Certification of Completion

Final Corrective Measures Addressing Groundwater Contamination

Former Borden Resin Facility – Bainbridge, New York

July 2003

Prepared For:

IRG Assumption, LLC.
Littleton, Colorado 80127

NYS Department of Environmental Conservation
Bureau of Radiation and
Hazardous Site Management
Syracuse, New York 13204 – 2400

Prepared By:

NKU NORTHERN KENTUCKY UNIVERSITY

Center for Applied Ecology

USGS 7.5-minute Sidney Quadrangle, 1982
Oblique Angle / 3-Dimensional

NKU NORTHERN KENTUCKY UNIVERSITY

CENTER FOR APPLIED ECOLOGY
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(859) 442-4280. fennells@nku.edu

July 15, 2003

via Federal Express

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Littleton, CO 80127

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Bureau of Radiation and Hazardous Site Management
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Bureau of Radiation and Hazardous Site Management
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Albany, NY 12233-7252

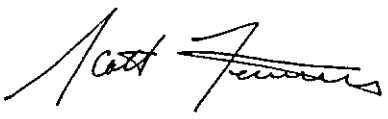
Subject: **Professional Engineer's Certification of Completion**
Final Corrective Measures Addressing Groundwater Contamination
Former Borden Resin Facility – Bainbridge, New York

Leslie, Tim, and Denise:

Attached for your files is the Professional Engineer's Certification of Completion addressing groundwater remediation at the Borden site. This certification is a requirement of the Order on Consent originally signed by Borden and NYSDEC in 1990.

Please feel free to contact me will any questions or comments.

Sincerely,



Scott Fennell, P.E.
Senior Environmental Engineer / Scientist

C: Mitch Moss – MACTEC Development Corporation
Site Copy – c/o Mitch Moss

1.0 PROFESSIONAL ENGINEER'S CERTIFICATION OF COMPLETION

In 1990 Borden, Inc. entered into an Order on Consent (Index # A7-0121-87-09) with the New York State Department of Environmental Conservation (NYSDEC) to address environmental contamination at the former Borden Resin Facility in Bainbridge, New York (Figure 1). This document fulfills Condition X of the Order relative to the submission of as-built drawings, final engineering report, and engineer's certification that construction of remedial systems addressing groundwater contamination has been completed. A previous engineer's certification was submitted (dated September 2001) relative to remedial systems and measures addressing soil and sewer contamination.

Note that Columbus-Cherokee Real Estate, LLC purchased the site from Borden, Inc. and is now responsible for implementation of the Order.

1.1 Project Background

Phenol Recovery Area. On September 23, 1998, NYSDEC finalized a "Corrective Measures Implementation Plan" (CMIP) describing groundwater remediation requirements for the "Phenol Recovery Area" of the former Borden Resin Facility (Figure 2). The CMIP described site groundwater contaminants, the selected remediation technology (in-situ bioremediation), remedial goals and criteria, and termination requirements. In March 1999, Cherokee Environmental Risk Management, LP (now IRG Environmental) submitted a "Remedial Design and Start-up Monitoring Plan" describing a one-year pilot test demonstration of in-situ bioremediation utilizing air sparging. Unfortunately, the air sparging pilot test (implemented April 2001 thru January 2002) did not achieve objectives specified in the CMIP (50 percent decrease in contaminant concentrations at monitoring well MW-15) and exhibited operational limitations such as sparge well siltation and air line freezing.

During the period March thru October 2002, MACTEC (a.k.a. Harding ESE) conducted additional investigations and developed an alternative groundwater remediation plan in consultation with NYSDEC. The modified groundwater remediation approach, approved by NYSDEC in a letter dated October 29, 2002, utilizes a one-time injection of chemical oxygenate and continuous operation of a pump-and-treat system to achieve hydraulic

control of the contaminant plume and to achieve termination standards specified in the CMIP. In accordance with the modified approach, chemical oxygenate was injected in November 2002 and the continuous pump-and-treat system was completed and began operation in December 2002.

Remedial Goals for the modified groundwater remediation approach remain the same as those specified in the CMIP:

1. Prevent off-site migration of contaminants above NYSDEC Groundwater Protection Standards,

2. Reduce contaminant mass of the plume.

Termination standards are to meet Groundwater Protection Standards or gain NYSDEC approval of a risk-based closure demonstration.

Other Areas. Besides the Phenol Recovery Area, groundwater contamination also occurred at other areas of the Borden site, namely at the "PCB Area" and "Bone Yard" (Figure 2). Groundwater contamination at these other areas was relatively minor and was addressed by soil and sewer removal as documented in the September 2001 engineer's certification. Groundwater monitoring of these areas subsequent to soil and sewer remediation is confirming that trace contaminant levels are disappearing. The site groundwater monitoring plan (Appendix C) describes final monitoring requirements to close the groundwater issues, and no active groundwater remediation is anticipated to be required at these areas.

1.2 Purpose and Basis of Certification

This document provides a professional engineer's certification that corrective measures addressing groundwater in the Phenol Recovery Area were implemented in accordance with NYSDEC-approved plans. A professional engineer's certification is required by Condition X of the Consent Order entered into by Borden, Inc. and NYSDEC.

The basis of certification was discussed with all parties (Cherokee/IRG Environmental, MACTEC, and NYSDEC) prior to final corrective measures implementation. As agreed with the NYSDEC, the certifying engineer provides certification based upon the following:

1. Site observation of soil and groundwater sampling locations and procedures.

2. Site observation of chemical oxygenate injection.

3. Site observation of collection well construction.

4. Site observation of treatment system final construction and review of effluent monitoring data.

5. Review of hydraulic control demonstration data.

Certain additional sampling and collection well locations were specified after approval of written plans based upon observations and concerns raised by NYSDEC or the engineer. For example, the number of collection wells (in addition to Sump 1) was increased from the originally-specified three to five.

Note that the certifying engineer relies upon certain data and/or documentation prepared by other parties including:

1. Location/elevation data prepared by a licensed surveyor (Lynn Pullis, P.S.),

2. Sample analyses performed by analytical laboratories (e.g., Integrated Analytical),

3. Well construction diagrams, groundwater maps, diagrams and other materials prepared by the remediation engineer (MACTEC).

Note also that the certifying engineer's "site observation" activities described above did not entail continuous observation of all activities. Rather, "site observation" entailed viewing one or more representative events (e.g., sampling, injection, well installation), viewing marked/flagged sampling/injection locations, and viewing the final constructed and operating pump-and-treat system during two trips to the site (conducted during the weeks ending

November 22 and December 13, 2002). It is also noteworthy that NYSDEC also made inspection trips during the period of corrective measures implementation.

This certification does not address the ability of the pump-and-treat system to achieve the Remedial Criteria timelines specified in the CMIP. These timelines, such as 75 percent contaminant reduction at selected monitoring wells within seven years, were developed for in-situ bioremediation and may not be appropriate for pump-and-treat, which is acknowledged to generally require a longer time to achieve concentration reductions.

In the event treatment system effluent limits are not achieved, that plume migration is not controlled, and/or that the mass of contamination in groundwater is not reduced, expansion of the existing system and/or additional corrective measures may be necessary.

1.3 Certification Statement

In accordance with Condition X of Consent Order Index No. A7-0121-87-09, entered into by Borden, Inc. and NYSDEC, this certification of completion document has been prepared by an engineer licensed to practice in the State of New York.

7/11/03

Scott Fennell, P.E. Date Seal

2.0 FINAL CORRECTIVE MEASURES AS-BUILT REPORT

2.1 Chemical Oxygenate Injection

A Progress Report prepared by MACTEC for the week ending November 22, 2002 documented chemical oxygenate treatment of the groundwater contamination plume. PermeOx-brand calcium peroxide manufactured by FMC was injected to provide slow-release oxygen thus promoting in-situ bioremediation of groundwater contaminants. Figure 3 illustrates 101 locations where oxygenate was injected into two-inch diameter push-point borings extending from 7.5 to 25 feet below grade. (The water table in the vicinity of the contaminant plume varies from approximately three to ten feet below grade.) Thirty-five injection locations in the area of highest groundwater contamination received approximately 124 pounds per boring, while the remaining 66 locations received approximately 36 pounds per boring. Shortly after completion of the injection program, dissolved oxygen readings in monitoring wells exhibited increases, in some cases going from approximately one to over 20 mg/L.

2.2 Groundwater Collection and Treatment System

The groundwater collection and treatment system was completed and began operation in December 2002. The treatment train consists of the following elements (in order):

1. Groundwater collection from five four-inch collection wells plus one collection sump using in-well pneumatic pumps. (Well construction diagrams are provided in Appendix B. The sump is a manually slotted approximately 10-foot by 36-inch corrugated metal pipe, installed vertically from grade by excavation and backfilled with gravel.)

2. Aeration / bioremediation (10 CFM) within a 1000-gallon surge tank.

3. Bag filtration (50 microns) to remove particulates.

4. Activated carbon adsorption within two 2,500-pound pressure vessels in series.

5. Metered discharge of treated groundwater to ground surface.

The treatment system layout, housed inside an insulated and heated building, is illustrated on Figures 4 and 5. The groundwater collection system and utility layout is illustrated on Figure 6.

A groundwater surface contour map developed by the operator under system pumping conditions (March 2003) is provided in Figure 7. Contaminant plume maps for the same period are provided on Figures 8A thru 8D. (Excerpted from the June 30, 2003 Quarterly Monitoring Report prepared by MACTEC.)

2.3 Operation and Maintenance

System operation is monitored and controlled using a programmable logic controller with remote telemetry, such that the system can be monitored and controlled at the site or from the remote (office) location. Monitored parameters include vessel pressure levels, well and tank water levels, air temperature and flow, and component status (on/off).

An "Operation and Maintenance Plan" was prepared by MACTEC for the system and submitted to NYSDEC on February 10, 2003. The O&M Plan includes:

- System description text, illustrations, and component list (Table 1 - attached),
- Equipment Manuals,
- "Groundwater Monitoring Plan" (subsequently modified)
- "Contingency Plan" to address system deficiencies such as insufficient hydraulic control, and
- "Reporting Plan".

The O&M Plan is kept on site and at the remote operator location for easy reference and implementation. Operator personnel visit the site on a weekly basis.

2.4 Monitoring Systems

The groundwater collection and treatment system is monitored to ensure that effluent limits are achieved, that plume migration is controlled, and that the mass of contamination in groundwater is reduced.

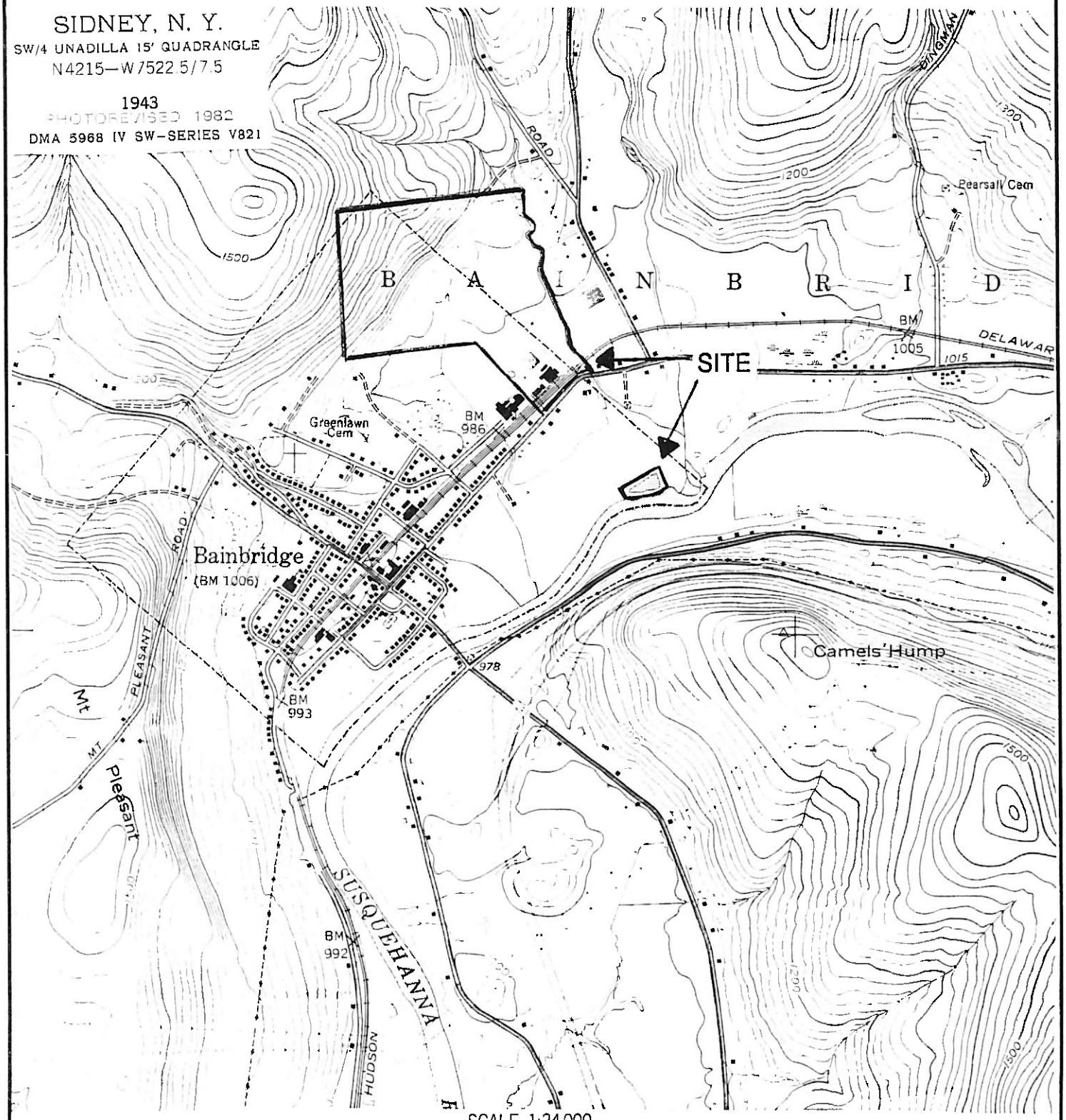
Effluent Monitoring. In a memo dated December 6, 2002, NYSDEC Bureau of Water Permits issued a permit to discharge treated groundwater to the ground surface. In accordance with the permit, effluent is monitored on a bi-monthly basis to ensure discharge concentration limits are achieved. Parameters include flow, phenolics, selected volatile organic compounds, and PCBs. In the event discharge limits are exceeded, the operator must make system changes such as replacement of activated carbon to ensure compliance with discharge limits.

Note that on-going discussions with the local Publicly-Owned Treatment Works may allow future discharge of all or part of the treated groundwater to the sanitary sewer. A separate permit to discharge would be required specifying effluent limitations and sampling frequency.

Groundwater Monitoring. The groundwater monitoring program (Appendix C) includes perimeter monitoring wells to ensure that contaminant migration is checked, and plume monitoring wells to demonstrate contaminant mass reduction (Figure 9). Site contaminants to be monitored were specified in the CMIP, and include volatile organics, phenolics, formaldehyde, and tentatively identified semi-volatile compounds. After remediation termination criteria have been achieved (groundwater standards or risk-based criteria, discussed in CMIP Section 4.6), groundwater monitoring will continue for a minimum of three years (CMIP Section 4.7).

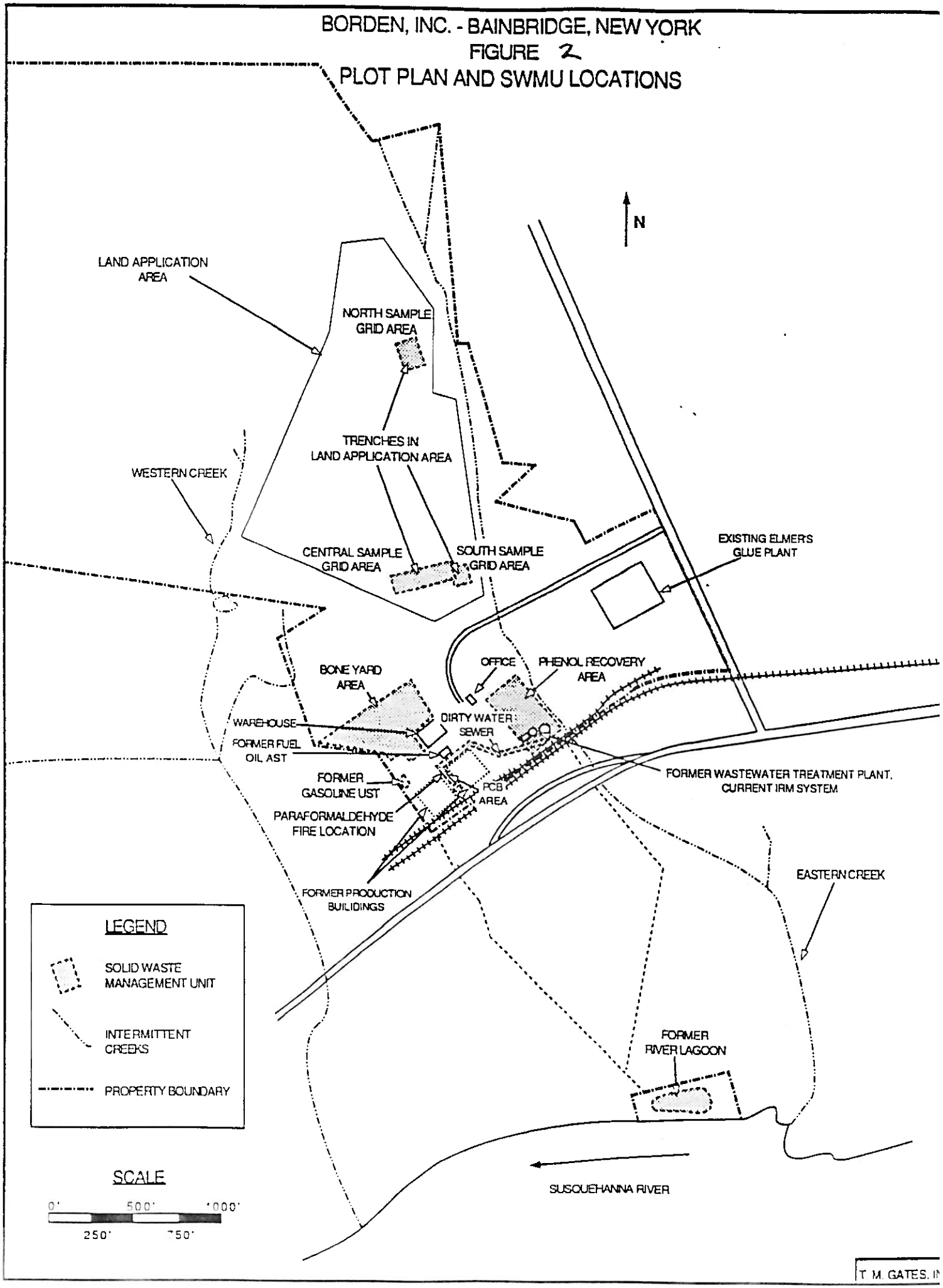
Appendix A
Figures and Table

BORDEN, INC. - BAINBRIDGE, NEW YORK
FIGURE 1
SITE LOCATION

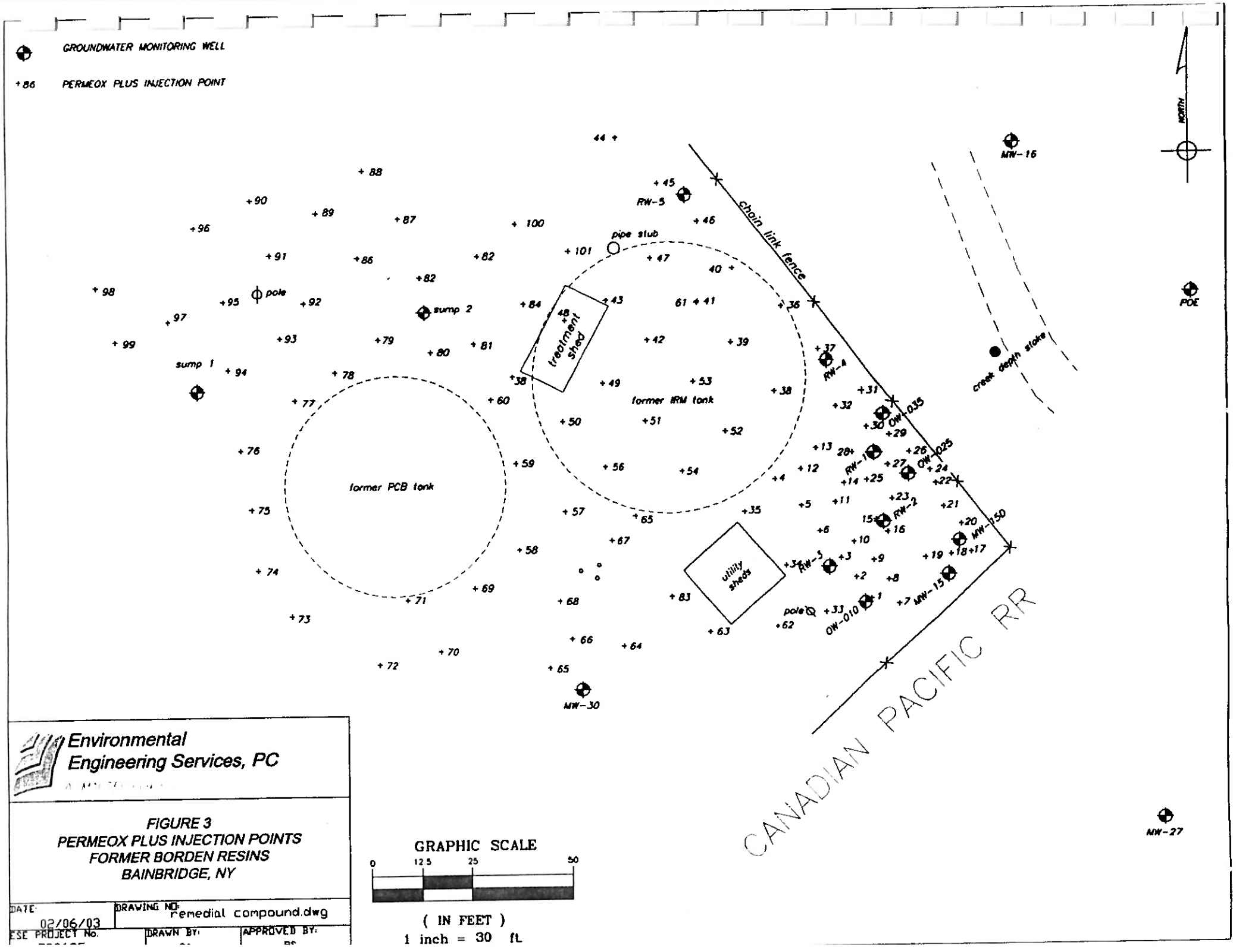


T. M. GATES, INC.

BORDEN, INC. - BAINBRIDGE, NEW YORK
FIGURE 2
PLOT PLAN AND SWMU LOCATIONS



T. M. GATES, I



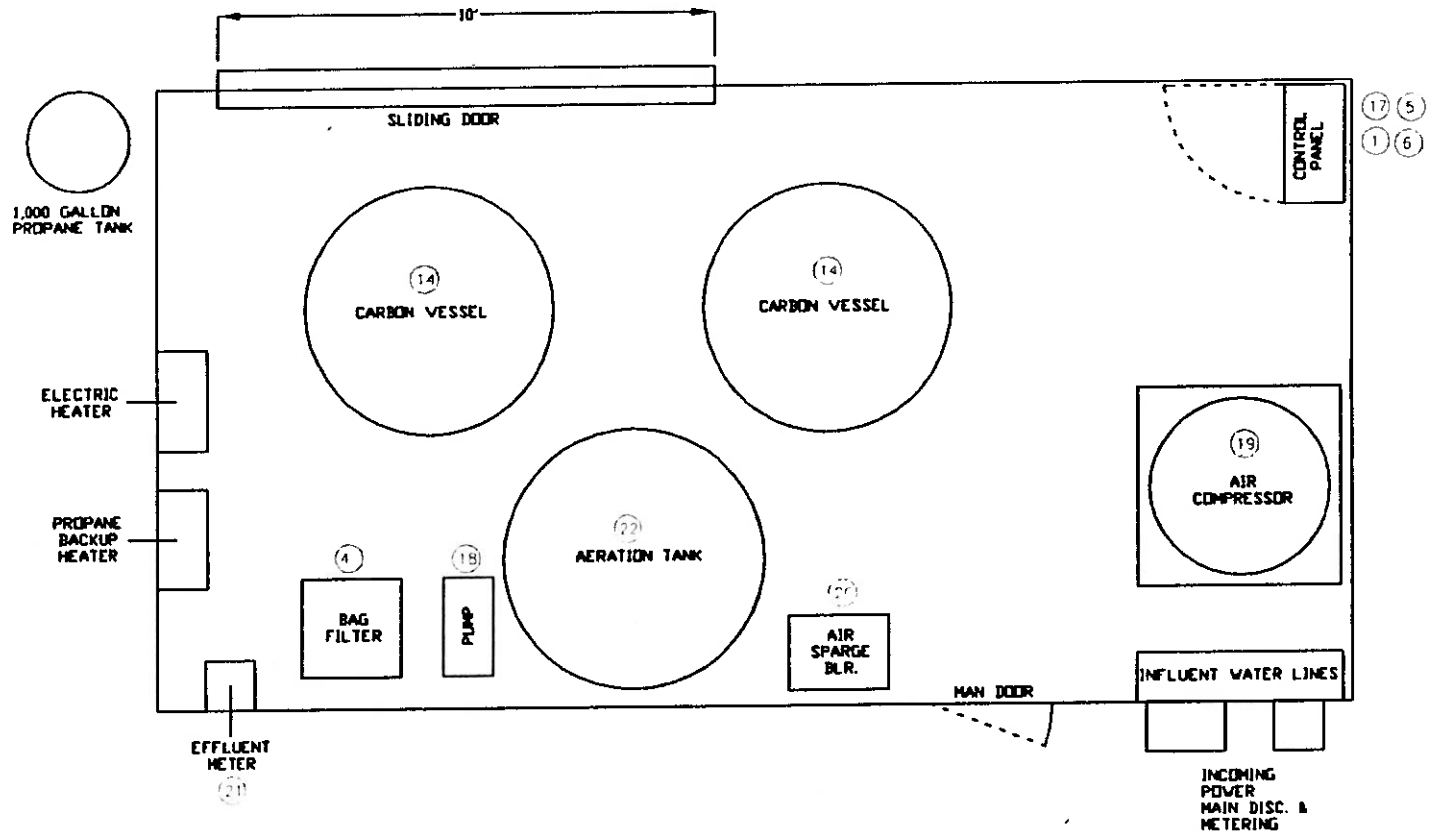
Environmental Engineering Services, PC

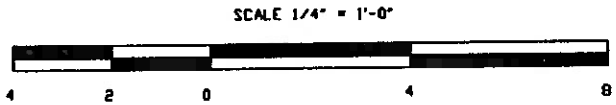
FIGURE 3
PERMEOX PLUS INJECTION POINTS
FORMER BORDEN RESINS
BAINBRIDGE, NY

GRAPHIC SCALE
0 12.5 25 50
(IN FEET)
1 inch = 30 ft

DATE:	DRAWING NO:
02/06/03	remedial compound.dwg
ESE PROJECT No.	DRAWN BY: / APPROVED BY:

(5) SYSTEM COMPONENT - SEE TABLE 1





REVISIONS			
1	11/15/02		

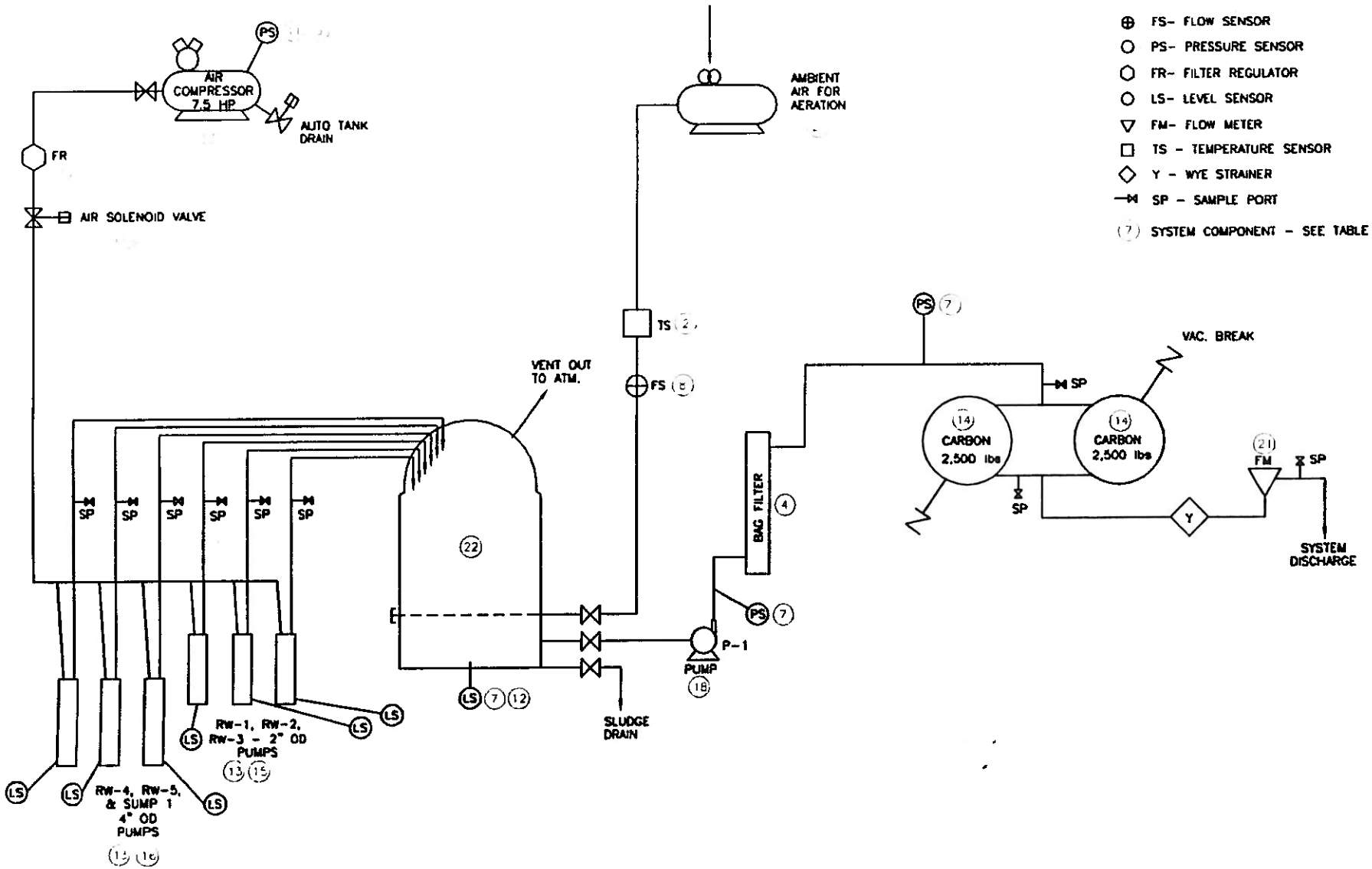
BORDEN
TREATMENT SYSTEM
BAINBRIDGE, NY

Environmental Engineering Services, PC
5205 Militia Hill Road
Plymouth Meeting, Pennsylvania 19462

BUILDING LAYOUT

PROJECT NO.
722685

FIGURE 4



NOTE: DRAWING NOT TO SCALE

REVISIONS			
△	02/06/03	add well, update	CJA
△	11/15/02		

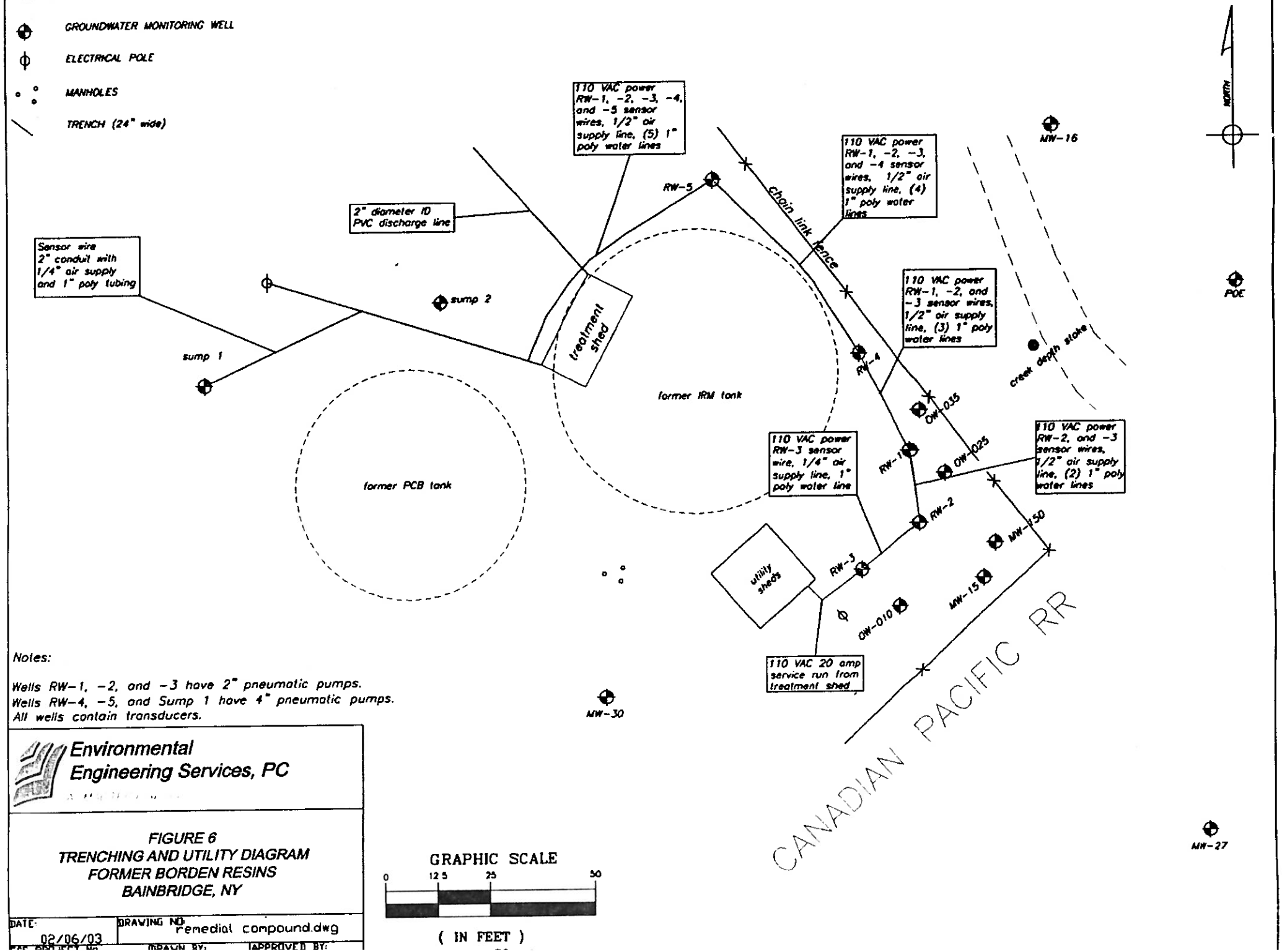
BORDEN
TREATMENT SYSTEM
BAINBRIDGE, NY

Environmental Engineering Services, PC
5205 Militia Hill Road
Plymouth Meeting, Pennsylvania 19462

PROCESS FLOW DIAGRAM

PROJECT NO.
722685

FIGURE 5



Notes:

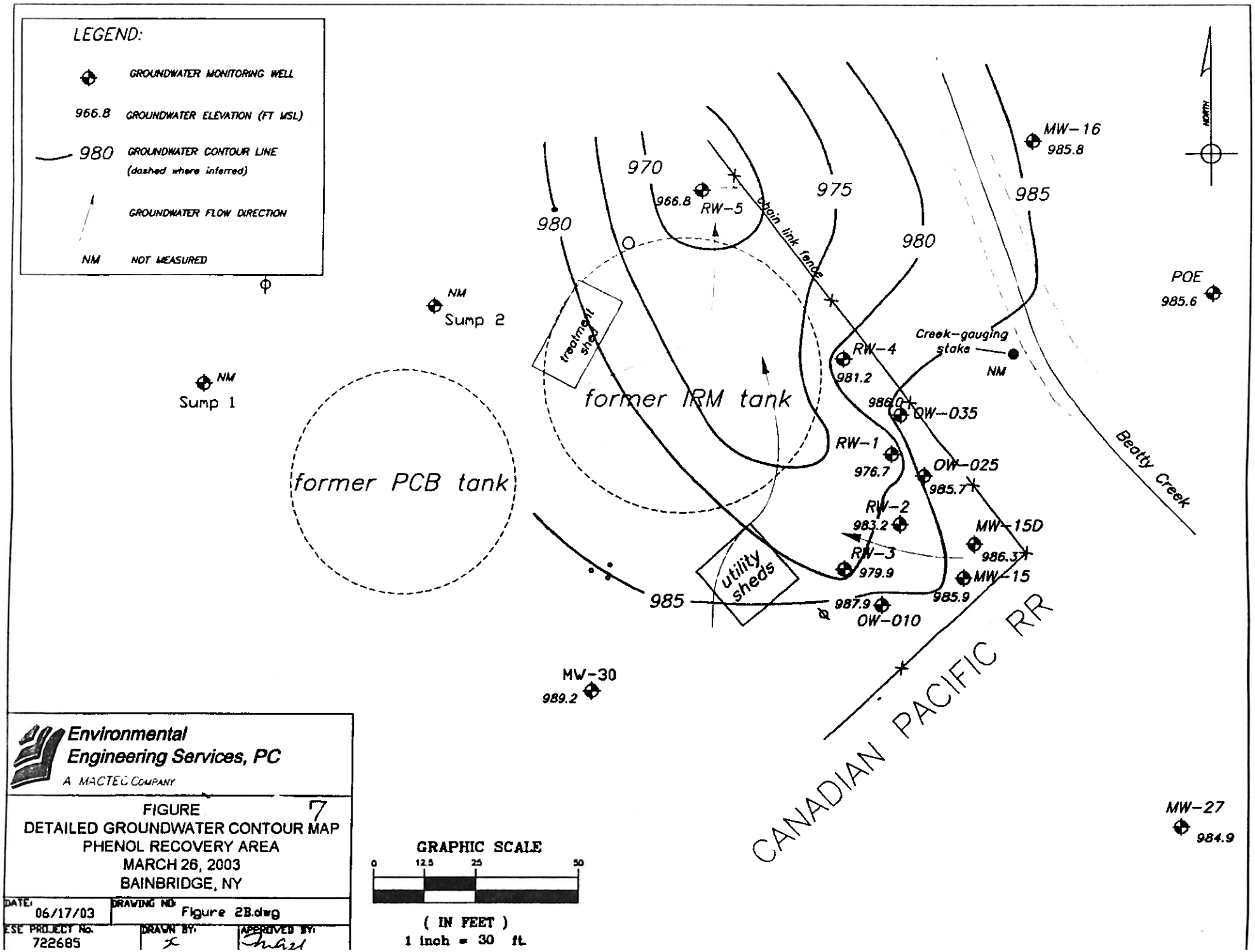
Wells RW-1, -2, and -3 have 2" pneumatic pumps.
Wells RW-4, -5, and Sump 1 have 4" pneumatic pumps.
All wells contain transducers.

Environmental Engineering Services, PC

FIGURE 6
TRENCHING AND UTILITY DIAGRAM
FORMER BORDEN RESINS
BAINBRIDGE, NY

DATE: 02/06/03
DRAWING NO: remedial compound.dwg
DRAWN BY:
APPROVED BY:

GRAPHIC SCALE
0 12.5 25 50
(IN FEET)



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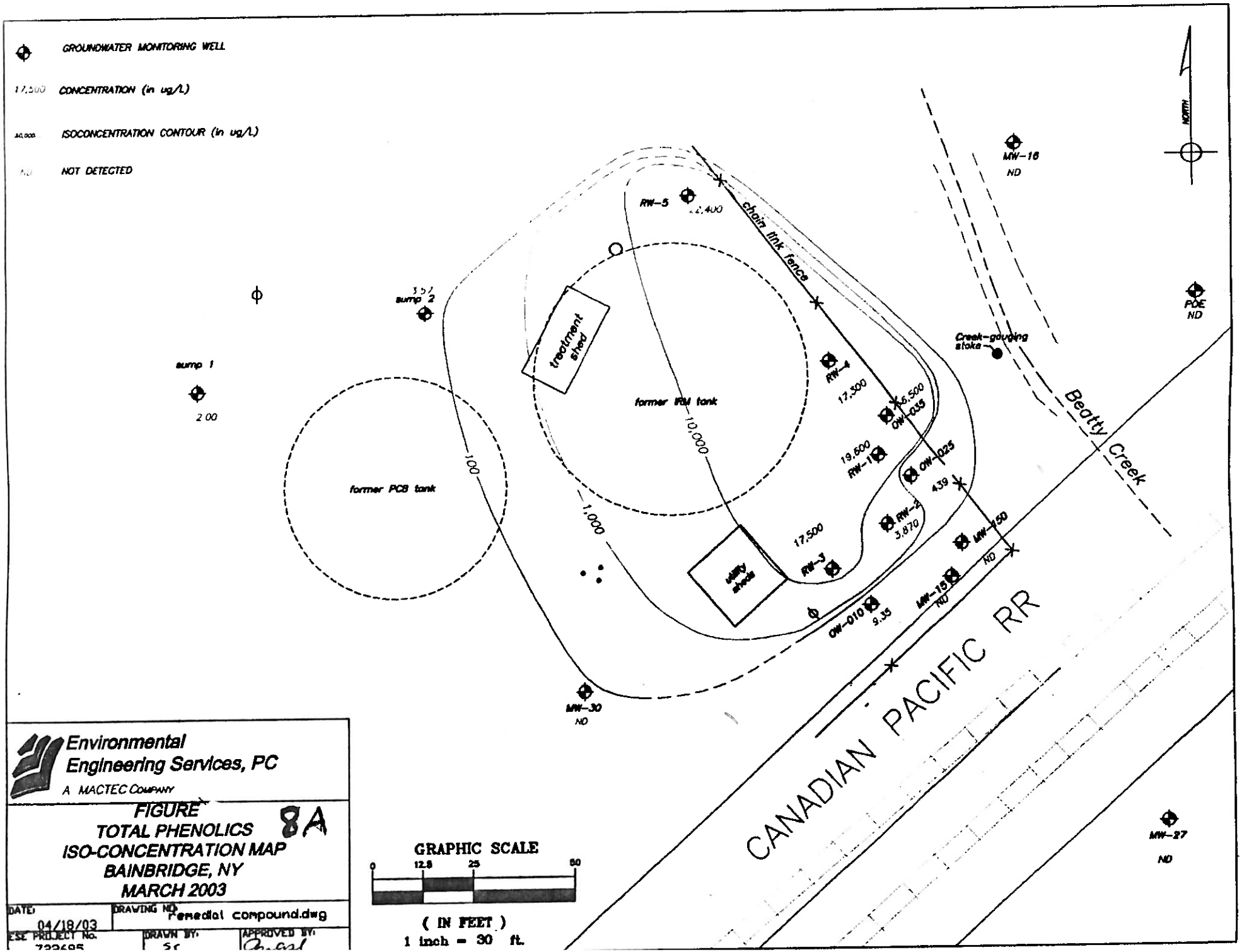
A MACTEC Company

FIGURE 7
DETAILED GROUNDWATER CONTOUR MAP
PHENOL RECOVERY AREA
MARCH 26, 2003
BAINBRIDGE, NY

DATE:	DRAWING NO:	
06/17/03	Figure 2B.dwg	
ESE PROJECT No.	DRAWN BY:	APPROVED BY:
722685	JC	

GRAPHIC SCALE
0 12.5 25 50
(IN FEET)
1 inch = 30 ft.



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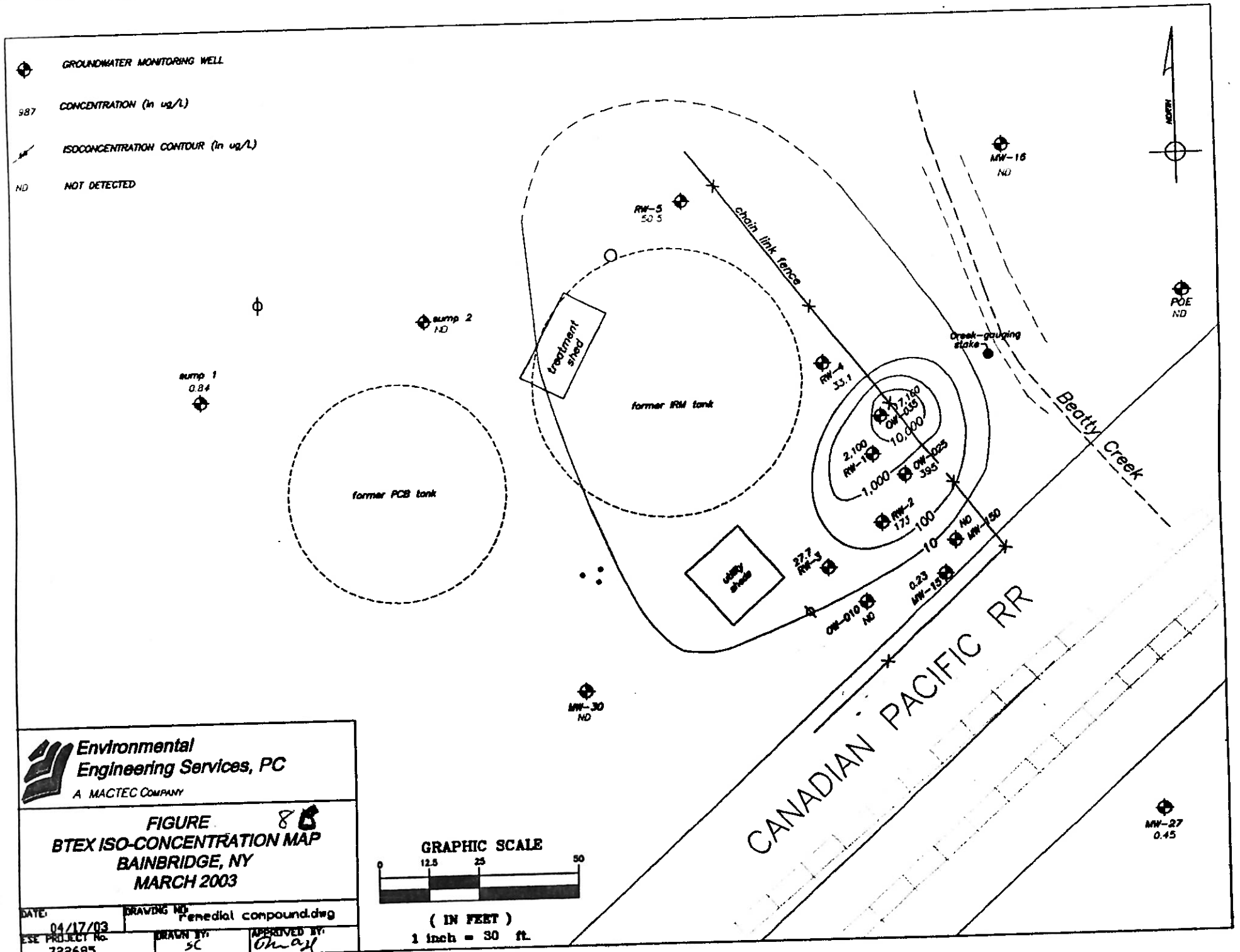
A MACTEC Company

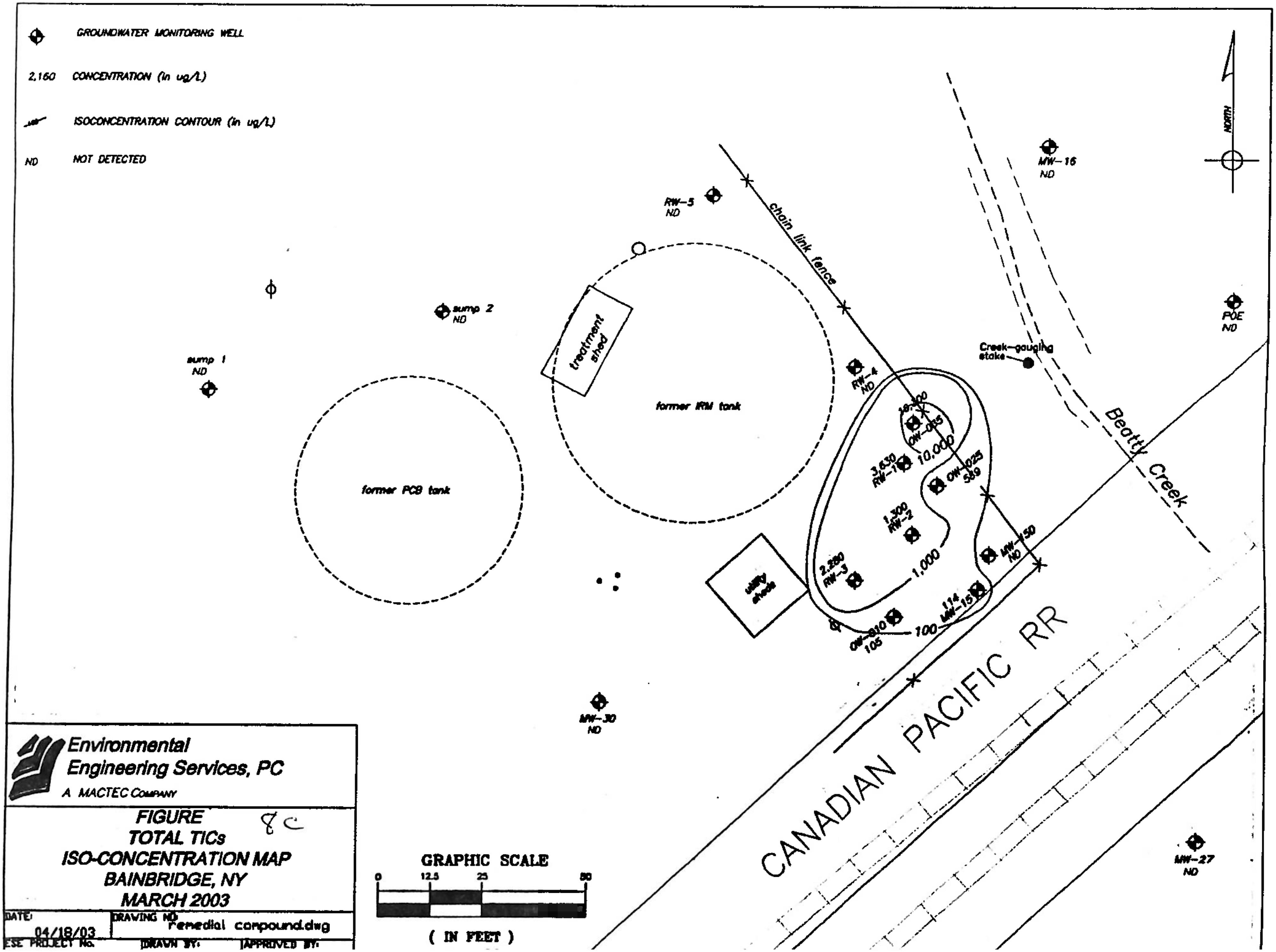
FIGURE 8A
TOTAL PHENOLICS
ISO-CONCENTRATION MAP
BAINBRIDGE, NY
MARCH 2003

GRAPHIC SCALE
0 12.5 25 50
(IN FEET)
1 inch = 30 ft.

DATE:	DRAWING NO.
04/18/03	Remedial compound.dwg
ESE PROJECT No.	DRAWN BY:
722695	SC

APPROVED BY:

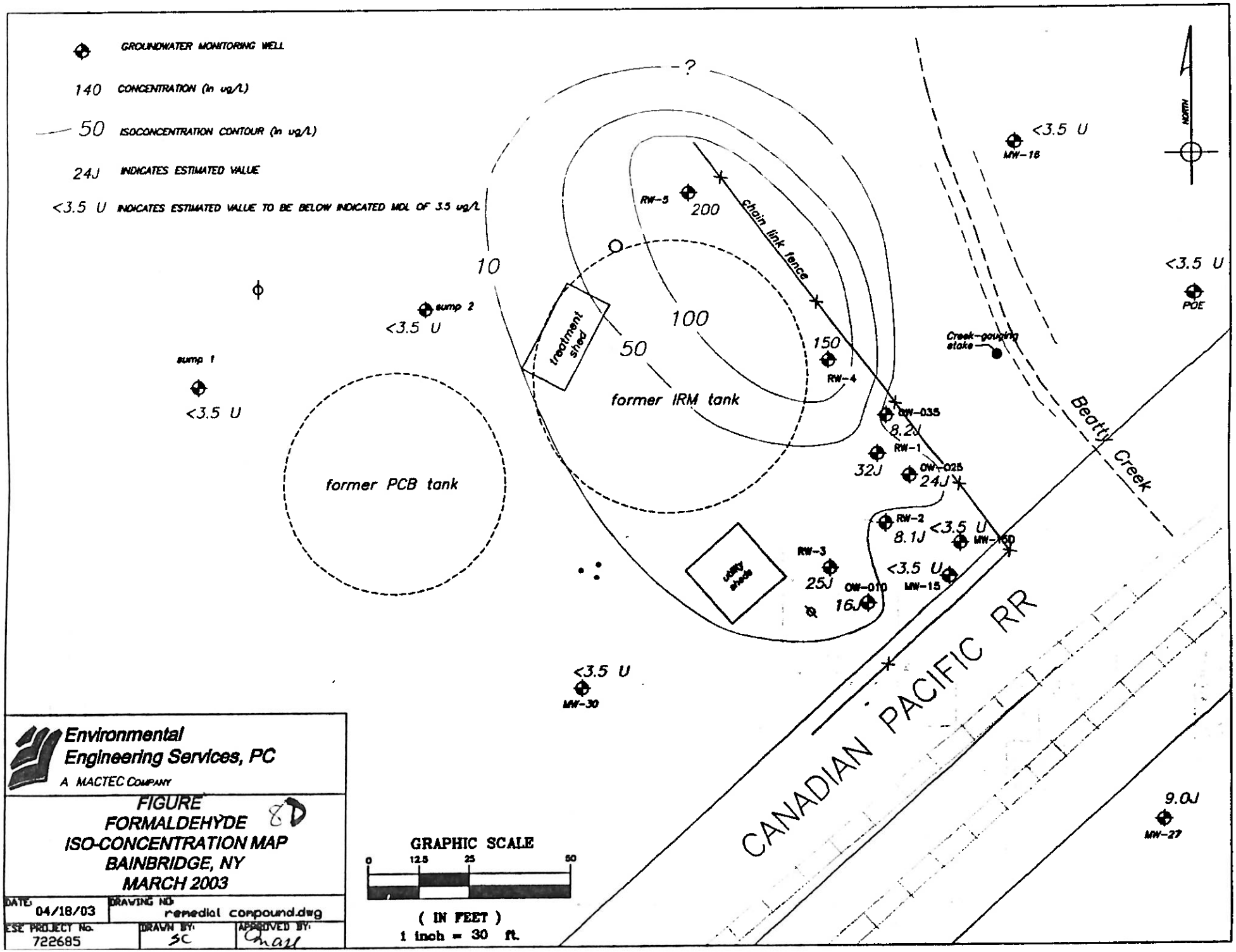

GROUNDWATER MONITORING WELL
987 CONCENTRATION (in ug/L)
ISOCONCENTRATION CONTOUR (in ug/L)
ND NOT DETECTED
NORTH
chain link fence
treatment shed
former IRM tank
former PCB tank
utility shade
creek-gauging stake
Beatty Creek
CANADIAN PACIFIC RR
RW-5 50.5
RW-4 33.1
RW-2 173
RW-1 2,100
OW-035 7,760
OW-025 395
OW-010 ND
MW-15 0.23
MW-15D ND
MW-16 ND
MW-30 ND
MW-27 0.45
POE ND
sump 1 0.84
sump 2 ND
10,000
1,000
100
10
Environmental Engineering Services, PC
A MACTEC Company
FIGURE 8
BTEX ISO-CONCENTRATION MAP
BAINBRIDGE, NY
MARCH 2003
DATE: 04/17/03
DRAWING NO: remedial compound.dwg
ESE PROJECT No. 722685
DRAWN BY: SC
APPROVED BY: CMA
GRAPHIC SCALE
0 12.5 25 50
(IN FEET)
1 inch = 30 ft.



Environmental Engineering Services, PC
A MACTEC Company

FIGURE 8C
TOTAL TICs
ISO-CONCENTRATION MAP
BAINBRIDGE, NY
MARCH 2003

DATE: 04/18/03	DRAWING NO: remedial compound.dwg	
ESE PROJECT No.	DRAWN BY:	APPROVED BY:



Environmental Engineering Services, PC
A MACTEC COMPANY

FIGURE 8D
FORMALDEHYDE
ISO-CONCENTRATION MAP
BAINBRIDGE, NY
MARCH 2003

DATE: 04/18/03	DRAWING NO: remedial compound.dwg	
ESE PROJECT No. 722685	DRAWN BY: SC	APPROVED BY: Chad

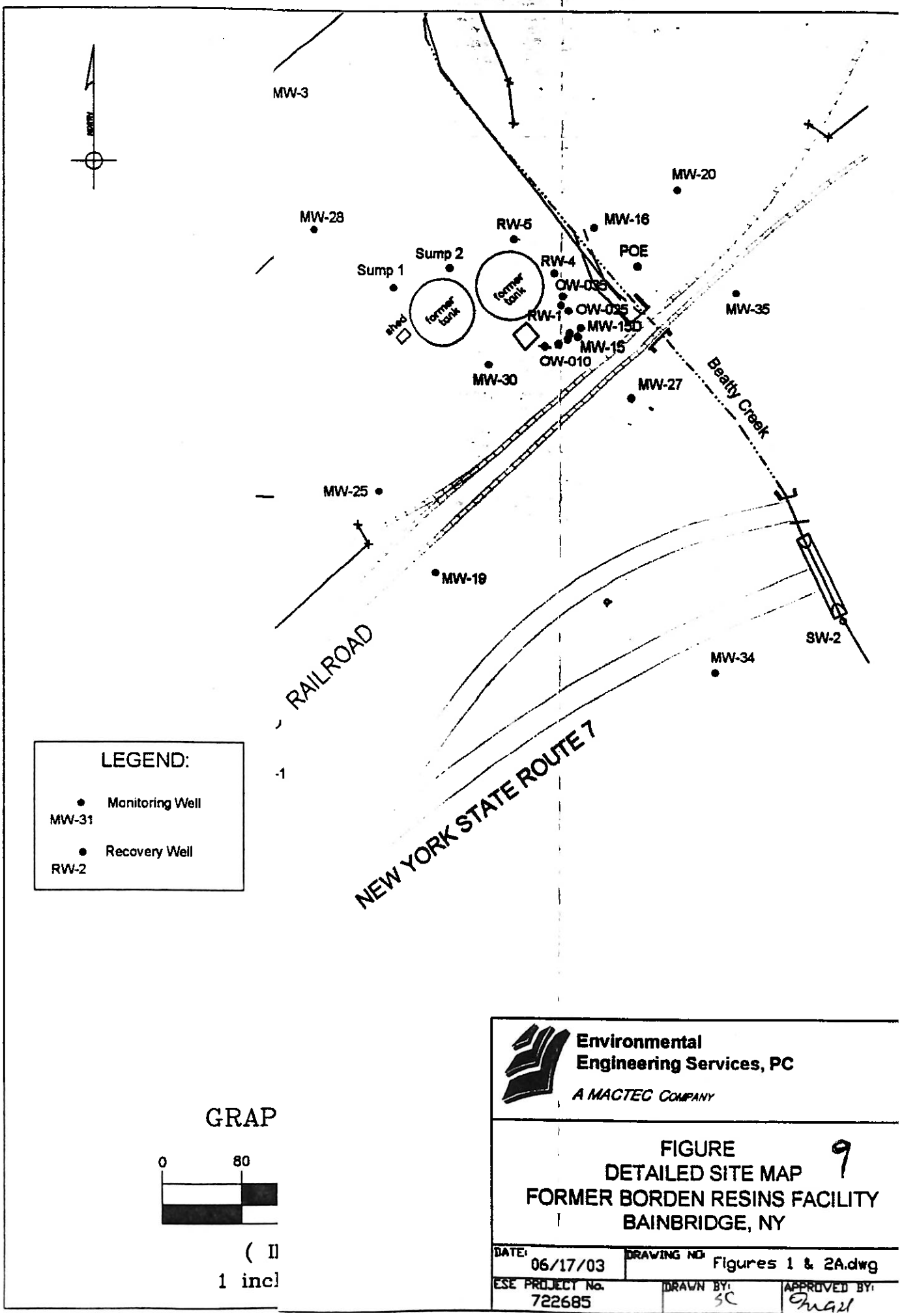

MW-3
MW-20
MW-28
RW-5
MW-16
POE
Sump 2
Sump 1
RW-4
former tank
former tank
shed
OW-035
OW-035
RW-1
MW-35
MW-15D
MW-15
OW-010
MW-30
MW-27
Beatty Creek
MW-25
MW-19
SW-2
MW-34
RAILROAD
NEW YORK STATE ROUTE 7
LEGEND:
Monitoring Well
MW-31
Recovery Well
RW-2
0
80
GRAP
(Il
1 incl
Environmental Engineering Services, PC
A MACTEC COMPANY
FIGURE 9
DETAILED SITE MAP
FORMER BORDEN RESINS FACILITY
BAINBRIDGE, NY
DATE: 06/17/03
DRAWING NO: Figures 1 & 2A.dwg
ESE PROJECT No. 722685
DRAWN BY: SC
APPROVED BY:

Table 1
Former Borden Resins Facility
Bainbridge, NY
System Components

Part #	Vendor	Part Description	Quantity
1	Sigma Controls	24" x 30" NEMA 4 Electric Panel	1
2	Omega	Model EWS-TX 4-20 mA temperature sensor	1
3	Norgren	General purpose and oil removal filter/regulator	1
4	Hayward	FLT4202 bag filter not to exceed 150 psi	1
5	Acme Electric Corp.	Linear Open Frame DC power supply	1
6	Circuit Components, Inc.	All Silicon Bi-directional Transient Voltage Suppressor Model PIP-120	1
7	Dwyer	Series 604A Differential Pressure Transmitter	2
8	Dwyer	Series DS-300 Flow Sensor, pitot tube	1
9	Dwyer	Series 673 Pressure Transmitter	1
10	Parker	Gold Ring Solenoid Valve, 2-Way Direct Acting	1
11	United Electric Controls	10 Series Spectra Pressure Switch	1
12	Dwyer	Series 634S Pressure Transmitter	1
13	Sigma Controls	Model 6000 Pressure transducer level sensor	6
14	Carbonair	Model PC-20 liquid phase carbon adsorber, 2,500 pound capacity	2
15	Geotech	Geotech 1.66" Auto-Reclaimer controllerless, pneumatic pump	3
16	Geotech	Geotech 3.56" Auto-Reclaimer controllerless, pneumatic pump	3
17	EOS Research	ProControl Series 2 plus, programmable logic controller	1
18	Depco Pump Co.	Goulds 2HM1F5EO, 1.5 hp, 5 stages, TEFC 3 phase transfer pump	1
19	SpeedAir	Model 5F565, 7.5 hp, 230/460 VAC, 3 phase, 2-stage air compressor	1
20	Fluid Power, Inc.	Thomas VX 150 #184002, 230/460/60/3 compressor, 10.49cfm @25 psig	1
21	Duff	5/8" water meter, with remote monitoring pulse generation	1
22		1,000 gallon polyethylene tank	1

Appendix B

Well Construction Diagrams

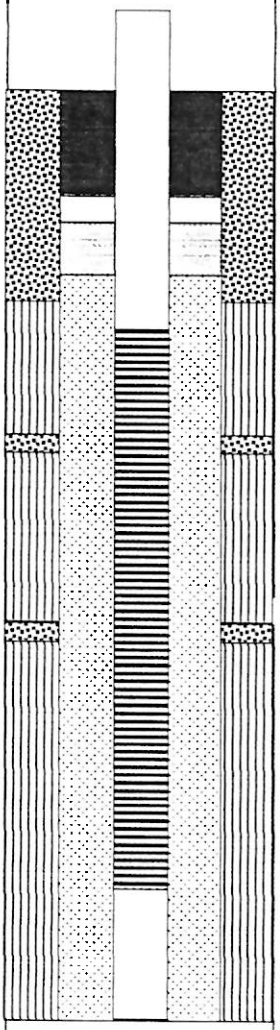
MACTEC

5205 Militia Hill Road
Plymouth Meeting, Pennsylvnia 19462

Former Borden Resin Facility
Bainbridge, New York

Project No.	722685	**Page**	1 of 1
Boring No.	RW-1	**Drilling Rig:**	Ingersoll Rand
Contractor:	Parrat Wolfe	**Drilling Method:**	Jetting with Steel Auge Schumasoil Screen
Drill Crew:	Glen Lansing Rick Navakta	**Sampling Method:**	No samples
Date Started:	11/20/2002	**Date Finished:**	11/21/2002
Logged by:	S.J. O'Brien	**First water during drilling (feet bgs):**	-
Bentonite Chips:	5' - 7'		
Cement:	4' - 5'		

Surface Elevation: -
Top of Casing Elevation: -
Screened Interval: 9' - 30'
Type '00N' Sand Pack: 7' - 35'

DEPTH (feet)	SOIL OR GROUNDWATER SAMPLE INTERVAL (feet)	BLOW COUNTS	LITHOLOGY	SAMPLE DESCRIPTION
0				0' - 4' Silty Sandy Gravel, moderately graded, loose, dry to damp, red brown to brown, chemical odor
5				Silty Sandy Gravel, moderately graded, loose, dry to damp, brown to olive brown, chemical odor, sandy silt layers
10				8' - 12' Silt, little sand and gravel, damp to wet, olive-brown to brown ~ 0.5 feet of silty sandy gravel at bottom
15				12' - 16' Silt, firm, wet, olive-brown mottling ~ 0.3 feet of silty sandy gravel at top
20				16' - 20' Silt, firm, wet, olive-brown mottling 20' - 20.3' Silty Sandy Gravel, wet, olive-brown 20.3' - 24' Silt, firm, wet, grey-brown mottling
25				24' - 28' Silt, firm, wet, grey-brown mottling
30				
35				End of Boring @ 35 feet
40				

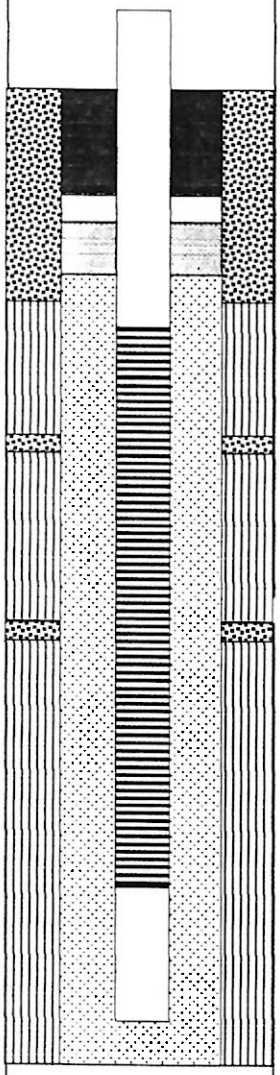
MACTEC

5205 Militia Hill Road
Plymouth Meeting, Pennsylvnia 19462

Former Borden Resin Facility
Bainbridge, New York

Project No.	722685	**Page**	1 of 1
Boring No.	RW-2	**Drilling Rig:**	Ingersoll Rand
Contractor:	Parrat Wolfe	**Drilling Method:**	Jetting with Steel Auger Schumasoil Screen
Drill Crew:	Glen Lansing Rick Navakta	**Sampling Method:**	No samples
Date Started:	11/19/2002	**Date Finished:**	11/20/2002
Logged by:	S.J. O'Brien	**First water during drilling (feet bgs):**	-
Bentonite Chips:	5' - 7'		
Cement:	4' - 5'		

Surface Elevation:	-
Top of Casing Elevation:	-
Screened Interval:	9' - 30'
Type '00N' Sand Pack:	7' - 35.8'

DEPTH (feet)	SOIL OR GROUNDWATER SAMPLE INTERVAL (feet)	BLOW COUNTS	LITHOLOGY	SAMPLE DESCRIPTION
0				0' - 4' Silty Sandy Gravel, moderately graded, loose, dry to damp, red brown to brown, chemical odor
5				Silty Sandy Gravel, moderately graded, loose, dry to damp, brown to olive brown, chemical odor, sandy silt layers
10				8' - 12' Silt, little sand and gravel, damp to wet, olive-brown to brown ~ 0.5 feet of silty sandy gravel at bottom
15				12' - 16' Silt, firm, wet, olive-brown mottling ~ 0.3 feet of silty sandy gravel at top
20				16' - 20' Silt, firm, wet, olive-brown mottling 20' - 20.3' Silty Sandy Gravel, wet, olive-brown 20.3' - 24' Silt, firm, wet, grey-brown mottling
25				24' - 28' Silt, firm, wet, grey-brown mottling
30				
35				End of Boring @ 35.8 feet.
40				

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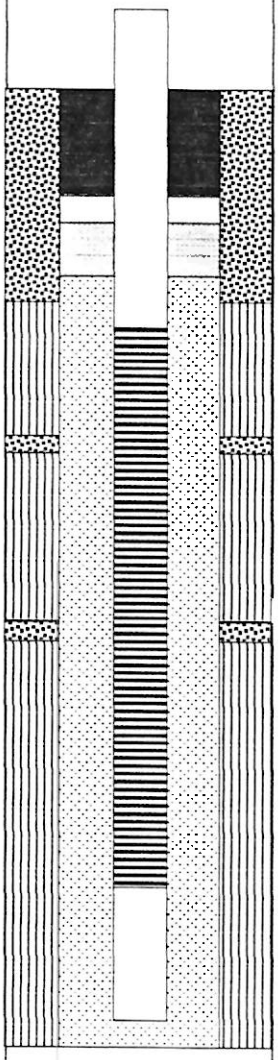
Former Borden Resin Facility
Bainbridge, New York

Project No.	722685	**Page**	1 of 1
Boring No.	RW-3	**Drilling Rig:**	Ingersoll Rand
Contractor:	Parrat Wolfe	**Drilling Method:**	Jetting with Steel Auger: Schumasoil Screen
Drill Crew:	Glen Lansing Rick Navakta	**Sampling Method:**	No samples
Date Started:	11/18/2002	**Date Finished:**	11/19/2002
Logged by:	S.J. O'Brien	**First water during drilling (feet bgs):**	-
Bentonite Chips:	5' - 7'		
Cement:	4' - 5'		

Surface Elevation: -
Top of Casing Elevation: -
Screened Interval: 9' - 30'
Type '00N' Sand Pack: 7' - 35.5'

DEPTH (feet)	SOIL OR GROUNDWATER SAMPLE INTERVAL (feet)	BLOW COUNTS	LITHOLOGY	SAMPLE DESCRIPTION
0				0' - 4' Silty Sandy Gravel, moderately graded, loose, dry to damp, red brown to brown, chemical odor
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15				12' - 16' Silt, firm, wet, olive-brown mottling ~ 0.3 feet of silty sandy gravel at top
20				16' - 20' Silt, firm, wet, olive-brown mottling 20' - 20.3' Silty Sandy Gravel, wet, olive-brown 20.3' - 24' Silt, firm, wet, grey-brown mottling
25				24' - 28' Silt, firm, wet, grey-brown mottling
30				
35				End of Boring @ 35.5 feet
40				

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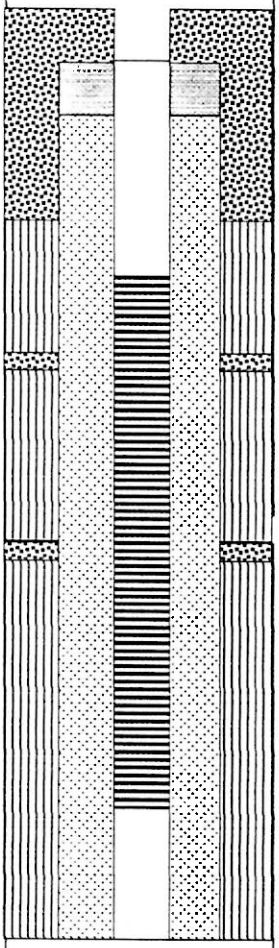
Former Borden Resin Facility
Bainbridge, New York

Project No.	722685	**Page**	1 of 1
Boring No.	RW-4	**Drilling Rig:**	Ingersoll Rand
Contractor:	Parrat Wolfe	**Drilling Method:**	Jetting with Steel Augers Continous Screen
Drill Crew:	Glen Lansing Rick Navakta	**Sampling Method:**	No samples
Date Started:	12/5/2002	**Date Finished:**	12/6/2002
Logged by:	R. Shoyer	**First water during drilling (feet bgs):**	-
Surface Elevation:	-		
Top of Casing Elevation:	-		
Screened Interval:	10' - 30'	**Bentonite Chips:**	2' - 4'
'00N, 0 & 00' Sand Pack:	4' - 35'	**Cement:**	-

DEPTH (feet)	SOIL OR GROUNDWATER SAMPLE INTERVAL (feet)	BLOW COUNTS	LITHOLOGY	SAMPLE DESCRIPTION
0				0' - 4' Silty Sandy Gravel, moderately graded, loose, dry to damp, red brown to brown, chemical odor
5				Silty Sandy Gravel, moderately graded, loose, dry to damp, brown to olive brown, chemical odor, sandy silt layers
10				8' - 12' Silt, little sand and gravel, damp to wet, olive-brown to brown ~ 0 5 feet of silty sandy gravel at bottom
15				12' - 16' Silt, firm, wet, olive-brown mottling ~ 0.3 feet of silty sandy gravel at top
20				16' - 20' Silt, firm, wet, olive-brown mottling 20' - 20 3' Silty Sandy Gravel, wet, olive-brown 20.3' - 24' Silt, firm, wet, grey-brown mottling
25				24' - 28' Silt, firm, wet, grey-brown mottling
30				
35				End of Boring @ 35 feet.
40				

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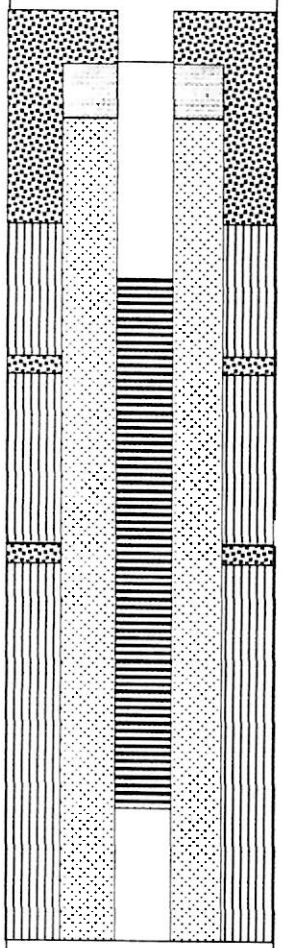
Bainbridge, New York

Project No.	722685	**Page**	1 of 1
Boring No.	RW-5 former Sump-3	**Drilling Rig:**	Ingersoll Rand
Contractor:	Parrat Wolfe	**Drilling Method:**	Hollow Stem Augering Continous Screen
Drill Crew:	Glen Lansing Rick Navakta	**Sampling Method:**	No samples
Date Started:	12/5/2002	**Date Finished:**	12/6/2002
Logged by:	R. Shoyer	**First water during drilling (feet bgs):**	-
Bentonite Chips:	2' - 4'		
Cement:	-		

Surface Elevation: -
Top of Casing Elevation: -
Screened Interval: 10' - 30'
'00N, 0 & 00' Sand Pack: 4' - 35'

DEPTH (feet)	SOIL OR GROUNDWATER SAMPLE INTERVAL (feet)	BLOW COUNTS	LITHOLOGY	SAMPLE DESCRIPTION
0				0' - 4' Silty Sandy Gravel, moderately graded, loose, dry to damp, red brown to brown, chemical odor
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20				16' - 20' Silt, firm, wet, olive-brown mottling 20' - 20 3' Silty Sandy Gravel, wet, olive-brown 20 3' - 24' Silt, firm, wet, grey-brown mottling
25				24' - 28' Silt, firm, wet, grey-brown mottling
30				
35				End of Boring @ 35 feet
40				

Appendix C

Groundwater Monitoring Requirements

IRG Assumption, LLC

7991 Shaffer Parkway, Suite 100
Littleton, CO 80127
Phone: (303) 972-6633
Facsimile: (303) 972-6655

Leslie Casiple
Project Manager
lcasiple@irgco.com

June 17, 2003

Via Email

Denise Radtke
Engineering Geologist, Region 7
New York State Department of Environmental Conservation
Bureau of Radiation and Hazardous Site Management
625 Broadway
8th Floor
Albany, NY 12233-7252

Re: Former Borden Resin Facility, Bainbridge, NY - Monitoring Requirements

Ms. Radtke:

The following is to memorialize our conversations of June 16, 2003 and June 17, 2003 regarding the monitoring requirement for the former Borden Resin Facility located in Bainbridge, New York.

We have agreed as follows:

Bone Yard Area

MW-2B	To be sampled annually for PCBs until three consecutive quarters below standards is achieved
MW-17	To be sampled annually for PCBs until three consecutive quarters below standards is achieved

**Note:* *Two rounds of sampling meeting these criteria have already been gathered; therefore, it is anticipated that this requirement will be fulfilled with one additional sampling event.*

PCB Area

MW-23	To be sampled annually for VOCs until three quarters below standards is achieved

**Note:* *Two rounds of sampling meeting these criteria have already been gathered; therefore, it is anticipated that this requirement will be fulfilled with one additional sampling event.*

MW-24 / MW-1	To be sampled annually for PCBs until three quarters below standards is achieved

**Note:* *MW-1 will replace MW-24 as representative of this area pending your review of the location and well construction. One round of sampling meeting these criteria has already been gathered; therefore, it is anticipated that this requirement will be fulfilled with two additional sampling events.*

Phenol Recovery Area

IRG

Perimeter Sampling:	Intended to provide clean line of wells to demonstrate plume containment
POE	To be sampled semi-annually for BTEX, Phenolics, and TICs during system operation.
MW-16	To be sampled annually for BTEX, Phenolics, and TICs and annually for formaldehyde during system operation.
MW-19	To be sampled semi-annually for BTEX, Phenolics, and TICs during system operation.
MW-27	To be sampled annually for BTEX, Phenolics, and TICs and annually for formaldehyde during system operation.
MW-34	To be sampled semi-annually for BTEX, Phenolics, and TICs during system operation.
MW-35	To be sampled semi-annually for BTEX, Phenolics, and TICs during system operation.

*Note: *Following one year of sampling, should MW-27 and MW-34 remain below standards, sampling of MW-34 will be discontinued and MW-27 will thereafter be sampled semi-annually.*

Plume Sampling:	Intended to provide data within the plume to demonstrate mass contaminant reduction
MW-15	To be sampled quarterly for BTEX, Phenolics, and TICs during system operation.
OW-10	To be sampled annually for BTEX, Phenolics, TICs and formaldehyde during system operation.
OW-35	To be sampled quarterly for BTEX, Phenolics, and TICs during system operation.
RW-1	To be sampled annually for BTEX, Phenolics, and TICs during system operation.
RW-2	To be sampled annually for BTEX, Phenolics, and TICs during system operation.
RW-3	To be sampled annually for BTEX, Phenolics, and TICs during system operation.
RW-4	To be sampled annually for BTEX, Phenolics, and TICs during system operation.
RW-5	To be sampled annually for BTEX, Phenolics, TICs and formaldehyde during system operation.
Sump 1	To be sampled annually for BTEX, Phenolics, and TICs during system operation.

In addition, we have agreed upon the following points:

- MW-29 and MW-29D have been/will be decommissioned
- All non-sampled wells will be periodically inspected to maintain integrity for possible use in post-termination monitoring, as required
- The samples collected during the March 2003 event will represent the first annual sampling event under this new program
- Samples to be collected in the Bone Yard and PCB areas will be collected at the next semi-annual sampling event scheduled for September 2003.

I have attached an excel spreadsheet summarizing this information for your convenience. If you have any questions or concerns, please feel free to contact me.

Sincerely,

Leslie E. Casiple
IRG Assumptions, Project Manager

attachment

cc: Tim DiGiulio, NYSDEC Division of Solid and Hazardous Materials
Mitch Moss, MACTEC Development Corporation
Andrew Mills, MACTEC Development Corporation
Scott Fennell, Northern Kentucky University

Monitoring Program Beginning June 2003

Group 1: Phenol Recovery Area	Lab Parameters:	Frequency:	Lab Parameters:	Frequency:	Field Parameters
Sump-1	BTEX, Phenolics & TICs	annual	N/A	N/A	pH, temp, conductivity
Sump-3 RW-5	BTEX, Phenolics & TICs	annual	Formaldehyde	annual	pH, temp, conductivity
MW-15	BTEX, Phenolics & TICs	quarterly	N/A	N/A	pH, temp, conductivity
MW-15D	N/A	N/A	N/A	N/A	N/A
MW-16	BTEX, Phenolics & TICs	annual	Formaldehyde	annual	pH, temp, conductivity
MW-19	BTEX, Phenolics & TICs	semi-annual	N/A	N/A	pH, temp, conductivity
MW-20	N/A	N/A	N/A	N/A	N/A
MW-27	BTEX, Phenolics & TICs	annual	Formaldehyde	annual	pH, temp, conductivity
MW-29	N/A	N/A	N/A	N/A	N/A
MW-29D	N/A	N/A	N/A	N/A	N/A
MW-30	N/A	N/A	N/A	N/A	N/A
MW-34	BTEX, Phenolics & TICs	semi-annual	N/A	N/A	pH, temp, conductivity
MW-35	BTEX, Phenolics & TICs	semi-annual	N/A	N/A	pH, temp, conductivity
SW-2	N/A	N/A	N/A	N/A	pH, temp, conductivity
OW-10	BTEX, Phenolics & TICs	annual	Formaldehyde	annual	N/A
OW-25	N/A	N/A	N/A	N/A	N/A
OW-35	BTEX, Phenolics & TICs	quarterly	N/A	N/A	N/A

Group 2: Bone Yard Area	Lab Parameters:	Frequency:	Lab Parameters:	Frequency:	Field Parameters
MW-2B	PCBs	annual (2003)	N/A	N/A	pH, temp, conductivity
MW-17	PCBs	annual (2003)	N/A	N/A	pH, temp, conductivity
MW-21	PCBs	N/A	N/A	N/A	N/A

Group 3: PCB Area	Lab Parameters:	Frequency:	Lab Parameters:	Frequency:	Field Parameters
MW-23	VOC	annual (2003)	N/A	N/A	pH, temp, conductivity

Group 4: PCB Area	Lab Parameters:	Frequency:	Lab Parameters:	Frequency:	Field Parameters
MW-24 MW-1	PCBs	annual	N/A	N/A	pH, temp, conductivity

Group 5: Phenol Recovery Area (Additional Wells)	Lab Parameters:	Frequency:	Lab Parameters:	Frequency:	Field Parameters
RW-1	BTEX, Phenolics & TICs	annual	N/A	N/A	pH, temp, conductivity
RW-2	BTEX, Phenolics & TICs	annual	N/A	N/A	pH, temp, conductivity
RW-3	BTEX, Phenolics & TICs	annual	N/A	N/A	pH, temp, conductivity
RW-4	BTEX, Phenolics & TICs	annual	N/A	N/A	pH, temp, conductivity
POE	BTEX, Phenolics & TICs	semi-annual	N/A	N/A	pH, temp, conductivity
Sump 2	N/A	N/A	N/A	N/A	N/A

Samples Per Year	
BTEX/VOCs	26
Phenolics	25
TICs	25
Formaldehyde	4
PCBs	3
Total	**83**

**** Note that March 2003 event will be used as 1st annual event under this Monitoring Program**

1) Noted that MW-29 had been destroyed during excavation activities and will be considered to have been decommissioned.
2) Noted that due to accessability issues, MW-29D will be decommissioned.
3) MW-1 will replace with MW-24 as the representative well for the PCB Area, Group 4, based on Denise's review of location and well construction. It will be sampled for a period of 2 years (provided levels are below standards).
4) If MW-27 and MW-34 are below standards, MW-27 will become semi-annual and MW-34 will be discontinued.