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SOIL GAS SURVEY
FOUR WINDS SHOPPING CENTER AND ENVIRONS
TUTU AREA, ANNA'S RETREAT
U.S. VIRGIN ISLANDS



TARGET ENVIRONMENTAL SERVICES, INC.

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TUTU AREA, ANNA'S RETREAT
U.S. VIRGIN ISLANDS

PREPARED FOR

LAW OFFICE OF JOHN K. DEMA, P.C.
1236 STRAND STREET, SUITE 103
CHRISTIANSTED, ST. CROIX, VIRGIN ISLANDS 00820-5008

PREPARED BY

TARGET ENVIRONMENTAL SERVICES, INC.
9180 RUMSEY ROAD
COLUMBIA, MARYLAND 21045
(410) 992-6622

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EXECUTIVE SUMMARY

On January 7 through 13, 1991, **TARGET Environmental Services, Inc. (TARGET)** conducted a soil gas survey at **Four Winds Shopping Center and Environs, Tutu Area, Anna's Retreat, U.S. Virgin Islands**, where petroleum and chlorinated hydrocarbons have been detected in water supply wells. The samples were analyzed by GC/FID and GC/ECD for petroleum and chlorinated hydrocarbons.

The highest levels of Total FID Volatiles were present on the **Rodriguez Esso** and this occurrence apparently extends some distance to the southeast. The highest hydrocarbon levels in the **Four Winds Plaza** area occurred at **Tutu Esso**. This occurrence appeared to have migrated northward beyond the pump islands into the shopping center parking lot. The FID chromatogram signatures of the samples with the highest levels of Total FID Volatiles from both **Esso** stations reveal a complex petroleum hydrocarbon fuel mixture. There was no evidence that contaminants from a reported occurrence on the **Texaco** property to the northeast have impacted the **Four Winds Plaza** property. The water supply wells at **Four Winds Plaza** are within the area of contamination associated with **Tutu Esso**. The water supply well on the Harthman property nearest location 166, appears to be at greatest risk of being impacted by the occurrence on the **Rodriguez Esso**.

GC/ECD analysis revealed significant concentrations of tetrachloroethene (PCE), cis-1,2-dichloroethene (c-1,2-DCE) and trichloroethene (TCE) in the northern portion of the **Tutu Esso** and beneath the **Four Winds Plaza** parking lot. No significant chlorinated hydrocarbons were detected on the Harthman and **Rodriguez Esso** properties.

Introduction

The Law Office of John K. Dema, representing Four Winds Plaza, contracted TARGET Environmental Services, Inc. (TARGET) to perform a soil gas survey on a portion of the Four Winds Plaza property and on adjacent properties in the Tutu area, Anna's Retreat, St. Thomas, U.S. Virgin Islands. The purpose of the soil gas survey was to help determine the source(s) of the hydrocarbons in the shopping center's water supply wells and to determine if water supply wells on the adjacent Harthman property were at similar risk.

In 1983 and 1987, halogenated and non-halogenated hydrocarbons were discovered in water supply wells in the area. Subsequent soil gas surveys and water samples from the supply wells detected petroleum and halogenated hydrocarbons in the ground water at nearby Esso and Texaco service stations and beneath the shopping center parking lot. As a result, the Virgin Islands Department of Planning and Natural Resources ordered that the supply wells be shut down.

Site soils were reported to be permeable stratified sands, gravels and clays up to 20 feet thick over fractured bedrock. The ground water level fluctuates from a rainy season high of about 20 feet to a dry season low of about 90 feet. Regional flow is southward. The field phase of the soil gas survey was conducted on January 7 through 13, 1992.

Detectability

The soil gas survey data presented in this report are the result of precise sampling and measurement of contaminant concentrations in the vadose zone. Analyte detection at a particular location is representative of vapor, dissolved, and/or liquid phase contamination at that location. The presence of detectable levels of target analytes in the vadose zone is dependent upon several factors, including the presence of vapor-phase hydrocarbons or dissolved or liquid concentrations adequate to facilitate volatilization into the unsaturated zone.

Terminology

In order to prevent misunderstanding of certain terms used in this report, the following clarifications are offered:

The term "feature" is used in reference to a discernible pattern in the contoured data. It denotes a contour form rather than a definite or separate chemical occurrence.

The term "occurrence" is used to indicate an area where chemical compounds are present in sufficient concentrations to be detected by the analysis of soil vapors. The term is not indicative of any specific mode of occurrence (vapor, dissolved, etc.), and does not necessarily indicate or suggest the presence of "free product" or "phase-separated hydrocarbons."

The term "anomaly" refers to an area where hydrocarbons were measured in excess of what would normally be considered "natural" or "background" levels.

The term "analyte" refers to any of the hydrocarbons standardized for quantification in the chromatographic analysis.

The term "vadose zone" represents the unsaturated zone between the ground water table and the ground surface.

The term "indicates" is used when evidence dictates a unique conclusion. The term "suggests" is used when several explanations of certain evidence are possible, but one in particular seems more likely. As a result, "indicates" carries a higher degree of confidence in a conclusion than does "suggests."

The terms "elevated" and "significant" are used to describe concentrations of analytes which indicate the existence of a potential problem in the soil or ground water.

The terms "low", "moderate" and "high", when applied to Total FID Volatile petroleum hydrocarbons, are relative and subjective terms based on TARGET's analysis of thousands of soil gas samples from hundreds of sites. Because site conditions and sampling techniques vary, specific action levels cannot be set for soil gas. Decisions regarding the necessity for further actions should be based upon comparisons of samples of soil or ground water with the regulatory action levels set for these media.

Field Procedures

Soil gas samples were collected at a total of 169 locations at the site, as shown in Figure 1A and 1B. Three proposed samples (Sample 24 from near the southeast corner of **Western Auto**, Sample 47 from southeast of the car wash, and Sample 168 from south of **Gasset Auto**) could not be collected due to the presence of very shallow ground water. Several samples were collected shallower than the proposed 4 feet due to probe refusal (see Table 1). Sample 172 was collected from a monitoring well located between the building on the Tutu Esso and the adjacent car wash.

To collect the samples a 1/2 inch hole was produced to a depth of approximately 4 feet by using a drive rod. Where pavement or concrete was present, a rotary hammer was employed for penetration prior to using the drive rod. The entire sampling system was purged with ambient air drawn through an organic vapor filter cartridge, and a stainless steel probe was inserted to the full depth of the hole and sealed off from the atmosphere. A sample of in-situ soil gas was then withdrawn through the probe and used to purge atmospheric air from the sampling system. A second sample of soil gas was withdrawn through the probe and encapsulated in a pre-evacuated glass vial at two atmospheres of pressure (15 psig). The self-sealing vial was detached from the sampling system, packaged, labeled, and stored for laboratory analysis.

Prior to the day's field activities all sampling equipment, slide hammer rods and probes were decontaminated by washing with soapy water and rinsing thoroughly. Internal surfaces were flushed

dry using pre-purified nitrogen or filtered ambient air, and external surfaces were wiped clean using clean paper towels.

Field control samples were collected at the beginning and end of each day's field activities and after every twentieth soil gas sample. These QA/QC samples were obtained by filtering ambient air through a dust and organic vapor filter cartridge and collecting in the same manner as described above.

The volatile petroleum hydrocarbons reported in Field Control Samples 210 and 213 are the result of carryover in the sampling equipment following the collection of Samples 106 and 146, respectively, which contained high levels of volatile hydrocarbons. The very low levels of volatile hydrocarbons reported in Field Control Samples 214, 215 and 216 are most likely the result of minor carryover, but the levels are insufficient to have influenced the survey results.

A very low level of tetrachloroethene (PCE) was present in Field Control Sample 202. This sample was collected following Sample 20, which contained a moderate amount of PCE. Field Control Sample 202 was the last blank of the day and the blank collected as the first sample the next morning did not contain detectable levels of PCE.

Laboratory Procedures

All of the samples collected during the field phase of the survey were subjected to dual analyses. One analysis was conducted according to EPA Method 601 (modified) on a gas chromatograph equipped with an electron capture detector (ECD), but using direct injection instead of purge and trap. Specific analytes standardized for this analysis were:

- 1,1-dichloroethene (11DCE)
- methylene chloride (CH_2Cl_2)
- trans-1,2-dichloroethene (t12DCE)
- 1,1-dichloroethane (11DCA)
- cis-1,2-dichloroethene (c12DCE)
- chloroform (CHCl_3)
- 1,1,1-trichloroethane (111TCA)
- carbon tetrachloride (CCl_4)
- trichloroethene (TCE)
- 1,1,2-trichloroethane (112TCA)
- tetrachloroethene (PCE)

The chlorinated hydrocarbons in this suite were chosen because of their common usage in industrial solvents, and/or their degradational relationship to commonly used compounds.

The second analysis was conducted according to EPA Method 602 (modified) on a gas chromatograph equipped with a flame ionization detector (FID), but using direct injection instead of purge and trap. The analytes selected for standardization in this analysis were:

- methyl tertiary butyl ether (MTBE)
- benzene
- toluene
- ethylbenzene
- meta- and para- xylene
- ortho-xylene

These compounds were chosen because of their utility in evaluating the presence of fuel products, or petroleum based solvents.

The analytical equipment was calibrated using an instrument-response curve and injection of known concentrations of the above standards. Retention times of the standards were used to identify the peaks in the chromatograms of the field samples and their response factors were used to calculate the analyte concentrations.

The Total FID Volatiles values were generated by summing the areas of all chromatogram peaks and calculated using the instrument response factor for toluene. Injection peaks, which also contain the light hydrocarbon methane, were excluded to avoid the skewing of the Total FID Volatiles values due to injection disturbances and biogenic methane. For samples with low hydrocarbon concentrations, the calculated Total FID Volatiles concentration is occasionally lower than the sum of the individual analytes. This is because the response factor used for the Total FID Volatiles calculation is a constant, whereas the individual analyte response factors vary with concentration. It is important to understand that the Total FID Volatiles levels reported are relative, not absolute, values.

The tabulated results of the laboratory analyses of the soil gas samples are reported in micrograms per liter ($\mu\text{g/l}$) in Tables 2 and 3. Although "micrograms per liter" is equivalent to "parts per billion (v/v)" in water analyses, they are not equivalent in gas analyses, due to the difference in the mass of equal volumes of water and gas matrices. Because pentane and MTBE co-elute, they are listed together in the table. The xylenes concentrations reported in Table 2 are the sum of the m- and p-xylene and o-xylene concentrations for each sample.

For QA/QC purposes, a duplicate analysis was performed on every tenth field sample. Laboratory blanks of nitrogen gas (99.999%) were also analyzed after every tenth field sample.

Discussion and Interpretation of Results

In order to provide graphic presentation of the results, selected individual data sets in Tables 2 and 3 have been mapped and contoured to produce Figures 2 through 12. The contour lines show areas where concentrations are of similar magnitude. The limits of the soil gas survey do not necessarily outline the exact edges of a potential ground water or soil plume which acts as a source of the vapors. However, areas of highest concentration and relative highs and lows are clearly exhibited in the soil gas data and the data will reflect conditions in the subsurface at each sample point. Dashed contours are used where patterns are extrapolated into areas of less complete data, or as auxiliary contours. Map sample points with no data shown indicate that the analyte concentrations in the sample were below the detection limit.

The survey area was divided into two parts: the first part is the area including and surrounding the parking lot of the **Four Winds Plaza** and **Tutu Esso**. The second part includes the **Harthman Property**, **Rodriguez Esso** and vicinity.

Four Winds Plaza and Tutu Esso Area

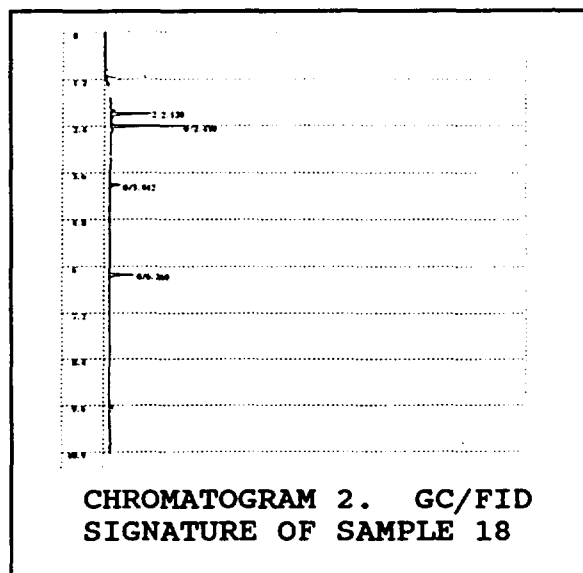
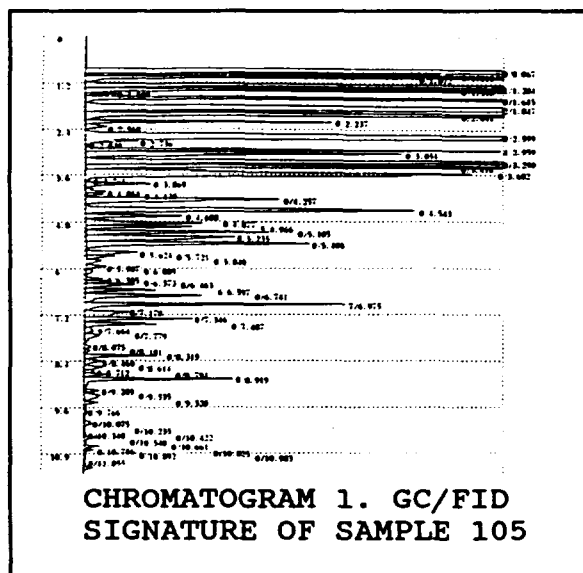
Observations

The highest levels of Total FID Volatiles from the **Tutu Esso** and adjacent areas (Figure 2) occurred between the building and the tank area on the **Esso** site (Stations 105 and 106). Significantly elevated levels are also present north of the pump islands (Stations 95 and 97). Low levels extend northward into the **Four Winds Plaza** parking lot and are present south of the car wash.

Isolated very low levels typical of background concentrations were evident at a few other scattered locations.

Map patterns for MTBE/pentane (Figure 3) are similar to, but less extensive than, those of Total FID Volatiles. Benzene (Figure 4) was detected only on the Esso site. The toluene, ethylbenzene, and xylenes occurrences, as exemplified by the xylenes map (Figure 5), are similar. These analytes are at their highest concentrations in Sample 105, and the occurrences extend northward beyond the pump islands.

The FID chromatogram signatures of the samples from the TuTu Esso reveal a complex petroleum hydrocarbon fuel mixture, as exemplified by Chromatogram 1, Sample 105. Isolated peaks representing the FID response to chlorinated compounds are present in the signatures of several samples from the parking lot, shown by Chromatogram 2, Sample 18.



The xylenes are less volatile and less soluble than the other analytes, adsorb more readily to the soil particles, and tend to remain nearer to the source. As a result, the xylenes are usually

good indicators of source locations. The xylene map patterns suggest that the hydrocarbons entered the subsurface near the center of the Esso site. The occurrence south of the car wash (Stations 51-53) may have originally been continuous with the occurrence on the Esso station. Soil venting during excavation activities which took place when the car wash was built is probably responsible for the absence of volatile hydrocarbons in samples at and immediately south of the car wash.

GC/ECD analysis of the samples from the Tutu Esso/Four Winds Plaza area revealed tetrachloroethene (PCE, Figure 6) to be the most widespread halogen. The highest level was present near the northern boundary of the Tutu Esso (Station 35) and comparable levels extend northward into the parking lot. Lower levels were present throughout most of the remainder of the surveyed area. Slight increases in concentration were observed northwest of the paint store (Station 61) and in the northern portion of the parking lot (Station 10).

Elevated levels of cis-1,2-dichloroethene (c-1,2-DCE, Figure 7) and trichloroethene (TCE, Figure 8) were present in the same area with the highest levels of PCE. TCE was highest north of the pump islands on the Esso site (Station 97), but its overall extent was much more limited than the PCE. Relatively low levels of trans-1,2-dichloroethene (t-1,2-DCE) were present in the northern portion of the Esso site and in a small area of the parking lot to the north. An isolated low level of 1,1-dichloroethene (1,1-DCE, not mapped) was present in one sample north of the pump islands and very low levels of 1,1,1-trichloroethane (1,1,1-

TCA, not mapped) were present in a few samples adjacent to the building on the Esso site.

Conclusions

Map patterns and chromatographic data indicate that petroleum hydrocarbons have entered the subsurface at the Tutu Esso and have subsequently migrated northward beyond the pump islands. Xylene map patterns suggest that the source for the occurrence is clearly associated with the Esso facility. There is no evidence that contaminants from a reported release on the Texaco property northeast of the Four Winds Plaza have impacted the survey area.

GC/ECD analysis indicates that significant concentrations of PCE, c-1,2-DCE and TCE and lesser occurrences of t-1,2-DCE, 1,1,1-TCA and 1,1-DCE are present in the northern portion of the Tutu Esso and beneath the Four Winds Plaza parking lot. The PCE occurrence extends throughout most of the survey area, while c-1,2-DCE and TCE were detectable only on the northern portion of the Tutu Esso and beneath the adjacent Four Winds Plaza parking lot. The DCE and TCA were likely minor components of original PCE or TCE solvent mixtures or they may be breakdown products formed when the original compound(s) underwent chemical transformation in the subsurface. While no specific source point is evident, the contour patterns do not support a source outside the immediate area of occurrence.

Rodriguez Esso and Harthman property

Observations

The Total FID Volatiles map for this area (Figure 10) reveals high levels near the pump islands/tank area and near the building on the Esso site. The occurrence(s) extend throughout the Rodriguez site with very low levels continuing northward to the dirt road. Very low levels are also present adjacent to the road south of the Lutheran Church and along a dirt road leading from Route 38 to the water tanks. The concentration gradients on the Rodriguez site are very steep, indicating limited lateral migration in the vadose zone.

The standardized petroleum analytes were present only on the Esso site. Map patterns for MTBE/pentane (Figure 11) were similar to, but slightly less extensive than those of Total FID Volatiles. Benzene (not mapped) was limited to two samples between the building and the pump islands/tank area. Map patterns for toluene, ethylbenzene and xylenes were similar and are represented by the xylenes map (Figure 12).

The FID chromatogram signatures of the samples from the Rodriguez Esso site with the highest levels of Total FID Volatiles are similar to those described previously for the Tutu Esso.

GC/ECD analysis of the samples from this area revealed only isolated very low levels of chloroform, c-1,2-DCE, 1,1,1-TCA and PCE in one or two samples and the occurrences were not mapped.

Conclusions

Map patterns and chromatographic data suggest that petroleum hydrocarbons entered the subsurface at the **Rodriguez Esso**. The high level of volatile hydrocarbons observed adjacent to Route 38 suggests that this occurrence extends beyond the property boundary to the southeast. Xylene map patterns for this site are also consistent with a source associated with the tanks, pumps and lines.

The very low levels of volatile hydrocarbons observed in Samples 107 to 111 on the Harthman property are of the magnitude which could typically result from truck traffic on the dirt road between the water tanks and Route 38. The Harthman water supply well located near sampling location 166 is at greatest risk of being impacted by the occurrence on the **Rodriguez Esso**.

The very low levels of chlorinated hydrocarbons observed at isolated scattered locations in this survey area do not suggest the presence of significant chlorinated hydrocarbon contamination. There is no evidence of significant PCE contamination entering this area from **O'Henry Cleaners** (or any other source) to the east across Route 38 from the Lutheran Church.

TABLE 1
SAMPLING DEPTH

SAMPLE	FEET	SAMPLE	FEET
1	4	48	4
2	4	49	3
3	4	50	4
4	4	51	4
5	4	52	3
6	4	53	4
7	4	54	4
8	3.5	55	4
9	4	56	4
10	3	57	4
11	4	58	4
13	3	59	4
14	3.5	60	4
15	4	61	3
16	4	62	4
17	4	63	4
18	4	64	4
19	4	65	4
20	4	66	4
21	4	67	4
22	4	68	4
23	4	69	4
25	4	70	4
26	4	71	4
27	3.5	72	4
28	4	73	3.5
29	4	74	4
30	4	75	3
31	4	76	4
32	4	77	4
33	4	78	4
34	3	79	4
35	4	80	4
36	4	82	2
37	4	83	4
38	4	84	4
39	4	85	4
40	4	86	4
41	4	87	4
42	4	88	4
43	3	89	4
44	4	90	4
45	3	91	3.5
46	2	92	4

TABLE 1 (cont)

SAMPLING DEPTH

SAMPLE	FEET	SAMPLE	FEET
93	3	138	4
94	3.5	139	4
95	3	140	4
96	3	140	4
97	3.5	141	4
98	2.5	142	4
99	4	142	4
100	4	143	4
101	4	143	4
102	4	144	4
103	3.5	145	4
104	3	146	4
105	4	147	4
106	4	148	4
107	4	149	4
108	4	150	4
109	4	151	4
110	3	152	4
111	3	153	4
112	4	154	3
113	3	155	4
114	4	156	4
115	4	157	4
116	4	158	4
117	3.5	159	4
118	3	160	3
119	4	161	4
120	4	162	4
122	4	163	4
123	4	164	4
124	2.5	165	4
125	3	166	4
126	4	167	4
127	4	169	4
128	4	170	4
129	4	171	4
130	4		
131	4		
132	4		
133	4		
134	4		
135	2		
136	4		
137	4		

TABLE 2

ANALYTE CONCENTRATIONS VIA GC/FID ($\mu\text{g/l}$)

SAMPLE	MTBE	BENZENE	TOLUENE	ETHYL- BENZENE	XYLENES	TOTAL FID VOLATILES ¹
1	<1.0	<1.0	<1.0	<1.0	<1.0	4.5
2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3	23	<1.0	<1.0	<1.0	<1.0	38
4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
9	2.1	<1.0	<1.0	<1.0	<1.0	6.9
10	<1.0	<1.0	<1.0	<1.0	<1.0	3.6
11	9.5	<1.0	<1.0	<1.0	<1.0	21
12	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
13	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
14	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
15	<1.0	<1.0	<1.0	<1.0	<1.0	1.7
16	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
17	<1.0	<1.0	<1.0	<1.0	<1.0	1.8
18	8.6	<1.0	<1.0	<1.0	<1.0	13
19	<1.0	<1.0	<1.0	<1.0	<1.0	5.6
20	<1.0	<1.0	<1.0	<1.0	<1.0	6.6
21	6.7	<1.0	<1.0	<1.0	<1.0	14
22	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
23	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
25	<1.0	<1.0	<1.0	<1.0	<1.0	2.0
26	4.5	<1.0	<1.0	<1.0	<1.0	18
27	4.0	<1.0	<1.0	<1.0	<1.0	2.9
28	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29	1.5	<1.0	<1.0	<1.0	<1.0	2.4
30	<1.0	<1.0	<1.0	<1.0	3.1	71
31	<1.0	<1.0	<1.0	<1.0	<1.0	1.7
32	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
33	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
34	<1.0	<1.0	<1.0	<1.0	<1.0	4.2
35	<1.0	<1.0	<1.0	<1.0	<1.0	8.0
36	<1.0	<1.0	<1.0	<1.0	<1.0	1.1
37	<1.0	<1.0	<1.0	<1.0	<1.0	2.2
38	<1.0	<1.0	<1.0	<1.0	<1.0	2.3
39	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
40	8.5	<1.0	<1.0	<1.0	<1.0	6.2
41	<1.0	<1.0	1.3	<1.0	<1.0	1.7
42	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
43	1.6	<1.0	<1.0	<1.0	<1.0	3.2
44	2.8	<1.0	<1.0	<1.0	<1.0	1.4
45	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
46	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
48	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
49	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
51	134	<1.0	4.2	1.7	<1.0	222
52	<1.0	<1.0	<1.0	<1.0	<1.0	15
53	3.9	<1.0	<1.0	<1.0	<1.0	11
54	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
55	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
56	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
57	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
58	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
59	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

¹ CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

TABLE 2 (cont)

ANALYTE CONCENTRATIONS VIA GC/FID ($\mu\text{g/l}$)

SAMPLE	MTBE	BENZENE	TOLUENE	ETHYL- BENZENE	XYLENES	TOTAL FID, ¹ VOLATILES
60	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
61	<1.0	<1.0	<1.0	<1.0	<1.0	1.9
62	<1.0	<1.0	1.1	<1.0	<1.0	2.2
63	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
64	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
65	<1.0	<1.0	<1.0	<1.0	<1.0	1.4
66	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
67	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
68	<1.0	<1.0	<1.0	<1.0	<1.0	1.1
69	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
70	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
71	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
72	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
73	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
74	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
75	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
76	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
77	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
78	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
79	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
80	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
81	<1.0	<1.0	<1.0	<1.0	<1.0	1.4
82	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
83	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
84	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
85	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
86	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
87	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
88	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
89	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
90	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
91	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
92	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
93	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
94	7.0	<1.0	<1.0	<1.0	<1.0	9.3
95	678	<1.0	19	6.5	6.4	1,930
96	<1.0	<1.0	<1.0	<1.0	<1.0	10
97	1,341	<1.0	46	6.4	6.6	5,146
98	68	<1.0	<1.0	<1.0	<1.0	144
99	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
100	6.2	<1.0	<1.0	<1.0	<1.0	35
101	209	12	44	17	103	525
102	6.8	<1.0	<1.0	<1.0	<1.0	11
103	319	2.3	6.1	7.3	18	762
104	128	<1.0	6.0	1.2	2.3	918
105	17,650	485	197	594	290	52,100
106	8,901	57	58	105	52	51,080
107	<1.0	<1.0	<1.0	<1.0	<1.0	1.7
108	<1.0	<1.0	<1.0	<1.0	<1.0	2.3
109	<1.0	<1.0	<1.0	<1.0	<1.0	1.3
110	<1.0	<1.0	<1.0	<1.0	<1.0	9.2
111	<1.0	<1.0	<1.0	<1.0	<1.0	2.1
112	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
113	<1.0	<1.0	<1.0	<1.0	<1.0	1.5
114	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
115	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
116	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

¹ CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

TABLE 2 (cont)

ANALYTE CONCENTRATIONS VIA GC/FID ($\mu\text{g/l}$)

SAMPLE	MTBE	BENZENE	TOLUENE	ETHYL- BENZENE	XYLENES	TOTAL FID VOLATILES ¹
117	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
118	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
119	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
120	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
121	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
122	<1.0	<1.0	<1.0	<1.0	<1.0	2.3
123	<1.0	<1.0	<1.0	<1.0	<1.0	2.2
124	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
125	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
126	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
127	<1.0	<1.0	<1.0	<1.0	<1.0	1.3
128	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
129	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
130	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
131	<1.0	<1.0	<1.0	<1.0	<1.0	9.2
132	<1.0	<1.0	<1.0	<1.0	<1.0	3.7
133	<1.0	<1.0	<1.0	<1.0	<1.0	5.3
134	<1.0	<1.0	<1.0	<1.0	<1.0	8.9
135	<1.0	<1.0	<1.0	<1.0	<1.0	1.7
136	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
137	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
138	31,840	<1.0	325	245	772	228,400
139	290	6.9	3.3	1.4	6.2	1,008
140	3.5	<1.0	<1.0	<1.0	<1.0	18
141	1.9	<1.0	<1.0	<1.0	<1.0	8.2
142	188	<1.0	7.7	5.2	8.5	2,083
143	51	<1.0	<1.0	<1.0	<1.0	263
144	144	<1.0	8.6	1.2	1.1	804
145	590	16	2.0	13	2.8	930
146	35,730	<1.0	377	82	259	515,000
147	49	<1.0	107	9.7	30	870
148	1.6	<1.0	<1.0	<1.0	<1.0	9.4
149	1.1	<1.0	<1.0	<1.0	<1.0	11
150	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
151	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
152	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
153	<1.0	<1.0	<1.0	<1.0	<1.0	1.7
154	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
155	<1.0	<1.0	<1.0	<1.0	<1.0	1.1
156	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
157	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
158	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
159	<1.0	<1.0	<1.0	<1.0	<1.0	1.4
160	<1.0	<1.0	<1.0	<1.0	<1.0	1.2
161	<1.0	<1.0	<1.0	<1.0	<1.0	1.2
162	<1.0	<1.0	<1.0	<1.0	<1.0	1.1
163	<1.0	<1.0	<1.0	<1.0	<1.0	1.6
164	<1.0	<1.0	<1.0	<1.0	<1.0	3.0
165	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
166	<1.0	<1.0	<1.0	<1.0	<1.0	7.5
167	<1.0	<1.0	<1.0	<1.0	<1.0	5.1
169	4.7	<1.0	<1.0	<1.0	<1.0	21
170	<1.0	<1.0	<1.0	<1.0	<1.0	3.5
171	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
172	14	<1.0	<1.0	1.7	2.7	18

¹ CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

TABLE 2 (cont)

ANALYTE CONCENTRATIONS VIA GC/FID (µg/L)

SAMPLE	MTBE	BENZENE	TOLUENE	ETHYL- BENZENE	XYLENES	TOTAL FID VOLATILES ¹
FIELD CONTROL SAMPLES						
201	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
202	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
203	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
204	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
205	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
206	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
207	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
208	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
209	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
210	5.1	<1.0	<1.0	<1.0	<1.0	10
211	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
212	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
213	4.9	<1.0	<1.0	<1.0	<1.0	57
214	<1.0	<1.0	<1.0	<1.0	<1.0	2.2
215	<1.0	<1.0	<1.0	<1.0	<1.0	1.8
216	<1.0	<1.0	<1.0	<1.0	<1.0	1.4
LABORATORY DUPLICATE ANALYSES						
10	<1.0	<1.0	<1.0	<1.0	<1.0	3.6
10R	<1.0	<1.0	<1.0	<1.0	<1.0	3.6
20	<1.0	<1.0	<1.0	<1.0	<1.0	6.6
20R	<1.0	<1.0	<1.0	<1.0	<1.0	6.5
31	<1.0	<1.0	<1.0	<1.0	<1.0	1.7
31R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
41	<1.0	<1.0	1.3	<1.0	<1.0	1.7
41R	<1.0	<1.0	1.6	<1.0	<1.0	1.9
52	<1.0	<1.0	<1.0	<1.0	<1.0	15
52R	<1.0	<1.0	<1.0	<1.0	<1.0	15
66	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
66R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
78	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
78R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
88	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
88R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
98	68	<1.0	<1.0	<1.0	<1.0	144
98R	67	<1.0	<1.0	<1.0	<1.0	145
116	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
116R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
126	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
126R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
136	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
136R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

¹ CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

TABLE 2 (cont)

ANALYTE CONCENTRATIONS VIA GC/FID (µg/l)

SAMPLE	MTBE	BENZENE	TOLUENE	ETHYL- BENZENE	XYLENES	TOTAL FID, VOLATILES ¹
LABORATORY DUPLICATE ANALYSES (cont)						
146	35,730	<1.0	377	82	259	515,000
146R	35,650	<1.0	376	81	259	511,100
170	<1.0	<1.0	<1.0	<1.0	<1.0	3.5
170R	<1.0	<1.0	<1.0	<1.0	<1.0	3.4
205	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
205R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
209	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
209R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
214	<1.0	<1.0	<1.0	<1.0	<1.0	2.2
214R	<1.0	<1.0	<1.0	<1.0	<1.0	1.9
LABORATORY BLANKS						
108	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
208	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
318	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
418	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
528	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
668	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
788	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
888	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
988	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1168	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1268	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1368	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1468	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1708	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2058	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2098	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2148	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

¹ CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

TABLE 3

ANALYTE CONCENTRATIONS VIA GC/ECD (µg/l)

SAMPLE	11DCE	CH ₂ Cl ₂	t12DCE	11DCA	c12DCE	CHCl ₃	111TCA	CCl ₄	TCE	112TCA	PCE
1	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.37
2	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
3	<1.0	<1.0	<1.0	<1.0	1.6	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
4	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	1.7
5	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
6	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.10
7	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.14
8	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	4.3
9	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.19
10	<1.0	<1.0	<1.0	<1.0	1.2	<0.10	<0.10	<0.05	2.3	<0.10	19
11	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.39
12	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	4.6
13	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.19
14	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
15	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	0.83	<0.10	6.3
16	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.05
17	<1.0	<1.0	<1.0	<1.0	3.4	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
18	<1.0	<1.0	1.6	<1.0	22	<0.10	<0.10	<0.05	3.7	<0.10	17
19	<1.0	<1.0	<1.0	<1.0	9.3	<0.10	<0.10	<0.05	2.8	<0.10	16
20	<1.0	<1.0	<1.0	<1.0	2.4	<0.10	<0.10	<0.05	3.1	<0.10	34
21	<1.0	<1.0	1.2	<1.0	22	<0.10	<0.10	<0.05	4.3	<0.10	19
22	<1.0	<1.0	<1.0	<1.0	1.6	<0.10	<0.10	<0.05	<0.5	<0.10	0.43
23	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
25	<1.0	<1.0	<1.0	<1.0	2.8	<0.10	<0.10	<0.05	1.2	<0.10	6.1
26	<1.0	<1.0	2.0	<1.0	31	<0.10	<0.10	<0.05	6.1	<0.10	28
27	<1.0	<1.0	<1.0	<1.0	1.1	<0.10	<0.10	<0.05	1.3	<0.10	2.0
28	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	1.0
29	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	2.1	<0.10	6.9
30	<1.0	<1.0	<1.0	<1.0	9.6	<0.10	<0.10	<0.05	2.9	<0.10	31
31	<1.0	<1.0	<1.0	<1.0	4.9	<0.10	<0.10	<0.05	0.51	<0.10	2.6
32	<1.0	<1.0	<1.0	<1.0	1.8	<0.10	<0.10	<0.05	<0.5	<0.10	0.07
33	<1.0	<1.0	<1.0	<1.0	1.4	<0.10	<0.10	<0.05	<0.5	<0.10	0.72
34	<1.0	<1.0	<1.0	<1.0	1.4	<0.10	<0.10	<0.05	3.2	<0.10	19
35	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	2.4	<0.10	41
36	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	7.1
37	<1.0	<1.0	<1.0	<1.0	3.9	<0.10	<0.10	<0.05	1.8	<0.10	7.0
38	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.14	<0.05	0.56	<0.10	3.4
39	<1.0	<1.0	<1.0	<1.0	1.5	<0.10	<0.10	<0.05	<0.5	<0.10	0.46
40	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	0.18	<0.05	<0.5	<0.10	2.7
41	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	2.7
42	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	2.4
43	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.77
44	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.19
45	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
46	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
48	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.40
49	<1.0	<1.0	<1.0	<1.0	3.6	<0.10	<0.10	<0.05	<0.5	<0.10	0.14
50	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	2.5
51	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
52	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
53	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
54	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
55	<1.0	<1.0	<1.0	<1.0	2.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.17
56	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
57	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
58	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
59	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.43

11DCE = 1,1-dichloroethene
 t12DCE = trans-1,2-dichloroethene
 c12DCE = cis-1,2-dichloroethene
 111TCA = 1,1,1-trichloroethane
 TCE = trichloroethene
 PCE = tetrachloroethene

CH₂Cl₂ = methylene chloride
 11DCA = 1,1-dichloroethane
 CHCl₃ = chloroform
 CCl₄ = carbon tetrachloride
 112TCA = 1,1,2-trichloroethane

TABLE 3 (cont)

ANALYTE CONCENTRATIONS VIA GC/ECD (µg/l)

SAMPLE	11DCE	CH ₂ Cl ₂	t12DCE	11DCA	c12DCE	CHCl ₃	111TCA	CCl ₄	TCE	112TCA	PCE
60	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.70
61	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	12
62	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	8.6
63	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	3.5
64	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
65	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.64
66	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
67	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
68	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
69	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
70	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
71	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
72	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
73	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
74	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
75	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
76	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
77	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
78	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
79	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
80	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
81	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
82	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
83	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
84	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
85	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
86	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
87	<1.0	<1.0	<1.0	<1.0	<1.0	0.24	<0.10	<0.05	<0.5	<0.10	<0.05
88	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
89	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
90	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	1.0
91	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
92	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
93	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
94	<1.0	<1.0	<1.0	<1.0	8.2	<0.10	<0.10	<0.05	3.3	<0.10	7.7
95	<1.0	<1.0	1.7	<1.0	6.7	<0.10	<0.10	<0.05	4.4	<0.10	2.0
96	<1.0	<1.0	1.4	<1.0	5.7	<0.10	<0.10	<0.05	8.4	<0.10	21
97	2.2	<1.0	4.8	<1.0	13	<0.10	<0.10	<0.05	23	<0.10	1.9
98	<1.0	<1.0	<1.0	<1.0	2.9	<0.10	<0.10	<0.05	<0.5	<0.10	2.1
99	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	3.0
100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.07
101	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
102	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.44
103	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
104	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
105	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
106	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
107	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
108	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
109	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
110	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
111	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
112	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
113	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
114	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
115	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
116	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05

11DCE = 1,1-dichloroethene
 t12DCE = trans-1,2-dichloroethene
 c12DCE = cis-1,2-dichloroethene
 111TCA = 1,1,1-trichloroethane
 TCE = trichloroethene
 PCE = tetrachloroethene

CH₂Cl₂ = methylene chloride
 11DCA = 1,1-dichloroethane
 CHCl₃ = chloroform
 CCl₄ = carbon tetrachloride
 112TCA = 1,1,2-trichloroethane

ANALYTE CONCENTRATIONS VIA GC/ECD (µg/l)

11DCE	=	1,1-dichloroethene	CH ₂ Cl ₂	=	methylene chloride
t12DCE	=	trans-1,2-dichloroethene	11DCA	=	1,1-dichloroethane
c12DCE	=	cis-1,2-dichloroethene	CHCl ₃	=	chloroform
111TCA	=	1,1,1-trichloroethane	CCl ₄	=	carbon tetrachloride
TCE	=	trichloroethene	112TCA	=	1,1,2-trichloroethane
PCE	=	tetrachloroethene			

TABLE 3 (cont)

ANALYTE CONCENTRATIONS VIA GC/ECD (µg/l)

SAMPLE	11DCE	CH ₂ Cl ₂	t12DCE	11DCA	c12DCE	CHCl ₃	111TCA	CCl ₄	TCE	112TCA	PCE
FIELD CONTROL SAMPLES											
201	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
202	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	0.14
203	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
204	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
205	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
206	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
207	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
208	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
209	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
210	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
211	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
212	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
213	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
214	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
215	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
216	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
LABORATORY DUPLICATE ANALYSES											
10	<1.0	<1.0	<1.0	<1.0	1.2	<0.10	<0.10	<0.05	2.3	<0.10	19
10R	<1.0	<1.0	<1.0	<1.0	1.1	<0.10	<0.10	<0.05	2.4	<0.10	19
20	<1.0	<1.0	<1.0	<1.0	2.4	<0.10	<0.10	<0.05	3.1	<0.10	34
20R	<1.0	<1.0	<1.0	<1.0	2.4	<0.10	<0.10	<0.05	3.3	<0.10	33
31	<1.0	<1.0	<1.0	<1.0	4.9	<0.10	<0.10	<0.05	0.51	<0.10	2.6
31R	<1.0	<1.0	<1.0	<1.0	4.4	<0.10	<0.10	<0.05	<0.5	<0.10	2.5
41	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	2.7
41R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	2.6
52	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
52R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
66	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
66R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
78	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
78R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
88	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
88R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
98	<1.0	<1.0	<1.0	<1.0	2.9	<0.10	<0.10	<0.05	<0.5	<0.10	2.1
98R	<1.0	<1.0	<1.0	<1.0	2.9	<0.10	<0.10	<0.05	<0.5	<0.10	2.1
116	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
116R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
126	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
126R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
136	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
136R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
11DCE	=	1,1-dichloroethene				CH ₂ Cl ₂	=	methylene chloride			
t12DCE	=	trans-1,2-dichloroethene				11DCA	=	1,1-dichloroethane			
c12DCE	=	cis-1,2-dichloroethene				CHCl ₃	=	chloroform			
111TCA	=	1,1,1-trichloroethane				CCl ₄	=	carbon tetrachloride			
TCE	=	trichloroethene				112TCA	=	1,1,2-trichloroethane			
PCE	=	tetrachloroethene									

TABLE 3 (cont)

ANALYTE CONCENTRATIONS VIA GC/ECD (µg/l)

SAMPLE	11DCE	CH ₂ Cl ₂	t12DCE	11DCA	c12DCE	CHCl ₃	111TCA	CCl ₄	TCE	112TCA	PCE
LABORATORY DUPLICATE ANALYSES (cont)											
146	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
146R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
170	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
170R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
205	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
205R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
209	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
209R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
214	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
214R	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
LABORATORY BLANKS											
108	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
208	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
318	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
418	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
528	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
668	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
788	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
888	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
988	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
1168	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
1268	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
1368	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
1468	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
1708	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
2058	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
2098	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05
2148	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.05	<0.5	<0.10	<0.05

11DCE = 1,1-dichloroethene
 t12DCE = trans-1,2-dichloroethene
 c12DCE = cis-1,2-dichloroethene
 111TCA = 1,1,1-trichloroethane
 TCE = trichloroethene
 PCE = tetrachloroethene

CH₂Cl₂ = methylene chloride
 11DCA = 1,1-dichloroethane
 CHCl₃ = chloroform
 CCl₄ = carbon tetrachloride
 112TCA = 1,1,2-trichloroethane

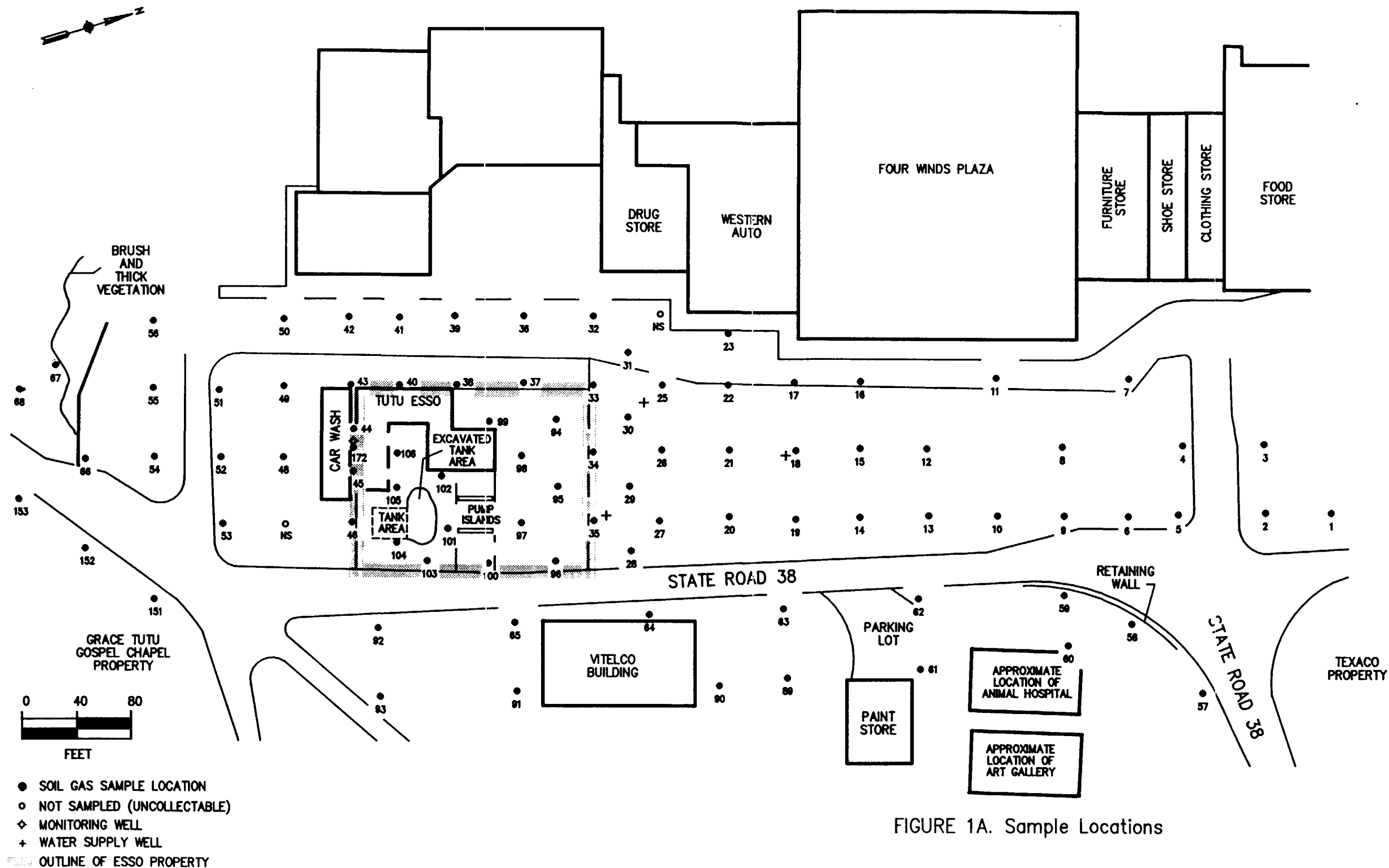


FIGURE 1A. Sample Locations



This map is integral to a written report and should be viewed in that context.

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AND ENVIRONS
TUTU AREA, ANNA'S RETREAT
UNITED STATES VIRGIN ISLANDS

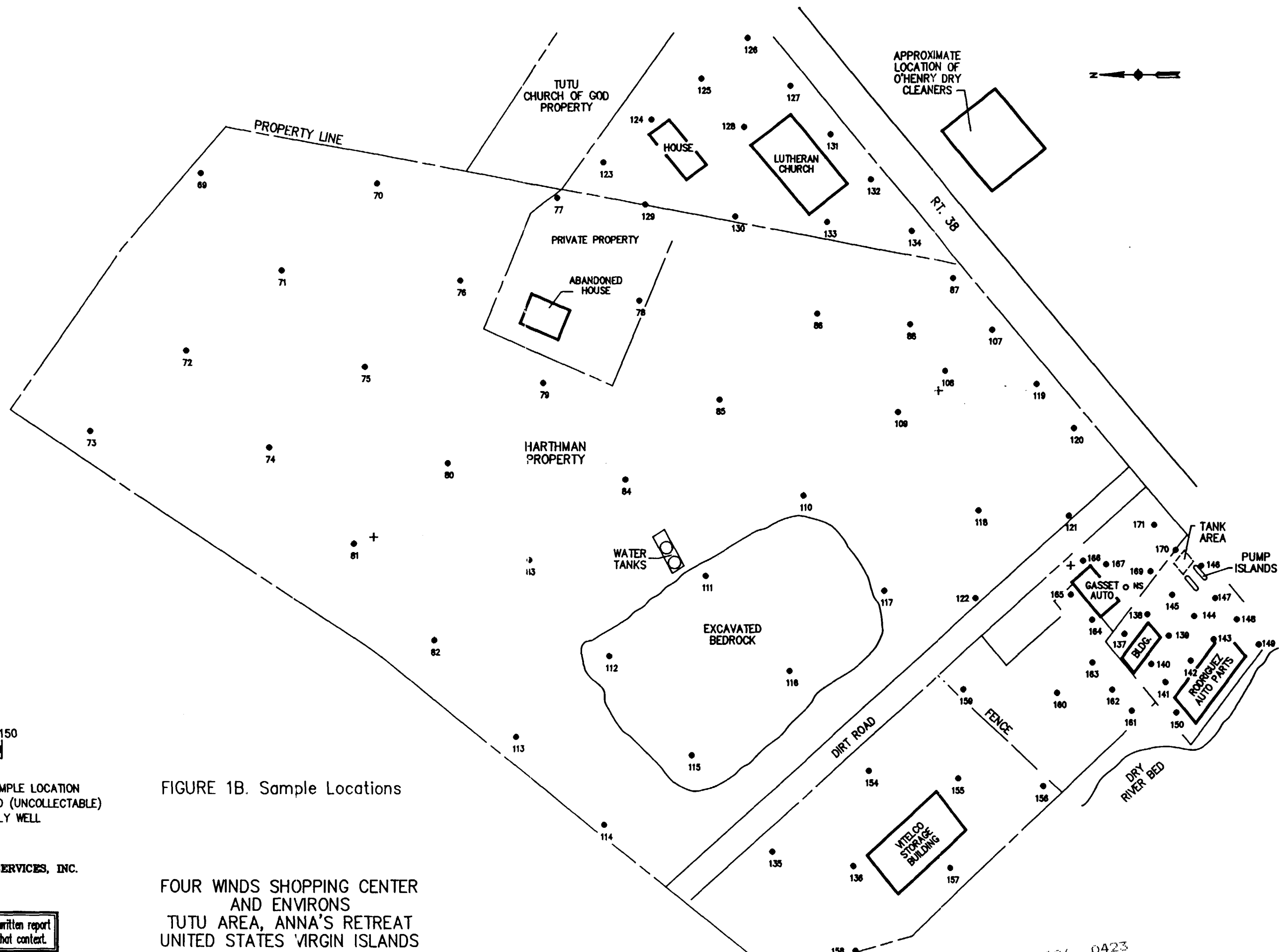


FIGURE 1B. Sample Locations

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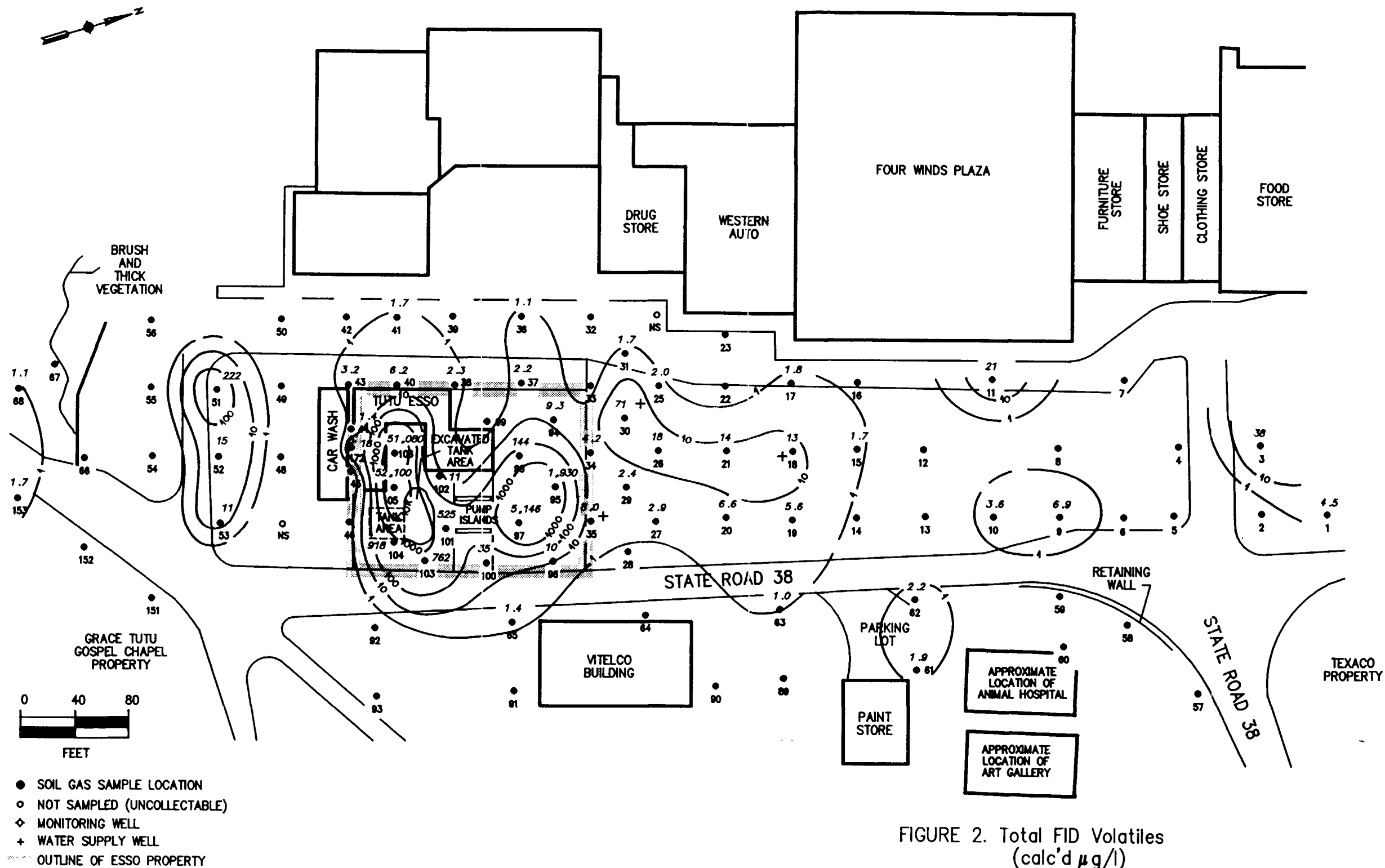


FIGURE 2. Total FID Volatiles
(calc'd $\mu\text{g/l}$)

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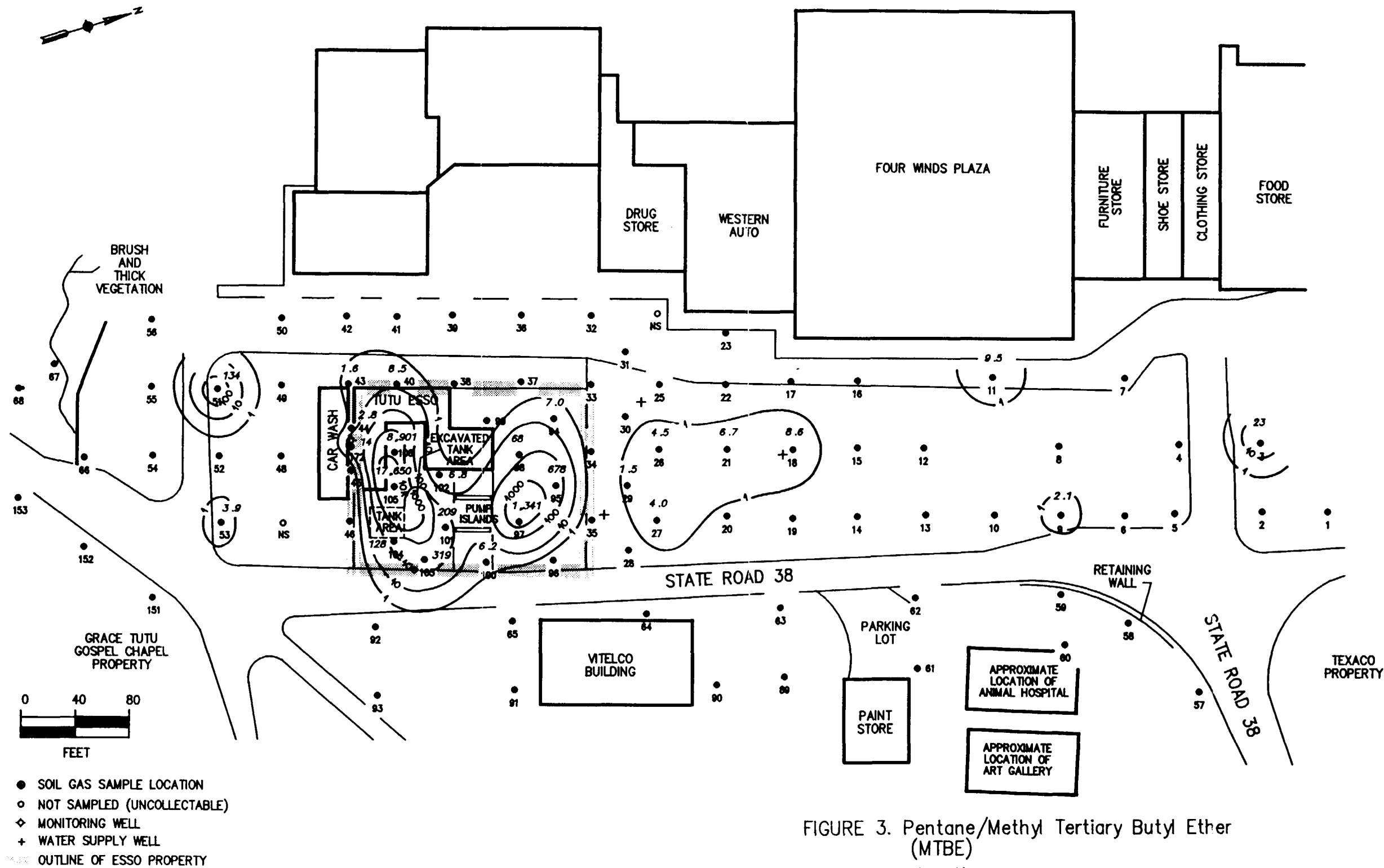


FIGURE 3. Pentane/Methyl Tertiary Butyl Ether (MTBE) ($\mu\text{g/l}$)

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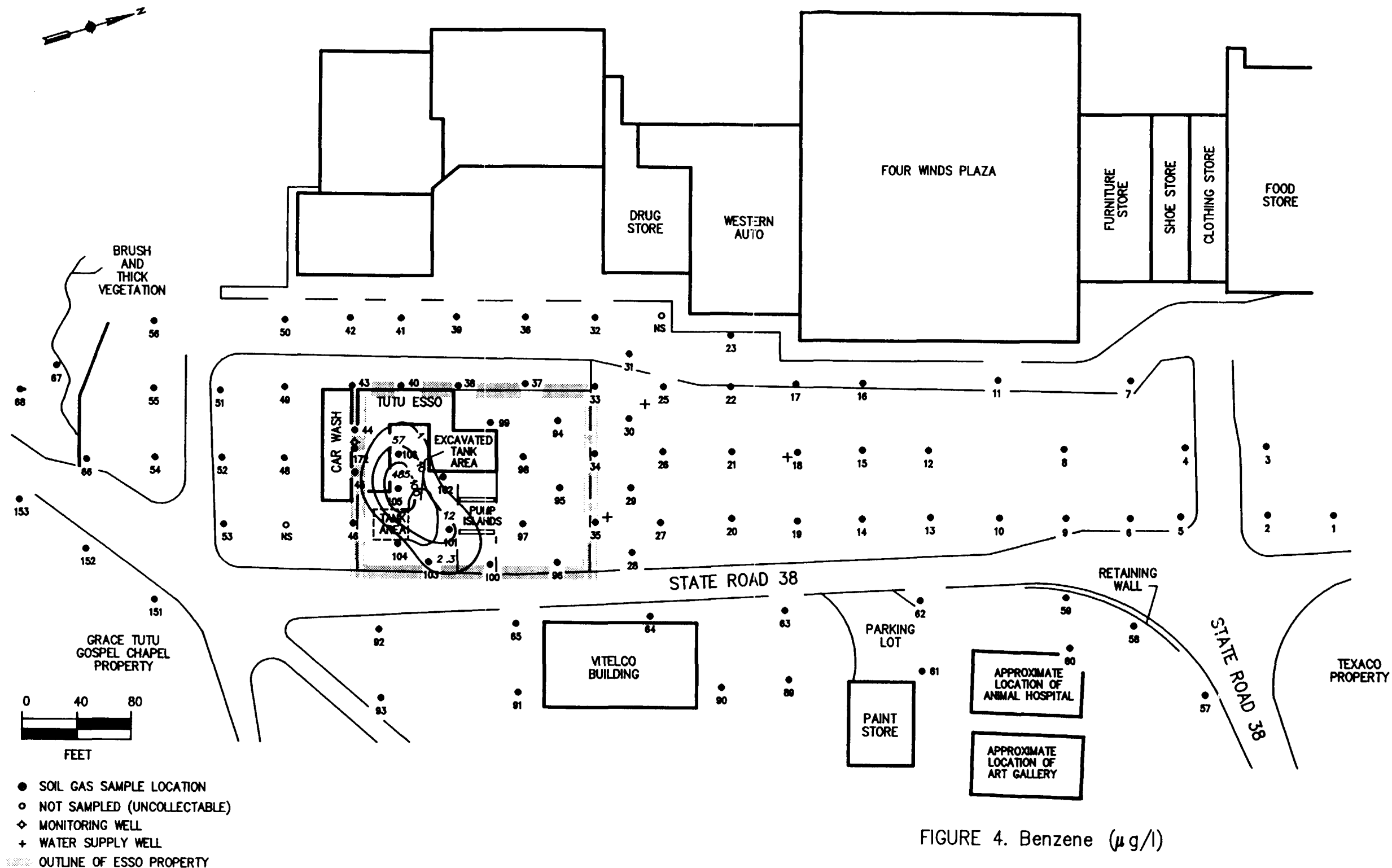


FIGURE 4. Benzene ($\mu\text{g/l}$)

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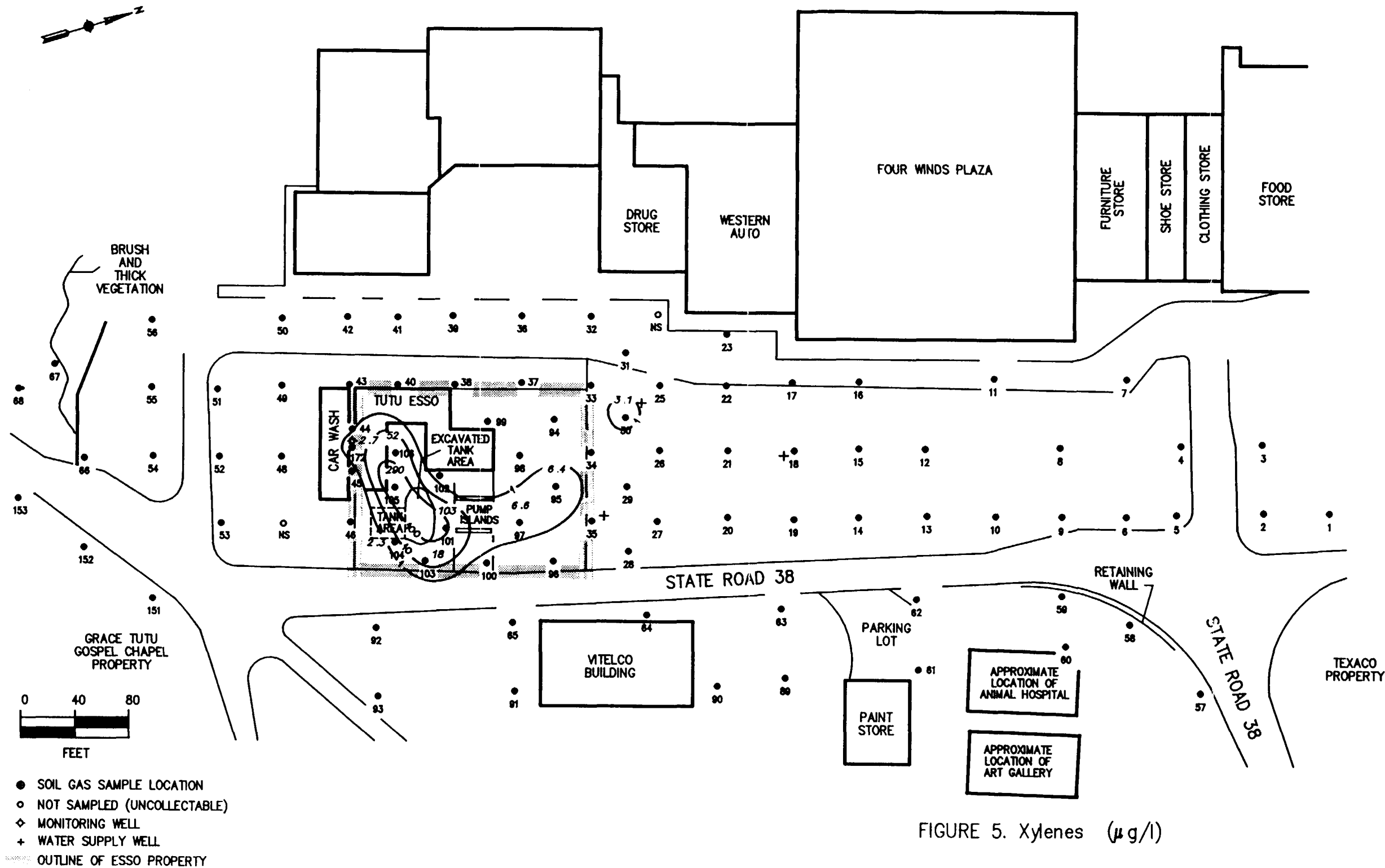


FIGURE 5. Xylenes ($\mu\text{g/l}$)

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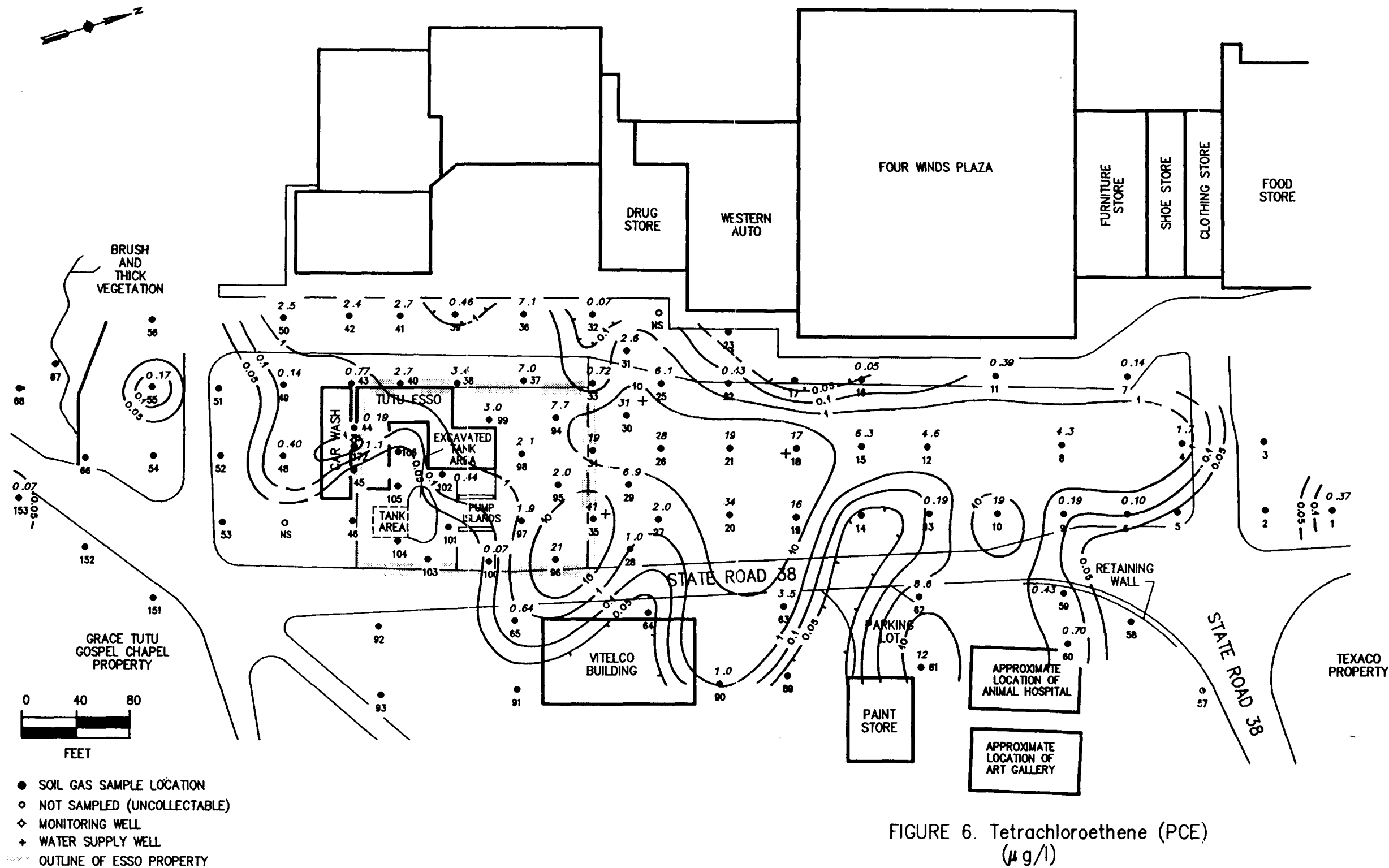


FIGURE 6. Tetrachloroethene (PCE)
($\mu\text{g/l}$)

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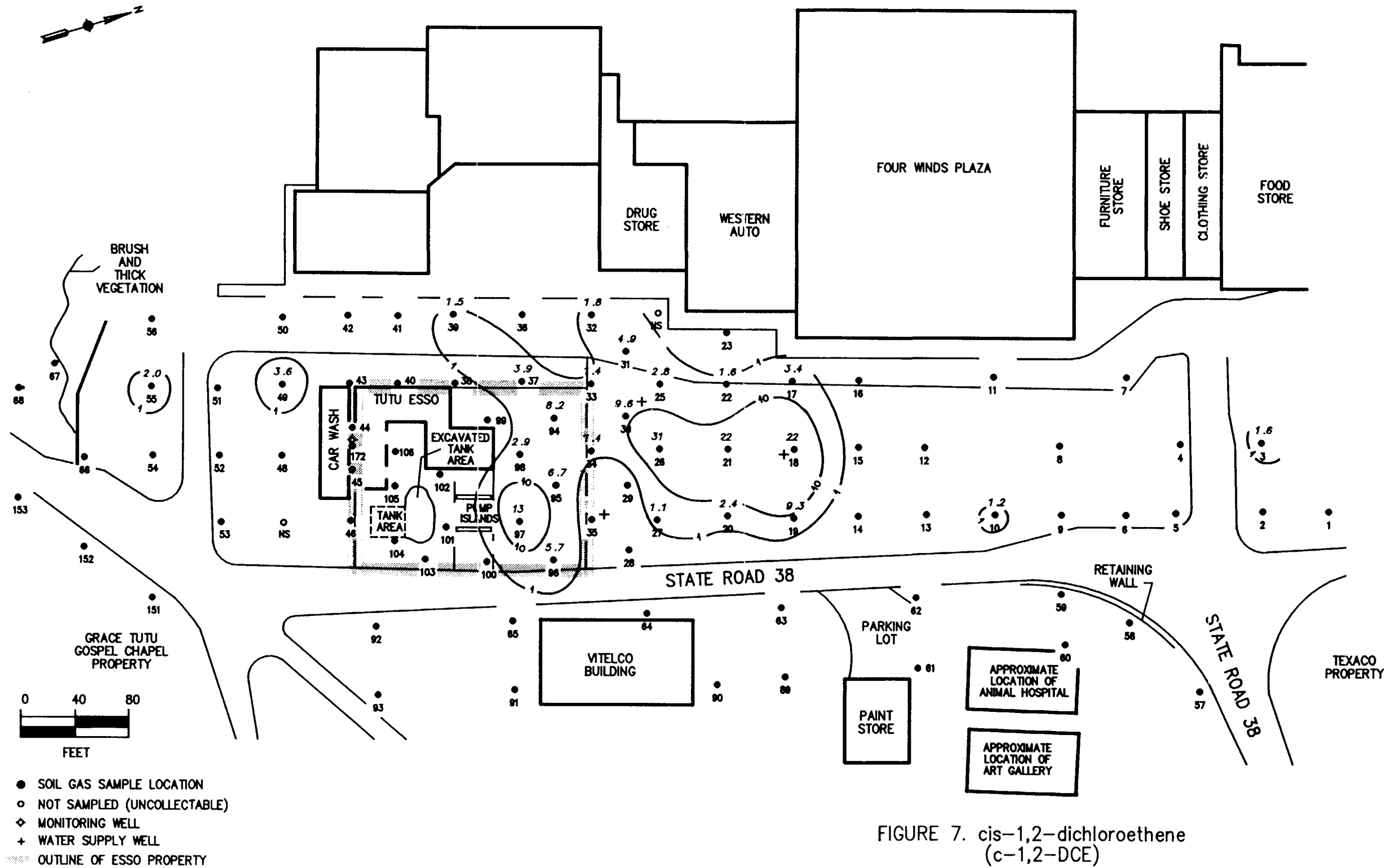


FIGURE 7. cis-1,2-dichloroethene
(c-1,2-DCE)
($\mu\text{g/l}$)

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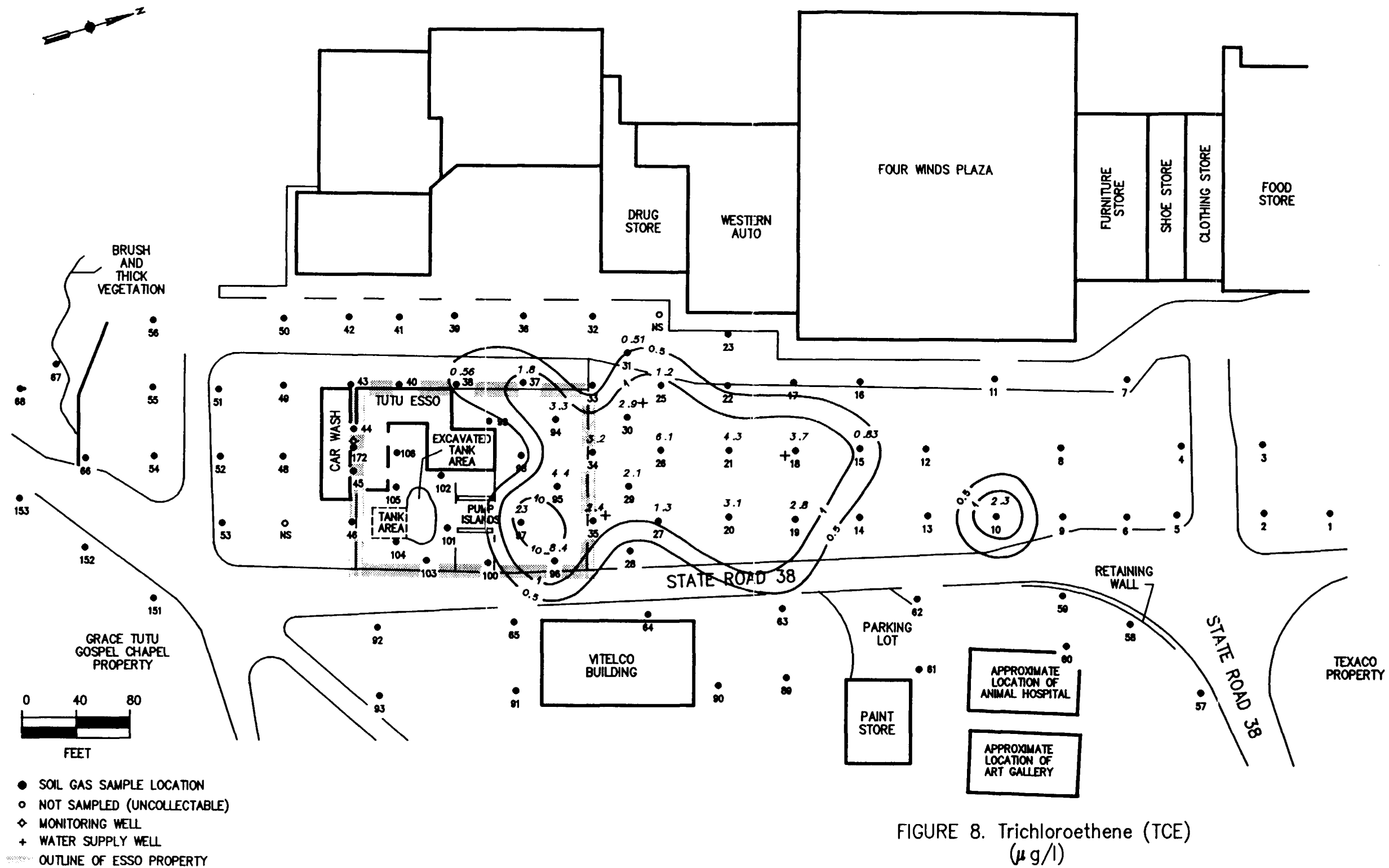


FIGURE 8. Trichloroethene (TCE)
(μ g/l)

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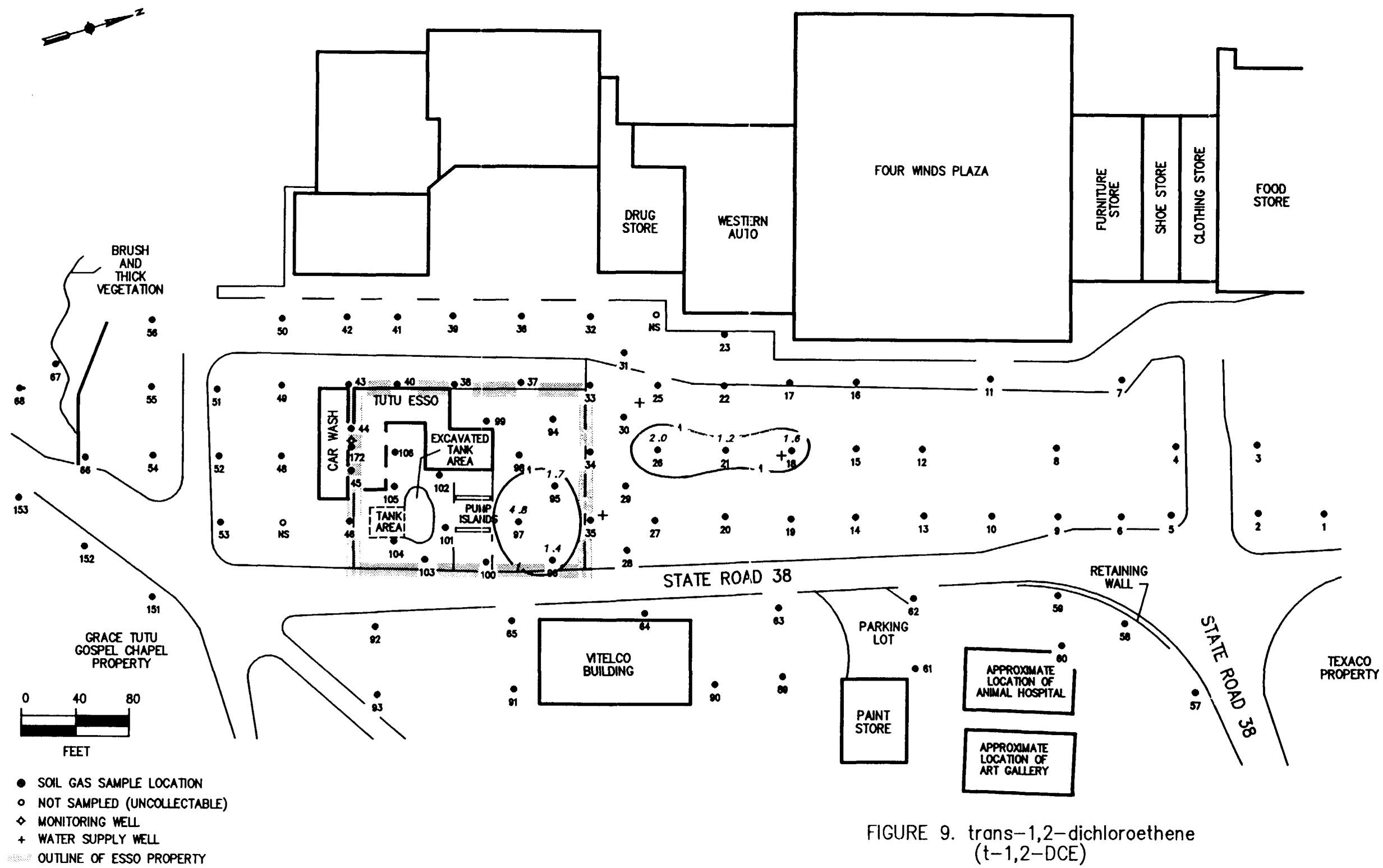


FIGURE 9. trans-1,2-dichloroethene
(t-1,2-DCE)
(µg/l)

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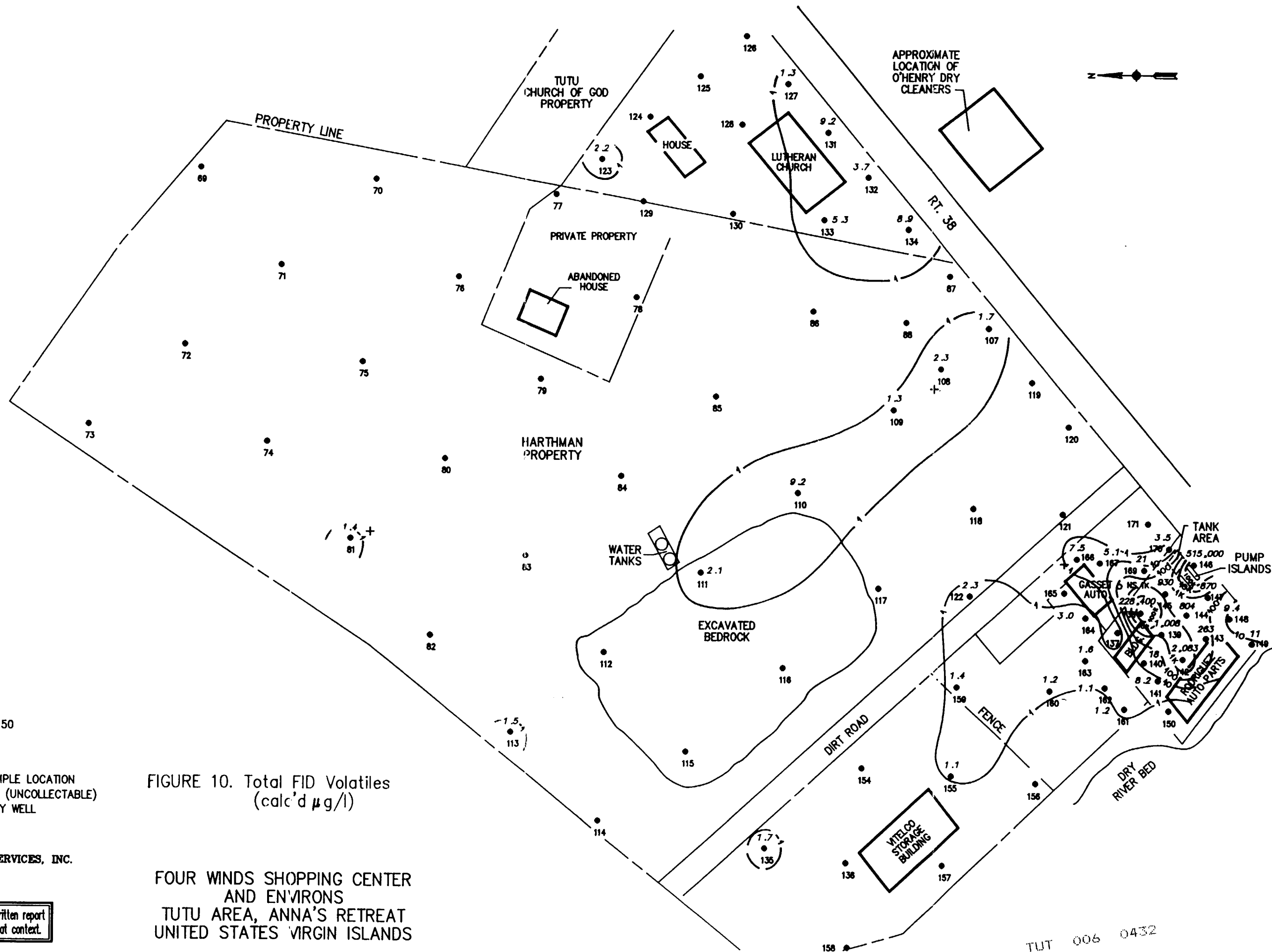


FIGURE 10. Total FID Volatiles
(calc'd $\mu\text{g/l}$)

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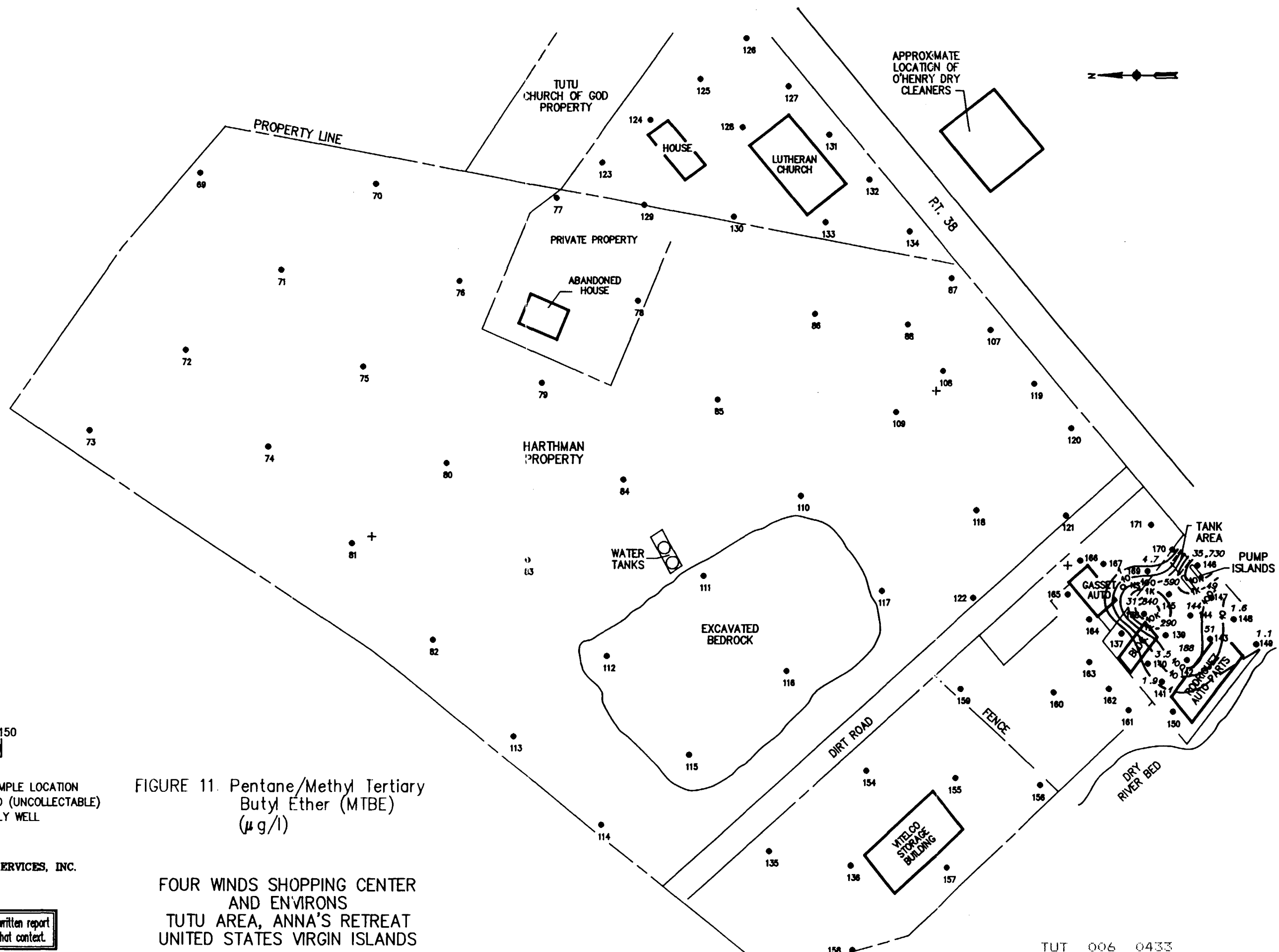


FIGURE 11. Pentane/Methyl Tertiary Butyl Ether (MTBE) ($\mu\text{g/l}$)

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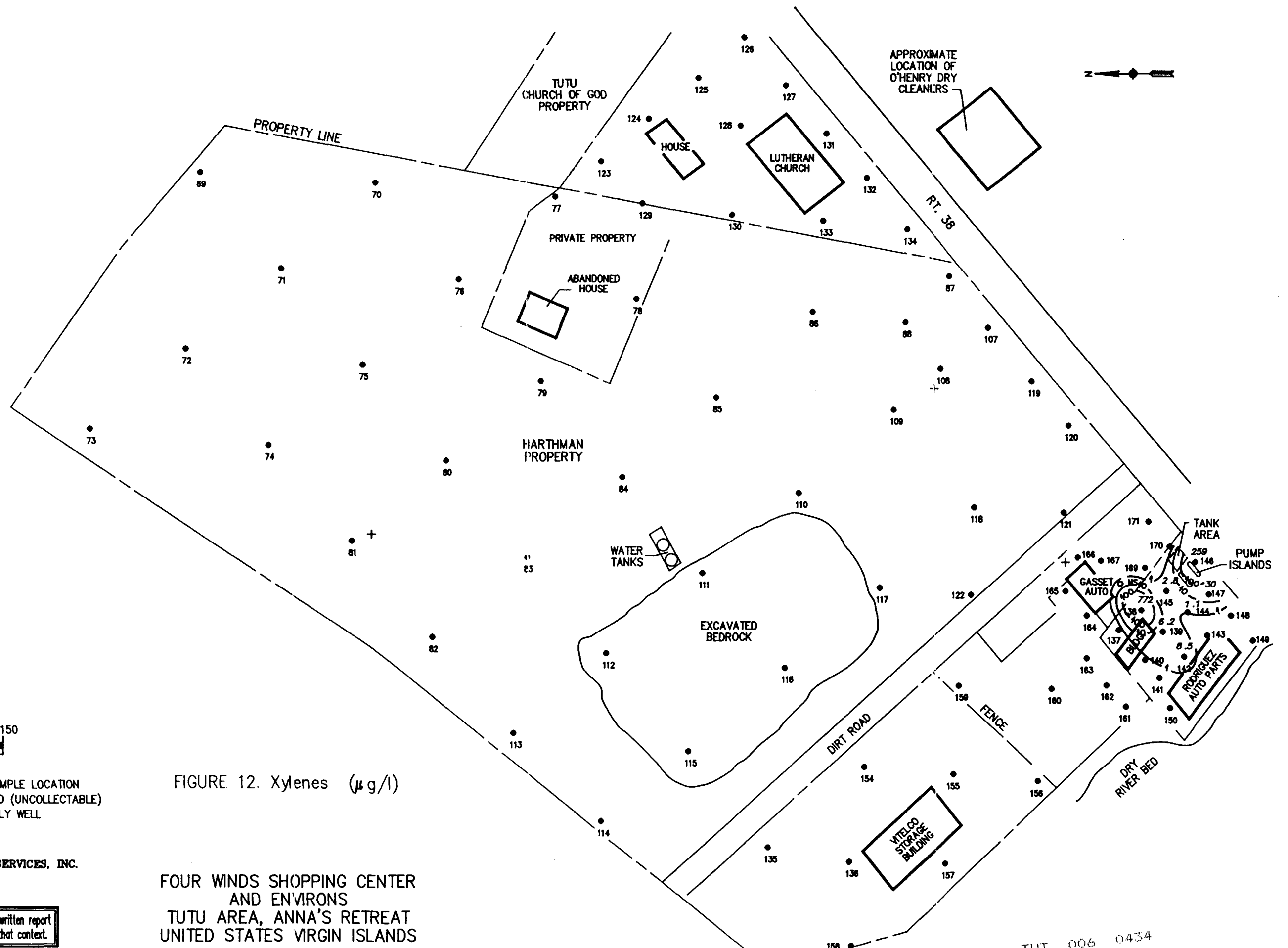


FIGURE 12. Xylenes ($\mu\text{g/l}$)

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