ProvGas
A ProvEnergy Company

13 April 2001

Mr. Joseph Martella
Office of Waste Management
Department of Environmental Management
235 Promenade Street
Providence, Rhode Island 02908

MAY 3 2001

Re: Providence Gas Company, 642 Allens Avenue, Providence

Dear Mr. Martella:

In our recent data submission which characterizes the environmental conditions at the above referenced site, you will note that sample location D48 indicated surface and subsurface exceedances for Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, and Arochlor 1260 as follows:

D48 sample

Arochlor	Depth	Result
1016	0-2 ft	< 35 ppm
1221	0-2 ft	< 35 ppm
1232	0-2 ft	< 35 ppm
1242	0-2 ft	140 ppm
1242	6-8 ft	40 ppm
1248	0-2 ft	< 35 ppm
1254	0-2 ft	< 35 ppm
1260	0-2 ft	< 35 ppm

Please note that all samples at all depths in adjacent locations had no Arochlor exceedances. Also note that the method reporting limit of 35 ppm for all Arochlors except 1242 were due to the dilution that was necessary to quantify Arochlor 1242.

None of the disposal facilities that were taking remediation waste could accept Arochlors at the level present at location D48. Therefore, we contract Clean Harbors to excavate and dispose of the soil. On 1 and 2 August 2000, Clean Harbors personnel hand excavated the area because of the presence of live natural-gas distribution lines. The horizontal extent of the excavation was to the asphalt road, concrete sidewalk, or estimated location of unaffected soil. The vertical extent of the excavation was the top of the groundwater table. According to Clean Harbors work order slips, personnel excavated approximately 17 cubic yards of soil.

Please note that the most of the sidewalls of the excavation are bounded by site features including the former No 2 Compressor House, pipe stand supports, an asphalt road, and a concrete sidewalk. These features are show on the sketch of the post-excavation sample grid.

Environmental Science Services (ESS) personnel collected post excavation samples from the sidewalls and bottom on 3 August 2000. After the analysis came back we realized we collected additional bottom samples to determine an upper confidence limit. ESS personnel collected the additional bottom samples on 23 August 2000.

The results are summarized below. Please note that all results are reported in milligrams per Kilogram (ppm) and that all results have only three significant figures.

Location	Result	Arochlor
w-1(0-2)	< 0.105	
w-1(2-4)	< 0.105	
w-2(0-2)	< 0.116	
w-2(2-4)	< 0.112	
n-1(2-4)	< 0.119	
n-2(2-4)	< 0.115	
e-1(0-2)	0.172	1254
e-1(2-4)	< 0.115	
D49 (0-2)	< 0.252	
D49 (4-6)	< 0.252	
D64 (0-2)	< 0.266	
D64 (4-6)	0.190	1254
Bottom1	*84.200*	1242
Bottom2	0.413	1254
Bottom3	< 0.110	
Bottom4	0.146	1254
Bottom5	3.470	1242
Bottom6	< 0.115	
Bottom7	0.348	1242
Bottom8	0.215	1242
Bottom9	9.440	1242
Bottom10	0.135	1242
Bottom11	5.650	1242
Bottom12	15.700	1242
Bottom13	0.514	1242
Bottom14	*241.000*	1242
Bottom15	0.842	1242
Bottom16	20.100	1242
Bottom17	1.390	1242
Bottom18	0.228	1242

Since the Bottom 1 and Bottom 14 samples were adjacent and the highest values in the data set, Clean Harbors returned to remove soil approximately one foot into the groundwater on 8 September 2000. According to Clean Harbors work order slips, personnel excavated approximately 17 cubic yards of soil. ESS personnel resampled the Bottom 1 and Bottom 14 grids. The new data set appears below.

Location	Result	Arochlor
w-1(0-2)	< 0.105	
w-1(2-4)	< 0.105	
w-2(0-2)	< 0.116	
w-2(2-4)	< 0.112	
n-1(2-4)	< 0.119	
n-2(2-4)	< 0.115	
e-1(0-2)	0.172	1254
e-1(2-4)	< 0.115	
D49 (0-2)	< 0.252	
D49 (4-6)	< 0.252	
D64 (0-2)	< 0.266	
D64 (4-6)	0.190	1254
Bottom1	*2.910*	1242
Bottom2	0.413	1254
Bottom3	< 0.110	
Bottom4	0.146	1254
Bottom5	3.470	1242
Bottom6	< 0.115	
Bottom7	0.348	1242
Bottom8	0.215	1242
Bottom9	9.440	1242
Bottom10	0.135	1242
Bottom11	5.650	1242
Bottom12	15.700	1242
Bottom13	0.514	1242
Bottom14	*26.500*	1242
Bottom15	0.842	1242
Bottom16	20.100	1242
Bottom17	1.390	1242
Bottom18	0.228	1242

Please note that the values in *Italics* are the portions of the grid where further remediation took place to address outliers in the data set.

Using a log normal distribution, a 95% upper confidence limit concentration ($UCLC_{95}$)for the above data set was calculated:

$$UCLC_{95} = e^{[\mu+\sigma(NORMSINV(p))]}$$

Where p is the probability associated with the lognormal distribution. For this situation, a 95% cumulative probability corresponds to a value of 0.45 associated with the lognormal distribution (i.e., $z = (x - \mu)/\sigma$; see NORMSINV below)

μ is the mean of ln(x).

σ is the standard deviation of ln(x).

NORMSINV is the inverse of the standard normal cumulative distribution using an iterative technique for calculating the function. The iterations solve the normal density function for x:

$$f(x) = [1 / (\sqrt{2\pi})]\, e^{-(x-\mu)^2/2\sigma^2}$$; where x is the displacement from the mean

For this data set, the mean is 3.005 and the standard deviation is 6.505. For the purposes of determining mean and standard deviation, the method reporting limit (MRL) is used for samples where Aroclor is present below the MRL. Therefore the $UCLC_{95}$ is 8.91 ppm.

Since the Arochlor limit is 10 ppm, the post excavation sampling indicates compliance with the standard set forth in Rule 8.10(A)(ii) of the *Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases*. This same technique is used in Appendix A of the approved Remedial Action Work Plan for the site dated 4 December 1998.

The excavated soil was loaded onto three licensed vehicles on 14 September 2000 and transported to the licensed Chemical Waste Management facility in Model City, New York on Hazardous Waste Manifests NYB7886376, NYB7886385, and NYB7886403. The soil arrived at Model City on 15 September 2000. The excavated area was backfilled with soil in compliance with the standards set in the approved Remedial Action Work Plan.

If you have any questions concerning the information in this letter or any other matter regarding the remediation at PGC, please feel free to call me at 272-5040 x629.

Sincerely,

Marc Viera
Environmental Manager

C: A. Fish, SUC
T. O'Connor, VHB

Attachments:
Figure 1: Site Location
Figure 2: PCB Exceedance
Figure 3: Post Excavation Sampling Grid
Appendix A: Electronic Deliverable Printout of D48 Sample
Appendix B: Certificates of Analyses – Post Excavation Sampling 3 August 2000
Appendix C: Certificates of Analyses – Post Excavation Sampling 23 August 2000
Appendix D: Certificates of Analyses – Post Excavation Sampling 12 September 2000
Appendix E: Histogram of Final Data Set
Appendix F: Manifests for Shipment of Excavated Soils
Appendix G: Weight Slips for Excavated Soil Arriving at Model City

No appendices included in this PDF

FIGURES

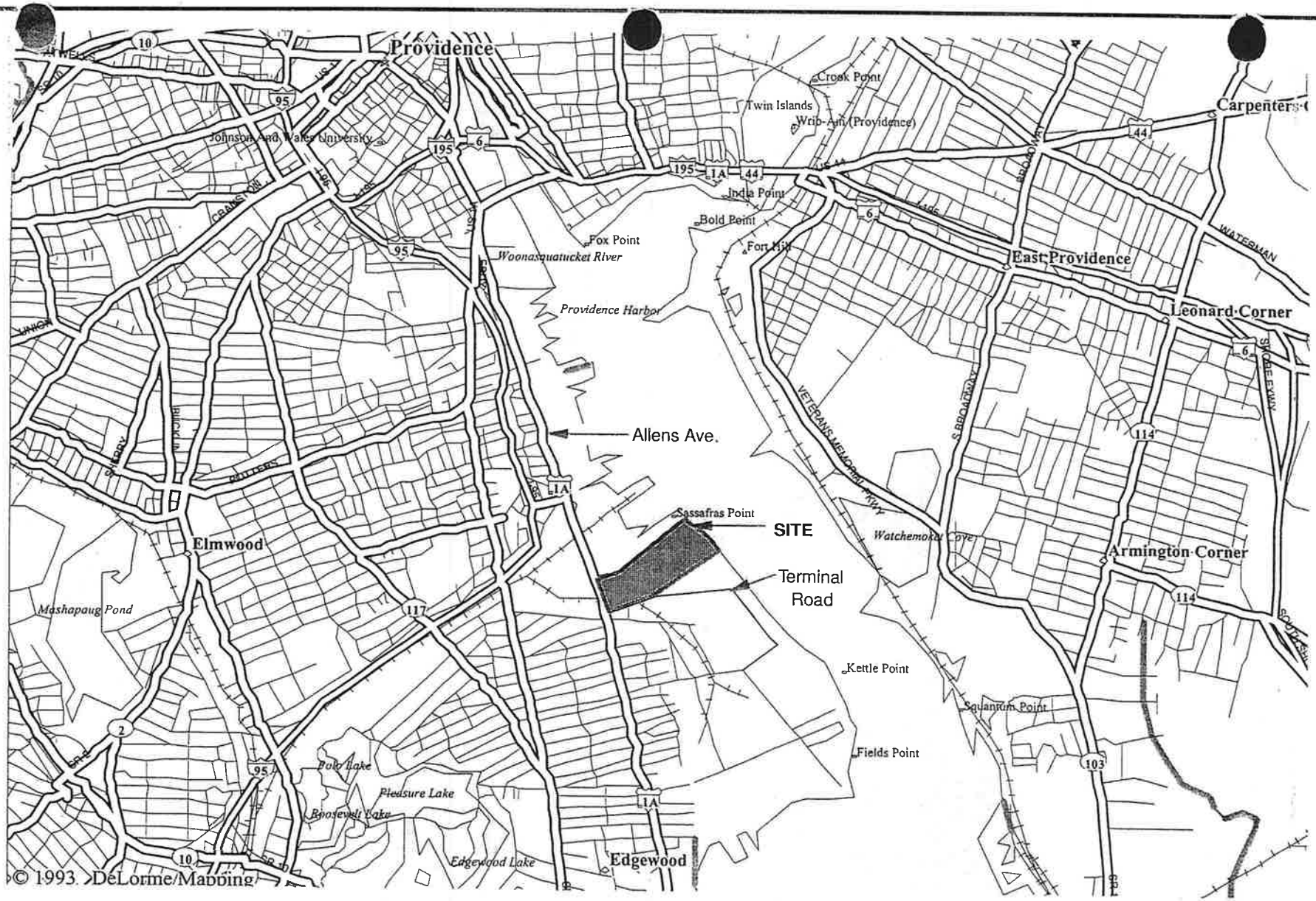

Figure 1:

SITE LOCATION

PROVIDENCE GAS COMPANY
PROVIDENCE, RHODE ISLAND

642 Allens Av

ESS ENVIRONMENTAL SCIENCE SERVICES, INC.

ENVIRONMENTAL SCIENTISTS, ENGINEERS, AND PLANNERS

272 West Exchange Street, Providence, Rhode Island 02903 (401) 421-0398

SCALE: AS SHOWN DATE: NOVEMBER, 1998

P1510

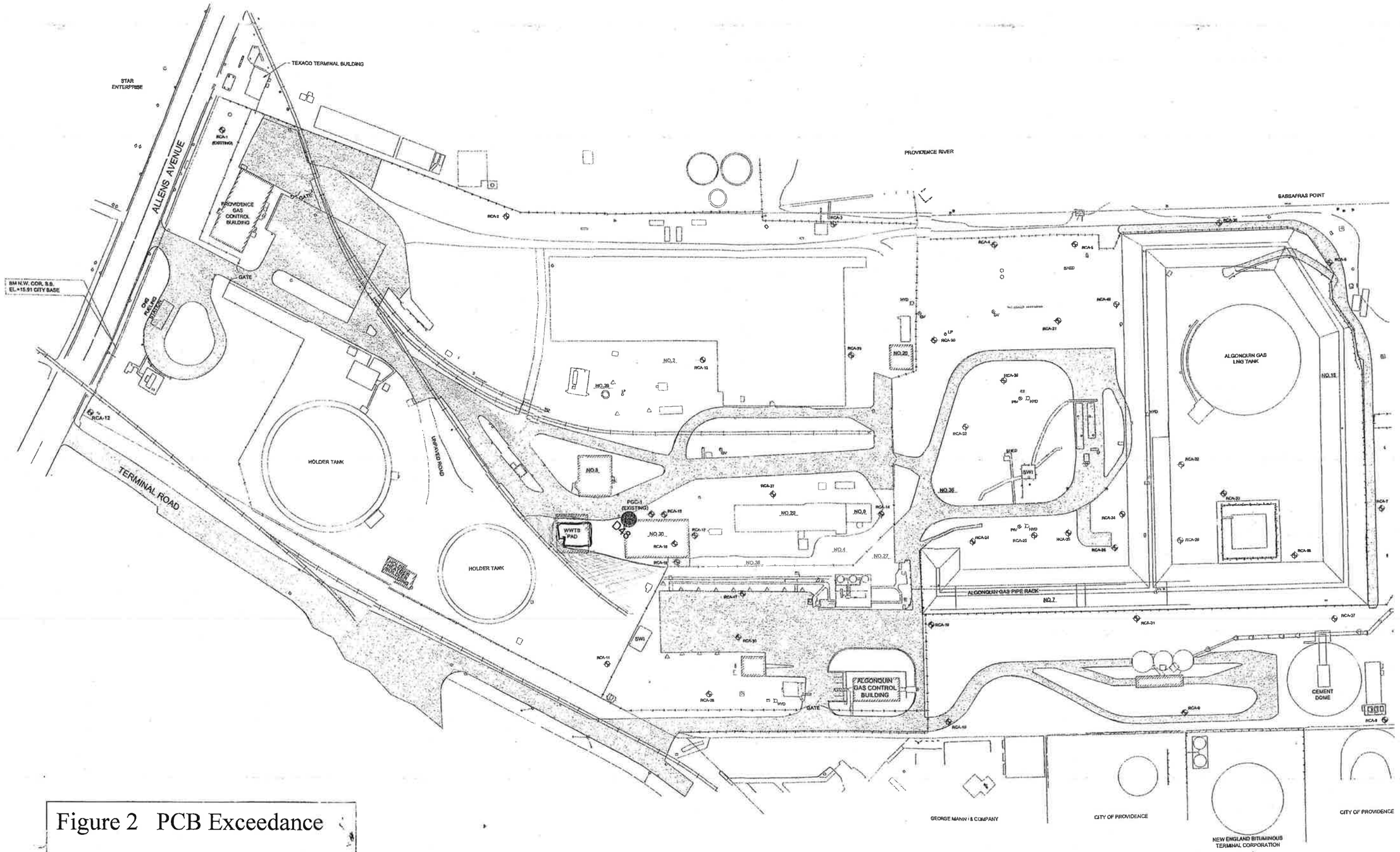

Figure 2 PCB Exceedance

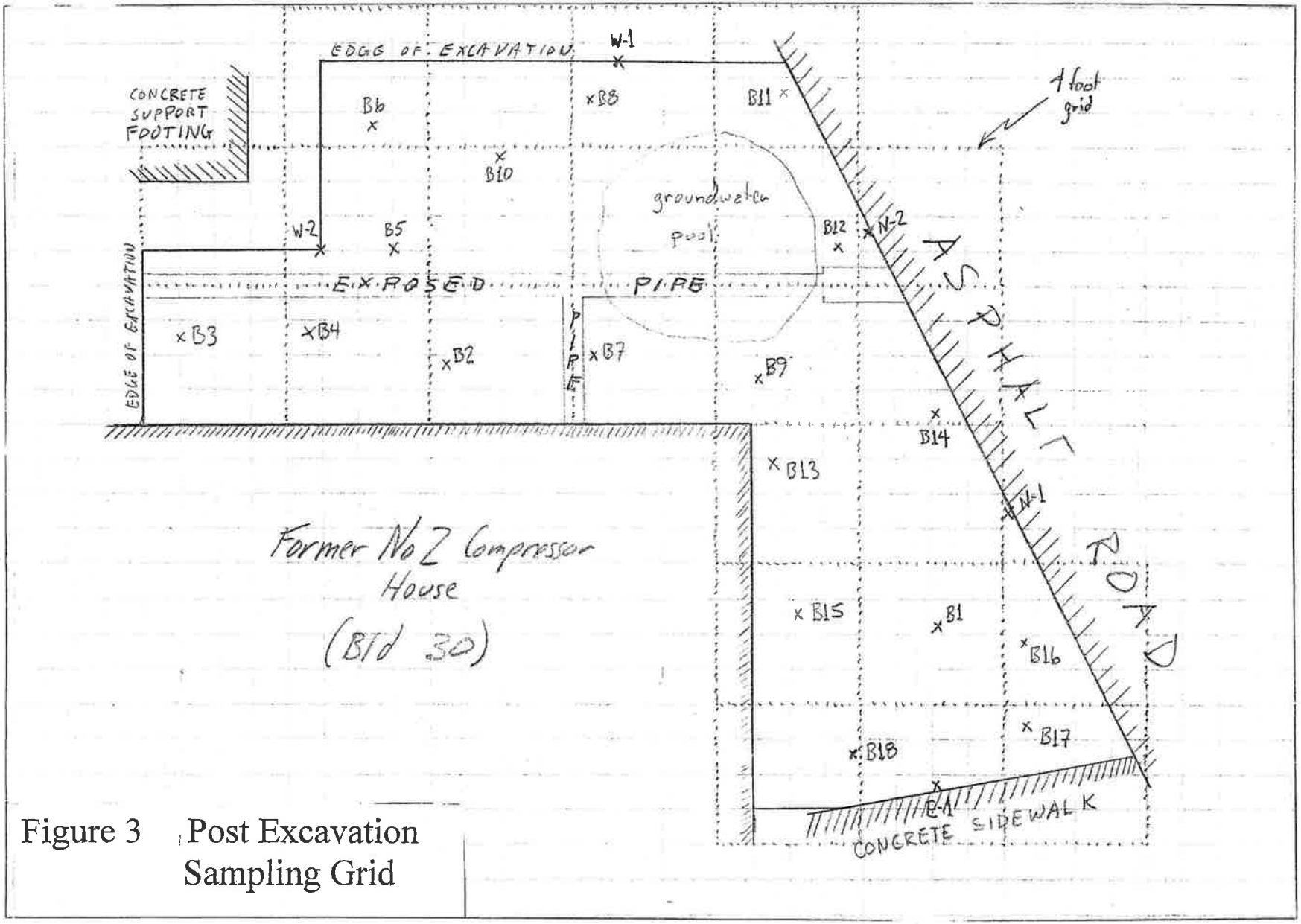

Figure 3 Post Excavation Sampling Grid