2488/24404

SUMMARY REPORT

Interim Remedial Measure

Cambridge Industries
Canandaigua, New York

James R. Heckathorne, P.E.
Vice President

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O'BRIEN & GERE
ENGINEERS, INC.

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1. Introduction

1.1. General

This Summary Report documents the Interim Remedial Measure (IRM) conducted to address soil exhibiting volatile organic compounds (VOCs) at the Cambridge Industries site (Site #835010) located at 111 North Street, Canandaigua, New York. This IRM is the second of two IRMs completed at the site as discussed in Section 2.

Presented in Table 1-1 below are the soil Remedial Action Objectives (RAOs) that were established for the project. The RAOs were presented in the IRM Work Plan dated July 1998, which was submitted to the New York State Department of Environmental Conservation (NYSDEC) for approval on July 23, 1998. The RAOs were extracted from the NYSDEC Technical and Administrative Guidance Manual (TAGM) #4046, *Determination of Soil Cleanup Objectives and Cleanup Levels* (January 24, 1994).

Table 1-1. *Soil cleanup objectives - Cambridge Industries, Canandaigua, New York.*

Constituents	NYS TAGM (#4046) Recommended Soil Cleanup Levels (μg/kg)
Tetrachloroethylene	140
Trichloroethylene	70
1,1,1-Trichloroethane	80
1,2-Dichloroethylene	30
1,1-Dichloroethane	20
Methylene Chloride	10
Toluene	150
Xylenes	120
2- Butanone	30

Source: NYSDEC TAGM HWR-92-4046

To achieve these RAOs, Cambridge Industries excavated and processed soils from beneath and adjacent to the plant building which exhibited VOCs above the clean-up objectives. However, due to the location of the soils, lack of accessibility, and need to preserve the integrity of the structure, excavation efforts within the building did not reach RAOs in all instances. These instances are discussed in Section 3.2 of this report.

1.2. Report organization

The Summary Report includes a description of construction activities completed, including material processing, performance monitoring, and air sampling. For convenience, the Summary Report is divided into five sections. Section 2 presents a chronology of bench mark events and background information regarding the site. Section 3 describes the remedial actions completed at the site as required by the construction plans and specifications, and presents the results of verification sampling conducted pursuant to the requirements of the NYSDEC-approved IRM Work Plan. Section 4 describes the HASP monitoring activities that were conducted during the completion of the remedial activities. Based on these sections, conclusions and recommendations are presented in Section 5.

2. Background

The 4.5 acre site is located at 111 North Street in Canandaigua, New York and contains an approximate 29,000 square foot single story manufacturing and office building. The site is currently owned by Cambridge Industries and is presently unoccupied. A site location map is included as Figure 1, and a site plan showing the existing building is presented as Figure 2. The site is located in an industrial area bounded by Mobil Corporation Thin Plastics manufacturing facility to the north, the Canandaigua Wine Plant to the south, additional Cambridge Industries manufacturing facilities to the west, and Sonoco, a manufacturer of paper tubes and polyethylene bags, to the east. The ground surface slopes down steeply from North Street southward toward the building, with a relatively level area immediately north of the building.

Past site investigations indicated the presence of VOCs, predominately tetrachloroethylene (PCE) and trichloroethylene (TCE), in soil and ground water samples at the site. The VOC source area was established to be in the vicinity of the building where the former scupper drain was located (Figure 2). VOCs were also detected within the storm water ditch area.

2.1. First interim remedial measure

An Order on Consent (Index #B8-0279-89-06) between NYSDEC and the then owner, Voplex, was executed on July 7, 1994 and included implementation of an earlier IRM at the site. The first IRM included excavation and off-site disposal of soils containing elevated levels of barium from the storm water ditch area, which was performed by O'Brien and Gere Technical Services, Inc. in October 1995.

The storm system catch basins and associated underground piping, a buried 1,000 gallon settling tank, and a trench drain located inside the facility were addressed by removing the solids from inside the trench drain and sump, and pressure washing the inside of the drains and settling tank. This was followed by abandonment of the lines, trench, and tank in place by filling with concrete. These activities occurred in November 1995.

Also included as part of the first IRM was the construction and subsequent operation of a ground water collection and treatment system. This system consists of a recovery well which pumps collected ground water through an equalization tank, bag filtration unit, and two granular activated carbon (GAC) drums which are connected in series. The treated ground water is then discharged to a local publicly owned treatment works (POTW) facility. This system was installed and began operations in December 1995. In December 1996, an east/west interceptor trench located off the southeastern corner of the building was added to this ground water collection and treatment system (Figure 3). Quarterly sampling has been performed to evaluate the effectiveness of the ground water collection system.

A soil vapor extraction (SVE) well (SVE-7) was also installed in December 1996 inside the building next to the former chemical storage room. The location of SVE-7 is shown on Figure 4. The location of the well was selected based on past sampling events which identified this area as containing VOCs in excess of site soil cleanup objectives. An SVE unit was mobilized to the site and operation of the SVE system began in February 1997. Sampling events since that time have shown that the SVE system has removed soil vapor containing VOCs. However, the extent of removal was limited to the unsaturated zone and the system did not address saturated soils.

2.2. Second interim remedial measure

To expedite the cleanup process and achieve site delisting in as short a period as possible, Cambridge elected to undertake an aggressive approach to the remediation program through the removal of the VOC source material. The second IRM included excavation and treatment of a large percentage of the soils containing concentrated VOCs using a mechanical volatilization system (MVS). It is expected that residual VOCs remaining after completion of the second IRM will be largely bound to the soils and will not significantly partition to the ground water system.

In instances where residual concentrations suggest that partitioning could occur, iron filing addition to the backfilled soils would act to dechlorinate the compounds before they could migrate from the source area. The resultant decline in VOC concentrations in the ground water should also enable the NYSDEC to issue a Record of Decision (ROD) requiring no further remedial action at the site, and to reclassify the site as a Class 4. It is expected that with successful removal of the majority of the VOC mass,

the ground water recovery system can be shut down and replaced with a ground water monitoring program. An IRM Work Plan dated July 1998 was submitted on July 23, 1998 and received NYSDEC-approval by a December 2, 1998 letter.

In accordance with Section 3.2.1 of the IRM Work Plan and as shown on Figure 5, four soil borings (B-1, B-2, B-3 and B-4) were completed inside the building on August 25, 1998 to better define the extent of contaminated soils under the building. Two samples from each boring were submitted to a laboratory and analyzed for VOCs using EPA Method 8260. The results revealed the presence of VOCs, primarily PCE and TCE in the soil samples. The concentrations of VOCs detected in B-3 were significantly lower than those identified in B-1, B-2 and B-4. Furthermore, free product was observed in boring B-1 at a depth of approximately 10 ft below the floor of the building. This depth coincides with the interface between the silty clay aquitard and the overlying silty sand at this location. Based on analysis of a soil sample from this location, the free product was composed primarily of PCE and TCE with lesser amounts of toluene and xylene. These results suggested that VOCs in the form of DNAPL (dense non-aqueous phase liquids or "product") were concentrated along the building foundation as residual product (isolated globules) and as a pool of free product in the vicinity of B-1.

To better define the horizontal extent of the elevated levels of VOCs, another series of borings were completed on October 1 and 2, 1998. Eleven borings (GB-1 through GB-11) were installed at the locations shown on Figure 5. Up to two soil samples from each boring were submitted to a laboratory for VOC analysis using EPA Method 8260. The results indicated VOC concentrations significantly lower than those observed in borings B-1, B-2 and B-4, which supported the theory that the VOCs are predominantly centered toward the former scupper drain area and likely extend to approximately 10 feet within the interior of the building.

In addition to the boring program, a disposable bailer was used to assess the presence of free product in the soil vapor extraction (SVE) well SVE-7 and the ground water recovery well RW-1. RW-1 was found to contain free product. These results suggested that soils on top of the confining unit in the vicinity of RW-1 and B-1 may contain free product.

Based on the site investigations which were performed in August and October 1998 which included the installation, sampling and analysis of 15 soil borings inside the facility, an addendum to the IRM Work Plan dated July 1998 was presented to the NYSDEC on October 20, 1998. The

addendum was generated to incorporate additional soil excavation area into the IRM activities.

In preparation for the soil excavation program, a monitoring well was installed at the B-1 location for the purpose of recovering free product. Approximately 40 gallons of free product and contaminated ground water was recovered between January 1999 and June 1999.

2.3. Iron filings technology

In accordance with discussions with the NYSDEC on July 20, 1999, plans were also developed to use iron filings as a means to degrade residual chlorinated organics remaining in the source area following the excavation and on-site soil treatment. The proposed plan and supporting information is summarized below. The plan was developed in concept by EnviroMetal Technologies, Inc. (ETI) of Waterloo, Ontario, the holder of the patent for the use of zero-valence iron to dechlorinate chlorinated organic compounds. A copy of the letter from ETI discussing the approach to this program is attached for reference as Exhibit 1.

Information pertaining to the site characteristics following the excavations discussed in Section 3.1 was provided to ETI as part of their initial evaluation of the applicability of the technology. These characteristics included estimates of ground water concentrations, hydraulic conductivity, hydraulic gradient, and flow velocity in the area of concern, and are provided as Appendix A. Ground water concentrations in the source area were estimated using the concentrations of the treatment system influent as a basis. Both the current levels and the estimated levels (Appendix A) were provided to give ETI an understanding of the range of concentrations that could be expected. The hydrogeologic characteristics were based on information developed during investigations completed to date.

Based on review of the information provided regarding the site characteristics and the soil remediation program, ETI provided two scenarios for use of iron filings. The first scenario involved the mixing of iron with the soils placed back within the excavation which would typically be saturated. The second option involved placement of a 2 to 3 ft thick iron filing wall along the down gradient edge of the excavation. Given the complexity of the subsurface geology and the resultant flow of ground water from the source area, the first alternative of mixing iron with the treated soils

was selected. It is expected that this approach will maximize the potential for contact of ground water with the iron and optimize dechlorination process.

3. Remedial actions completed

As noted in Addendum 1 to the July 1998 IRM Work Plan, the objective of the IRM was to remove the majority of the VOCs within the soils. To accomplish this, soils beneath the building were excavated to the extent practicable. However, due to the location of the soils, lack of accessibility, and understanding the need to preserve the integrity of the structure, the excavation efforts within the building did not reach remedial action objectives (RAOs) in all instances.

This section describes the construction activities which were completed, and discusses areas where the RAOs may not have been achieved. This section also describes the monitoring that occurred while excavation activities were being completed.

3.1. Excavations

The intended area of excavation as presented in the letter dated July 6, 1999 to the NYSDEC is illustrated in Figure 6. This area was derived from data collected during previous site investigations efforts and was considered to represent the bulk of the VOCs. The excavation was completed in two stages, inside and outside of the building, to protect the integrity of the building foundation.

Prior to initiating the interior excavation, the ground water treatment system and the SVE treatment system were disconnected and moved away from the work area. The interior cinder block walls of the former chemical storage area and the adjacent loading dock area interior wall were also removed, and the floor was saw cut to reveal the underlying soils. A foundation encountered beneath the floors along the interior cinder block walls was also removed as needed to access the impacted soils.

As the soils were excavated from beneath the building, they were initially placed on plastic sheeting with hay-bale berms. The soils were then amended with lime as needed to dry out the material for processing through the MVS. The plastic sheeting, however, did not withstand the activities so

its use was discontinued. Instead, it was agreed with NYSDEC that four samples from beneath the processing/staging area would be collected for analysis following completion of the work and impacted soils scrapped from the surface if necessary.

The excavated soil was analyzed both before and after the MVS as required by the Work Plan. Soils suspected to contain significant levels of VOCs or free phase product, however, were segregated for off-site disposal. An ultraviolet (UV) light was utilized in the field to assist in the identification of the presence of dense non-aqueous phase liquid (DNAPL) or free phase product. In total, 50 cy (40 tons) of soils were loaded into two roll-offs for off-site disposal at the Waste Management, Inc. facility in

Consistent with the requirements of the NYSDEC-approved IRM Work Plan, the soils were handled and processed through the MVS using the following steps:

1. Soils were excavated and stockpiled in batches of approximately 200 cy. As necessary, lime was added to the soil to reduce the moisture content. The untreated soil stockpiles were also covered with polyethylene sheeting, when not being handled, to minimize exposure to precipitation. The soils were sampled for VOCs prior to MVS treatment to establish the processing rate necessary not to cause emissions more than the SCGs.

2. The stockpiled soils were screened to remove large, non-processible materials and debris. That material (such as large stones, bricks, timber, concrete, etc.) was collected and stockpiled separately and subsequently backfilled into the excavation.

3. The screened soils were loaded into and processed through the MVS where the soils were pulverized to reduce soil particle size, increase particle surface area, and promote volatilization of the VOCs. Soils that did not meet a particle size of ⅛" were retreated. The excavated soils were processed through the MVS at an average rate of approximately 20 to 40 tons per hour, resulting in emissions less than the SCGs.

4. One grab and one composite sample was obtained both before and after processing through the MVS, from each 200 c.y. soil stockpile, to evaluate VOC removal efficiency of the MVS process. The composite was prepared by obtaining a minimum of five grab samples from various points around the soil stockpile. The grab samples were composited with care to minimize volatilization by trying to leave the soils as undisturbed as possible and by trying to minimize head space in the completed,

composited sample container. The grab and composite sample of the post-processed soil were sent to a laboratory for analysis once VOC monitoring (via PID) indicated that the soil pile might conform to soil cleanup objectives.

The results of the pre- and post-processing sampling analyses are presented in Table 3-1. The laboratory reports are provided in Appendix C.

The results of the post-processing soil samples were also used to document that processed soils did not contain VOCs at levels above the RAOs. Table 1-1 presented earlier lists the site RAOs which were extracted from NYSDEC's TAGM#4046.

Soils not sufficiently processed, based on the results of the post-processing sampling and analyses, were reprocessed through the MVS and were subsequently re-characterized. These are identified on Table 3-1.

5. In addition to soil sampling activities described above, real-time VOC monitoring of soil and soil headspace was conducted both before and after processing the soil on a continuous basis using a photo ionization detector (PID). The PID monitoring was used to protect workers and the community from exposure to potentially dangerous levels of VOCs as discussed in Section 4, as well as to help evaluate whether further excavation or reprocessing of soils was likely.

6. Once the levels of VOC residues in the soil were below the RAOs, based on the results of the post-processing sampling and analyses, the separate stockpiles were designated for use as backfill on-site.

7. For structural reasons, the interior excavation was backfilled using flowable concrete. The treated soils were placed in and around the exterior excavation area.

8. Following backfilling, the exterior excavation was graded to promote drainage, and recovery well RW-1 was replaced. The berm and former lawn areas were re-seeded. The surface in front of the loading dock area will be paved in the spring of 2000.

The final limits of completed excavations are shown on Figure 7. In total, 1603 c.y. of soil was removed from outside the structure and from beneath the floor inside the structure. The excavation extended in depth to the top of the confining clay unit (present between 4 and 12 ft below grade) inside

and outside the building, and immediately around monitoring well MW-7S as shown on Figure 7. To preserve the integrity of the structure, excavation of soils beneath the exterior footers of the building occurred at no more than a one-on-one slope away from the bottom of the footers towards the interior or exterior of the building.

The RAOs were the goal for the removal actions at the site. However, structural integrity of the building was a priority in defining the extent of the excavation inside of the building and adjacent to it. An additional goal was to maintain the integrity of the clay confining layer present at the base of the excavations. Following removal of the soils to the extent possible, soil samples were collected from the sidewalls and floor of the excavations to document the level of success in meeting the RAOs.

3.2. Post-excavation verification sampling

As the excavations inside and outside the building progressed, soil samples were obtained from the base and walls of the excavations. As necessary based on the results, the excavations were extended to the extent practicable while protecting the structural integrity of the building and preserving the integrity of the clay confining layer encountered at the base of the excavations.

Figure 8 depicts the approximate locations where the final verification samples were collected from the outside excavation and the excavation around monitoring well MW-7S.

Figure 9 similarly depicts the approximate locations where the final verification samples were collected from the excavation below the floor of the existing building.

The soil samples were submitted to O'Brien & Gere Laboratories, Inc. in Syracuse, N.Y., an approved New York State Certified Laboratory, where they were analyzed for VOCs in accordance with EPA Method 8021. The results of the analyses are summarized in Table 3-2 and are shown on Figures 8 and 9. The laboratory reports for the post-excavation sampling analyses are provided in Appendix D.

As shown on Figures 8 and 9, residual levels of VOCs exceeding the RAOs remained at the floor of the excavation at the confining clay layer. The excavation was not extended deeper, however, to preserve the integrity of the confining layer. It is not expected that these residuals would migrate given the low permeability of the confining layer. Residual levels of VOCs also remained at the walls of the excavation; however, the excavations generally could not be extended without undermining the structural integrity of the building. Extension of the sidewalls was not deemed practicable as the VOCs were typically found to be present within the lower portions of the excavation.

It should be noted that the residual VOCs present, particularly along the east and south walls of the exterior, are predominantly those compounds which result from VOC degradation. As such, it is believed that the walls of the outside excavation are close to the outer fringes of the source area.

To address the residual VOCs remaining in the vicinity of the building, iron was added to the backfill to promote degradation of the VOCs as discussed below.

As agreed with NYSDEC, four samples from beneath the processing/ staging area were collected for VOC analysis using EPA Method 8260 following completion of the work. Tetrachloroethylene was detected in two of the four samples at levels of 6.4 μg/kg and 11 μg/kg respectively, below the cleanup objective of 140 μg/kg. No other VOCs were detected in the four samples. The laboratory reports for these analyses are included as part of Appendix E.

3.3. Iron filings addition

In accordance with the recommendations presented in Exhibit 1, iron filings were added to the excavated soils at a rate one 3,000 lb bag of iron to approximately 18.5 c.y. of soil, approximately 5% by weight. The iron was mixed with the soils using the hammermill prior to placement within the excavation. A total of 21 tons of iron, generated in accordance with ETI specifications, were delivered to the site by Connelly-GPM, Inc. A portion of the iron was also added to the backfill in the bottom 5 ft of the MW-7S excavation to degrade any residuals remaining in this area following excavation and treatment of the soils.

The iron filings in the main excavation were extended to contact the walls of the excavation at the southern and northern ends. This was done to minimize the potential for water from the source area to flow around, rather than through, the iron-containing soils.

Following placement of the iron-containing soils, the remaining volume of the treated soils was placed in the excavation in accordance with the letter to the NYSDEC dated August 6, 1999 from O'Brien & Gere (Exhibit 2).

4. Health & safety monitoring

4.1. Introduction

In accordance with the NYSDEC-approved IRM Work Plan and Health & Safety Plan, air monitoring was performed by the on-site crew during excavation. The monitoring consisted of Draeger tube and PID screening for VOCs, and real-time particulate monitoring. The objective of the monitoring was to document that VOC emissions at the property boundary were below the New York State SGCs, as presented in Air Guide 1. The air sampling and analysis results were also used as part of the monitoring requirements of the site-specific Health and Safety Plan developed for the site.

4.2. Air monitoring

Drager tube sampling for vinyl chloride was performed at the site while the source area soils were amended. Drager tube readings were taken to coincide, when possible, with peak volatile organic compound (VOC) levels measured by a photo ionization detector (PID). A PID was used continuously at the work zone and at the perimeter of the site at a point downwind of the work zone. The PID was equipped with a data recorder device to document readings. Drager tube sampling and analyses were used to monitor for the presence of VOCs both at the work zone and at the perimeter of the site at a point downwind of the work zone. The results of the air monitoring activities described above are presented in Appendix F.

Based on the results of the PID monitoring and Drager tube analyses, adjustments to soil processing rate were made or administrative controls were initiated, as required.

In addition to VOC monitoring, dust monitoring for particulate matter was performed continuously at the site perimeter, downwind of construction activities. Monitoring consisted of using MIE's DataRAM or equal, which is a direct-reading, real-time monitor for dust, smoke, fumes and mists capable of sensing concentrations over the range of 0.1 $\mu g/m^3$ to 100 mg/m^3. The results of the dust monitoring activities are also presented in Appendix F. When dust levels approached NYSDEC-established action levels, the MVS soil processing rate was decreased and dust suppression measures, such as application of water mist, were utilized until perimeter dust levels conformed to the action levels.

5. Conclusions

The overall remedial goal for the site is to meet applicable Standards, Criteria, and Guidance (SCGs) and be protective of human health and the environment. The remedial objectives include the following:

- Reduce, control, or eliminate soil contamination, to the extent practicable;
- Eliminate the potential for direct contact with contaminated soils;
- Mitigate the impacts of contaminated ground water to human health and the environment; and
- Provide for the attainment of SCGs for ground water quality to the extent practicable

The IRM completed at the Cambridge Industries site, focussed on meeting the remedial objectives listed above by:

- Treatment of contaminated soils to levels below SCGs to reduce soil contamination and reduce loading to the ground water system
- Placement of iron filings around soils along the foundation where soils containing VOCs could not be removed; and
- Placement of asphalt over the excavation area (Spring 2000) to reduce potential for direct contact with soils containing residual VOCs

An operation and maintenance program will be implemented which will include continued ground water collection via the recovery well and downgradient collection trench and treatment via activated carbon and discharge to the POTW. In addition, ground water will be monitored periodically to assess the effectiveness of the overall remedy. It is anticipated that contaminant concentrations in ground water will decrease sufficiently to allow cessation of ground water collection and ultimately delisting of the site. These decisions will be made in concert with the NYSDEC.

6. Certification

Based on the results of the laboratory analyses, field notes, and observations made during field visits, O'Brien & Gere Engineers, Inc. hereby certifies that the Interim Remedial Measure was completed in accordance with the 1994 IRM Order on Consent #B8-029-89-06 and the NYSDEC-approved IRM Work Plan dated July 1998 and supplemental field decisions as documented herein.

TABLE 3-1

PRE- and POST-PROCESSING SOILS DATA

INTERIM REMEDIAL MEASURE
CAMBRIDGE INDUSTRIES
CANANDAIGUA, NEW YORK

Location	Grab/ Composite	Date Collected	1,1-Dichloro-ethylene	cis-1,2-Dichloroethylene	Trichloro-ethylene	Tetrachloro-ethylene	1,1-Dichloro-ethane	1,1,1-Trichloro-ethane	Ethyl Benzene	Toluene	Xylene (total)	Methylene Chloride	2-Butanone	Acetone	4-Methyl 2-pentanone
Cleanup Goals			40	30	70	140	20	80		150	120	10	30		
PTB-1	Grab	07/14/99	<2.9	54	65	580E	<2.9	17	15	14	62	<5.8	<12	<12	<5.8
PTB-1	Composite	07/14/99	<2.9	20	81	350E	<2.9	14	15	18	48	7.9	15	<12	<5.9
ATB-1	**Grab**	**07/20/99**	**<2.8**	**<2.8**	**8**	**85**	**<2.8**	**<2.8**	**<2.8**	**<2.8**	**12**	**<5.6**	**48**	**85**	**<5.6**
ATB-1	**Composite**	**07/20/99**	**<2.8**	**<2.8**	**6.6**	**45**	**<2.8**	**<2.8**	**<2.8**	**<2.8**	**9.9**	**<5.6**	**29**	**46**	**<5.6**
PTB-2	Grab	07/21/99	<29	<29	36	700	<29	<29	<29	<29	87	<57	170	260	<57
PTB-2	Composite	07/21/99	<14	<14	100	790	<14	16	<14	22	33	<29	77	100	<29
ATB-2	Grab	07/26/99	<2.8	3	56	510E	<2.8	8.5	5	12	29	<5.6	57	180	<5.6
ATB-2	Composite	07/26/99	<2.8	<2.8	22	200	<2.8	3.4	<2.8	5	10	<5.6	38	110	<5.6
ATB-2R	**Grab**	**08/02/99**	**<2.6**	**<2.6**	**2.6**	**13**	**<2.6**	**<2.6**	**<2.6**	**<2.6**	**<2.6**	**<5.1**	**<10**	**19**	**<5.1**
ATB-2R	**Composite**	**08/02/99**	**<2.5**	**<2.5**	**<2.5**	**17**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**5.2**	**<5.0**	**38**	**68**	**<5.0**
PTO-1	Grab	07/28/99	<2.9	86	1100E	3500E	11	450E	6	55	35	<5.9	<12	<12	<5.9
PTO-1	Composite	07/28/99	<2.9	58	170	630E	4.4	56	<2.9	15	11	<5.8	<12	<12	<5.8
ATO-1	**Grab**	**08/02/99**	**<2.5**	**<2.5**	**<2.5**	**12**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<5.0**	**<10**	**16**	**<5.0**
ATO-1	**Composite**	**08/02/99**	**<2.5**	**<2.5**	**<2.5**	**13**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<5.0**	**<10**	**29**	**<5.0**
PTO-2	Grab	08/02/99	<2.8	25	260E	3600E	<2.8	58	6	46	42	<5.7	42	64	<5.7
PTO-2	Composite	08/02/99	4.7	560E	3400E	7800E	16	770E	43	490E	280	10	85	250	7
ATO-2	Grab	08/04/99	<24	<24	80	1500	<24	<24	<24	31	42	<47	290	440	<47
ATO-2	Composite	08/04/99	<20	<20	<20	200	<20	<20	<20	<20	<20	<40	150	210	<40
ATO-2R	**Grab**	**08/12/99**	**<4.7**	**<4.7**	**6.3**	**78**	**<4.7**	**<4.7**	**<4.7**	**<4.7**	**<4.7**	**<9.3**	**<19**	**40**	**<9.3**
ATO-2R	**Composite**	**08/12/99**	**<4.7**	**<4.7**	**<4.7**	**84**	**<4.7**	**<4.7**	**<4.7**	**<4.7**	**<4.7**	**<9.3**	**<19**	**39**	**<9.3**
PTO-3	Grab	08/03/99	<2.8	80	14	34	<2.8	2.8	<2.8	42	13	<5.6	87	400	5.7
PTO-3	Composite	08/03/99	<2.8	120	210	140	4.5	<2.8	<2.8	51	11	<5.6	17	110	<5.6
ATO-3	**Grab**	**08/09/99**	**<2.9**	**7.3**	**5.2**	**19**	**<2.9**	**<2.9**	**<2.9**	**<2.9**	**<2.9**	**<5.7**	**12**	**73**	**<5.7**
ATO-3	**Composite**	**08/09/99**	**<2.8**	**3.5**	**4.2**	**28**	**<2.8**	**<2.8**	**<2.8**	**<2.8**	**<2.8**	**<5.6**	**<11**	**86**	**<5.6**

TABLE 3-1

PRE- and POST-PROCESSING SOILS DATA

INTERIM REMEDIAL MEASURE
CAMBRIDGE INDUSTRIES
CANANDAIGUA, NEW YORK

Location	Grab/ Composite	Date Collected	1,1-Dichloro-ethylene	cis-1,2-Dichloroethylene	Trichloro-ethylene	Tetrachloro-ethylene	1,1-Dichloro-ethane	1,1,1-Trichloro-ethane	Ethyl Benzene	Toluene	Xylene (total)	Methylene Chloride	2-Butanone	Acetone	4-Methyl 2-pentanone
Cleanup Goals			40	30	70	140	20	80		150	120	10	30		
PTO-4	Grab	08/04/99	<19	520	2100E	7600E	42	39	43	670	310	<39	210	4300E	82
PTO-4	Composite	08/04/99	<20	75	740	3700E	<20	27	<20	98	32	<40	200	1400	<40
ATO-4	Grab	08/09/99	<4.6	<4.6	13	82	<4.6	<4.6	<4.6	<4.6	<4.6	<9.3	<19	90	<9.3
ATO-4	Composite	08/09/99	<5.5	11	78	440E	<5.5	<5.5	<5.5	16	9.1	<11	<22	170	<11
ATO-4R	**Grab**	**08/19/99**	**<2.7**	**<2.7**	**15**	**69**	**<2.7**	**<2.7**	**<2.7**	**<2.7**	**<2.7**	**<5.5**	**<11**	**18**	**<5.5**
ATO-4R	**Composite**	**08/19/99**	**<3.3**	**<3.3**	**4.2**	**21**	**<3.3**	**<3.3**	**<3.3**	**<3.3**	**<3.3**	**<6.6**	**<13**	**23**	**<6.6**
PTO-5	Grab	08/09/99	<5.8	21	87	16	<5.8	<5.8	<5.8	10	<5.8	<12	<23	130	<12
PTO-5	Composite	08/09/99	<5.7	38	59	16	<5.7	<5.7	<5.7	15	<5.7	<11	28	410	<11
ATO-5	**Grab**	**08/12/99**	**<6.7**	**<6.7**	**<6.7**	**25**	**<6.7**	**<6.7**	**<6.7**	**<6.7**	**<6.7**	**<13**	**<27**	**110**	**<13**
ATO-5	**Composite**	**08/12/99**	**<4.6**	**14**	**23**	**53**	**<4.6**	**<4.6**	**<4.6**	**9.3**	**<4.6**	**<9.3**	**<19**	**95**	**<9.3**

Notes:
Results in ug/Kg dry weight
PTB - Pre-treatment building excavation
ATB - After treatment building excavation
PTO - Pre-treatment outside excavation
ATO - After treatment outside excavation
R designates retreated pile
Bold values presented are final results following treatment

TABLE 3-2

POST-EXCAVATION VERIFICATION SAMPLING RESULTS

INTERIM REMEDIAL MEASURE
CAMBRIDGE INDUSTRIES
CANANDAIGUA, NEW YORK

Location	Date Collected	1,1-Dichloro-ethylene	cis-1,2-Dichloroethylene	Trichloro-ethylene	Tetrachloro-ethylene	1,1-Dichloro-ethane	1,1,1-Trichloro-ethane	Ethyl Benzene	Toluene	Xylene (total)	Methylene Chloride	2-Butanone	Acetone	4-Methyl 2-pentanone
Cleanup Goals		40	30	70	140	20	80		150	120	10	30		
OSWN1	08/09/99	<2.8	20	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<5.6	<14	<14	<7.0
OSWN2	08/12/99	<6.6	1300E	<6.6	<6.6	67	<6.6	<6.6	200	15	<13	31	800	21
OSWE1	08/09/99	<3.0	200	4.7	4.9	3.5	<3.0	<3.0	6.7	3.9	<5.9	<12	<12	<5.9
OSWE1R	08/12/99	<7.5	520	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<15	<30	<30	<15
OSWE2	08/12/99	<9.3	140	<9.3	<9.3	<9.3	<9.3	<9.3	10	<9.3	<19	<37	<37	<19
OSWS1	08/09/99	23	1200 E	17	44	28	11	4	13	6.6	<6.1	1100E	<12	<6.1
OSWS1R	08/12/99	<3.0	21	<3.0	3.8	<3.0	<3.0	<3.0	<3.0	<3.0	<6.0	<12	27	<6.0
OSWS2	08/12/99	<22	2000E	<22	<22	75	<22	29	460	180	<43	<87	1000	<43
OB1	08/09/99	210	1100	52	<7.2	160	<7.2	<7.2	<7.2	<7.2	830E	88	6200E	15
OB2	08/09/99	<7.2	24	270	340	110	39	<7.2	14	<7.2	150	35	1000	<14
OB3	08/09/99	15	2200E	1500E	<11	200	<11	<11	160	<11	730	68	1900E	43
OB4	08/09/99	140	660E	<7.1	<7.1	64	<7.1	<7.1	<7.1	<7.1	310	<28	7000E	<14
7SN	08/09/99	<15	420	<15	<15	22	<15	<15	<15	<15	<29	<59	<59	<29
7SE	08/09/99	<3.0	50	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<5.9	<12	15	<5.9
7SS	08/09/99	<5.0	110	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<9.9	<20	<20	<9.9
7SW	08/09/99	<7.5	120	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<15	<30	38	<15
7SB	08/09/99	<6.9	60	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<14	<28	42	<14
BSW-N	07/21/99	<3.1	5.8	13	49	<3.1	3.1	<3.1	<3.1	<3.1	<6.2	<12	<12	<6.2
BSW-NW	07/21/99	<3.0	<3.0	12	41	<3.0	3.2	<3.0	<3.0	<3.0	<6.1	<12	<12	<6.1
NSW-NE	07/21/99	21	990	1700E	2300E	100	60	17	150	96	<29	<58	110	<29
BB-N	07/21/99	<15	72	48	88	21	<15	<15	<15	<15	<29	<59	<59	<29
SVE-SW-W	07/21/99	<2.9	20	11	66	<2.9	<2.9	<2.9	<2.9	<2.9	<5.9	<12	19	<5.9
BBC-SVE7	07/22/99	120	4600E	170	260	490	<14	<14	480	29	<28	100	790	<28
BSW-SW	07/23/99	<15	270	83	210	26	<15	<15	<15	<15	<30	<61	<61	<30

TABLE 3-2

POST-EXCAVATION VERIFICATION SAMPLING RESULTS

INTERIM REMEDIAL MEASURE
CAMBRIDGE INDUSTRIES
CANANDAIGUA, NEW YORK

Location	Date Collected	1,1-Dichloro-ethylene	cis-1,2-Dichloroethylene	Trichloro-ethylene	Tetrachloro-ethylene	1,1-Dichloro-ethane	1,1,1-Trichloro-ethane	Ethyl Benzene	Toluene	Xylene (total)	Methylene Chloride	2-Butanone	Acetone	4-Methyl 2-pentanone
Cleanup Goals		40	30	70	140	20	80		150	120	10	30		
BB-S	07/23/99	21	1800E	140	1100	280	<15	29	720	170	<29	120	1500	51
BSW-S	07/23/99	15	290	33	63	84	<15	<15	78	<15	<30	<59	130	<30
BSW-SE	07/23/99	<14	300	21	86	15	<14	<14	79	<14	<29	6500E	2000	61
WEST WALL #1-A	08/16/99	<20	<20	<20	110	<20	<20	<20	<20	54	<40	640	140	<40
WEST WALL #1-B	08/16/99	<21	55	<21	62	<21	<21	<21	<21	38	<41	1900	300	<41
WEST WALL #2-A	08/16/99	<17	<17	<17	240	<17	<17	<17	<17	21	<35	<70	<70	<35
WEST WALL #2-B	08/16/99	<21	<21	<21	330	<21	<21	<21	<21	<21	<41	<82	<82	<41

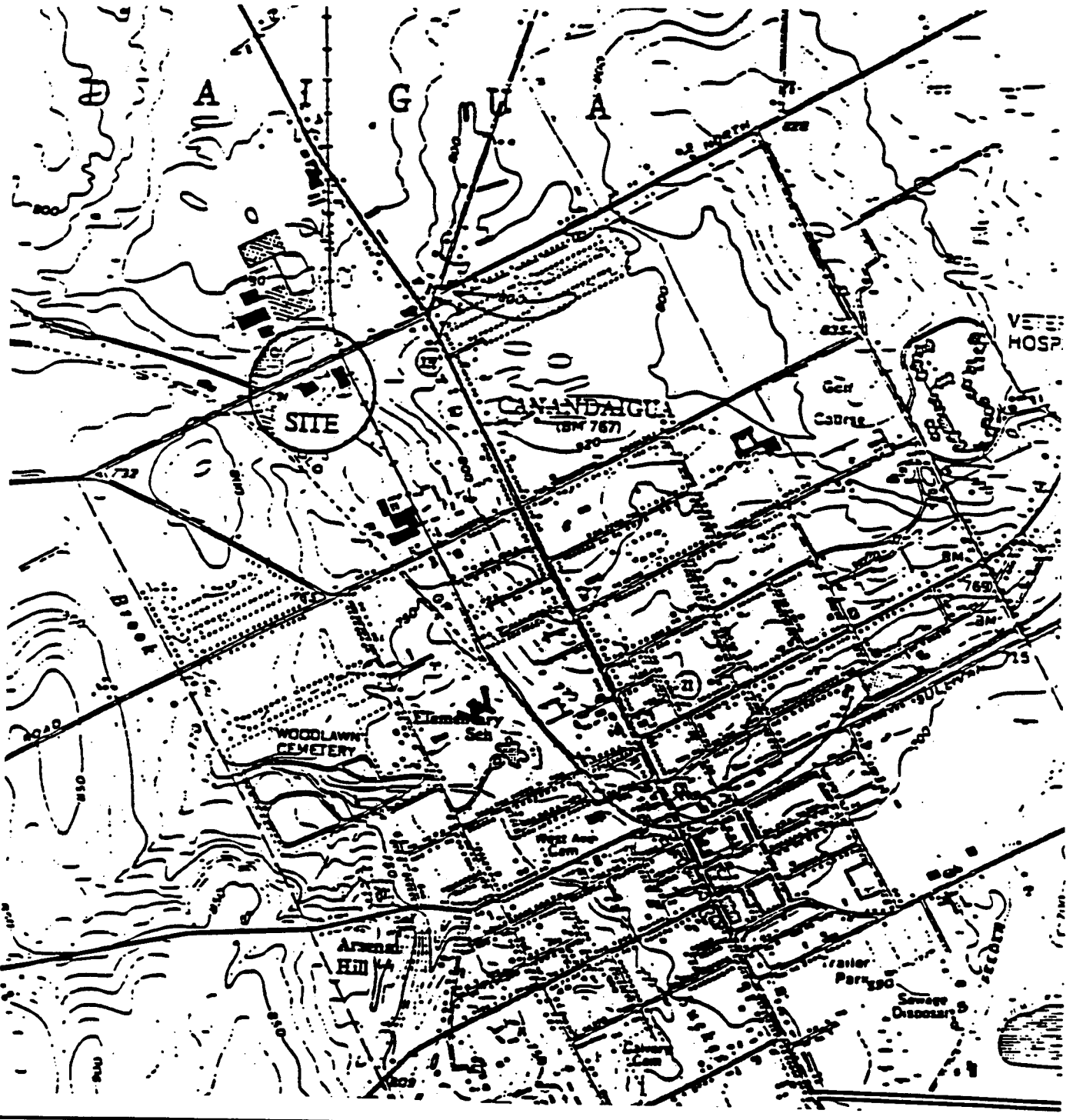
NOTES: (1) Data reported in ug/Kg dry weight

(2) Vinyl chloride also detected at 180 ug/kg in BSW-S

(3) "R" identifier in location name designates that further excavation was completed and a new sample was collected.

MWH I: \DIV71\PROJECTS\6612004\DWG\RMSR\006.DWG SF:1

FIGURE 1



ADAPTED FROM 7.5 MIN. U.S.G.S. CANANDAIGUA QUADRANGLE, QUAD MAP

STATE LOCATION MAP

CAMBRIDGE INDUSTRIES, INC. CANANDAIGUA, NY
INTERIM REMEDIAL MEASURE SUMMARY REPORT

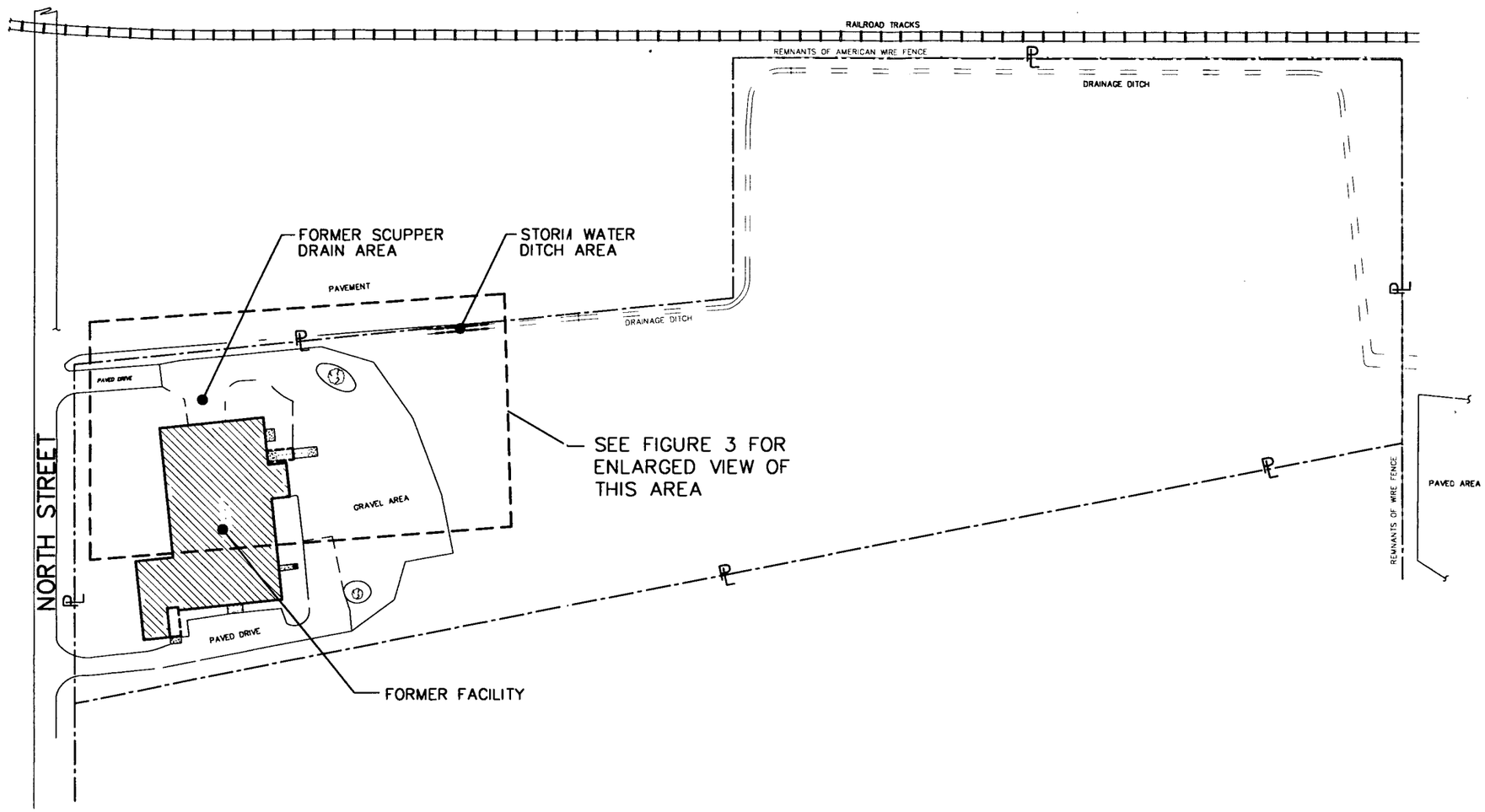
SITE LOCATION MAP

FILE NO. 6612.004.006
DATE: SEPTEMBER 1999

0 2000 4000
APPROX. SCALE IN FEET

O'BRIEN & GERE

FIGURE 2



REV DATE: 9/24/99

LEGEND

PL — PROPERTY LINE

CAMBRIDGE INDUSTRIES, INC.
CANANDAIGUA, NEW YORK
INTERIM REMEDIAL MEASURE
SUMMARY REPORT

SITE PLAN

0 150 300

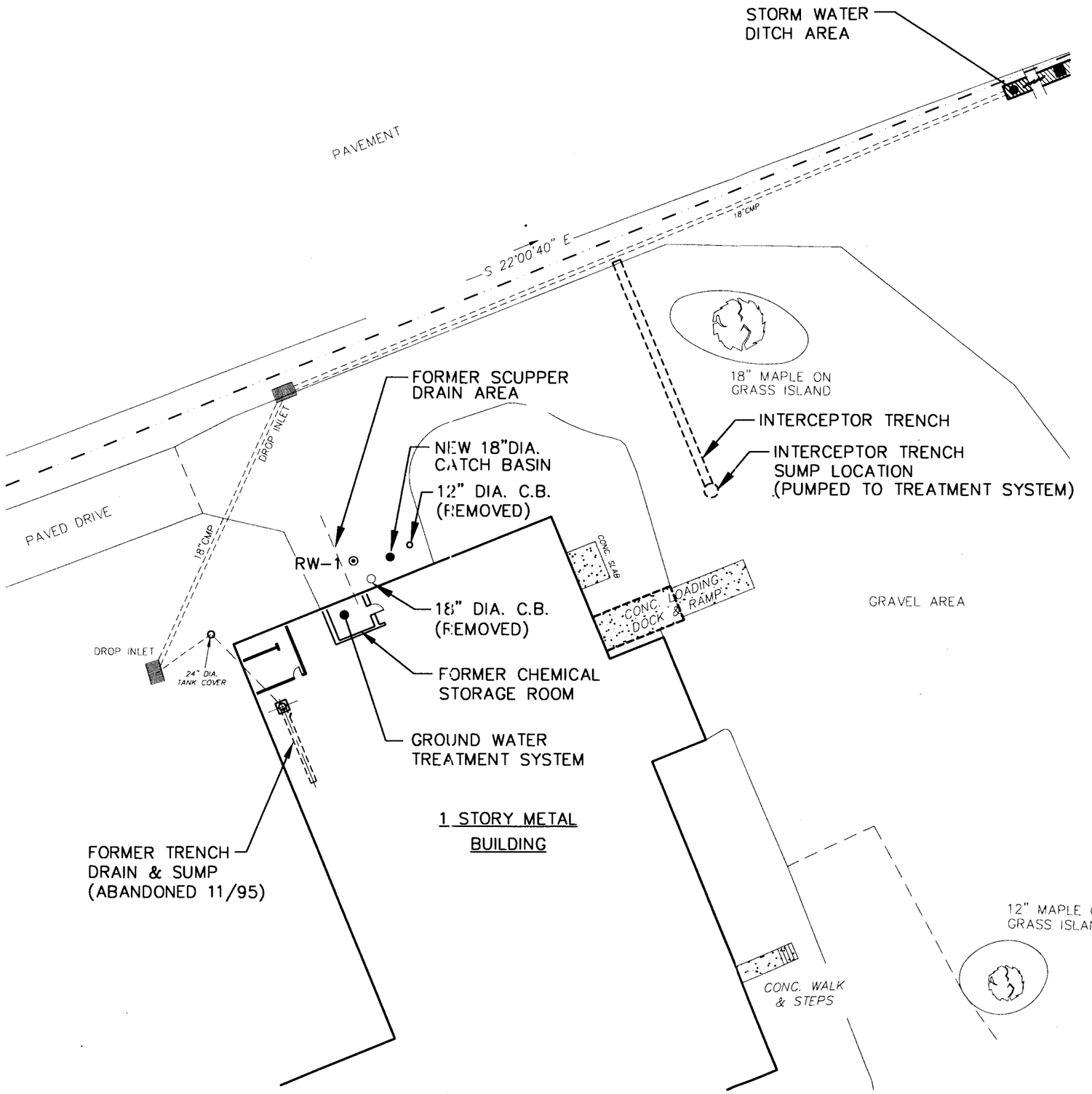
SCALE IN FEET

DATE: SEPTEMBER 1999

FILE NO. 6612.004.007

O'BRIEN & GERE ENGINEERS INC.

FIGURE 3



REV DATE: 9/24/99

CAMBRIDGE INDUSTRIES, INC.
CANANDAIGUA, NEW YORK
INTERIM REMEDIAL MEASURE
SUMMARY REPORT

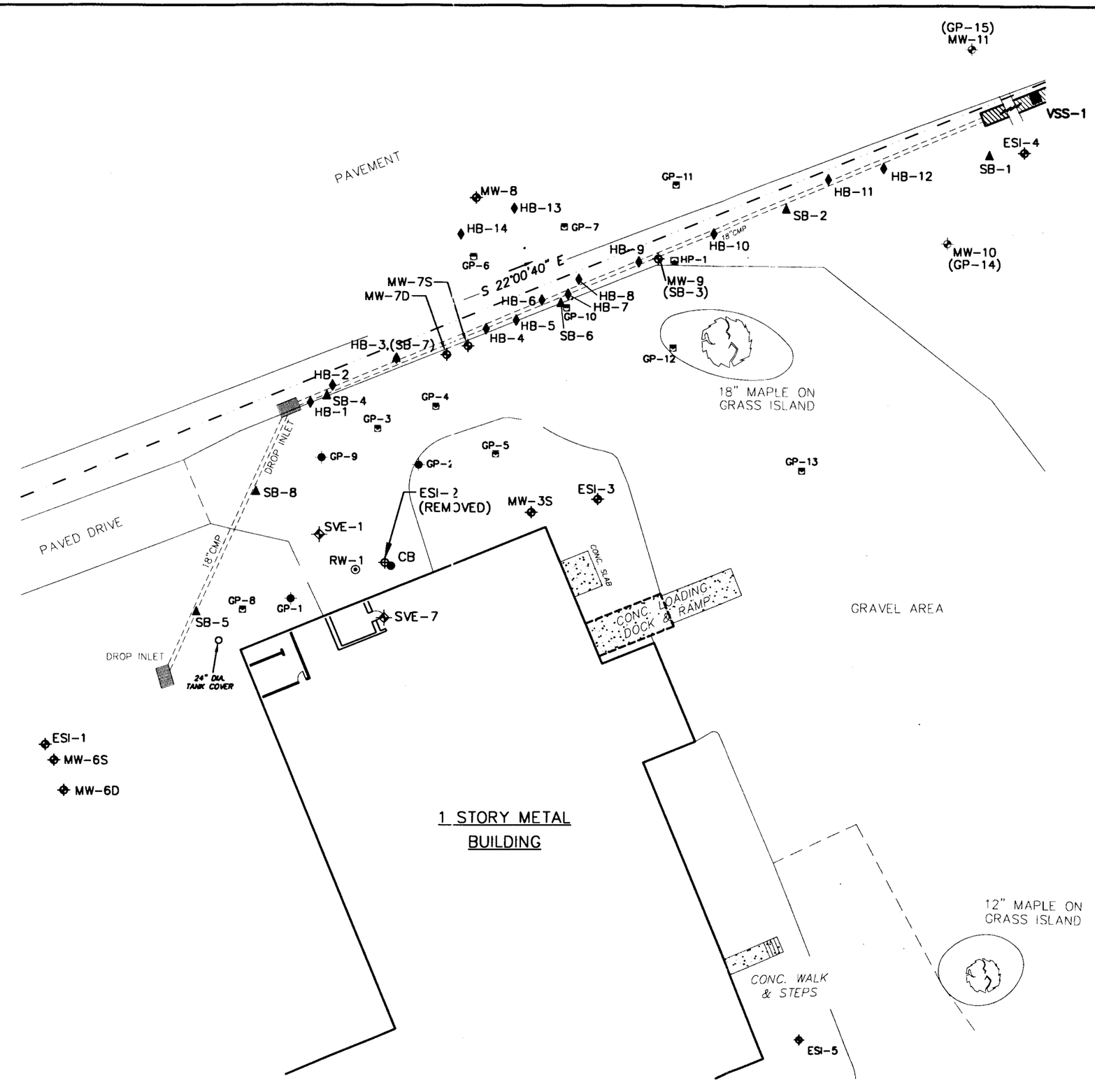
PARTIAL SITE PLAN

0 40 80
SCALE IN FEET

DATE: SEPTEMBER 1999
FILE NO. 6612.004.008

O'BRIEN & GERE
ENGINEERS INC.

FIGURE 4



REV DATE: 9/24/99

LEGEND

- MW-3S — SHALLOW GROUND WATER MONITORING WELL
- MW-7D — DEEP GROUND WATER MONITORING WELL
- ESI-3 — APPROXIMATE LOCATION OF MONITORING WELL
- SVE-1 — APPROXIMATE LOCATION OF SOIL VAPOR WELL
- APPROXIMATE LOCATION OF RECOVERY WELL
- VERIFICATION SOIL SAMPLE (VSS)-1
- SOIL BORING LOCATION
- HAND AUGER LOCATION
- DIRECT PUSH BORINGS WITH WELLS LEFT IN PLACE
- ABANDONED DIRECT PUSH BORINGS
- GROUND WATER VERTICAL PROFILE LOCATION

CAMBRIDGE INDUSTRIES, INC.
CANANDAIGUA, NEW YORK
INTERIM REMEDIAL MEASURE SUMMARY REPORT

SAMPLING LOCATION PLAN

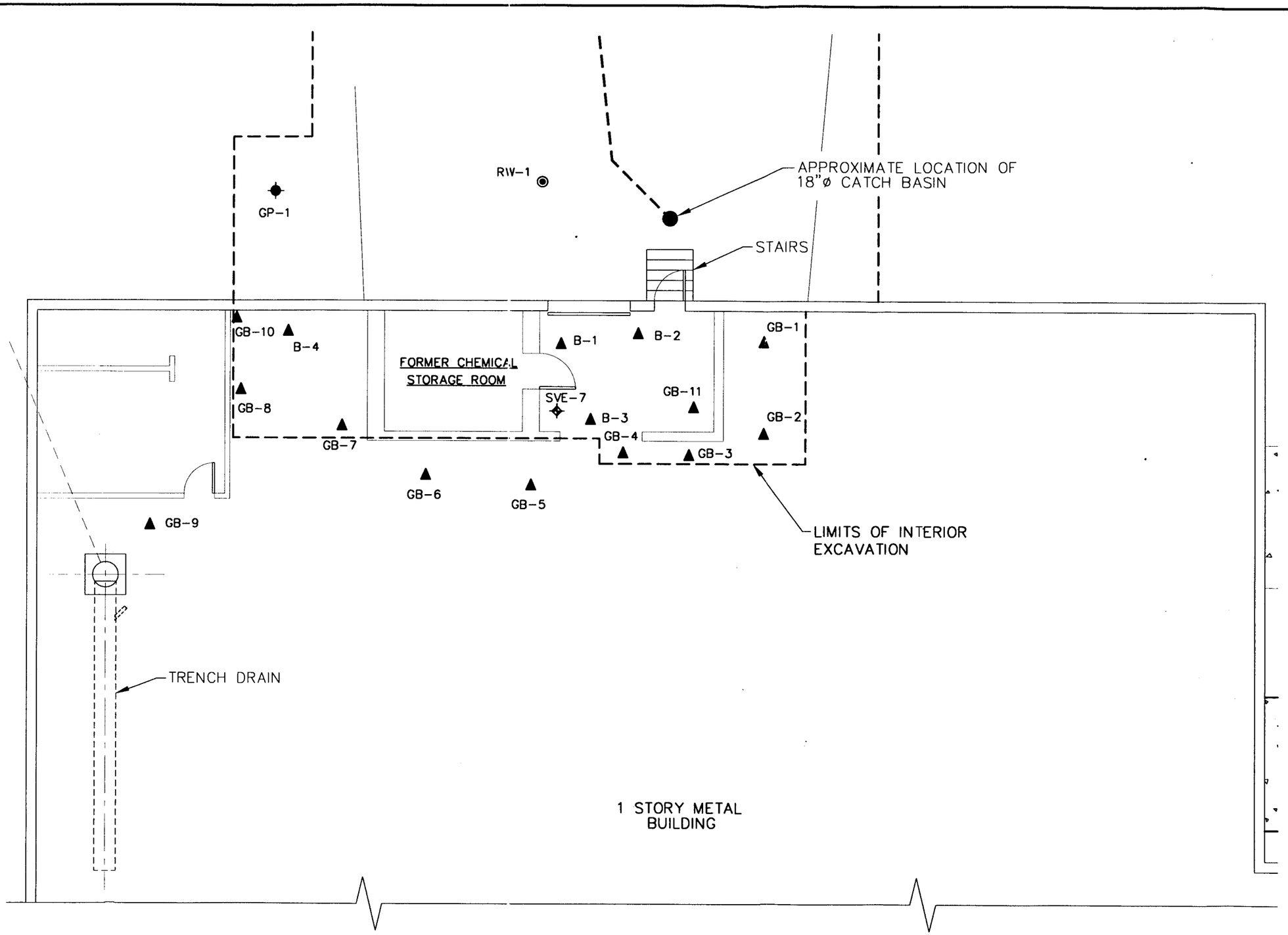
0 40 80
SCALE IN FEET

DATE: SEPTEMBER 1999
FILE NO. 6612.004.009

O'BRIEN & GERE ENGINEERS, INC.

MWH I: \DIV71\PROJECTS\6612004\DWG\71\004.DWG SF:1 (10)

FIGURE 5



LEGEND

- ▲ SOIL BORING
- SVE-1 ✦ SVE WELL
- RW-1 ◉ RECOVERY WELL
- MW-9 ⊕ MONITORING WELL

CAMBRIDGE INDUSTRIES, INC.
CANANDAIGUA, NEW YORK

SOIL BORING LOCATION PLAN

10 0 10

SCALE IN FEET

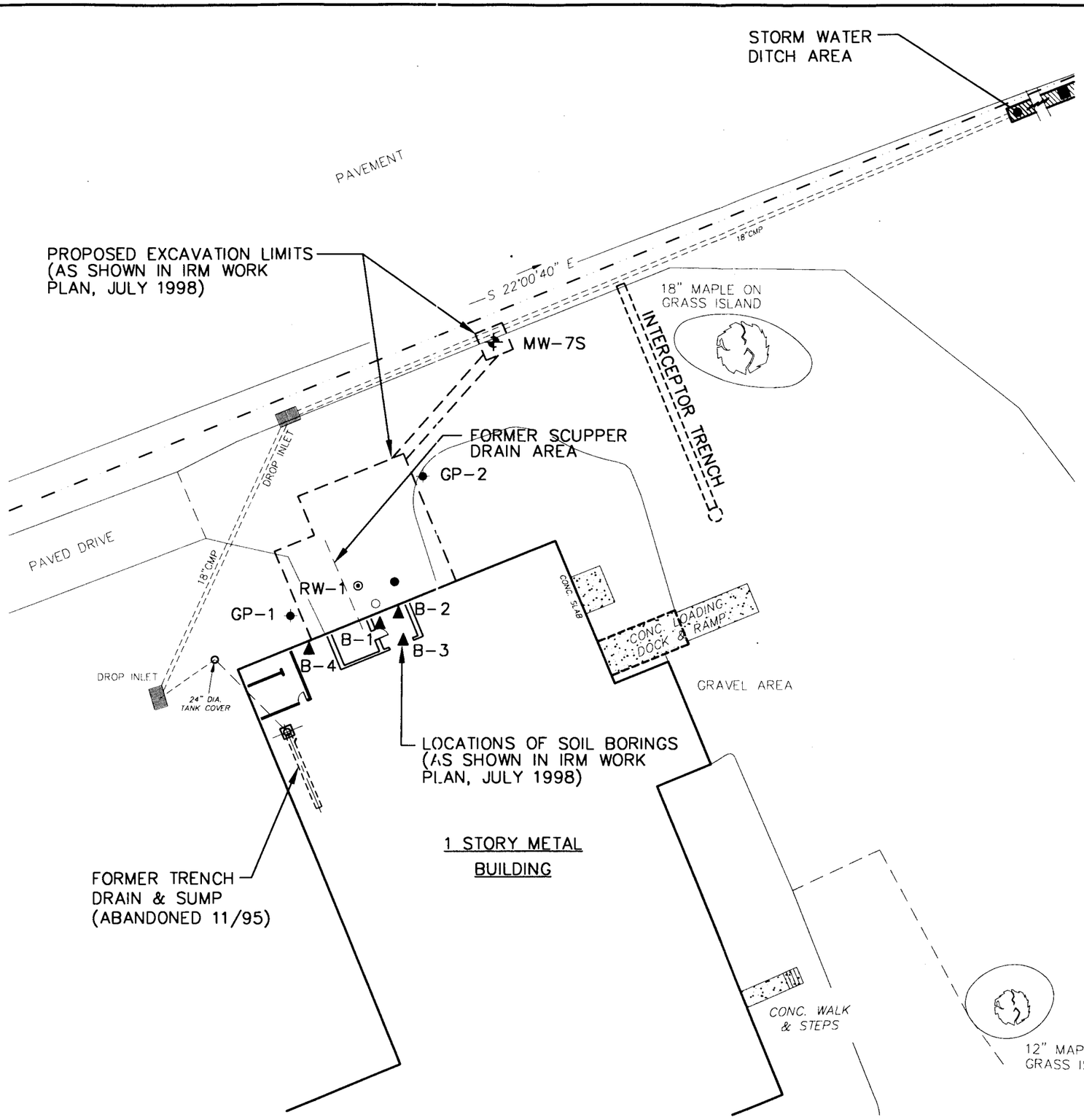
DATE: SEPTEMBER 1999

FILE NO. 6612.004.004

O'BRIEN & GERE ENGINEERS, INC.

REV DATE: 9/24/99

FIGURE 6



REV DATE: 10/21/99

LEGEND

- EXCAVATION LIMITS
- MONITORING WELL
- SOIL BORING

CAMBRIDGE INDUSTRIES, INC.
CANANDAIGUA, NEW YORK
INTERIM REMEDIAL MEASURE SUMMARY REPORT

PROPOSED LIMITS OF EXCAVATION

40 0 40

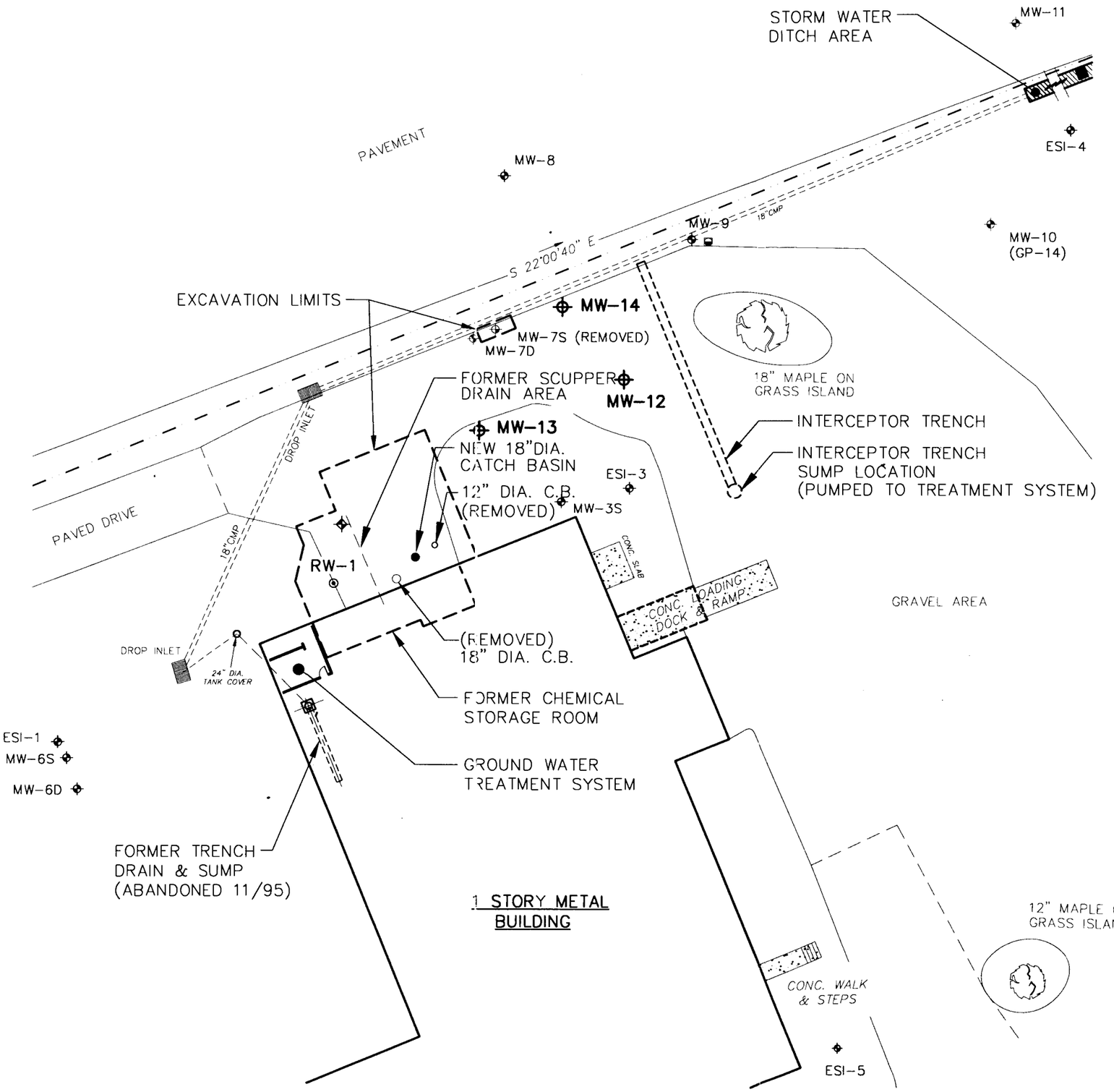
SCALE IN FEET

DATE: OCTOBER 1999

FILE NO. 6612.004.013

O'BRIEN & GERE ENGINEERS INC.

FIGURE 7



REV DATE: 01/14/00

LEGEND

- ESI-4 — MONITORING WELL
- EXCAVATION LIMITS
- MW-14 — PROPOSED MONITORING WELL LOCATION

CAMBRIDGE INDUSTRIES, INC.
CANANDAIGUA, NEW YORK
INTERIM REMEDIAL MEASURE
SUMMARY REPORT

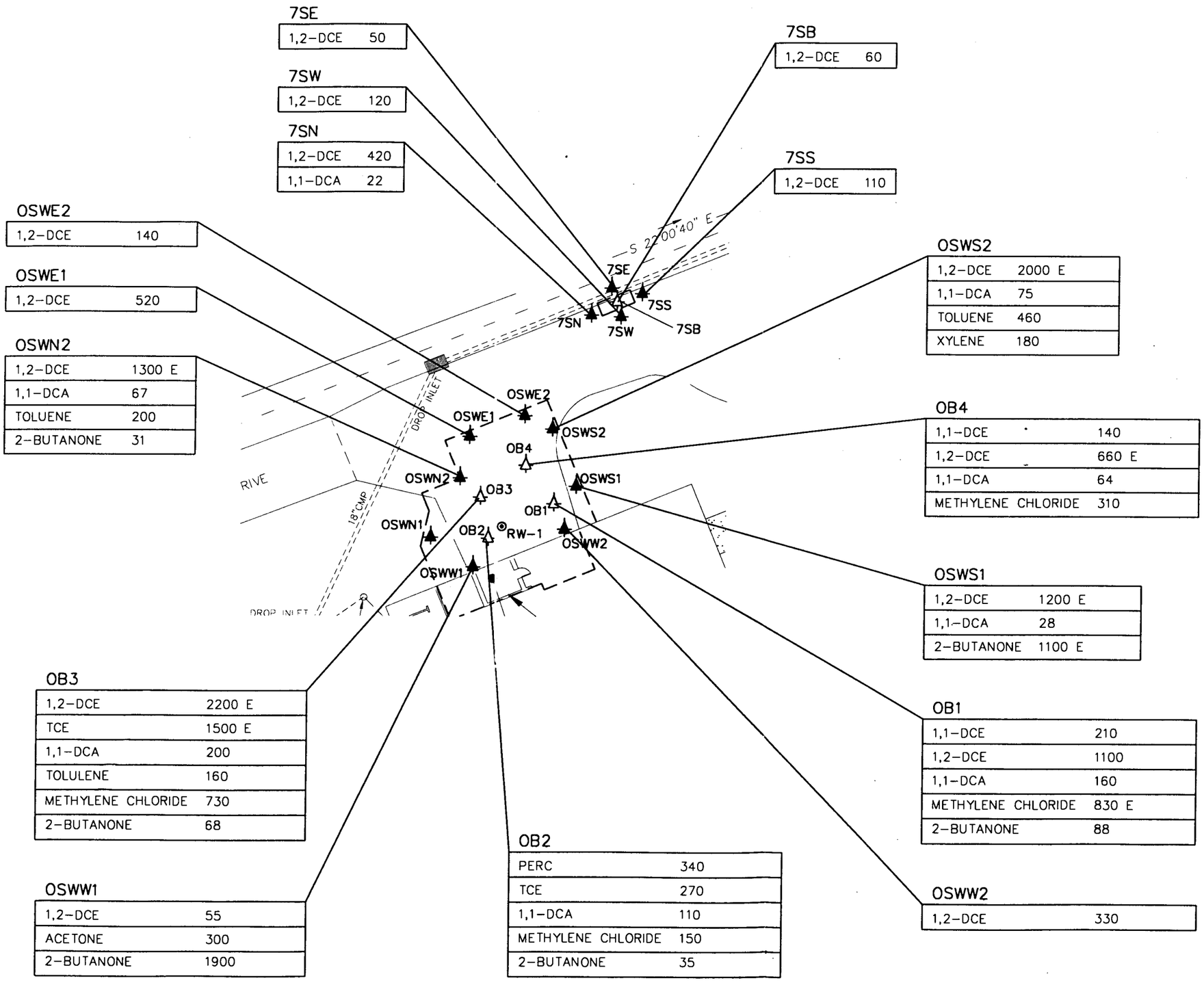
FINAL LIMITS OF EXCAVATION

0 40 80
SCALE IN FEET

DATE: OCTOBER 1999
FILE NO. 6612.004.010

O'BRIEN & GERE
ENGINEERS INC.

FIGURE 8



REV DATE: 10/21/99

LEGEND

- – – – EXCAVATION LIMITS
- OSWS1 — EXCAVATION WALL VERIFICATION SAMPLE
- OB4 — EXCAVATION FLOOR VERIFICATION SAMPLE

FIGURE NOTE:

COMPOUNDS LISTED PRESENT AT LEVEL ABOVE REMEDIAL ACTION OBJECTIVES. ALL VALUES PRESENTED IN UNITS OF ug/kg.

CAMBRIDGE INDUSTRIES, INC.
CANANDAIGUA, NEW YORK
INTERIM REMEDIAL MEASURE
SUMMARY REPORT

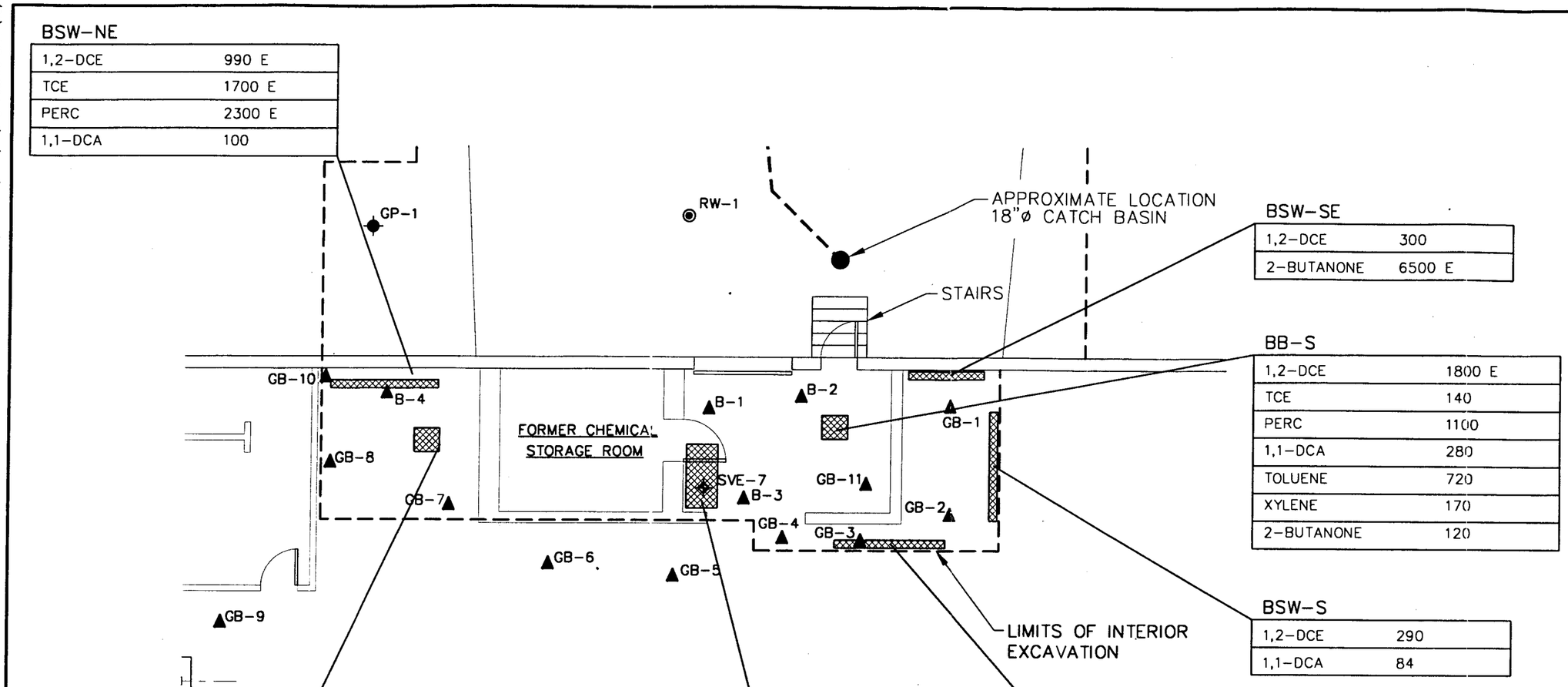
FINAL VERIFICATION SAMPLING RESULTS (OUTSIDE BUILDING)

0 40 80
SCALE IN FEET

DATE: OCTOBER 1999
FILE NO. 6612.004.011

O'BRIEN & GERE ENGINEERS INC.

FIGURE 9



LEGEND

- ▲ SOIL BORING
- SVE-1 ✦ SVE WELL
- RW-1 ◉ RECOVERY WELL
- MW-9 ✦ MONITORING WELL

FIGURE NOTE:

COMPOUNDS LISTED PRESENT AT LEVEL ABOVE REMEDIAL ACTION OBJECTIVES. ALL VALUES PRESENTED IN UNITS OF ug/kg.

CAMBRIDGE INDUSTRIES, INC.
CANANDAIGUA, NEW YORK
INTERIM REMEDIAL MEASURE
SUMMARY REPORT

FINAL VERIFICATION SAMPLING RESULTS (INSIDE BUILDING)

10 0 10

SCALE IN FEET

DATE: OCTOBER 1999

FILE NO. 6612.004.012

O'BRIEN & GERE ENGINEERS INC.

REV DATE: 10/19/99

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

Client: O'Brien & Gere Technical Services, Inc.
Project: Cambridge Industries, Inc.
Proj. Desc: Canandaigua, NY

Job No.: 2488.080.517
Certification NY No.: 10155

Sample: M7111
Samp. Description: PTB-1 - Grab
Instrument: HP5973 GCMS#3
Units: ug/Kg Dry weight
Number of analytes: 66

Collected: 07/14/99
Received: 07/14/99
Prepared: 07/15/99

Matrix: Solid
QC Batch: 071599S1
%Solids: 85.6
Sample size: 5 g

Parameter		Result	Surrog Limits	Dilution	Analyzed	Notes
Toluene		14.		1	07/15/99	
1,3-Dichloropropane		<2.9		1	07/15/99	
Dibromochloromethane		<2.9		1	07/15/99	
2-Hexanone		<5.8		1	07/15/99	
1,2-Dibromoethane		<2.9		1	07/15/99	
Tetrachloroethene	E	580.		1	07/15/99	
1,1,1,2-Tetrachloroethane		<2.9		1	07/15/99	
Chlorobenzene		<2.9		1	07/15/99	
Ethylbenzene		5.0		1	07/15/99	
Bromoform		<2.9		1	07/15/99	
Xylene (total)		25.		1	07/15/99	
Styrene		<2.9		1	07/15/99	
1,1,2,2-Tetrachloroethane		<2.9		1	07/15/99	
1,2,3-Trichloropropane		<2.9		1	07/15/99	
Isopropylbenzene		<2.9		1	07/15/99	
Bromobenzene		<2.9		1	07/15/99	
n-Propylbenzene		<2.9		1	07/15/99	
2-Chlorotoluene		<2.9		1	07/15/99	
4-Chlorotoluene		<2.9		1	07/15/99	
1,3,5-Trimethylbenzene		<2.9		1	07/15/99	
tert-Butylbenzene		<2.9		1	07/15/99	
n-Butylbenzene		<2.9		1	07/15/99	
1,2,4-Trimethylbenzene		<2.9		1	07/15/99	
sec-Butylbenzene		<2.9		1	07/15/99	
1,3-Dichlorobenzene		<2.9		1	07/15/99	
1,4-Dichlorobenzene		<2.9		1	07/15/99	
p-Isopropyltoluene		<2.9		1	07/15/99	
1,2-Dichlorobenzene		<2.9		1	07/15/99	
1,2-Dibromo-3-chloropropane		<2.9		1	07/15/99	
1,2,4-Trichlorobenzene		<2.9		1	07/15/99	
Naphthalene		<2.9		1	07/15/99	

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: August 2,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

Client: O'Brien & Gere Technical Services, Inc.
Project: Cambridge Industries, Inc.
Proj. Desc: Canandaigua, NY

Job No.: 2488.080.517
Certification NY No.: 10155

Sample: M7111
Samp. Description: PTB-1 - Grab
Instrument: HP5973 GCMS#3
Units: ug/Kg Dry weight
Number of analytes: 66

Collected: 07/14/99
Received: 07/14/99
Prepared: 07/15/99

Matrix: Solid
QC Batch: 071599S1
%Solids: 85.6
Sample size: 5 g

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Hexachlorobutadiene	<2.9		1	07/15/99	
1,2,3-Trichlorobenzene	<2.9		1	07/15/99	
Dibromofluoromethane (surrogate)	105.%	70-129	1	07/15/99	
1,2-Dichloroethane-d4 (surrogate)	98.%	70-121	1	07/15/99	
Toluene-d8 (surrogate)	102.%	70-124	1	07/15/99	
Bromofluorobenzene (surrogate)	86.%	72-130	1	07/15/99	

Notes:

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: August 2,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

enviromental technologies inc.

745 Bridge St. West, Suite 7
Waterloo, Ontario, Canada N2V 2G6
tel: (519) 746-2204 fax: (519) 746-2209

SITE PROFILE (page 1 of 2)

CONTACT: Deborah Wright ADDRESS:
COMPANY: O'Brien+Gere Engs PO Box 4873
TEL: 315 437-6100 Syracuse NY 13221
FAX: 315 463-7554 E-MAIL: wrightdy@OBG.com

GROUNDWATER CHEMISTRY (provide attachments if appropriate)

Organic Compounds	Expected Concentration Entering Treatment Zone (µg/L)		Regulatory Limit (µg/L)
Tetrachloroethene	(1100)	200	5
Trichloroethene	(850)	100	5
C-1,2-DCE	(1500)	300	5
T-1,2 DCE	(25)	<10	5
Vinyl Chloride	(200)	<25	2
1,1,1 Trichloroethane	(700)	<50	
1,2-DCA	(5)	ND	
1,1-DCA	(320)	<50	
ethylbenzene	(50)	<10	
Toluene	(50)	<10	5
Xylenes (total)	(370)	<50	
4 methyl 2 Pentanone	(50)	<10	
Methylethyl Ketone	(200)	<50	

Inorganic Compounds	Expected Concentrations Entering Treatment Zone (mg/L)	Inorganic Parameters	Expected Value Entering Treatment Zone
Ca		Conductance	
Fe		TDS	
K		Dissolved Oxygen	
Mg		pH	(7.4-2.5) to 9**
Na		Eh	
Cl		Temperature	
SO_4		TOC	
NO_3		DOC	
Alkalinity			
Other:			
Hardness	190 ppm		

- # in parentheses are pre-soil removal values in source areas. Other #s are predictions
Other #s are estimates
** Lime added to soils as part of treatment expected to increase pH in source area

enviromental technologies inc.

745 Bridge St. West, Suite 7
Waterloo, Ontario, Canada N2V 2G6
tel: (519) 746-2204 fax: (519) 746-2209

SITE PROFILE (page 2 of 2)

PLUME CHARACTERISTICS:

Depth to water table: 4 - 8 ft variable based on precip
Plume width: _____
Depth from surface to plume top: 4 - 8 ft
Depth from surface to plume bottom: 8 - 15 ft
Total plume thickness: 4 to 7 ft

SITE GEOLOGY:

Geology/soil type of formation: fine sand and silt
Geology of confining layer: glacial till w/a heavy matrix
Depth to lower confining layer: 8 - 15 ft in area of concern
Porosity: 0.30
Groundwater flow direction: south
Hydraulic conductivity: 4.2×10^{-5} cm/sec (0.118 ft/day)
Hydraulic gradient: 0.03
Groundwater flow velocity: 0.0118 ft/day

SITE:

Location: NiYork State
Description (attach maps if available): see attached

SKETCH:

Current Site Use: Industrial
Future Site Use: Industrial
Construction Constraints: low cost remedial action

Approximate Start Date for Remedial Action: ongoing - currently excavation
Comments: _____

Soils are treated + placed back in excavated area outside of building. These soils will contain lime (10% by vol)