Tac Sea Motel
SITE 3

AGI TECHNOLOGIES
A CDM COMPANY

A Report Prepared For:

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FINAL REPORT
CLEANUP ACTION PLAN
FORMER TAC-SEA MOTEL
17024 INTERNATIONAL BOULEVARD
SEATAC, WASHINGTON

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1.0 INTRODUCTION

This cleanup action plan (CAP) has been prepared to document plans for cleanup actions to address chlorinated solvent contamination in soil and groundwater at the former Tac-Sea Motel (the site) in SeaTac, Washington. This cleanup is being performed in compliance with the Model Toxics Control Act (MTCA) (Chapter 173-340). AGI Technologies (AGI) prepared this CAP on behalf of the property owner, Linda Lee, and the site lessee/developer, Gateway Investment LLC (Gateway). This CAP was prepared as a part of Gateway's application for a routine consent decree.

A remedial investigation (AGI, 1999a) and Feasibility Study (AGI, 1999b) were completed for the site to assist in acquisition and redevelopment of the property and to support preparation of the CAP. These documents provide a thorough description of the site, nature and extent of contamination, and remedial alternatives considered. Cleanup actions are required to comply with MTCA and support Gateway's redevelopment of the site. The purposes of this CAP are to: (1) describe the site, including a summary of its history and the nature and extent of contamination as determined by the RI; (2) identify site specific cleanup levels and points of compliance; (3) summarize the remedial alternatives presented in the FS; and (4) identify and describe the selected alternative for site remediation.

2.0 SITE SETTING AND BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

2.1.1 Location

The site is located in the City of SeaTac, Washington, northeast of the intersection of International Boulevard and South 171st Street as shown on **Figure 1**. The motel address was identified as 17024 International Boulevard. In the past, even numbered addresses between 17014 and 17056 also have been identified with the former motel (Environmental Associates, Inc., 1997). In addition, the address of a former house located on a portion of the site (Lot 9) was 17041 29th Avenue South.

2.1.2 Land Use and Site Description

The site currently occupies a portion of a 5-acre pay parking lot that supports the nearby SeaTac International Airport. The parking lot, which is operated by Master Park, is asphalt paved with associated curbing, landscaping, and stormwater controls and an office building. Stormwater controls include catch basins and an underground stormwater detention/wet vault. **Figure 2** shows the site boundaries with respect to the parking lot boundaries and features.

2.2 SITE HISTORY

The site was redeveloped into the pay parking lot between August and December 1998. **Figure 3** shows site features prior to redevelopment. A 13,000-square-foot single story rectangular structure onsite was demolished in late August 1998. Tac-Sea Motel and SeaTac Food Mart were the most recent tenants of the structure. The motel vacated the site in May 1998. The food mart vacated the site in August 1998. The property also was used for pay parking until the motel vacated the site. Asphalt paved parking extended east and west of the building; unpaved parking extended south of the building to 171st Street. On the north side, the building extended essentially to the property line.

AGI's understanding of the site's development and occupant history is based on a Phase 1 EA prepared by Environmental Associates, Inc. (1997). From about 1949 to the early 1950s, a small real estate office was at the southwest corner of the site. In 1953, the real estate office was replaced by the building that was most recently demolished. Several additions were constructed onto the building between 1953 and 1960. The building was initially developed as a strip mall and was converted to a motel between 1980 and 1985. Most occupants of the strip mall, including a restaurant, drug store, barber shop, doctors clinic, variety store, appliance store, airport grocery, liquor store, bar, pet shop, and bank, were of no apparent environmental concern. However, chemical use assumed to be associated with three tenants, Tux Cleaners, Jewel Cleaners No. 2, and Douglas Printing, led to suspicions of subsurface contamination. Individually, these tenants occupied the unit addressed as 17038 Pacific Highway South between approximately 1955 and 1980.

2.3 FUTURE SITE USE

The site's current and short-term use is as a pay parking lot. Future development plans include construction of a hotel complex on the property.

3.0 SITE CHARACTERIZATION SUMMARY

3.1 PRE-DEMOLITION INVESTIGATIONS

Prior to demolition of the building, AGI explored subsurface soil conditions onsite and offsite by drilling 16 boreholes (B1 through B9, MW1 through MW7) at locations shown on **Figure 4.** Soil samples from drilled borings were field screened using an organic vapor meter equipped with a photoionization detector (OVM-PID) to check for the presence of chlorinated volatile organic compounds (VOCs). Selected soil samples were submitted for chemical analysis based in part on field screening results. Monitoring wells were installed in seven of the boreholes and groundwater samples collected from each well were submitted for analysis of VOCs.

The investigation was conducted in a phased approach between January and July 1998; the information gained from prior site work was used to guide the approach for subsequent site work. On January 8 and 9, 1998, boreholes B1 through B6 were drilled around the motel and adjacent parking lot as an initial screening assessment of potential site contamination. The common dry cleaning solvent tetrachloroethene (PCE) was identified in soil from B1 that was drilled in front of the former dry cleaning establishment. On February 6, 1998, B7 was drilled near B1 to evaluate the vertical contaminant profile. At this time, two 45-degree angle borings (B8 and B9) also were drilled underneath the building to evaluate contaminant concentrations immediately under the suspected source area. Monitoring well MW1, expected to be closest to the source area, was drilled and installed on February 20, 1998. Groundwater sampled from MW1 also contained PCE. On March 4 and 5, 1998, three additional onsite monitoring wells, MW2 through MW4, were installed and sampled to establish the gradient and PCE concentrations at the property boundary. On July 20 through 22, 1998, offsite monitoring wells MW5 through MW7 were installed to evaluate offsite migration of PCE.

3.2 POST- DEMOLITION INVESTIGATIONS

On September 4, 1998, one soil sample was collected from each of three shallow test holes (TH1 through TH3) that were dug using a post-hole digger and hand auger. The samples were collected from depths of 2 to 2.5 feet below ground surface (bgs). The test holes were situated under the former dry cleaners in a straight line off a sewer cleanout as shown on **Figure 5.** AGI dug eight test pits (TP1 through TP8) using a trackhoe on September 10, 1998, to further explore contaminant concentrations in potential source areas. Test pits were primarily dug along sewer lines. Test pit locations are shown on **Figure 5.** Test pit depths ranged from 14 to 22 feet below grade. During our test pit exploration, we encountered two septic tanks, one located immediately in front of the former dry cleaners (Tank 1) and the second about 20 feet farther north (Tank 2) as shown on **Figure 5.** During field exploration activities, soils were screened for VOCs at varying depths using an OVM-PID. Selected soil samples were submitted for chemical analysis of chlorinated VOCs based on field screening results and proximity to septic tanks and sewer lines. AGI also collected samples of the water and sludge in each septic tank for analysis of potential chlorinated VOCs.

One 500-gallon underground storage tank (UST1) was discovered during building demolition. Further exploration identified a 300-gallon UST (UST2) about 65 feet north of UST1. UST locations are shown on **Figure 5**. Based on the location and residual contents in the USTs, they were presumed to be heating oil tanks that supplied the original heat source for the building. The tanks apparently had been abandoned when the onsite heat source was converted to natural gas. Able Environmental Consulting Services (Able) removed the USTs on September 10, 1998 with oversight by AGI. Soils in both UST cavities were visibly stained and had a strong hydrocarbon odor. Two soil samples from each excavation were submitted for chemical analysis to establish petroleum types and concentrations.

3.3 INTERIM REMEDIAL ACTIONS

Interim actions were conducted under an Agreed Order to profile and dispose of wastes in the septic tanks and remove petroleum-contaminated soils associated with the USTs. High concentrations of chlorinated solvents were detected in the waste in Tank 1. The chlorinated solvents were apparently from discharges by the former dry cleaners. Liquid waste in this tank was treated using granular activated carbon (GAC) and then disposed at a sewage-treatment facility. The sludge and GAC was solidified and transported offsite for treatment and disposal by incineration. The septic tanks were removed after being emptied and disposed of at a municipal solid waste landfill. Soil samples were collected from the excavation limits and tested for chlorinated VOCs. About 180 tons of petroleum-contaminated soil (PCS) was excavated from the two UST locations and transported to a facility for treatment by thermal desorption.

4.0 INVESTIGATION FINDINGS

4.1 PHYSICAL SUBSURFACE CONDITIONS

Subsurface sediments encountered during the RI consisted of 35 to 60 feet of glacial till, which averaged 53 feet in the immediate vicinity of the former dry cleaning establishment. The till is sandy in nature and typically contains layers of fluvial sediments from 25 to 45 feet bgs. Glacial Advance Outwash sand underlies the till. Groundwater was encountered in the Advance Outwash beginning anywhere between 56 and 80 feet bgs and exists under water-table conditions. The groundwater-flow direction is west to southwesterly **(Figure 6)**. Based on particle-size analysis, aquifer hydraulic conductivity is estimated to range from 4×10^{-2} to 6×10^{-2} centimeters per second. The horizontal groundwater gradient was estimated at 4.5 to 11.6 feet per mile. Linear horizontal groundwater velocity was estimated at 117 to 455 feet per year.

4.2 NATURE AND EXTENT OF SOIL CONTAMINATION

4.2.1 Contaminant Types

Tetrachloroethene (PCE) and its related degradation product *cis*-1,2-dichloroethene (*cis*-1,2-DCE) were detected in soil samples collected onsite. An unrelated VOC, methylene chloride, also was detected in soil samples. Another chlorinated solvent, 1,1,1-trichloroethane (1,1,1-TCA) was detected, in an offsite soil sample. Diesel-range petroleum hydrocarbons were detected at underground storage tank locations.

4.2.2 Contaminant Concentrations and Delineation

VOC analytical results for soils are summarized in **Tables 1** through **3**. RI and interim actions identified PCE in site subsurface soils underneath and around the front of the former dry cleaners' unit, especially near sewer lines, and around septic tanks. Detected concentrations range from 0.012 to 0.65 milligram per kilogram (mg/kg). PCE concentrations progressively decrease after 25 feet bgs, but PCE was still detected at a depth of 65 feet bgs (0.013 mg/kg). *Cis*-1,2,-DCE was detected in only one soil sample at a low concentration. Based on field screening and chemical analytical results, we estimate soils containing low concentrations of PCE exist over an area of about 70 by 100 feet, as shown on **Figure 7**, to depths as much as 70 feet. Methylene chloride was detected in eight of the ten samples analyzed from test pits. Methylene chloride is a common laboratory contaminant and the laboratory noted that this is the likely cause of these detections. A low concentration of 1,1,1-TCA was detected in one deep soil sample collected from an offsite borehole and appears to be unrelated to onsite VOC contamination.

Diesel-range petroleum hydrocarbon concentrations in soils from the UST excavations ranged from 3,900 to 10,000 mg/kg (**Table 4**). Samples collected from the excavation limits following PCS excavation contained up to 150 mg/kg diesel, which is less than the State of Washington Model Toxics Control Act (MTCA)[1] Method A cleanup level of 200 mg/kg. Based on confirmatory sampling, residual petroleum hydrocarbon concentrations meet criteria for a MTCA Method A cleanup and no further actions will be required with respect to releases from former heating oil UST1 and UST2.

4.3 NATURE AND EXTENT OF GROUNDWATER CONTAMINATION

4.3.1 Contaminant Types

PCE and its degradation products, trichloroethene (TCE) and *cis*-1,2-DCE, were identified in groundwater. Chloroform and 1,1,1-TCA also were detected. Petroleum hydrocarbons have not yet been tested in groundwater, but will be during the next sampling round. To date, groundwater has not exhibited evidence of petroleum hydrocarbon contamination (i.e. odor or sheen). Based on the physical properties of diesel, depth to groundwater, and the success of interim remedial actions, petroleum hydrocarbon contamination is not expected to have reached groundwater.

4.3.2 Contaminant Concentrations and Delineation

PCE is present in groundwater at onsite and offsite well locations. PCE concentrations detected onsite range from 83 to 350 micrograms per liter (µg/L). Detected PCE concentrations in offsite wells south of the site range from 6 to 13 µg/L. TCE, *cis*-1,2-DCE, and chloroform also were detected at low concentrations in onsite wells. Although TCE and *cis*-1,2-DCE are likely to be degradation products of PCE, the source of chloroform is uncertain. Volatile organic compounds in groundwater are summarized in **Table 5**.

1,1,1-TCA was only detected at a low concentration in the farthest upgradient well. Based on the location and low concentration detected, 1,1,1-TCA appears to be a minor contaminant in the general site area and is not related to historical onsite activities.

Based on groundwater-flow directions and contaminant concentrations in wells south of the site, the PCE plume is expected to be migrating primarily toward the west. Due to access restraints, the offsite contaminant plume to the west has not yet been physically delineated. Based on scientific analysis and judging by the amount of lateral migration to the south, but lack of detected contamination in MW5 to the southwest, we estimate the contaminant plume may extend 250 to 500 to the west. This estimate will be further qualified by mathematical modeling when additional onsite wells have been installed and sampled. If and when possible, physical sampling will be conducted to confirm scientific calculations.

[1] MTCA promulgated by Washington Administrative Code 173-340.

5.0 CONTAMINANTS OF CONCERN FOR CLEANUP ACTIONS

The selection of contaminants of concern (COC) is a stepwise process that evaluates and organizes site data to identify chemicals that may pose risks to human health and the environment. The selection of COCs may reduce the number of chemicals that are considered during development of cleanup alternatives, so that risk management and remedial design decisions may focus on specific chemicals that have the potential to pose significant risk.

COC screening criteria was accomplished based on MTCA guidelines (173-340-708). Each media was screened using the following criteria in the order listed.

- Evaluation of data quality and its effect on data usability.
- Frequency of detection.
- Comparison to chemical-specific applicable and relevant and appropriate requirements (ARARs).
- Evaluation of cross-media concerns and re-evaluation of ARARs.

5.1 CONTAMINANTS OF CONCERN IN SOIL

PCE, 1,1,1-TCA, *cis*-1,2-DCE, methylene chloride, and diesel were detected in one or more soil samples analyzed during the RI. With respect to the potential for direct exposure, Ecology's *Guidance on Sampling and Data Analysis Methods* (1995) Section A2.2 states that the concentrations of all hazardous substances in each soil sample should be compared directly with cleanup levels. The locations of samples that exceed one or more cleanup levels are used to delineate areas requiring a decision on the need for remediation. For protection of groundwater, Section A3.3.2.4 of the guidance states that Method A or Method B soil cleanup levels can be used. Method B cleanup levels are calculated by multiplying groundwater cleanup levels by 100 (Ecology, 1995). **Table 6** presents a summary of contaminants detected in site soil including the maximum concentration detected, number of detections, and number of samples analyzed. These values are then compared against Method A cleanup levels and Method B formula values provided in the MTCA Cleanup levels and Risk Calculations (CLARC) tables.

PCE is the only chemical retained as a contaminant of concern in soils. PCE is a contaminant of concern due to its frequency of detection (greater than 50 percent of the samples analyzed); one sample exceeded the MTCA Method A cleanup level of 0.5 mg/kg; ten samples exceeded the MTCA Method B cleanup level of 0.0858 mg/kg for protection of groundwater (carcinogenic); and because groundwater is impacted.

1,1,1-TCA was eliminated as a contaminant of concern because only 2 percent (1 in 44) of the samples contained this chemical; it was not detected in onsite samples; and it did not exceed MTCA Method A or B cleanup levels.

Cis-1,2-DCE was eliminated as a contaminant of concern because only 2 percent (1 in 44) of the samples contained this chemical; it did not exceed its MTCA Method B cleanup level; and, concentrations detected in groundwater do not exceed the Method B cleanup levels (Method A cleanup level not available). Further, any remedial actions conducted with respect to PCE also would remove *cis*-1,2-DCE because of its similar characteristics (i.e. volatility) and because it was detected in the same area as PCE impacted soil.

Methylene chloride was eliminated as a contaminant of concern because its presence is believed to be due to laboratory contamination. Notations on the laboratory report indicate that methylene chloride detections were likely due to laboratory background contamination. The method blank that was analyzed during this set of soil samples did not contain methylene chloride, however, the method blank is analyzed at the beginning of the day. Although the laboratory takes every precaution to avoid cross contamination, methylene chloride contamination can occur later in the day when extractions using this chemical are occurring. The maximum methylene chloride concentration was 0.014 µg/kg, only 0.004 µg/kg greater than the detection limit. This is considered reasonable as laboratory background contamination. Further substantiation that methylene chloride is due to laboratory contamination is that it was detected in only one set of soil samples, whereas PCE was detected in multiple sets of soil samples.

Finally, diesel was eliminated as a contaminant of concern because removal of the USTs and cleanup of associated petroleum hydrocarbon contaminated soils occurred as an interim remedial action in compliance with MTCA and Guidance for Remediation of Petroleum Contaminated Soils (Ecology, 1994). Compliance sampling conducted after completion of cleanup actions indicates that remaining onsite soils do not exceed the MTCA Method A cleanup level.

5.2 CONTAMINANTS OF CONCERN IN GROUNDWATER

PCE, trichloroethene (TCE), cis-1,2-DCE, chloroform, and 1,1,1-TCA were detected in groundwater. **Table 6** presents a summary of contaminants detected in groundwater including the maximum concentration detected, number of detections, and number of samples analyzed. Federal drinking-water standards (maximum contaminant levels [MCL]) also are included in **Table 6.**

PCE is a contaminant of concern in groundwater. PCE concentrations were detected in 73 percent of groundwater samples analyzed and exceeded MTCA Method A and B cleanup levels and Federal drinking-water standards.

1,1,1-TCA was eliminated as a contaminant of concern. This chemical was only detected in 1 out of 15 groundwater samples. Further, it was detected in an upgradient well and appears to be due to an offsite contaminant source. The concentration of 1,1,1-TCA did not exceed Method A or B cleanup levels or its Federal drinking-water standard.

TCE and *cis*-1,2-DCE were eliminated as a contaminant of concern. These two chemicals are likely to be degradation products of PCE. Neither TCE nor *cis*-1,2-DCE exceeded MTCA Method A or B cleanup levels or Federal drinking-water standards. TCE and cis-1,2-DCE are found within the PCE plume and they share similar chemical characteristics with PCE (i.e. volatility). Therefore, remedial actions conducted for PCE in groundwater also will decrease concentrations of these chemicals.

Chloroform has been detected in 47 percent of groundwater samples, but only slightly exceeded the Method B carcinogenic cleanup level of 7.17 µg/L in one sample (9.3 µg/L), but not in a subsequent sample collected from the same well. Federal drinking-water standards were not exceeded. Chloroform was eliminated as a contaminant of concern because exceedances with respect to State cleanup levels were minor and cleanup actions for PCE also will decrease or eliminate chloroform.

6.0 PROPOSED CLEANUP LEVELS AND POINTS OF COMPLIANCE

6.1 INTRODUCTION

MTCA requires that cleanup levels be identified for hazardous substances present at a site. Cleanup levels are defined as the concentration of each hazardous substance that is protective of human health and the environment. In addition, MTCA requires determining the location(s) on the site where the cleanup levels are to be attained to be protective of human health and the environment. These locations are termed points of compliance. The points of compliance are media and exposure route specific.

Appropriate cleanup levels and points of compliance for the site were determined by:

- Identifying potential human and ecological receptors through characterization of contaminant transport and potential receptor exposure pathways.
- Compiling relevant State and Federal ARARs.
- Assessing the site location and related zoning considerations, as well as features of the planned development.

MTCA provides three basic methods for establishing cleanup levels: Method A, Method B, and Method C. Method A is designed for sites undergoing routine cleanup actions and at sites that involve relatively few hazardous substances [WAC 173-340-700(3)(a)]. Method B is applicable to all sites and is considered the standard method for determining cleanup levels. Method B uses risk-based formulas with conservative exposure assumptions. Method C is a conditional method for determining cleanup levels. This method also uses risk-based formulas, but is based on industrial exposure scenarios.

Method A was used to establish cleanup levels at this site because the circumstances of site contamination fit the criteria for using this method. The site is relatively simple in that there is one primary contaminant of concern, PCE, for which a Method A cleanup level has been established.

6.2 SOIL CLEANUP LEVEL AND POINT OF COMPLIANCE

The Method A cleanup level for PCE in soil is 0.5 mg/kg and is based on protection of groundwater. MTCA specifies that the point of compliance for soil cleanup based on protection of groundwater is throughout the site [WAC 173-340-740(6)]. Only one soil sample analyzed during the RI exceeded the cleanup level for PCE. However, because PCE is ubiquitous in soils near the former dry cleaning establishment, it may be a continuing contaminant source for groundwater.

6.3 GROUNDWATER CLEANUP LEVEL AND POINT OF COMPLIANCE

The Method A cleanup level for PCE in groundwater is 5 µg/L and is based on State and Federal drinking-water standards. The shallow aquifer underlying the site is considered potable and is moderately productive. AGI conducted a comprehensive research effort and did not identify existing drinking water wells likely to be impacted by offsite migration of PCE from the site. However, the impacted aquifer does represent a potential source of drinking water. MTCA specifies that the point of compliance for groundwater cleanup is the point or points where groundwater cleanup levels must be attained. MTCA specifies that the groundwater cleanup levels shall be attained in all groundwater from the point of compliance to the outer boundary of the hazardous substance plume [WAC 173-340-720(6)]. Groundwater exceeds the MTCA Method A cleanup level onsite and is migrating offsite at concentrations that exceed the cleanup level. The point of compliance for groundwater will be throughout the hazardous substance plume.

For offsite areas that are not accessible, confirmation of achievement of the points of compliance will be conducted using scientific methods, such as attenuation and contaminant transport modeling. The model or models used would be dependent upon the available data and the currently available models at the time of the assessment. Currently available models that may be suitable include: Biochlor, a natural attenuation model and database for chlorinated solvent sites; RT3D, a three dimensional reactive transport model that predicts degradation of PCE and its decay products via both anaerobic and aerobic pathways, and; MT3D, a three dimensional model that simulates advection, dispersion, and chemical reactions of dissolved constituents in groundwater. Both the RT3D and MT3D models are integrated within the Department of Defense Groundwater Modeling System (GMS).

7.0 SUMMARY OF REMEDIAL ALTERNATIVES

MTCA requires that all cleanup actions protect human health and the environment, comply with cleanup standards, comply with applicable State and Federal laws, and provide for compliance monitoring. In addition, the cleanup action conducted must use permanent solutions to the maximum extent practicable, provide for reasonable restoration time frame, and consider public concerns during public comment.

The following objectives were developed to meet MTCA cleanup action requirements.

- Limit stormwater infiltration to minimize continued leaching of residual contaminants into groundwater.
- Reduce residual contaminant concentrations in soils to further reduce continued impacts to groundwater.
- Reduce contaminant concentrations in the shallow aquifer to reestablish it as a potential source of drinking water.

Three potential remedial alternatives were evaluated as a part of the feasibility study process. This section summarizes the remedial alternatives identified for the former Tac-Sea Motel site.

7.1 ALTERNATIVE 1 – INSTITUTIONAL CONTROLS

Alternative 1 includes process options to limit contaminant migration and monitor environmental impacts but does not actively reduce site contamination. Process options include surface-water controls and capping to limit infiltration and precipitation, thereby slowing contaminant leaching. Remediation would occur only by natural attenuation in anticipation that natural processes would gradually reduce contaminant concentrations in groundwater. Groundwater monitoring would be conducted to satisfy compliance monitoring requirements.

The cost range for Alternative 1 was estimated to be $150,000 to $185,000.

7.2 ALTERNATIVE 2 – IN SITU BIOLOGICAL GROUNDWATER TREATMENT

Alternative 2 includes stormwater controls, capping, and groundwater monitoring, the same as for Alternative 1. In addition, *in situ* processes to enhance the anaerobic biological degradation of chlorinated VOCs would be implemented. Research suggests biologic transformation of the chlorinated solvents occurs primarily by anaerobic means. PCE and TCE can be microbially degraded as the primary substrate or through co-metabolism. Specifically, a lactic acid product would be added to the aquifer. The indigenous anaerobic microbes metabolize the product, thereby producing hydrogen. The resulting hydrogen can be used by reductive dehalogenators that are capable of dechlorinating VOCs. Continuous hydrogen production resulting from the slow release of lactic acid continues to eliminate oxygen in the treatment area so anaerobic activity continues.

The cost range for Alternative 2 was estimated to be $260,000 to $325,000.

7.3 ALTERNATIVE 3 – PHYSICAL SOIL AND GROUNDWATER TREATMENT

Alternative 3 includes stormwater controls, capping, and groundwater monitoring, the same as for Alternative 1. However, Alternative 3 focuses on physical-soil and groundwater-treatment methods. Process options include source control using soil-vapor extraction and onsite treatment of groundwater by air sparging with vapor extraction.

The cost range for Alternative 3 was estimated to be $225,000 to $285,000.

8.0 SELECTED CLEANUP ACTION

8.1 DESCRIPTION OF THE SELECTED ALTERNATIVE

Alternative 3, physical soil and groundwater treatment, is the selected remedial alternative. As described previously, recent onsite redevelopment included placement of new pavement and installation of stormwater controls across the entire site and adjacent property associated with the parking lot. These features will serve as institutional controls. Alternative 3 also includes source control using soil-vapor extraction and onsite treatment of groundwater by air sparging with vapor extraction. Extraction wells will be installed onsite for purposes of soil vapor extraction and air sparging. Soil vapor extraction wells will be screened within the unsaturated zone. Air sparging wells will be screened within the saturated zone. Air will be injected into the groundwater to volatilize VOCs in the process transferring them to the vapor phase. Vacuum applied to top of air sparging wells and soil vapor extraction wells will draw off VOCs for direct discharge to the atmosphere or, if necessary, pretreatment prior to discharge. Specific details of the system design are included in the Engineering Design included as **Appendix A**.

8.2 PERMITTING

Redevelopment required completion and approval of a State Environmental Policy Act (SEPA) checklist, grade and fill permit, and building permit. Installation of the VES will require meeting substantive permit requirements with the Puget Sound Air Pollution Control Authority notice of construction (NOC). An electrical permit will be required through the City of SeaTac for construction of the system.

8.3 COMPLIANCE WITH STATE AND FEDERAL LAWS

According to MTCA, cleanup actions must comply with applicable State and Federal laws and regulations. In addition, MTCA allows advisories, guidelines, proposed standards, and regulations that are not directly applicable or relevant and appropriate, to be considered when selecting cleanup actions. ARARs and other information to be considered regarding site cleanup are presented in **Table 7**.

8.4 INSTITUTIONAL CONTROLS

Institutional controls are measures undertaken to limit or prohibit activities that may interfere with the integrity of the cleanup action or which may result in exposure to hazardous substances at a site (WAC 173-340-440). Site redevelopment included features recognized as institutional controls. These include paving and stormwater controls. The entire site was paved except for minor areas of landscaping. Stormwater runoff will be intercepted by storm drain catch basins which in turn are conveyed by underground piping to a detention/wet vault and then finally to the city storm drain system. The pavement and storm drain system minimize potential infiltration of surface water and therefore potentially reduces mobility of contaminants in site soils. Stormwater controls are shown on **Figure 2**. Because no residual contamination exceeding cleanup levels will be left after implementing this cleanup, deed restrictions will not be required.

8.5 COMPLIANCE MONITORING

MTCA (WAC 173-340-410) specifies compliance monitoring requirements for cleanup actions. Compliance monitoring includes three monitoring elements: performance, protection, and confirmation as described below.

8.5.1 Performance Monitoring

Performance monitoring confirms that cleanup actions are achieving the desired results. For this project, performance monitoring will consist of quarterly groundwater monitoring and monthly Air sparging/VES monitoring to evaluate whether remedial actions are resulting in decreasing contaminant concentrations. A Sampling and Analysis Plan (SAP) including the Field Sampling Plan and Quality Assurance Project Plan are included as **Appendix B**. Performance monitoring also will include inspection of the asphalt cap and surface-water drainage controls. A surface-water management and pavement maintenance plan is included in **Appendix C**.

8.5.2 Protection Monitoring

Protection monitoring confirms that human health and the environment are adequately protected during site activities. Routine protection monitoring will be conducted in accordance with the site Health and Safety Plan during and after installation of the remediation system (e.g. field screening for VOCs during drilling and system operation). A Health and Safety Plan for remediation system installation and monitoring is included in **Appendix D**.

8.5.3 Confirmation Monitoring

Confirmational monitoring will confirm the long-term effectiveness of the cleanup once performance monitoring indicates cleanup levels have been attained. Confirmational monitoring will consist of groundwater monitoring for 2 to 3 years after the remediation system has been shut down. Confirmational monitoring will be conducted in accordance with the SAP (**Appendix B**).

8.6 MAINTENANCE

Routine inspection, monitoring, and maintenance of the treatment system and engineering controls will be conducted. The remediation system will be monitored on a regular basis, the frequency of which will depend on site-specific conditions. System monitoring typically is scheduled on a monthly basis. Inspection of the asphalt cap and surface-water drainage controls will occur on a quarterly basis as outlined in **Appendix C**. Maintenance of these structures will occur on an as needed basis.

9.0 JUSTIFICATION AND DETERMINATIONS

Alternative 3 addresses remaining contamination issues and meets the substantiative requirements of MTCA for protecting human health and the environment. Also, in conjunction with implementing Alternative 3, site redevelopment has resulted in improved stormwater controls.

9.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Alternative 3 provides good overall protection of human health and the environment because contaminants on the site are addressed with respect to potential human and environmental receptors.

9.2 COMPLIANCE WITH CLEANUP LEVELS

Alternative 3 provides compliance with cleanup levels because contaminants on the site in excess of cleanup levels are removed.

9.3 COMPLIANCE WITH STATE AND FEDERAL LAWS

MTCA, the primary ARAR for this site, should be met with Alternative 3. Other ARARs, such as minimum standards for construction of wells, RCRA disposal restrictions, and air pollution control, will be adhered to during implementation specific tasks.

9.4 COMPLIANCE MONITORING

Requirements for compliance monitoring will be met under Alternative 3 and includes performance, protection, and confirmation monitoring. Groundwater will be sampled and tested to evaluate reduction of contaminant concentrations to cleanup standards. Groundwater monitoring will be conducted quarterly over the course of active remedial activities and for a minimum of 2 years after attainment of cleanup levels. The competency of the pavement cap and surface-water controls also will be checked quarterly during groundwater monitoring rounds. Treatment system monitoring will be conducted to evaluate compliance with emission standards. All work will be conducted in accordance with the project Health and Safety Plan.

9.5 RESTORATION TIME FRAME

Based on our experience and engineering judgement, it would take 5 to 7 years to achieve onsite cleanup levels with Alternative 3. This compares to estimates of greater than 30 years for Alternative 1 and 5 to 10 years for Alternative 2. Alternative 3 is expected to provide the shortest restoration time frame of any of the alternatives. Further, Alternative 3 has been implemented widely on other similar sites, so the estimated time frame is based on previous experience by AGI and others. The conditions for site restoration under Alternative 1 do not appear favorable, based on the lack of degradation products observed in groundwater. The methods outlined in Alternative 2 are not yet widely used. The high productivity and apparently aerobic conditions would also make it problematic and time consuming to change conditions of the aquifer to enhance biodegradation.

9.6 LONG-TERM EFFECTIVENESS

The overall reliability and certainty of success is relatively high. PCE is very amenable to volatilization remediation techniques, therefore, air sparging and VES are considered appropriate. The permeable nature of the aquifer furthers the potential success for air sparging techniques. The low permeability of the till soils will hinder the success of soil vapor extraction; however, due to the low concentrations of PCE, it should be suitable for augmenting air sparging.

9.7 SHORT-TERM EFFECTIVENESS

Workers would face short-term risks during implementation and construction, and while maintaining and monitoring the treatment systems. These risks would be minimized by staffing with properly trained personnel and implementing a site Health and Safety Plan.

9.8 IMPLEMENTABILITY

All technologies under Alternative 3 are well known and have been utilized at numerous other cleanup sites. Numerous suppliers and contractors offer the equipment and expertise to supply and install such equipment.

9.9 COST

The estimated cost for Alternative 3 is $225,000 to $285,000. The next preferable alternative, Alternative 2, was comparable in its cost estimate.

9.10 COST BENEFIT ANALYSIS

Alternative 3 was chosen as the preferred alternative over Alternative 2. It is the higher preferred alternative consistent with WAC 173-304-360. Therefore, a cost-benefit analysis was not conducted.

9.11 PUBLIC PARTICIPATION

Public participation is an integral part of MTCA (WAC-173-340-600). Under MTCA, the public has the opportunity to review and comment at critical stages during the cleanup process. A 30-day comment period will occur before this CAP is finalized. A public meeting may be held during the comment period. At this meeting, the public can receive information, ask questions, and present formal comment on site developments, reports and plans. Public comment is recorded for the Responsiveness Summary.

Once comments are received and the comment period ends, community acceptance will be evaluated. Ecology will then make a final decision and formally select the cleanup action alternative to be used at the site. The Final CAP will then be issued and the remedial design finalized.

10.0 REFERENCES

AGI. 1999a. Draft Final Remedial Investigation, Tac-Sea Motel, 17024 International Boulevard, SeaTac, Washington. Prepared for Linda Lee Property. Project No. 16,180.004. January 7.

AGI. 1999b. Draft Final Feasibility Study, Tac-Sea Motel, 17024 International Boulevard, SeaTac, Washington. Prepared for Linda Lee Property. Project No. 16,180.004. January 7.

Environmental Associates, 1997. Phase I Environmental Audit Tac-Sea Motel, 17024 International Boulevard, SeaTac, Washington. Prepared for T. Jones, Inc., Job No. 7151, May.

DISTRIBUTION

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Remediation Services Manager

PJM/lsr

AGI TECHNOLOGIES

Table 1
Volatile Organic Compounds in Soil from Borings
Linda Lee Property/Former Tac-Sea Motel CAP
SeaTac, Washington

Borehole Location	Sample Depth (ft bgs)	Date Sampled	EPA Methods 8010A or 8260A Tetrachloro-ethene (mg/kg)	1,1,1-trichloroethane (mg/kg)	OVM-PID (ppm)
B1	1.5	1/8/98	0.018	ND	0
	4.5	1/8/98	0.024	ND	0
B2	1	1/8/98	ND	ND	0
	8	1/8/98	ND	ND	0
B7	25	2/6/98	0.65	ND	30
	30	2/6/98	0.45	ND	46
	35	2/6/98	0.27	ND	33
	65	2/6/98	0.013	ND	0
B8	8.5	2/6/98	0.31	ND	19
	15.5	2/6/98	0.27	ND	7
	22.6	2/6/98	0.22	ND	3
	29.6	2/6/98	0.22	ND	7
B9	15.5	2/6/98	0.030	ND	0
	22.6	2/6/98	0.016	ND	--
MW2	10	3/4/98	0.087	ND	2
	25	3/4/98	0.033	ND	6
MW5	55	7/20/98	ND	ND	0
	60	7/20/98	ND	ND	0
MW6	65	7/21/98	ND	ND	0
MW7	64	7/22/98	ND	ND	0
	69	7/22/98	ND	0.024	0
Detection Limit			0.01	0.01	1
Cleanup Level [a]			0.5	20	

Notes:

Boxed value exceeds the cleanup level.

a) Washington Administrative Code Chapter 173-340 Model Toxics Control Act Cleanup Regulations Method A suggested cleanup level for residential soil.

OVM-PID - organic vapor meter-photoionization detector.

ft bgs - feet below ground surface.

mg/kg - milligram per kilogram.

ppm - part per million.

-- not measured.

AGI TECHNOLOGIES

Table 2

Volatile Organic Compounds in Soil from Test Holes and Test Pits

Linda Lee Property/Former Tac-Sea Motel CAP

SeaTac, Washington

Sample I.D.	Sample Depth (ft bgs)	Date Collected	Location	EPA Test Method 8260A			
				Tetrachloroethene	*cis*-1-2-Dichloroethene	Methylene Chloride [a]	OVM-PID (ppm)
				mg/kg			
TH1-2.5	2.5	09/04/98	Hand Auger	ND	ND	ND	0
TH2-2.5	2.5	09/04/98	Hand Auger	ND	ND	ND	0
TH3-2	2	09/04/98	Hand Auger	ND	ND	ND	0
TP2-3.0	3	09/14/98	#2 Test Pit	NA	NA	NA	0
TP2-14.0	14	09/14/98	#2 Test Pit	ND	ND	NA	0
TP3-2.0	2	09/14/98	#3 Test Pit	ND	ND	0.011	2
TP3-15	15	09/14/98	#3 Test Pit	ND	ND	0.013	0
TP4-3.0	3	09/14/98	#4 Test Pit	ND	ND	0.013	2
TP4-15.0	15	09/14/98	#4 Test Pit	ND	ND	0.014	0
TP5-3.0	3	09/14/98	#5 Test Pit	ND	ND	ND	0
TP5-18.0	18	09/14/98	#5 Test Pit	ND	ND	0.010	0
TP6-5.0	5	09/14/98	#6 Test Pit	NA	NA	NA	2
TP6-15.0	15	09/14/98	#6 Test Pit	NA	NA	NA	9
TP6-19.0	19	09/14/98	#6 Test Pit	0.023	ND	0.011	18
TP6-22.0	22	09/14/98	#6 Test Pit	0.026	ND	0.010	11
TP7-5.0	5	09/14/98	#7 Test Pit	NA	NA	NA	0
TP7-15.0	15	09/14/98	#7 Test Pit	0.012	ND	0.011	6
TP8-15.0	15	09/14/98	#8 Test Pit	ND	ND	ND	0
Detection Limit				0.01	0.01	0.01	1
Cleanup Level [b]				0.5	N/A	N/A	

Notes:

a) Methylene chloride is likely due to laboratory background contamination.

b) Washington Administrative Code Chapter 173-340 Model Toxics Control Act Cleanup Regulation Method A suggested cleanup level for residential soil.

OVM-PID - organic vapor meter equipped with photoionization detector.

mg/kg - milligram per kilogram.

NA - sample not analyzed for this compound.

N/A - not available.

ND - not detected.

AGI TECHNOLOGIES

Table 3

Volatile Organic Compounds in Soil Samples from Septic Tank Excavations, October 13, 1998

Linda Lee Property/Former Tac-Sea Motel CAP

SeaTac, Washington

Sample I.D.	Sample Depth (ft bgs)	Location	EPA Test Method 8260A		OVM-PID (ppm)
			Tetrachlorethene	*cis*-1,2-Dichloroethene	
			mg/kg		
Septic 2-S3'	3	Tank 2 South Sidewall	ND	ND	3
Septic 2-B5'	5	Tank 2 Excavation Bottom	ND	ND	0
Septic 2-W3'	3	Tank 2 West Sidewall	0.046	ND	0
Septic 2-E4'	4	Tank 2 East Sidewall	ND	ND	0
Septic 1-W3'	3	Tank 1 West Sidewall	0.044	ND	0
Septic 1-N3'	3	Tank 1 North Sidewall	0.086	ND	0
Septic 1-S3'	3	Tank 1 South Sidewall	0.041	ND	18
Septic 1-E4'	4	Tank 1 East Sidewall	0.140	0.023	10
Septic 1-B5'	5	Tank 1 Excavation Bottom	0.053	ND	3
Detection Limit			0.01	0.01	1
Cleanup Level [a]			0.5	N/A	

Notes:

a) Washington Administrative Code Chpater 173-340 Model Toxics Control Act Cleanup Regulation Method A suggested cleanup level for residential soil.

mg/kg - milligram per kilogram.

ppm - part per million.

N/A - not available.

AGI TECHNOLOGIES

Table 4

Petroleum Hydrocarbons in Soil Samples from UST Removal and Soil Excavations

Linda Lee Property/Former Tac-Sea Motel CAP

SeaTac, Washington

Sample I.D.	Sample Depth (ft bgs)	Date Collected	Location	Washington State or Northwest Method TPH-D mg/kg	Washington State Method WTPH-HCID Gasoline mg/kg	Diesel mg/kg	Oil mg/kg
UST Removal							
T1EB1	9	09/10/98	#1 UST-excavation bottom	5,600 J	ND	D	ND
T1SW2	6	09/10/98	#1 UST-south sidewall	10,000 J	--	--	--
T2EB1	8	09/10/98	#2 UST-excavation bottom	5,700 J	ND	D	ND
T2SW2	5	09/10/98	#2 UST-south sidewall	3,900 J	--	--	--
Soil Excavations							
T1B-12'	12	10/12/98	#1 UST-excavation bottom	ND	--	--	--
T1S-6'	6	10/12/98	#1 UST-south sidewall	ND	--	--	--
T1W-6'	6	10/12/98	#1 UST-west sidewall	27	--	--	--
T1N-8'	8	10/12/98	#1 UST-north sidewall	ND	--	--	--
T1E-7'	7	10/12/98	#1 UST-east sidewall	26	--	--	--
T2B-12'	12	10/12/98	#2 UST-excavation bottom	150	--	--	--
T2E-8'	8	10/12/98	#2 UST-east sidewall	ND	--	--	--
T2W-7'	7	10/12/98	#2 UST-west sidewall	26	--	--	--
T2N-6	6	10/12/98	#2 UST-north sidewall	17,000 [a]	--	--	--
T2S-9'	9	10/12/98	#2 UST-south sidewall	5,700 [a]	--	--	--
Tank 2-N-6ft/10-14	6	10/14/98	#2 UST-north sidewall	ND [b]	--	--	--
Tank 2-S-9ft/10-14	9	10/14/98	#2 UST-south sidewall	ND [b]	--	--	--
Detection Limit				25	20	50	10
Cleanup Level [c]				200	100	200	200

Notes:

a) Area re-excavated and resampled on October 14, 1998.

b) Sample also quantified for oil and none detected (<50 mg/kg).

c) Washington Administrative Code Chapter 173-340 Model Toxics Control Act Cleanup Regulation Method A suggested cleanup level for residential soil.

-- sample not analyzed for this compound.

ND - not detected.

D - detected.

Table 5
Volatile Organic Compounds in Groundwater
Linda Lee Property/Former Tac-Sea Motel CAP
SeaTac, Washington

Well I.D.	Date Sampled	EPA Methods 8101A or 8260A Tetrachloroethene	Trichloroethene	*cis*-1,2-Dichloroethene	Chloroform	1,1,1-Trichloroethane
		µg/L				
Onsite Wells						
MW1	02/23/98	350	0.36	11	3.4	ND
	02/25/98	240	1.20	13	4.5	ND
	07/24/98	330	ND	20	5	ND
MW2	03/06/98	100	0.33	5.9	9.3	ND
	07/24/98	230	ND	13	7	ND
	11/05/98	280	ND	17	8	ND
MW3	03/06/98	83	ND	0.92	1.6	ND
	07/24/98	130	ND	ND	ND	ND
MW4	03/06/98	ND	ND	ND	ND	0.52
	07/24/98	ND	ND	ND	ND	ND
Offsite Wells						
MW5	07/20/98	ND	ND	ND	ND	ND
	07/24/98	ND	ND	ND	ND	ND
MW6	07/24/98	13	ND	ND	ND	ND
	11/05/98	13	ND	ND	ND	ND
MW7	07/24/98	6	ND	ND	ND	ND
Detection Limit		0.2 [a]/5 [b]	0.2/5	0.2/5	0.2/5	0.5/5
Cleanup Level [c]		5.0	5.0	--	--	200

Notes:

Boxed value exceeds the cleanup level.

a) Detection limit for quantification by EPA Method 8010A; samples analyzed in February and March 1998.

b) Detection limit for quantification by EPA Method 8260A; samples analyzed in July and November 1998.

c) Washington Administrative Code Chapter 173-340 Model Toxics Control Act Cleanup Regulation Method A suggested cleanup level for residential ground water.

µg/L - microgram per liter.

ND - not detected

-- not available.

AGI TECHNOLOGIES

Table 6
Comparison of Cleanup Levels and Drinking-Water Standards
Linda Lee Property/Former Tac-Sea Motel FS
SeaTac, Washington

	Tetrachloroethene		Trichloroethene		cis-1,2-Dichloroethene		Chloroform		1,1,1-Trichloroethane		Methylene Chloride		TPH-Diesel	
	Soil mg/kg	Water µg/L	Soil mg/kg	Water µg/L	Soil mg/kg	Water µg/L	Soil mg/kg	Water µg/L	Soil mg/kg	Water µg/L	Soil mg/kg	Water µg/L	Soil mg/kg	Water µg/L
Maximum Detected Concentration	0.65	350	ND	1.20	0.023	20	ND	9.3	0.024	0.52	0.014	ND	150	--
Number of Detections	23	11	0	3	1	7	0	7	1	1	8	0	4	--
Number of Samples	44	15	44	15	44	15	44	15	44	15	44	15	10	0
MTCA Method A	0.5	5	0.50	5	N/A	N/A	N/A	N/A	20	200	0.5	5.0	200	1,000
MTCA Method B [a]														
Carcinogenic	19.6	0.858	90.9	3.98	N/A	N/A	164	7.17	N/A	N/A	133	5.83	N/A	N/A
Noncarcinogenic	800	80	N/A	N/A	800	80	800	80	7,200	720	4,800	480	N/A	N/A
Protective of Groundwater														
Carcinogenic	0.0858	--	0.398	--	--	--	0.717	--	--	--	0.583	--	N/A	N/A
Noncarcinogenic	8	--	--	--	8	--	8	--	720	--	48.0	--	N/A	N/A
Federal Drinking Water Standards (MCL)	--	5	--	5	--	70	--	100 [b]	--	200	--	5	N/A	N/A

Notes:

a) Cleanup Levels and Risk Calculation Database (CLARC II) tables, July 1993. Unapportioned values.
b) Status is tentative. Totals for all trihalomethanes is 80 µg/L.
MCL - maximum contaminant level - Primary Drinking-Water Standards.
mg/kg - milligram per kilogram.
µg/L - microgram per liter.
N/A - not available.

AGI TECHNOLOGIES

Table 7
Summary of ARARs
Linda Lee Property/Former Tac-Sea Motel CAP
SeaTac, Washington

Authorizing Statute	Implementing Regulation	Potential ARAR Determination	Description/Rationale for Determination
Chemical Specific			
Model Toxics Control Act (MTCA) RCW 70.105D	MTCA Cleanup Regulations WAC 173-340	Applicable	Establishes cleanup standards for soil and groundwater at sites where hazardous substances have come to be located. This is the primary regulation driving cleanup actions at the site.
Safe Drinking Water Act Public Law 93-523	National Primary Drinking Water Standards	Relevant and Appropriate	Standards that apply to public water systems. Primary standards protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health. Not directly applicable because they apply at the outlet of the user.
Water Pollution Control Act RCW 90.48	Water Quality Standards for Groundwaters of the State of Washington (WAC 173-200)	Relevant and Appropriate	Establishes groundwater quality standards, which together with technology-based treatment standards, provide for protection of existing and future use of groundwater. Not directly applicable because it specifically does not apply to cleanup actions approved by Ecology under MTCA.
Action Specific			
Hazardous Waste Management RCW 70.105 and RCRA	Dangerous Waste Regulation (WAC 173-303) and Identification and Listing of Hazardous Waste 40 CFR Part 261	Applicable	Identifies wastes subject to RCRA. Establishes limits of contaminants in wastes and identifies waste generation processes in order to classify wastes considered as dangerous/hazardous. Directly applicable to septic wastes generated during interim actions and for purge water generated during compliance monitoring.
Water Well Construction RCW 18.04	Minimum Standards for Construction of Wells (WAC 173-160)	Applicable	Establishes standards for monitoring and extraction wells installed for compliance monitoring remedial actions.
RCRA	Standards Applicable to Generators of Hazardous Waste 40 CFR Part 262	Applicable	Establishes standards for generators of hazardous waste. Requires determination whether waste is hazardous/dangerous. Requirements for obtaining ERA ID No. recordkeeping and manufacturing. Directly applicable to septic sludge generated during interim actions.

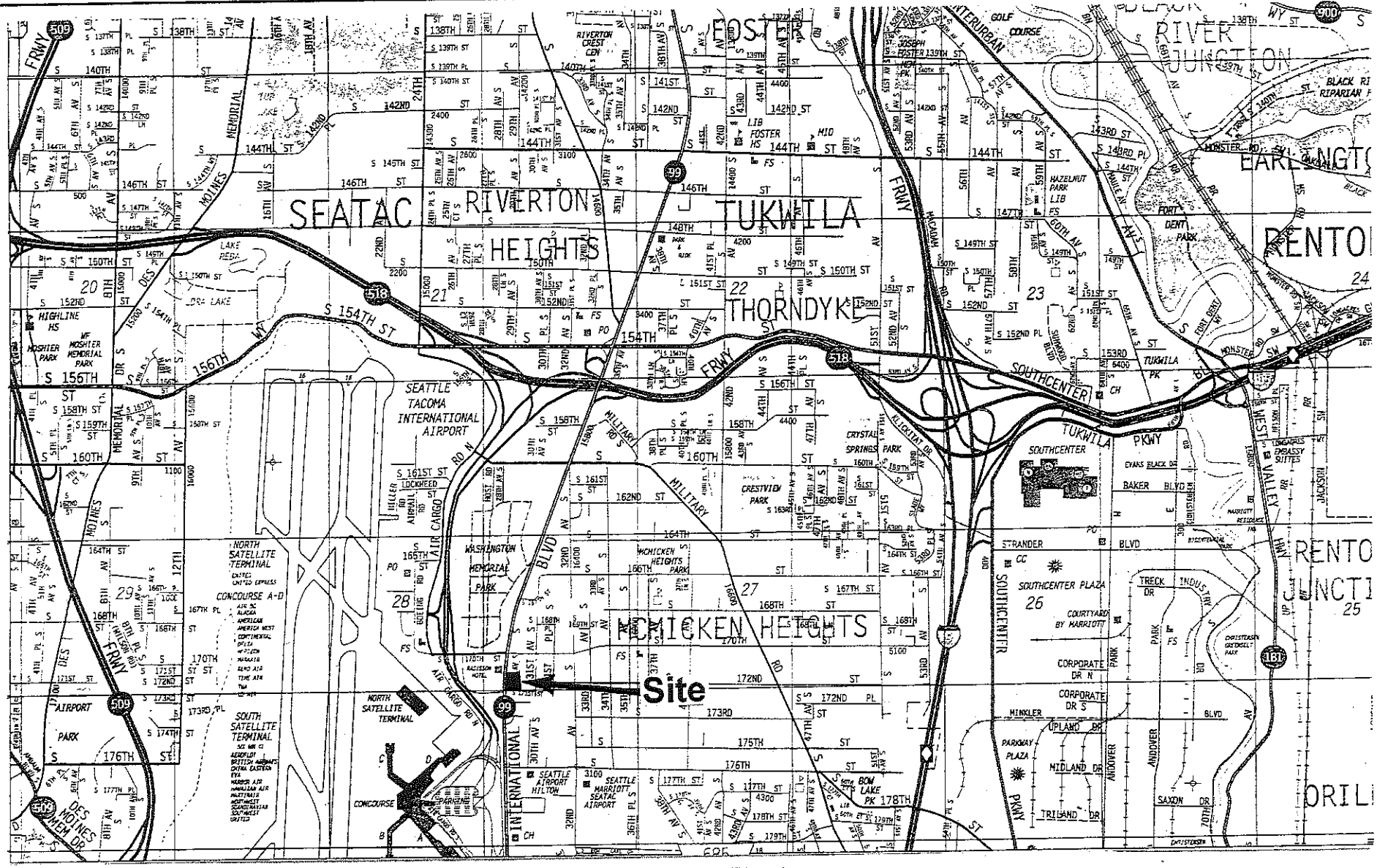
AGI TECHNOLOGIES

Table 7
Summary of ARARs
Linda Lee Property/Former Tac-Sea Motel CAP
SeaTac, Washington

Authorizing Statute	Implementing Regulation	Potential ARAR Determination	Description/Rationale for Determination
Action Specific			
RCRA	Standards Applicable to Transporters of Hazardous Waste 40 CFR Part 263	Relevant and Appropriate	Applies to waste designated as hazardous/dangerous that is transported off site. Establishes standards for transport of these materials.
RCRA	Land Disposal Restrictions 40 CFR Part 268	Applicable	Identifies waste restricted from land disposal. Directly applicable to dangerous/hazardous wastes.
State Clean Air Act (RCW 70.94)	Puget Sound Air Pollution Control Agency (PSAPCA) Regulation I and III General Regulations for Air Pollution Sources (WAC 173-40)	Applicable	Applies to air emissions. The substantive requirements for the PSAPCA Notice of Construction (NOC) must be met.
State Environmental Policy Act (SEPA) RCW 43.21C	SEPA Rules WAC 192-11	Applicable	Requires a review of potential damage that occurs to the environment as a result of man's activities. SEPA checklist may be required prior to construction of the remediation system. A SEPA checklist was required during the construction permitting process. Additional conditions imposed by the City of SeaTac included validating that residual contamination would not impact construction activities and that stormwater runoff would not be impacted.

FIGURES

FIGURES



N

0 2400
Scale in Feet

SITE VICINITY
Washington

AGI TECHNOLOGIES

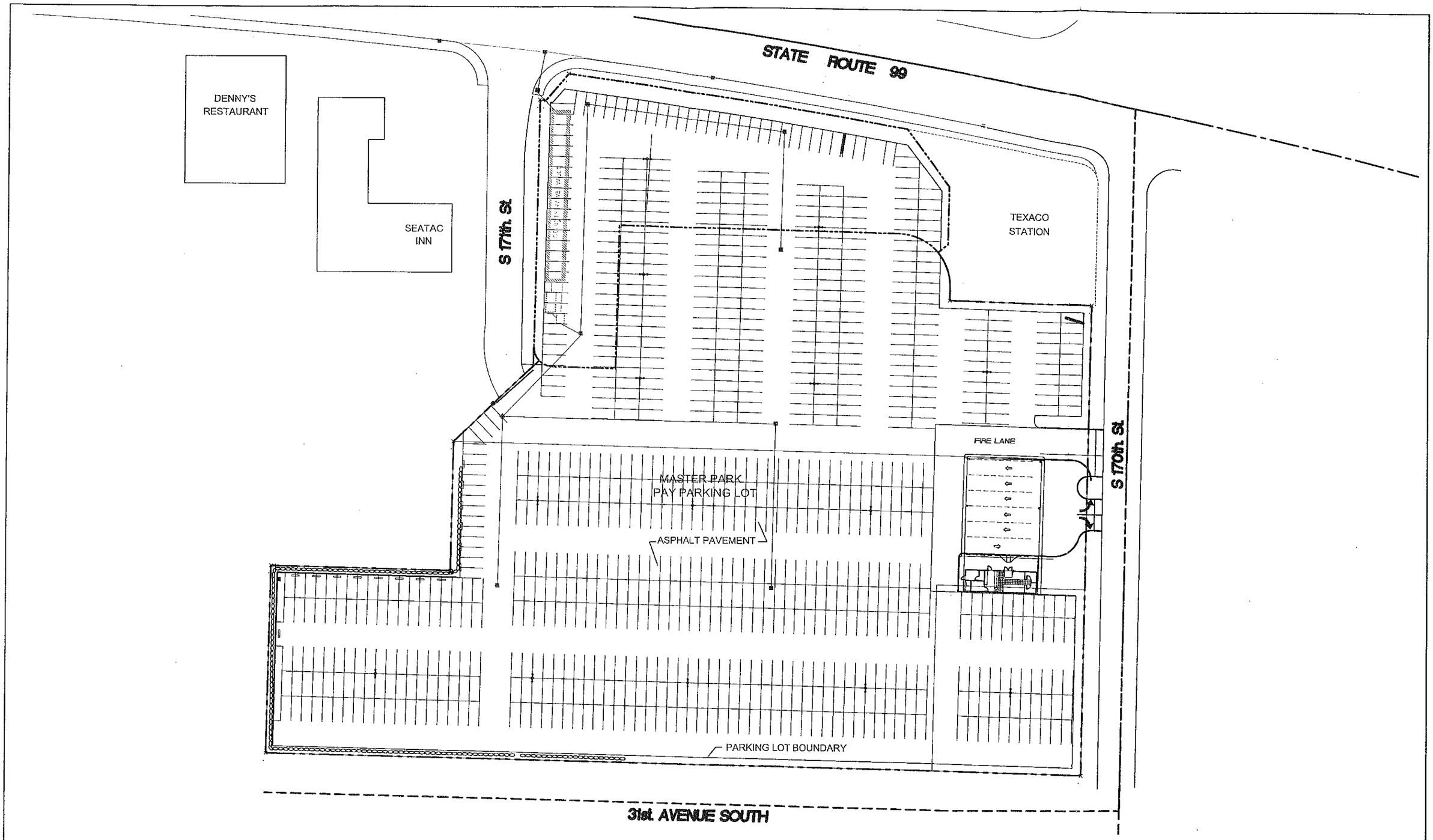
Vicinity Map

Linda Lee Property/Former Tac-Sea Motel CAP
SeaTac, Washington

FIGURE 1

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
16,180.004	PJR	2 Feb 99		-	-

1800004VM-1.cdr



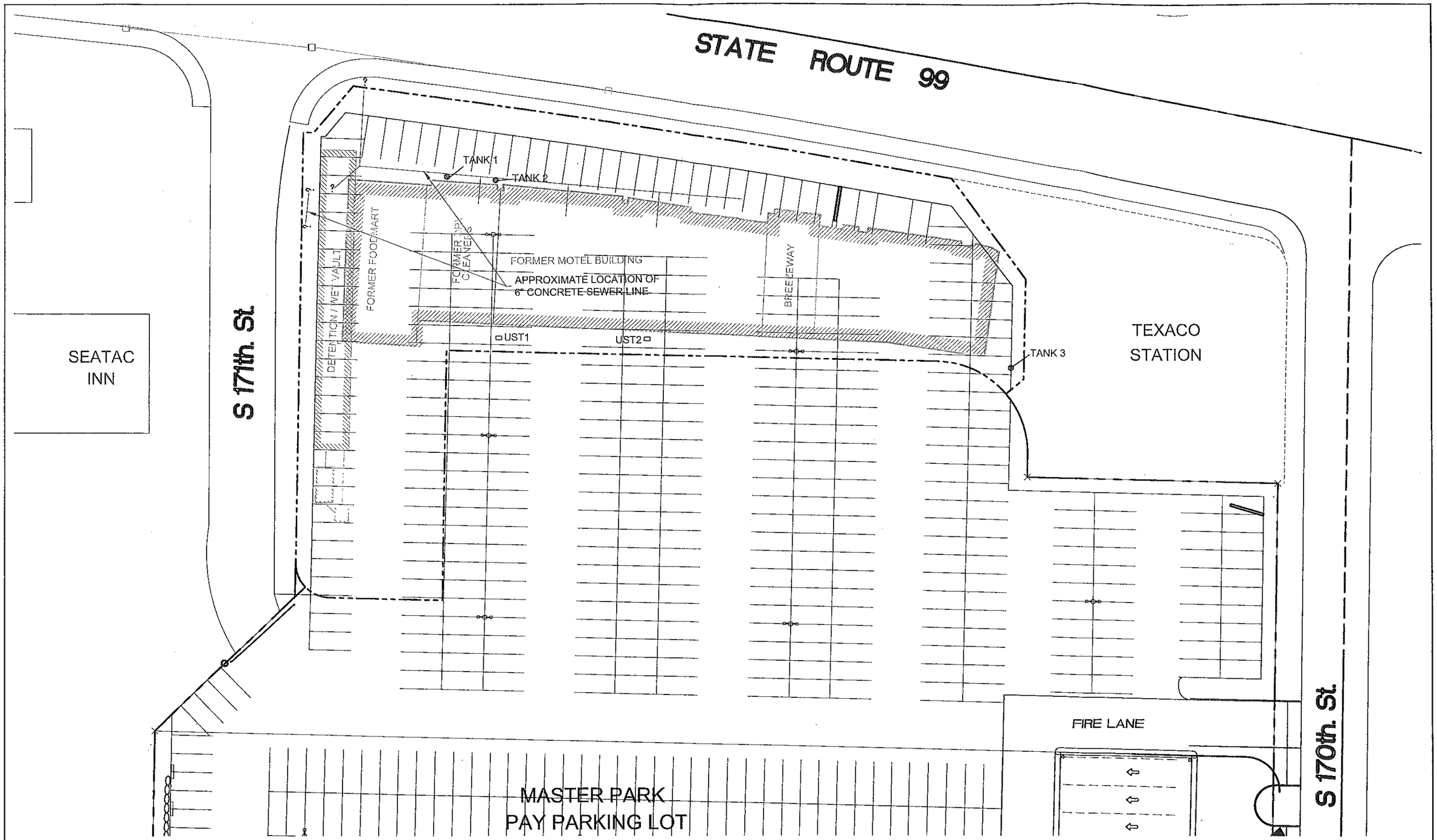
AGI TECHNOLOGIES

Current Site and Parking Lot Features

Linda Lee Property / Former Tac-Sea Motel CAP
SeaTac, Washington

FIGURE 2

180004-FIG-2.dwg	PROJECT NO. 16,180.004	DRAWN PJR	DATE 5 FEB 99	APPROVED	REVISED *	DATE *



AGI TECHNOLOGIES

Historical Site Features

Linda Lee Property / Former Tac-Sea Motel CAP
SeaTac, Washington

FIGURE 3

180004-FIG-3.dwg	PROJECT NO. 16,180.004	DRAWN PJR	DATE 5 FEB 99	APPROVED	REVISED *	DATE *

STATE ROUTE 99

S 171th. St.

SEATAC INN

TANK 1

TANK 2

FORMER FOOD MART

DETENTION / IVE VAULT

FORMER DRY CLEANERS

FORMER MOTEL BUILDING

APPROXIMATE LOCATION OF 6" CONCRETE SEWER LINE

BREEZEWAY

UST1

UST2

TANK 3

TEXACO STATION

FIRE LANE

S 170th. St.

MASTER PARK PAY PARKING LOT

N

0 70

Scale in Feet

LEGEND

TANK 1 — FORMER SEPTIC TANK LOCATION AND ID

UST1 — FORMER UNDERGROUND STORAGE TANK LOCATION AND ID

LAMP POST

SITE BOUNDARY

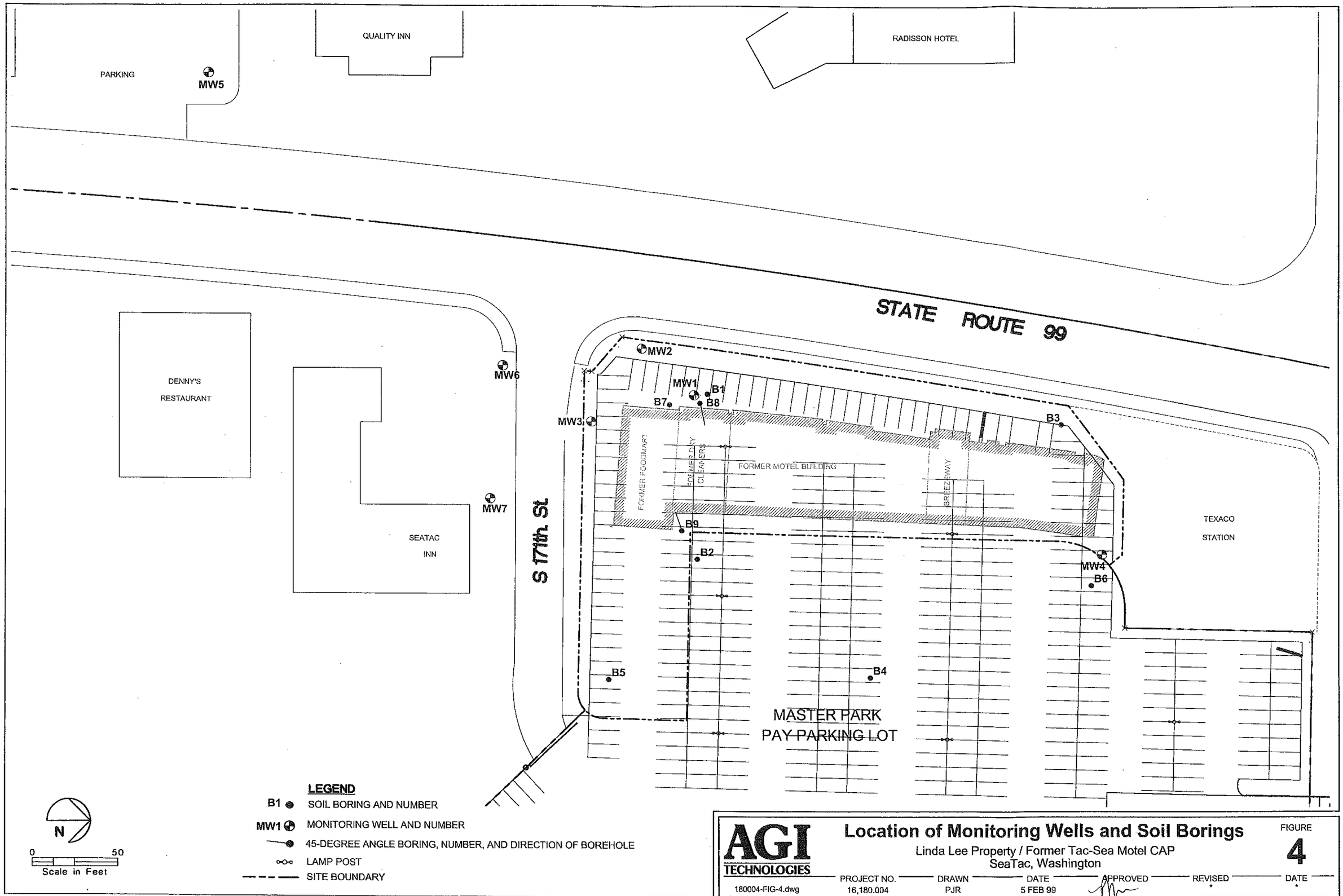
AGI TECHNOLOGIES

Historical Site Features

Linda Lee Property / Former Tac-Sea Motel CAP
SeaTac, Washington

FIGURE 3

180004-FIG-3.dwg	PROJECT NO. 16,180.004	DRAWN PJR	DATE 5 FEB 99	APPROVED	REVISED *	DATE *



AGI TECHNOLOGIES

Location of Monitoring Wells and Soil Borings

Linda Lee Property / Former Tac-Sea Motel CAP
SeaTac, Washington

FIGURE 4

180004-FIG-4.dwg	PROJECT NO. 16,180.004	DRAWN PJR	DATE 5 FEB 99	APPROVED	REVISED *	DATE *

STATE ROUTE 99

S 171th. St.

EATAC
INN

TP5
TP7
TP1
TANK 1
TP8
TP2
TANK 2
TP6
TH1
TH2
TP3
TH3
TP4
FORMER FOODMART
FORMER DRY CLEANERS
FORMER MOTEL BUILDING
BREEZEWAY
UST1
UST2
TANK 3

MASTER PARK
PAY PARKING LOT

LEGEND

- TH1 — TEST HOLE AND NUMBER
- TP7 — TEST PIT AND NUMBER
- LAMP POST
- SITE BOUNDARY
- TANK 1 — FORMER SEPTIC TANK LOCATION AND ID
- UST1 — FORMER UNDERGROUND STORAGE TANK LOCATION AND ID

N

0 30
Scale in Feet

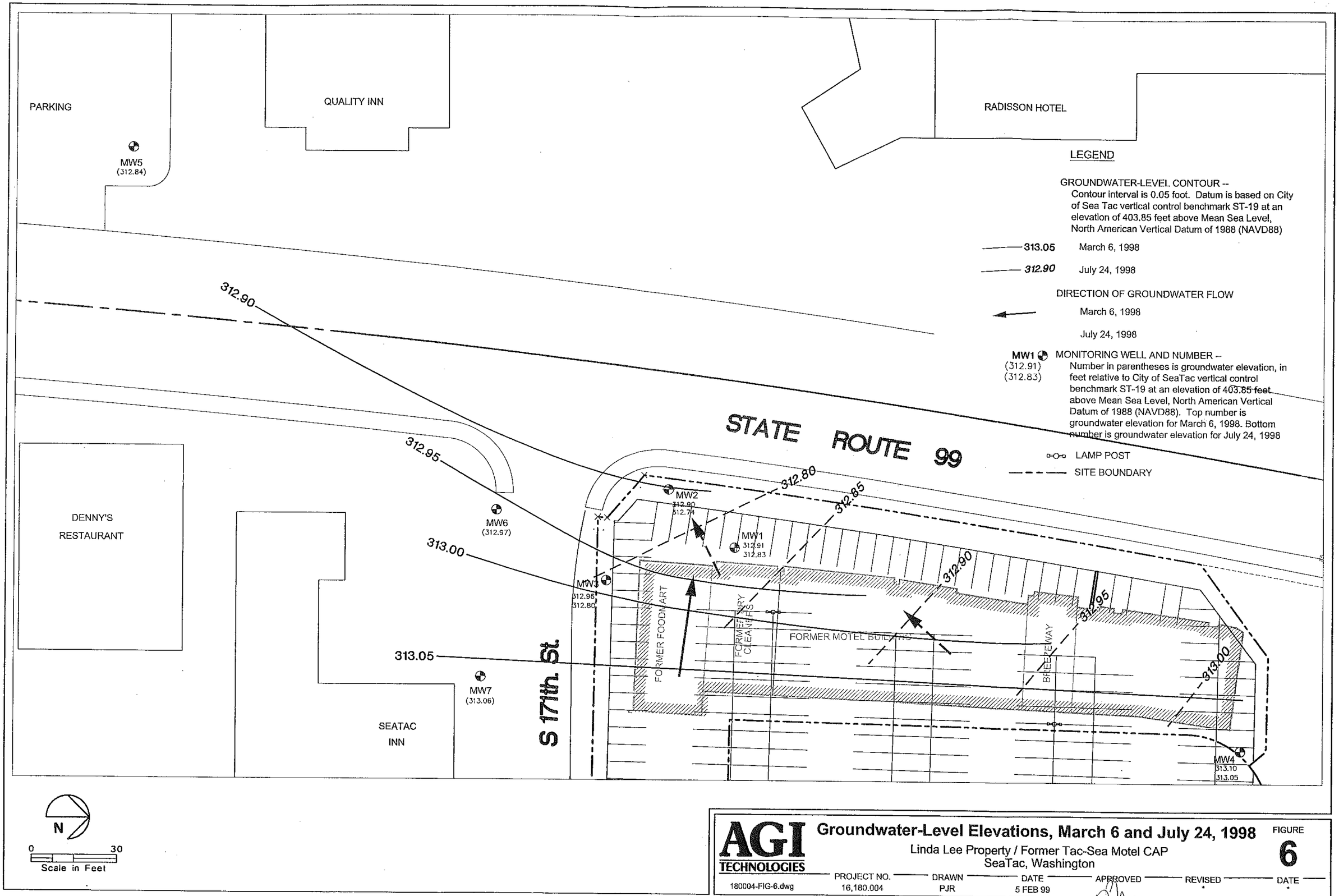
AGI TECHNOLOGIES

Location of Test Holes and Test Pits

Linda Lee Property / Former Tac-Sea Motel CAP
SeaTac, Washington

FIGURE 5

180004-FIG-5.dwg	PROJECT NO. 16,180.004	DRAWN PJR	DATE 5 FEB 99	APPROVED	REVISED *	DATE *



LEGEND

GROUNDWATER-LEVEL CONTOUR -- Contour interval is 0.05 foot. Datum is based on City of Sea Tac vertical control benchmark ST-19 at an elevation of 403.85 feet above Mean Sea Level, North American Vertical Datum of 1988 (NAVD88)

313.05 March 6, 1998

312.90 July 24, 1998

DIRECTION OF GROUNDWATER FLOW

March 6, 1998

July 24, 1998

MW1 (312.91) (312.83) MONITORING WELL AND NUMBER -- Number in parentheses is groundwater elevation, in feet relative to City of SeaTac vertical control benchmark ST-19 at an elevation of 403.85 feet above Mean Sea Level, North American Vertical Datum of 1988 (NAVD88). Top number is groundwater elevation for March 6, 1998. Bottom number is groundwater elevation for July 24, 1998

LAMP POST

SITE BOUNDARY

Groundwater-Level Elevations, March 6 and July 24, 1998

Linda Lee Property / Former Tac-Sea Motel CAP
SeaTac, Washington

FIGURE 6

AGI TECHNOLOGIES	PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
180004-FIG-6.dwg	16,180.004	PJR	5 FEB 99		*	*

STATE ROUTE 99

S 171th. St.

FORMER FOODMART

FORMER DRY CLEANERS

APPROXIMATE AREA OF PCE IMPACTED SOIL

FORMER MOTEL BUILDING

BREEZEWAY

N

0 20

Scale in Feet

LEGEND

LAMP POST

SITE BOUNDARY

AGI TECHNOLOGIES

Approximate Area of PCE Impacted Soil

Linda Lee Property / Former Tac-Sea Motel CAP
SeaTac, Washington

FIGURE 7

180004-FIG-7.dwg	PROJECT NO. 16,180.004	DRAWN PJR	DATE 5 FEB 99	APPROVED	REVISED *	DATE *

APPENDIX A

APPENDIX A

Engineering Design Drawings

AGI TECHNOLOGIES

APPENDIX B

Sampling and Analysis Plan

APPENDIX B

Sampling and Analysis Plan

PLAN ORGANIZATION

The Sampling and Analysis Plan (SAP) is comprised of the Field Sampling Plan and the Quality Assurance Project Plan (QAPP). The SAP is required by Washington State's Model Toxics Control Act (WAC 173-340) for compliance monitoring during cleanup activities. The succeeding sections of this plan describe project organization, data quality objectives, sample handling and shipment, analytical methods, quality control samples, data validation procedures, and reporting.

PROJECT ORGANIZATION

Mr. Gary Laakso, Remediation Services Manager, will act as the Project Consultant. Ms. Pamela Morrill will be the Project Manager. She will coordinate all project activities, be responsible for communication, quality-assurance review, data analysis, and reporting. She also will be responsible for coordinating and managing subcontractors, supervising field activities, and technical oversight. The Health and Safety Officer is Ms. Monica Beckman. She will be responsible for assuring that all field work adheres to the procedures discussed in the site-specific Health and Safety Plan.

CCI Analytical (CCI), Everett, Washington, is the analytical laboratory chosen for the project. CCI will be responsible for laboratory data analysis and laboratory report preparation. AGI has reviewed a copy of CCI's Quality Assurance Program document and found it consistent with U.S. EPA and Washington Department of Ecology requirements for volatile organic compound (VOC) and fuel hydrocarbon analyses.

FIELD SAMPLING PLAN

Purpose and Scope

The purpose of the Field Sampling Plan is to ensure that remedial investigation field methods and procedures are appropriate, documented, and consistent with WAC 173-340. The plan describes all field observation, subsurface exploration, and sample-collection methods. The plan also describes all decontamination, recordkeeping, and sample handling procedures.

Vapor Extraction System Monitoring

Vapor extraction system monitoring includes measuring air velocity, extracted vapor concentration, and vacuum at the well heads. The data are used to estimate the relative quantity of VOCs extracted. Air velocity is measured using either a Kurz meter or magnehelic. Relative VOC concentrations are measured by extracting vapors through a sample port into a Tedlar bag using a battery operated pump. VOC concentrations are then directly measured using an organic vapor meter equipped with a photoionization detector (OVM-PID). This technique is not a compound-specific analysis and is affected by, among other influences, climate (e.g. temperature and humidity), instrument calibration and operation. Total daily VOC emission rates are estimated using air velocity and VOC concentrations.

Groundwater Monitoring

Water-Level Monitoring: Water levels will be measured monthly in selected wells. Water depths will be measured to the nearest 0.01-foot using a SINCO water-level sounder. These data will be used to evaluate groundwater gradients and flow directions.

Groundwater Sampling: Monitoring wells will be sampled in general accordance with U.S. Environmental Protection Agency (EPA) specifications and recommendations presented in the Groundwater Technical Enforcement Guidance Document and Practical Guide to Groundwater Sampling will be performed as follows:

- Prior to purging, water depth will be measured to the nearest 0.01 foot using a SINCO water-level indicator.

- After initial measurement, the monitoring well will be purged using a disposable bailer or "low-flow" sampling techniques using a submersible pump. Purge water will be placed in 55-gallon drums and stored onsite. During purging, pH, temperature, and specific conductance will be measured and recorded at regular intervals. Groundwater samples will be collected when field parameter measurements have stabilized within 10 percent for three consecutive readings or a maximum of five well volumes have been purged.

- Water samples will be collected using a disposable bailer lowered into the well on nylon twine or directly through the discharge port of the submersible pump. Water will be poured gently into precleaned sample containers to avoid sample overflow or degassing. Samples will be labeled, secured with a chain-of-custody seal, and placed in a chilled ice chest.

Decontamination Procedures

Disposable bailers and nylon twine used during well development and sampling will be replaced between sampling events. Other sampling equipment will be decontaminated as follows:

1 Wash and scrub with nonphosphate-based detergent and potable water (or cycled through the pump and tubing).

2 Rinse with potable tap water (or cycled through the pump and tubing).

3. Rinse with deionized water (or cycled through the pump and tubing).

4. Air dry and store in clean plastic bags between sampling.

Field Records

A summary of each day's field activities will be recorded on a Field Investigation Daily report. All field sampling activities will be recorded on field sampling forms to identify sample location, time of collection, field measurements, observations, and sampling methods. These forms include:

- Water-level measurements
- Groundwater sampling record
- Vapor sampling record

Sample Handling and Shipment

All sample jars will have a label containing identifying information related to site, location, sample number, and field personnel. A security seal is fixed to each jar prior to placement in a chilled insulated shipping container. Chain-of-custody forms will be used to ensure sample integrity during handling and shipment. Chain-of-custody protocol to be used includes the following:

- Chain-of-custody forms will be completed. Each form records sampler's name, sample identification number, time of sampling, matrix sampled, and requested chemical analysis.
- During custody transfer, the chain-of-custody forms will be signed by the individual in possession of the samples as well as the person receiving the samples.
- All sample jars will be protected with a chain-of-custody seals.
- All shipping containers will have custody seals whenever the samples leave the immediate control of the individual identified on the chain-of-custody form.

QUALITY-ASSURANCE PROJECT PLAN

Purpose and Scope

The purpose of the QAPP is to describe the quality-control and quality-assurance procedures used to ensure that groundwater chemical data are of known quality and acceptable for use in evaluating the nature and extent of any site contamination and suitable for use in any remedial action planning. The scope of sampling and analysis activities include groundwater sampling from monitoring wells.

Data-Quality Objectives

Data quality will be judged on representativeness of field sampling, compatibility of new and old data, analytical accuracy, analytical precision, and data completeness. Data that successfully meet these criteria can be used to assess the evaluation of cleanup actions.

Sample Labels and Seals

Each sample will be labeled and have a custody seal fixed to its cap immediately after collection. All sample labels and seals will be provided by AGI. Each label will include, at a minimum, the following information:

- Project Name
- AGI Project Number
- Name of collector
- Date and time of collection
- Number which uniquely identifies the sample and its collection location
- Preservative (if any)

A custody seal will be affixed to all samples to prevent tampering during shipment to the laboratory. If any custody seals are found broken when the laboratory receives a sample shipment, no analysis will be performed unless there is incontrovertible evidence that the samples were not compromised. Broken or missing custody seals will be noted on the Chain-of-Custody Records by the receiving analytical laboratory.

Chain-of-Custody/Analytical Request Record

A Chain-of-Custody Record/Analytical Request Record will be completed and accompany every sample shipment to the analytical laboratory to establish the documentation necessary to trace sample possession from the time of collection. The Chain-of-Custody Record will be sequentially numbered and contain, at a minimum, the following information:

- Sample number
- Signature of collector
- Date and time of collection
- Place of collection
- Sample matrix
- Signatures of persons involved in the chain of possession
- Inclusive dates of possession
- Condition of samples

The Chain-of-Custody Record also will be used to indicate the requested analytical method.

Sample Shipment

Following sealing and labeling, sample containers will be placed on Blue Ice in an insulated cooler. The cooler will be sealed and a custody seal affixed across the box. Samples will be transported by truck to the analytical laboratory. Samples will be delivered to the laboratory within 24 hours of collection.

Corrections

All original data recorded on field sampling forms, sample identification labels, and Chain-of-Custody Records will be written in indelible ink. All these documents will be kept in AGI's Bellevue Office for at least 7 years after the sampling date.

If an error is made in a document, the sampler will make corrections by drawing a single line through the error and entering the correct information. The erroneous information will not be obliterated. Any subsequent error discovered on a document will be corrected by either the sampler, the Project Manager, or editing hydrologist, engineer, or geochemist. All corrections must be initialed and dated.

Analytical Methods

Analytical methods selected for water samples are those approved by U.S. EPA and Washington Department of Ecology. Selected methods include:

- EPA Method 8260A, 8010A for VOCs
- WTPH-D for diesel-range hydrocarbons

Methodologies for VOC determinations are described by U.S. EPA in Test Methods for Evaluating Solid Waste (SW-846, 3rd Edition). Methodology for fuel hydrocarbon determination is described by Washington Department of Ecology.

Laboratory Quality-Control Samples

The laboratory will provide quality-control sample results for discrete batches of soil and water samples submitted for analysis. These data will consist of method blanks, surrogate spikes, matrix spikes/matrix spike duplicates, and control samples as required by the selected analytical methods and described in SW-846 (3rd Edition) with updates.

Representativeness of Field Samples: The Field Sampling Plan describes sampling methods for the collection of groundwater samples.

Comparability: Data comparability will be maintained by use of consistent methods, consistent detection limits, and consistent units.

Accuracy: Accuracy will be assessed using surrogate and matrix spikes (i.e., addition of a known chemical at a known concentration). Acceptable recovery criteria (control limits) for this project have been established by CCI and are based on the requirements discussed in EPA's Test Methods for Evaluating Solid Waste (SW-846 3rd Edition) and Washington State's method WTPH-D. For a surrogate spike, the standards are chemically similar but not identical to the compounds in the fraction being analyzed. For a matrix spike, known amounts of the analytes are added to the sample to test for matrix interference effects. Generally, both surrogate and matrix spikes are added for organic compound analyses.

Precision: Precision is checked using laboratory duplicates and matrix spike duplicates measurements. Acceptable precision criteria for this project have been established by CCI and are consistent with suggested EPA control limits for soil and groundwater.

Completeness: Completeness is a measure of the amount of valid data obtained from the analytical measurement system. The target completeness objective will be 90 percent; the actual completeness may vary depending on the intrinsic nature of the fill samples. Data completeness will be assessed during quality-control reviews.

Quantitation Levels: Method or instrument detection levels for soil and water samples have been determined by CCI using EPA or Washington Department of Ecology required methods. Practical quantitation or reporting levels for soil and water were also established by the laboratory. AGI confirmed that laboratory reporting levels were less than MTCA Method A Cleanup Levels.

Sampling Procedures

Sample Collection: Sample collection procedures and documentation forms are discussed in the Field Sampling Plan.

Field Quality-Control Samples: Field duplicates will be collected in the event that quarterly sampling data suggest significant heterogeneity of sample results between sampling events. Decontamination and sampling procedures described in Field Sampling Plan are considered sufficient to ensure no cross contamination between wells. However, rinsate samples may be collected at the discretion of the project manager to confirm decontamination procedures.

Changes in Procedure: Any change in sampling procedure as described in the Field Sampling Plan will be documented on the Field Investigation Daily Report and will be discussed in the project report. Approval from the project manager will be necessary to implement any onsite changes.

Sample Containers, Holding Times, and Preservation: Pre-cleaned sample jars and bottles will be obtained from the project laboratory. Water samples to be analyzed for fuel hydrocarbons will be placed in 1 liter amber glass jars. Water samples to be analyzed for VOCs will be placed in 40 milliliter vials. The vials will have Teflon-lined septum lids and the jars will be filled to a point where there is no headspace.

Preservation for diesel-range fuel hydrocarbons in water is refrigeration to 4 degrees Celsius. Preservation for VOCs in water is hydrochloric acid (pH<2) and refrigeration to 4 degrees Celsius.

Sample Handling and Shipment

Chain-of-custody procedures will be used to document sample possession. The principal documents that will be used are:

- Sample labels and seals
- Field sampling records
- Chain-of-custody records

Data Validation and Reporting

Data Validation: AGI will complete a quality-assurance review of all field observations, field records, laboratory data, and quality-control samples. The quality-assurance review for each analytical batch of samples will be completed in accordance with U.S. EPA data validation functional guidelines for organics (EPA/540/R94/082/033). Data qualifier flags will be assigned to all results that do not meet the data quality objectives discussed above.

Quality-Assurance Reporting: The quality-assurance review will be documented in a report and attached to its appropriate laboratory report. Laboratory reports and the quality-assurance review will be an appendix to the project report.

APPENDIX C

AGI TECHNOLOGIES

APPENDIX C

Surface-Water Management and Pavement Maintenance

APPENDIX C

Surface-Water Management and Pavement Maintenance Plan

PURPOSE

Remedial actions for the site include placement of an asphalt cap and surface-water management controls, the purpose of which is to minimize infiltration of surface water that may subsequently leach residual contaminants from subsurface soils into groundwater. These features were incorporated during site redevelopment into a pay parking lot, which was completed in December 1998. The site is asphalt paved, except for minimal areas of landscaping. Storm drains are incorporated throughout the site and discharge to an underground stormwater detention/wet vault. From the vault, stormwater discharges into the City of SeaTac's storm drain system through a connection at International Boulevard. Site features are shown on **Plate C1.**

In order for the asphalt cap and the storm drain system to be effective, they must remain competent. This plan outlines the methods of monitoring and maintenance of the surface-water management structures and asphalt cap.

SCOPE

Monitoring will consist of inspecting asphalt pavement and storm drain features in the area of concern. The asphalt will be inspected for large cracks, potholes, and other disturbances that have compromised the integrity of the asphalt. Storm drain catch basins and the vault will be inspected to check for cracks and holes and/or ability to contain water as appropriate. For example, when inspections are conducted during or soon after a period of rainfall, storm drain structures will contain water. If one or more of the structures contain significantly less water than those in the surrounding area, they will be further checked to ascertain whether there is leakage to the subsurface. When inspections are conducted during a dry period, these structures are likely to be dry. At this time, the inspection will focus on checking for cracks, holes, or other signs of incompetence.

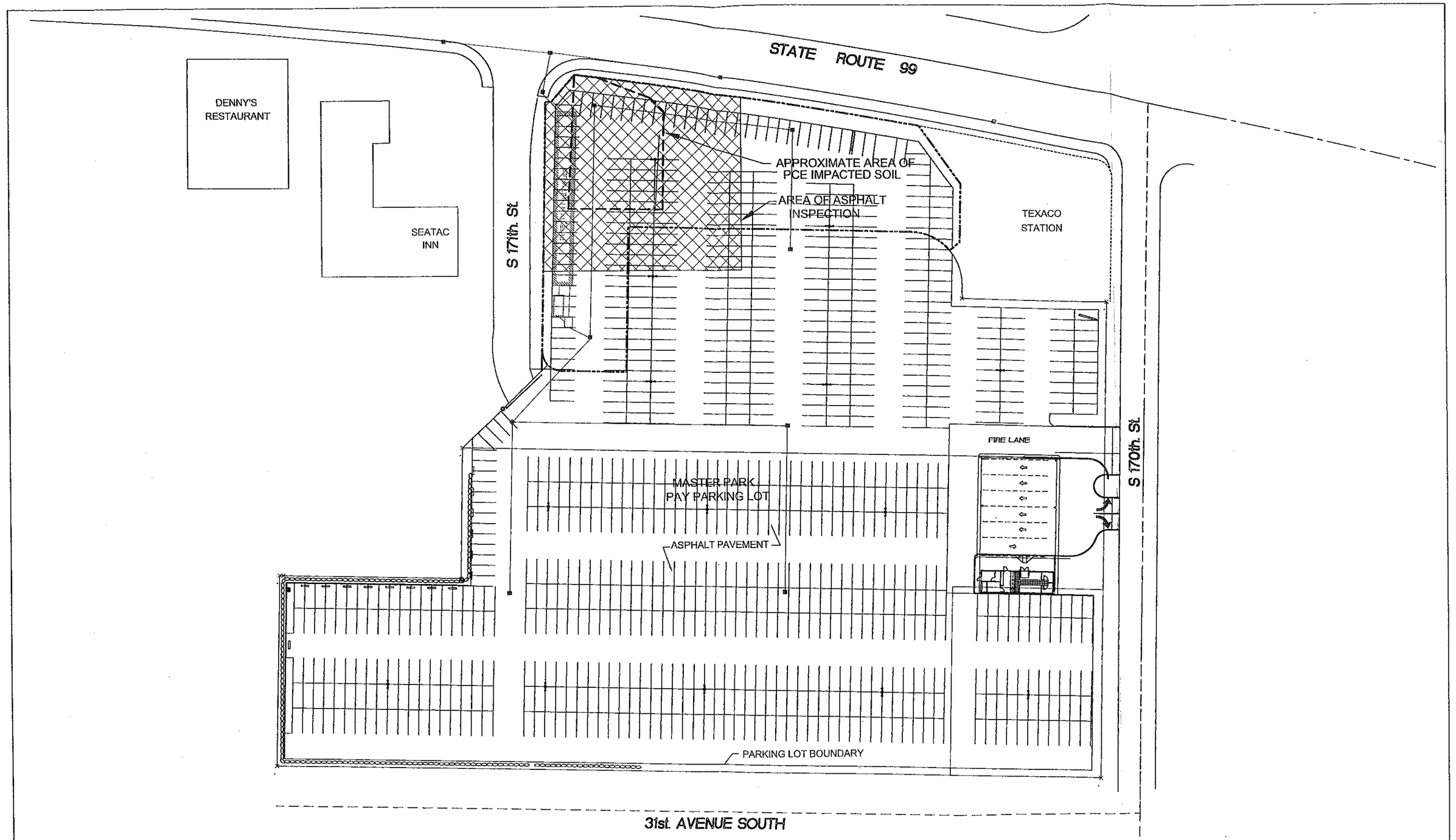
The inspection will be conducted over an area approximately 1½ times the size of the approximate lateral limits of residual soil contamination as shown on **Plate C1.**

REMEDIAL ACTIONS

Gateway Investment LLC will be notified within 48 hours of any inspection that finds repairs are necessary. Gateway will complete required repairs as soon as practical.

SCHEDULE AND DOCUMENTATION

AGI Technologies will conduct the asphalt and storm drain inspection during routine quarterly groundwater monitoring rounds to be conducted as another aspect of the performance monitoring program. Inspection observations will be recorded on the Field Inspection Daily Reports. These field notes will be kept in AGI's files at their Bellevue office.



AGI TECHNOLOGIES

Area of Asphalt Inspection

Linda Lee Property / Former TacSea Motel CAP
SeaTac, Washington

FIGURE **C-1**

180004-FIG-2.dwg	PROJECT NO. 16,180.004	DRAWN PJR	DATE 5 FEB 99	APPROVED	REVISED *	DATE *

APPENDIX D

AGI TECHNOLOGIES

APPENDIX D

Project Health and Safety Plan