 Soil Sampling

Overburden Soil Sampling

All drilling activities will be supervised by an experienced McLaren/Hart geologist. The overburden will be drilled utilizing a Geoprobe® hydraulic sampling unit. Soil samples are obtained at single or multiple depths through the use of a thin-wall sampling tube. The 12-inch sampling tube with internal piston is attached to the lead rod and driven to just above the desired depth. A reverse-threaded stopcock which holds the moveable piston in place is removed. Once the stop-cock has been removed, the piston is free to move and rods are driven an additional 12 inches, collecting a one or two foot soil core. The sample is collected at the surface after the rods have been retrieved. In addition, since the rods are driven and not turned to the sampling depth, no cuttings are generated.

2.3.5.2 Monitoring Well Installation

Monitoring Well Installation

The new monitoring well at the 45A Site will consist of Schedule 40, 2-inch PVC riser pipe and 10-slot screen. The PVC pipe will be threaded; no glued connections will be permitted. The well installation will be described on the boring log, and a schematic diagram will be prepared showing the details of the well construction.

The well will be centered in the borehole. A filter pack of No. 0 grade sand will extend from approximately 1 to 2 feet above the top of the screen to about 6 inches below the bottom of the screen. The sand filter pack will be tremied into the annulus using a minimum 3/4" PVC pipe, unless, in the judgement of the field geologist, conditions are favorable for installation of the sand filter pack without the use of a tremie pipe. The purpose of the sand filter pack is to stabilize the formation around the screen and act as a filter, preventing fine-grained materials from entering the well. The placement of the sand pack will be coordinated with the withdrawal of the augers/casing so that the well screen is not exposed to the native formation, thereby reducing the possibility of caving of native material about the screen whenever practical. The depths of the sand pack installation will be verified by measurements with a weighted tape.

Following installation of the sand filter pack, a 3 foot thick bentonite seal will be installed to prevent grout from penetrating the sand filter pack. Bentonite pellets will be poured into the borehole to a height of at least three feet above the top of the sand, and allowed to expand for a minimum of 30 minutes, at which point the remainder of the borehole will be grouted. A cement-bentonite grout will be used, consisting of Portland cement and approximately 3 percent bentonite, which will be placed in the annulus around the well casing from the top of the bentonite seal to the surface.

A flush mount with lockable cap will be cemented in place at the ground surface. The wells will be seated in a concrete surface pad, approximately 2 feet by 2 feet and 4 inches thick. The pad will be installed so the surface of the concrete slopes downward and away from the well thus directing runoff water away from the well.

Monitoring Well Development

Well Development Procedure - The newly installed well will be developed at least 48 hours after completion to ensure free flow of groundwater between the formation and the well and minimize

turbidity in subsequently obtained water samples. The objective of the well development is to remove sediments from the bottom of the well and the screened interval and to restore the natural hydraulic properties which may have been disturbed during well installation. The development will allow for the collection of representative groundwater samples and determination of aquifer hydraulic parameters.

The well development method to be applied will be over-pumping. The objective of the over-pumping is to evacuate the suspended sediment and water within the well as a result of installation. The development process will be repeated until the water appears to be clear and relatively silt-free, to the extent practical. It should be noted that the achievement of a silt-free discharge may not be possible, should a high content of fines be present in formation materials adjacent to the well screen.

Overpumping is accomplished using either of several types of pumps, depending upon water levels and recharge rates. All downhole equipment and materials used will be either of new, unused condition, or will be decontaminated by steam-cleaning prior to use.

Handling of Development Waste Water - Water generated during development of the new monitoring well will be containerized in 55-gallon drums pending characterization and disposal.

Monitoring Well Surveying

The elevation of the new well will be surveyed to the nearest 0.01 foot by a surveyor certified in the State of New York, and will be referenced to the National Geodetic Vertical Datum of 1929. Additionally, the horizontal well coordinates shall be surveyed to the nearest foot and referenced. Typical well construction is illustrated in Figure 2-4. Information regarding the construction of the monitoring well will be recorded by the on-site geologist and included in the final report. The well will be clearly identified with an embossed metal label indicating the well number.

2.3.5.3 Groundwater Sampling and Hydraulic Measurements

Groundwater Sampling

Procedure For Purging of Monitoring Wells - Prior to sampling, each of the monitoring wells to be sampled will be purged to remove stagnant water within the well casing and within the vicinity of the well screen and gravel pack. The objective of the purging process is to allow collection of groundwater samples which are representative of actual groundwater conditions. The following steps outline the monitoring well purging procedures.

1. Prior to purging, water level measurements will be recorded with a decontaminated water level indicator at all wells.

2. Three to five well volumes will be purged from each well in order to obtain a representative groundwater sample. The volume of water in each well casing will be determined from field measurements of total depth and depth to water.

3. The wells will be purged using either a grundfos pump or centrifugal pump with disposable ½-inch diameter tubing. Pumping rates during purging will be measured and recorded in the field notebook.

4. Prior to sample collection, a stabilization test will be conducted during purging each well to ensure that standing water in the well casing has been removed, and that the sample will be representative of the aquifer. During purging pH, temperature, turbidity, and temperature corrected specific conductance of the discharge flow will be monitored following each well volume discharged. When measurements of three successive well volumes have stabilized the well will be sampled.

5. If a monitoring well goes dry during purging, the well will be allowed to recover before sample collection.

Handling of Purge Waste Water - Groundwater evacuated from the monitoring wells during the purging process will be containerized in 55-gallon drums pending disposal.

Sample Collection Procedure - Monitoring well sampling will be conducted within 3 hours of well purging where practical, but the duration between purging and sampling will not exceed 24 hours. The following procedures outline sample collection and field testing/measurement methods which are applicable to monitoring well sampling.

1. The well number and sample date will be labeled on each sample bottle prior to sample collection.

2. Latex or nitrile gloves will be worn during sample collection. Samples will be collected either from dedicated bailers or from disposable polyethylene bailers. The polypropylene bailer cord will be used to lower the bailer into the well. The bailer cord and disposable bailer (if used) will be disposed of following use.

3. The bailer will be gently lowered into the upper 3 to 5 feet of the water column and brought to the surface without excessive agitation of the water column or the water in the bailer. The bailer cord will not be allowed to touch the ground or the outer well casing. The sample bottles will be filled by carefully pouring water from the bailer. Following collection of the VOC sample, the remaining sample bottles will be filled simultaneously from each successive bailer, to allow representative samples to be collected in each container. Following sample collection, the well number, type

and number of containers, preservatives used, and other requested information will be entered on the Chain-of-Custody Form.

4. Some parameters require additional special handling. Volatile organic analysis samples must be free of air bubbles. If any bubbles can be seen in the sample, the bottle must be emptied and refilled. If preserved sample bottles are utilized, discard any bottles with bubbles and resample using a new bottle. When a bubble-free sample has been obtained, it must be immediately stored in an ice packed cooler at 4^0 C, where it is to remain until receipt by the laboratory.

5. All pertinent information will be recorded in the field data notebook (including color, odor, sediment content, etc.). Any situations at the site that have the potential to interfere with the analyses will also be recorded in the field notebook. In the event that the well is not sampled immediately following purging, measurements of field parameters will be made at the time of sampling.

6. Samples will be stored on ice in a secured cooler until delivered into custody of the analytical laboratory.

7. The wells will be locked following sampling to prevent introduction of foreign material into the well. Any required maintenance needed to secure the well or to maintain well integrity will be noted and reported to Photocircuits.

8. Samples for Quality Assurance/Quality Control will be collected in accordance with the procedures outlined in Section 2.4.

Hydraulic Measurements

Hydraulic measurements will be made at monitoring well locations using an electronic water level indicator. The depth to groundwater in each monitoring well will be measured to the nearest 0.01 foot increment, referenced from the PVC well casing. Prior to use at each well location, the electric water level indicator probe will be rinsed with distilled water.

Using casing elevation data, groundwater depth measurements will be converted to groundwater elevations for use in defining flow directions within hydrogeologic units at the site.

Slug Tests

Each of the existing wells and the newly installed well will be slug tested to determine an approximate average hydraulic conductivity (K) for the site. The slug test is conducted by either removing a known volume of water or by displacing a known volume of water using a slug. Once the volume of water or the slug is removed, the changes in the piezometric surface in the monitoring well are recorded using a pressure transducer in conjunction with a data logger which controls the frequency and stores the water level readings. The slug test procedures are outlined as follows:

1) The pressure transducer is inserted into the piezometer to a depth greater than the depth at which the slug will be inserted.

2) The PVC slug is inserted into the monitoring well and after the static water level has equilibrated, the static water level will be measured using an electronic water level indicator to confirm the expected length of the static water column.

3) The pressure transducer is connected to the data logger, and the data logger is programmed for a logarithmic sampling frequency to allow for high-speed early data collection. The expected monitoring frequency is presented below.

Elapsed Time	Measurement Frequency
0-2 seconds	0.2 seconds
2-20 seconds	1 second
20-120 seconds	5 seconds
2-10 minutes	30 seconds
10-100 minutes	2 minutes
100-120 minutes (end of test)	10 minutes

4) The data logger is started at the precise moment that the slug is removed from the monitoring well. The slug test is terminated after the water level has returned to equilibrium or after up to two hours of recorded recovery data has been obtained.

The results of the "rising head" slug test will be evaluated using the Bouwer and Rice (1976) method to determine an approximate average value of K for the overburden aquifer at each well location. The results of the slug tests will be averaged to establish a representative value of K for the site.

2.3.5.4 Geotechnical Sampling

Two soil samples of the overburden will be collected for geotechnical analysis of permeability to air, permeability to water, total porosity, and particle size distribution. The samples will be collected from selected boreholes drilled for either soil borings or the installation of a monitoring well.

2.4 RI COMPLETION CRITERIA

The results of the sampling and analysis activities will be reviewed with NYSDEC prior to the production of the RI report. As a result of this review, the NYSDEC will determine that the RI is complete based on the following criteria:

1. The nature and distribution of contamination attributable to the site has been adequately determined.

2. Site conditions have been sufficiently characterized to properly conduct the Feasibility Study.

2.5 QUALITY ASSURANCE PROJECT PLAN

2.5.1 Purpose of the QAPP

The purpose of this QAPP is to provide project organizational and procedural standards which are intended to assure the quality and useability of field and laboratory data generated during site investigative activities.

2.5.2 Project Organization and Responsibilities

The project management organization provides clear lines of authority and a control structure to support this RI/IRM Workplan. The organizational structure for the project is shown in Figure 5-1. The key project personnel and their respective responsiblilties are summarized below.

Project Director - Andrew Barber

Mr. Barber will serve as the Project Director for all aspects of the project including overall quality assurance and staff management. Mr. Barber will ensure that the necessary integration of the project team occurs, and will provide technical review and oversite to members of the Project Team.

Project Manager - Charles Schneider

As the Project Manager Mr. Schneider will be responsible to coordinate all day-to-day field and engineering activities associated with the project. Mr. Schneider will also manage all aspects of site characterization activities and will be responsible for adherence to project schedules; reviewing and assessing the performance of technical staff and subcontractors; maintaining full orderly project documentation; interacting with the State agencies during progress of the project; and managing project specific problems and issue resolutions.

Health and Safety Task Manager - Alison DiPasca

Ms. DiPasca is responsible for ensuring that all site activities are conducted in accordance with applicable federal, state, and local regulations as well as corporate health and safety policies of McLaren/Hart. These responsibilities include coordination of the preparation, review, and implementation of the site-specific Health and Safety Plan; perform documentation review to ensure that all site employees have had adequate health and safety training and are medically certified; and to undertake periodic audits as necessary to determine the effectiveness of the site-specific Health and Safety Plan and to ensure timely corrections of deficiencies.

Field Team Leader - Daniel Baldwin

Mr. Baldwin will supervise McLaren/Hart's sampling team in the collection of all samples during the RI. Mr. Baldwin will be responsible for coordinating the activities of field personnel and subcontractors; adherence of field activities to the SI/RP Work Plan; documentation of field work; and management of the sampling team and sampling activities. Mr. Baldwin will report directly to the Project Manager.

Site Safety Officer - Daniel Baldwin

Mr. Baldwin will be responsible for the implementation of the Health and Safety Plan during all field activities. During the field investigation, Mr. Baldwin will interact with the Health and Safety Task Manager and all on-site personnel on matters of field health and safety.

2.5.3 Subcontractors

McLaren/Hart will retain qualified subcontractors to perform specific tasks during the RI. McLaren/Hart will provide overall management, coordination, and quality control and review of subcontractors' activities. The project tasks which will be subcontracted consist of drilling and well installation, surveying and laboratory analytical services.

2.5.4 Quality Assurance Objectives

The overall Quality Assurance objective is to ensure that the field and laboratory procedures employed during the project will generate data of sufficient and adequate quality for its intended use. The data will be used to further characterize the site so that remedial alternatives can be evaluated and ultimately, a remedy for the site can be selected. In order for the data to be used for these purposes, the data must be of a known and acceptable quality.

The quality of measurement data is characterized by the accuracy, precision, completeness, representativeness and comparability of the data collected. Each of these elements is discussed below in relation to the data which will be generated from sampling and analysis activities conducted at the Site. Table 2-1 presents these QA objectives for each of the major parameter groups for soil and water matrices. Accuracy and precision objectives are based on prior knowledge of the measurement system employed and on method validation studies. The objectives referenced in Table 2-1 are based on the attainable/acceptable ranges as specified in the analytical methods to be used in this project.

2.5.4.1 Precision and Accuracy

Accuracy is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is often expressed as the percent difference between two values. Precision is a measure of mutual agreement among individual measurements of the same property and is often expressed as the standard deviation or relative percent difference (RPD). The accuracy and precision associated with the measurement of inorganic and organic parameters are discussed in the analytical methods and in data validation guidance to be employed for this investigation.

Analytical accuracy is determined by comparing results from the analysis of surrogates, matrix

spikes, or check standards to their known values. Every sample analyzed for organics is spiked with compounds (surrogates) which behave chemically and physically like target compounds. The percent recoveries of the surrogates from all samples and blanks are reported as a measure of the accuracy of the method. Matrix spike recovery can also be used to assess analytical accuracy. Acceptable percent recovery ranges have been proposed, and are presented in Table 2-1.

The equation used to calculate percent recovery (%R) is as follows:

$$Percent\ Recovery(Spike\ Sample) = \frac{RSS - RUS}{SA} x100$$

Where: RSS = Results of Spike Sample
RUS = Results of Unspiked Sample
SA = Amount of Spike Added

Precision is measured by analyzing field duplicates and laboratory duplicates. Duplicate samples from each matrix are spiked Matrix Spike/Matrix Spike Duplicate. Percent recovery and relative percent difference of the matrix spikes are reported. RPD measures the precision of the method for the particular matrix. The maximum RPD limits for organics are presented in Table 2-1. One of every twenty samples is designated as the Matrix Spike/Matrix Spike Duplicate (MS/MSD) sample. Accuracy and precision limits for inorganic analytes are also based on spike and duplicate analyses and are presented in Table 2-1. The particular compounds and concentrations to be used for spiking are specified in the referenced methods.

The equation used to calculate % RPD is as follows:

$$Relative\ Percent\ Difference(RPD) = \frac{D_1 - D_2}{0.5(D_1 + D_2)} x100$$

Where: D_1 = First Sample Results
D_2 = Duplicate Sample Results

2.5.4.2 Completeness

With respect to data collection, completeness is a measure of the amount of valid data obtained compared to the amount that was specified or expected to be obtained under normal conditions. The measure is usually expressed as a percentage. Occasionally, completeness is something less than 100 percent due to difficulties in collection and analysis of environmental samples. An overall completeness rate of 90% is generally acceptable and will be the standard applied to this project.

$$Percent\ Completeness = \frac{Number\ of\ Valid\ Results}{Number\ of\ Expected\ Results} x100$$

2.5.4.3 Comparability

The data generated from this site should be comparable with similar measurements made by others at this or a similar site. To assure that the measurements are comparable, sample collection and analysis will follow standard EPA methods; also, standard reporting units will be used for all data. All aqueous sample data for organic and inorganic analytes will be reported in ug/l. All sediment or soil sample data will be reported in micrograms per kilogram (ug/kg) for organic analytes and in milligrams per kilogram (mg/kg) for inorganic analytes.

2.5.4.4 Representativeness

Data representativeness is ensured by using standard sampling procedures and analytical methods. Blank and field replicate samples will be collected for comparison to the environmental samples. Specific approaches are incorporated into sample collection for each medium as outlined below.

Monitoring wells will be flushed of three to five casing volumes prior to collecting samples to ensure that a representative sample has been obtained from the aquifer. During collection of groundwater samples, one field blank per day of sampling, one replicate per twenty samples, and a trip blank for each sample shipment, will be collected to check for laboratory/field contamination. A similar frequency of Quality Assurance/Quality Control (QA/QC) sampling will be maintained for sampling of surface water and sediment media.

2.5.5 Sampling Procedures

2.5.5.1 Selection of Sampling Locations

All available data was reviewed, including results from previous sampling events to identify sample locations, the number of samples to be collected, and the target analytes. Areas of potential contaminant migration were also considered during selection of sample locations. A complete discussion of sampling rationale and the number of samples to be collected with maps depicting sampling locations are presented in the FSP. Table 2-2 summarizes the approximate number of samples to be collected from each area and the required analyses.

2.5.5.2 QA/QC Sample Collection

Sampling activities will include the collection of groundwater, surface water and sediment

samples. Procedures to be followed in the collection of these samples are discussed in the FSP in Section 2.3. The discussion within this section is restricted to the collection of quality assurance samples including replicates, field blank and trip blank samples. A summary of the number of quality assurance samples to be collected from each matrix is presented in Table 2-3.

Replicate samples will be collected from each matrix at the frequency of one replicate per twenty samples as designated in Table 2-3. Replicate samples will be collected from every matrix. The replicate sample will be collected at the same location and if possible from the same sample aliquot as the original sample. Replicates of water samples will be obtained by alternately filling sample containers from the same sampling device.

Trip blanks will consist of a set of sample bottles filled at the laboratory with demonstrated analyte free water. Trip blanks will be handled and transported in the same manner as the samples acquired that day, except that the sample containers are not opened in the field. Trip blanks will be analyzed for volatile organics and will accompany all sample shipments which contain samples to be analyzed for volatile organics.

Field blanks will be aqueous rinsate samples. Analyte free water from the laboratory will be passed through decontaminated sampling equipment and collected into the appropriate empty sample bottles. Field blanks are analyzed for the same parameters as their associated matrix. All field blanks will be packaged and shipped to the laboratory with samples of the same matrix. Field blanks will be collected at a frequency of one per day, per matrix; i.e. a field blank will be collected for each matrix sampled that day.

2.5.5.3 Sample Preservation

Sample preservation, containers, and holding times for each analytical parameter are specified in

Table 5-4. Holding times have been specified from the time of sample collection. All sample preservation will be performed in the field immediately after collecting samples. Aqueous samples and blanks to be analyzed for volatiles will be acidified with 1:1 hydrochloric acid (HCl) to pH <2. The amount of acid to be added will be determined on a separate vial of sample first, to be discarded after use. If acidification causes the sample to effervesce or to form a precipitate, the sample will not be acidified and the holding time for volatile analysis will be reduced to 7 days. Any deviations from the preservation methods as described will be noted in the field notebook and on the chain-of-custody form.

After collection, samples will be cooled to approximately 4 degrees Centigrade and will be maintained at a reduced temperature during shipment to the laboratory. All samples will be shipped to the laboratory via an overnight carrier or laboratory courier service.

2.5.6 Field Documentation

Field notebooks will provide the means of recording any field events including data collection and sampling activities. The notebooks will be bound and maintained by the project field team to provide daily records of significant events, observations, and measurements during the field investigation. All entries are to be signed and dated. All members of the field investigation team are to use these notebooks, which are to be kept as a permanent record.

Field notebooks are intended to provide sufficient data and observations to enable participants to reconstruct events that occurred during field work when preparing reports and to refresh the memory of the field personnel if called upon to give testimony during legal proceedings. The field notebook entries should be factual, detailed, and objective. Unless restricted by weather conditions, all original data recorded in field notebooks and on sample identifications tags, chain-of-custody records, and receipt-for-samples forms are written in waterproof ink.

If an error is made on an accountable document the correction is made by simply crossing out the error and entering the correct information. The erroneous information should not be obliterated. All corrections must be initialed and dated. Whenever a sample is collected or a measurement is made, a detailed description of the event will be recorded. The sampler, sample time, sample location, sample description, sample measurement, and any field observations will be included in the field notebook. All equipment used to make measurements will be identified, along with the date of calibrations. Sample custody will be documented in the field notebook. Field data sheets may also be used to record field data.

Notebooks will be assigned to field personnel, but will be stored in the project file when not in use. Field data sheets will also be maintained in the project file.

2.5.7 Sample Custody

Chain-of-custody procedures provide an accurate written record which can be used to trace the possession of samples from the time of collection through sample analysis and data reporting by the laboratory. Both the field team and the laboratory are responsible for documenting sample custody. A sample is considered to be in an individual's custody if any of the following criteria are met: 1) the sample is in the individual's possession; 2) the sample was in the individual's possession and then locked up or sealed to prevent tampering; or 3) the sample is stored in a secured area.

2.5.8 Field Sample Custody

Custody documentation will be maintained for each sample collected in the field. The field team member performing the sampling is responsible for the care and custody of the sample until they are properly dispatched. Chain-of-custody forms will be used to document sample custody. The

following information will be specified for each sample on the field chain-of-custody form: sample number; sample matrix; date and time of sample collection; analysis requested; number of containers per sample; sample preservation; and method of shipment. One chain-of-custody form will be used for each sample shuttle shipped for analysis. All other pertinent sample information including sample location will be recorded in the field notebook.

The chain-of-custody form will be signed by sampling personnel. The forms will be placed in a water-tight plastic bag and taped to the underside of the lid of the cooler containing the samples designated on the form. A copy of the form is retained by the sampler for the project file.

2.5.9 Sample Packaging and Shipment

The laboratory will provide the field personnel with all the sample containers necessary for completing the field sampling. Sample containers will be obtained directly from the laboratory to ensure that the containers are free of contamination and are the appropriate volume for the requested analysis. Preservatives used in field sampling will be reagent grade and will be supplied by either the laboratory or purchased directly.

Following sampling, the sealed sample container will be rinsed with tap water, dried and labeled. The bottles will be labeled with the following information: site name, sample number, initials of collector, date and time of collection, type of sample, analysis required, and preservative.

Sample labels will be completed in waterproof ink. Labels will be taped onto the sample bottles. Following labeling, sample containers will be placed in sealed, clear plastic zip lock type bags and placed in a cooler for storage and shipment. Ice, sealed in double plastic bags, or "blue ice" will be placed in each cooler to maintain all samples at 4°C. The samples will be cushioned using vermiculite, foam rubber or other similar packaging material. Chain-of-custody forms will be

enclosed in each cooler. Coolers will be sealed with custody seals in such a manner that the custody seal would be broken if the cooler were opened. The lid of the cooler will be securely taped shut. Sample coolers will be shipped to the analytical laboratory via overnight delivery or laboratory courier service.

2.5.10 Laboratory Sample Custody

Samples will be received at the laboratory by the sample custodians who examine each sample to ensure that it is the expected sample, inspect the sample containers for possible damage, and ensure that the documentation is complete and adequate. The sample custodians will ensure that each sample has been preserved in the manner required by the particular test to be conducted and stored according to the correct procedure. Samples will be maintained at 4°C until analysis begins.

2.5.11 Analytical Procedures

McLaren/Hart's Mobile Laboratory has been selected to provide analytical services for this project. All samples will be analyzed on-site at the Photocircuits property. The McLaren/Hart Mobile Laboratory has demonstrated performance with the selected analytical methods and is certified by NYSDEC to conduct the proposed analyses.

EPA or other standard methods will be used for all analyses.

2.5.11.1 Organics

Volatile Organic Compounds

All soil and groundwater samples, as well as all related QA/QC samples, will be analyzed using EPA Method 8240.

2.5.12 Equipment Calibration and Maintenance

2.5.12.1 Responsibility

A calibration and maintenance program will be implemented to ensure that routine calibration and maintenance is performed on all field instruments. The program provides equipment of the proper type, range, accuracy, and precision to provide data compatible with the specified requirements and desired results. Calibration of measuring and test equipment is performed internally using in-house reference standards or externally by agencies or manufacturers. The Field Team Leader is responsible for ensuring that the field instruments used in the investigation are calibrated and maintained according to manufacturers specifications. Field instrument manuals describing calibration, maintenance, and field operating procedures for these instruments will be available for easy reference by field and project personnel.

Team members will be trained in the field calibration, operation and maintenance of the equipment, and will perform the prescribed field operating procedures outlined in the operation and field manuals accompanying the respective instruments. They will keep records of all field instrument calibrations and field checks in the field notebooks.

2.5.12.2 Field Instruments

The field instruments are maintained and calibrated in accordance with identified maintenance and calibration procedures. Records will be prepared and maintained for each piece of calibrated measuring and test equipment to indicate that established calibration procedures have been followed (e.g. results of calibration, problems, corrective action). Records for field equipment used only for this specific project will be kept in the project files.

Instrument response will be checked prior to bringing the instruments to the Site and prior to operation at the Site. Instrument response will also be checked at the end of the day to determine if the instrument has drifted from its initial calibration. Equipment that fails calibration or becomes inoperable during use will be removed from service and tagged to prevent inadvertent use. If on-site monitoring equipment should fail, the Site Health and Safety Officer will be contacted immediately and will either provide replacement equipment or have the malfunction repaired immediately.

Monitoring of specific conductance (temperature corrected), pH, temperature and turbidity will be conducted using a Horiba U-10 multimeter. The meter will be calibrated daily according to the manufacturer's specifications using a single calibration solution standard provided by the manufacturer (Calitech Auto-Cal Solution).

Organic vapors in air will be monitored using an OVM-580B photoionization detector, calibrated daily to a 100 ppm isobutylene standard, according to the manufacturer's specifications.

Periodic preventive maintenance is required for sensitive equipment. The field instruments are maintained through periodic calibration and adjustment by the instrument manufacturer as needed. In general, field instruments are serviced by the manufacturer every 6 months or less.

Routine maintenance is performed whenever an instrument is acquired for field use, and when returned from field use. Instrument manuals are kept on file for reference purposes should equipment need repair. Troubleshooting sections of manuals are often useful in assisting personnel performing maintenance tasks. Preventive maintenance, other than routine maintenance and calibration, is performed as needed.

2.5.12.3 Laboratory Instruments

All laboratory equipment will be maintained in accordance with manufacturer's specifications. Quality assurance, tuning, and calibration procedures will be conducted according to the current EPA method specific protocols.

2.5.13 Data Documentation, Reduction and Reporting

2.5.13.1 General

The Project Manager will maintain project files which will contain complete project documentation. These files will include project plans, field notebooks, field data sheets, photographs, maps and drawings, sample identification documents, chain-of-custody records, the entire analytical data package provided by the laboratory, references and literature, report notes and calculations, progress and technical reports, correspondence and other pertinent information. The project file will be kept at the McLaren/Hart office in Warren, NJ. The file will be maintained for the duration of McLaren/Hart's involvement in the project.

2.5.13.2 Data Reduction

Data reduction techniques and all equations used to calculate concentrations will be as specified

by each of the USEPA analytical methodologies.

2.5.13.3 Data Reporting

All data will be transmitted in hard copy and on diskette. All original data files will be stored in a manner which precludes manipulation of the original data, and all manipulation, editing, and presentation will be performed on data copied from the original data files.

The analytical laboratory will prepare and retain analytical and QC documentation consistent with the requirements of the referenced analytical methods. The analytical reports prepared by the laboratory will present sample documentation and results consistent with the requirements of NYSDEC Analytical Services Protocol (ASP) Category B deliverables.

2.5.14 Internal Quality Control Checks and Performance/System Audits

2.5.14.1 Quality Control Checks

Laboratory QC Checks

The McLaren/Hart Mobile Laboratory has been selected based on their overall ability to perform the analyses specific to this project and their acceptance by NYSDEC. Certain minimum requirements must be met for laboratory participation in NYSDEC-regulated projects. In general these requirements specify the qualifications of personnel, available instrumentation, analysis of performance evaluation samples, and adherence to and documentation of standard operating procedures and quality assurance plans.

It will be the responsibility of the Laboratory QA Officer to document, in each data package

provided, that both initial and ongoing instrument and analytical QC functions have been met. Internal quality control checks, including spiked samples, duplicate samples, laboratory control samples, reagent specifications, and calibration checks, are performed in accordance with the specific methodologies used. Specific QC procedures and their frequency are incorporated into the referenced methods. The minimum criteria for most analyses generally consist of a daily calibration check, method blank analysis, analysis of spike or control samples, and duplicate analysis for each parameter.

Field QC Checks

For field quality control, replicate and field blank samples will be obtained for each sample matrix. Trip blanks will be used in conjunction with all samples to be analyzed for volatile organic compounds. The frequency of QC sample collection is given in Table 2-2.

The standard frequency for obtaining field replicates and samples designated as MS/MSDs is one per twenty samples per matrix. Field replicate samples serve as a check on the overall precision of the sampling and analytical method. Matrix duplicate samples check on laboratory analytical precision, and may be used to assess matrix effect.

Field blanks will be collected throughout the sampling event for each matrix. Field blanks will be collected on a daily basis for the matrices sampled that day. Field blanks will be obtained by pouring laboratory provided distilled analyte-free water over decontaminated sampling equipment (trowels, mixing bowls, bailers, etc). The water will pass over this equipment and be allowed to run directly into laboratory prepared bottles. All field blank information will be noted in the field notebook. Trip blanks will only be sent with each shipment of samples to be analyzed for volatile organics.

Field blanks measure incidental or accidental sample contamination occurring during the entire sample handling process of sampling, transport, sample preparation and analysis. Trip blanks measure cross-contamination which can occur during sample transport, storage or field handling. Trip blanks can also check on the laboratory water quality.

2.5.14.2 Performance and System Audits

Laboratory Performance and System Audits

The analytical laboratory will conduct internal quality control checks and audits in accordance with specific methods and criteria required under their internal operating procedures and under the governing laboratory programs. The laboratory QA Officer will be primarily responsible for conducting these audits.

The systems audit consists of evaluation of all components of the measurement systems to determine their proper selection and use. Systems audits are normally conducted prior or shortly after systems are operational, and are then performed on a regularly scheduled basis. Performance audits are conducted periodically, and includes the analysis of performance evaluation samples.

Field Team Performance Audits

The QA officer or designee will be responsible for auditing the field team. A performance audit will be conducted during the field activities to ensure that proper procedures are followed and that subsequent data will be valid. The audit will focus on the details of the QA program, and will evaluate the following:

- Project Responsibilities

- Sample Custody Procedures
- Document Control
- Sample Identification System
- QC Corrective Action Procedures
- Sampling Techniques
- Adherence to the QAPP

The audit will evaluate the implementation of the project Sampling and Analysis Plan, that is the FSP and QAPP.

2.5.14.3 Preventative Maintenance

Preventive maintenance procedures for analytical laboratory instruments will follow manufacturers' specifications.

2.5.14.4 Specific Routine Procedures to Assess Precision, Accuracy and Completeness of Data

It will be the responsibility of the Project QA Officer and the Laboratory QA Officer to ensure that these procedures are followed. The control limits have already been specified in the analytical methods referenced in Section 2.5.11.

The following items will be considered for all data: custody documentation; adherence to holding times; duplicate, spike, and blank sample results; reporting units; and completeness of documentation.

2.5.14.5 Corrective Action

Corrective action on a day-to-day basis for field activities will be handled by consultation between team members and the Field Team Leader. The Field Team Leader will make immediate decisions with the team members on new protocols to be followed. All changes in field procedures will be documented in the field notebook, reported to the Project Manager, and reported in the final report. Corrective actions will be taken if performance audits reveal the need to amend field procedures.

The Field Health and Safety Officer will have ultimate authority to make decisions regarding modifications to health and safety practices and regarding safety emergencies. The Project Manager will be consulted at the time of any such field decisions or corrective actions that result in modification of protocols as outlined in any of the project plans, i.e. the FSP, QAPP or HASP.

Corrective action in the laboratory will be handled by consultation between the Laboratory QA Officer and the Project QA Officer. Corrective actions are implemented when accuracy, precision, calibration or other internal method specific quality assurance criteria can not be met. All changes in laboratory procedures will be documented and reported.

All modifications to procedures during the course of the project will be documented and these exceptions will be permanently incorporated into the project file.

2.5.14.6 Quality Assurance Reports to Management

The QA Officer will periodically report to the Project Manager on the status of the investigation. This report may be of either verbal or written format and will include, as appropriate, a summary of the sampling results; audit findings; and any necessary corrective action procedures.

2.5.15 Decontamination

2.5.15.1 Drilling Equipment

Drilling equipment, including the drill rig, augers, drill rods, split-spoons, and bits will be decontaminated by steam cleaning prior to use at each new boring location and prior to demobilization from the site. Decontamination activities will take place within a decontamination pad to be constructed for this purpose. All decontamination rinsate liquids will be containerized prior to characterization and disposal.

2.5.15.2 Well Construction Materials

All PVC screen and riser pipe that is not certified clean, or if the wrapping is torn, or if it is evident that the wrapping has been deliberately opened, and any metal casing materials which may be required for well installation and construction will be decontaminated by steam cleaning prior to use.

2.5.15.3 Sampling Equipment and Field Instruments

To prevent cross-contamination of samples, all equipment which comes into contact with the environmental medium being sampled will be thoroughly decontaminated prior to use. Decontamination of sampling equipment will be accomplished through the following steps:

1. Wash/scrub with non-phosphate detergent (e.g.- Alconox)
2. Rinse with tap water
3. Rinse with solution of 10% nitric acid (metals sampling)
4. Rinse with methanol (pesticide grade or purer)

5. Thoroughly rinse with deionized water, using at least five times the volume of solvent used in Steps 3 and 4
6. Air dry
7. Wrap in aluminum foil for transport

2.5.15.4 Personnel

Decontamination of personnel exiting the site is discussed in the Health and Safety Plan. Personnel decontamination will consist of brushing any loose soil from the body, followed by removal of personnel protective equipment, washing hands and a visual inspection by the site safety officer prior to leaving the site.

3.0 HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

CLIENT: PHOTOCIRCUITS, INC.

SITE NAME: Pass & Seymour Inc. (Former Slater Electric)

SITE ADDRESS: 45a Sea Cliff Ave, Glen Cove, NY 11542

PROJECT NUMBER: 120802678

DATE PREPARED: August 1, 1996

DATE(S) REVISED: October 8, 1996

DATE EXPIRES: January 8, 1997

HEALTH AND SAFETY PLAN APPROVALS

PROJECT MANAGER — DATE
Charles Schneider

FIELD SUPERVISOR/
SITE SAFETY OFFICER — DATE
Dan Baldwin

HEALTH & SAFETY MANAGER — DATE
Alison DiPasca

Acknowledgements:
CONTRACTOR — DATE

TABLE OF CONTENTS

ATTACHMENTS

DO NOT INCLUDE THIS FORM IN HEALTH & SAFETY PLAN
FOR INTERNAL TRACKING PURPOSES ONLY

To be filled out by Administration:

HEALTH & SAFETY PLAN DOCUMENT TRACKING FORM

1st Notice Date: _____
2nd Notice Date: _____

HASP JOB#: HASP DATED:

CC: _____

JOB NAME: FILE LOCATION: _____

CLIENT NAME: OFFICE OF ORIGINATION:

PROJECT MANAGER: FIELD SUPERVISOR:

RETURN THE MISSING DOCUMENTS TO THE HEALTH & SAFETY ADMINISTRATOR BY: _____

(✓) if Needed*	DOCUMENTS REQUIRED	Document Missing (✓)	Date Completed:
	Signed Cover Page/Acknowledgement Sheet, *including contractor(s) signatures*		
	Section 1.4; Additional Authorized Site Personnel: Training Verification, *including Project Manager/Field Supervisor Initials*		
	Utility Clearance; Underground Service Alert, *including signatures & distribution*		
	Utility Clearance; McLaren/Hart Utility Clearance Checklist, *including signatures & distribution*		
	Direct Reading Report Form, *including signatures & distribution*		
	Instrument Calibration Log, *including signatures & distribution*		
	Tailgate Safety Meeting Form, *including signatures & distribution*		
	PM/Field Supervisor Audit Form, *including signatures & distribution*		
	Other:		
	Other:		

• To be filled out by the Health & Safety Manager during completion and/or revision of the HASP

1.0 GENERAL INFORMATION

1.1 Introduction

This Health & Safety Plan (HASP) addresses those activities associated with the scope of work stated in the HASP and will be implemented by the Site Safety Officer (SSO) during site work. Compliance with this HASP is required of all persons and third parties who enter this site. Assistance in implementing this plan can be obtained from the Site Safety Officer and Project Manager, and/or the Health and Safety Manager (HSM). The content of this HASP may change or undergo revision based upon additional information made available to health and safety (H&S) personnel, monitoring results or changes in the scope of work. Any changes proposed must be reviewed by H&S staff and are subject to approval by the HSM and Project Manager.

This site-specific Health & Safety Plan has been prepared for the use of McLaren/Hart and its employees and supplements the Health and Safety training that each McLaren/Hart employee receives. The health and safety guidelines in this Plan were prepared specifically for this site. Due to the potentially hazardous nature of the site covered by this Plan and the activity occurring on the site, it is not possible to discover, evaluate, and provide protection for all possible hazards which may be encountered. This plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if these conditions change.

This Plan is not intended to be used by any other contractor or personnel of any such contractor. This Plan may not address the specific health and safety needs or requirements of any other such contractor and its employees. Neither this Plan nor any part of it should be used on any other site.

McLaren/Hart expressly disclaims any and all guarantees or warranties, express or implied, that the Plan will meet the needs or requirements of any such contractor or its employees. McLaren/Hart, therefore, cannot and does not assume any liability by the use or reuse of the Plan by any client, contractor or their employees or agents. Any reliance on the Plan will be at the sole risk and liability of such party.

1.2 Executive Summary

McLaren/Hart Environmental Engineering Corporation was contracted to perform RI and IRM activities related to soil and groundwater issues at the Pass & Seymour Site (Former Slater Electric). Section 2.0 Project Information details the scope of work to be carried out during site activities.

1.3 Acknowledgement

I acknowledge having reviewed this Health & Safety Plan, understand its contents and agree to abide by it. Additionally, I am current in the training and medical surveillance requirements specified in 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response.

NAMES/SIGNATURES	DATE	COMPANY
1. Dan Baldwin/		McLaren/Hart
2. Mike Shorter/		McLaren/Hart
3. Dudley Warner/		McLaren/Hart
4. Jennifer Zarnowsky/		McLaren/Hart
5.		
6.		
7.		
8.		
9.		
10.		

2.0 PROJECT INFORMATION

2.1 Site Description

The site is located at 45 Sea Cliff Avenue and is bordered by several small businesses to the west, Glen Cove Creek to the east and Photocircuits Corporation to the south. The site produces electric components including outlets, switches and wall boxes.

See Attachment 1 for Site Map.

2.2 Background Information

Findings from an examination of the site by NCDPW Hazardous Waste Unit personnel on April 27, 1993 included the following: there is a hazardous waste storage area on site, as well as three-275 gallon above ground waste oil tank. Analyses of soil and groundwater resulted in the following contaminants being found: trichloroethene(TCE), Tetrachloroethene (PCE), and 1,2-Dichlorothene (total). McLaren/Hart has conducted soil and groundwater sampling at the site to further characterize issues and to develop a remedial strategy for the site.

2.3 Purpose of Site Work

McLaren/Hart will be on-site conducting field activities for the remedial investigation and IRM implementation, as negotiated with NYSDEC and consistent with the approved work plans.

2.4 Scope of Work

1. Soil and groundwater sampling using Geoprobe equipment.
2. Well installation/development/surveying
3. Groundwater sampling from existing monitoring wells.
4. Aquifer testing (slug-testing)
5. Installation of Air Sparging and Soil-Vapor Extraction wells and treatment trailer
6. AS/SVE Pilot testing

2.5 Utility Clearance

Utility clearance will be completed prior to site activities.

3.0 HEALTH AND SAFETY RISK ANALYSIS

3.1 Chemical Hazards

TABLE 3-1
KNOWN AND/OR PROBABLE CONTAMINANTS*

CONTAMINANT	SOURCE OF CONTAMINATION	SOURCE OF SAMPLE DATA (soil/water/air)	RANGE OF CONCENTRATION
trichloroethene (TCE)	USTs	soil and groundwater	ND-0.03 ppm; ND-100 ppb
1,2-DCE	USTs	groundwater	ND-21 ppb
acetone	USTs	soil	ND-0.068 ppb
tetrachloroethene (PCE)	USTs	soil and groundwater	ND -2.3 ppm; ND-150 ppb
methylene chloride	USTs	soil	ND-0.007 ppb

*Source of data: 1993 Report from Nassau

3.2 Non-chemical Hazards

Non-chemical hazards are associated with:

1. Cold stress
2. Slip, trip, fall
3. Automobile traffic
4. Biological hazards associated with insects , ticks
5. Utility clearnace
6. Noise (Geoprobe, drill rig)
7. Equipment handling
8. Electrical
9. Machinery

TABLE 3-2
ASSESSMENT OF CHEMICAL HAZARDS
(Central/Eastern Regions)

Task No.	Chemical Name* (or class)	PEL/TLV*	Other Pertinent Limits* (Specify)	Warning Properties - Odor Threshold*	Potential Exposure Pathways	Acute Health Effects	Chronic Health Effects
1-6	Acetone	1000/750 ppm	STEL = 1000 ppm No ceiling limit for acetone REL = 250 ppm	Minty sweet odor - 20 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression; headache; dizziness.	Dermatitis
1-6	Methylene chloride (dichloromethane)	500 ppm/50 ppm	OSHA STEL = 1,000 ppm	Sweet odor - 156 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression	Possible liver and kidney damage; dermatitis; suspected human carcinogen
1-6	1,2-Dichloroethylene (acetylene dichloride)	200/200 ppm	None cited	Bitter pungent odor - 0.1 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression	Possible CNS damage
1-6	Perchloroethylene (tetrachloroethylene; tetrachloroethene; or PCE)	25/25 ppm	No ceiling TLV-STEL = 100 ppm	Chlorinated solvent odor - 5 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression; skin burns	Liver and kidney damage; peripheral neuropathy; animal carcinogen.
1-6	Trichloroethylene (TCE)	100 ppm/50 ppm	STEL = 200 ppm No ceiling TLV-STEL = 100 ppm NIOSH Rel = 25 ppm	Sweet, solventy odor - 0.2 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression; headache; tremors; nausea; cardiac arrhythmia	Possible liver, kidney, cardiovascular, GI and CNS injury; suspected human carcinogen.

*PEL = OSHA Permissible Exposure Limit; represents the maximum allowable 8-hr. time weighted average (TWA) exposure concentration.
TLV = ACGIH Threshold Limit Value; represents the maximum recommended 8-hr. TWA exposure concentration.
STEL = OSHA Short-term Exposure Limit; represents the maximum allowable 15 minute TWA exposure concentration.
TLV-STEL = ACGIH Short-term Exposure Limit; represents the maximum recommended 15 minute TWA exposure concentration.
C = OSHA Ceiling Limit; represents the maximum exposure concentration above which an employee shall not be exposed during any period without respiratory protection.
IDLH = Immediately Dangerous to Life and Health; represents the concentration at which one could be exposed for 30 minutes without experiencing escape-impairing or irreversible health effects.
( ) = ACGIH TLV Intended Change
[SKIN] = Indicates a significant contribution of the total exposure by the cutaneous route.
Warning = Represents the lowest concentration detectable in a given population. However, detection varies greatly with the individual.
REL = NIOSH Recommended Exposure Limit, based on a 10-hour TWA exposure

4.0 HEALTH AND SAFETY FIELD IMPLEMENTATION

4.1 Personal Protective Equipment (PPE) Requirements

PPE may be upgraded or downgraded by the site industrial hygienist, HSM, or qualified Site Safety Officer based upon site conditions and air monitoring results.

See Table 4-1 for PPE requirements.

4.2 Monitoring Equipment Requirements

Monitoring is conducted by the Site Safety Officer or designee. Conduct contaminant source monitoring initially. Complete breathing zone monitoring if source concentrations are near or above contaminant action level concentrations. Log direct reading monitoring as specified in the Table 4-1 Monitoring Protocol and record results on Direct Reading Report form. Direct reading instrumentation shall be calibrated in accordance with manufacturing requirements, e.g., at least daily, and results of the calibration shall be documented on the Instrument Calibration Log (see Attachment 2).

TABLE 4-1
MONITORING PROTOCOLS AND CONTAMINANT ACTION LEVELS

CONTAMINANT/ ATMOSPHERIC CONDITION	MONITORING EQUIPMENT	MONITORING PROTOCOL	BREATHING ZONE[1] ACTION LEVEL CONCENTRATIONS	
			MONITORED LEVEL[2] FOR MANDATORY RESPIRATOR USE ABOVE BACKGROUND	MONITORED LEVEL[3] FOR MANDATORY WORK STOPPAGES
Total VOCs	FID (OVA)	Initial /disgression of SSO[4]	5 ppm	25 ppm above background

1 Monitoring performed at operator's breathing zone. Monitor at the source first; if the source concentration is near or above the action level concentration, monitor in the breathing zone.

2 Monitored levels will require the use of an approved respiratory protection system specified in Table 4-2.

3 Call the Project Manager and Health and Safety Manager for consultation.

4 Establish background upon initiation of site work. At the disgression of the Site Safety Officeror designee, the decision to proceed or stop activities will be determined.

TABLE 4-2
PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIREMENTS

JOB TASKS	PPE							LEVEL OF PROTECTION	LEVEL IF UPGRADE	ADDITIONAL PPE FOR UPGRADE	MONITORING EQUIPMENT
	SUIT	GLOVES	FEET	HEAD	EYE	EAR	RESPIRATOR				
1-6	Std	Work/L	Steel	HH	Glass	Plugs	N/A	D	C	Full or half APR w/OV/AG HEPA, Tyvek, Steel/booties Neo	PID

Personal Protective Equipment (PPE):

SUIT:

Std	=	Standard work clothes
Tyvek	=	Uncoated Tyvek disposable coverall
PE Tyvek	=	Polyethylene-coated Tyvek
Chemrel	=	Chemrel coverall with hood
Saranex	=	Saranex-laminated Tyvek
Lt PVC	=	Light wt. PVC rain gear
Med PVC	=	Medium wt. PVC suit
Hvy PVC	=	Heavy wt. PVC coverall with hood
Road	=	Roadwork vest
Nomex	=	Nomex coveralls

GLOVES:

Work	=	Work gloves (canvas, leather)
Neo	=	Neoprene gloves
PVC	=	PVC gloves
N	=	Nitrile gloves
V	=	Vinyl gloves
L	=	Latex gloves

Personal Protective Equipment (PPE):

FEET:

Steel	=	Steel-toe boots
Steel +	=	Steel-toe Neoprene or PVC boots
Booties	=	PVC or Latex booties

HEAD:

HH	=	Hard hat

EYE:

Glass	=	Safety glasses
Goggle	=	Goggles
Shield	=	Face shield

EAR:

Plugs	=	Earplugs
Muff	=	Ear muffs

Personal Protective Equipment (PPE):

RESPIRATOR:

APR	=	Air-purifying respirator
Full APR	=	Full face APR
Half APR	=	Half face APR
PAPR	=	Powered Air-purifying Respirator
SAR	=	Airline supplied air respirator
SCBA	=	Self contained breathing apparatus
Escape	=	Escape SCBA
OV	=	Organic Vapor cartridge
AG	=	Acid gas cartridge
OV/AG	=	Organic vapor/Acid gas cartridge
AM	=	Ammonia cartridge
D/M	=	Dust/mist pre-filter and cover for cartridge
HEPA	=	High efficiency particulate air filter cartridge

OTHER:

*	=	Use if contact with wet soil or water
**	=	Optional use except if specific hazard present

4.3 Decontamination Procedures

Depending on the specific job task, decontamination may include personnel themselves, sampling equipment, and/or heavy equipment. The specified level of protection (A, B, C, or D) for a task does not in itself define the extent of personal protection or equipment decontamination. For instance, Level C without dermal hazards will require less decontamination than Level C with dermal hazards. And, heavy equipment will always require decontamination to prevent cross-contamination of samples and/or facilities. The following sections summarize general decontamination protocols.

4.3.1 Personnel

Use steps and procedures outlined below as guidelines for personnel decontamination:

- Brush loose soil from body;
- Boot removal (where appropriate);
- Suit removal (where appropriate);
- Respirator/hard hat removal (where appropriate);
- Respirator wash (where appropriate);
- Glove removal;
- Field wash hands

4.3.2 Samples and Sampling Equipment

The same decontamination line will be used for sampling equipment decon as is used for personnel decon. At a minimum the following is performed:

- Refer to work plan for specific equipment decontaminator policies and procedures;
- Sampling equipment will be brushed clean and rinsed with distilled water or other appropriate cleaning material;
- Samples will be dry-wiped prior to packaging.

4.3.3 Decon Wastes

- Spent decon solutions may be required to be drummed and disposed of as hazardous waste and/or solvent solutions may be required to be segregated from water rinses.

- Decontamination shall be performed in a manner that minimizes the amount of waste generated.

5.0 SITE OPERATING PROCEDURES

5.1 Initial Site Entry Procedures

- Locate nearest available telephone.
- Prior to working on-site, conduct an inspection for physical and chemical hazards.
- Conduct or review utility clearance prior to start of work, if appropriate.
- Note any specialized protocols particular to work tasks associated with the project.

5.2 Daily Operating Procedures

- Hold Tailgate Safety Meetings prior to work start and as needed there after (suggest daily, however minimum of weekly).

  (See Attachment 2 for Tailgate Safety Meeting Form.)

- Use monitoring instruments and follow designated protocol and contaminant action levels.
- Use personal protective equipment (PPE) as specified.
- Use hearing protection if noise levels exceed 85 dbA.
- Remain upwind of operations and airborne contaminants, if possible.
- Establish a work/rest regime when ambient temperatures and protective clothing create a potential heat stress hazard.
- Do not carry cigarettes, gum, etc. into contaminated areas.
- Refer to Site Safety Officer (SSO) for specific safety concerns for each individual site task.
- Be alert to your own physical condition.
- All accidents, no matter how minor, must be reported immediately to the SSO.

6.0 EMERGENCY RESPONSE PROCEDURES

6.1 Emergency Incident Procedures

The nature of work at contaminated or potentially contaminated work sites makes emergencies a continual possibility. Although emergencies are unlikely and occur infrequently, a contingency plan is required to assure timely and appropriate response actions. The contingency plan is reviewed at tailgate safety meetings.

6.1.1 Emergency Incident Procedures

If an emergency incident occurs, take the following action:

Step 1: Size-up the situation based on the available information.

Step 2: Notify the Site Safety Officer and/or Field Supervisor.

Step 3: Only respond to an emergency if personnel are sufficiently trained and properly equipped.

Step 4: As appropriate, evacuate site personnel and notify emergency response agencies, e.g., police, fire, etc.

Step 5: As necessary, request assistance from outside sources and/or allocate personnel and equipment resources for response.

Step 6: Consult the posted emergency phone list and contact key project personnel.

Step 7: Prepare an incident report. Forward incident report to Project Manager/Health and Safety Manager within 24 hours.

6.1.2 Medical Emergencies

If a medical emergency occurs, take the following action:

Step 1: Assess the severity of the injury and perform life-saving first aid/CPR as necessary to stabilize the injured person. Follow universal precautions to protect against exposure to blood borne pathogens.

Step 2: Get medical attention for the injured person immediately. (Call 911 or consult the Emergency Contacts list which must be posted at the site).

Step 3: Notify the Site Safety Officer and Field Supervisor immediately. The Site Safety Officer will assume charge during a medical emergency.

Step 4: Depending on the type and severity of the injury, transport the injured employee to the nearest hospital emergency room. If the injury is not serious, then transport the injured employee to a nearby medical clinic. Consult your Health & Safety Manager for guidance, if necessary.

Step 5: Notify the injured person's personnel office, including the Regional Manager, Project Manager, and Health and Safety Manager.

Step 6: Prepare an accident report. The Site Safety Officer is responsible for its preparation and submittal to the Health and Safety Manager (HSM) and Corporate Health and Safety Director within 24 hours. CHSD fax number is (916) 638-7622.

6.1.3 Site-Specific Procedure

HOSPITAL ROUTE:
Directions to the Community Hospital in Glen Cove (1-1.5 miles from site):
Go east on Sea Cliff Avenue (right hand turn out of sites) to Cedar Swamp Rd. Left (north) on Cedar Swamp Rd. Right onto Pearsall Avenue then left onto Walnut Rd. The hospital is on the corner of Walnut and St. Andrews Lane. Hospital is located 5 to 10 minutes from site. The hospital address is: 101 St. Andrew's Lane, Glen Cove, NY 11542, (516) 674-7300.

6.2 Site Specific Requirements in Event of an Emergency:

6.2.1 Facility Notifications

The facility contact is JIM KERR (516) 674-1153

See Attachment 3 for individual site Emergency Contacts Lists.

6.2.2 Locate Shut-Offs

Not applicable for the scope of work defined herein.

6.2.3 Evacuation Route

If evacuation is required, the Field Supervisor shall:

Step 1: Activate the communication system to alert site workers of evacuation. Personnel shall be advised to remain upwind of contaminants, if possible, and proceed to the designated assembly area.

Step 2: Account for all personnel at the assembly area.

Step 3: Notify the client of the need to initiate evacuation procedures for other site personnel.

Step 4: Notify the Fire and Police Departments and request their assistance for evacuating the surrounding area and residences.

6.2.4 Spill Containment Plan

If a spill of hazardous material occurs, the following steps shall be taken to mitigate the incident:

Step 1: Notify the Field Supervisor, and he/she shall assess the extent of the spill to determine if it can be safely mitigated with the personnel and protective equipment available at the site.

Step 2: If the release is beyond the field team's capabilities, the Field Supervisor shall evacuate the site personnel to a safe location upwind of the release, and notify the Project Manager and Fire Department.

Step 3: The Project Manager shall notify the client, Health and Safety Manager, Corporate Health and Safety Director, and regulatory agencies, if necessary.

Step 4: If the spill can be safely mitigated using defensive actions, first don the appropriate PPE. Initially, Level C PPE should be worn until air monitoring indicates a downgrade in PPE is appropriate.

Step 5: Takes steps to secure the area and to prevent unauthorized persons from entering the area.

Step 6: Takes steps to contain the spill and to prevent it from reaching sewers, storm ditches, etc.

Step 7: Clean up the spill with absorbent, neutralizers, soil removal as appropriate. Place waste in sealed, labeled containers for disposal.

EMERGENCY CONTACTS
(To be Posted)

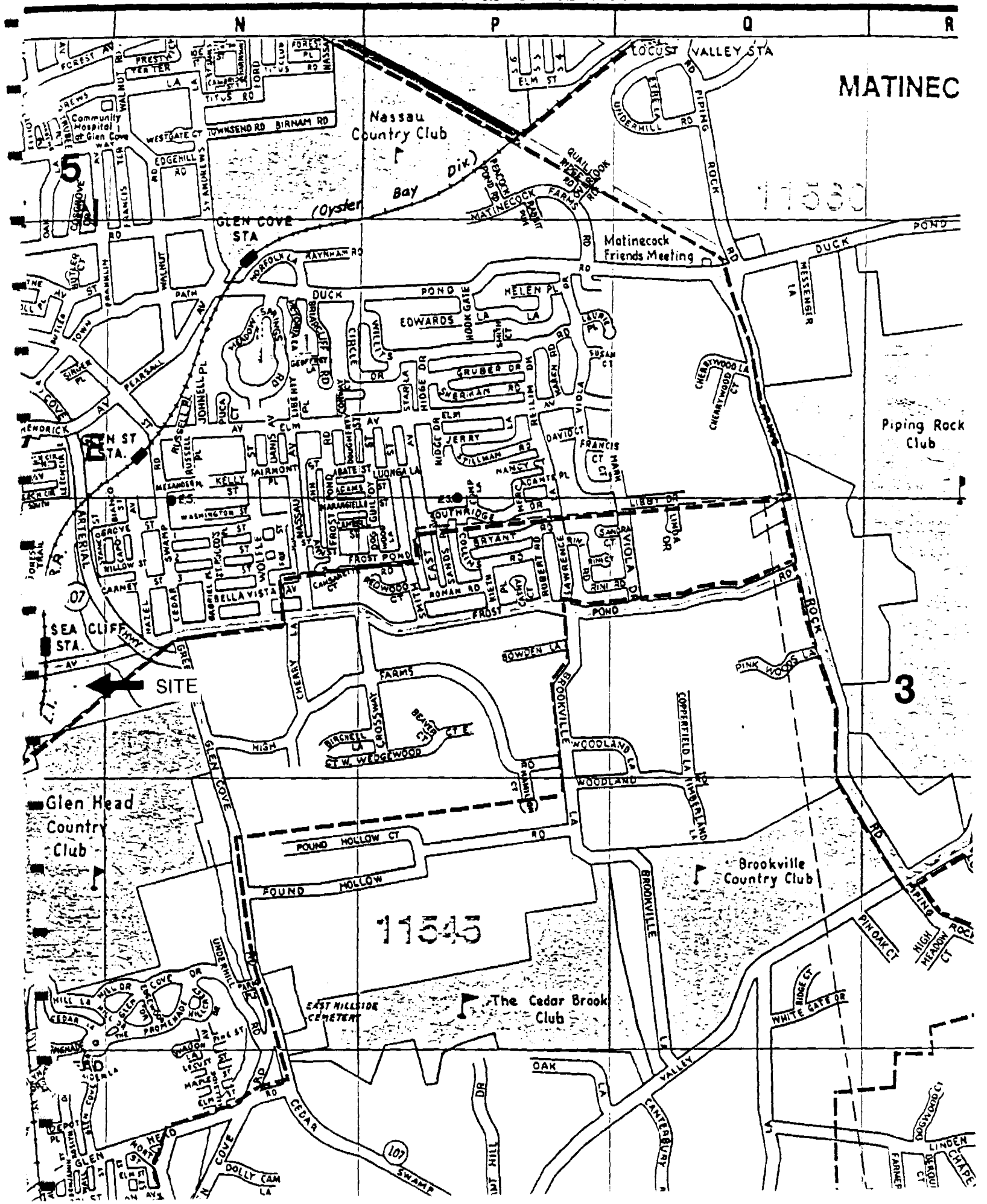
TITLE	NAME	PHONE NUMBER
EMERGENCY		
Police	Emergency Service	911
Fire	Emergency Service	911
Local Hospital	Community Hospital, Glen Cove, NY	516-979-9800
Local Ambulance/Rescue	Emergency Service	911
Poison Control Center		1-800-962-1253
Haz. Waste Natl. Response Center	HAZMAT	(800) 424-8802
PROJECT/BUSINESS		
Project Manager	Charles Schneider	(908) 647-8111 ext.278
Practice Area Leader	Martha Mackie	(908) 647-8111 ext.259
Health & Safety Manager	Alison DiPasca	(908) 647-8111 ext.258
Corporate Health & Safety Director	David Durst	(916) 638-3969 ext.258
Field Supervisor	Dan Baldwin	(908) 647-8111 ext.272
Site Safety Officer	Dan Baldwin	(908) 647-8111 ext.272
Alternate Site Safety Officer	Mike Shorter	(908) 647-8111 ext.281
Client Contact	Jim Kerr	(516) 674-1153
Site Contact	Jim Kerr	(516) 674-1153
Subcontractor	Aquifer Drilling and Testing	(718) 899-0490
Subcontractor	Bladykas & Panetta (Surveyor)	(516) 922-3031
Human Resources Manager	Sharon Clark	(916) 638-3696 ext.240

Site Location: *45a Sea Cliff Avenue, Glen Cove, NY - nearest cross-street is Greenvale-Glen Cove Rd. (Route 107)*

ATTACHMENT 1

SITE MAPS

FOR ADJOINING AREA SEE MAP NO 8



ATTACHMENT 2

HEALTH AND SAFETY FORMS

Add forms as appropriate for the task(s) performed.

X Utility Clearance, Underground Service Alert

X Utility Clearance, McLaren/Hart Utility Clearance Checklists

X Direct Reading Report Form

X Instrument Calibration Log

X Tailgate Safety Meeting Form

☐ PM/Field Supervisor Audit Form

X Other: M/H Health and Safety protocol #28
For Heat/Cold Stress procedures.

McLaren/Hart Health and Safety Policy

TITLE: UTILITY CLEARANCE		NO: HS 34
APPROVED: Russell B. Palchak	DATE: 4/3/95 SUPERSEDES:	PAGE: 1 OF 7

34.1 GENERAL POLICY STATEMENT

It is McLaren/Hart's policy to ensure that an adequate utility clearance is conducted prior to commencing subsurface field operations, such as drilling and excavating to minimize the potential for personal injury and property damage which could result from contact with buried utilities. The purpose of the utility clearance is to identify the locations of underground/aboveground utilities prior to subsurface activities including but not limited to excavation, drilling, Geoprobe®, coring, and/or soil vapor survey activities.

34.2 RESPONSIBILITIES

34.2.1 Project Manager

34.2.1.1 The Project Manager shall ensure that adequate time, resources, and equipment are available for conducting the utility clearance prior to initiating subsurface field activities.

34.2.1.2 The Project Manager shall ensure that employees who conduct utility clearances are adequately trained and knowledgeable of utility clearance procedures and detection equipment operation.

34.2.1.3 The Project Manager shall ensure implementation of utility clearance procedures including adherence to this policy, and should seek engineering technical assistance as needed.

34.2.2 Clearance Engineer

34.2.2.1 The Clearance Engineer shall conduct the utility clearance prior to initiation of subsurface field activities.

34.2.2.2 The Clearance Engineer shall document utility clearances and provide written documentation to the Project Manager.

34.2.3 Field Supervisor

34.2.3.1 The Field Supervisor shall verify the adequacy of the utility clearance as required under paragraph 34.4 of this policy prior to initiating subsurface field activities.

34.2.3.2 In the event of a utility strike, the Field Supervisor shall initiate emergency and notification procedures as detailed in the site specific Health and Safety Plan (HASP).

34.2.4 Health and Safety Manager

34.2.4.1 The Health and Safety Manager shall coordinate training and assist in the implementation of this procedure.

34.2.4.2 The Health and Safety Manager shall audit field activities and project files for compliance with this procedure.

34.3 UTILITY CLEARANCE PROCEDURES

34.3.1 General

34.3.1.1 The following utilities are usually present at most sites and shall always be assessed during the utility clearance process:

- Electrical (underground AND overhead)
- Natural gas
- Water
- Telephone
- Sanitary and storm sewers

34.3.1.2 Some sites may contain additional utilities which shall be checked on a site-by-site basis, such as:

- Cable TV/security systems
- Fiber optic cables
- Underground storage tanks and piping
- Chemical process piping
- Steam lines
- Compressed air
- Transportation pipelines

34.3.2 Pre-Utility Clearance Requirements

The following information must be submitted to the Clearance Engineer prior to scheduling the field utility clearance.

34.3.2.1 A McLaren/Hart Utility Clearance Request Form (HS 34-1) is initiated by the Project Manager prior to the start of work. All of the information requested on the form must be completed.

34.3.2.2 A site map, with the area requiring clearance, must be submitted with the Utility Clearance Request Form (HS 34-1). (In California, a copy of the specific Thomas Guide page, with the site location marked on it, must be included with the Utility Clearance Request Form (HS 34-1).

34.3.2.3 The Project Manager shall make arrangements with the client to obtain all available utility drawings for the subject site. If drawings are available, they must be included with the Utility Clearance Form and as an attachment to the HASP.

34.3.3 Locator Service Contractors

34.3.3.1 If a locator service contractor is used, then the Project Manager shall enter into a contract with the locator service which indemnifies McLaren/Hart in the event of a utility break resulting from inaccurate utility clearance information.

34.3.3.2 The Project Manager shall obtain from the locator service documentation which includes a site map with detail of utilities and landmarks and clearance forms. The documentation shall indicate that the utilities have been located, verified, and marked.

34.3.4 Required Steps for Conducting a Utility Clearance

The following steps shall be conducted in order to identify and mark the underground utilities which are present in the area of field operations. These procedures shall be conducted and documented prior to commencing subsurface operations, such as drilling, excavating, concrete coring and operating a Geoprobe®.

34.3.4.1 **Contact Utility Companies.** Contact the utility companies at least 48-72 hours (as required by local jurisdiction) prior to field activities so that the public utilities which enter the site can be identified and marked. Many states have a utility clearance service/broker available for coordinating clearance of public utilities; however, these brokers do not generally notify municipalities. Municipal storm/sanitary sewers and water lines must be handled independently. **Note that utility companies and clearance services will not identify buried utilities which are on the project site beyond the utility easement.**

Note: In California and bordering states, Underground Service Alert (USA) is a one-call regional notification program that supplies a toll free telephone number to anyone excavating so they can notify the appropriate USA participating members of their intent to dig. Participating members usually consist of all public utilities as well as some private (e.g. oil companies). Calling USA does not guarantee that all persons/companies with utilities in your specific site area have been notified. When you call USA, you must obtain a site-specific list of the parties that USA will be notifying. USA will provide a dig alert number for the project. This number is valid for 14 days from the initial notification. All work must be completed within the 14 days. If work extends beyond 14 days, USA must be re-notified, at which time a new dig alert number will be issued. Prior to calling USA, all areas

designated for clearance must be marked with white paint. **California State law requires that you call USA prior to digging/drilling.** Prior to calling USA, have the following information ready:

A. Thomas Guide page and grid number
B. Exact street address
C. Name of nearest cross street
D. Type of work
E. Additional comments like the number of borings, site access issues, etc.
F. Intended dig date.

34.3.4.2 The **Clearance Engineer** shall visually inspect the site for discovery and verification of the following:

A. Proper identification of the area to be cleared.
B. General inspection of the adjacent properties, noting any utilities that could possibly run under/over the area of concern.
C. General inspection of the area to be cleared and creation of a scaled site map detailing the locations of all site utilities with respect to the specific areas to be cleared.
D. Presence of :

- Manholes
- Drains
- Junction boxes
- Cable sheaths/piping extruding from buildings
- Poles that have one-way lines
- Recent disturbances of the ground surface
- Pipeline markers
- Pump stations
- Transformers and capacitors
- Cut-off valves

34.3.4.3 **Review of available site utility drawings:** Once the visual inspection of the site, adjacent sites, and the areas of concern has been completed, the Clearance Engineer shall review the available site utility drawings provided by the Project Manager. Additional site reconnaissance and interviews with site employees may be necessary to verify information contained on the maps. The expected locations of underground/aboveground utilities should be noted by the Clearance Engineer. The date of the drawings should be noted as well. If the documentation is fairly old, it may not provide accurate information. Site utility drawings should only be used as supplemental information, and can never be used as the sole source of information for the utility clearance.

Caution: Site drawings may not be accurate; however, they should

provide an indication of which utilities could be present.

34.3.4.4 **Utility Clearance Engineer** will use appropriate equipment to identify and mark utilities in area of investigation or subsurface activities. Refer to Health and Safety Policy 34, Appendix SOP 34, Radiodetection RD400PXL Pipe Locator.

34.3.4.5 **Client Review.** The locations of the proposed subsurface activities and the results of the utility clearance should be reviewed with the client/site contact (if available). Request the site contact to review and sign the Utility Request Form (HS 34-1).

34.3.5 Documentation

34.3.5.1 The **Utility Clearance Form (HS 34-1)** shall be completed to document that a utility clearance has been conducted prior to initiating subsurface intrusive operations. The Utility Clearance Form consists of the following three sections:

- Utility Clearance Request: This section describes background information on the site. This section is completed by the Project Manager/delegate.
- Utility Clearance Checklist: This section is used to identify the known or suspected utilities at the site. The left side is completed by the Project Manager. The Field Verification is initialed and dated by the Clearance Engineer upon locating and marking the presence of each utility.
- Review and Signature: The Clearance Engineer and the Project Manager/delegate sign the form when the clearance is completed. If the client/site engineer is available, they should sign the form after reviewing the proposed boring and/or excavation locations.

34.3.5.2 A **site sketch** shall be created by the Clearance Engineer for every utility clearance conducted. The map should be drawn to scale and include a legend. The map should include the locations of all known and suspected utility lines, as well as the locations designated for excavation or drilling. The site map and any notes should be attached to the Utility Clearance Request Form and delivered to the qualified Project Manager/delegate.

34.4 VERIFICATION OF UTILITY CLEARANCE

34.4.1 **Criteria for Determining if Verification is Required**

Verification by the Field Supervisor is required whenever there is any doubt about the accuracy of the utility clearance. The Clearance Engineer shall make a note on the Utility Clearance Request (HS 34-1) when verification is necessary. If any of the following criteria are present, then verification of the utility clearance is required.

34.4.1.1 If the utility companies or clearance services have not marked the utilities entering the site, then verification procedures are required.

34.4.1.2 If there are no site utility drawings available, then verification procedures are required.

34.4.1.3 If the site utility drawings are outdated or believed to be inaccurate, then verification procedures are required.

34.4.1.4 If the site cannot be inspected for evidence of underground utilities (i.e., because of snow-cover or other reason), then verification procedures are required.

34.4.1.5 If the site is congested with underground utilities, then verification procedures are required.

34.4.1.6 If there is any other reason to doubt the accuracy of the utility clearance, then verification procedures are required.

34.4.2 **Verification Procedures**

The following methods may be used as alternate methods to verify that utilities are not present in an area prior to conducting subsurface operations.

34.4.2.1 Hand-auger to a depth of 5-feet at boring locations.

34.4.2.2 Dig with a hand shovel to a depth of 5-feet prior to beginning an excavation.

34.4.2.3 Use a pipe locator, magnetometer, or ground-penetrating radar to search for buried metal utilities.

Note: Refer to the McLaren/Hart Standard Operating Procedure for Operation of the Radiodetection RD400PXL Pipe Locator.

34.5 **TRAINING REQUIREMENTS**

34.5.1 **General**

A Clearance Engineer shall be trained by a qualified instructor on at least two different sites prior to conducting utility clearances alone. Qualified Clearance Engineers must be able to read and understand utility and construction drawings. The Clearance Engineer must be familiar with and understand the limitations of the utility clearance equipment.

34.5.2 **Training Course Content**

Utility clearance training shall include, but not be limited to the following:

A. Contacting utility companies (Contacting USA in California)
B. Proper clearance procedure and equipment
C. Review of site maps
D. Description of utilities to be identified
E. Methods for detecting utilities
F. Use and limitations of the utility locating equipment.

34.5.3 **Instructor Qualifications**

The instructor must have demonstrated proficiency through experience in conducting utility clearances, using the utility locating equipment, and in instructing other McLaren/Hart personnel in proper utility clearance procedures. Instructors must be authorized to instruct by the Regional Manager and Health and Safety Manager.

34.6 RECORDKEEPING REQUIREMENTS

Prior to filing in the project file, a completed copy of the Utility Clearance Form (HS 34-1) and a copy of the Site Utility Sketch shall be distributed to the following for review and approval:

- Project Manager
- Field Supervisor
- Health and Safety Manager

McLaren Hart
ENVIRONMENTAL ENGINEERING CORPORATION

CONTACT SERVICE ALERT AGENCY BEFORE YOU DIG

Date:_____ Ticket No._____
Dig Alert Expiration Date:_____

UTILITY CLEARANCE REQUEST

Work/Clearance Previously at this location? Y ☐ N ☐

Today's Date:_____ Dig-In Start Date:_____

Project Name:_____ Task No.:_____

Exact Location of Utility Clearance (address, etc.):_____

_____

Facility Contact Name:_____ Telephone No.:( )_____

Facility Engineer Name:_____ Telephone No.:( )_____

Site Description (Include Operational Constraints/Hazards):_____

_____

What Facility Utility Drawings are Available?_____ If available, please provide.

CHECKLIST

(Completed by Project Manager/Delegate) | (Completed by Clearance Engineer)

1. Site/Facility Drawings Available?	Y ☐ N ☐	FIELD VERIFICATION
2. Checked with (Fac. Engr., Facility Contract, Other)?	Y ☐ N ☐	
3. Emergency/Safety Shut-Off Switches Located on Utility Plan?	Y ☐ N ☐	

IDENTIFY KNOWN UTILITY (CHECK EVERY SITE)			INITIAL/DATE	NOTES
A.	Water Lines	Y ☐ N ☐	A. _____	_____
B.	Sanitary/Industrial Sewer	Y ☐ N ☐	B. _____	_____
C.	Storm Drains	Y ☐ N ☐	C. _____	_____
	Electrical Lines or Vaults	Y ☐ N ☐	D. _____	_____
E.	Natural Gas	Y ☐ N ☐	E. _____	_____
F.	Liquid Fuel	Y ☐ N ☐	F. _____	_____
G.	Steam	Y ☐ N ☐	G. _____	_____
H.	Compressor Air	Y ☐ N ☐	H. _____	_____
I.	Telephone/Cable	Y ☐ N ☐	I. _____	_____
J.	Overhead Lines or Pipes	Y ☐ N ☐	J. _____	_____
K.	Others (List)	Y ☐ N ☐	K. _____	_____

Clearance Engineer:_____
(Name - Print) (Signature) (Date)

McLaren/Hart Review:_____ (Proj. Mgr/Delegate) (Name - Print) (Signature) (Date)

Client Review:_____
(Name - Print) (Signature) (Date)

Attachments: Must be included!
Site Safety Plan (By P.M.)
Site Sketch (By Clearance Engineer)
Others (List):_____

Distribution:
Project Manager_____
Field Supervisor_____
Project File_____
Health and Safety Manager

UTILITY CLEARANCE CHECK

CLIENT:	JOB #:	
SITE NAME AND LOCATION:	PROJECT START DATE:	CLEARANCE REQUEST DATE:
M/H PROJECT MANAGER:	DRILLING/CONSTRUCTION SUPERVISOR:	
USA CONTACT DATE: (1-800-642-2444)	USA TICKET NUMBER:	

FACILITY DRAWINGS INSPECTION (INITIALS & DATE)	FIELD VERIFICATION (INITIALS & DATE)
WATER MAIN:	WATER MAIN:
SANITARY:	SANITARY:
STORM #:	STORM:
TELEPHONE:	TELEPHONE:
ELECTRIC:	ELECTRIC:
GAS LINES:	GAS LINES:
STEAM LINES:	STEAM LINES:
LIQUID FUEL:	LIQUID FUEL:
COMPRESSED AIR:	COMPRESSED AIR:
OVERHEAD LINES:	OVERHEAD LINES:

DATE PERFORMED:	FACILITY CONTACT:
CLEARANCE ENGINEER:	SUPERVISING ENGINEER VERIFICATION:
NOTES:	

J437.frm Authority for Utility Clearance on-site is provided by the client, whereas off-site clearance is provided by Public Utility Companies. Clearance shall be verified from available site drawings including retrofitting information.

DIRECT READING REPORT

CLIENT:	JOB #:	PM:	DATE:
SITE NAME AND LOCATION:	WEATHER CONDITIONS (WIND SPEED, DIRECTION, TEMP., HUMIDITY):		
M/H EMPLOYEE:	EMPLOYEE TITLE:		

DIRECT READING DATA

LOCATION	TASK DESCRIPTION	TIME	INSTRUMENT TYPE	SUBSTANCE/AGENT	CONCENTRATION	SOURCE:(S)

COMMENTS:

McLaren Hart
ENVIRONMENTAL ENGINEERING CORPORATION

INSTRUMENT CALIBRATION LOG

Client Name and Site:	Project Manager:	Task Number:

Calibration Event:

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Comments:

NOTE: Return to HSM Upon Completion of Site Work.

TAILGATE SAFETY MEETING

DATE: _____ TIME: _____ JOB #: _____

CLIENT: _____ PROJECT MGR.: _____

SITE LOCATION: _____

TYPE OF WORK: _____

_____

_____

SAFETY TOPICS PRESENTED

PROTECTIVE CLOTHING/EQUIPMENT: _____

_____

CHEMICAL HAZARDS: _____

ACTION LEVELS: _____

PHYSICAL HAZARDS: _____

EMERGENCY PROCEDURES: _____

_____

HOSPITAL/CLINIC: _____

PHONE NO.: _____

SPECIAL EQUIPMENT: _____

OTHER: _____

ATTENDEES

PRINT NAME/COMPANY NAME	SIGNATURE
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

MEETING CONDUCTED BY: _____ SUPERVISOR: _____

J431.FRM

TITLE: HEAT AND COLD STRESS		NO: HS 28
APPROVED: Russell B. Palchak	DATE: 06-01-93 SUPERSEDES: NONE	PAGE: 1 OF 8

28.1 GENERAL POLICY STATEMENT

It is the policy of McLaren/Hart to establish guidelines for work in environments where exposure to heat and cold stress are encountered and to provide guidance to evaluate and control these stressors.

28.2 HEAT STRESS PROCEDURES

28.2.1 The effects of heat stress is dependent on a number of factors. These factors include the source of heat, whether it be radiant heat from an industrial process, or ambient temperature with or without sun loads, the type of work performed, duration of work activity, relative humidity, age and physical condition of the worker and the type of clothing worn (e.g., impervious clothing vs. standard work attire - Level D).

28.2.2 Given the variety of factors which can result in the development of a heat- related disorder, the following guidelines can be used to implement a work/rest regime based on the Permissible Heat Exposure Threshold Limit Value (TLV) published by the American Conference of Governmental Industrial Hygienists (ACGIH). The work/rest regime is based on exposure to an acclimatized fully-clothed worker wearing breathable (cotton) attire. The actual rest periods and frequency will be dependent on the worker's level of acclimatization, the type of heat stress environment encountered (e.g., radiant vs. solar), use of protective clothing and type of work performed.

28.2.3 The Permissible Heat Exposure Threshold Limit Values are presented in Table 28-1 as a guide to monitor and control worker exposure for heat stress environments. The Heat Stress TLV is based on the following Table. Heat stress measurement using the Wet Bulb Globe Temperature Index on which the TLV is based is presented in Section 28.3.

TABLE 28-1

PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES (MEASUREMENTS ARE PRESENT IN (°F) WBGT)

WORK - REST REGIMEN	WORK LOAD		
	LIGHT	MODERATE	HEAVY
Continuous Work	86	80	77
75% Work - 25% Rest, each hour	87	82	78
50% Work - 50% Rest, each hour	89	85	82
25% Work - 75% Rest, each hour	90	88	86

28.2.3.1 Definitions of work-load categories.

A. Light Work Load - sitting, standing to control machines, performing light hand and arm work.

B. Moderate Work Load - walking about with moderate lifting and pushing.

C. Heavy Work Load - pick and shovel work.

28.3 HEAT STRESS MEASUREMENT

The method of heat stress measurement required to assess the permissible heat exposure TLV is by the Wet Bulb Globe Temperature Index (WBGT). This technique is the most practical method to evaluate environmental factors which most nearly correlate with deep body temperature and other physiological responses to heat.

28.3.1 WBGT measurements can be made with a Reuter-Stokes, or equivalent, direct reading Heat Stress Monitor. This instrument measures dry bulb temperature, natural aspirated wet bulb temperature, and Vernon globe equivalent temperature and electronically calculates the Wet Bulb Globe Temperature Index (formula presented in Section 28.3.2). An alternate method of measuring the WBGT Index using dry, natural wet bulb and globe temperature is presented in the ACGIH Threshold Limit Values for Chemical Substances and Physical Agents under "Heat Stress: Evaluation and Control."

28.3.2 WBGT values are calculated using the following formula:

A. Outdoors with solar load:
WBGT = 0.7 NWB + 0.2 GT + 0.1 DB

B. Indoors or Outdoors with no solar load:
WBGT = 0.7 NWB + 0.3 GT

WBGT = Wet Bulb Globe Temperature Index
NWB = Natural Wet Bulb Temperature
DB = Dry Bulb Temperature
GT = Globe Temperature

28.4 CLASSIFICATION AND PREVENTION OF HEAT ILLNESSES

28.4.1 <u>Heatstroke</u>

28.4.1.1 *Condition:* (a) hot dry skin: red, mottled, or cyanotic; (b) high and rising core temperature, 105°C and over; (c) brain disorders: mental confusion, loss of consciousness, convulsions, or coma, as core temperature continues to rise. Fatal if treatment delayed.

28.4.1.2 *Predisposing Factors:* (a) Sustained exertion in heat by unacclimatized workers; (b) obesity and lack of physical fitness; (c) recent alcohol intake; (d)

dehydration; (e) individual susceptibility; (f) chronic cardiovascular disease in the elderly.

28.4.1.3 *Corrective Actions:* Immediate and rapid cooling by immersion in chilled water with massage, or by wrapping in wet sheet with vigorous fanning with cool dry air. Avoid overcooling. Treat shock if present. Seek medical attention.

28.4.1.4 *Prevention:* Medical screening of workers. Selection based on health and physical fitness. Acclimatization for 8 to 14 days by graded work and heat exposure. Monitoring workers during sustained work in severe heat environments.

28.4.2 **Heat Syncope**

28.4.2.1 *Clinical Features:* Fainting while standing and immobile in heat.

28.4.2.2 *Predisposing Factors:* Lack of acclimatization.

28.4.2.3 *Treatment:* Remove to cooler area. Seek medical attention.

28.4.2.4 *Prevention:* Acclimatization.

28.4.3 **Heat Exhaustion**

28.4.3.1 *Clinical Features:* (a) Fatigue, nausea, headache, giddiness; (b) skin clammy and moist, complexion pale, muddy, or with hectic flush; (c) may faint on standing, with rapid pulse and low blood pressure.

28.4.3.2 *Predisposing Factors:* (1) Sustained exertion in heat, (2) lack of acclimatization, (3) failure to replace water and/or salt lost in sweat.

28.4.3.3 *Treatment:* Remove to cooler environment. Provide salted fluids such as Gatorade or equivalent. Seek medical attention.

28.4.3.4 *Prevention:* Acclimatize workers using a breaking-in schedule for 1 or 2 weeks. Supplement dietary salt only during acclimatization. Ample drinking water, gatorade or equivalent, to be available at all times and to taken frequently during work day.

28.4.4 **Heat Cramps**

28.4.4.1 *Clinical Features:* Painful spasms of muscles used during work (arms, legs, or abdominal). Onset can occur during or after work hours.

28.4.4.2 *Predisposing Factors*: (1) Heavy sweating during hot work, (2) drinking large volumes of water without replacing salt loss.

28.4.4.3 *Treatment*: Drinking liquids with salt supplement such as Gatorade or equivalent. Seek medical attention.

28.4.4.4 *Prevention*: Adequate salt intake with meals. In unacclimatized men, provide salted (0.1 percent) drinking water.

28.4.5 Heat Rash

28.4.5.1 *Clinical Features*: Profuse tiny raised red blisters on affected areas. Pricking sensations during heat exposure.

28.4.5.2 *Predisposing Factors*: Unrelieved exposure to humid heat with skin continuously wet with unevaporated sweat.

28.4.5.3 *Treatment*: Seek medical attention.

28.4.5.4 *Prevention*: Cooled resting and sleeping quarters to allow skin to dry between heat exposures.

28.5 TRAINING REQUIREMENTS

Train staff to recognize heat stress conditions and the methods necessary to prevent and treat heat stress.

28.5.1 Proper clothing and PPE requirements.

28.5.2 Recognition, prevention and first aid treatment for heat stress.

28.5.3 Suggested work/rest regimes and fluid intake.

28.5.4 Safe work practices in heat stress environments.

28.6 HEAT STRESS CONTROL

28.6.1 Working in a hot environment requires that employees take precautions and provide adequate protection to prevent heat stress. The following are guidelines to recognize and prevent heat stress conditions.

28.6.1.1 Make staff assignments for work involving physical labor and/or involving heat stress, based on physical fitness level of available labor pool. Employees newly exposed to heat should begin their work level at 50% of suggested work schedule and increase level by 10% per day to allow for acclimatization.

28.6.1.2 Supervision and "buddy system" should be used to carefully observe workers in heat stress environments

to evaluate each individual's susceptibility to heat stress. Any behavior exhibiting signs of heat stress should be promptly investigated.

28.6.1.3 Initiate a modified work/rest regimen when Ambient Temperatures and protective clothing create a potential heat stress hazard. If ambient temperatures exceed 75°F, the following work/rest regimen is recommended (guidelines assume light to moderate work):

Temperature	Work Period	Rest Period
75 - 80°F	90 Minutes	15 Minutes
80 - 85°F	60 Minutes	15 Minutes
85 - 90°F	45 Minutes	15 Minutes
90 - 95°F	30 Minutes	15 Minutes

28.6.1.4 Rest periods should be taken in a shaded area if available, as this will considerably reduce the affects of heat stress.

A. When temperatures reach above 75°F, the site supervisor or SSO will monitor the heat rate of each working employee every 90 minutes. When temperatures are above 80°F, the heart rate will be monitored every 60 minutes and above 90°F, every 30 minutes.

B. If individuals' heart rates are 110 beats per minute or less at the end of the rest period, they can resume work. If greater than 110 beats per minutes, individuals will rest another 10 minutes. If the heart rate is reduced below 110 at the end of 10 minutes, the employee may return to work and the next work period should be reduced by 33 percent (e.g., at 75°F to 80°F, the work period should be reduced to 60 minutes; at 80°F to 85°F, reduced to 45 minutes; at 85°F to 90°F, reduced to 30 minutes; and at greater than 90°F, reduce to 20 minutes.

C. If at the end of the 10 minute rest period, the heart rate is still above 110, the individual must leave the area through proper decontamination procedures and rest in a cool place outside the exclusion zone for one hour.

D. The rest periods will be modified as the employees become acclimatize to heat.

28.6.1.5 Provide plenty of water and/or other drink which replenishes electrolytes (eg.: Gatorade) at each rest period. Generally, salt intake is sufficient from dietary intake, however, the best way to compensate

for excessive sweat loss is to drink replacement fluids which contain electrolytes, including salt, such as Gatorade, or equivalent. Alternately, a little extra salt in the diet can accomplish the same thing. Salt tablets should not be used. Workers on a low sodium diet should consult with their physician prior to engaging in work in heat stress environments.

28.6.1.6 Protective clothing inhibits the transfer of heat between the body and the surrounding environment. This can increase the onset of heat stress symptoms. The following consideration should be evaluated when protective clothing is worn in heat stress environments.

A. More frequent rest breaks;

B. Worker rotation to provide frequent breaks in cool areas;

C. Wear ice vests or vortex tubes, if practical; and

D. Schedule changes to accommodate work at night or early morning hours.

28.7 COLD STRESS PROCEDURE

28.7.1 Cold stress can present a significant hazard to workers and can result in hypothermia. Hypothermia is a potentially life threatening condition which results in a drop in the body's core temperature. At lower body temperatures the body can react by a reduction in mental awareness, reduced rational decision-making, loss of consciousness and death. Several factors incorporate the harmful effects of cold: wet clothing, smoking, drinking alcoholic beverages, fatigue, emotional stress and certain diseases and medications. Workers exposed to severe cold can suffer hypothermia or frostbite.

28.8 CLASSIFICATION AND PREVENTION OF COLD ILLNESSES

28.8.1 The following are the most prevalent and significant cold stress conditions:

Hypothermia: The signs and symptoms of hypothermia include shivering, dizziness, numbness, confusion, weakness, impaired judgement, impaired vision and drowsiness. The stages of hypothermia are: shivering, apathy, loss of consciousness, decreasing pulse rate and breathing rate and death.

First aid measures for hypothermia are: Call Emergency Medical Services and move the victim to a warm area and into dry clothing.

Frostbite: Frostbite is the most common injury caused by cold. It happens when ice crystals form in body tissues, usually the nose, ears, chin, cheeks, fingers, or toes. This restricts blood

flow to the injured parts. The effect is worse if the frostbitten parts are thawed and then refrozen.

Signs and symptoms of frostbite may be that the skin is slightly flushed. The skin color then changes to white and then grayish blue. Pain is sometimes felt early but later goes away. The frostbitten parts feel very cold and numb, and the victim may not be aware of the injury. In severe cases, frostbite may result in blisters or gangrene.

First aid measures for frostbite are: Move the victim to a warm area and place the frozen parts in warm water (100-105°F). Handle them gently and do not rub or massage them. Loosely bandage the injured parts. Seek prompt medical attention.

28.9 TRAINING REQUIREMENTS

28.9.1 Worker training should be provided to discuss the hazards of cold stress environments and to review preventative work practices. The training should include:

28.9.1.1 Proper clothing and PPE requirements.

28.9.1.2 Recognition, prevention and first aid treatment of frostbite and hypothermia. Discussion should include rewarming procedures.

28.9.1.3 Suggested work/rest regimes and eating/drinking habits.

28.9.1.4 Safe work practices in cold stress environments.

28.10 RECOGNITION CONTROL AND PREVENTION

28.10.1 The first signs of cold stress are pain in the extremities. Severe shivering may result as body temperature drops.

28.10.1.1 Protection from cold stress must be considered in addition to provisions for personal protective equipment.

28.10.1.2 Provisions for insulating dry clothing must be provided.

28.10.1.3 Wind chill can substantially reduce the cooling rate experienced by personnel. Prevention of excessive cooling exacerbated by windchill condition requires increased insulation value of the protective work clothing.

28.10.1.4 The effects of wind chill and temperature can be referenced in the ACGIH TLVs for Chemical Substances and Physical Agents.

28.10.2 The following work practices should be followed to minimize the effects of cold stress conditions:

28.10.2.1 Wear adequate layers of insulating dry clothing. Keep a change of dry clothes available in case clothing becomes wet.

28.10.2.2 Use the buddy system to look for signs of cold stress.

28.10.2.3 If appropriate, use wind shields to reduce the effects of wind.

28.10.2.4 Heated warming shelters should be available when the Equivalent Chill Temperature (ECT) is less than 20°F (-7°C). The CET is used for the purpose of assessing the combined effects of wind and low air temperatures on exposed skin.

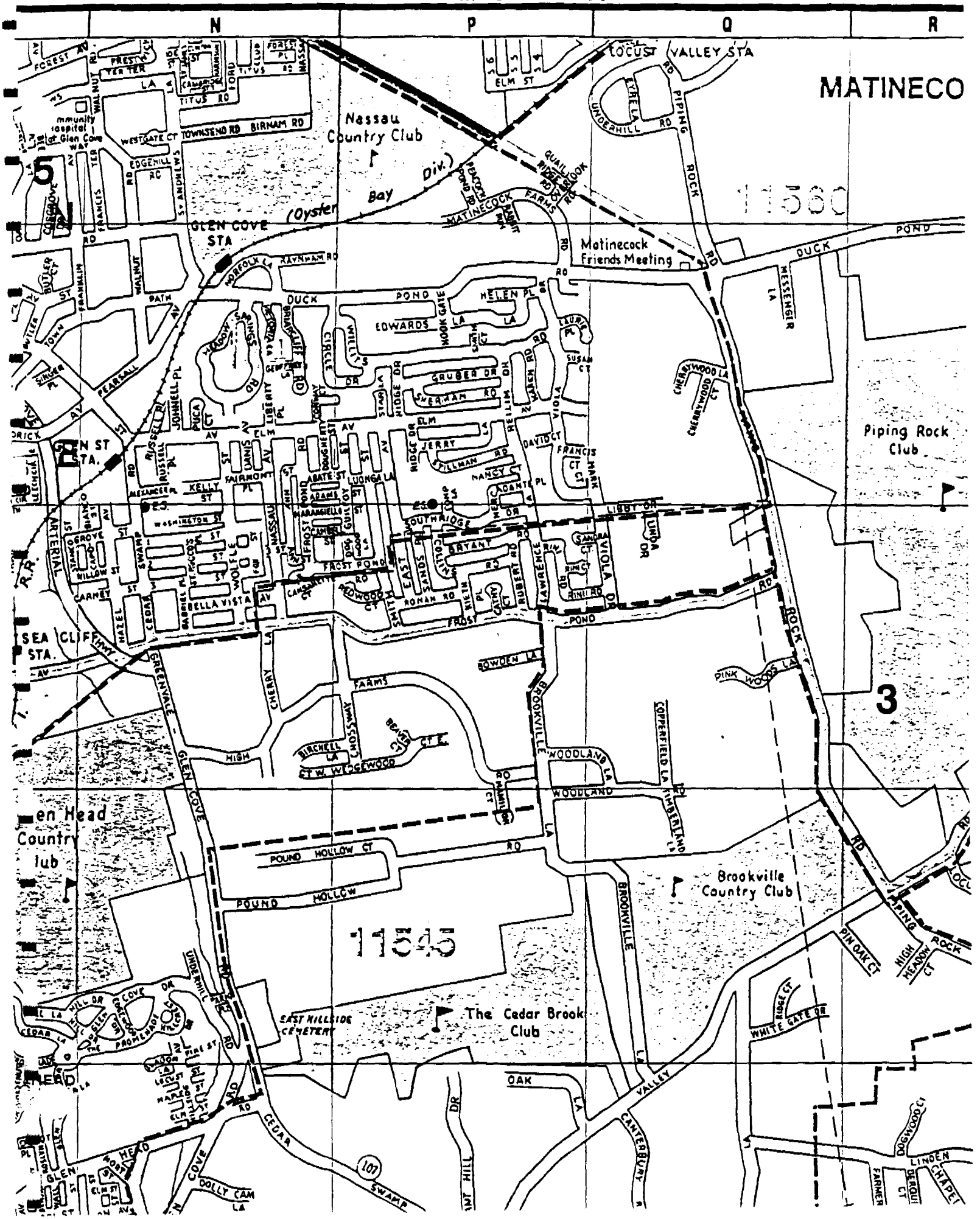
28.10.2.5 To prevent dehydration which can increase the susceptibility of workers to cold injuries, warm sweet drinks and soups should be provided. Coffee intake should be limited due to its diuretic effects.

28.10.2.6 Should a work-warming regime be necessary, the ACGIH TLVs should be consulted.

ATTACHMENT 3

HOSPITAL ROUTE MAP

FOR ADJOINING AREA SEE MAP NO 8



HEALTH AND SAFETY PLAN

CLIENT: PHOTOCIRCUITS, INC.

SITE NAME: PHOTOCIRCUITS, INC.

SITE ADDRESS: 31 Sea Cliff Ave, Glen Cove, NY 11542

PROJECT NUMBER: 120802678

DATE PREPARED: August 1, 1996

DATE(S) REVISED: October 8, 1996

DATE EXPIRES: January 8, 1997

HEALTH AND SAFETY PLAN APPROVALS

PROJECT MANAGER — DATE
Charles Schneider

FIELD SUPERVISOR/
SITE SAFETY OFFICER — DATE
Dan Baldwin

HEALTH & SAFETY MANAGER — DATE
Alison DiPasca

Acknowledgements:
CONTRACTOR — DATE

TABLE OF CONTENTS

ATTACHMENTS

DO NOT INCLUDE THIS FORM IN HEALTH & SAFETY PLAN
FOR INTERNAL TRACKING PURPOSES ONLY

To be filled out by Administration:

HEALTH & SAFETY PLAN DOCUMENT TRACKING FORM

1st Notice Date: _____
2nd Notice Date: _____

HASP JOB#: HASP DATED:

JOB NAME: FILE LOCATION:

CC: _____

CLIENT NAME: OFFICE OF ORIGINATION:

PROJECT MANAGER: FIELD SUPERVISOR:

RETURN THE MISSING DOCUMENTS TO THE HEALTH & SAFETY ADMINISTRATOR BY: _____

(✓) if Needed*	DOCUMENTS REQUIRED	Document Missing (✓)	Date Completed:
	Signed Cover Page/Acknowledgement Sheet, *including contractor(s) signatures*		
	Section 1.4; Additional Authorized Site Personnel: Training Verification, *including Project Manager/Field Supervisor Initials*		
	Utility Clearance; Underground Service Alert, *including signatures & distribution*		
	Utility Clearance; McLaren/Hart Utility Clearance Checklist, *including signatures & distribution*		
	Direct Reading Report Form, *including signatures & distribution*		
	Instrument Calibration Log, *including signatures & distribution*		
	Tailgate Safety Meeting Form, *including signatures & distribution*		
	PM/Field Supervisor Audit Form, *including signatures & distribution*		
	Other:		
	Other:		

* To be filled out by the Health & Safety Manager during completion and/or revision of the HASP

1.0 GENERAL INFORMATION

1.1 Introduction

This Health & Safety Plan (HASP) addresses those activities associated with the scope of work stated in the HASP and will be implemented by the Site Safety Officer (SSO) during site work. Compliance with this HASP is required of all persons and third parties who enter this site. Assistance in implementing this plan can be obtained from the Site Safety Officer and Project Manager, and/or the Health and Safety Manager (HSM). The content of this HASP may change or undergo revision based upon additional information made available to health and safety (H&S) personnel, monitoring results or changes in the scope of work. Any changes proposed must be reviewed by H&S staff and are subject to approval by the HSM and Project Manager.

This site-specific Health & Safety Plan has been prepared for the use of McLaren/Hart and its employees and supplements the Health and Safety training that each McLaren/Hart employee receives. The health and safety guidelines in this Plan were prepared specifically for this site. Due to the potentially hazardous nature of the site covered by this Plan and the activity occurring on the site, it is not possible to discover, evaluate, and provide protection for all possible hazards which may be encountered. This plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if these conditions change.

This Plan is not intended to be used by any other contractor or personnel of any such contractor. This Plan may not address the specific health and safety needs or requirements of any other such contractor and its employees. Neither this Plan nor any part of it should be used on any other site.

McLaren/Hart expressly disclaims any and all guarantees or warranties, express or implied, that the Plan will meet the needs or requirements of any such contractor or its employees. McLaren/Hart, therefore, cannot and does not assume any liability by the use or reuse of the Plan by any client, contractor or their employees or agents. Any reliance on the Plan will be at the sole risk and liability of such party.

1.2 Executive Summary

McLaren/Hart Environmental Engineering Corporation has been contracted to perform RI and IRM activities related to soil and groundwater issues at the Photocircuits Site. Section 2.0 Project Information details the scope of work to be carried out during site activities.

1.3 Acknowledgement

I acknowledge having reviewed this Health & Safety Plan, understand its contents and agree to abide by it. Additionally, I am current in the training and medical surveillance requirements specified in 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response.

(Please Print Clearly)

NAME/SIGNATURES	DATE	COMPANY AFFILIATION
1. Dan Baldwin/		McLaren/Hart
2. Mike Shorter/		McLaren/Hart
3. Dudley Warner/		McLaren/Hart
4. Jennifer Zarnowsky/		McLaren/Hart
5.		
6.		
7.		
8.		
9.		
10.		

2.0 PROJECT INFORMATION

2.1 Site Description

The Photocircuits Site is located in Glen Cove, New York in a mixed residential and light industrial area. The company manufactures circuit boards at this facility. The site is currently active and has been used for industrial activities.

See Attachment 1 for Site Map.

2.2 Background Information

A previous environmental investigation, in July 1993 by the Nassau County Department of Public Works,performed at the site indicates the presence of halogenated and nonhalogenated volatile organic compounds (VOCs) in shallow and deep zones of the Upper Glacial Aquifer. Additionally, halogenated VOCs were detected in soil samples collected from the unsaturated zone in on-site borings. McLaren/hart has conducted soil and groundwater sampling at the site to further characterize issues and to develop a remedial strategy for the site.

2.3 Purpose of Site Work

McLaren/Hart will be on-site conducting field activities for the remedial investigation and IRM implementation, as negotiated with NYSDEC and consistent with the approved work plans.

2.4 Scope of Work

1. Soil and groundwater sampling using Geoprobe equipment.
2. Well installation/development/surveying.
3. Groundwater sampling from existing monitoring wells.
4. Aquifer testing (slug-testing).
5. Installation of Air Sparging and Soil-Vapor Extraction wsells and treatment trailer.
6. AS/SVE Pilot testing.

2.5 Utility Clearance

A utility clearance will be completed as necessary prior to site activities.

3.0 HEALTH AND SAFETY RISK ANALYSIS

3.1 Chemical Hazards

TABLE 3-1
KNOWN AND/OR PROBABLE CONTAMINANTS*

CONTAMINANT	SOURCE OF CONTAMINATION	SOURCE OF SAMPLE DATA (soil/water/air)	RANGE OF CONCENTRATION
trichloroethene (TCE)	Solvent tank farm	soil and groundwater	ND-96 ppm; ND-79 ppb
1,1-dichloroethene (1,1-DCE)	Solvent tank farm	soil and groundwater	ND-23 ppm; ND-190 ppb
1,1,1-trichloroethane (1,1,1-TCA)	Solvent tank farm	soil and groundwater	ND-120 ppm; ND-2100 ppb
1,1-dichloroethane	Solvent tank farm	groundwater	ND-3400 ppb
cis-1,3-dichloropropene	Solvent tank farm	soil	ND-1.4 ppm
1,2-dichloroethene, total (1,2-DCE)	Solvent tank farm	groundwater	ND-86 ppb
methylene chloride	Solvent tank farm	soil	ND-51 ppb
tetrachloroethene (PCE)	Solvent tank farm	soil and groundwater	ND-51 ppm; ND-66 ppb
toluene	UST area	soil	ND-5.8 ppm

*Source of Data: 1993 report from Nassau County Department of Public Works.

3.2 Non-chemical Hazards

Non-chemical hazards are associated with:

1. Cold stress
2. Slip, trip, fall
3. Automobile traffic
4. Biological hazards - insects, ticks
5. Utilities
6. Noise (Geoprob, drill rig)
7. Equipment handling
8. Electrical
9. Machinery

TABLE 3-2
ASSESSMENT OF CHEMICAL HAZARDS
(Central/Eastern Regions)

Task No.	Chemical Name[a] (or class)	PEL/TLV[a]	Other Pertinent Limits[a] (Specify)	Warning Properties - Odor Threshold[a]	Potential Exposure Pathways	Acute Health Effects	Chronic Health Effects
1-6	1,1-dichloroethylene (vinylidene chloride; 1,1-dichloroethene; or DCE)	1/5 ppm	TLV-STEL = 20 ppm	Sweet chloroform odor - 515 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression	Possible liver and kidney damage; suspected human carcinogen
1-6	Tetrachloroethene (perchloroethylene; tetrachloroethylene; or PCE)	25/25 ppm	No ceiling TLV-STEL = 100 ppm	Chlorinated solvent odor - 5 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression; skin burns	Liver and kidney damage; peripheral neuropathy; animal carcinogen.
1-6	Toluene	200/50 ppm	STEL = 150 ppm No ceiling [SKIN]	Rubbery, mothball odor - 2 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression	Possible liver, kidney and CNS damage; dermatitis.
1-6	1,1,1-Trichloroethane (methyl chloroform; or TCA)	10/10 ppm [skin]	STEL = 450 ppm C = 800 ppm NIOSH C = 350 ppm	Chloroform odor - 102 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression; cardiac arrhythmia.	Possible liver, CNS and CVS damage; dermatitis.
1-6	1,1-Dichloroethane (DCA)	100/10 ppm	N/A	Chloroform odor - 110 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression	Possible liver and kidney damage; acute effect.
1-6	1,2-Dichloroethlene (acetylene dichloride)	200/200 ppm	None cited	Bitter pungent odor - 0.1 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression	Possible CNS damage
1-6	Methylene chloride (dichloromethane)	500 ppm/50 ppm	OSHA STEL = 1,000 ppm	Sweet odor - 156 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression	Possible liver and kidney damage; dermatitis; suspected human carcinogen
1-6	Cis 1,3-Dichloropropene	1 ppm/1 ppm[skin]	None cited	Chloroform odor (garlic or skunk-like;) - 1-3 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irratation; CNS depression	Possible liver and kidney damage; dermatitis; suspected human carcinogen

TABLE 3-2
ASSESSMENT OF CHEMICAL HAZARDS
(Central/Eastern Regions)

Task No.	Chemical Name[a] (or class)	PEL/TLV[a]	Other Pertinent Limits[a] (Specify)	Warning Properties - Odor Threshold[a]	Potential Exposure Pathways	Acute Health Effects	Chronic Health Effects
1-6	Trichloroethene (TCE)	100 ppm/50 ppm	STEL = 200 ppm No ceiling TLV-STEL = 100 ppm NIOSH Rel = 25 ppm	Sweet, solventy odor - 0.2 ppm	Inhalation; Dermal; Ingestion	Eye, skin and respiratory irritation; CNS depression; headache; tremors; nausea; cardiac arrhythmia	Possible liver, kidney, cardiovascular, GI and CNS injury; suspected human carcinogen.

[a]PEL = OSHA Permissible Exposure Limit; represents the maximum allowable 8-hr. time weighted average (TWA) exposure concentration.
TLV = ACGIH Threshold Limit Value; represents the maximum recommended 8-hr. TWA exposure concentration.
STEL = OSHA Short-term Exposure Limit; represents the maximum allowable 15 minute TWA exposure concentration.
TLV-STEL = ACGIH Short-term Exposure Limit; represents the maximum recommended 15 minute TWA exposure concentration.
C = OSHA Ceiling Limit; represents the maximum exposure concentration above which an employee shall not be exposed during any period without respiratory protection.
IDLH = Immediately Dangerous to Life and Health; represents the concentration at which one could be exposed for 30 minutes without experiencing escape-impairing or irreversible health effects.
( ) = ACGIH TLV Intended Change
[SKIN] = Indicates a significant contribution of the total exposure by the cutaneous route.
Warning = Represents the lowest concentration detectable in a given population. However, detection varies greatly with the individual.
REL = NIOSH Recommended Exposure Limit, based on a 10-hour TWA exposure

4.0 HEALTH AND SAFETY FIELD IMPLEMENTATION

4.1 Personal Protective Equipment (PPE) Requirements

PPE may be upgraded or downgraded by the site industrial hygienist, HSM, or qualified Site Safety Officer based upon site conditions and air monitoring results.

See Table 4-2 for PPE requirements.

4.2 Monitoring Equipment Requirements

Monitoring is conducted by the Site Safety Officer or designee. Conduct contaminant source monitoring initially. Complete breathing zone monitoring if source concentrations are near or above contaminant action level concentrations. Log direct reading monitoring as specified in the Table 4-1 Monitoring Protocol and record results on Direct Reading Report form. Direct reading instrumentation shall be calibrated in accordance with manufacturing requirements, e.g., at least daily, and results of the calibration shall be documented on the Instrument Calibration Log (see to Attachment 2).

TABLE 4-1
MONITORING PROTOCOLS AND CONTAMINANT ACTION LEVELS

CONTAMINANT/ ATMOSPHERIC CONDITION	MONITORING EQUIPMENT	MONITORING PROTOCOL	BREATHING ZONE* ACTION LEVEL CONCENTRATIONS	
			MONITORED LEVEL** FOR MANDATORY RESPIRATOR USE above background	MONITORED LEVEL*** FOR MANDATORY WORK STOPPAGES
Total VOCs	FID (OVA)	Initial /disgression of SSO +	5 ppm	25 ppm above background

* Monitoring performed at operator's breathing zone. Monitor at the source first; if the source concentration is near or above the action level concentration, monitor in the breathing zone.

** Monitored levels will require the use of an approved respiratory protection system specified in Table 4-2.

*** Call the Project Manager and Health and Safety Manager for consultation.

\+ Establish background upon initiation of site work. At the disgression of the Site Safety Officer or designee, the decision to proceed or stop activities will be determined.

TABLE 4-2
PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIREMENTS

JOB TASKS	PPE							LEVEL OF PROTECTION	LEVEL IF UPGRADE	ADDITIONAL PPE FOR UPGRADE	MONITORING EQUIPMENT
	SUIT	GLOVES	FEET	HEAD	EYE	EAR	RESPIRATOR				
1-6	Std	Work/L	Steel	HH	Glass	Plugs	N/A	D	C	Full or half APR w/OV/AG HEPA, Tyvek, Steel/booties Neo	FID

Personal Protective Equipment (PPE):

SUIT:

Std	=	Standard work clothes
Tyvek	=	Uncoated Tyvek disposable coverall
PE Tyvek	=	Polyethylene-coated Tyvek
Chemrel	=	Chemrel coverall with hood
Saranex	=	Saranex-laminated Tyvek
Lt PVC	=	Light wt. PVC rain gear
Med PVC	=	Medium wt. PVC suit
Hvy PVC	=	Heavy wt. PVC coverall with hood
Road	=	Roadwork vest
Nomex	=	Nomex coveralls

GLOVES:

Work	=	Work gloves (canvas, leather)
Neo	=	Neoprene gloves
PVC	=	PVC gloves
N	=	Nitrile gloves
V	=	Vinyl gloves
L	=	Latex gloves

Personal Protective Equipment (PPE):

FEET:

Steel	=	Steel-toe boots
Steel +	=	Steel-toe Neoprene or PVC boots
Booties	=	PVC or Latex booties

HEAD:

HH	=	Hard hat

EYE:

Glass	=	Safety glasses
Goggle	=	Goggles
Shield	=	Face shield

EAR:

Plugs	=	Earplugs
Muff	=	Ear muffs

Personal Protective Equipment (PPE):

RESPIRATOR:

APR	=	Air-purifying respirator
Full APR	=	Full face APR
Half APR	=	Half face APR
PAPR	=	Powered Air-purifying Respirator
SAR	=	Airline supplied air respirator
SCBA	=	Self contained breathing apparatus
Escape	=	Escape SCBA
OV	=	Organic Vapor cartridge
AG	=	Acid gas cartridge
OV/AG	=	Organic vapor/Acid gas cartridge
AM	=	Ammonia cartridge
D/M	=	Dust/mist pre-filter and cover for cartridge
HEPA	=	High efficiency particulate air filter cartridge

OTHER:

*	=	Use if contact with wet soil or water
**	=	Optional use except if specific hazard present

4.3 Decontamination Procedures

Depending on the specific job task, decontamination may include personnel themselves, sampling equipment, and/or heavy equipment. The specified level of PPE (A,B,C, or D) for a task does not in itself define the extent of personel protection or equipment decontamination. For instance, Level C without dermal hazards will require less decontamination than Level C with dermal hazards. And, heavy equipment will always require decontamination to prevent cross-contamination of samples and/or facilities. The following sections summarize general decontamination protocols.

4.3.1 Personnel

Use steps and procedures outlined below as guidelines for personnel decontamination:

- Brush loose soil from body;
- Boot removal (where appropriate);
- Suit removal (where appropriate);
- Respirator/hard hat removal (where appropriate);
- Respirator wash (where appropriate);
- Glove removal;
- Field wash hands

4.3.2 Samples and Sampling Equipment

The same decontamination line will be used for sampling equipment decon as is used for personnel decon. At a minimum the following is performed:

- Refer to work plan for specific equipment decontaminator policies and procedures;
- Sampling equipment will be brushed clean and rinsed with distilled water or other appropriate cleaning material;
- Samples will be dry-wiped prior to packaging.

4.3.3 Decon Wastes

- Spent decon solutions may be required to be drummed and disposed of as hazardous waste and/or solvent solutions may be required to be segregated from water rinses.

- Decontamination shall be performed in a manner that minimizes the amount of waste generated.

5.0 SITE OPERATING PROCEDURES

5.1 Initial Site Entry Procedures

- Locate nearest available telephone.
- Prior to working on-site, conduct an inspection for potential physical and chemical hazards.
- Conduct or review utility clearance prior to start of work, if appropriate.
- Note any specialized protocols particular to work tasks associated with the project.

5.2 Daily Operating Procedures

- Hold Tailgate Safety Meetings prior to work start and as needed thereafter (suggest daily minimum of weekly).

  (See Attachment 2 for Tailgate Safety Meeting Form.)

- Use monitoring instruments and follow designated protocol and contaminant action levels.
- Use personal protective equipment (PPE) as specified.
- Use hearing protection if noise levels exceed 85 dbA.
- Remain upwind of operations and airborne contaminants, if possible.
- Establish a work/rest regime when ambient temperatures and protective clothing create a potential heat stress hazard.
- Do not carry cigarettes, gum, etc. into contaminated areas.
- Refer to Site Safety Officer (SSO) for specific safety concerns for each individual site task.
- Be alert to your own physical condition.
- All accidents, no matter how minor, must be reported immediately to the SSO.

6.0 EMERGENCY RESPONSE PROCEDURES

6.1 Emergency Incident Procedures

The nature of work at contaminated or potentially contaminated work sites makes emergencies a continual possibility. Although emergencies are unlikely and occur infrequently, a contingency plan is required to assure timely and appropriate response actions. The contingency plan is reviewed at tailgate safety meetings.

6.1.1 Emergency Incident Procedures

If an emergency incident occurs, take the following action:

Step 1: Size-up the situation based on the available information.

Step 2: Notify the Site Safety Officer and/or Field Supervisor.

Step 3: Respond to an emergency only if personnel are sufficiently trained and properly equipped.

Step 4: As appropriate, evacuate site personnel and notify emergency response agencies, e.g., police, fire, etc.

Step 5: As necessary, request assistance from outside sources and/or allocate personnel and equipment resources for response.

Step 6: Consult the posted emergency phone list and contact key project personnel.

Step 7: Prepare an incident report. Forward incident report to Project Manager/Health and Safety Manager within 24 hours.

6.1.2 Medical Emergencies

If a medical emergency occurs, take the following action:

Step 1: Assess the severity of the injury and perform life-saving first aid/CPR as necessary to stabilize the injured person. Follow universal precautions to protect against exposure to blood borne pathogens.

Step 2: Get medical attention for the injured person immediately. (Call 911 or consult the Emergency Contacts list which must be posted at the site).

Step 3: Notify the Site Safety Officer and Field Supervisor immediately. The Site Safety Officer will assume charge during a medical emergency.

Step 4: Depending on the type and severity of the injury, transport the injured employee to the nearest hospital emergency room. If the injury is not serious, then transport the injured employee to a nearby medical clinic. Consult your Health & Safety Manager for guidance, if necessary.

Step 5: Notify the injured person's personnel office, including the Regional Manager, Project Manager, and Health and Safety Manager.

Step 6: Prepare an accident report. The Site Safety Officer is responsible for its preparation and submittal to the Health and Safety Manager (HSM) and Corporate Health and Safety Director within 24 hours. CHSD fax number is (916) 638-7622.

6.1.3 Site-Specific Policies and Procedures:

HOSPITAL ROUTE:

Directions to Community Hospital at Glen Cove (1-1.5 miles form site):

Go east on Sea Cliff Avenue to Cedar Swamp Road and make a left. Make a right onto Pearsall Avenue and a left on Walnut Road. The hosital is on the corner of Walnut Road and St. Andrews Lane.

Hospital address is: 101 St. Andrew's Lane
Glen Cove, NY 11542
(516) 674-7300

6.2 Site Specific Requirements in Event of an Emergency:

6.2.1 Facility Notifications

The facility contact is Jim Kerr (516) 674-1153

See Attachment 3 for individual site Emergency Contacts Lists.

6.2.2 Locate Shut-Offs

Not applicable for the scope of work defined herein.

6.2.3 Evacuation Route

If evacuation is required, the Field Supervisor shall:

Step 1: Activate the communication system to alert site workers of evacuation. Personnel shall be advised to remain upwind of contaminants, if possible, and proceed to the designated assembly area.

Step 2: Account for all personnel at the assembly area.

Step 3: Notify the client of the need to initiate evacuation procedures for other site personnel as necessary.

Step 4: Notify the Fire and Police Departments and request their assistance for evacuating the surrounding area and residences.

6.2.4 Spill Containment Plan

If a spill of hazardous material occurs, the following steps shall be taken to mitigate the incident:

Step 1: Notify the Field Supervisor, and he/she shall assess the extent of the spill to determine if it can be safely mitigated with the personnel and protective equipment available at the site.

Step 2: If the release is beyond the field team's capabilities, the Field Supervisor shall evacuate the site personnel to a safe location upwind of the release, and notify the Project Manager and Fire Department.

Step 3: The Project Manager shall notify the client, Health and Safety Manager, Corporate Health and Safety Director, and regulatory agencies, if necessary.

Step 4: If the spill can be safely mitigated using defensive actions, first don the appropriate PPE. Initially, Level C PPE should be worn until air monitoring indicates a downgrade in PPE is appropriate.

Step 5: Takes steps to secure the area and to prevent unauthorized persons from entering the area.

Step 6: Takes steps to contain the spill and to prevent it from reaching sewers, storm ditches, etc.

Step 7: Clean up the spill with absorbent, neutralizers, soil removal as appropriate. Place waste in sealed, labeled containers for disposal.

EMERGENCY CONTACTS
(To be Posted)

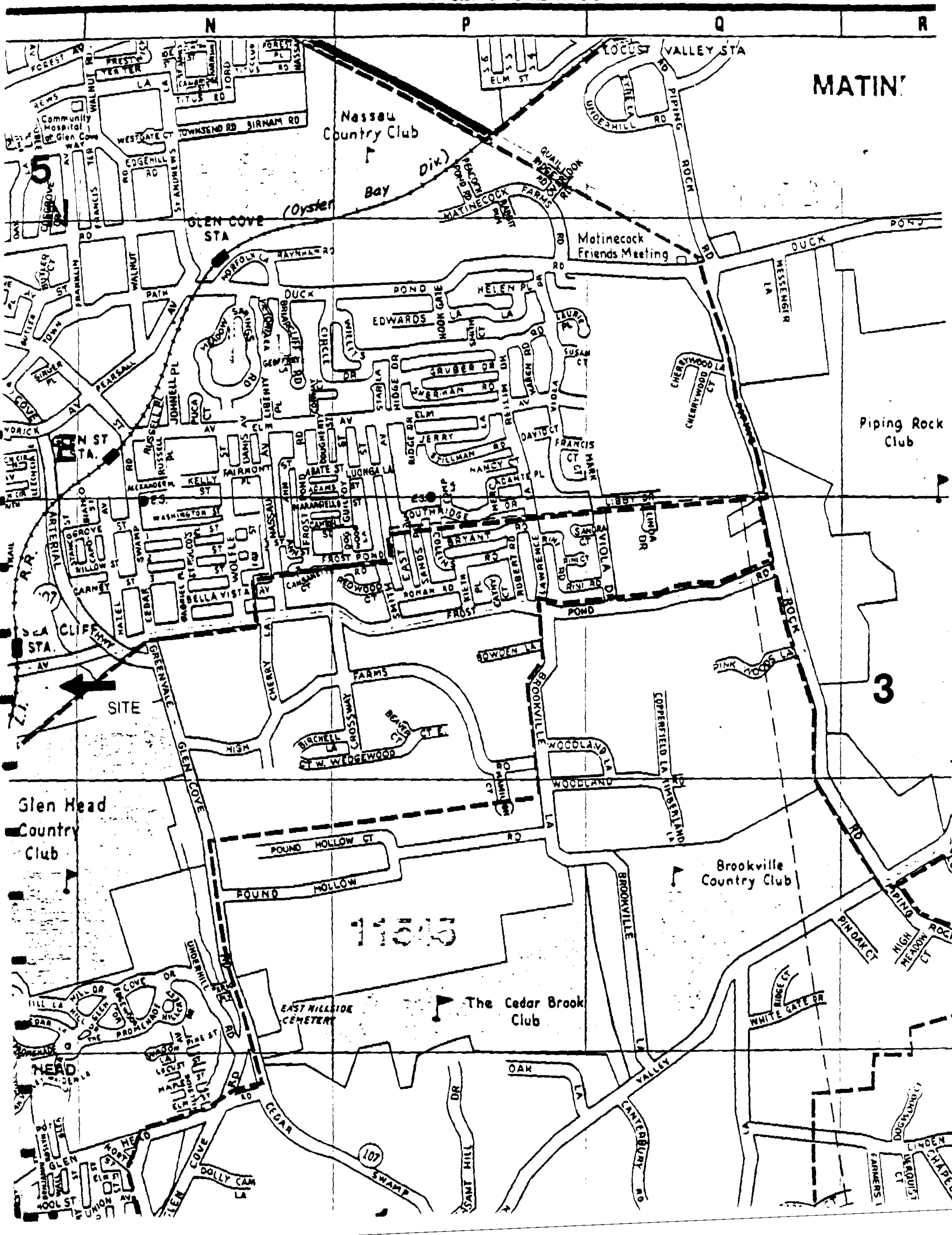
TITLE	NAME	PHONE NUMBER
EMERGENCY		
Police	Emergency Service	911
Fire	Emergency Service	911
Hospital	Community Hospital at Glen Cove	(516) 979-9800
Local Ambulance/Rescue	Emergency Service	911
Poison Control Center		1-800-962-1253
Haz. Waste Natl. Response Center	HAZMAT	(800) 424-8802
PROJECT/BUSINESS		
Project Manager	Charles Schneider	(908) 647-8111 ext.253
Practice Area Leader	Martha Mackie	(908) 647-8111 ext.259
Health & Safety Manager	Alison DiPasca	(908) 647-8111 ext.258
Corporate Health & Safety Director	David Durst	(916) 638-3696 ext.258
Field Supervisor	Dan Baldwin	(908) 647-8111 ext.272
Site Safety Officer	Dan Baldwin	(908) 647-8111 ext.272
Alternate Site Safety Officer	Mike Shorter	(908) 647-8111 ext.281
Client Contact	Jim Kerr	(516) 674-1153
Site Contact	Jim Kerr	(516) 674-1153
Subcontractor	Aquifer Drilling and Testing	(718) 899-0490
Subcontractor	Bladykas & Panetta (Surveyor)	(516) 922-3031
Human Resources Manager	Sharon Clark	(916) 638-3696 ext.240

Site Location: *31 Sea Cliff Ave, Glen Cove, New York*, nearest cross-street is Greenvale-Glen Cove Rd.(Route 107)

ATTACHMENT 1

SITE MAPS

FOR ADJOINING AREA SEE MAP NO. 8



ATTACHMENT 2

HEALTH AND SAFETY FORMS

Add forms as appropriate for the task(s) performed.

X Utility Clearance, Underground Service Alert

X Utility Clearance, McLaren/Hart Utility Clearance Checklists

X Direct Reading Report Form

X Instrument Calibration Log

X Tailgate Safety Meeting Form

☐ PM/Field Supervisor Audit Form

X Other: M/H Health and Safety protocol #28
For Heat/Cold Stress procedures.

McLaren/Hart Health and Safety Policy

TITLE: UTILITY CLEARANCE		NO: HS 34
APPROVED: Russell B. Palchak	DATE: 4/3/95 SUPERSEDES:	PAGE: 1 OF 7

34.1 GENERAL POLICY STATEMENT

It is McLaren/Hart's policy to ensure that an adequate utility clearance is conducted prior to commencing subsurface field operations, such as drilling and excavating to minimize the potential for personal injury and property damage which could result from contact with buried utilities. The purpose of the utility clearance is to identify the locations of underground/aboveground utilities prior to subsurface activities including but not limited to excavation, drilling, Geoprobe®, coring, and/or soil vapor survey activities.

34.2 RESPONSIBILITIES

34.2.1 Project Manager

34.2.1.1 The Project Manager shall ensure that adequate time, resources, and equipment are available for conducting the utility clearance prior to initiating subsurface field activities.

34.2.1.2 The Project Manager shall ensure that employees who conduct utility clearances are adequately trained and knowledgeable of utility clearance procedures and detection equipment operation.

34.2.1.3 The Project Manager shall ensure implementation of utility clearance procedures including adherence to this policy, and should seek engineering technical assistance as needed.

34.2.2 Clearance Engineer

34.2.2.1 The Clearance Engineer shall conduct the utility clearance prior to initiation of subsurface field activities.

34.2.2.2 The Clearance Engineer shall document utility clearances and provide written documentation to the Project Manager.

34.2.3 Field Supervisor

34.2.3.1 The Field Supervisor shall verify the adequacy of the utility clearance as required under paragraph 34.4 of this policy prior to initiating subsurface field activities.

34.2.3.2 In the event of a utility strike, the Field Supervisor shall initiate emergency and notification procedures as detailed in the site specific Health and Safety Plan (HASP).

34.2.4 Health and Safety Manager

34.2.4.1 The Health and Safety Manager shall coordinate training and assist in the implementation of this procedure.

34.2.4.2 The Health and Safety Manager shall audit field activities and project files for compliance with this procedure.

34.3 UTILITY CLEARANCE PROCEDURES

34.3.1 General

34.3.1.1 The following utilities are usually present at most sites and shall always be assessed during the utility clearance process:

- Electrical (underground AND overhead)
- Natural gas
- Water
- Telephone
- Sanitary and storm sewers

34.3.1.2 Some sites may contain additional utilities which shall be checked on a site-by-site basis, such as:

- Cable TV/security systems
- Fiber optic cables
- Underground storage tanks and piping
- Chemical process piping
- Steam lines
- Compressed air
- Transportation pipelines

34.3.2 Pre-Utility Clearance Requirements

The following information must be submitted to the Clearance Engineer prior to scheduling the field utility clearance.

34.3.2.1 A McLaren/Hart Utility Clearance Request Form (HS 34-1) is initiated by the Project Manager prior to the start of work. All of the information requested on the form must be completed.

34.3.2.2 A site map, with the area requiring clearance, must be submitted with the Utility Clearance Request Form (HS 34-1). (In California, a copy of the specific Thomas Guide page, with the site location marked on it, must be included with the Utility Clearance Request Form (HS 34-1).

34.3.2.3 The Project Manager shall make arrangements with the client to obtain all available utility drawings for the subject site. If drawings are available, they must be included with the Utility Clearance Form and as an attachment to the HASP.

34.3.3 **Locator Service Contractors**

34.3.3.1 If a locator service contractor is used, then the Project Manager shall enter into a contract with the locator service which indemnifies McLaren/Hart in the event of a utility break resulting from inaccurate utility clearance information.

34.3.3.2 The Project Manager shall obtain from the locator service documentation which includes a site map with detail of utilities and landmarks and clearance forms. The documentation shall indicate that the utilities have been located, verified, and marked.

34.3.4 **Required Steps for Conducting a Utility Clearance**

The following steps shall be conducted in order to identify and mark the underground utilities which are present in the area of field operations. These procedures shall be conducted and documented prior to commencing subsurface operations, such as drilling, excavating, concrete coring and operating a Geoprobe®.

34.3.4.1 **Contact Utility Companies.** Contact the utility companies at least 48-72 hours (as required by local jurisdiction) prior to field activities so that the public utilities which enter the site can be identified and marked. Many states have a utility clearance service/broker available for coordinating clearance of public utilities; however, these brokers do not generally notify municipalities. Municipal storm/sanitary sewers and water lines must be handled independently. **Note that utility companies and clearance services will not identify buried utilities which are on the project site beyond the utility easement.**

Note: In California and bordering states, Underground Service Alert (USA) is a one-call regional notification program that supplies a toll free telephone number to anyone excavating so they can notify the appropriate USA participating members of their intent to dig. Participating members usually consist of all public utilities as well as some private (e.g. oil companies). Calling USA does not guarantee that all persons/companies with utilities in your specific site area have been notified. When you call USA, you must obtain a site-specific list of the parties that USA will be notifying. USA will provide a dig alert number for the project. This number is valid for 14 days from the initial notification. All work must be completed within the 14 days. If work extends beyond 14 days, USA must be re-notified, at which time a new dig alert number will be issued. Prior to calling USA, all areas

designated for clearance must be marked with white paint. **California State law requires that you call USA prior to digging/drilling.** Prior to calling USA, have the following information ready:

A. Thomas Guide page and grid number
B. Exact street address
C. Name of nearest cross street
D. Type of work
E. Additional comments like the number of borings, site access issues, etc.
F. Intended dig date.

34.3.4.2 The **Clearance Engineer** shall visually inspect the site for discovery and verification of the following:

A. Proper identification of the area to be cleared.
B. General inspection of the adjacent properties, noting any utilities that could possibly run under/over the area of concern.
C. General inspection of the area to be cleared and creation of a scaled site map detailing the locations of all site utilities with respect to the specific areas to be cleared.
D. Presence of :

- Manholes
- Drains
- Junction boxes
- Cable sheaths/piping extruding from buildings
- Poles that have one-way lines
- Recent disturbances of the ground surface
- Pipeline markers
- Pump stations
- Transformers and capacitors
- Cut-off valves

34.3.4.3 **Review of available site utility drawings:** Once the visual inspection of the site, adjacent sites, and the areas of concern has been completed, the Clearance Engineer shall review the available site utility drawings provided by the Project Manager. Additional site reconnaissance and interviews with site employees may be necessary to verify information contained on the maps. The expected locations of underground/aboveground utilities should be noted by the Clearance Engineer. The date of the drawings should be noted as well. If the documentation is fairly old, it may not provide accurate information. Site utility drawings should only be used as supplemental information, and can never be used as the sole source of information for the utility clearance.

Caution: Site drawings may not be accurate; however, they should

provide an indication of which utilities could be present.

34.3.4.4 **Utility Clearance Engineer** will use appropriate equipment to identify and mark utilities in area of investigation or subsurface activities. Refer to Health and Safety Policy 34, Appendix SOP 34, Radiodetection RD400PXL Pipe Locator.

34.3.4.5 **Client Review.** The locations of the proposed subsurface activities and the results of the utility clearance should be reviewed with the client/site contact (if available). Request the site contact to review and sign the Utility Request Form (HS 34-1).

34.3.5 **Documentation**

34.3.5.1 The **Utility Clearance Form (HS 34-1)** shall be completed to document that a utility clearance has been conducted prior to initiating subsurface intrusive operations. The Utility Clearance Form consists of the following three sections:

- Utility Clearance Request: This section describes background information on the site. This section is completed by the Project Manager/delegate.
- Utility Clearance Checklist: This section is used to identify the known or suspected utilities at the site. The left side is completed by the Project Manager. The Field Verification is initialed and dated by the Clearance Engineer upon locating and marking the presence of each utility.
- Review and Signature: The Clearance Engineer and the Project Manager/delegate sign the form when the clearance is completed. If the client/site engineer is available, they should sign the form after reviewing the proposed boring and/or excavation locations.

34.3.5.2 **A site sketch** shall be created by the Clearance Engineer for every utility clearance conducted. The map should be drawn to scale and include a legend. The map should include the locations of all known and suspected utility lines, as well as the locations designated for excavation or drilling. The site map and any notes should be attached to the Utility Clearance Request Form and delivered to the qualified Project Manager/delegate.

34.4 VERIFICATION OF UTILITY CLEARANCE

34.4.1 **Criteria for Determining if Verification is Required**

Verification by the Field Supervisor is required whenever there is any doubt about the accuracy of the utility clearance. The Clearance Engineer shall make a note on the Utility Clearance Request (HS 34-1) when verification is necessary. If any of the following criteria are present, then verification of the utility clearance is required.

34.4.1.1 If the utility companies or clearance services have not marked the utilities entering the site, then verification procedures are required.

34.4.1.2 If there are no site utility drawings available, then verification procedures are required.

34.4.1.3 If the site utility drawings are outdated or believed to be inaccurate, then verification procedures are required.

34.4.1.4 If the site cannot be inspected for evidence of underground utilities (i.e., because of snow-cover or other reason), then verification procedures are required.

34.4.1.5 If the site is congested with underground utilities, then verification procedures are required.

34.4.1.6 If there is any other reason to doubt the accuracy of the utility clearance, then verification procedures are required.

34.4.2 **Verification Procedures**

The following methods may be used as alternate methods to verify that utilities are not present in an area prior to conducting subsurface operations.

34.4.2.1 Hand-auger to a depth of 5-feet at boring locations.

34.4.2.2 Dig with a hand shovel to a depth of 5-feet prior to beginning an excavation.

34.4.2.3 Use a pipe locator, magnetometer, or ground-penetrating radar to search for buried metal utilities.

Note: Refer to the McLaren/Hart Standard Operating Procedure for Operation of the Radiodetection RD400PXL Pipe Locator.

34.5 **TRAINING REQUIREMENTS**

34.5.1 **General**

A Clearance Engineer shall be trained by a qualified instructor on at least two different sites prior to conducting utility clearances alone. Qualified Clearance Engineers must be able to read and understand utility and construction drawings. The Clearance Engineer must be familiar with and understand the limitations of the utility clearance equipment.

34.5.2 **Training Course Content**

Utility clearance training shall include, but not be limited to the following:

A. Contacting utility companies (Contacting USA in California)
B. Proper clearance procedure and equipment
C. Review of site maps
D. Description of utilities to be identified
E. Methods for detecting utilities
F. Use and limitations of the utility locating equipment.

34.5.3 **Instructor Qualifications**

The instructor must have demonstrated proficiency through experience in conducting utility clearances, using the utility locating equipment, and in instructing other McLaren/Hart personnel in proper utility clearance procedures. Instructors must be authorized to instruct by the Regional Manager and Health and Safety Manager.

34.6 RECORDKEEPING REQUIREMENTS

Prior to filing in the project file, a completed copy of the Utility Clearance Form (HS 34-1) and a copy of the Site Utility Sketch shall be distributed to the following for review and approval:

- Project Manager
- Field Supervisor
- Health and Safety Manager

McLaren Hart
ENVIRONMENTAL ENGINEERING CORPORATION

CONTACT SERVICE ALERT AGENCY BEFORE YOU DIG

Date:_____ Ticket No._____
Dig Alert Expiration Date:

UTILITY CLEARANCE REQUEST

Work/Clearance Previously at this location? Y ☐ N ☐

Today's Date:_____ Dig-in Start Date:_____

Project Name:_____ Task No.:_____

Exact Location of Utility Clearance (address, etc.):_____

_____

Facility Contact Name:_____ Telephone No.:(___)_____

Facility Engineer Name:_____ Telephone No.:(___)_____

Site Description (facilities, operations, construction, materials):_____

_____

What Facility Utility Drawings are Available?_____ If available, please provide.

(Completed by Project Manager/Delegate) **CHECKLIST** (Completed by Clearance Engineer)

1. Site/Facility Drawings Available?	Y ☐ N ☐	**FIELD VERIFICATION**
2. Checked with (Fac. Engr., Facility Contract, Other)?	Y ☐ N ☐	
3. Emergency/Safety Shut-Off Switches Located on Utility Plan?	Y ☐ N ☐	

IDENTIFY KNOWN UTILITY (CHECK EVERY SITE)		INITIAL/DATE	NOTES
A. Water Lines	Y ☐ N ☐	A. _____	_____
B. Sanitary/Industrial Sewer	Y ☐ N ☐	B. _____	_____
C. Storm Drains	Y ☐ N ☐	C. _____	_____
Electrical Lines or Vaults	Y ☐ N ☐	D. _____	_____
E. Natural Gas	Y ☐ N ☐	E. _____	_____
F. Liquid Fuel	Y ☐ N ☐	F. _____	_____
G. Steam	Y ☐ N ☐	G. _____	_____
H. Compressor Air	Y ☐ N ☐	H. _____	_____
I. Telephone/Cable	Y ☐ N ☐	I. _____	_____
J. Overhead Lines or Pipes	Y ☐ N ☐	J. _____	_____
K. Others (List)	Y ☐ N ☐	K. _____	_____

Clearance Engineer:_____
(Name - Print) (Signature) (Date)

McLaren/Hart Review:_____ (Proj. Mgr/Delegate) (Name - Print) (Signature) (Date)

Client Review:_____
(Name - Print) (Signature) (Date)

Attachments: Must be included!
Site Safety Plan (By P.M.)
Site Sketch (By Clearance Engineer)
Others (List):_____

Distribution:
Project Manager_____
Field Supervisor_____
Project File_____
Health and Safety Manager

UTILITY CLEARANCE CHECK

CLIENT:	JOB #:	
SITE NAME AND LOCATION:	PROJECT START DATE:	CLEARANCE REQUEST DATE:
M/H PROJECT MANAGER:	DRILLING/CONSTRUCTION SUPERVISOR:	
USA CONTACT DATE: (1-800-642-2444)	USA TICKET NUMBER:	

FACILITY DRAWINGS INSPECTION (INITIALS & DATE)	FIELD VERIFICATION (INITIALS & DATE)
WATER MAIN:	WATER MAIN:
SANITARY:	SANITARY:
STORM #:	STORM:
TELEPHONE:	TELEPHONE:
ELECTRIC:	ELECTRIC:
GAS LINES:	GAS LINES:
STEAM LINES:	STEAM LINES:
LIQUID FUEL:	LIQUID FUEL:
COMPRESSED AIR:	COMPRESSED AIR:
OVERHEAD LINES:	OVERHEAD LINES:

DATE PERFORMED:	FACILITY CONTACT:
CLEARANCE ENGINEER:	SUPERVISING ENGINEER VERIFICATION:
NOTES:	

J437.frm Authority for Utility Clearance on-site is provided by the client, whereas off-site clearance is provided by Public Utility Companies. Clearance shall be verified from available site drawings including retrofitting information.

DIRECT READING REPORT

CLIENT:	JOB #:	PM:	DATE:
SITE NAME AND LOCATION:	WEATHER CONDITIONS (WIND SPEED, DIRECTION, TEMP., HUMIDITY):		
M/H EMPLOYEE:	EMPLOYEE TITLE:		

DIRECT READING DATA

LOCATION	TASK DESCRIPTION	TIME	INSTRUMENT TYPE	SUBSTANCE/AGENT	CONCENTRATION	SOURCE:(S)

COMMENTS:

McLaren Hart
ENVIRONMENTAL ENGINEERING CORPORATION

INSTRUMENT CALIBRATION LOG

Client Name and Site:	Project Manager:	Task Number:

Calibration Event:

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Comments:

NOTE: Return to HSM Upon Completion of Site Work.

TAILGATE SAFETY MEETING

DATE: _____ TIME: _____ JOB #: _____

CLIENT: _____ PROJECT MGR.: _____

SITE LOCATION: _____

TYPE OF WORK: _____

_____

_____

SAFETY TOPICS PRESENTED

PROTECTIVE CLOTHING/EQUIPMENT: _____

_____

CHEMICAL HAZARDS: _____

ACTION LEVELS: _____

PHYSICAL HAZARDS: _____

EMERGENCY PROCEDURES: _____

_____

HOSPITAL/CLINIC: _____

PHONE NO.: _____

SPECIAL EQUIPMENT: _____

OTHER: _____

ATTENDEES

PRINT NAME/COMPANY NAME	SIGNATURE
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

MEETING CONDUCTED BY: _____ SUPERVISOR: _____

1431.FRM

TITLE: HEAT AND COLD STRESS		NO: HS 28
APPROVED: Russell B. Palchak	DATE: 06-01-93 SUPERSEDES: NONE	PAGE: 1 OF 8

28.1 GENERAL POLICY STATEMENT

It is the policy of McLaren/Hart to establish guidelines for work in environments where exposure to heat and cold stress are encountered and to provide guidance to evaluate and control these stressors.

28.2 HEAT STRESS PROCEDURES

28.2.1 The effects of heat stress is dependent on a number of factors. These factors include the source of heat, whether it be radiant heat from an industrial process, or ambient temperature with or without sun loads, the type of work performed, duration of work activity, relative humidity, age and physical condition of the worker and the type of clothing worn (e.g., impervious clothing vs. standard work attire - Level D).

28.2.2 Given the variety of factors which can result in the development of a heat- related disorder, the following guidelines can be used to implement a work/rest regime based on the Permissible Heat Exposure Threshold Limit Value (TLV) published by the American Conference of Governmental Industrial Hygienists (ACGIH). The work/rest regime is based on exposure to an acclimatized fully-clothed worker wearing breathable (cotton) attire. The actual rest periods and frequency will be dependent on the worker's level of acclimatization, the type of heat stress environment encountered (e.g., radiant vs. solar), use of protective clothing and type of work performed.

28.2.3 The Permissible Heat Exposure Threshold Limit Values are presented in Table 28-1 as a guide to monitor and control worker exposure for heat stress environments. The Heat Stress TLV is based on the following Table. Heat stress measurement using the Wet Bulb Globe Temperature Index on which the TLV is based is presented in Section 28.3.

TABLE 28-1

PERMISSIBLE HEAT EXPOSURE THRESHOLD
LIMIT VALUES [MEASUREMENTS ARE PRESENT IN (°F) WBGT]

WORK - REST REGIMEN	WORK LOAD		
	LIGHT	MODERATE	HEAVY
Continuous Work	86	80	77
75% Work - 25% Rest, each hour	87	82	78
50% Work - 50% Rest, each hour	89	85	82
25% Work - 75% Rest, each hour	90	88	86

28.2.3.1 Definitions of work-load categories.

A. Light Work Load - sitting, standing to control machines, performing light hand and arm work.

B. Moderate Work Load - walking about with moderate lifting and pushing.

C. Heavy Work Load - pick and shovel work.

28.3 HEAT STRESS MEASUREMENT

The method of heat stress measurement required to assess the permissible heat exposure TLV is by the Wet Bulb Globe Temperature Index (WBGT). This technique is the most practical method to evaluate environmental factors which most nearly correlate with deep body temperature and other physiological responses to heat.

28.3.1 WBGT measurements can be made with a Reuter-Stokes, or equivalent, direct reading Heat Stress Monitor. This instrument measures dry bulb temperature, natural aspirated wet bulb temperature, and Vernon globe equivalent temperature and electronically calculates the Wet Bulb Globe Temperature Index (formula presented in Section 28.3.2). An alternate method of measuring the WBGT Index using dry, natural wet bulb and globe temperature is presented in the ACGIH Threshold Limit Values for Chemical Substances and Physical Agents under "Heat Stress: Evaluation and Control."

28.3.2 WBGT values are calculated using the following formula:

A. Outdoors with solar load:
WBGT = 0.7 NWB + 0.2 GT + 0.1 DB

B. Indoors or Outdoors with no solar load:
WBGT = 0.7 NWB + 0.3 GT

WBGT = Wet Bulb Globe Temperature Index
NWB = Natural Wet Bulb Temperature
DB = Dry Bulb Temperature
GT = Globe Temperature

28.4 CLASSIFICATION AND PREVENTION OF HEAT ILLNESSES

28.4.1 <u>Heatstroke</u>

28.4.1.1 *Condition*: (a) hot dry skin: red, mottled, or cyanotic; (b) high and rising core temperature, 105°C and over; (c) brain disorders: mental confusion, loss of consciousness, convulsions, or coma, as core temperature continues to rise. Fatal if treatment delayed.

28.4.1.2 *Predisposing Factors*: (a) Sustained exertion in heat by unacclimatized workers; (b) obesity and lack of physical fitness; (c) recent alcohol intake; (d)

dehydration; (e) individual susceptibility; (f) chronic cardiovascular disease in the elderly.

28.4.1.3 *Corrective Actions:* Immediate and rapid cooling by immersion in chilled water with massage, or by wrapping in wet sheet with vigorous fanning with cool dry air. Avoid overcooling. Treat shock if present. Seek medical attention.

28.4.1.4 *Prevention:* Medical screening of workers. Selection based on health and physical fitness. Acclimatization for 8 to 14 days by graded work and heat exposure. Monitoring workers during sustained work in severe heat environments.

28.4.2 **Heat Syncope**

28.4.2.1 *Clinical Features:* Fainting while standing and immobile in heat.

28.4.2.2 *Predisposing Factors:* Lack of acclimatization.

28.4.2.3 *Treatment:* Remove to cooler area. Seek medical attention.

28.4.2.4 *Prevention:* Acclimatization.

28.4.3 **Heat Exhaustion**

28.4.3.1 *Clinical Features:* (a) Fatigue, nausea, headache, giddiness; (b) skin clammy and moist, complexion pale, muddy, or with hectic flush; (c) may faint on standing, with rapid pulse and low blood pressure.

28.4.3.2 *Predisposing Factors:* (1) Sustained exertion in heat, (2) lack of acclimatization, (3) failure to replace water and/or salt lost in sweat.

28.4.3.3 *Treatment:* Remove to cooler environment. Provide salted fluids such as Gatorade or equivalent. Seek medical attention.

28.4.3.4 *Prevention:* Acclimatize workers using a breaking-in schedule for 1 or 2 weeks. Supplement dietary salt only during acclimatization. Ample drinking water, gatorade or equivalent, to be available at all times and to taken frequently during work day.

28.4.4 **Heat Cramps**

28.4.4.1 *Clinical Features:* Painful spasms of muscles used during work (arms, legs, or abdominal). Onset can occur during or after work hours.

28.4.4.2 *Predisposing Factors:* (1) Heavy sweating during hot work, (2) drinking large volumes of water without replacing salt loss.

28.4.4.3 *Treatment:* Drinking liquids with salt supplement such as Gatorade or equivalent. Seek medical attention.

28.4.4.4 *Prevention:* Adequate salt intake with meals. In unacclimatized men, provide salted (0.1 percent) drinking water.

28.4.5 Heat Rash

28.4.5.1 *Clinical Features:* Profuse tiny raised red blisters on affected areas. Pricking sensations during heat exposure.

28.4.5.2 *Predisposing Factors:* Unrelieved exposure to humid heat with skin continuously wet with unevaporated sweat.

28.4.5.3 *Treatment:* Seek medical attention.

28.4.5.4 *Prevention:* Cooled resting and sleeping quarters to allow skin to dry between heat exposures.

28.5 TRAINING REQUIREMENTS

Train staff to recognize heat stress conditions and the methods necessary to prevent and treat heat stress.

28.5.1 Proper clothing and PPE requirements.

28.5.2 Recognition, prevention and first aid treatment for heat stress.

28.5.3 Suggested work/rest regimes and fluid intake.

28.5.4 Safe work practices in heat stress environments.

28.6 HEAT STRESS CONTROL

28.6.1 Working in a hot environment requires that employees take precautions and provide adequate protection to prevent heat stress. The following are guidelines to recognize and prevent heat stress conditions.

28.6.1.1 Make staff assignments for work involving physical labor and/or involving heat stress, based on physical fitness level of available labor pool. Employees newly exposed to heat should begin their work level at 50% of suggested work schedule and increase level by 10% per day to allow for acclimatization.

28.6.1.2 Supervision and "buddy system" should be used to carefully observe workers in heat stress environments

to evaluate each individual's susceptibility to heat stress. Any behavior exhibiting signs of heat stress should be promptly investigated.

28.6.1.3 Initiate a modified work/rest regimen when Ambient Temperatures and protective clothing create a potential heat stress hazard. If ambient temperatures exceed 75°F, the following work/rest regimen is recommended (guidelines assume light to moderate work):

Temperature	Work Period	Rest Period
75 - 80°F	90 Minutes	15 Minutes
80 - 85°F	60 Minutes	15 Minutes
85 - 90°F	45 Minutes	15 Minutes
90 - 95°F	30 Minutes	15 Minutes

28.6.1.4 Rest periods should be taken in a shaded area if available, as this will considerably reduce the affects of heat stress.

A. When temperatures reach above 75°F, the site supervisor or SSO will monitor the heat rate of each working employee every 90 minutes. When temperatures are above 80°F, the heart rate will be monitored every 60 minutes and above 90°F, every 30 minutes.

B. If individuals' heart rates are 110 beats per minute or less at the end of the rest period, they can resume work. If greater than 110 beats per minutes, individuals will rest another 10 minutes. If the heart rate is reduced below 110 at the end of 10 minutes, the employee may return to work and the next work period should be reduced by 33 percent (e.g., at 75°F to 80°F, the work period should be reduced to 60 minutes; at 80°F to 85°F, reduced to 45 minutes; at 85°F to 90°F, reduced to 30 minutes; and at greater than 90°F, reduce to 20 minutes.

C. If at the end of the 10 minute rest period, the heart rate is still above 110, the individual must leave the area through proper decontamination procedures and rest in a cool place outside the exclusion zone for one hour.

D. The rest periods will be modified as the employees become acclimatize to heat.

28.6.1.5 Provide plenty of water and/or other drink which replenishes electrolytes (eg.: Gatorade) at each rest period. Generally, salt intake is sufficient from dietary intake, however, the best way to compensate

for excessive sweat loss is to drink replacement fluids which contain electrolytes, including salt, such as Gatorade, or equivalent. Alternately, a little extra salt in the diet can accomplish the same thing. Salt tablets should not be used. Workers on a low sodium diet should consult with their physician prior to engaging in work in heat stress environments.

28.6.1.6 Protective clothing inhibits the transfer of heat between the body and the surrounding environment. This can increase the onset of heat stress symptoms. The following consideration should be evaluated when protective clothing is worn in heat stress environments.

A. More frequent rest breaks;

B. Worker rotation to provide frequent breaks in cool areas;

C. Wear ice vests or vortex tubes, if practical; and

D. Schedule changes to accommodate work at night or early morning hours.

28.7 COLD STRESS PROCEDURE

28.7.1 Cold stress can present a significant hazard to workers and can result in hypothermia. Hypothermia is a potentially life threatening condition which results in a drop in the body's core temperature. At lower body temperatures the body can react by a reduction in mental awareness, reduced rational decision-making, loss of consciousness and death. Several factors incorporate the harmful effects of cold: wet clothing, smoking, drinking alcoholic beverages, fatigue, emotional stress and certain diseases and medications. Workers exposed to severe cold can suffer hypothermia or frostbite.

28.8 CLASSIFICATION AND PREVENTION OF COLD ILLNESSES

28.8.1 The following are the most prevalent and significant cold stress conditions:

Hypothermia: The signs and symptoms of hypothermia include shivering, dizziness, numbness, confusion, weakness, impaired judgement, impaired vision and drowsiness. The stages of hypothermia are: shivering, apathy, loss of consciousness, decreasing pulse rate and breathing rate and death.

First aid measures for hypothermia are: Call Emergency Medical Services and move the victim to a warm area and into dry clothing.

Frostbite: Frostbite is the most common injury caused by cold. It happens when ice crystals form in body tissues, usually the nose, ears, chin, cheeks, fingers, or toes. This restricts blood

flow to the injured parts. The effect is worse if the frostbitten parts are thawed and then refrozen.

Signs and symptoms of frostbite may be that the skin is slightly flushed. The skin color then changes to white and then grayish blue. Pain is sometimes felt early but later goes away. The frostbitten parts feel very cold and numb, and the victim may not be aware of the injury. In severe cases, frostbite may result in blisters or gangrene.

First aid measures for frostbite are: Move the victim to a warm area and place the frozen parts in warm water (100-105°F). Handle them gently and do not rub or massage them. Loosely bandage the injured parts. Seek prompt medical attention.

28.9 TRAINING REQUIREMENTS

28.9.1 Worker training should be provided to discuss the hazards of cold stress environments and to review preventative work practices. The training should include:

28.9.1.1 Proper clothing and PPE requirements.

28.9.1.2 Recognition, prevention and first aid treatment of frostbite and hypothermia. Discussion should include rewarming procedures.

28.9.1.3 Suggested work/rest regimes and eating/drinking habits.

28.9.1.4 Safe work practices in cold stress environments.

28.10 RECOGNITION CONTROL AND PREVENTION

28.10.1 The first signs of cold stress are pain in the extremities. Severe shivering may result as body temperature drops.

28.10.1.1 Protection from cold stress must be considered in addition to provisions for personal protective equipment.

28.10.1.2 Provisions for insulating dry clothing must be provided.

28.10.1.3 Wind chill can substantially reduce the cooling rate experienced by personnel. Prevention of excessive cooling exacerbated by windchill condition requires increased insulation value of the protective work clothing.

28.10.1.4 The effects of wind chill and temperature can be referenced in the ACGIH TLVs for Chemical Substances and Physical Agents.

28.10.2 The following work practices should be followed to minimize the effects of cold stress conditions:

28.10.2.1 Wear adequate layers of insulating dry clothing. Keep a change of dry clothes available in case clothing becomes wet.

28.10.2.2 Use the buddy system to look for signs of cold stress.

28.10.2.3 If appropriate, use wind shields to reduce the effects of wind.

28.10.2.4 Heated warming shelters should be available when the Equivalent Chill Temperature (ECT) is less than 20°F (-7°C). The CET is used for the purpose of assessing the combined effects of wind and low air temperatures on exposed skin.

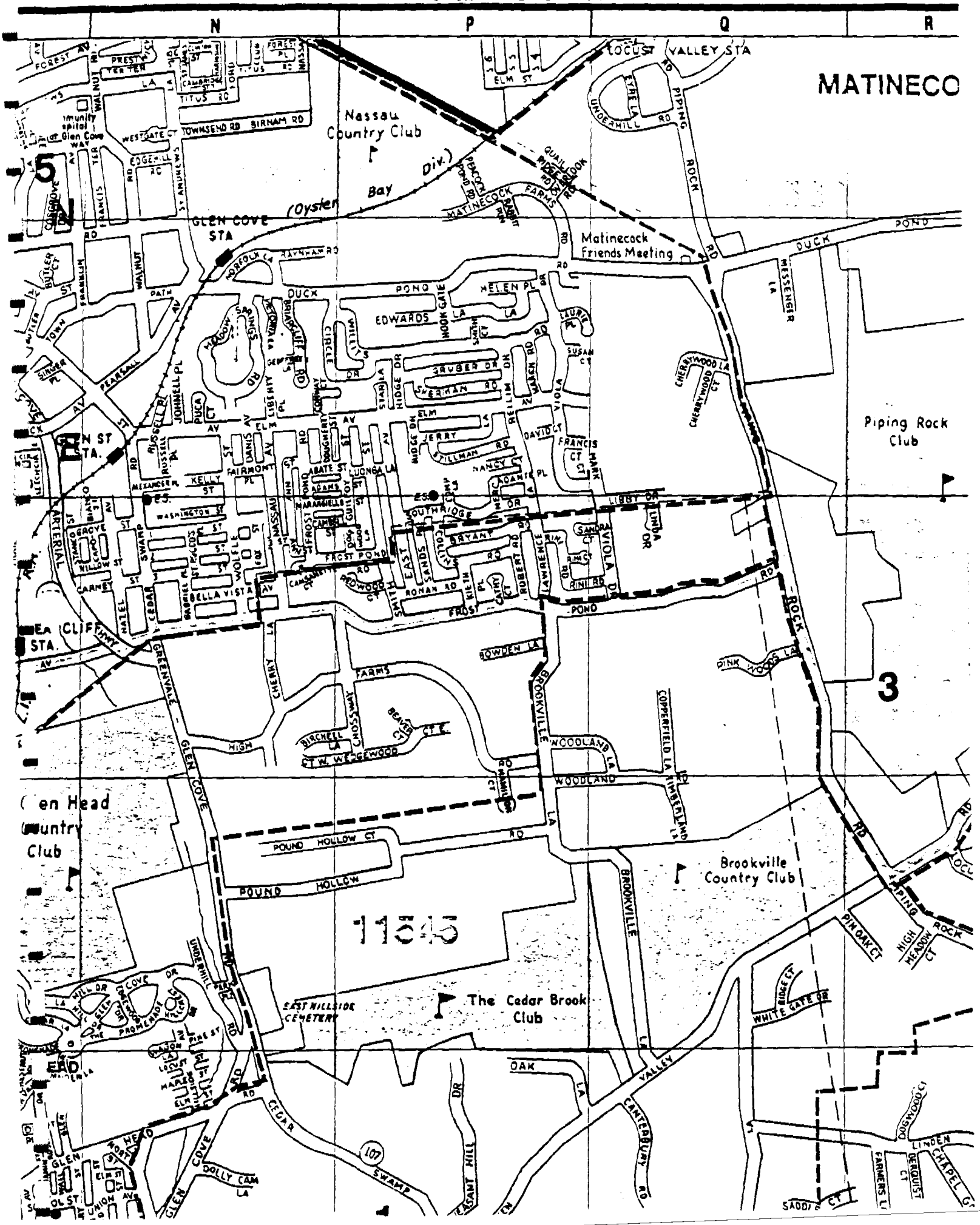
28.10.2.5 To prevent dehydration which can increase the susceptibility of workers to cold injuries, warm sweet drinks and soups should be provided. Coffee intake should be limited due to its diuretic effects.

28.10.2.6 Should a work-warming regime be necessary, the ACGIH TLVs should be consulted.

ATTACHMENT 3

HOSPITAL ROUTE MAP

FOR ADJOINING AREA SEE MAP NO 8



4.0 CITIZEN PARTICIPATION PLAN

4.1 INTRODUCTION

In order to provide a means by which all interested parties can become informed and involved in the SI/RP activities underway at the site, a number of public involvement initiatives will be undertaken. An existing contacts list will be maintained, and expanded as appropriate, for use in the periodic distribution of newsletters and notices. Relevant project and background documents will be made available to interested parties, and public meetings will be held at key points in the process toward selection and implementation of a strategy for remediation of the Photocircuits and 45A Sites.

This plan has been structured in accordance with the guidance provided in the May 20, 1992 NYSDEC memorandum "Citizen Participation Requirements Contained in Part 375–Interim Guidance."

4.2 PROJECT DESCRIPTION

The process toward successful remediation of the Photocircuits and 45A Sites includes the following key steps:

- development of an initial list of realistic possible remedial activities,
- preparation of a Remedial Investigation Work Plan (for review by NYSDEC),
- implementation of the Remedial Investigation Work Plan (including soil and groundwater sampling and well installation),

- preparation of the Remedial Investigation Report (for review by NYSDEC), and

- preparation of a Interim Remedial Measure Workplan (for review by NYSDEC).

4.3 PUBLIC CONTACT LIST

A Contact List will be maintained to ensure that potentially affected and/or concerned citizens, groups, officials, and news media representatives receive relevant information. Individuals or organizations on the Contact List will be sent newsletters and any notices that are prepared regarding the scheduling of public meetings, the availability of project documents or fact sheets, or other relevant events.

A mailing list will be prepared as part of the implementation of the RI and IRM. This list will be prepared after identification of geographical regions that are close to the site and/or along potential routes for environmental transport of contaminants. The list will be adapted for use with the ongoing work.

The Contact List will be expanded as new individuals or organizations express their interest, for example via communication with the point of contact or by way of sign-up sheets at public meetings. The contact list may also be revised as new information is gained regarding the nature or extent of potential environmental contamination from the Photocircuits and 45A Sites.

4.4 IDENTIFICATION OF DEPARTMENT CONTACTS

In public presentations and citizen participation materials that are prepared, the regulatory agency with current, relevant jurisdiction over the Photocircuits and 45A Sites is the New York State Department of Environmental Conservation (NYSDEC). The designated point of contact within the

NYSDEC for matters dealing with the Photocircuits and 45A Sites will be as follows:

Mr. Joseph Jones
New York State Department of Environmental Conservation
Bureau of Eastern Remedial Action
Division of Environmental Remediation
50 Wolf Road, Albany, New York 12233
(518) 457-1708 FAX (518) 457-3972

The address and telephone/fax numbers for Any additional or alternative contacts will be determined by Photocircuits, and shall be identified to the public when appropriate.

4.5 IDENTIFICATION OF DOCUMENT REPOSITORIES

Document repositories will be maintained at the Glen Cove Public Library, Glen Cove, New York. Documents that will be made available at this repository will likely include:

- Work Plans, procedures, and reports generated in the course of the project,
- copies of analytical reports of environmental samples collected at or near the site,
- previous analytical data,
- summaries of toxicologic information on the contaminants of concern, and
- relevant background materials.

4.6 DESCRIPTION OF CITIZEN PARTICIPATION ACTIVITIES

To provide means by which interested parties can become informed and involved in the RI/IRM activities underway at the Photocircuits and 45A Sites, the following section describes public

involvement activities that are planned.

4.6.1 Identified Point of Contact

To ensure effectiveness in responding to comments or requests from members of the public, an individual has been identified as a central Point of Contact for Photocircuits Corporation for matters dealing with investigation and remediation of the Photocircuits and 45A Sites. This contact person is listed below:

Mr. James Kerr
Manager, Wastewater Treatment
Photocircuits Corporation
31 Sea Cliff Avenue, Glen Cove, New York 11542
(516) 674-1153 FAX (516) 674-1076

The above information will be publicized in newsletters, notices, and fact sheets. This contact person will forward comments and requests to co-workers or contractors, as appropriate, in order that follow-up or preparation of a response can occur.

Existence of a publicly-identified Point of Contact will support presentation of unified, coordinated, and timely responses to issues or concerns that may arise, and will minimize the potential for confusion among citizens that can exist when multiple organizations and individuals are involved in decision-making and site remediation processes.

When final remediation plans and specifications and health and safety plans for the associated work are available, newsletters, notices, and/or fact sheets will:

- provide background on the remediation plan,
- describe significant elements of the health and safety plans, and
- identify the Point of Contact and contact persons for all applicable regulatory agencies.

4.6.2 Notices, Public Comments and Public Meetings

The Proposed Remediation Plan will be distributed through the contact list, and the public will be given 30 days to provide comments. The 30 day comment period will provide for submission of written comments and presentation of oral comments at a public meeting. The meeting will be used to present the results of the site investigation, to introduce the proposed remedy, reasons for its selection, and the schedule for its implementation.

A number of written formats will be used to disseminate information to individuals on the Contact List. Newsletters and fact sheets will be used to describe the site and the process that is being used to select and implement remedial alternatives.

Newsletters, notices, and/or fact sheets will be used to announce the availability of the final RI/IRM Work Plan (briefly outlining the proposed investigation), and to announce the Proposed IRM Plan (summarizing the reasons for selecting the remedial alternative).

After the comment period, written notices will announce the signing of the Record of Decision (briefly outlining the selected remedy, discussing any significant changes from the proposed remedy, and responding to significant comments, criticisms, and any newly submitted data). The Record of Decision will address public comments on the remedial alternatives and the recommended alternative in accordance with the New York State Inactive Hazardous Waste Site Citizen Participation Plan and statutory and regulatory requirements.

Before the start of any remedial construction that may affect the public, mailings will be used to:

- briefly describe the site and the remedial construction and its goals,
- discuss the upcoming activity,

- present the schedule for the remaining work, and
- identify the Point of Contact and contact persons for all applicable regulatory agencies.

If mailings relating to the planned interim remedial measures ("IRM") generate significant public comment, an informal public meeting will be held to discuss the IRM.

After completion of remedial construction, newsletters, notices, and/or fact sheets will be used for the following purposes:

- to briefly describe the site and the remedial program,
- to discuss how the remedial program has mitigated problems at the site,
- to describe long-term site operation, monitoring, or maintenance requirements,
- to identify who will be responsible for operations, monitoring, and maintenance, and
- to identify the Point of Contact and contact persons for all applicable regulatory agencies.

4.6.3 Glossary of Key Terms

In order to promote effective interaction with concerned and potentially affected citizens, a glossary of terms and acronyms that are unique to the site investigation and remediation processes will be developed and periodically updated. Use of jargon and obscure terminology often discourages citizens from becoming involved to the extent that they may desire. While public interaction materials and presentations will be prepared and conducted using terminology that is readily understood by general audiences of varying levels of education and environmental experience, some of the reports and background documents will inevitably contain some terms for which definitions should be readily accessible.

The glossary of key terms may periodically be updated based on the input of citizens in the course

of routine correspondence or at public meetings. The glossary of key terms will most likely be prepared in the form of a fact sheet or newsletter insert.

5.0 WORK PLAN FOR AN INTERIM REMEDIAL MEASURE

5.1 INTRODUCTION

In August 1996, McLaren/Hart conducted a Preliminary Site Investigation (PSI) at the Photocircuits Site located at 31 Sea Cliff Avenue, Glen Cove, New York, and the adjacent property at 45A Sea Cliff Avenue (former Slater Electric/Pass & Seymour Site) owned by Alpha Forty-Five L.L.C. The results of the PSI are contained in the PSI report dated September 1996. One area of soil and groundwater contamination was identified on the Photocircuits Site, and one area of soil contamination was identified on the 45A Site. The contaminants are chlorinated and non-chlorinated volatile organic compounds (VOCs). These areas will be characterized further during the Remedial Investigation (RI).

The purpose of this work plan is to, consistent with the National Contingency Plan (NCP) and 6NYCRR Part 375, develop an Interim Remedial Measure (IRM) to address the identified soil and groundwater contamination. While the RI will determine the nature and extent of contamination, the results of the PSI indicate that the two observed areas of contamination are localized, relatively high concentration "hot spots". By their nature, these areas lend themselves to remediation, prior to the completion of the RI and Feasibility Study (FS), by accepted remedial technologies (presumptive remedies).

This plan presents background information for the project, an evaluation of alternative remedial technologies, and a description of the proposed activities and procedures.

5.2 BACKGROUND

McLaren/Hart Environmental Engineering Corporation (McLaren/Hart) on behalf of Photocircuits Corporation (Photocircuits), has completed the implementation of a PSI to assess soil and ground

water quality at Photocircuits property located at 31 Sea Cliff Avenue, Glen Cove, NY and the adjacent property at 45A Sea Cliff Avenue owned by Alpha Forty-Five L.L.C. The purpose of the PSI was to verify and update results of previous investigations, since several years had elapsed since these investigations, and to provide a basis for evaluation of the site prior to negotiation of an Administrative Consent Order (ACO) with the New York Department of Environmental Conservation (NYSDEC). Since 1986, several phases of investigatory activities have been performed at the main Photocircuits site located at the Photocircuits Site and at the 45A Site. During these previous activities, eleven monitoring wells were installed at the Photocircuits site and three were installed at the 45A site. Additionally, several soil borings were advanced at each of the sites to assess contaminant impacts to soil.

The scope of the PSI included redevelopment, resurveying and sampling of existing monitoring wells at both sites, and collection of soil samples using a Geoprobe® at five Areas of Review (AORs) at each site. AORs were selected based on data generated in previous investigations and on the March 1994 report prepared by the Nassau County Department of Public Works detailing a preliminary site assessment conducted in the Sea Cliff Avenue Industrial Area, of which the Photocircuits and the Alpha Forty-Five L.L.C. sites are a part.

Analytical results from the seventeen soil samples collected on the Photocircuits Site indicated the presence of volatile organic compounds (VOCs) in soils at the five AORs. However, only two of the AORs, the drum storage area and the acid/base/solvent tank farm (which are adjacent to one another), contained VOCs at concentrations in excess of the New York State Department of Environmental Conservation (NYSDEC) Soil Cleanup Objectives contained in Technical and Administrative Guidance Memorandum (TAGM) HWR-94-4046. Soil samples from GP-11 and GP-12 contained three compounds in excess of the Soil Cleanup Objectives: 1,1-dichloroethene, 1,1-dichloroethane, and 1,1,1-trichloroethane.

On the 45A Site, soil samples from three of the four investigated AORs contained detectable concentrations of VOCs. However, only the soil sample from GP-30 (near the aboveground tetrachloroethene storage tank), contained VOCs in excess of NYSDEC Soil Cleanup Objectives.

The results of soil sampling and analysis for the PSI are similar to the results obtained by H2M in 1986. Concentrations of chlorinated VOCs were detected in the vicinity of the acid/base/solvent tank farm and drum storage area in excess of NYSDEC Soil Cleanup Objectives in the 1986 study.

VOCs were detected in four of the eleven monitoring wells on the Photocircuits site and in one of the two temporary well point samples collected with the Geoprobe on the eastern side of the Photocircuits property.

The groundwater sample from MW-7, a shallow well in the vicinity of the acid/base/solvent tank farm and the drum storage area, contained the following compounds at concentrations in excess of 6NYCRR Part 703.5 standards for Class GA waters: vinyl chloride, chloroethane, 1,1-dichloroethene, methylene chloride, 1,1-dichloroethane, 1,2-dichloroethane, 2-butanone, 1,1,1-trichloroethane, trichloroethene, toluene, and tetrachloroethane.

The sample from MW-10, a deep well on the northeast corner of the Photocircuits property, contained the following compounds at concentrations exceeding the Part 703.5 standards: 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, trichloroethene, and tetrachloroethane. The sample from NC-Well, a shallow well located just off the north edge of the Photocircuits property along Sea Cliff Avenue, contained 1,1-dichloroethane and 1,1,1-trichloroethane in concentrations in excess of Part 703.5 standards. GW-GP-10, a groundwater sample collected from a temporary well point on the east side of the Butler 2 building indicated contained toluene, m&p xylene, and o-xylene in excess of Part 703.5 standards.

On the 45A site, groundwater samples from two of the three shallow monitoring wells contained VOCs above the laboratory detection limits. The sample from well MW-1S, which is located southeast of the main building, contained tetrachloroethene at a concentration exceeding the Part 703.5 standard. The sample from well MW-3S, located north of the main building, contained trichloroethene and tetrachloroethene at concentrations in excess of the Part 703.5 standards.

A comparison of groundwater analytical data from the December, 1991 sampling performed by H2M at the Photocircuits site with the groundwater data obtained during the August 1996 PSI has been made. With the exception of MW-7 and MW-10, concentrations of VOCs in the groundwater samples collected in 1996 are appreciably less than those in the 1991 samples. A comparison of analytical results from the two groundwater sampling events at the 45A site has also been made and again, it appears that concentrations of VOCs in groundwater have decreased from 1991 to 1996.

Depth to water measurements were collected in August and September. Groundwater flow in the deeper portion of the aquifer is to the northwest, consistent with earlier data. Groundwater flow in the shallow portion of the aquifer is also predominantly towards the northwest, however, water-level measurements from each period reveals the presence of a groundwater depression on the Photocircuits Site, near MW-7.

5.3 EVALUATION OF ALTERNATIVE REMEDIAL TECHNOLOGIES

Conditions at the Photocircuits and 45A Sites are as follows:

- Both properties are underlain by the unconfined Upper Glacial Aquifer (roughly 200 feet in thickness); the aquifer generally consists of high permeability sediments. The aquifer is underlain by the Port Washington Confining Unit.

- Localized lithology ranges from a very fine to fine silty sand to a fine to coarse sand with gravel.

- Hydraulic conductivity generally ranges from 10 to 300 ft/day.

- The depth to the water table ranges from 3 feet below land surface (bls) on the Photocircuits Site to roughly 25 feet bls on the 45A Site.

To address the soil and groundwater contamination at the two sites, three technologies were evaluated: excavation, in-situ bioremediation/chemical treatment, and air sparging/soil vapor extraction.

Excavation was eliminated from consideration for both sites as the contamination is present beneath substantial structures at each site (the tank farm at Photocircuits and the westernmost building on the 45A Site). The cost and implementability of excavation preclude further consideration.

The non-chlorinated compounds present at the Photocircuits site could likely be degraded in-situ without the addition of chemical reagents. The use of in-situ bioremediation or chemical treatment for the degradation of chlorinated hydrocarbons would require delivery of reagents to the subsurface. Because of the relatively high groundwater flow velocities, there may be difficulties with controlling the migration of the chemical reagents in groundwater. There is also a question of whether a sufficiently anaerobic environment can be developed given the relatively high soil permeabilities. Finally, it is not likely that an in-situ approach will effectively degrade chlorinated VOCs which are present in the unsaturated zone. Because of the number of potential technical difficulties, this approach is not being given further consideration.

The use of soil vapor extraction for VOC contaminated soil is a presumptive remedy within the

federal superfund program. The application of soil vapor extraction and air sparging is largely influenced by soil permeability, with the higher permeabilities present at these sites being more favorable. Further, the geologic materials underlying the sites are typically low in organic carbon; therefore contaminant sorption should be limited and VOCs should move readily in the vapor phase in the unsaturated zone. A schematic of the application of air sparging/soil vapor extraction is shown on Figure 5-1. In the air sparging portion, air is injected below the water table which provides two effects: an in-situ air stripping effect and enhanced aerobic bioremediation due to the increase in oxygen. In the soil vapor extraction portion, soil gas is extracted from the unsaturated zone, collecting VOCs present in the soil as well as those sparged from the water table.

Based on the current knowledge of site conditions, air sparging/soil vapor extraction is an implementable technology for the site. Because soil vapor extraction is a presumptive remedy for VOC contaminated soil, it has been screened against remedy selection factors such as short and long term effectiveness, reliability and cost. Consequently, air sparging/soil vapor extraction will be pilot tested at both the Photocircuits and 45A Sites. Assuming that the pilot testing verifies the implementability of air sparging/soil vapor extraction, this technology will be used for the IRM.

5.4 SCOPE OF WORK

This section presents the tasks which will be undertaken to verify the applicability of air sparging/ soil vapor extraction and to design, install and operate the remedial system.

Task 1 Pilot Test

To evaluate the potential of air sparging/soil vapor extraction technology, and to obtain site specific data to be used in the design of a full-scale system, a pilot test will be conducted. The pilot test will be conducted following the completion of RI field work. Several sparging points and soil vapor

monitoring wells will be installed at the tank farm area at the Photocircuits Site and around GP-30 at the 45A Site. One or more vapor extraction wells will be installed at each of the sites. Figures 5-1 and 5-2 depict the approximate number and location of the sparging points, vapor recovery wells and vapor monitoring wells which will be installed for the pilot test.

Figure 5-3 depicts the construction of the sparging points, vapor monitoring wells and both vertical and horizontal vapor recovery wells. The decision on whether horizontal or vertical vapor recovery wells will be installed will depend on how contaminants are distributed in the subsurface and the position of the water table (both of these issues will be resolved during the RI). The final number and location of sparging points/vapor recovery wells will also be dependant upon the contaminant distribution; a final location map will be provided for NYSDEC approval prior to starting the pilot test.

The setup for the pilot test will be as shown on Figure 5-4; the aboveground items (compressor, blower, treatment, piping, etc) will be set up on a temporary basis. The following instruments will be used for the collection of field data/parameters:

- Magnahelic gauge - vacuum and pressure differential (inches of water)
- Pitot tube - air/vapor flow (cubic feet per minute [cfm])
- Photoionization detector (PID) - VOCs in extracted soil vapor (parts per million)
- Gas Analyzer - lower explosive limit (lel), carbon dioxide, methane and oxygen (percent)

Prior to pilot test startup in each area, sparging points and extraction wells will be developed by injecting air and applying vacuum, respectively. Vacuum or pressure measurements will be made in nearby sparging points, vapor recovery wells and/or groundwater monitoring wells. Development will be continued until vacuum and pressure measurements become sufficiently stabilized to demonstrate that soil gas in the subsurface is moving in response to the applied force at the sparging point or

vapor extraction well.

To start the test in each area, the blower will be connected to the vapor extraction well. The blower will be activated and allowed to run for one to two hours at a nominal flow rate of 50 cfm, until a reasonably stable flow regime is established, based on vacuum readings. At this point, compressed air will be injected into one of the sparging points at a nominal flow rate of 3 cfm. After one hour, the flow rate of injected air will be increased to 6 cfm for an hour and then to 9 cfm after another hour. Air injection rates may vary from the specified rates depending on field conditions. An air compressor fitted with an oil filter on the discharge will be used to supply compressed air.

The testing will continue so that each sparging will be tested individually, while the blower is in operation. Depending on the proximity of other sparging points, additional testing may be conducted with air injection into more than one sparging point.

During the pilot testing, the following parameters will be monitored:

- Induced vacuum at the blower
- Air flow from the blower
- Induced vacuum in adjacent sparging wells and groundwater monitoring wells
- Approximate total VOC concentrations in the extracted soil gas
- Water levels in nearby groundwater monitoring wells

Vapor samples will be collected before, after, and periodically during the pilot testing for laboratory analysis of VOCs as well as carbon dioxide, oxygen, nitrogen and methane. VOC samples will be analyzed using U.S. Environmental Protection Agency (USEPA) Method 8240 modified for the air matrix. Samples will be collected with a large syringe, which will be used to transfer the sample to a one-liter tedlar bag or pre-evacuated vial.

A report will be prepared which presents the results of the pilot test. The report will discuss the effective radius of influence for both the sparging and soil vapor extraction components. The report will also discuss the rate of contaminant removal. A conceptual design of the final system (layout of sparging points and vapor recovery wells, sizing of blower and compressor, etc.) will be provided in the report, along with a schedule for the final design and installation.

Task 2 System Design

A remedial system will be designed based on the pilot testing. The system will have an aboveground mechanical design (blower, compressor, piping, controls) and a subsurface design. The deliverable for this task will be a design report and design drawings. The remedial system will be designed as explosion-proof, if pilot testing results indicate that potentially explosive levels of vapor may be present during the operational period. It is anticipated that the above ground portion of the system will be trailer mounted with an enclosure, such that it can be used first at the Photocircuits Site and then moved to the 45A Site. The design phase will evaluate whether treatment is needed for the air discharge, and treatment will be incorporated if warranted. An air discharge permit application will be prepared during this phase, pursuant to 6NYCRR Part 201. Design drawings and the permit application will be signed and/or stamped by a Professional Engineer licensed in New York State.

Task 3 System Installation, Startup and Operation

The system will be installed according to the design drawings. Once installed, the system will undergo a one to two week startup evaluation where operations will be monitored daily. Monitoring activities will include collecting pertinent flow, vacuum, pressure and VOC measurements.

Following the startup period, a monitoring/maintenance program will be developed. The program will provide for the regular collection of measurements to evaluate system performance, and a

schedule of maintenance activities for optimal system performance. The frequency for critical operational maintenance activities such as draining the moisture condenser and changing vapor-phase activated carbon (if used) will be specified in the program.

The system will be first operated at the Photocircuits site. When VOC monitoring data indicate that the remedial system is recovering minimal amounts of contaminants (i.e. - an asymptotic relationship between concentration and time is reached), the system will be shut down for a minimum of two weeks. Following the shutdown period, several tests will be conducted to determine whether residual contamination is present and whether a different mode of operation will be capable of recovering this contamination. Testing will consist of the following, at a minimum:

- The system will be re-started and field measurements of VOCs will be made and vapor samples collected. A substantial rebound in VOC concentrations would indicate that there is appreciable residual contamination is present and that further testing is necessary.

- The system will be tested in a "pulsed" mode where the system is operated in an on-off cycle to enhance the recovery of residual contamination.

- The system will be operated with different combinations of sparging points in operation.

The system will continue to operate at the Photocircuits site until it is demonstrated that residual contamination has been reduced to acceptable levels as defined by an asymptotic condition. The trailer-mounted portion of the system will then be transported to the 45A Site and put into operation, following the same procedures for startup and shutdown as previously described.

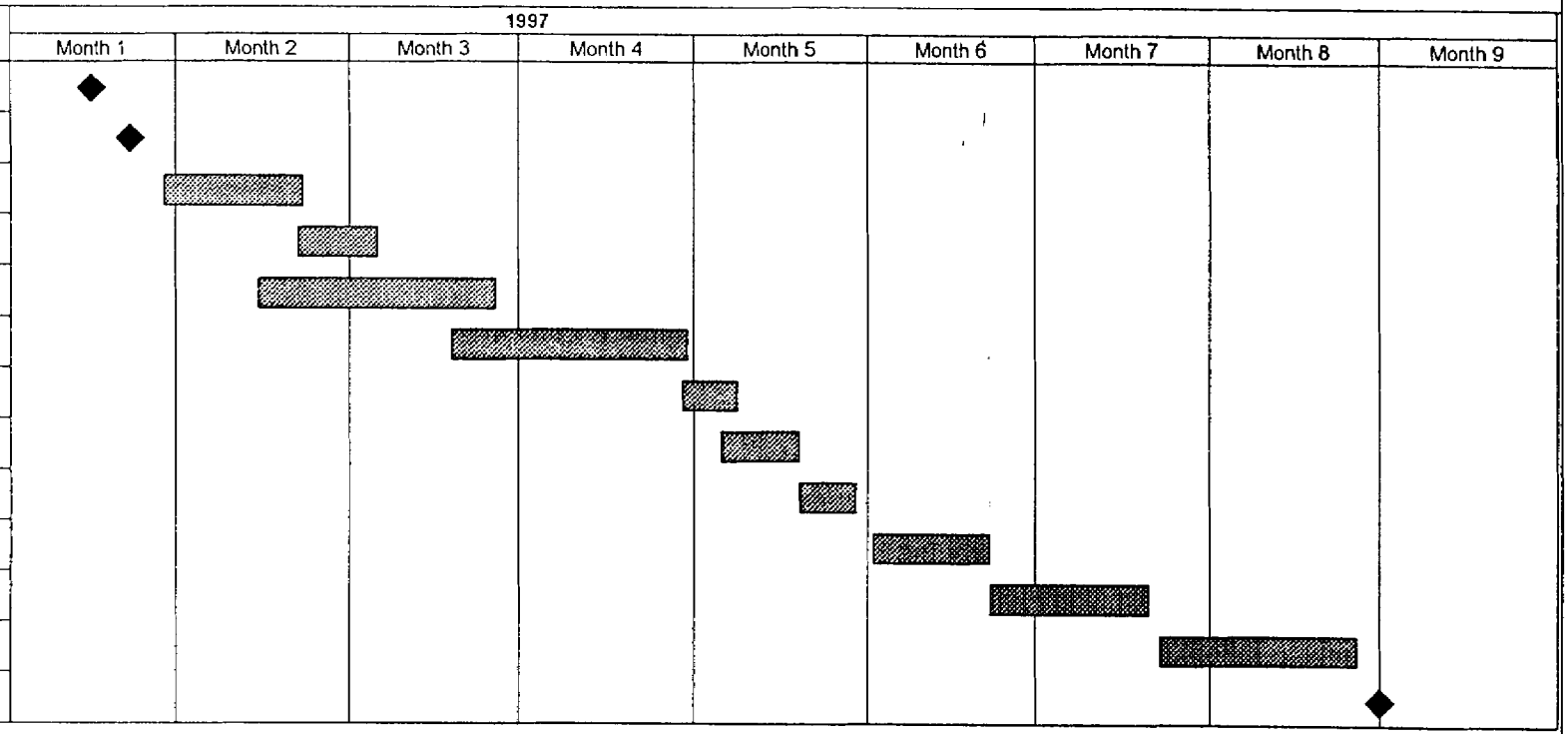
Evaluation of IRM Effectiveness

Groundwater will be monitored during the IRM to evaluate the impact of contaminant removal on site groundwater quality. The effectiveness of the IRM will be judged based on the reduction of VOC concentrations in site monitoring wells. The greatest effects will be seen in wells which are positioned close to the contaminant source areas (e.g. - MW-7 in the Tank Farm area). It is anticipated that VOC-concentrations will decline at a greater rate in the monitoring wells located around the site in response to the IRM.

The necessity for additional groundwater remediation will be based in large measure on the effectiveness of the IRM and the results of the groundwater monitoring. The IRM is anticipated to provide a significant degree of contaminant mass removal, but there may be areas of groundwater contamination which exceed state/federal drinking water standards following completion of the IRM. Depending on the magnitude of concentrations, contaminant distribution and trends in groundwater quality, a risk assessment will be conducted to evaluate the degree of risk posed by the residual groundwater contamination, and groundwater contamination existing in the industrial park area . If appropriate, a demonstration of the natural attenuation of residual groundwater contamination will be performed.

6.0 TENTATIVE SCHEDULE FOR IMPLEMENTATION OF IRM

Tentative Schedule of RI / IRM Activites
Photocircuits
Glen Cove, New York



Project: Photocircuits
Date: 3/24/97

Task

Milestone

H:\GEO\PHOTOCIR\SCHEDUL3.MPP

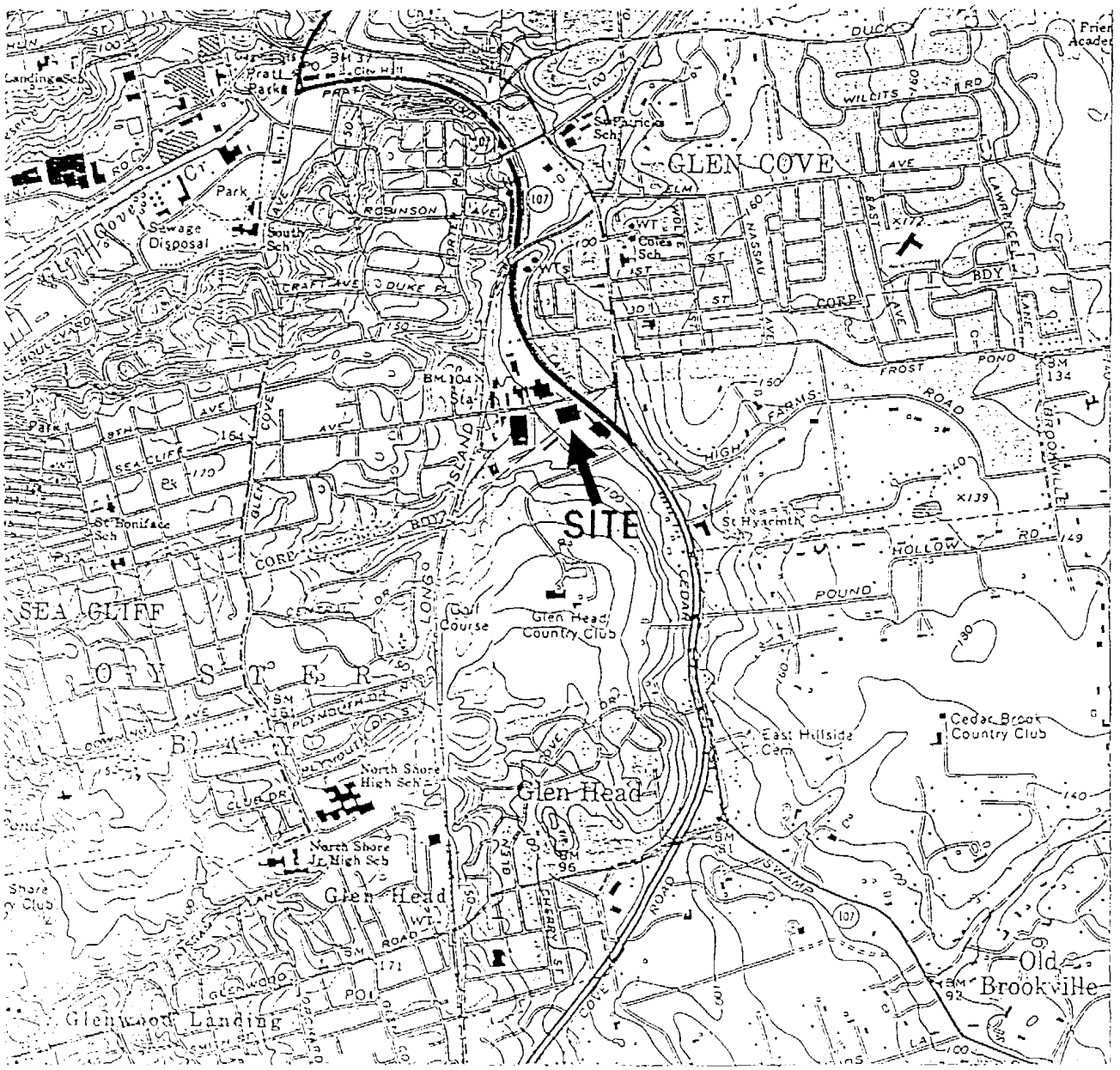


FIGURE 2-1

SITE LOCATION MAP

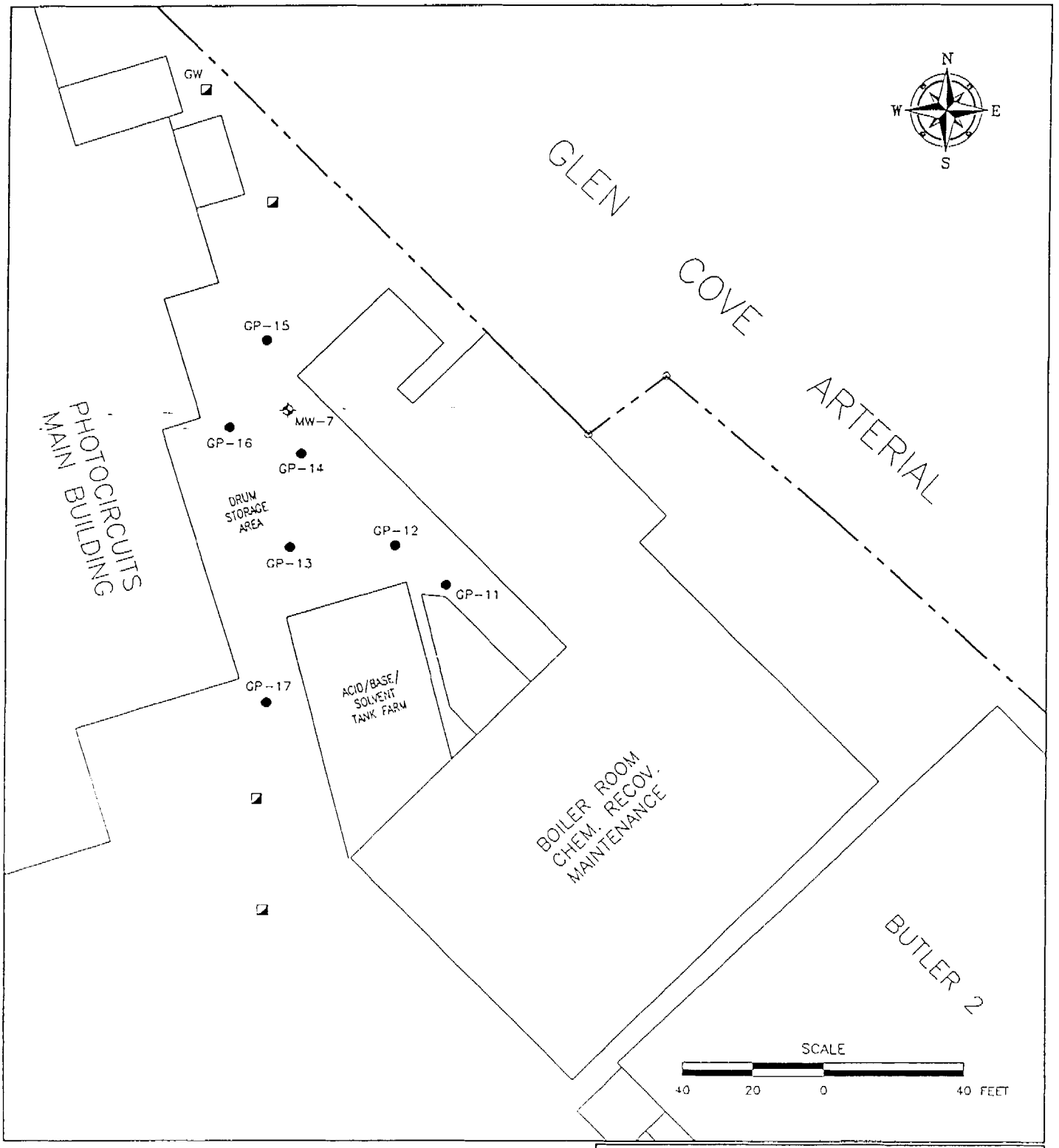
PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart® ENVIRONMENTAL ENGINEERING CORPORATION

DRWN: D.B.	CHK'D: C.B.S.
SCALE: AS SHOWN	DATE: 10/08/96

incarnadine -

stained crimson
or blood-color



LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY
- MONITORING WELL LOCATION
- GEOPROBE SAMPLING LOCATION
- PROPOSED SOIL BORING LOCATION
- PROPOSED MONITORING WELL LOCATION
- PROPOSED SOIL BORING WITH GROUNDWATER GRAB SAMPLE

FIGURE 2-2

PROPOSED SOIL AND GROUNDWATER SAMPLING LOCATIONS (PHOTOCIRCUITS SITE)

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart® ENVIRONMENTAL ENGINEERING CORPORATION

DRWN: S.F.H.	CHK'D: C.B.S.
SCALE: AS SHOWN	DATE: 11/04/96

SAC 37650111 11/04/96

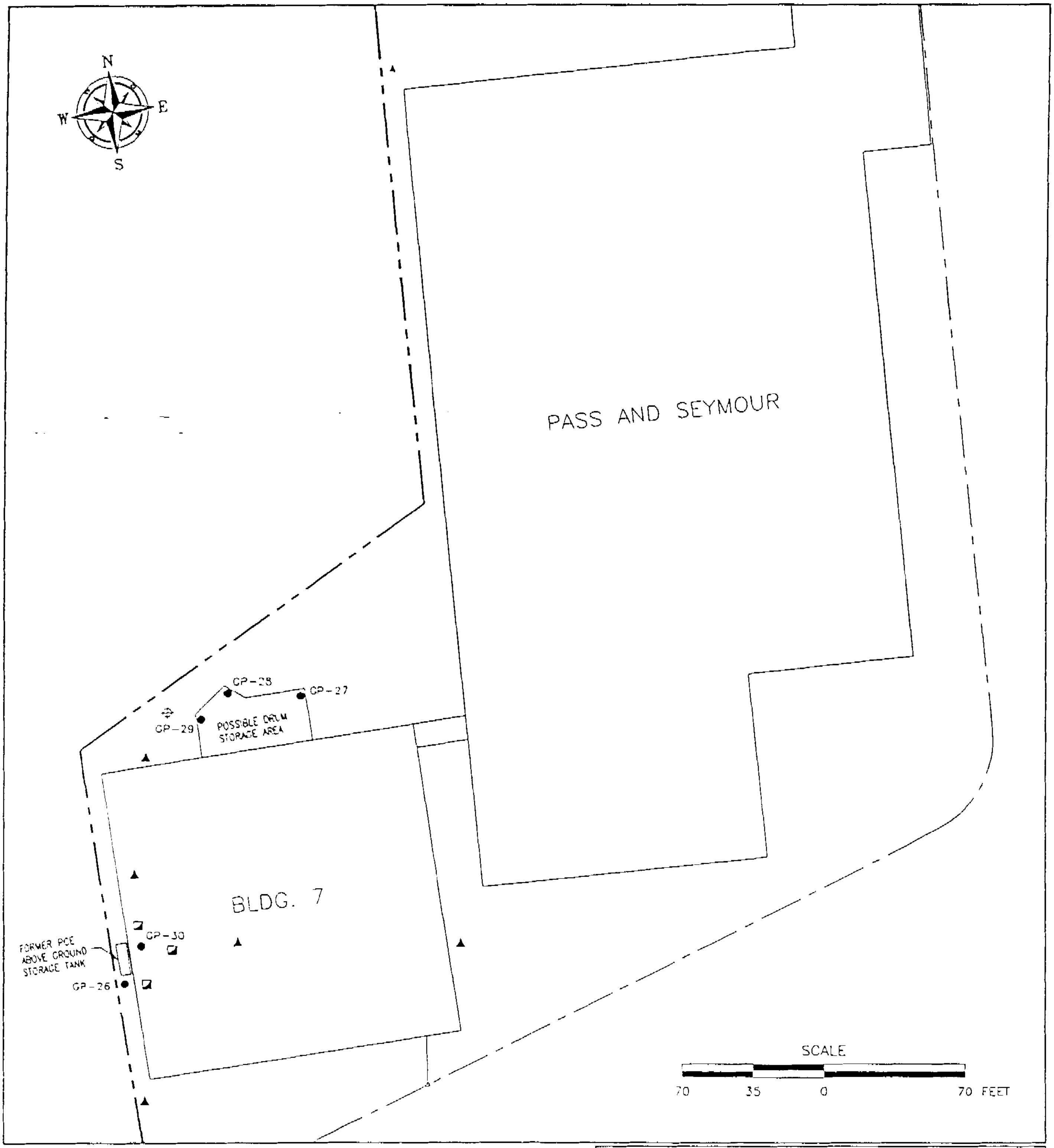


FIGURE 2-3

PROPOSED SOIL AND GROUNDWATER SAMPLING LOCATIONS (SITE 45A)

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart® ENVIRONMENTAL ENGINEERING CORPORATION

DRWN: S.F.H.	CHK'D: C.B.S.
SCALE: AS SHOWN	DATE: 10/09/96

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY
- ● GEOPROBE SAMPLING LOCATION
- ▲ PROPOSED GROUNDWATER GRAB SAMPLE LOCATION
- PROPOSED SOIL BORING LOCATION
- PROPOSED MONITORING WELL LOCATION

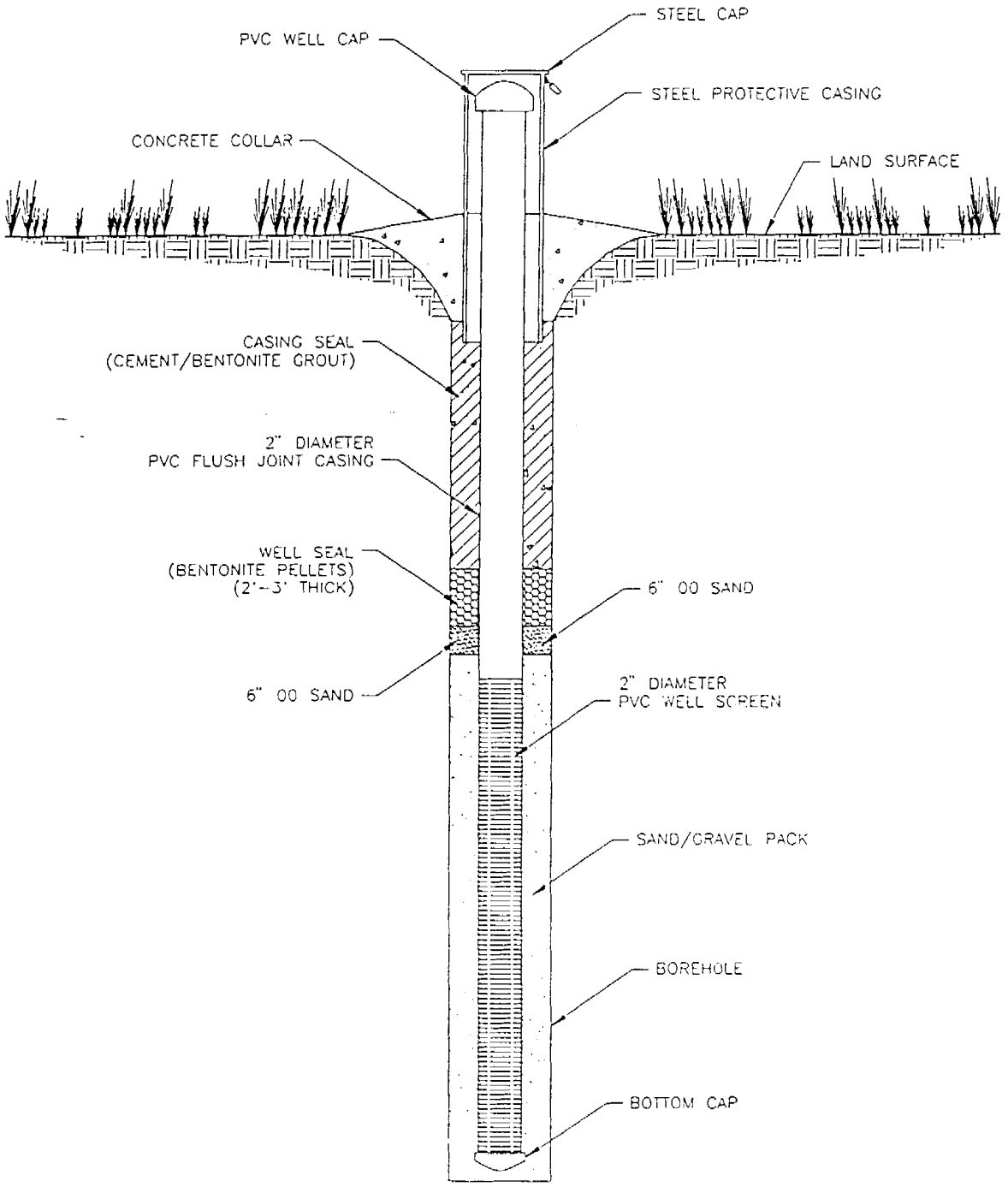


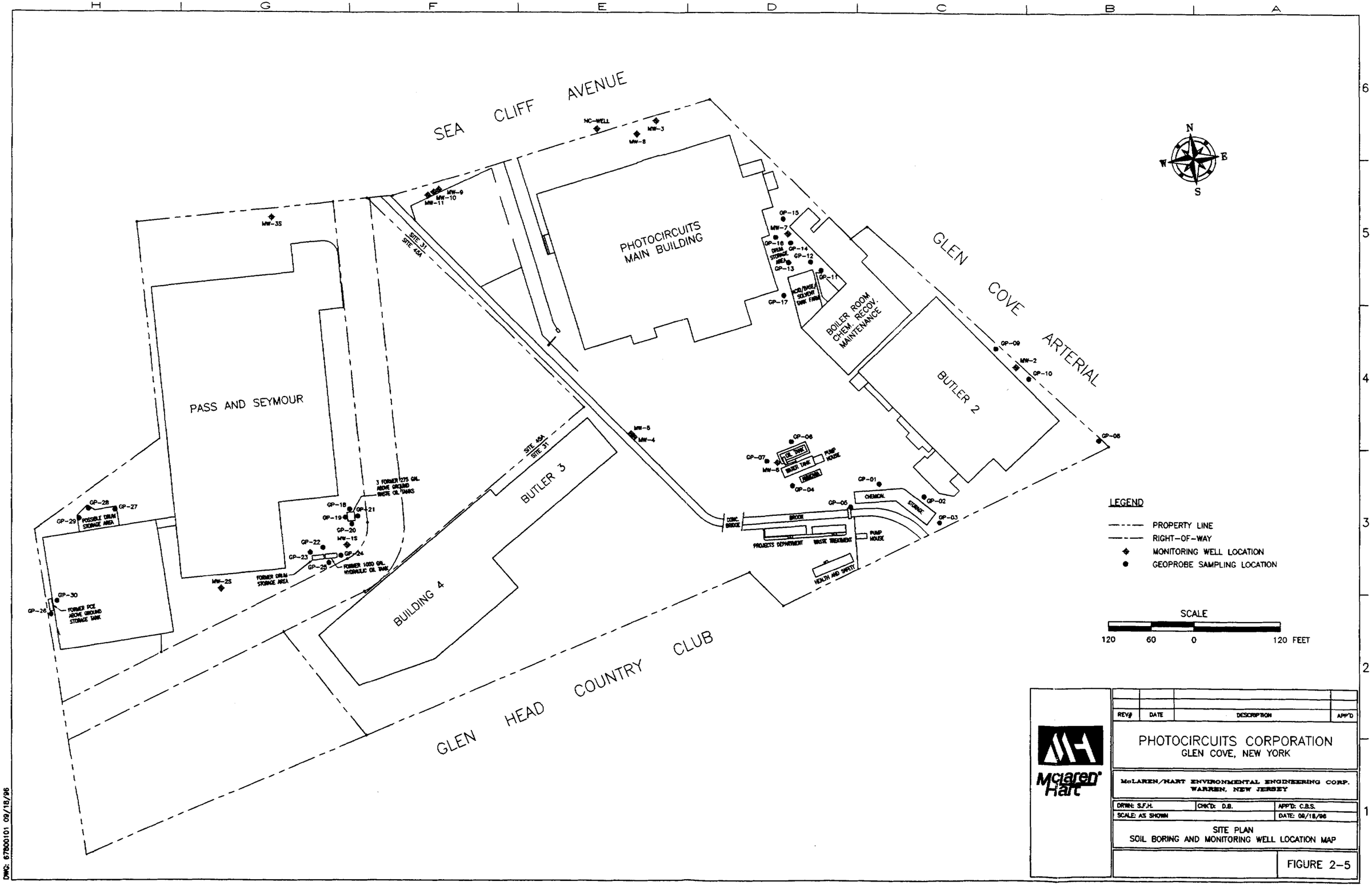
FIGURE 2-4

SCHEMATIC DIAGRAM OF
A TYPICAL WELL CONSTRUCTION

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart® ENVIRONMENTAL ENGINEERING CORPORATION

DRWN: S.F.H.	CHK'D: P.C.
SCALE: AS SHOWN	DATE: 10/09/96



LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY
- MONITORING WELL LOCATION
- GEOPROBE SAMPLING LOCATION

SCALE

120 60 0 120 FEET

REV#	DATE	DESCRIPTION	APP'D

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

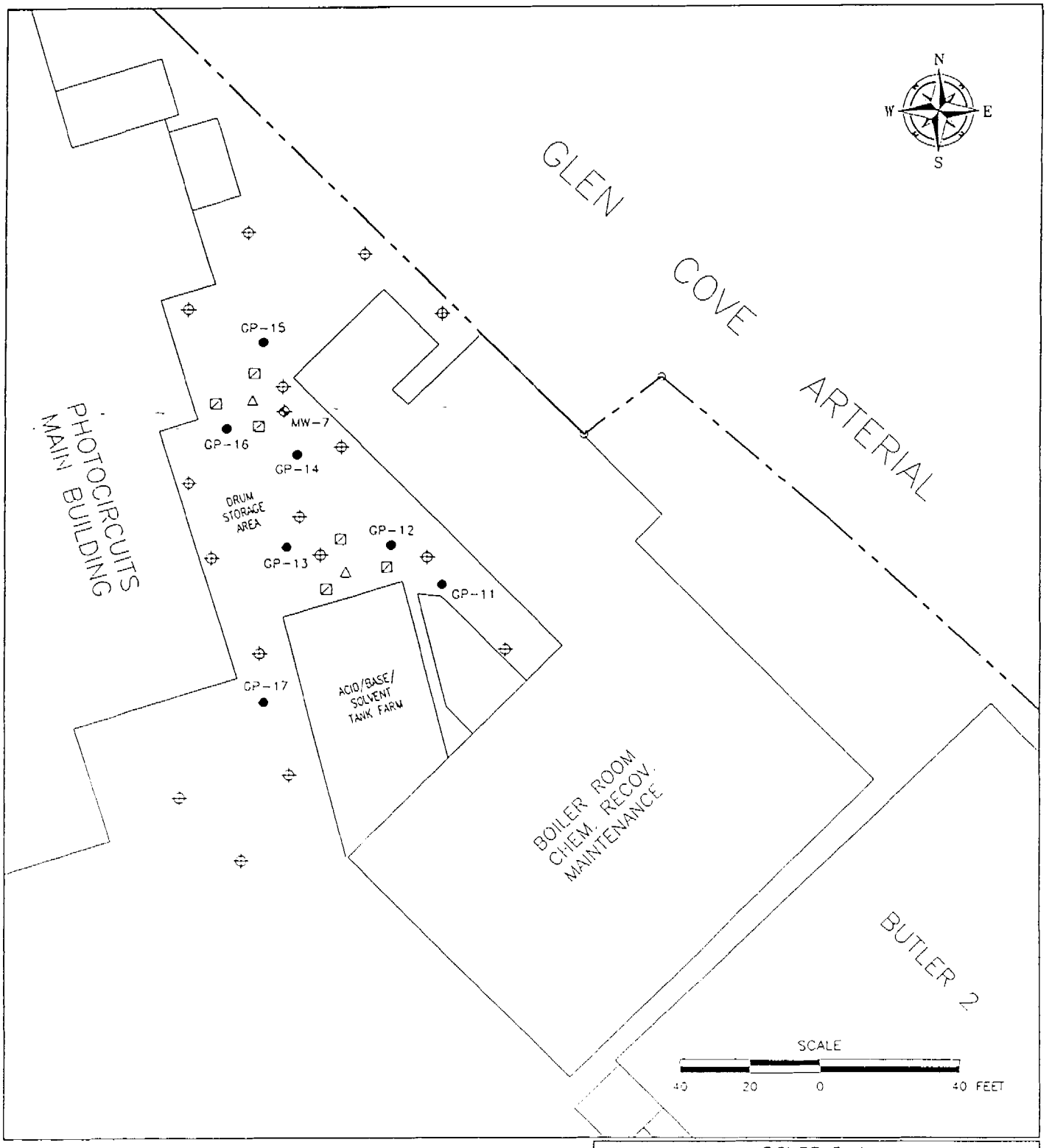
McLAREN/HART ENVIRONMENTAL ENGINEERING CORP.
WARREN, NEW JERSEY

DRWN: S.F.H.	CHK'D: D.B.	APP'D: C.B.S.
SCALE: AS SHOWN		DATE: 09/18/96

SITE PLAN
SOIL BORING AND MONITORING WELL LOCATION MAP

FIGURE 2-5

DWG: 67B00101 09/18/96



LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY
- MONITORING WELL LOCATION
- GEOPROBE SAMPLING LOCATION
- SOIL VAPOR EXTRACTION WELL
- AIR SPARGING POINT
- SOIL VAPOR MONITORING WELL

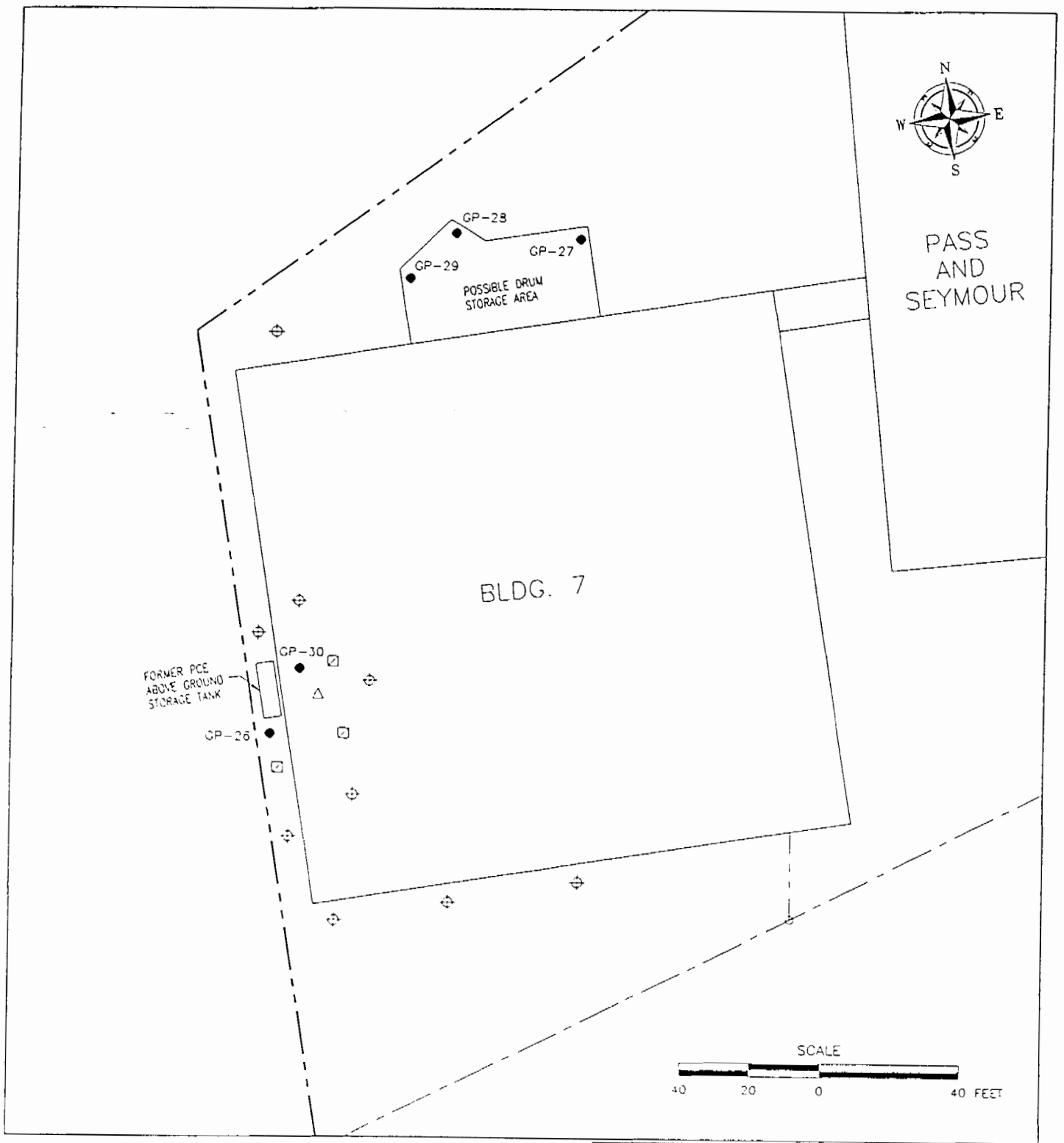
FIGURE 5-1

LOCATION OF AIR SPARGING POINTS, SOIL VAPOR EXTRACTION/MONITORING WELLS (PHOTOCIRCUITS SITE)

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart® ENVIRONMENTAL ENGINEERING CORPORATION

DRWN: S.F.H.	CHK'D: C.B.S.
SCALE: AS SHOWN	DATE: 10/09/96



LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY
- GEOPROBE SAMPLING LOCATION
- SOIL VAPOR EXTRACTION WELL
- AIR SPARGING POINT
- SOIL VAPOR MONITORING WELL

FIGURE 5-2

LOCATION OF AIR SPARGING POINTS, SOIL VAPOR EXTRACTION/MONITORING WELLS (SITE 45A)

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart ENVIRONMENTAL ENGINEERING CORPORATION

DRWN: S.F.H.	CHK'D: C.B.S.
SCALE: AS SHOWN	DATE: 10/09/96

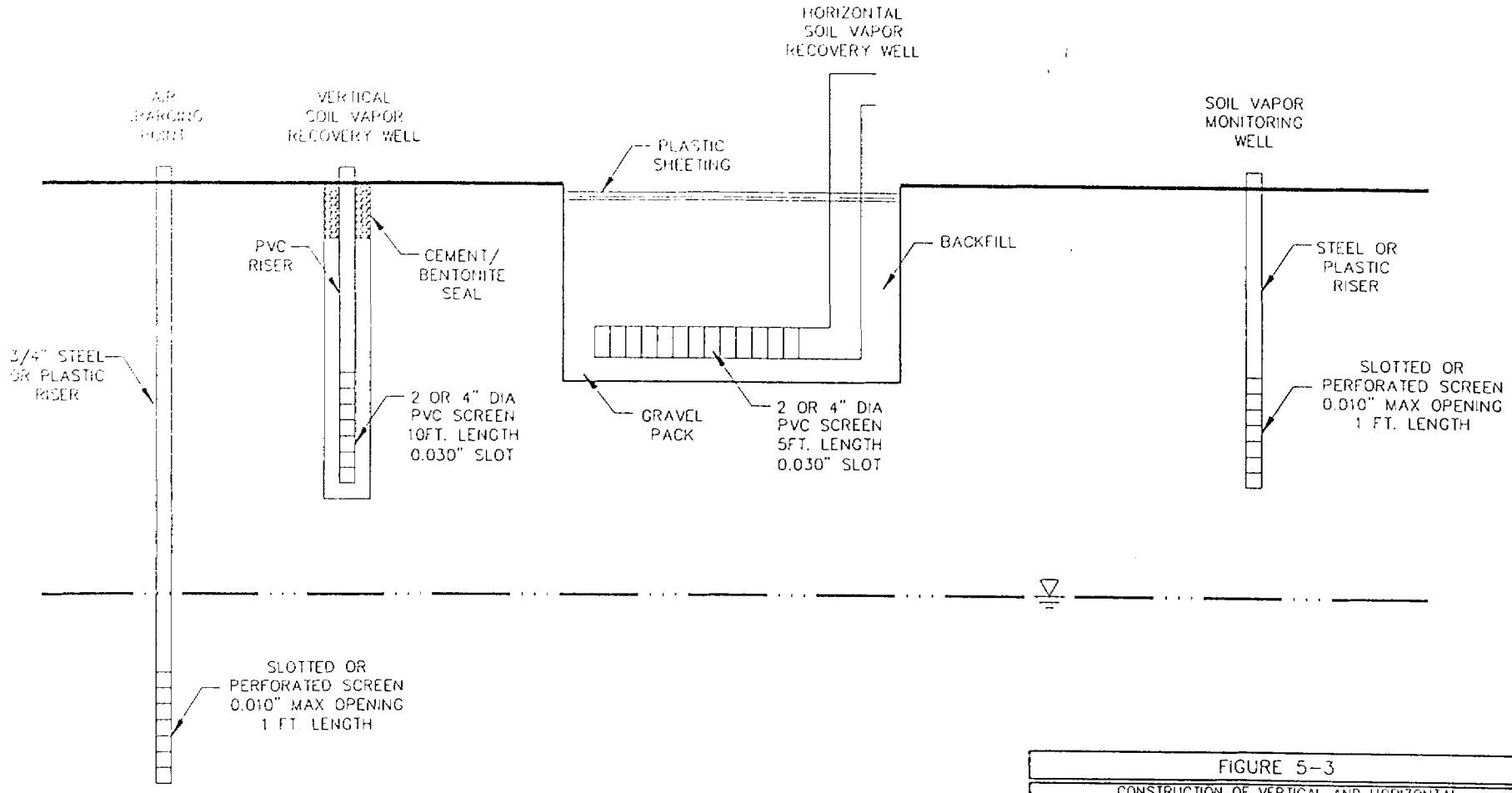


FIGURE 5-3

CONSTRUCTION OF VERTICAL AND HORIZONTAL SOIL VAPOR RECOVERY WELLS, AIR SPARGING POINTS AND SOIL VAPOR MONITORING WELLS

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart® ENVIRONMENTAL ENGINEERING CORPORATION

DRWN: S.G.	CHK'D: P.C.
SCALE: AS SHOWN	DATE: 10/09/96

DWG: 67800114 10/09/96

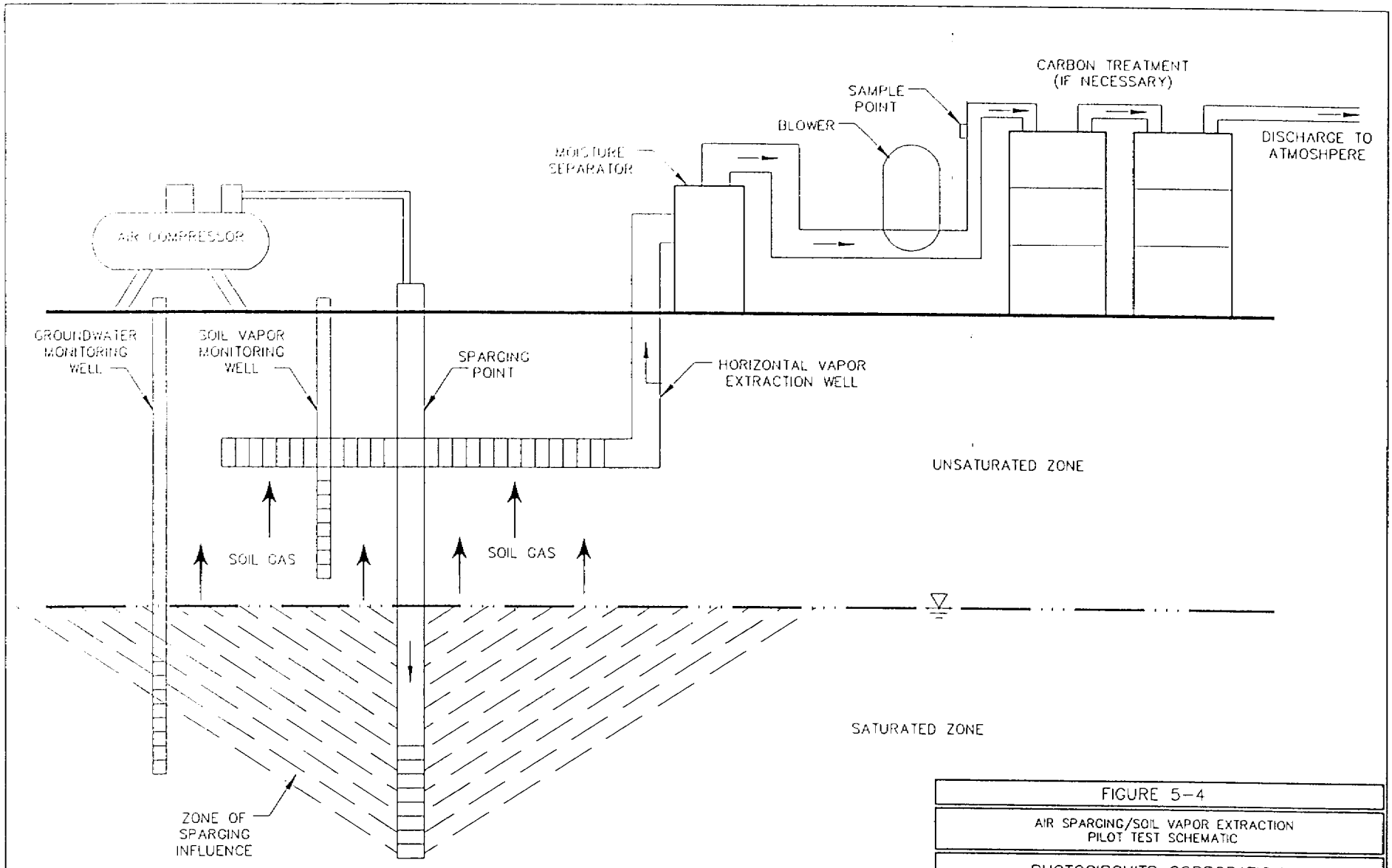


FIGURE 5-4

AIR SPARGING/SOIL VAPOR EXTRACTION
PILOT TEST SCHEMATIC

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart® ENVIRONMENTAL ENGINEERING CORPORATION

DRWN: S.C.	CHK'D: P.C.
SCALE: AS SHOWN	DATE: 10/09/96

DWG: 67800113 10/09/96

TABLE 2-I
QA OBJECTIVES FOR PRECISION, ACCURACY AND COMPLETENESS OF ANALYSES
QUALITY ASSURANCE PROJECT PLAN

Parameter	Matrix	Precision[a] Maximum RPD	Accuracy[b] Percent Recovery	Completeness (%)
Volatile Organics	aqueous	<20	80-120[c]/83-143[d]	90
Volatile Organics	soil	<20	80-120[c]/83-143[d]	90

a For organic parameters, precision limits are given as the relative percent difference of spike recovery from the matrix spike/matrix spike duplicate (MS/MSD) samples. Precision limits for MS/MSD organic analyses are advisory only. For metals and chemical/physical parameters, relative percent difference limits are from the analysis of matrix duplicates samples (duplicate error ratio).

b For organic parameters, accuracy is measured as the percent recovery of surrogate spikes. For metals, accuracy is measured as the percent recovery of matrix spikes. These limits are for soil and water samples specified in the USEPA CLP Statement of Work for Organic Analysis, Document No. OLMO1.8, 8/91; SOW for Inorganics Analysis, Document No. ILMO1.0, 3/90; and in the USEPA Laboratory Data Validation Functional Guidelines for Organics 2/88; for Inorganics 7/88.

c For surrogate compound 1,2-dichloroethane-d

d For surrogate compound 1,2-dichlorobenzene-d

Table 2-2
Sampling Summary Table
Quality Assurance Project Plan

Site Name	Sample ID	Sample Location	Sample Matrix	Field Parameters	VOCs
	Ground water (GW)				
Site 45A	MW-1S	UG/SG	Aqueous	X	X
	MW-2S	UG/SG	Aqueous	X	X
	MW-3S	DG	Aqueous	X	X
Photocircuits	MW-2	UG	Aqueous	X	X
	MW-3	DG	Aqueous	X	X
	MW-4	SG	Aqueous	X	X
	MW-5	SG	Aqueous	X	X
	MW-6	UG	Aqueous	X	X
	MW-7	DG	Aqueous	X	X
	MW-8	DG	Aqueous	X	X
	MW-9	DG	Aqueous	X	X
	MW-10	DG	Aqueous	X	X
	MW-11	DG	Aqueous	X	X
	NC-WELL	DG	Aqueous	X	X
	Groundwater Grab Samples				
Site 45A	GWG 1-13	PCE TANK	Aqueous	X	X
	Soil				
	SB 1-12	PCE TANK	Soil	NA	X
Photocircuits	SB 1-8	UST FARM	Soil	NA	X
	QA/QC Samples				
	Field Duplicates		GW	NA	X
	Field Duplicates		Soil	NA	X
	Field Blanks		GW	NA	X
	Trip Blanks		Aqueous	NA	X
	Matrix Spikes		GW	NA	X
	Matrix Spike Dups		GW	NA	X

Notes

VOCs: Volatile Organic Compounds

NA: Not Analyzed

DG: Down Gradient

SG: Side Gradient

UG: Up Gradient

TABLE 2-3
QC Sample Summary
Quality Assurance Project Plan

Matrix	Parameters	Field Replicates	Field Blanks	Trip Blanks
Groundwater	VOCs	1/20	1 per day	1 per shipment
Soils	VOCs	1/20	1 per day	--

TABLE 2-4
Sample Collection Requirements
Quality Assurance Project Plan

Parameter	Matrix	Sample Preservation	Holding Time*	Container
Volatile Organics	aqueous	Cool, 4°C	7 days	(3) 40-ml glass vials Teflon lined septum
Volatile Organics	soil	Cool, 4°C	14 days	(1) 4oz glass Teflon lined cap

*Holding times are specified from the time of sample collection.

TABLE 2-5
Summary of Analytical Methods
Quality Assurance Project Plan

Parameter	Matrix	Method References
Volatile Organics	Soils	USEPA Method 8240
Volatile Organics	Groundwater	USEPA Method 8240