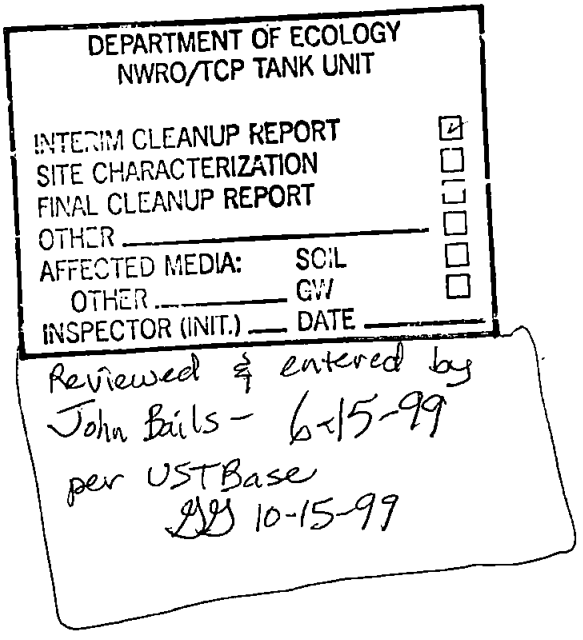
UNDERGROUND STORAGE TANK

SITE ASSESSMENT/CHARACTERIZATION REPORT

Conducted at:

Vashon Auto Center
17803 Vashon Highway
Vashon, WA
King County, WA



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Prepared for:

Owners

December 30, 1997

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December 30, 1997

Site: Vashon Auto Center
17803 Vashon Hwy.
Vashon, WA

DOE Site # 100619 11720

I. EXECUTIVE SUMMARY

AA ENVIRO ASSESSMENT , INC. (AEA) served as the Owner's representative in the Underground Storage Tank (UST) removal/decommissioning project and Site Assessment/Characterization conducted at 17803 Vashon Hwy, Vashon, WA. Fieldwork included observing excavations, decommissioning, soil sampling/laboratory analysis, and the removal of four (4) out of (7) UST's on 8/1/97, and 8/6/97. Our observations were then compiled to prepare a site characterization report.

Our investigations of the subject site were conducted under the guidelines set forth in the Washington State Department of Ecology "Guidance for Site Checks and Site Assessments for Underground Storage Tanks" (October, 1992 revision).

During the excavation of the storage tanks, visual and olfactory observations confirmed Petroleum contaminated soils (PCS) in two of three excavations. Previous boring assessments also confirmed PCS surrounding all tanks at the subject site except for a 500 gallon tank that had once been used to store kerosene.

Based on our investigations and observations, and confirmation of laboratory results, PCS still exists at the subject site under the building and within and around the tank cavity of the three existing, active gasoline tanks that are still in the ground at this time.

II. INTRODUCTION:

The subject site had a change of ownership in July, 1997. The purpose of this site assessment was to decommission and remove three tanks, (a fourth "surprise" tank was also discovered in the removal process) and to perform an EPA required upgrade on three (3) existing, active gasoline tanks at the subject site.

The subject site is a gasoline service station and auto center, and C-Store. The site currently operates under the name Vashon Auto Center, and is located at 17803 Vashon HWY, Vashon, WA. A plot map and vicinity map are provided in Appendix B.

III. SITE BACKGROUND:

According to an interview with an old supplier for this site, it was built in 1947. The store section of the building was an extension built sometime after the tanks were installed. The extension to the building then put tank #4 (formerly the leaded tank and currently an unleaded tank) and the piping to the pump islands partially under the building- (See site sketch, Appendix A)

Summary of Boring Investigation Conducted by AEA in June, 1997

On June 23, 1997, six (6) soil samples were collected on site from six probe locations using TEG Strataprobe System, and under the supervision of AA ENVIRO ASSESSMENT (AEA) site assessor. The soil samples were collected using a 2" diameter stainless steel probe rod with a sampling device attached to the end of the rods that allowed retrieval of discrete soil samples. The soil probes were installed to a maximum depth of 12 feet. Soil samples were analyzed for Gasoline by WTPH-Gx and BTEX by EPA Method 8020, diesel by WTPH-D and Kerosene and heating oil and heavy oils by WTPH-D Extended.

After the soil samples were collected, the borings were backfilled with bentonite, and covered with asphalt patch material. Soil cuttings were placed in buckets and transported to TEG lab for disposal.

Undisturbed soil samples were collected from 3 to 7 feet intervals in each boring and all borings were conducted to depths of 10 to 12 feet..

There was both visual and olfactory evidence of petroleum contamination in borings B1, B2, and B4.

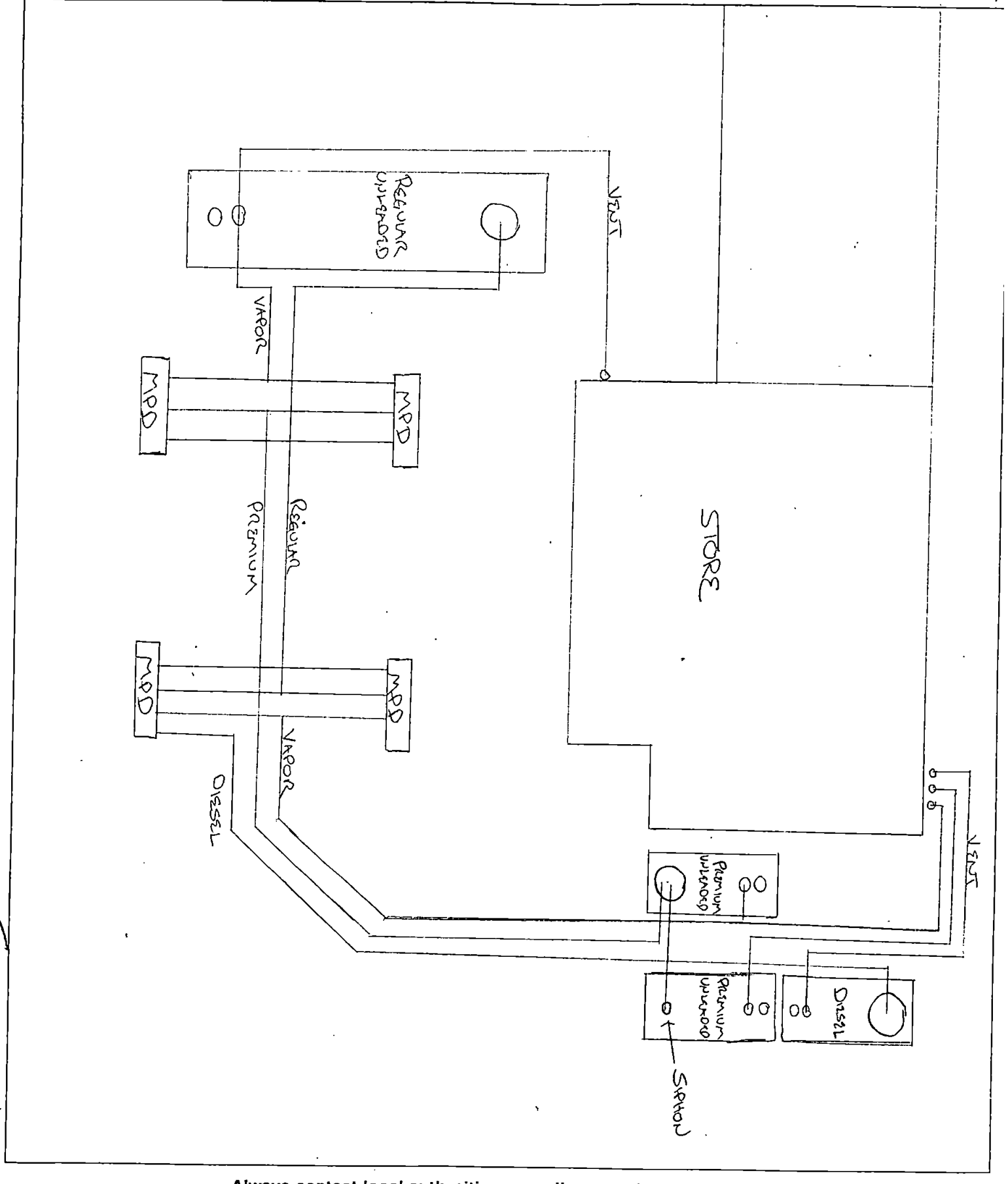
Boring B6 at 7 feet showed no evidence of kerosene at all.

Sample B5 results for oil was non detect.

Sample B6 results for diesel was 2200ppm, well above the MTCA Method A clean up standard of 200ppm. Figure 1 showing locations of all borings prior to the removal of the tanks is presented below:

UBI # _____

IV SITE PLAN (In the space below, provide an *as built* site plan of the tank and piping installation. Include all the information requested in the instructions.)



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Always contact local authorities regarding permit requirements.
You must have the installation supervisor sign the back side of this page.

RESULTS OF FIELD SCREENING AND CHEMICAL ANALYSIS SAMPLING OF SOILS

Sample ID #	Sample Location	Sample Depth	Date Analyzed	Field Screening results		EPA 8020					
				Headspace vapors (ppm)	Kerosene	WTPH-G (mg/kg) ppm	WTPH-D mg/kg) ppm	B	T	E	X
	SEE DIAGRAM										
B1		5-6'	6-24-97				11,100				
B2		6-7'				3350		34.6	110	65.1	340
B3		7'					19	0.016	0.016	nd	nd
B4		7'				211	nd				
B5		7'					47				
B6					ND						

* Indicates water sample, in ppb

Note: Field Test Using a Gastec GT 202 PID meter

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IV. UST System Data:

The subject site consisted of seven (7) UST's. Information on this system is as follows:

Tank 1 - 300 gallon, contained heating oil fuel in the past. The site converted to natural gas, and the tank was supposedly being used for waste oil. Upon removal of the tank, there was no evidence of heavy oils, but diesel was detected.

Tank 2, 3, and 4, are unleaded, 3,000 gallon capacity. All three tanks are currently active. Tank 3 had been temporarily abandoned with water. Tank 4 was formerly used to store leaded gasoline. The tanks are reported to be approximately 20 years old.

Tank 5 was diesel, 675 gallon, It is reported to be approximately 12 years old, now removed.

Tank 6 was kerosene, 500 gallon, and reported to be approximately 20 years old, now removed.

Tank 7 was discovered under tank 6, 300 gallon, and empty, and the age is unknown, also removed.

* Tank Status - Tanks 2,3 and 4 are currently active and have been upgraded to meet 1998 EPA requirements. Tanks 1,5,6, and "surprise tank" (7) were removed and information is as follows:

* Tank material - steel
* Tank construction - single wall
* Compartments - 1 each
* Piping material - steel
* Pumping System - suction
* Substance use - motor fuel for vehicles

V. SITE DATA:

A site diagram showing sampling locations and distances of tanks to nearby structures is attached to this report. Telephone and electrical power is located overhead. Natural Gas lines are underground.

VI. GEOLOGICAL AND HYDROGEOLOGICAL CHARACTERISTICS:

Soil at this site appears to be OL (Organic silts and organic sily clays of low plasticity) under the Unified Soil Classification System.

The subject site is located on Vashon Island and is surrounded by water.

According to well logs in the area, and the Vashon Groundwater Management plan, the depth to groundwater in the area is approximately 120 feet+, with a seasonal fluctuation of 10 feet. The directional flow of the groundwater appears to flow in a southeasterly direction. The subject site is provided with city water and sewer.

VII. DECOMMISSION PROCEDURES

All UST's removed were decommissioned according to all local, County, State, and Federal regulations. All applicable permits were acquired for the project and are attached in Appendix E. The King County Fire Marshall was present during the removal of all tanks.

VIII. TANK EXCAVATIONS

A) Tank 1, Old Heating Oil Tank

Amalgamated services performed all pumping and rinsing of the UST's and receipts are attached to Appendix E.

Tank 1 was removed from the subsurface on August 1, 1997. There was a three foot cover to the top of the tank. There were no PCS observed to approximately 4 feet below ground surface (bgs). The clean overburden soils were placed on visqueen adjacent to the pit. The tank was marshaled from the excavation pit, secured adjacent from the cavity, and inspected. The tank was in extremely poor condition with major cell corrosion. There were approximately 18 holes observed in the bottom, ends, and east side of the tank. PCS were observed at 4 feet bgs and all PCS excavated were temporarily placed on separate visqueen awaiting transport off site.

PCS were removed to a depths of 11 feet, and PCS were "chased" three (3) feet to the foundation of the building. A total of (5) soil samples were collected from the base and sidewalls of the pit. (O1 through O5). The samples were analyzed for NWTPH-Dx/Extended. Heavy oil was not present in the final soil samples, but Diesel was. Sample O2 was well above MTCA Method A cleanup standards at 2620ppm for diesel. (Cleanup Standards for diesel and oil is 200ppm). This sample was collected next to the foundation of the building and prevented any further "chasing". It is obvious that PCS still exist under the building at this time. All other final soil samples collected and analyzed were non-detect for diesel and heavy oil. (See Figure 3).

B) Tank 5, Diesel

Tank 5 was also removed from the subsurface on August 1, 1997. There was an approximate 3 foot cover to the top of the tank, and 7 feet to the bottom of the tank. There was a 4 foot cover of clean, overburden soil before PCS were observed within the excavation. Upon marshaling the tank from the excavation, no visible holes were detected and the tank was in fair condition with minor pitting/cell corrosion. The clean

soil was placed in a stockpile, and the PCS were placed on visqueen in a separate stockpile. PCS were removed to depths of 9.5', and a "chase" was extended to approximately 2 feet under the curbing toward Vashon Highway in an attempt to remove all the PCS. It should be noted here that prior borings in the area of this tank revealed gasoline PCS above MTCA Method A Cleanup Standards at 211 ppm. The cleanup standard for gasoline is 100ppm. One (1) soil sample was collected at 8 feet and analyzed for gasoline and diesel (G-D). The sample result was just above cleanup standards for diesel at 237 ppm, and gasoline was also detected in the soil at levels below cleanup standards for gasoline (38ppm). Excavating continued to depths of 9.5'. Soil samples were collected at the base and along the sidewalls of the pit. (D-1 through D-5) The soil samples were analyzed for diesel by Method WTPH-Dx. All sample analyses were non-detect. (See Figure 2). It is possible that the distributor in the past could have accidentally pumped the wrong fuel in the tank, or perhaps the tank had been used to store gasoline at one time. There is no information to tell us for sure why the diesel tank pit would contain gasoline PCS. (See Figure 4).

C) Tank 6, Kerosene, and second tank (7) below tank 6. (See Figure 3 in Appendix A)

Tank 6 was removed on August 1, 1997 and upon removal, the pit revealed a second tank. The "surprise" tank beneath tank 6 was removed on August 8, 1997, with the Fire Marshall on site for observation. The depth to the bottom of the second tank was 10 feet. There was an approximate 3.5' cover to the top of the first tank, and there were no visual or olfactory evidence of PCS around the fill points or within the pit. Upon inspection, both tanks were in fairly good condition with minor cell corrosion. A total of 5 soil samples were collected from the base and sidewalls of the excavation (K-1 through K-5), and one more beneath the second tank (T-1). The samples were analyzed for kerosene, gasoline, diesel, and heavy oil due to the unknown contents of the second tank. All sample results were non-detect. (See Figure 5).

STOCKPILE SAMPLING:

A total of 270 cyds. of PCS was hauled to Fife Sand & Gravel located in Fife, WA, for treatment. Soil samples were collected from the PCS stockpiles per DOE and Fife Sand & Gravel requirements. (See results of chemical analyses tables located in Appendix A).

UPGRADE FINDINGS:

In 1997, DOE submitted a Corrective Action Notice to the subject site in regard to the gasoline tanks failing tightness testing. Liberty Enterprises, Inc., performed an upgrade to gasoline tanks 2,3, and 4. Upon preparing the tanks for upgrade, tanks 2 and 3 both had puncture holes in the bottom of the tanks. Investigations revealed these punctures were due to "sticking" the tanks. The tanks were sandblasted and cleaned, and plates were welded and lined over the punctures to prevent future "sticking punctures". The plates were 1/4 inch thick galvanized steel.

The prior boring assessment conducted in June, 1997, had revealed gasoline PCS in the area of the gasoline tanks. Upon excavating soils at a depth of 4 feet around the tanks to perform the upgrade, approximately 94 cubic yards of PCS was placed on visqueen awaiting the collection of soil samples. Three (3) soil samples were collected from the stockpile and analyzed for gasoline by Method WTPH-Gx. The average contaminant concentration for gasoline was 524 ppm. The 94 cyds. of gasoline PCS was also hauled to Fife Sand & Gravel for Treatment. (See Appendix E for receipts of PCS)

Trenching was conducted to place the new fiberglass piping into the ground. Liberty reported no visual or olfactory evidence of PCS where the new lines to the pump Island were placed. The old pipe lines were drained and left in the ground at this time due to the fact that they are located under the building.

Tables 1,2, and 3, showing the results of chemical analyses of the soil samples collected from the excavations and stockpiled PCS is presented below:

Table 1

RESULTS OF FIELD SCREENING AND CHEMICAL ANALYSIS SAMPLING OF SOILS

Sample ID #	Sample Location	Sample Depth	Date Analyzed	Field Screening results		EPA 8020					
				Headspace vapors (ppm)	Sheen	WTPH-G (mg/kg)	WTPH-D mg/kg)	B	T	E	X
	SEE DIAGRAM										
D-1			8/4/97				nd				
D-2							nd				
D-3							nd				
D-4							nd				
D-5							nd				
O-1							41				
O-2							2620				
O-4			↓				nd				
SP-1			8-4-97				nd				
SP-2			↓				788				
G-D	↓		↓			38	237				

* Indicates water sample, in ppb

D = Diesel
O = Waste Oil tank
G-D = Diesel pit (Tank 5)

Note: Field Test Using a Gastec GT 202 PID meter

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Table K

RESULTS OF FIELD SCREENING AND CHEMICAL ANALYSIS SAMPLING OF SOILS

Sample ID #	Sample Location	Sample Depth	Date Analyzed	Field Screening results		EPA 8020					
				Headspace vapors (ppm)	Sheen	WTPH-G (mg/kg) kerosene	WTPH-D mg/kg)	B	T	E	X
	SEE DIAGRAM										
K-1						nd	nd				
K-2						nd	nd				
K-3						nd	nd				
K-4						nd	nd				
K-5						nd	nd				
T-1						nd	28				
03						nd	nd				
05						nd	nd				
SP-3						49	1940				

* Indicates water sample, in ppb

Note: Field Test Using a Gastec GT 202 PID meter

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Table 3

RESULTS OF FIELD SCREENING AND CHEMICAL ANALYSIS SAMPLING OF SOILS

Sample ID #	Sample Location	Sample Depth	Date Analyzed	Field Screening results		EPA 8020					
				Headspace vapors (ppm)	Sheen	WTPH-G (mg/kg)	WTPH-D mg/kg)	B	T	E	X
	SEE DIAGRAM										
UG-1		3.5'	9-25-97			456					
UG-2		3.5'	↓			539					
UG-3		3.5'	↓			579					
	↓										

* Indicates water sample, in ppb

Note: Field Test Using a Gastec GT 202 PID meter

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The excavations were backfilled with a mixture of clean overburden soils and crushed rock.

X. QUANTITATIVE ANALYSIS:

Soil samples were collected from the tank cavities and sidewalls and one to three feet below the bottom of the tanks. Soil samples were also collected from the stockpiled PCS. The samples were analyzed in accordance with DOE requirements for underground storage tank decommissioning. Independent laboratory analyses were performed by Transglobal Environmental Geosciences Northwest, Inc., 7110 38th Drive SE, Lacey, WA. All laboratory reports and chain of custody records are provided in Appendix D.

XI. METHODS OF SAMPLING

Sampling was conducted with a back hoe bucket and hand tools. Sampling equipment was decontaminated between samples with Alconox solution wash followed with a clean distilled water rinse. All samples were kept refrigerated until relinquished by TEG (Transglobal Environmental Geosciences) laboratory located in Olympia, WA.

XII. CONCLUSION:

There were four (4) UST's successfully decommissioned and removed from the subject site in August, 1997. Evidence suggests that the impact to soils was due to punctures and holes in the tanks.

PCS still exists under the building from tank 1 located behind the building. PCS still exists within the area surrounding the gasoline tanks which have been upgraded. DOE would not require the destruction of the building to remove PCS. The new owner has suggested removing the existing PCS at the subject site sometime in the future when the building comes down, and if and when the three existing, upgraded tanks should be removed.

XIII. LIMITATIONS:

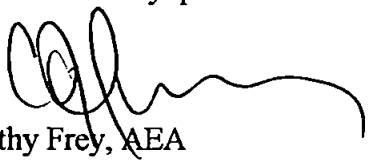
AEA does not assume liability for any other release, threatened release or other conditions at the subject property. AEA is not responsible for any claims, damages, or liabilities associated with the interpretations of findings in this report.

AEA shall not be responsible for conditions or consequences arising from relevant facts that were withheld, concealed, or not fully disclosed at the time this evaluation was performed. Our conclusions are based on observations made in limited areas. It is always possible that contamination exists in areas that were not tested or explored.

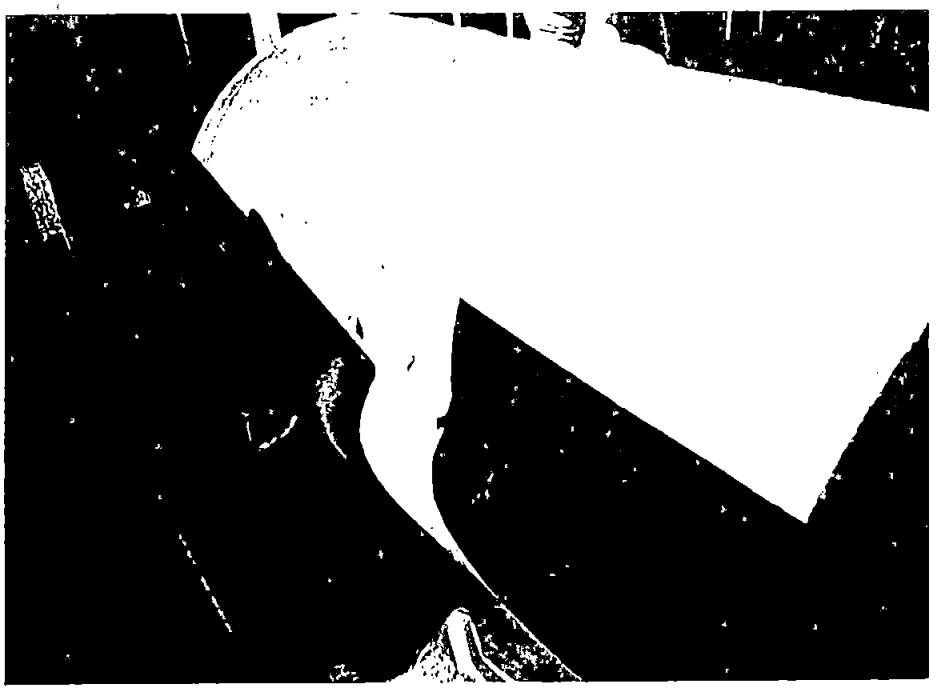
The underlying philosophy in formulating the conclusions and recommendations was to reduce uncertainties regarding the property and pertaining to environmental hazards, to

the degree viewed as reasonably accurate estimates, given the project limitations of the existing environmental conditions of the property.

We trust that the information presented in this report will satisfy your current requirements, and we appreciate the opportunity to provide our services for this project. If you have any questions or would like additional information, call anytime.



Cathy Frey, AEA



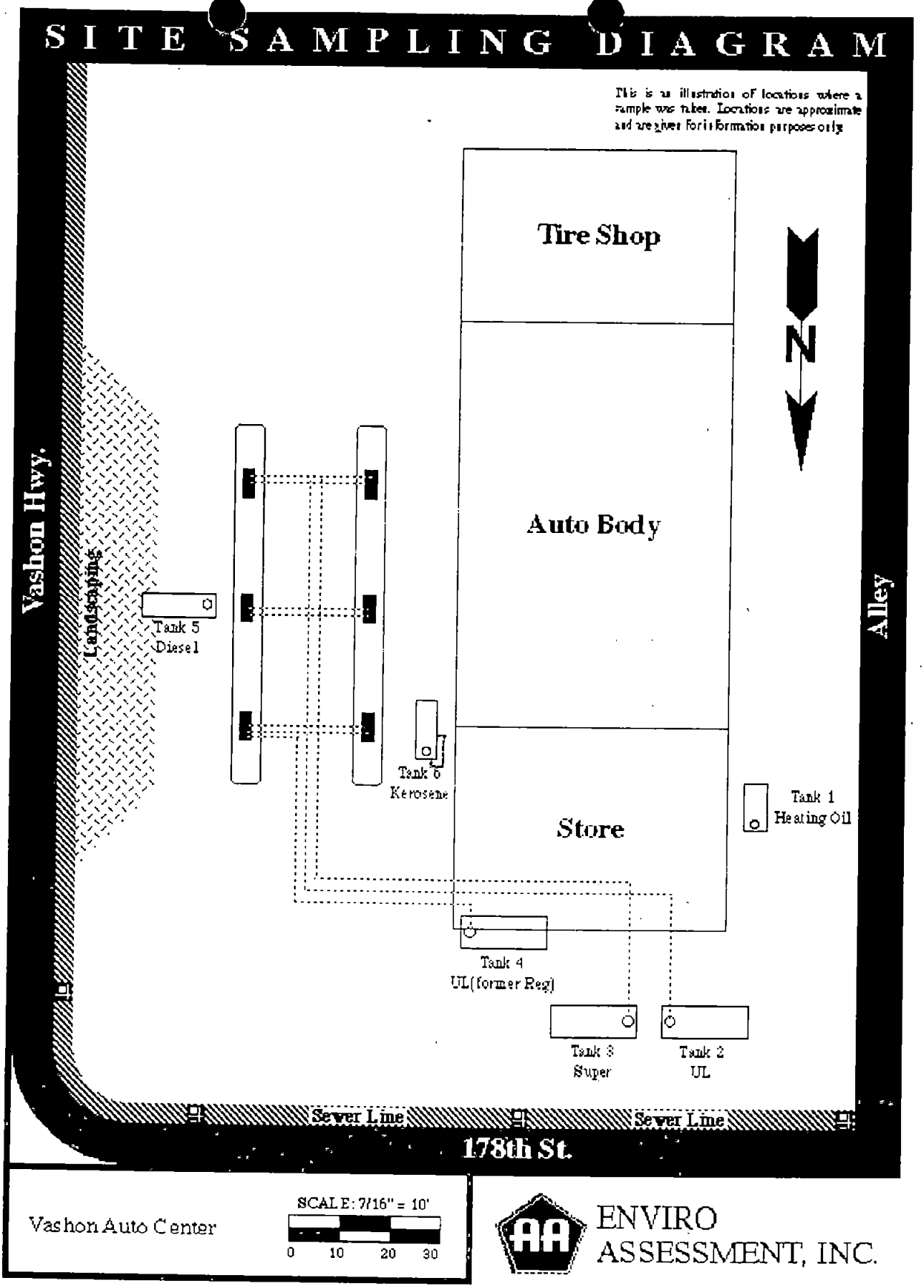
Tank 1 (old heating oil) with visible holes

PCS "chased" to foundation, and extending under building

Appendix A

Figure 2

SITE SAMPLING DIAGRAM



Vashon Auto Center

SCALE: 7/16" = 10'

0 10 20 30

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Figure 3

SITE SAMPLING DIAGRAM

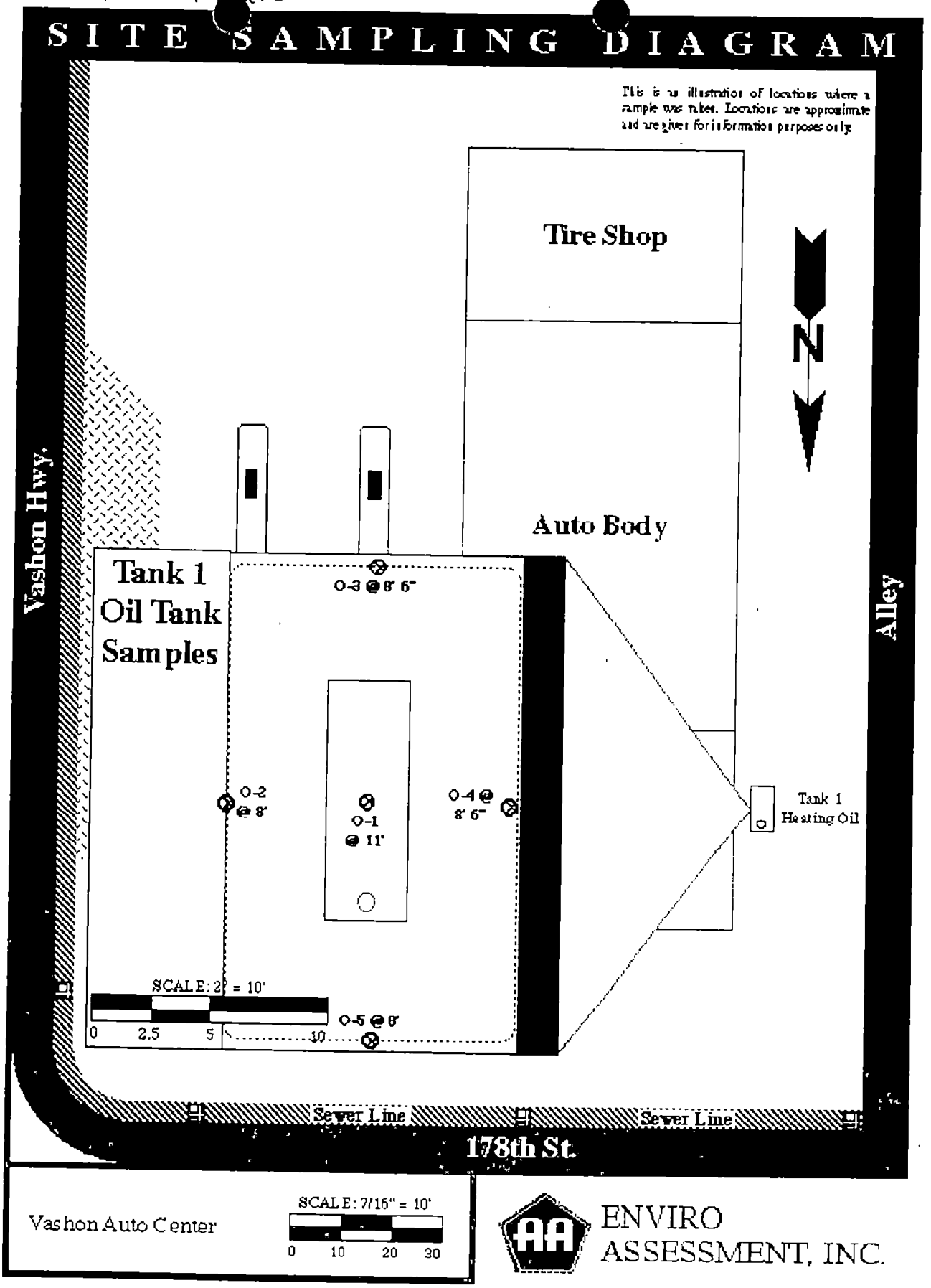
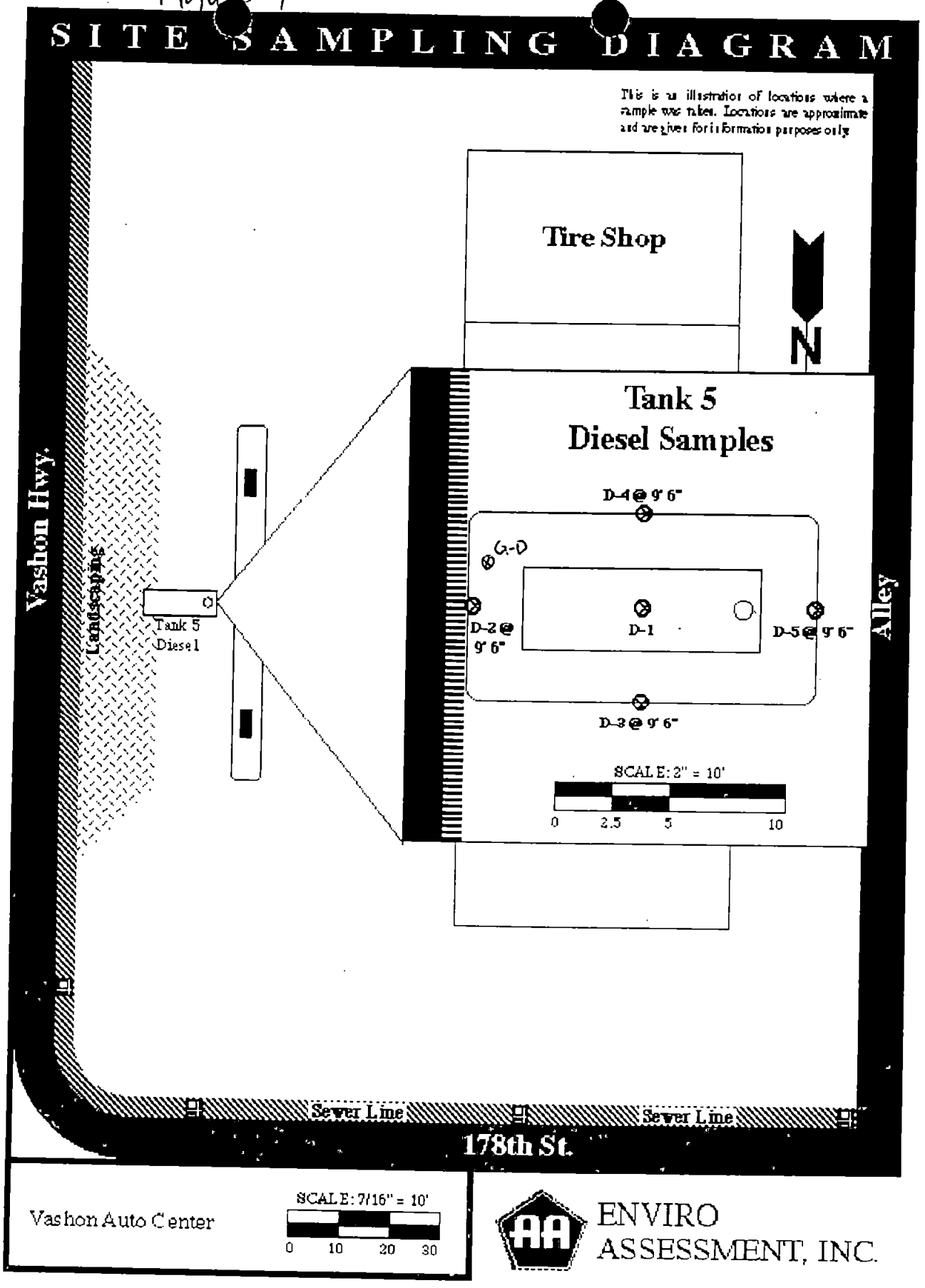


Figure 4

SITE SAMPLING DIAGRAM



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0 10 20 30

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