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September 15, 1992

JN 92324E

Ira Alexander
1500 Arboretum Place
Seattle, Washington 98112

Subject: Underground Storage Tank Removal and Supplemental Environmental Studies
Bayside Volvo
753 9th Avenue North
Seattle, Washington

101750

Dear Mr. Alexander:

In accordance with your recent request, Geotech Consultants, Inc. has completed field observation, documentation and laboratory analysis associated with the removal of three underground storage tanks (USTs) from the Bayside Volvo dealership in Seattle, Washington. The property is located at 753 9th Avenue North, as illustrated on the Vicinity Map, Plate 1.

The site is currently occupied by a one-story concrete masonry building. At the time of our visits on July 22, and September 2, 1992, the building was vacant, having previously been used as a car dealership. Topography in the vicinity slopes moderately toward the northeast. Shallow groundwater would be expected to follow surface topography, flowing generally toward the northeast and draining into Lake Union.

The tanks were located in an asphalt-surfaced parking area on the northwest portion of the property. The tanks were reportedly installed during 1949, when the existing building was constructed.

This activity was initiated to satisfy regulatory requirements imposed under WAC 173-360 pertaining to site assessment at the time of closure. This report provides a summary of our field and laboratory methods along with results and conclusions.

FINDINGS

Agency Notification

It is our understanding, since the tanks had not been used for several years, that permits and 30-day notification was not required by the Washington Department of Ecology. A letter from the UST removal contractor (T.M. Services) that addresses this issue has been appended.

Tank Excavation

On July 22, 1992, an environmental engineer from our firm was present during the removal of the USTs from the property. Upon our arrival on the site, we were met by Ed Mason, a UST supervisor for T.M. Services Corporation, of Arlington, Washington. Mr. Mason informed us that the tanks had been pumped and rinsed on the previous day by Marine Vacuum Service, Inc., of Seattle, Washington, and that the contents of the tanks had been disposed of properly.

Mr. Mason also stated that prior to our arrival on July 22, the tanks had been conditioned in a manner consistent with guidelines offered in API Recommended Practice 1604 (Removal and Disposal of Underground Petroleum Storage Tanks), and API Publication 2015. Specifically, dry ice had been added to the tanks, and at 11 a.m. on July 22, the tanks were inspected and removal approved by Inspector Chris Yamini of the Seattle Fire Department. A copy of the Fire Department permit has been appended.

Excavation and removal of the tanks was performed using a backhoe provided by T.M. Services. The tanks were removed between 12:30 and 2:30 p.m. and transported off site by T.M. Services for proper disposal.

Observations During Tank Removal

The tanks were "in-place" at the time of our arrival on July 22. All three tanks were single wall coated steel tanks, and were overlain by 3 to 4 feet of soil. The locations of the former USTs are shown on the Site Plan, Plate 2.

After removal, the tanks were measured, and inspected for holes and indications of leakage. The following table provides the condition, dimensions, maximum calculated capacity, and reported contents of each tank:

Tank	Contents	Length (inches)	Diameter (inches)	Capacity (gallons)	Condition
1	gasoline	74	63	1,000	Poor
2	used oil	61	38	300	Fair-Poor
3	fuel oil	98	45	675	Poor

Several "pinholes" were detected in Tanks 1 and 3. No holes or indications of leakage were detected in Tank 2. According to T.M. Service personnel, Tank 2 had been full of used oil prior to pumping on July 21.

As illustrated on the Site Plan, Tanks 1 and 2 were relatively close to each other, so removal resulted in one excavation. Soils with characteristic hydrocarbon odors were observed in this excavation from a depth of approximately 4 feet down to the maximum depth of 14 feet. The maximum lateral dimensions of the excavation were roughly 15 feet by 15 feet.

The excavation for Tank 3 measured roughly 12 feet (north-south) by 7 feet (east-west), and achieved a maximum depth of 9 feet. Soils with characteristic hydrocarbon odors were observed in this excavation extending from approximately 4 feet down to about 8 feet.

Soils in both excavations consisted of sand/silt mixtures. The lack of stratification and the presence of foreign materials such as bottles and brick fragments suggests that the soils in this area are imported fill down to at least a 10-foot depth. No groundwater seepage was observed in either excavation.

Soil Sampling

Discrete "grab" samples for laboratory analysis were collected from the excavations at selected depths. Composite samples were also collected from the upper 4 feet of material

removed from the excavation, which did not appear to be contaminated with petroleum hydrocarbons.

Samples were placed in sterilized glass jars with teflon-sealed lids furnished by the project laboratory. Samples were stored in an iced chest at the site and taken to the lab in this condition in an effort to preserve sample integrity by minimizing excessive dissipation of volatile fraction hydrocarbons. Each jar was clearly labeled as to sampling location, time of sampling, sampling person, project number, etc. EPA-recommended protocol for sample management, including maintenance of chain-of-custody documentation, was observed during the course of the project.

Once soil samples were obtained, the material which appeared to be contaminated was returned to the excavations. Soils from the upper 4 feet of the excavations were stockpiled on the site pending the results of laboratory analysis.

Laboratory Analysis

Since several types of petroleum products were reportedly stored on the site, one sample from each excavation was initially analyzed using the Washington Total Petroleum Hydrocarbons-Hydrocarbon Identification (WTPH-HCID) analysis, a quantitative test used to determine which hydrocarbon constituents, if any, are present. Gasoline-range hydrocarbons were detected in both samples. These and other selected samples were then analyzed using the WTPH-G method for gasoline, along with the gasoline constituents benzene, toluene, ethylbenzene, and xylenes (BTEX). Reported concentrations provide a basis for comparison of site conditions to cleanup levels specified in the Model Toxics Control Act (MTCA).

The results of laboratory analysis are presented in Table A, appended to this report. Review of this table suggests that gasoline concentrations in soils from both excavations exceed MTCA cleanup levels. Gasoline concentrations detected in soils sampled from the bottom of the excavation for Tanks 1 and 2 (at a depth of 14 feet), were below cleanup levels. However, benzene concentrations in this sample exceeded cleanup levels. No concentrations of benzene were detected in any of the other samples.

No gasoline or gasoline constituents were detected in the samples collected from the soils removed from the upper 4

feet of the excavations. These were soils which did not appear to be contaminated with petroleum hydrocarbons and were stockpiled on site.

Only gasoline-range hydrocarbon concentrations were detected in the soils sampled during this study.

PRELIMINARY CONCLUSIONS

Observations during the removal of the tanks and subsequent laboratory analyses indicate that the soils proximal to all three of the removed tanks are contaminated with levels of gasoline petroleum hydrocarbons that exceed Washington MTCA cleanup guidelines. The contamination appears to extend from 4 feet in depth to 12 or 14 feet in depth. No fuel oil contamination was identified in the soils from the excavation where the fuel oil tank was removed, even though the tank was observed to contain pin holes. If gasoline from the gasoline tank (Tank 1) extended as far as Tank 3, which is located more than 50 feet to the north, then it is highly probable that contamination extends under the building.

SUPPLEMENTAL ENVIRONMENTAL STUDIES

Because contamination was anticipated to extend under the existing building, additional exploration was considered necessary to define the extent of the contamination so that proper remediation measures could be developed. Previous site exploration by Environmental Associates, Inc. in June 1992, found no hydrocarbon concentrations exceeding cleanup limits in the soils or groundwater samples collected from boreholes located adjacent to the tanks and the eastern or front side of the building. However, their tests were primarily for diesel contamination.

Plans for Exploration Under Building

Potential exploration techniques included borings with portable equipment inside the building, limited backhoe exploration from outside the building, or later exploration when the building is demolished. A limited exploration using an extendahoe was chosen to obtain timely information at a reasonable cost.

On September 2, 1992, we arrived on site to conduct an exploration in an attempt to define the extent of contamination under the existing building. Because the building was reported to be supported on piling, excavating under the footings and floor slab was considered acceptable and the potential for building damage low. Using both backhoe and hand methods we expected to be able to explore at least 5 feet under the building. Based on the previous drilling and experience with similar spills from small tanks, this extent of exploration was considered to be adequate.

Two Supplemental Test Pits

Prior to extending the tank removal excavations under the building we excavated a test pit along the western fence about 28 feet from the southern building wall. This excavation encountered gasoline contamination from 4 feet in depth to about 12-14 feet in depth--almost identical to the contamination encountered in the tank removal excavations. Field analysis identified gasoline vapors measured in headspace at approximately 600 parts per million (ppm). An additional test pit was excavated in the northwestern corner of the site 14 feet from the north fence and 6 feet from the west fence. Similar conditions were encountered in this excavation with contamination encountered at about 4 feet and extending to about 12-14 feet in depth. It appeared to be concentrated within the old landfill debris. Based on the test pit information, the area of contamination appears to extend throughout the area of the parking lot (62 by 120 feet) behind the building and an unknown distance under the building and outside the property boundaries.

Previous Off-Site Exploration

As part of an environmental study of the property across Aloha Street to the north, Earth Consultants Inc. (ECI) installed three monitoring wells in Aloha Street. Two of these wells, located north of the building on the subject property, identified hydrocarbon contamination that decreased downgradient--toward the north/northeast. Contamination was not identified in monitoring wells installed in Aloha Street northwest of the subject property or in a well across Westlake Avenue to the east.

CONCLUSIONS

Based upon the information developed as a result of this study, it appears that soils proximal to the former USTs on

this site were contaminated by off-site sources, most likely located upgradient to the west. Any potential contamination from the on-site gasoline tank would have a very low probability of being able to migrate upgradient enough to be encountered in the test pits excavated along the western fence and in the northwestern corner of the property. Also the contamination in the test pits was first encountered at an elevation that was equal to or above the tops of the removed tanks.

ECI monitoring wells located in Aloha Street partially define the northern limits of the contamination plume to northeast of the site parking lot. Wells located west of the alley on west side of the site did not detect contamination.

Presently, as it is located underneath buildings and paved surfaces, the gasoline contamination plume does not appear to be an immediate health threat. The paving prevents human exposure to the contaminated soil and the plume does not appear to extend across Westlake Avenue or to approach Lake Union. Groundwater is not utilized in the area.

The following are issues that will need to be answered and further information that may need to be collected to address the condition of the site:

Limitations to Data Base

1. The source for the gasoline contamination has not been identified.

2. The extent of the contamination plume has not been defined.

Environmental - Legal Issues

1. Who are all the potentially liable parties?

2. How to pay for cleanup.

3. Design of an effective remediation method.

PRELIMINARY RECOMMENDATIONS

There are several approaches to cleanup that should be carefully considered. The options range from the possibility of taking no action at all to a coordinated group effort.

No Action

Because the contamination on the site is not a current human health threat through soil contact exposure or groundwater, the concern level by the WDOE will probably be low. According to our contacts with WDOE personnel, their immediate concern is to the health and safety of contractors who could have exposure during future earthwork construction. They are also concerned during any sales, that there is full disclosure of the potential problem to any prospective buyer. The problem and concern regarding cleanup lies in the number of buildings, streets, and utilities located above the contaminated area.

On-Site Cleanup

An individual cleanup action can be conducted for this site. In this activity WDOE has no official input or control. However, WDOE would review the final report and pass judgement on the project. There is no final acceptance and the site may be reopened for additional activities at the discretion of the state. Technologies considered for this site include microbiologic and vapor extraction methods. Installation of the chosen remediation technology would be most cost effective at the time of building demolition. The eventual cleanup of the site is limited if the contamination source is off-site and not controlled.

Group Cleanup

Another method of remediating the site is through a consent decree between the State of Washington, WDOE, and the potentially liable parties (PLPs). This action is administered by WDOE and would include participation of all parties involved with the contamination plume. Some state or federal matching funds may be available. Costs generally exceed individual actions by several times, but it is often the only way to involve a reluctant landowner in the remediation process.

AVAILABLE CLEANUP TECHNOLOGIES

One cleanup method is microbiological injection, or augmentation of existing organisms that ingest petroleum products as a natural part of their life process. This

process requires wells or some other way of getting the organisms into contact with the contaminated media. Though considerable time is required for final cleanup, there appears to be a minimal production of objectionable byproducts, and the activity appears to be able to proceed even under slabs and pavement. Costs vary with the type, concentration and amount of contamination present.

Another method is thermal desorption, which heats the soil to evaporate or burn the contaminating hydrocarbons. The soils are heated to 300-700 degrees with the off gasses reheated at higher temperatures. The method is very effective for gasoline contamination and the treated soils may be immediately returned into the site excavation.

Soil venting or vapor extraction involves the installation of wells or a system of horizontal piping in the area of soil contamination. An air blower is used to draw vapors out of the ground. Off gasses may be treated or vented to the air. This technology is effective for gasoline but not for diesel. The effectiveness is also dependent on the soil permeability (i.e. it is better in sand than in fine-grained soils).

The contaminated soils may also be excavated and removed from the site for off-site treatment or disposal. Liability for off-site disposal, however, remains with the owner for life. Costs include excavation, hauling, treatment/disposal fees, and replacement soil placed at the site.

There are other potential treatment methods but this is a review of those that are most practiced in the Seattle area. All costs are dependent on the amount of material to be remediated. More information is required prior to any effective analysis leading to a choice of remediation method.

INFORMATION REQUIRED

To make informed decisions regarding the site, more exploration is required. We know that there is gasoline contamination in the soil at 4 to about 14 feet in depth throughout the parking area of the site. It would be helpful to have information farther south and west of the parking

area. Since groundwater contamination was indicated in the two wells in Aloha Street, additional groundwater studies are needed. A drilling program including at least two borings that are developed as monitoring wells in the alley to the west of the site appears to be a logical first step in understanding the potential causes and extent of the contaminant plume. Any exploration of contamination under the present building should be deferred until after building demolition.

LIMITATIONS

This current status letter has been prepared for specific application to this project in a manner consistant with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in your request. No other warranty is expressed or implied.

If new information is developed in future site work which may include excavations, borings, studies, etc., Geotech Consultants, Inc. should be allowed to reevaluate the conclusions of this report and to provide amendments as required.

We understand at this period of the project that there are probably more questions than answers. It is our approach to attempt to gather information in stages in order to control costs.

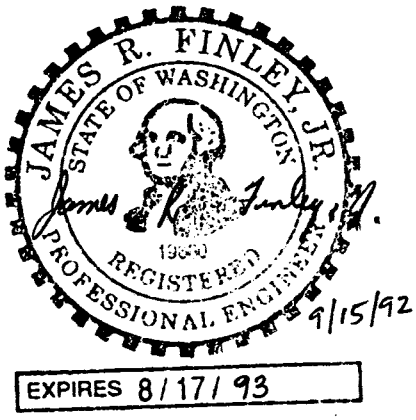
We trust this information is adequate for your present planning activities. If you have any questions or if we may be of further service, please do not hesitate to contact us.

Respectfully Submitted,

GEOTECH CONSULTANTS, INC.

John Cole by JFC.

John F. Cole
Senior Environmental Geologist



James R. Finley, Jr., P.E.
President

Attachments: Table A, Laboratory Results
Plate 1, Vicinity Map
Plate 2, Site Exploration Plan
Removal Documentation (8)
Laboratory Report (6)

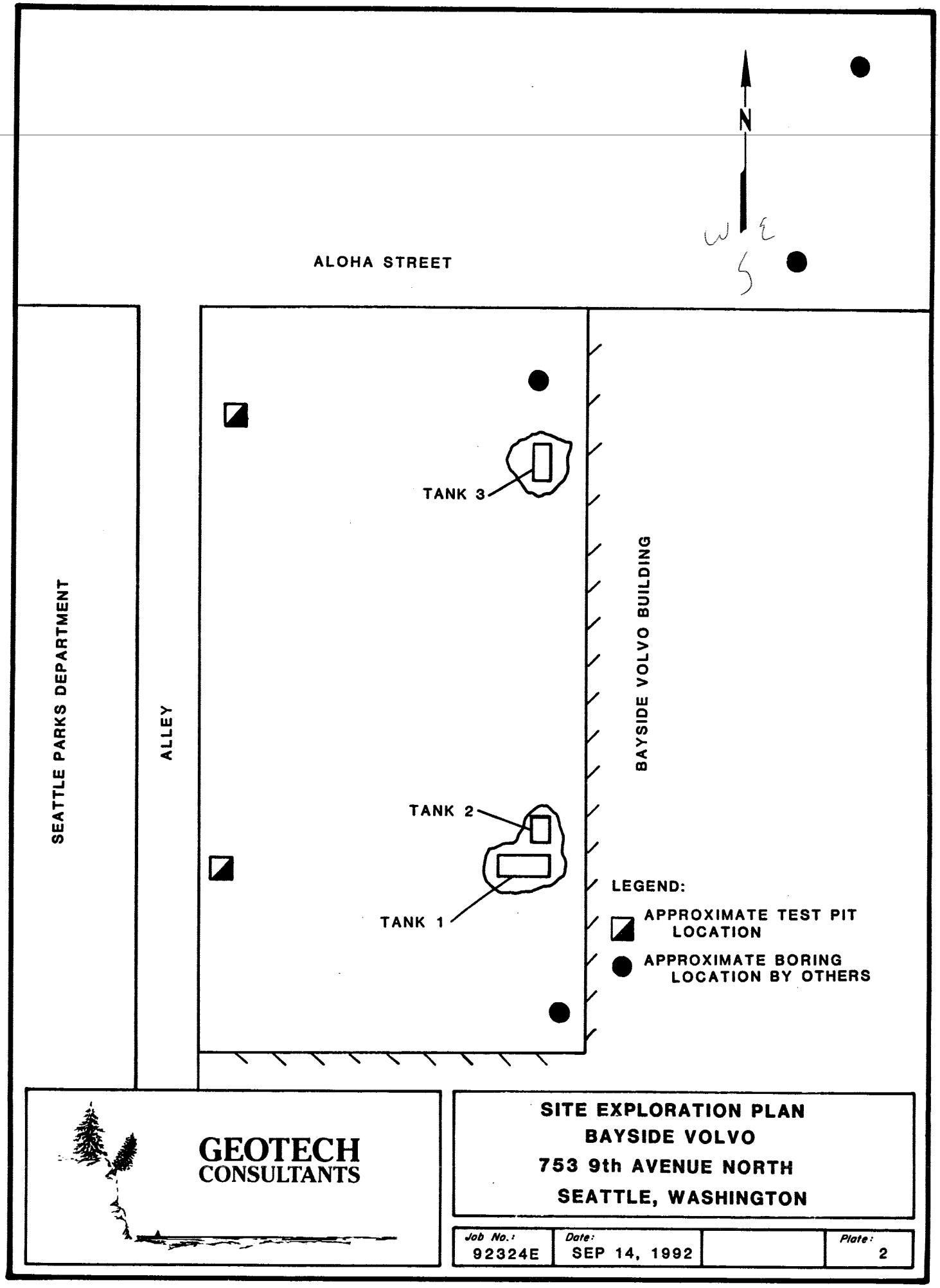
TABLE A: LABORATORY RESULTS

Sample #	Location	Analyte	Concentration
T12-SPLS1	Excavation for Tanks 1 and 2, 7-foot depth	TPH-gas	3,000 ppm
		B	<250 ppb
		T	1,000 ppb
		E	22,000 ppb
		X	111,000 ppb
T12-SPLS2	Excavation for Tanks 1 and 2, 14-foot depth	TPH-gas	80 ppm
		B	600 ppb
		T	60 ppb
		E	920 ppb
		X	2,240 ppb
T12-CL1	Excavation for Tanks 1 and 2, upper 4 feet of soil	TPH-gas	<50 ppm
		B	<50 ppb
		T	<50 ppb
		E	<50 ppb
		X	<50 ppb
T3-SPLS2	Excavation for Tank 3, 7.5-foot depth	TPH-gas	1,700 ppm
		B	<50 ppb
		T	1,600 ppb
		E	4,600 ppb
		X	9,500 ppb
T3-CL1	Excavation for Tank 3, upper 4 feet of soil	TPH-gas	<50 ppm
		B	<50 ppb
		T	<50 ppb
		E	<50 ppb
		X	<50 ppb
		E	<1 ppb
		X	<1 ppb

Cleanup guidelines as published in the Model Toxics Control Act (MTCA), chapter 173-340 WAC:

Soil	
for TPH, gasoline range	100 ppm
for BTEX	B< 500 ppb
	T< 40,000 ppb
	E< 20,000 ppb
	X< 20,000 ppb

Notes: B denotes benzene
T denotes toluene
E denotes ethylbenzene
X denotes total xylenes
ppm denotes concentration in parts per million
ppb denotes concentration in parts per billion



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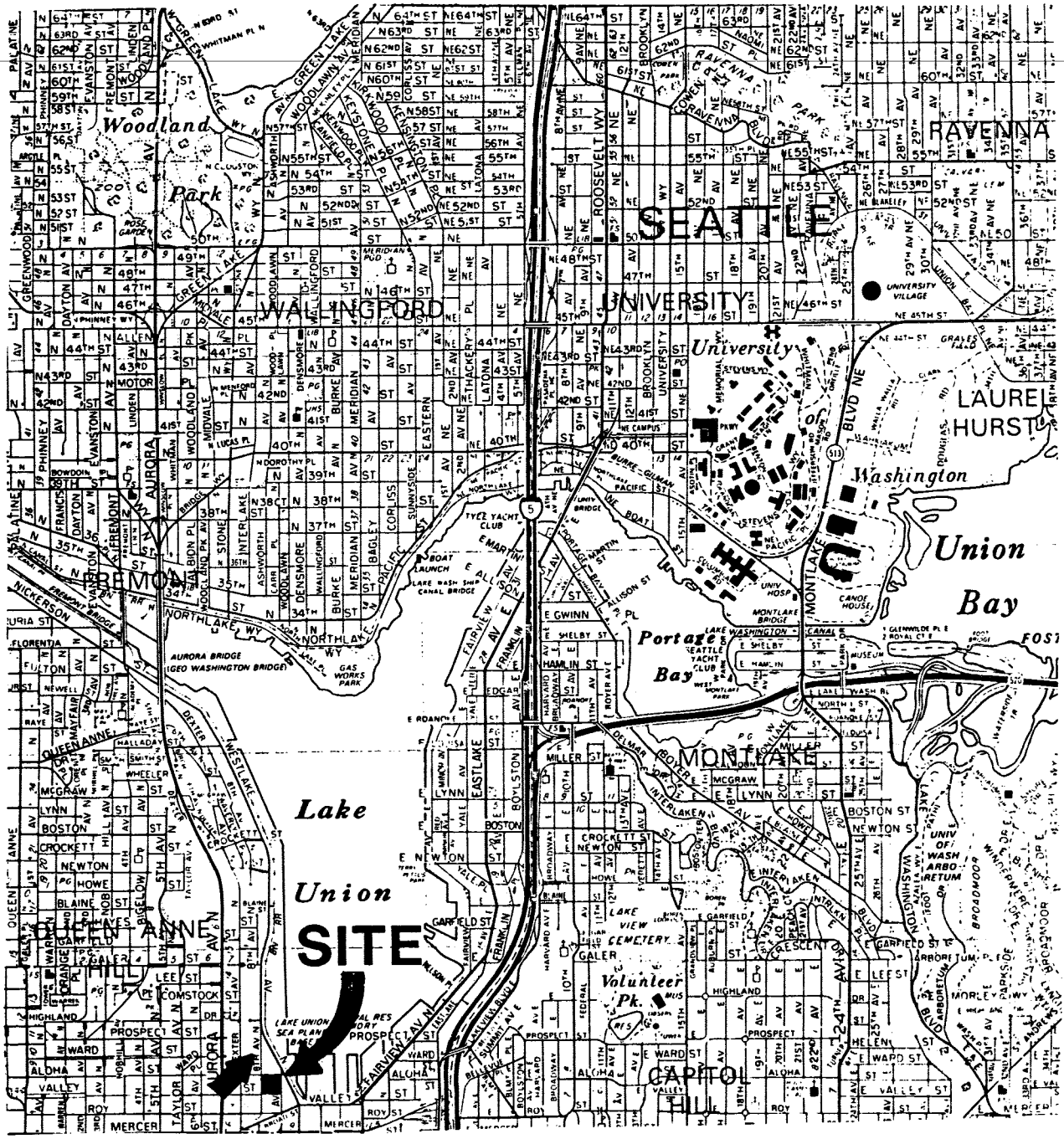
SITE EXPLORATION PLAN
BAYSIDE VOLVO
753 9th AVENUE NORTH
SEATTLE, WASHINGTON

Job No.:	Date:		Plate:
92324E	SEP 14, 1992		2



LEGEND:

APPROXIMATE DIRECTION OF SHALLOW GROUNDWATER FLOW NEAR SITE

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VICINITY MAP
753 9th AVENUE NORTH
SEATTLE, WASHINGTON

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