SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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ANCHORAGE
SAINT LOUIS
BOSTON

December 28, 1998

CEM Leasing
P.O. Box 70510
Fairbanks, Alaska 99707-0510

Attn: Mr. Phil Tannehill

RE: SOIL ANALYSIS, PLAZA TEXACO, 103 NORTH SANTA CLAUS LANE, NORTH POLE, ALASKA, ADEC FACILITY #2518

In response to the verbal request from Inland Petroservice, Inc., Shannon & Wilson, Inc., presents the results of the soil analysis associated with the underground storage tank (UST) system upgrade at Plaza Texaco, 103 North Santa Claus Lane, North Pole, Alaska (Figure 1). Our work was conducted in accordance with the Alaska Department of Environmental Conservation (ADEC) UST Regulations dated November 13, 1995. The objective of our work was to evaluate the presence or absence of petroleum hydrocarbon contamination in the vicinity of the USTs and the former piping exposed during the upgrade.

Background

Shannon & Wilson performed a limited site investigation of the facility in June 1996, which consisted of drilling and sampling three soil borings. Temporary well points were installed in the two borings, and the groundwater was sampled. The results of the analytical testing indicated that the soil and groundwater in the vicinity of the drill holes did not contain petroleum hydrocarbons in concentrations exceeding the most stringent ADEC cleanup levels. The locations of the borings are shown in Figure 2.

Site Description

Plaza Texaco is located at 103 North Santa Claus Lane in North Pole, Alaska. The ADEC facility identification number is 2518. There are two gasoline and one diesel 10,000-gallon USTs on the property located to the southwest of the dispensing island. The dispensing island is located under a canopy. The ground surface is covered by asphalt and concrete.

We understand the tank system upgrade included installation of new dispensers and replacement of the fuel piping between the tanks and the dispensers with double-wall piping. The tanks were retrofitted to 1998 compliance standards with cathodic protection, leak detection, overfill protection, and spill containment.

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Field work

Field screening and soil sampling were conducted on September 16, 1998, by Mark Lockwood, a geologist with our firm. The soil was field screened using a Photovac Microtip HL-2000 photoionization detector. The screening was accomplished by placing the soil in a resealable plastic bag. The soil was allowed to warm prior to inserting the probe to obtain a reading. The maximum reading was recorded.

Field screening results ranged from 3 ppm to 1200 ppm. A total of 60 cubic yards of contaminated soil were removed from below the dispensers, at the 90-degree elbows in the piping and atop the USTs around the fill pipes and turbine pumps. Additional soil could not be removed from the dispenser area without compromising the integrity of the canopy foundation. Similarly, additional soil could not be removed from around the USTs without compromising their security.

Soil samples were collected beneath the dispensers, joints in the piping (every 20 feet), and turbine pumps/fill pipes along the sides of the USTs. The locations of the samples are shown in Figure 2. The soil was collected directly from the excavation or the backhoe bucket and placed directly in the analytical sample jars provided to us by the laboratory.

The samples were submitted to Boreochem Mobile Laboratories in Fairbanks, Alaska, for the analysis of diesel range organics (DRO) by Alaska Method 102 and gasoline range organics (GRO) and aromatic volatile organic (benzene, toluene, ethylbenzene, and xylenes [BTEX]) by AK 101. GRO and BTEX samples were field preserved using laboratory-supplied methanol.

The contaminated soil was transported to Environmental Systems, Inc., in North Pole, Alaska, for thermal treatment. The Certificate of Remediation is attached.

The excavations were backfilled with fill from a local source. Slotted ventilation piping was installed in the area of dispensers and the USTs. The layout of the piping is shown in Figure 2. Currently the piping is stubbed out above the ground surface. The asphalt was patched following the upgrade and the placement of the backfill.

Analytical Results

A summary of analytical sample results is presented in Table 1. The complete analytical laboratory report is attached.

Soil beneath the northern dispenser contained 4,030 mg/kg DRO, 129 mg/kg GRO, 0.41 mg/kg benzene, and 5.46 mg/kg total BTEX. Soil beneath the southern dispenser contained 76.8 mg/kg DRO, 1,160 mg/kg GRO, 13.7 benzene, and 543 mg/kg total BTEX.

Soil remaining in the piping trench contained DRO ranging from less than the minimum reporting limit to 52.20 mg/kg, benzene was reported from less than the reporting limit to 0.58 mg/kg at the 90-degree elbow in the piping near the USTs. GRO was not detected at concentrations exceeding the reporting limit.

Soil located between and adjacent to the USTs contained DRO ranging from 16.70 mg/kg to 1210 mg/kg, GRO ranging from less than the reporting limit to 5,080 mg/kg, benzene ranging from less than the reporting limit to 3.56 mg/kg, and total BTEX ranging from less than the reporting limit to 1,700 mg/kg.

Quality Assurance and Quality Control

Quality assurance and quality control (QA/QC) for this project consisted of the collection of a field duplicate sample, analysis of a trip blank, and the laboratory in-house QA/QC protocols. The field duplicate sample, submitted to the laboratory as a blind sample, evaluates the precision of the laboratory results. The relative percent difference (RPD) between the sample result and the field duplicate result indicates the degree of precision. An evaluation of analytical precision can be performed only if the results of the analysis of both the original sample and its duplicate are above the method reporting limits. The RPD between samples 938-0916-02 and 938-0916-03 for GRO and BTEX fell outside Shannon & Wilson's acceptable range of data quality objectives. The RPD for DRO was within the acceptable range. This discrepancy may be explained by the fact the DRO sample was homogenized prior to placing the soil in the sample jar, but the volatile portion the sample was not. The laboratory reported QA/QC surrogates within acceptable limits. The trip blank that accompanied the samples in the field had results less than the method reporting limit for all analytes tested, indicating that sample handling procedures did not introduce contamination.

Discussion

To aid in the evaluation of the levels of soil contamination observed at this site, a preliminary matrix score was computed. This matrix score is used by the ADEC in establishing cleanup levels at a site. The matrix score takes into account various site-specific parameters including annual precipitation, soil type, volume of contaminated soil, depth to groundwater, and distance

to potential receptors. A preliminary score for this site is Level B (Table 2). The corresponding cleanup levels are as follows: GRO – 100 mg/kg, DRO – 200 mg/kg, benzene – 0.5 mg/kg, and total BTEX – 15 mg/kg.

Based on our previous work, the site is underlain by interbedded sandy gravels and silt. A silt layer is present from 3 to 6 feet below the surface, with a thickness ranging from 1.5 to 5.5 feet thick. At the time of our drilling in June 1996 frozen ground was encountered between 5 and 12.5 feet below the ground surface, and groundwater was encountered at a depth of 13 feet. With the presence of a silt layer, frozen ground, and asphalt, the potential for the downward migration of contaminants is low. This is supported by the results of groundwater sampling, which indicated volatile organic compounds were not present in concentrations exceeding the detection limits.

The results of our sampling indicate that soil containing concentrations of petroleum constituents in excess of the anticipated ADEC cleanup levels is present under the canopy foundations and the in the area of the USTs. This soil could not be removed without compromising foundations and the USTs. Perforated piping was installed to promote biologic degradation and aeration in these areas.

Conclusions and Recommendations

Based on our field observations and the results of analytical testing, Shannon & Wilson presents the following conclusions and recommendations:

- Soil containing DRO, GRO, and BTEX compounds in excess of the ADEC cleanup levels is located beneath the canopy foundations and between and adjacent to the USTs. This soil could not be removed without compromising the site structures. Ventilation piping was installed in these areas.

- Shannon & Wilson recommends placing turbine vents on the ventilation piping to assist in the removal of the volatile components from the subsurface.

Limitations

This letter report presents our observations and results based on soil samples collected during tank system upgrade. The soil samples were intended to evaluate the presence or absence of petroleum hydrocarbon-affected soil at the locations selected. Although our intention was to

sample the areas anticipated to have the highest potential for soil contamination, the levels observed might not be the greatest levels present at the site. It was also not the intent of our sampling to detect the presence of soil contaminants other than those for which laboratory analyses were performed. No conclusions can be drawn on the presence or absence of other contaminants.

The data presented in this letter report should be considered representative of the time of our site observations and sample collection. Changes in the observed site conditions can occur with the passage of time. In addition, changes in government codes, regulations, or laws may occur. Due to such changes, or others beyond our control, our observations and conclusions regarding this site may need to be revised wholly or in part. In addition, there can be no assurance that a regulatory agency or its staff will reach the same conclusions as Shannon & Wilson.

This report was prepared for the exclusive use of CEM Leasing and its representatives. If it is made available to others, it should be for information on factual data only and not as a warranty of conditions described in this report.

If you have any questions, please call.

Sincerely,

SHANNON & WILSON, INC.

Mark S. Lockwood
Senior Geologist

David M. McDowell
Senior Associate

Enclosures:
Table 1 Summary of Soil Sampling Results
Table 2 Matrix Score Sheet
Figure 1 Site Location Map
Figure 2 Site Plan
Certificate of Remediation
Analytical Laboratory Report

Table 1
SUMMARY OF SOIL SAMPLE RESULTS
Plaza Texaco, North Pole, Alaska

Results in mg/kg

Sample #	Location	Depth (ft)	DRO	GRO	Benzene	Toluene	Ethylbenzene	Xylenes
938-0916-01	North Dispenser	5.5	4,030.0	129.0	0.41	0.15	0.29	4.61
938-0916-02	South Dispenser	6.0	72.0	1,160.0	13.70	216.0	41.70	271.10
938-0916-03	Duplicate 02		76.80	250.0	0.64	9.67	3.54	31.57
938-0916-04	Piping Trench	3.5	6.86	<5.00	<0.050	<0.050	<0.050	<0.10
938-0916-05	Piping Trench	4.5	<5.00	<5.00	<0.050	<0.050	<0.050	<0.10
938-0916-06	Piping Trench	3.5	52.20	<5.00	<0.050	<0.050	<0.050	<0.10
938-0916-07	Piping Trench	3.5	9.83	<5.00	<0.050	<0.050	<0.050	<0.10
938-0916-08	Piping Trench	6.0	7.99	<5.00	0.58	<0.050	<0.050	0.17
938-0916-09	UST Excavation	4.0	1,210.0	3,300.0	3.56	280.00	62.30	869.00
938-0916-10	UST Excavation	4.0	618.0	5,080.0	0.76	225.00	89.50	1,380.0
938-0916-11	UST Excavation	4.0	52.90	<5.00	<0.050	0.07	<0.050	0.77
938-0916-12	UST Excavation	4.0	16.70	<5.00	<0.050	<0.050	<0.050	<0.10

GRO - Gasoline Range Organics

DRO - Diesel Range Organics

Table 2
ADEC Matrix Score Sheet

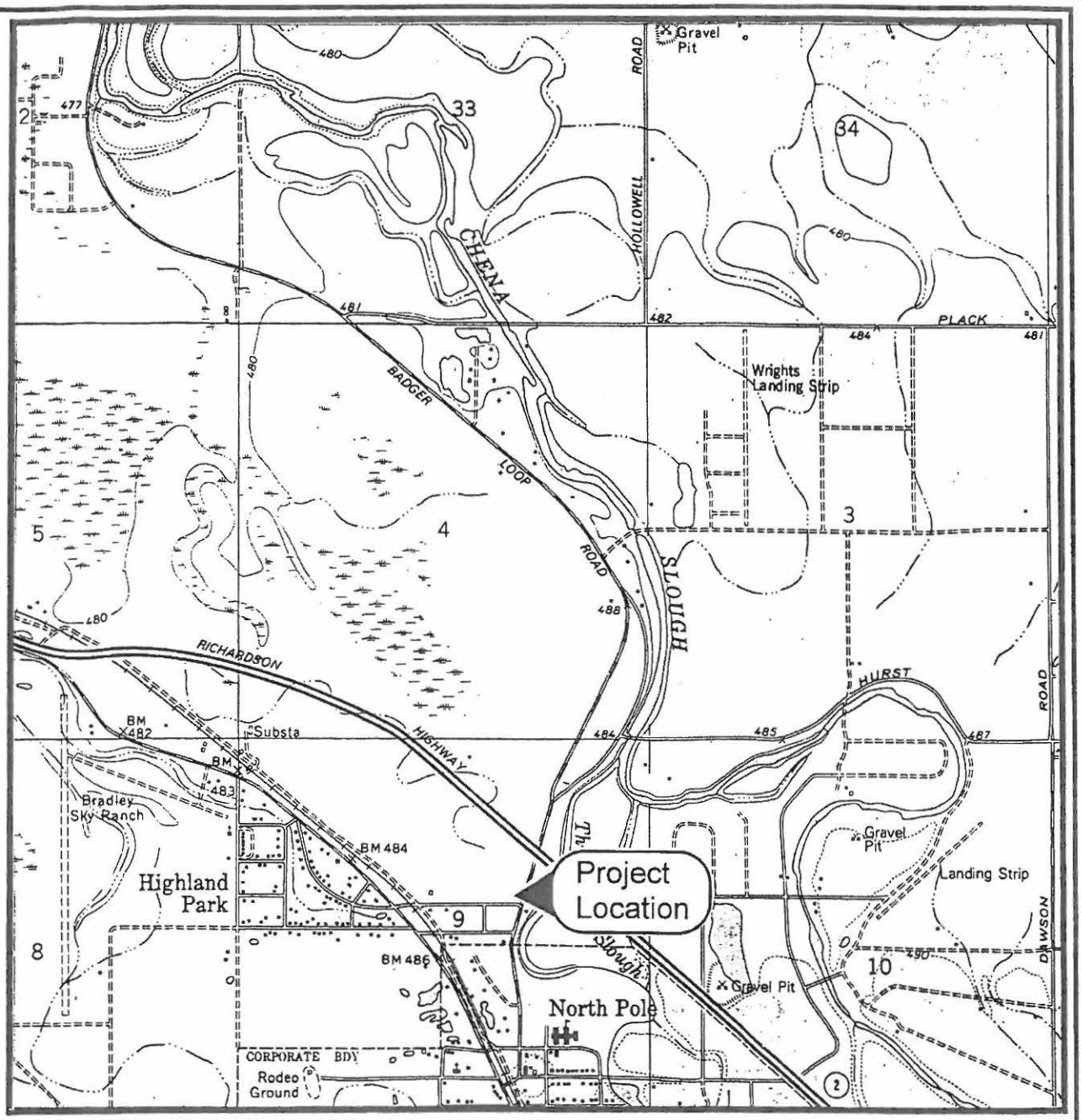
Part A: Determine score for each item*

1.	**Depth to Groundwater**		
	Less than 5 feet	(10)	
	5-16 feet	(8)	8
	16-25 feet	(6)	
	26-50 feet	(4)	
	More than 50 feet	(1)	
2.	**Mean Annual Precipitation**		
	More than 40 inches	(10)	
	26-40 inches	(5)	
	16-25 inches	(3)	
	Less than 15 inches	(1)	1
3.	**Soil Type (Unified Soil Classification)**		
	Clean, coarse-grained soils	(10)	
	Coarse-grained soils with fines	(8)	8
	Fine-grained soils (low organic carbon)	(3)	
	Fine-grained soils (high organic carbon)	(1)	
4.	**Potential Receptors**		
	(Select the most applicable category)		
	a. Public water system within 1000 feet, or private water system within 500 feet	(15)	
	b. Public/private water system within 1/2 mile	(12)	
	c. Public/private water system within 1 mile	(8)	8
	d. No water system within 1 mile	(4)	
	e. Nonpotable groundwater	(1)	
5.	**Volume of Contaminated Soil**		
	More than 500 cubic yards	(10)	
	101-500 cubic yards	(8)	
	26-100 cubic yards	(5)	5
	10-25 cubic yards	(2)	
	Less than 10 cubic yards	(0)	
TOTAL			30

*Items to be scored are defined at 18 AAC 78.315(b)

Part B: Add scores from Part A to determine matrix score and cleanup level

Matrix Score for Each Category	Cleanup Level in mg/kg				
	Gasoline Range Organics	Diesel Range Organics	Residual Range Organics	Benzene	Total BTEX
Category A: More than 40	50	100	2000	0.1	10
Category B: 27-40	100	200	2000	0.5	15
Category C: 21-26	500	1000	2000	0.5	50
Category D: Less than 21	1000	2000	2000	0.5	100



Base Map: USGS Fairbanks (D-1) SW, 1981

SCALE: 1:24,000

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Plaza Texaco
103 N. Santa Claus Lane, North Pole, Alaska

SITE LOCATION MAP

December 1998 X-0938

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Figure 1

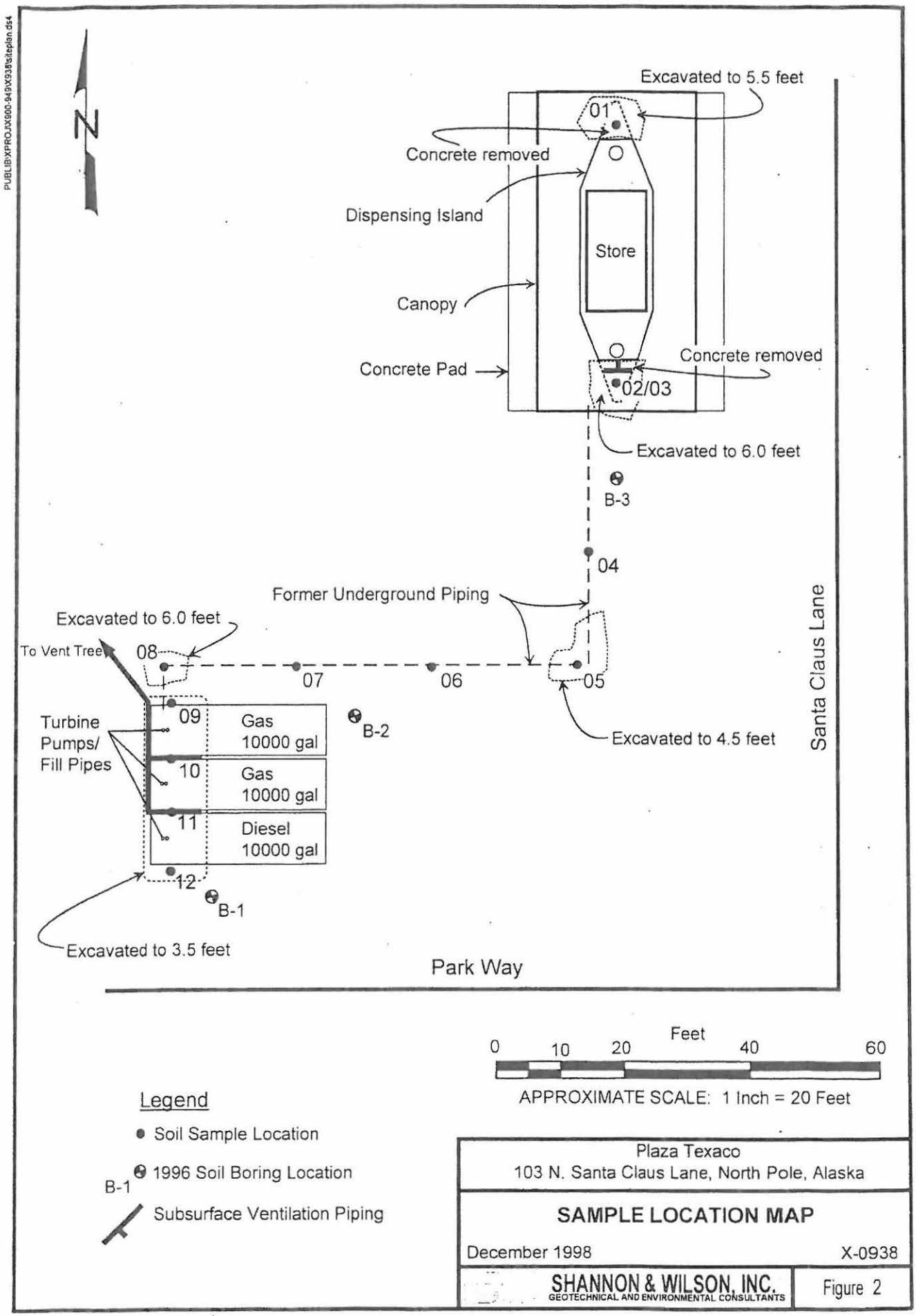
PUBLIB\XPROJ\X600-949\X938\siteplan.ds4
N
Excavated to 5.5 feet
01
Concrete removed
Dispensing Island
Store
Canopy
Concrete Pad
Concrete removed
02/03
Excavated to 6.0 feet
B-3
04
Former Underground Piping
Excavated to 6.0 feet
To Vent Tree
08
07
06
05
Santa Claus Lane
Turbine Pumps/ Fill Pipes
09
Gas 10000 gal
10
Gas 10000 gal
11
Diesel 10000 gal
12
B-2
B-1
Excavated to 4.5 feet
Excavated to 3.5 feet
Park Way
Feet
0
10
20
40
60
APPROXIMATE SCALE: 1 Inch = 20 Feet
Legend
Soil Sample Location
1996 Soil Boring Location
B-1
Subsurface Ventilation Piping
Plaza Texaco
103 N. Santa Claus Lane, North Pole, Alaska
SAMPLE LOCATION MAP
December 1998
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Figure 2