WESTON Ref. No.

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Corporate Environmental Progra
General Electric Company
100 Woodlawn Avenue, Pittsfi

February 16, 1999

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Dean Tagliaferro
Site Evaluation and Response Section (HBR)
U.S. Environmental Protection Agency
One Congress Street
Boston, MA 02203-2211

Alan Weinberg
Bureau of Waste Site Cleanup
Department of Environmental Protection
436 Dwight Street
Springfield, MA 01103

Re: Conceptual Containment Barrier Design for Lyman Street Site, General Electric Company, Pittsfield, Massachusetts DEP Site No. 1-0856, USEPA Area 5A

Dear Messrs. Olson, Tagliaferro, and Weinberg:

I. INTRODUCTION

The General Electric Company (GE) has recently completed supplemental investigations related to non-aqueous phase liquids (NAPLs) present at portions of the USEPA Area 5A/MCP Lyman Street Site in Pittsfield, Massachusetts. More specifically, the investigations conducted by GE between December 14, 1998 and January 29, 1999 provided further information concerning subsurface conditions in the vicinity of GE's existing NAPL recovery systems and the adjacent riverbank area. The results of these recent investigations were summarized in a document entitled *Source Control Investigation Report - Upper Reach of Housatonic River (First ½ Mile)*, dated February 9, 1999, prepared on behalf of GE by HSI GeoTrans, Inc. (Field Investigation Report). This letter builds upon the information presented in the Field Investigation Report and summarizes the activities proposed by GE to supplement the NAPL containment/recovery measures that are currently in place in this area.

The contents of this letter represents a continued follow-up to a letter from the United States Environmental Protection Agency (USEPA) to GE dated August 14, 1998. Issues posed in that letter were addressed by GE in a document entitled *Source Control Work Plan - Upper Reach of Housatonic River (First ½ Mile),* dated September 1998, prepared on behalf of GE by Blasland, Bouck & Lee, Inc. (BBL) (Work Plan), which was conditionally approved by USEPA via letter dated October 6, 1998. As indicated in that Work Plan, GE believes that its current containment/recovery measures prevent significant migration of NAPLs in the riverbank area. Although the results of the recent investigations do not alter GE's position regarding this matter, GE will proceed, in accordance with its commitment in the Work Plan, with the design and installation of supplemental NAPL containment measures in this area. Such measures will involve the design and installation of a sheetpile-based containment barrier along the riverbank.

This letter summarizes the information used to establish the preliminary and conceptual design parameters associated with the proposed containment barrier. Such information includes the results of the recently-performed field investigation activities (discussed in detail in the Field Investigation Report and summarized herein), as well as historical groundwater data available for the site. An overview of this data is provided below in Section II, while preliminary and conceptual design information regarding this proposed containment barrier is presented below in Section III.

Section IV of this report describes conceptual site restoration activities, while Section V summarizes the near-term activities to be performed by GE leading to the final design and implementation of the proposed containment barrier. Prior to the implementation of the proposed NAPL containment barrier, GE will prepare a detailed Design Report to provide additional information concerning the final configuration and design of the proposed NAPL containment barrier. Section VI presents a schedule for future activities, including final design of the barrier.

II. INVESTIGATION SUMMARY

A. Field Investigations

Most of the field investigations recently concluded in the subject area were proposed by GE in response to the USEPA's August 14, 1998 letter. The Work Plan was conditionally approved in a letter from the USEPA dated October 6, 1998. Subsequently, between December 14, 1998 and January 5, 1999, HSI/GeoTrans, Inc. (GeoTrans) advanced a total of eleven soil borings (LSSC-1 through LSSC-11), as shown on Figure 1. Following drilling, nine of the soil borings were converted into monitoring wells to gauge water table elevations and to monitor for the presence of NAPLs. Seismic refraction surveys were also conducted by Geophysical Applications, Inc. (GAI) to further assess the configuration of the till confining layer beneath the Lyman Street Parking Lot and adjacent areas.

During the performance of these field investigations, oversight of GE's activities was performed by the USEPA, through use of an oversight contractor (Roy F. Weston, Inc.). As previously stated, detailed results of the GeoTrans field investigations and the GAI seismic refraction survey were provided in the Field Investigation Report, submitted to the Agencies on February 9, 1999.

As a supplement to the initial investigation, four shallow soil borings (LSSC-12 through LSSC-15) were advanced by BBL at locations along the riverbank adjacent to the parking lot on January 29, 1999 (Figure 1). GE verbally proposed the installation of those borings to the Agencies on January 26, 1999, and approval was received prior to installation. Soil samples were collected at one-foot intervals to a depth of 6 to 8 feet below grade and submitted to Northeast Analytical, Inc. (NEA) for analysis for total petroleum hydrocarbons (TPH) by USEPA Method 418.1. The results of these analyses are presented in Table 1.

B. Historical Groundwater Data

To help provide information regarding design elevations for the proposed containment barrier, historical river levels and adjacent groundwater levels were evaluated using monitoring data dating back to 1992. Specifically, for the river levels, the data set consists of weekly monitoring results dating between January 1992 and January 1999. Weekly groundwater level measurements from riverbank well points are available from September 1992 to January 1999. Weekly monitoring data for the river and three of the nearby well points (P1, P3, and P4) are depicted on the hydrographs presented on Figure 2.

As shown on this figure, river elevations ranged from 970.14 to 976.50 feet above mean sea level, with an average level of 971.20 feet. During the 7-year monitoring period that was evaluated, four flow events occurred which produced river levels greater than 974 feet. Groundwater levels in the riverbank well points between September 1992 and January 1999 ranged from 970.35 feet to 976.43 feet and averaged about 971 feet. The groundwater levels as measured in the well points are generally slightly higher than or nearly equal to river levels. However, during several of the high-flow events when the river level was above 974 feet, the groundwater levels were lower than that of the river, indicating a landward flow direction. A groundwater level contour map representing low-water conditions is presented on Figure 3. Less frequent high-water (i.e., river level above 974 feet) conditions are presented on Figures 4 and 5. It should be noted that the high-flow river event which occurred on June 15, 1998 was not contoured because groundwater levels along the riverbank were not measured concurrently with that event.

C. Preliminary Findings

The data collected from the recent soil borings and monitoring wells, combined with data available from prior investigations for the site, have been used to further delineate the type(s) of subsurface deposits present in this area, and specifically the depth to the till confining layer. Using these data, a till elevation contour map

has been developed for the subsurface area in the vicinity of the riverbank (Field Investigation Report; Figure 4-2). In addition, preliminary geologic cross sections developed in directions generally parallel to and perpendicular to the river are included as Figures 4-3, 4-4, and 4-5 of the Field Investigation Report. This information illustrates that the depth to the till layer is approximately 20 to 25 feet below ground surface in the riverbank area, which is generally consistent with previous estimates. Generally, the till surface is highest at the center of the site and slopes to the northeast and southwest. A trough has been identified in the top of the till, beginning in the north-central portion of the site and sloping to the southwest.

Based on the recent drilling and geophysical survey results, the till unit is interpreted as being continuous throughout the site, and extending to limestone bedrock at a depth of 50 to 60 feet below grade. An isolated sand lens has been identified within the till at certain locations (LS-14, LS-25, and LSSC-10), but adjacent borings have shown that this lens is localized within the till unit. Overlying the till layer are stratified sand, gravel, and silt deposits, as shown on the cross sections (descriptive boring logs and information concerning the geologic nature of the overlying materials were presented in the Field Investigation Report).

Since their installation, none of the recently installed monitoring wells has produced a measurable thickness of LNAPL. However, as shown on Figure 1, LNAPL has been periodically detected in several existing wells, which are generally located within the former oxbow of the Housatonic River (Oxbow D). The LNAPL is currently being recovered and contained by three pumping wells and an absorbent boom system which has been installed along the riverbank in this area.

Measurable accumulations of DNAPL have been detected in one newly installed well (LSSC-07) and several existing wells (see Figure 1). The DNAPL occurs at the top of the till confining layer and exists within an apparent "L-shaped" trough. Although DNAPL has been found at the top of the riverbank in several wells (RW-1, LS-4, and LS-21), it is not present in the wells or well points located closest to the river.

The primary purpose of supplemental borings LSSC-12 through LSSC-15 was to assess the potential for vertical migration of LNAPL above the average water table elevation of 971.20 feet. This was done by observing the soil cores for evidence of LNAPL staining or sheens, collecting soil samples for analysis of total petroleum hydrocarbons (TPH), and performing shake tests on soil samples. The results of this series of tests are summarized in Table 1 and on Figure 6. During installation, LNAPL staining was visually observed in two of the four riverbank soil borings (LSSC-12 and LSSC-13). These same two borings detected LNAPL residuals during shake testing. No visual observations of LNAPL staining or residuals from

shake tests were shown to exist above an elevation of 974 feet. TPH values in the riverbank soil samples ranged from non-detect (in eleven samples) to 23,000 ppm. The TPH concentrations in the borings generally decreased from east to west, with maximum concentrations per boring ranging from 150 ppm in LSSC-15 to 23,000 ppm in LSSC-12. The observed soil TPH values were compared to the estimated TPH values for soil at residual saturation levels, based on physical properties of the soil and the LNAPL at the site. Typically, NAPL which is present at residual saturation levels or less for a particular soil will not be mobilized as a separate phase product (Cohen and Mercer, 1993). Estimates were made of TPH values which would represent soils at full oil saturation and residual saturation levels. The following available site or area data and typical assumptions were utilized for this analysis:

Oil Density	0.94 g/cc (average of site oil data)
Soil Dry Density	1.6 g/c (Lambe and Whitman, 1969)
Porosity	0.3 to 0.35 (Lambe and Whitman, 1969)
Residual Saturation	0.2 to 0.3 (estimates from adjacent East Street Area 2 data)
LNAPL TPH Concentration	660,000 ppm (average of site oil data)

References:

Cohen, R.M. and Mercer, J.W., 1993. *DNAPL Site Evaluation*, C.K. Smolley, Boca Raton, Florida.

Lambe, T.W. and Whitman, R.V., 1969. *Soil Mechanics*, John Wiley & Sons, New York.

Based on these inputs, the estimated TPH concentration for a soil sample fully saturated with LNAPL ranges from approximately 98,800 ppm (assuming a porosity of 0.3) to approximately 112, 500 ppm (assuming a porosity of 0.35), while the estimated TPH concentration at residual saturation ranges from a low of approximately 22,500 ppm (assuming a residual saturation level of 0.2 and a porosity of 0.3) to a high of 38,300 ppm (residual saturation of 0.3, porosity of 0.35). TPH levels near the lower range of the estimated residual saturation concentrations were observed in two of the supplemental riverbank borings, LSSC-12 and LSSC-13, at elevations between 972 and 975 feet. Groundwater was encountered in these borings at elevations of approximately 973 to 974 feet. Above 975 feet, TPH concentrations ranged from non-detect to less than 50 percent of the lower estimated residual saturation concentration. However, the results of shake tests performed on the soil samples during drilling revealed no sheens or LNAPL residuals above an elevation of 973 feet.

III. PRELIMINARY CONTAINMENT BARRIER DESIGN

Based on the results of the investigations and related evaluations described in this letter, GE proposes to supplement the ongoing LNAPL and DNAPL containment/recovery measures to include a sheetpile-based

containment barrier along a portion of the riverbank. Additional information concerning the anticipated installation and related activities is provided below.

The proposed location of the NAPL containment barrier is shown on Figure 7. Information concerning the presence of NAPLs, visual evidence of soil staining and sheens, depth to groundwater, geologic characteristics of the subsurface materials, and laboratory analytical results have been considered in selecting the vertical and horizontal extent of the proposed containment barrier. In addition, the scope of future Housatonic River bank soil and sediment removal activities in this stretch of the river were also considered (i.e., the possible removal of bank soils and sediments from this area and the need to support the remaining riverbank during such activities). The horizontal extent of the proposed containment barrier has been preliminarily selected to include those soil borings and monitoring wells where separate-phase LNAPL has been detected in the vicinity of the riverbank. At many of these locations, the LNAPL appears to be present at near-residual saturation levels.

The western extent of the proposed containment barrier will extend to the Lyman Street bridge abutment. In that area, the containment barrier would include monitoring well LS-38 and recent soil boring LSSC-11. Well LS-38 appears to represent the western limit of LNAPL migration. This well has been monitored regularly since its installation in the later part of 1995. During that time period, LNAPL was only detected twice in extremely small quantities (thickness of 0.01 feet). Two well points located immediately down the bank from well LS-38 and toward the river (P6 and P7) have been monitored since the latter part of 1994 and have never indicated the presence of LNAPL. A well recently installed on the west side of the Lyman Street bridge abutment (LSSC-08) did not indicate the presence of any NAPL staining or sheens near the top of the water table. The eastern end of the proposed containment barrier will extend between well point P5 and well LS-24. LNAPL has not been detected in these wells or nearby wells LS-20, LS-22, LS-25, or RW-2. Perpendicular wing walls will extend along both sides of the proposed barrier wall. Based on these preliminary design parameters, the length of the proposed containment barrier along the riverbank is approximately 300 feet. With the addition of the wing walls, the overall length of the proposed containment barrier will be approximately 400 feet.

With respect to the vertical extent of the proposed containment barrier, it is anticipated that the sheetpiling will extend approximately 5 feet into the till layer. The top of the till layer along the riverbank area is somewhat variable, existing at elevations ranging from approximately 962 to 967 feet. Therefore, the corresponding base elevations of the barrier wall will range from about 957 to 962 feet.

Regarding the installation of the containment barrier relative to the riverbank, a location within the lower portion of the bank is anticipated. It will likely be installed with an upper elevation of 978 from its east end to approximately soil boring LSSC-13. From this point westward, the upper elevation of the wall will be 977 feet. The upper elevation of the barrier wall was conservatively selected based on the TPH data, although LNAPL sheens or staining was not observed above an elevation of 974 feet. It is anticipated that the wall will be installed approximately 2 to 5 feet from the river's edge for the majority of its length, and up to approximately 20 feet from the river's edge along its west end. This location has been selected based on several considerations, primarily including the ability to contain any NAPLs that may be present within this portion of the riverbank as well as the scope of future sediment and bank soil removal actions to be performed within this section of the river. A conceptual cross section of the proposed containment barrier is provided on Figure 8. Based on the deepest proposed bottom elevation of 957 feet, and a ground surface elevation corresponding to the proposed installation location (ranging from approximately 977 to 978 feet), the maximum necessary vertical length of sheetpiling for the containment barrier is approximately 20 to 21 feet. During preparation of the Detailed Design Report, the proposed bottom elevation of the sheetpiling will be evaluated based on consideration of the proposed excavation of any sediments and bank soils adjacent to the sheetpile wall. The vertical extent of the wall may be adjusted as needed based on the results of this geotechnical evaluation.

The type of sheetpile to be used for the proposed containment barrier will be consistent with that recently installed near GE's Building 68 area and that proposed to be installed elsewhere within the USEPA Area 4/ East Street Area 2 site (i.e., Waterloo-type sheetpile). Waterloo sheetpiling is used to create a low-permeability sheetpile wall that utilizes specially designed sheetpile joints and sealants to minimize any potential for water leakage through the sheetpile sections.

GE plans to continue operation of existing recovery wells RW-1(R), RW-2 and RW-3, which are located on the upgradient side of the proposed containment barrier. The capture zones of these recovery wells will continue to provide hydraulic control of the LNAPL and will be backed-up by the proposed barrier. Further assessment of the area hydraulics (with the addition of the proposed barrier) is ongoing. Additional details regarding the design of the proposed sheetpile installation, including performance standards, the results of hydraulic modeling, and structural design calculations, will be provided in a forthcoming submittal to the Agencies, as discussed in Part V of this letter.

IV. SITE RESTORATION

As illustrated on Figures 1 and 8, the bank along the river in the area of the proposed sheetpile wall is relatively steep. It varies in slope from approximately 1V:2.5H (i.e., 1 foot vertical to 2.5 feet horizontal) to approximately 1V:2H at the eastern and western ends of the proposed wall, while along the central portion of the proposed wall, the slope measures approximately 1.6V:1H. Due to the relative steepness of the riverbank in this area, the soil along the river side of the proposed sheetpile wall will likely become unstable in certain areas (probably not along the western end near the bridge) upon installation of the wall. As such, it will likely be necessary to remove some of the soil along the river side of the proposed wall prior to installation. Select quantities of this material are already proposed for removal as part of GE's *Removal Action Work Plan Upper ½ Mile Reach of Housatonic River* (½ - Mile Work Plan). The extent of any further bank soil removal will be presented in the Final Design Plan, discussed in Section V.

The restoration of this area will be coordinated with the restoration to be performed as part of the ½-Mile Work Plan. As part of these activities, an attempt will be made to restore the existing bank slope through the use of stone-filled gabions in the relatively vertical portions of the bank and loose stone rip-rap in the other areas. The timing of the restoration activities related to the ½-Mile Work Plan may require an interim restoration of the Lyman Street riverbank, which will involve the temporary placement of erosion control measure (e.g., silt fencing geotextile) along the base of the sheetpile wall.

V. NEAR-TERM ACTIVITIES

Concurrent with Agency review and comment concerning the contents of this letter, GE will perform detailed design-related activities for the containment barrier. The results of these design activities will be presented in a Detailed Design Report. Included in that report will be proposed performance standards and detailed design calculations, including final sheetpile layout and structural calculations, the results of the hydraulic modeling, and other potential implementation-related issues.

Additionally, as noted above in Section IV, as part of the detailed containment barrier installation, it may be necessary to propose the removal of additional riverbank soil (along the river side of the sheetpile wall) which is not currently proposed for removal as part of GE's ½-Mile Work Plan. In order to evaluate the potential presence of NAPL residuals in this material, GE proposes the collection of additional bank soil samples and analysis of this material (beyond that already performed by USEPA). Specifically, GE proposes

sampling at eight bank locations along the edge of the proposed sheetpile (see Figure 7). A number of these locations correspond to areas previously sampled by the USEPA and GE (SLO170, SLO229, SLO182, SLO232, SLO235, and LS-Soil). Samples will be collected utilizing a direct push sampling probe. It is anticipated that samples will be collected to a depth of 8 feet below grade, depending upon visual observation (e.g., staining, sheens) and sampling limitations. Soil samples from depths below the depths previously sampled by the USEPA will be analyzed in 1-foot increments for PCBs and TPH. At locations not previously sampled, analysis of PCBs and TPH will be performed in 1-foot increments from the surface.

GE also proposes to install an additional monitoring well on the west side of the Lyman Street bridge, near existing well LSSC-08. Although well LSSC-08 did not indicate the presence of LNAPL within soil samples at that location, the well screen does not intercept the top of the water table. Therefore, another well will be constructed at this location (as illustrated on Figure 7) with a well screen between the elevations of approximately 967 to 977 feet.

No additional sediment sampling is proposed since GE recently proposed in the ½-Mile Work Plan to remove the sediment along this portion of the river to depths of 1 to 2.5 feet.

VI. SUMMARY AND SCHEDULE

Upon approval of this conceptual design plan for the Lyman Street containment barrier by the USEPA, GE will install the proposed monitoring well, conduct the supplemental bank soil sampling and analysis activities described herein and will submit the results of these activities. Included with this submission will be a detailed design of the proposed containment barrier. That report will be submitted within approximately six weeks from Agency approval of this proposal. That document will also propose a schedule for sheetpile installation.

We look forward to receiving your comments regarding this letter, and specifically any comments related to the proposed NAPL containment barrier.

Yours truly,

John D Ciampa/KEA

John D. Ciampa
Remediation Project Manager
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cc: S. Acre, EPA*
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J. Bieke, Shea & Gardner*
J. Bridge, HSI GeoTrans*
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State Representative D. Bosley
Mayor G.S. Doyle
State Representative C.J. Hodgkins
State Representative S.P. Kelly
State Representative P.J. Larkin
State Senator A.F. Nuciforo
A. Thomas, GE*
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Pittsfield Conservation Commission*
Housatonic River Initiative
Public Information Repositories ECL I-P-IV(A)(1)* & (2)*

(* with tables and figures)

TABLE 1

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

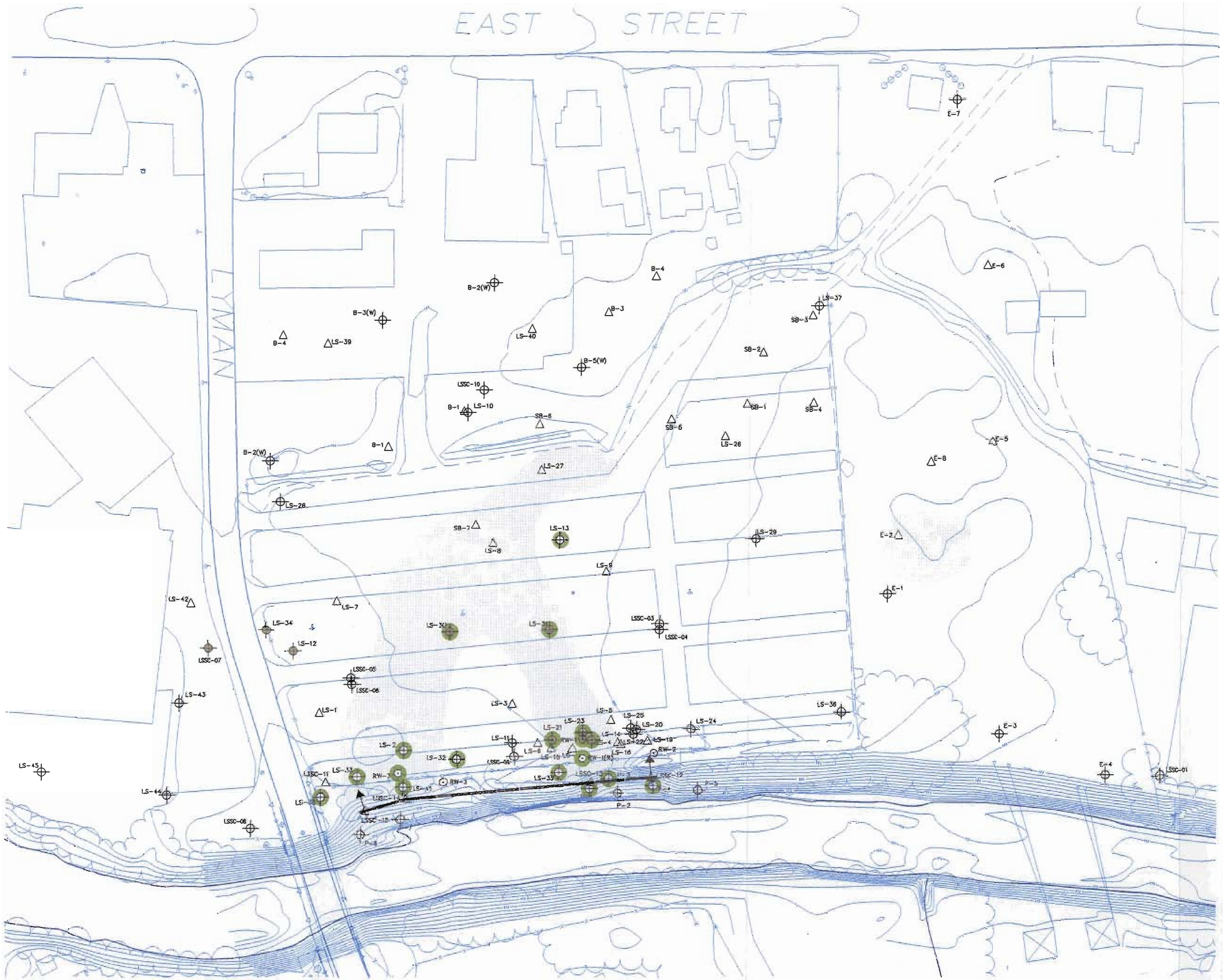
LYMAN STREET PARKING LOT / USEPA AREA 5A

RIVERBANK SUBSURFACE SOIL AND LNAPL SAMPLING SUMMARY - JANUARY 1999

SAMPLE LOCATION	SAMPLE DATE	SAMPLE TYPE	SAMPLE DEPTH (feet below grade)	SAMPLE ELEVATION (feet above MSL)	SAMPLE PID READING (instrument units)	STAINING OBSERVED	SHAKE TEST	TPH (ppm)
LSSC-12	1\29\99	Soil	0-1'	979-980	2.3	No	No	140
LSSC-12	1\29\99	Soil	1-2'	978-979	3.9	No	No	ND
LSSC-12	1\29\99	Soil	2-3'	977-978	11.4	No	No	1,400
LSSC-12	1\29\99	Soil	3-4'	976-977	2.8	No	No	5,900
LSSC-12	1\29\99	Soil	4-5'	975-976	2.5	No	No	9,300
LSSC-12	1\29\99	Soil	5-6'	974-975	2.0	No	No	23,000
LSSC-12	1\29\99	Soil	6-7'	973-974	2.4	Yes	No	22,000
LSSC-12	1\29\99	Soil	7-8'	972-973	5.0	Yes	Yes	13,000
LSSC-12	1\29\99	Soil	7-8' (Duplicate)	972-973	5.0	Yes	Yes	12,000
LSSC-13	1\29\99	Soil	0-1'	979-980	0.6	No	No	140
LSSC-13	1\29\99	Soil	1-2'	978-979	0.8	No	No	ND
LSSC-13	1\29\99	Soil	2-3'	977-978	1.1	No	No	140
LSSC-13	1\29\99	Soil	3-4'	976-977	1.2	No	No	ND
LSSC-13	1\29\99	Soil	4-5'	975-976	1.2	No	No	ND
LSSC-13	1\29\99	Soil	5-6'	974-975	1.3	No	No	ND
LSSC-13	1\29\99	Soil	6-7'	973-974	1.4	No	No	4,500
LSSC-13	1\29\99	Soil	7-8'	972-973	5.5	Yes	Sheen	21,000
LSSC-14	1\29\99	Soil	0-1'	979-980	0.6	No	No	180
LSSC-14	1\29\99	Soil	1-2'	978-979	1.1	No	No	ND
LSSC-14	1\29\99	Soil	2-3'	977-978	0.8	No	No	ND
LSSC-14	1\29\99	Soil	3-4'	976-977	0.7	No	No	920
LSSC-14	1\29\99	Soil	4-5'	975-976	0.6	No	No	1,200
LSSC-14	1\29\99	Soil	5-6'	974-975	0.6	No	No	2,900
LSSC-15	1\29\99	Soil	0-1'	979-980	0.1	No	No	120
LSSC-15	1\29\99	Soil	1-2'	978-979	0.2	No	No	ND
LSSC-15	1\29\99	Soil	2-3'	977-978	0.1	No	No	ND
LSSC-15	1\29\99	Soil	3-4'	976-977	0.2	No	No	ND
LSSC-15	1\29\99	Soil	3-4' (Duplicate)	976-977	0.2	No	No	ND
LSSC-15	1\29\99	Soil	4-5'	975-976	0.1	No	No	140
LSSC-15	1\29\99	Soil	5-6'	974-975	0.0	No	No	130
LSSC-15	1\29\99	Soil	6-7'	973-974	0.4	No	No	150
LSSC-15	1\29\99	Soil	7-8'	972-973	0.4	No	No	110
RW-1R	1\29\99	LNAPL	N/A	N/A	N/A	N/A	N/A	680,000
RW-3	1/29/99	LNAPL	N/A	N/A	N/A	N/A	N/A	640,000

Notes:

1. Samples were collected by Blasland, Bouck & Lee, Inc. and screened with a photoionization detector (PID) in the field.
2. Water shake tests were performed on all samples to evaluate the potential presence of LNAPL residuals.
   "No" indicates that no LNAPL residuals were observed.
   "Yes" indicates that LNAPL residuals were observed.
   "Sheen" indicates that a slight sheen formed on the water surface during the test.
3. Total Petroleum Hydrocarbon (TPH) analyses were conducted utilizing USEPA Method 418.1 by Northeast Analytical, Inc.
4. ppm: Dry weight parts per million.
5. ND: Not detected (detection limit of 100 ppm).
6. N/A: Not applicable.
7. LNAPL: Light Non-Aqueous Phase Liquid.



LEGEND:

- EXISTING INDEX ELEVATION CONTOUR
- EXISTING INTERMEDIATE ELEVATION CONTOUR
- DECIDUOUS TREE
- CONIFEROUS TREE
- MANHOLE
- CHAIN LINK FENCE
- POLE (NON-UTILITY)
- POLE (OVERHEAD UTILITY)
- APPROXIMATE DELINEATION OF FORMER OXBOWS
- LS-32 LNAPL OBSERVED (FROM 1998/1999 INVESTIGATIONS)
- DNAPL OBSERVED (FROM 1998/1999 INVESTIGATIONS)
- ES2-1 EXISTING MONITORING WELL
- RW-1(X) EXISTING PUMPING WELL
- X-11 EXISTING SOIL BORING
- LOCATION OF CROSS-SECTION N-N'

NOTES:

1. MAPPING IS BEST AVAILABLE INFORMATION AS OF 12/10/98 BASED ON MAPPING PROVIDED BY LOCKWOOD MAPPING, INC. PREPARED FROM 1990 AERIAL PHOTOGRAPHY; DATA PROVIDED BY GENERAL ELECTRIC; AND BLASLAND AND BOUCK ENGINEERS, PC. CONSTRUCTION PLANS. RIVERBANK AND RIVER BED TOPOGRAPHIC INFORMATION PROVIDED BY BBL FROM OCTOBER 12-23, 1998 FIELD SURVEY.
2. COORDINATE GRID BASED ON 1927 STATE PLANE COORDINATES.
3. ELEVATION DATUM REFERENCED TO NGVD 1929.
4. CONTOUR INTERVAL IN THE RIVER AND ON RIVERBANK = 1 FOOT CONTOUR. INTERVAL OUTSIDE RIVERBANK AREA = 2 FEET.
5. ALL SAMPLING LOCATIONS ARE APPROXIMATE.
6. NAPL = NON-AQUEOUS PHASE LIQUID. LNAPL = LIGHT NON-AQUEOUS PHASE LIQUID. DNAPL = DENSE NON-AQUEOUS PHASE LIQUID.

GRAPHIC SCALE

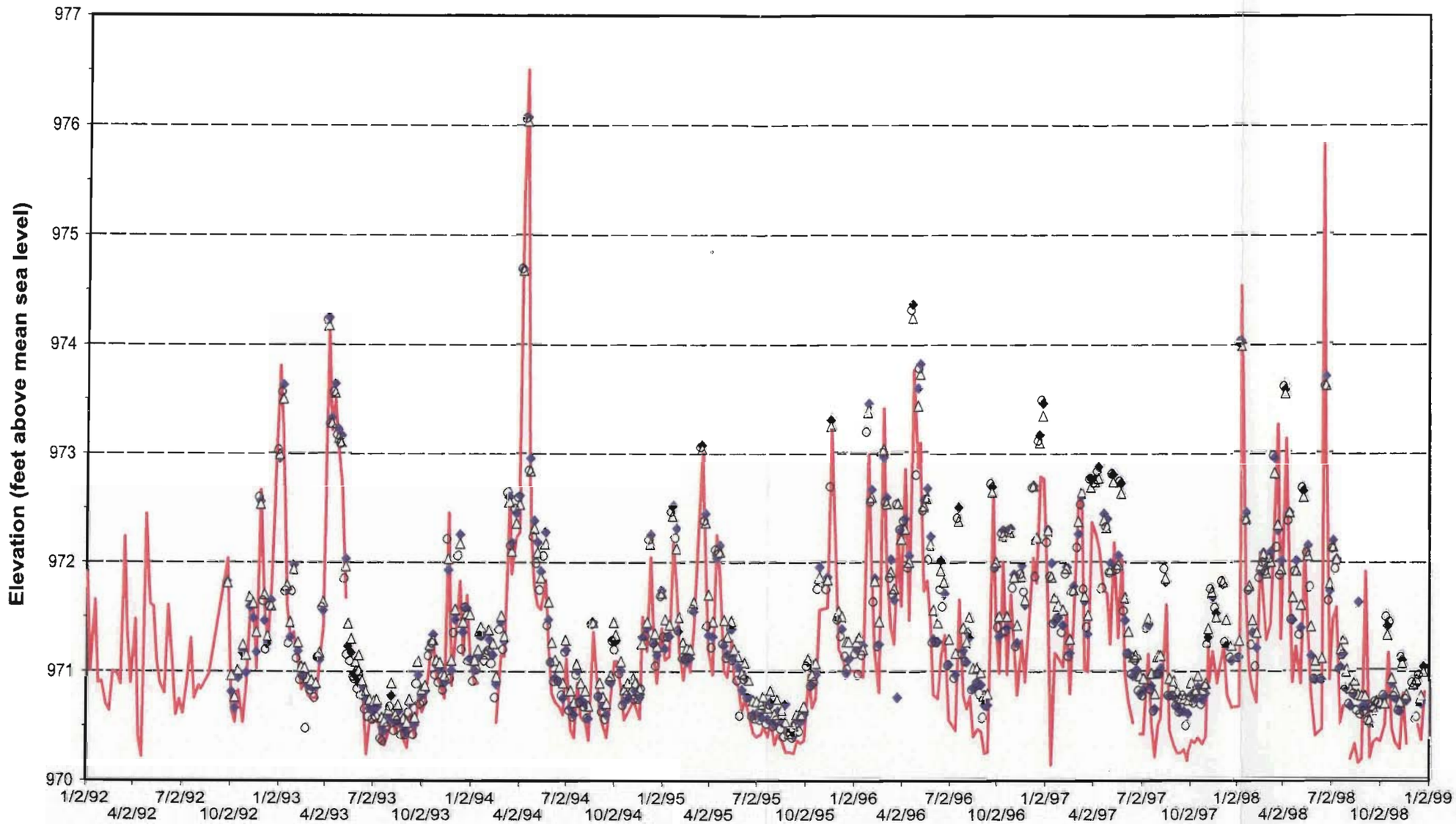
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

LYMAN STREET PARKING LOT SOURCE CONTROL INVESTIGATION

SITE PLAN

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 1



NOTES:

1. Data compiled by Golder associates.
2. River elevation data was not collected on the following dates: May 13-June 3, 1993; January 20 - February 10, 1994; June 19, 1997; July 30, 1998; and December 30, 1998.

LEGEND

◆ P-1 △ P-3 ○ P-4 — RIVER ELEVATION

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

LYMAN STREET PARKING LOT/ USEPA AREA 5A RIVERBANK AREA HYDROGRAPHS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 2

2/99 SYR-D54-DJH
20140005/20140g08.cdr

LS-28
LS-13
LS-34 (971.54)
LS-12 (971.33)
LS-30 (971.29)
LS-31 (972.01)
LSSC-03
LSSC-04
LSSC-07
LSSC-05
LSSC-06
LS-43 (971.48)
LS-23 (970.86)
LS-25
LS-20 (971.33)
LS-24 (971.01)
LS-21
LS-4 (970.90)
LS-22
LS-11 (970.91)
RW-1 (968.84)
RW-2 (985.50)
LS-2 (970.27)
RW-3 (967.85)
LS-32 (970.72)
LSSC-09
LS-33 (970.71)
LS-35 (970.71)
P-3 (970.70)
P-1 (970.67)
P-2 (970.67)
P-4 (970.68)
P-5 (970.88)
LS-41 (970.03)
LS-44 (971.50)
LS-38 (970.96)
P-7 (970.43)
LSSC-08
P-6 (970.38)
RIVER ELEVATION: 970.34
972
971

LEGEND:

- EXISTING INDEX ELEVATION CONTOUR
- EXISTING INTERMEDIATE ELEVATION CONTOUR
- DECIDUOUS TREE
- CONIFEROUS TREE
- MANHOLE
- CHAIN LINK FENCE
- POLE (NON-UTILITY)
- POLE (OVERHEAD UTILITY)
- APPROXIMATE DELINEATION OF FORMER OXBOWS
- ES2-1 EXISTING MONITORING WELL
- RW-3 EXISTING PUMPING WELL
- GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)

NOTES:

1. MAPPING IS BEST AVAILABLE INFORMATION AS OF 12/10/98 BASED ON MAPPING PROVIDED BY LOCKWOOD MAPPING, INC. PREPARED FROM 1990 AERIAL PHOTOGRAPHY; DATA PROVIDED BY GENERAL ELECTRIC; AND BLASLAND AND BOUCK ENGINEERS, PC. CONSTRUCTION PLANS. RIVERBANK AND RIVER BED TOPOGRAPHIC INFORMATION PROVIDED BY BBL FROM OCTOBER 12-23, 1998 FIELD SURVEY.
2. COORDINATE GRID BASED ON 1927 STATE PLANE COORDINATES.
3. ELEVATION DATUM REFERENCED TO NGVD 1929.
4. ALL SAMPLING LOCATIONS ARE APPROXIMATE.
5. SOME GROUNDWATER CONTOURS AROUND RECOVERY WELLS NOT SHOWN FOR CLARITY.

0 20' 40'
GRAPHIC SCALE

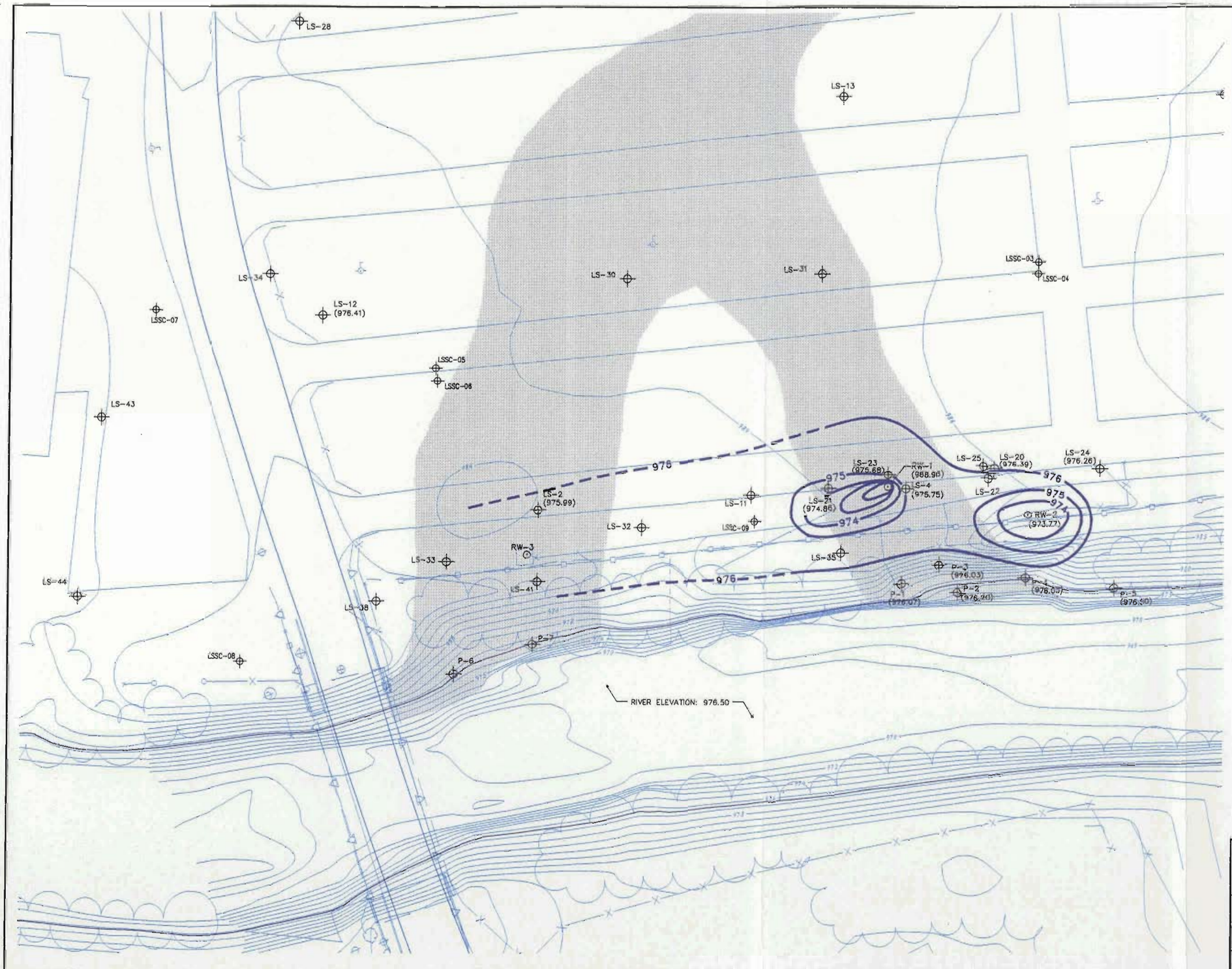
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
LYMAN STREET PARKING LOT
SOURCE CONTROL INVESTIGATION

GROUNDWATER ELEVATION CONTOUR MAP OCTOBER 1, 1998

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 3

X: 20140X1A,20140X1B
L: ON=*, OFF=*REF*
P: B01-D, B01-D2B
02/16/99 SYR-54-RLP RJM AK
20140005/DHOLLAND/20140B10.DWG



LEGEND:

- EXISTING INDEX ELEVATION CONTOUR
- EXISTING INTERMEDIATE ELEVATION CONTOUR
- DECIDUOUS TREE
- CONIFEROUS TREE
- MANHOLE
- CHAIN LINK FENCE
- POLE (NON-UTILITY)
- POLE (OVERHEAD UTILITY)
- APPROXIMATE DELINEATION OF FORMER OXBOWS
- ES2-1 EXISTING MONITORING WELL
- RW-1 EXISTING PUMPING WELL
- GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)

NOTES:

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2. COORDINATE GRID BASED ON 1927 STATE PLANE COORDINATES.
3. ELEVATION DATUM REFERENCED TO NGVD 1929.
4. ALL SAMPLING LOCATIONS ARE APPROXIMATE.
5. SOME GROUNDWATER CONTOURS AROUND RECOVERY WELLS NOT SHOWN FOR CLARITY.

0 20 40
GRAPHIC SCALE

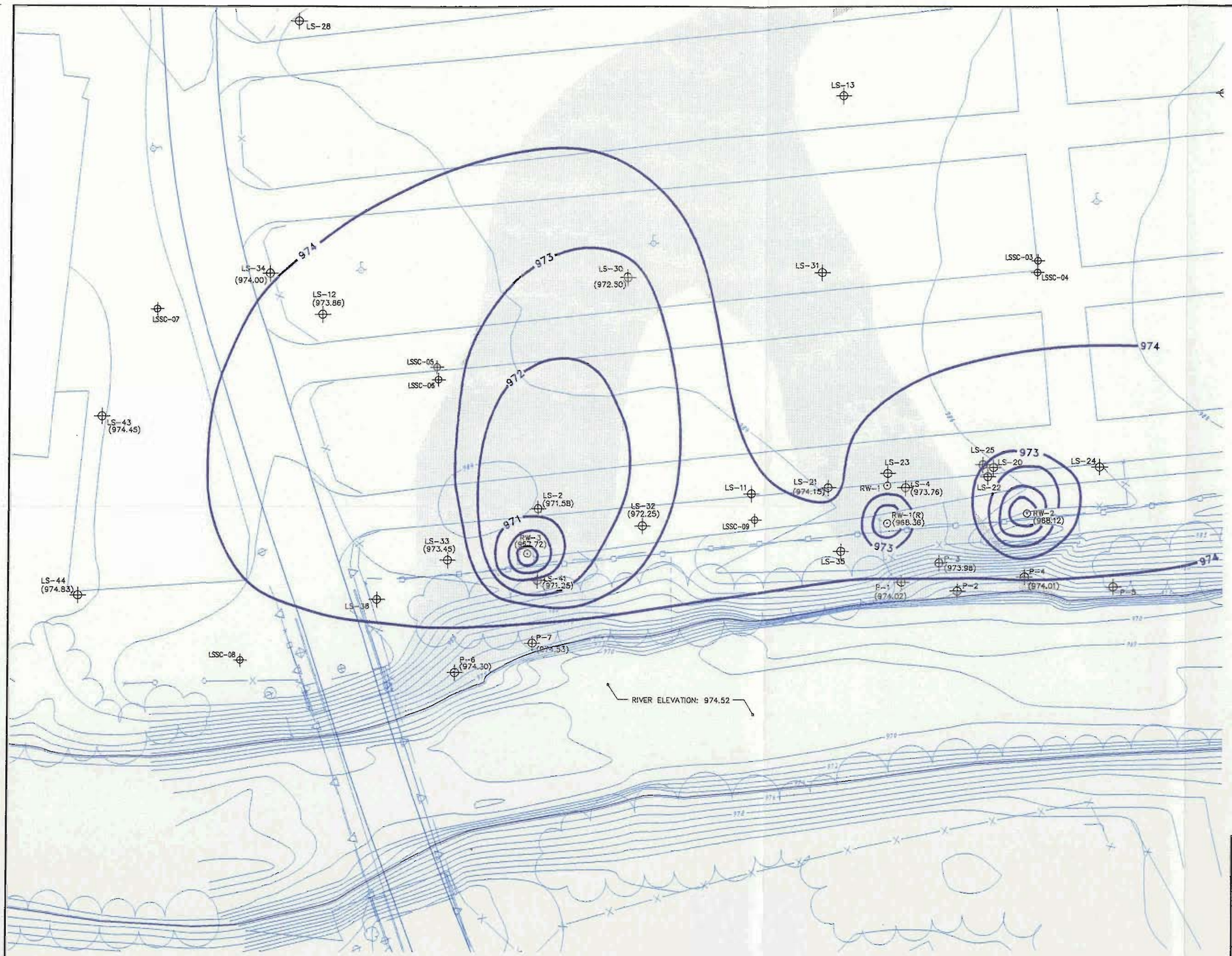
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
LYMAN STREET PARKING LOT
SOURCE CONTROL INVESTIGATION

GROUNDWATER ELEVATION CONTOUR MAP APRIL 13-14, 1994

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 4

x: 20140X1A,20140X1B
L: ON=*; OFF=*REF*
P: BG1-0, BG1-02B
03/15/99 SYR-34-REP R.M. AM
20140G05/DMOLLAND/20140B09.DWG



LEGEND:

- EXISTING INDEX ELEVATION CONTOUR
- EXISTING INTERMEDIATE ELEVATION CONTOUR
- DECIDUOUS TREE
- CONIFEROUS TREE
- MANHOLE
- CHAIN LINK FENCE
- POLE (NON-UTILITY)
- POLE (OVERHEAD UTILITY)
- APPROXIMATE DELINEATION OF FORMER OXBOWS
- ES2-1 EXISTING MONITORING WELL
- RW-3 EXISTING PUMPING WELL
- GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)

NOTES:

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2. COORDINATE GRID BASED ON 1927 STATE PLANE COORDINATES.
3. ELEVATION DATUM REFERENCED TO NGVD 1929.
4. ALL SAMPLING LOCATIONS ARE APPROXIMATE.
5. SOME GROUNDWATER CONTOURS AROUND RECOVERY WELLS NOT SHOWN FOR CLARITY.

0 20' 40'
GRAPHIC SCALE

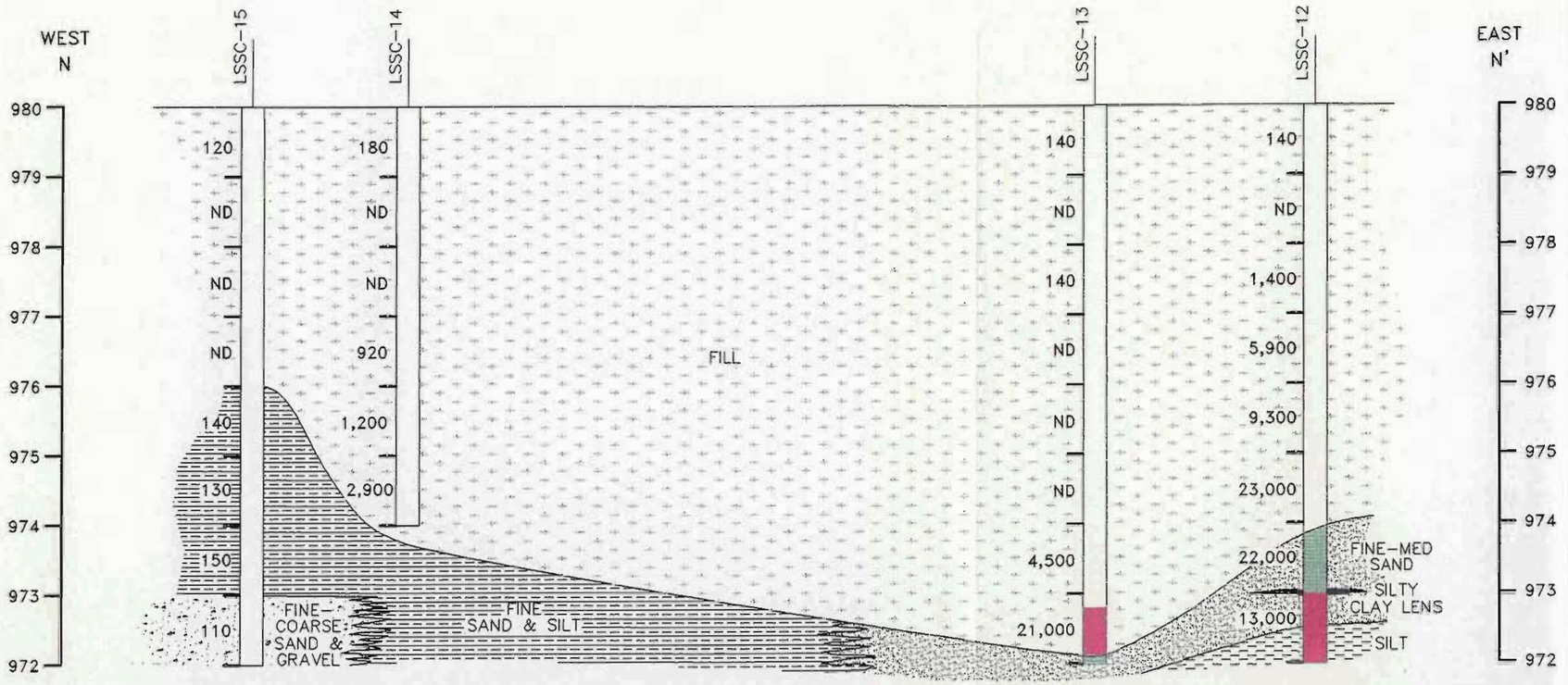
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
LYMAN STREET PARKING LOT
SOURCE CONTROL INVESTIGATION

GROUNDWATER ELEVATION CONTOUR MAP JANUARY 7-8, 1998

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 5

X: 20140X1A,20140X1B
L: ON=*, OFF=*REF*
P: B01-D, B01-D2B
02/16/99 SYR-54-RLP RJM AK
20140005/DHOLLAND/20140B05.DWG



LEGEND:

LSSC-15 BORING DESIGNATION

140 TOTAL PETROLEUM HYDROCARBON CONCENTRATION IN SOIL SAMPLE INTERVAL IN DRY WEIGHT PARTS PER MILLION

ND NOT DETECTED

STAINING OBSERVED ON SOIL SAMPLE

SHEEN OBSERVED DURING SOIL-WATER SHAKE TEST

0 2' 4'
VERTICAL GRAPHIC SCALE

0 30' 60'
HORIZONTAL GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
LYMAN STREET PARKING LOT
SOURCE CONTROL INVESTIGATION

CROSS SECTION N-N'

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE 6

L: ON=*; OFF=*REF
P: STD/PCP-BL
2/16/99 SYR-54-RCA
29140003\20140V06.DWG

LEGEND:

- PROPOSED CONTAINMENT BARRIER
- PROPOSED RIVER BANK SOIL BORING
- PROPOSED MONITORING WELL
- EXISTING INDEX ELEVATION CONTOUR
- EXISTING INTERMEDIATE ELEVATION CONTOUR
- DECIDUOUS TREE
- CONIFEROUS TREE
- MANHOLE
- CHAIN LINK FENCE
- POLE (NON-UTILITY)
- POLE (OVERHEAD UTILITY)
- APPROXIMATE DELINEATION OF FORMER OXBOWS
- ES2-1 EXISTING MONITORING WELL
- RW-3 EXISTING PUMPING WELL
- LS-1 EXISTING SOIL BORING

NOTES:

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2. COORDINATE GRID BASED ON 1927 STATE PLANE COORDINATES.
3. ELEVATION DATUM REFERENCED TO NGVD 1929.
4. ALL SAMPLING LOCATIONS ARE APPROXIMATE.

0 20' 40'
GRAPHIC SCALE

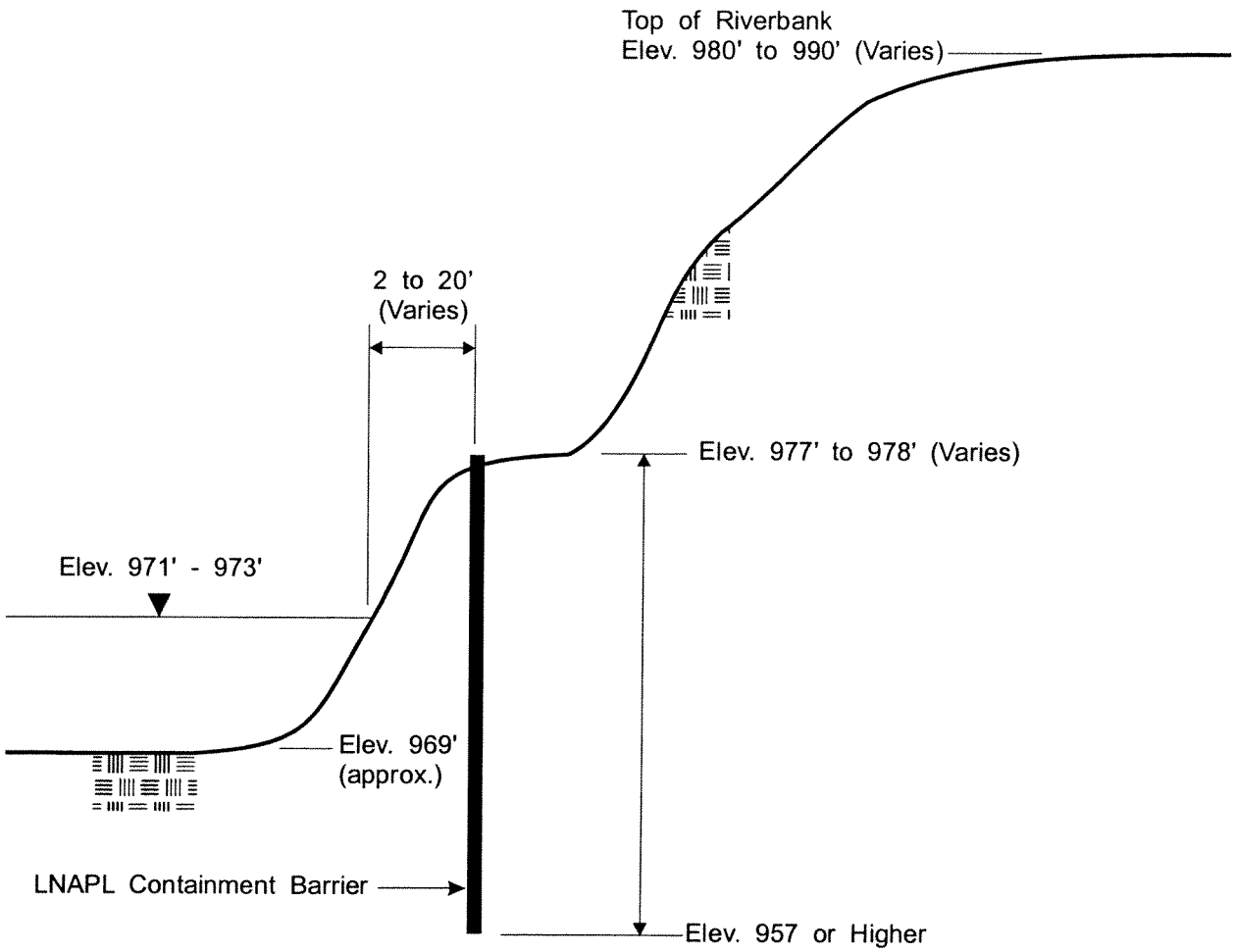
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
LYMAN STREET PARKING LOT
SOURCE CONTROL INVESTIGATION

PROPOSED CONTAINMENT BARRIER AND SUPPLEMENTAL SAMPLING LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 7

X: 20140X1A,20140X1B
L: ON=*, OFF=*REF*
P: B01-D, B01-02B
02/16/99 SYR-54-RLP RJM AK
20140005/BHOLLAND/20140B08.DWG



NOT-TO-SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
LYMAN STREET PARKING LOT
SOURCE CONTROL INVESTIGATIONS

CONTAINMENT BARRIER - CONCEPTUAL CROSS-SECTION

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE 8

02/98 SYR-D54-DJH
20140005/20140g09.cdr