

Kleen Environmental Technologies, Inc.

July 24, 1998

Ron Timm
Washington State Department of Ecology
Northwest Regional Office
Toxic Cleanup Program
3190 160th Avenue S.E.
Bellevue, WA 98008

RECEIVED
JUL 28 1998
DEPT OF ECOLOGY

Re: 14 Roy Street, Seattle, WA (#N-17-5513-000)

Dear Mr. Timm:

Kleen Environmental Technologies, Inc. (Kleen) has been retained by Motion Financial Management (MFM) of West Vancouver, British Columbia, Canada to assist in expediting the development of MFM's 14 Roy Street property (herein known as the site), located in Seattle, Washington (Figure 1). At the site, MFM is proposing to develop a mixed-use building that will include both residential and commercial facilities.

As of December 3, 1997, the site was listed in the Washington State Department of Ecology's (WDOE) *Confirmed and Suspected Contaminated sites Report*. The purpose of this letter is to summarize the present environmental status of the site and to present MFM's proposal for cleanup and development of the site.

The objectives of this letter are as follows:

- To summarize the nature and extent of contamination at the site and adjacent properties;
- To summarize the proposed site development;
- To open a dialogue with the WDOE regarding site cleanup and cleanup standards; and
- To devise a strategy with the WDOE that would allow MFM to develop the site in conjunction with the remediation of contaminants of concern (COC).

The data for the discussion presented below was acquired from the following reports:

- Geotech Consultants, Inc. June 15, 1998. Proposed Mixed-Use Building, 14 Roy Street, Seattle, Washington;
- Quality Environmental Services Team, Inc. May 15, 1998. Results of Underground Storage Tank Removal Program, 14 Roy Street, Seattle, Washington;
- Geo Engineers, Inc. February 17, 1998. Results of Groundwater Monitoring and Sampling August and November 1997, Former Unocal Service Station 0255, Seattle, Washington;
- Clayton Environmental Consultants. March 11, 1996. Soil and Groundwater Investigation Report at the Orestes site, Seattle, Washington for Roy Street Holding, Inc;
- Geo Engineers, Inc. June 25, 1994. Report of GeoEnvironmental Services Underground Storage Tank Removal, Unocal Service Station 0255, Seattle, Washington; and
- Geo Engineers, Inc. January 20, 1993. Report of GeoEnvironmental Services Supplemental Subsurface Contamination Study, Unocal Service Station 0255, Seattle, Washington.

Site Location

The site is located at 14 Roy Street in Seattle, Washington (Figure 2). The site is physically located at the intersection of First Avenue and West Roy Street, approximately two blocks north-northwest of the Seattle Center. The site covers an area of approximately 16,300 square feet. Prior to November of 1997, approximately 65 percent of the property was occupied by Orestes Restaurant, while the remainder of the property was covered by asphalt parking.

Apartment complexes are located on the properties adjacent to the north and east, a vacant lot is adjacent to the west (former Unocal gasoline station), and a parking garage, church and bookstore are located adjacent to the south.

Site History

Between 1955 and 1973, the site was occupied by Paramount Dry Cleaners. For a short period of time, the site was then occupied by a retail plant store followed by a restaurants from approximately 1983 to 1992. In November of 1997, MFM demolished

Orestes Restaurant. At present, the western portion of the site is currently unpaved while the eastern portion is an asphalt parking area.

Site Geology and Hydrology

The site has an elevation of 120 ft. above sea level and slopes to the south and west. The Puget Sound and Lake Union are located one and one-half miles and three-quarters of a mile southwest and east of the site, respectively.

The east and north parts of the site is underlain by a clayey silt representing the Lawton Clay member of the Vashon Drift. Locally, the Lawton Clay has a reported thickness of 25 feet. The west and south half of the site is underlain by sand and/or silty sand (sand unit). This material is believed to represent a combination of fill material (near surface) and the Esperance Sand member of the Vashon Drift. At the west and south half of the site, the clay has been intercepted at depths ranging from 8 to 18 feet below ground surface (BGS).

Groundwater at the site is reported to be perched within the sand unit where it overlies clay. At the site, the depth to groundwater varies from 6 to 8 feet BGS. Groundwater elevation data from an adjacent property indicates that groundwater in the area of the site flows to the southwest with a gradient of 0.53. Based on slug test data from an adjacent property (Unocal), the average hydraulic conductivity for the aquifer is 4.98×10^{-4} feet per minute.

On- and Off-site Soil and Groundwater Quality

Onsite Conditions

Between June 1995 and January 1996, Clayton Environmental Consultants, Inc. (Clayton) investigated the subsurface soil and groundwater quality at the site. Clayton's activities and findings were as follows:

- Two soil borings were drilled at the site and three soil borings were drilled off-site. The on-site borings were installed between the former Unocal gasoline station and the former Orestes Restaurant. Off-site soil borings were located on the south side of West Roy Street (Figure 3).
- On-site, soil borings (B1 and B2) were drilled to a depth 15 feet BGS, while off-site soil borings (B3, B4, and B5) were drilled to a depth of 15 to 19 feet BGS. One soil sample from each boring, collected near the water table, was analyzed for total petroleum hydrocarbons (TPHs), BTEX (benzene, toluene, ethylbenzene, and xylenes), and halogenated volatile organic compounds (HVOCs). Groundwater monitoring wells were

installed in soil borings B1, B2, and B3 (MW-1, MW-2, and MW-3, respectively).

- BTEX and TPHs were not detected in soil samples or were at concentrations less than the applicable MTCA cleanup standards. HVOCs were only detected in soil boring B2. At a depth of approximately 11 feet BGS, perchloroethylene (PCE) and trichloroethylene (TCE) were detected in sample B2-S3 at concentrations of 2.3 mg/Kg and 0.04 mg/Kg, respectively.
- Groundwater monitoring wells MW-1 and MW-2 were screened between 5 and 15 BGS, while MW-3 was screened between 9 and 19 feet BGS. As of Clayton's last groundwater sampling event (January 4 and 5, 1996), HVOCs were detected in all three wells, while petroleum hydrocarbons were not detected. The HVOC concentrations were as follows:

Well No.	perchloroethylene (µg/L)	trichloroethylene (µg/L)	1,2-dichloropropane (µg/L)
MW-1	27	6.4	9.6
MW-2	340	17	nd
MW-3	120	42	nd

- A passive soil gas survey was conducted in December of 1995. Seven soil gas probes were installed at the site and five were installed off-site (Figure 4). Concentrations of perchloroethene (PCE) and trichloroethene (TCE) at the site ranged from non-detect to 3.5 ng/L and non-detect to 0.24 ng/L, respectively. Off-site concentrations of PCE and TCE ranged from 0.363 ng/L to 27.3 ng/L and non-detect to 0.363 ng/L, respectively.

Between December 1997 and March 1998, Quality Environmental Services Team, Inc. (QUEST) removed a 4000-gallon PS-300 oil underground storage tank (UST), an 860-gallon mineral spirits UST, and 175- and 200-gallon vessels containing PHs and HVOCs (Figure 5). Quest's activities and findings were as follows:

- A 4000-gallon PS-300 UST was removed from the Northwest portion of the Site. The integrity of the UST was good (no holes or cracks); however, water and oil were discovered in the UST. Groundwater entered the UST excavation pit at a depth of 10 feet BGS. The HVOC and TPH concentrations in stockpile soil samples were as follows:

Sample No.	PCE (mg/Kg)	TCE (mg/Kg)	cis 1,2-DCE (mg/Kg)	TPH-D (mg/Kg)	TPH-O (mg/Kg)
ASTOCK	140	0.956	0.712	148	166
BSTOCK	nd	nd	0.715	650	422

PCE = perchloroethene, TCE = trichloroethene, DCE = dichloroethene,

TPH-D = diesel range TPHs, TPH-0 = heavy oil range TPHs

HVOC and fuel compounds were also detected in the water and oil pumped from the UST.

- An 860-gallon UST containing mineral spirits was removed from the northwest corner of the site. The UST contained a mixture of product and water. A soil sample collected from the bottom of the UST excavation pit, at a depth of six feet BGS, contained aromatic hydrocarbons, and HVOCs. HVOCs were detected at the following concentrations:

Sample No.	PCE (mg/Kg)	TCE (mg/Kg)	cis 1,2- DCE (mg/Kg)	1,2-DCP (mg/Kg)	TPH-G (mg/Kg)
FS@6'	130	0.960	0.071	0.710	16,000

PCE = perchloroethene, TCE = trichloroethene, DCE = dichloroethene, DCP = Dichloropropane, TPH-G = gasoline range TPHs

- A 175-gallon and a 200-gallon underground vessel were removed from near the south side of the 860-gallon UST. Characterization of the liquid in the vessels showed that they contained aromatic hydrocarbons and HVOCs.

Off-site Conditions

Arnold's Texaco

Arnold's Texaco is located approximately 250 feet southwest of the site at the intersection of West Roy Street and Queen Anne Avenue North (Figure 2). In 1986, GeoEngineer, Inc. (GEI) installed eight groundwater-monitoring wells down gradient from the station (i.e., to the southwest). Dissolved petroleum hydrocarbons were discovered in the groundwater. Light non-aqueous phase liquid (NAPL) was intercepted in well MW-6 located just west of the station. At present, a groundwater pump and treat system is active at the station.

Former Unocal Gasoline Station

The Unocal gasoline station was formerly located directly west of the site at 700 Queen Anne Avenue North. Since 1986, GEI has conducted an ongoing investigation of subsurface soil and groundwater quality at the station. During this time, GEI has drilled nine soil borings, installed nine-groundwater monitoring wells, excavated 16 test pits, and at minimum, has performed yearly groundwater quality monitoring. In February of 1992, GEI monitored the removal of six USTs from the station: two 12,000-gallon gasoline tanks, one 550-gallon heating oil tank, and one 500-gallon waste oil tank..

Petroleum contaminated soil and groundwater have been discovered throughout the station. Concentrations of TPHs and BTEX have been detected in both soil and groundwater at concentrations exceeding MTCA Method A groundwater cleanup standards. In addition, chlorinated solvents have been detected in two groundwater-monitoring wells located near the former Orestes Restaurant. Free product has been detected in two wells located down gradient of the station.

Results from the most recent groundwater sampling event at the station (August and November 1997) indicated that depth to groundwater ranged from 7.6 to 17.5 feet BGS in August, and 7.6 to 18.2 feet BGS in November. Free product was detected in two off-site wells and dissolved petroleum hydrocarbons were detected in the remaining wells (six wells) at concentrations that exceed MTCA Method A groundwater cleanup standards. HVOCs were also detected in the two monitoring wells located near the former Orestes. Concentrations of HVOCs exceeded both MTCA Methods A and B groundwater cleanup standards.

Groundwater Usability

Down gradient of the site, residents and commercial businesses obtain their drinking water from the City of Seattle's municipal water supply system. Therefore, groundwater underlying the site and surrounding area currently does not serve as a source of drinking water, and most likely will not serve as a future source. Currently, under WAC 173-340-720 of the Washington State's Model Toxics Control Act (MTCA), groundwater is not a potential future source of drinking water if:

1. The groundwater is present in insufficient quantity to yield greater than 0.5 gallons per minute on a *sustainable basis* to a well constructed in accordance with *normal domestic water well* construction practices;
2. The groundwater contains natural background concentrations of organic or inorganic constituents which make use of the water for drinking not practical;
3. The concentration of total dissolved solids in the groundwater is greater than 10,000 mg/L; or
4. Groundwater is situated at a greater depth or location, which makes recovery of water for drinking water purpose technically impossible.

Based on Clayton and GEI reports, groundwater underlying the site is probably not a future source of drinking water. This conclusion is based on the following rationale:

- Groundwater underlying the site and surrounding area appears to be perched and discontinuous. Therefore, it is unlikely that the groundwater is a source of drinking water or will ever yield greater than 0.5 gallons per minute on a *sustainable basis* from a *domestic water well*.

- The area background groundwater quality is poor due to release of petroleum hydrocarbons and solvents from the Texaco and former Unocal stations and the site.
- A deep potable water supply may exist beneath the site and surrounding area. This potential drinking water supply, if it exists, is probably protected from the overlying contaminated shallow aquifer by a clayey silt layer. Locally, this layer is up to 25 feet thick.

On-site Groundwater Cleanup Standards

Assuming that groundwater underlying the site and surrounding area is not a future source of drinking water and that the groundwater eventually discharges to the Puget Sound, MFM proposes that surface water quality standards be applied to evaluate groundwater quality at the site. Under WAC 173-201-040, the State of Washington has not established marine water quality criteria for PCE, TCE, 1,2 -dichloroethylene (DCE), and vinyl chloride (VC), but defers to the Federal Register (i.e., 40 CFR 131.36). However, the CFR does not establish water quality criteria for DCE and DCP. Therefore, MFM proposes the following site-specific groundwater quality standards based on EPA ambient water quality criteria and MTCA Method B surface water cleanup standards:

Contaminants of Concern	EPA Ambient Water Quality ($\mu\text{g/L}$) ⁽¹⁾	Method B Cleanup Standard ($\mu\text{g/L}$)
perchloroethylene	8.85	NA
trichloroethylene	81	NA
1,2-dichloropropane	NA	80
cis 1,2-dichloroethylene	NA	23.2
vinyl chloride	525	NA

(1) = based on the consumption of organisms, NA = not applicable under present scenario

Considering the distance between the site and the Puget Sound, and as the result of natural attenuation along the groundwater flow path, the concentrations of HVOCs reaching the Sound from the site would be significantly less than MFM's proposed cleanup standards. The MTCA Policy Advisory Committee has considered amending the MTCA regulations to allow an estimate of the dilution that occurs between an upland monitoring well and the point of discharge to surface water to be used to calculate cleanup levels at a point of compliance.

On-site Soil Cleanup Standards

MFM proposes to use MTCA Method B soil cleanup standards for BTEX and HVOCs and Method A soil cleanup standards for TPHs. Proposed soil cleanup standards are as follows:

Contaminants of Concern	Method A Cleanup Standard (mg/Kg)	Method B Cleanup Standard (mg/Kg)
perchloroethylene	NA	19.6
trichloroethylene	NA	90.9
1,2-dichloropropane	NA	14.7
cis 1,2-dichloroethylene	NA	800
vinyl chloride	NA	0.526
benzene	NA	34.5
toluene	NA	16,000
ethylbenzene	NA	8000
xlenes	NA	160,000
TPH-gasoline range	100.0	NA
TPH-diesel range	200.0	NA
TPH-heavy oil range	200.0	NA

NA = not applicable under present scenario

Should a significant volume of petroleum contaminated soil be intercepted at the site, WDOE's Interim TPH Policy may be applied to establish a risk based cleanup criteria for TPHs.

Proposed Land Use

The proposed structure for this site will rest on an essentially flat site at the south toe of Queen Anne Hill. An existing structure extends along the north property line across perhaps half the site. The north wall of this structure retains approximately 15 feet of earth as it provides a transition from the hill to more even terrain. This wall will be incorporated within new construction by means of piles and temporary reinforcing that will brace the wall during construction of a new retaining wall and it's own reinforcing slabs, columns, walls, footings and piles.

The proposed structure is comprised of three stories of wood-framed residential construction which bear upon two stories of concrete construction that will serve two levels of parking. the concrete slabs are post-tensioned. Columns rest upon spread footings in current drawings, yet must in all cases, bear upon competent, undisturbed earth. The fact of tank removal accordingly implies auger-cast piles in certain instances, however the exact extent of pile construction cannot be accurately

addressed at this time. Other parts of the site will require excavation. The most challenging area in this regard is presented by an underground electrical vault, approximately ten (10) feet in depth at the extreme southwest corner of the site. Soils log number four (4) indicates groundwater at nine feet. Earth must be retained along the property line, thus implying soldier piles and stepped footings to retaining walls.

Site Remediation and Development

In an effort to expedite the development of the site, MFM proposes to remediate contaminated soil and groundwater if intercepted during the course of site development. MFM anticipates intercepting contaminated soil and groundwater along the west and south sides of the site. If so, MFM proposes to treat contaminated soil and groundwater as follows:

- Excavate contaminated soil until the concentrations of COC are lower than applicable MTCA Cleanup standards, the boundaries of the site are reached, or the clayey silt layer underlying the site is intercepted. Contaminated soil will be disposed of at an off-site facility licensed by the State of Washington to accept petroleum-contaminated soil and/or hazardous waste.
- Soil samples will be collected in situ and analyzed for PHs and HVOCs using an on-site mobile laboratory.
- Contaminated groundwater will be treated at the site using a combination of air sparging and a carbon trap. MFM anticipates that treated groundwater will be discharged to the METRO sanitary sewer system.
- Effluent samples from the groundwater treatment system will be regularly analyzed to determine compliance with applicable METRO water quality standards.

As alternative, MFM may consider remediating contaminated soils prior to site development. This effort would focus on contaminated soil discovered along the west side of the site. Groundwater entering the excavation will be pumped and treated at the site or disposed of at an off-site facility licensed to except hazardous waste.

Institutional Controls

Based on MFM's present plans for developing the site, residual concentrations of hazardous substances in the soil and groundwater that exceed applicable cleanup standards may be left in place. Therefore, MFM is willing to discuss applying institutional controls to the site in an effort to limit direct human exposure to hazardous

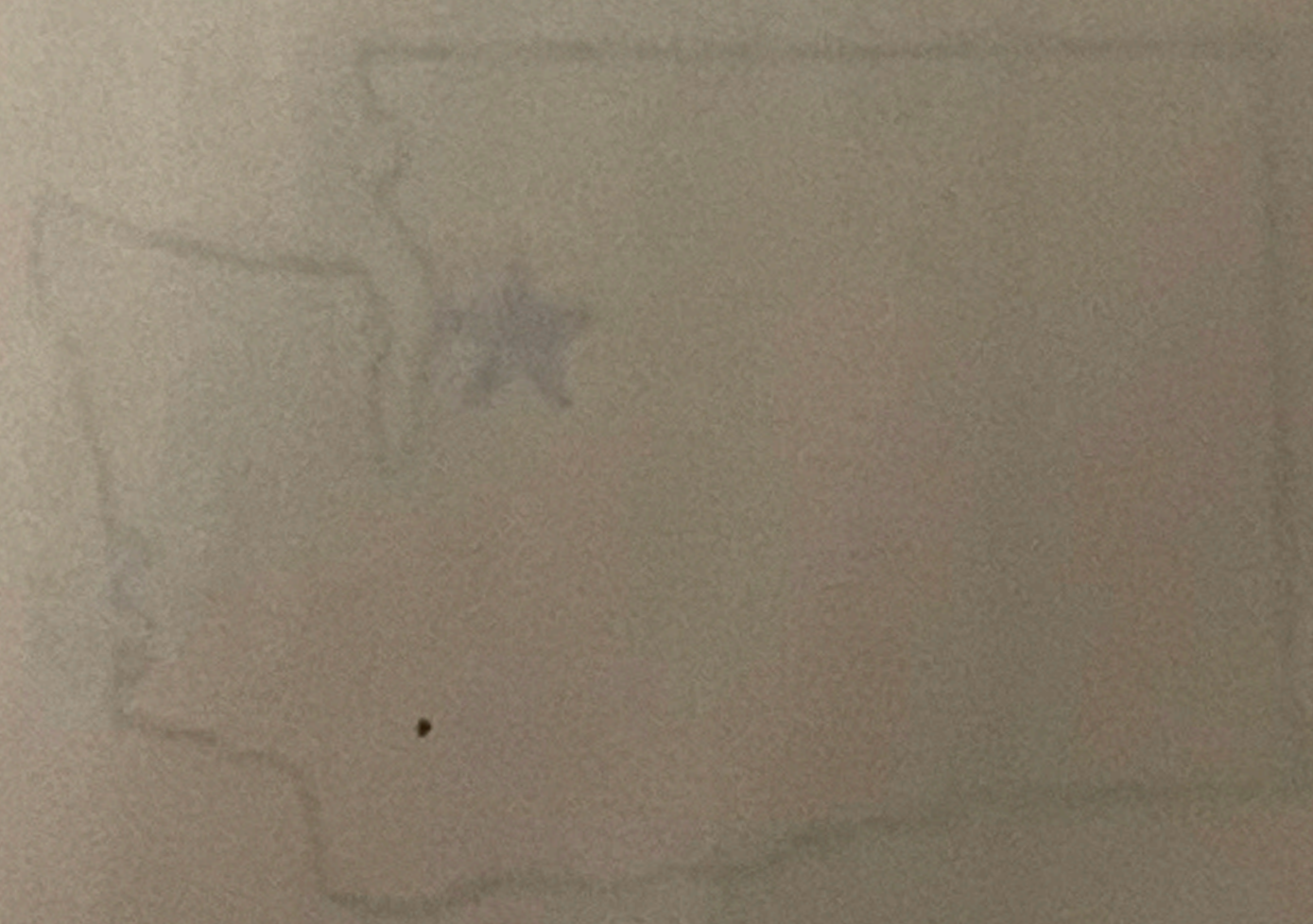
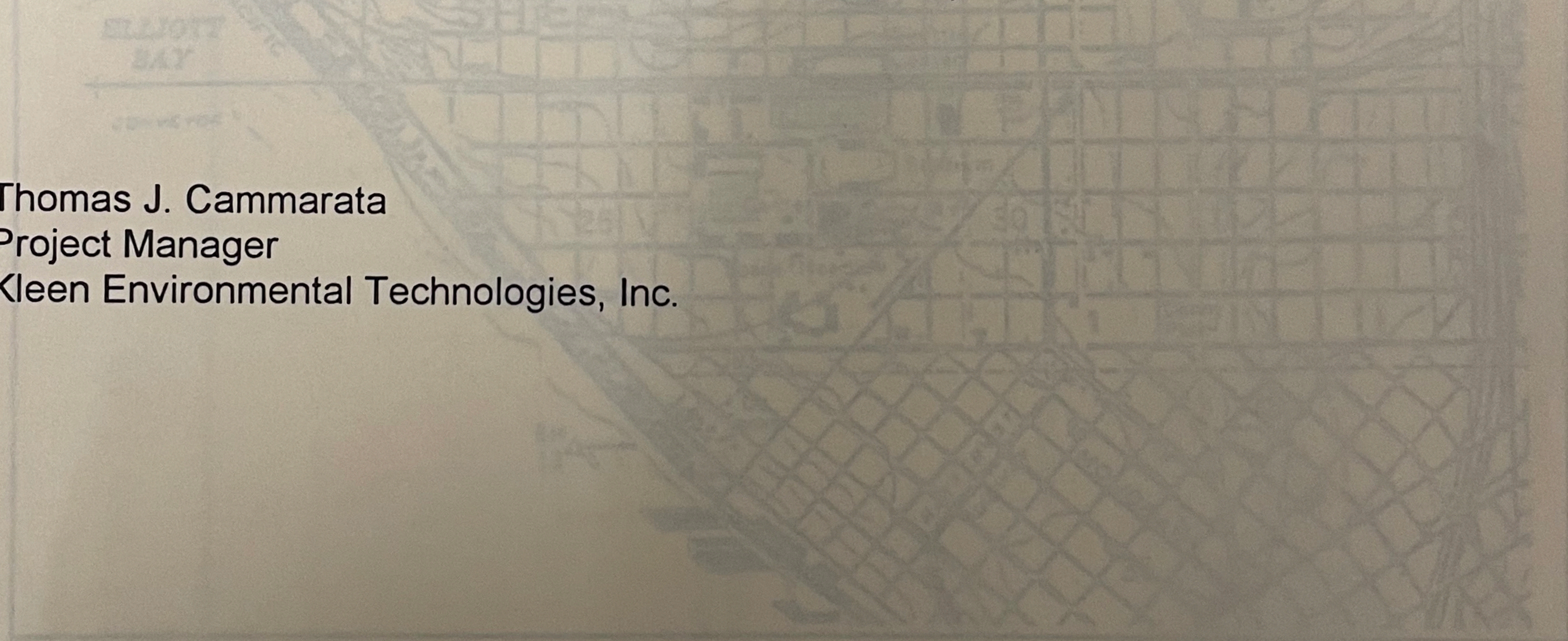
substances. MFM does not view the institutional controls as a substitute for cleanup action but as a means of expediting site development.

Conclusions

MFM would like to work in conjunction with WDOE to construct a plan to develop the site in conjunction with site remediation. MFM asserts that groundwater underlying the site is not a present or future source of drinking water and any contamination remaining at the site after development will not be a threat to human health or the environment. Additionally, since site development will probably lead to the removal of some contaminated soil and groundwater, area groundwater quality in the vicinity of the site may improve.

Thank you for your consideration in reviewing this report. Should you have any questions regarding site development or existing site conditions, please contact Thomas Cammarata at Kleen Environmental Technologies, Inc. (206-285-8010) or Ron Isaacs at Motion Financial Management (604-926-1642).

Thomas J. Cammarata
Project Manager
Kleen Environmental Technologies, Inc.



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1 mile

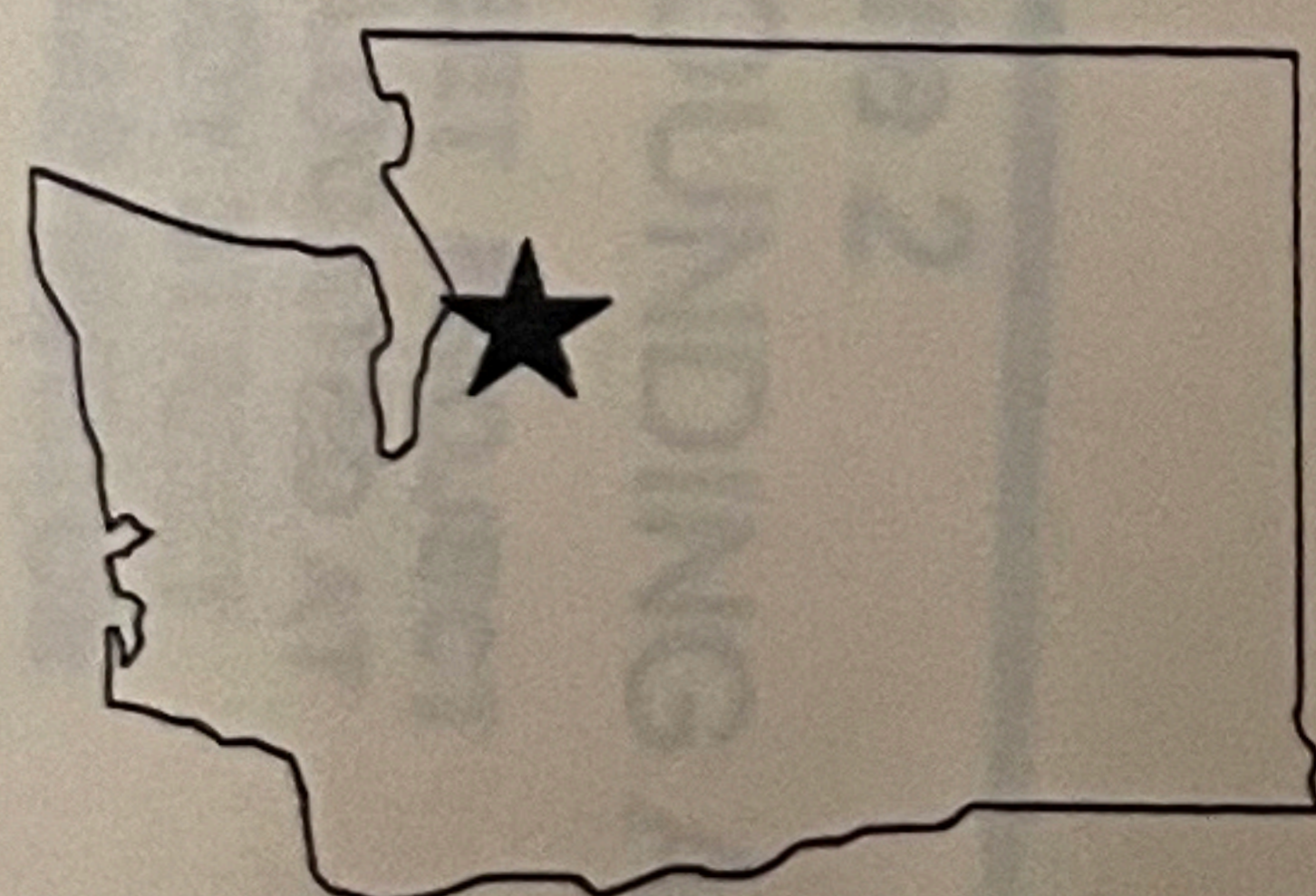
SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC SURVEY MAP
SEATTLE NORTH QUADRANGLE

Kleen ENVIRONMENTAL TECHNOLOGIES, INC.

USGS MAP

14 ROY STREET HIGH STREET PROJECT
PROPERTY LOCATED AT
WEST 14 ROY STREET
SEATTLE, WASHINGTON

PROJECT NO: 700	SCALE: 1"=100'	FILE: 14ROY
DESIGNED BY: TJC	DATE: 10/90	CHECKED BY:



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC SURVEY MAPS OF SEATTLE NORTH QUADRANGLE.

Kleen ENVIRONMENTAL TECHNOLOGIES, INC..

PROJECT NO.: 7043

DESIGNED BY: TJC

DRAWN BY: TJC

SCALE: 1:24,000

DATE: 7/20/98

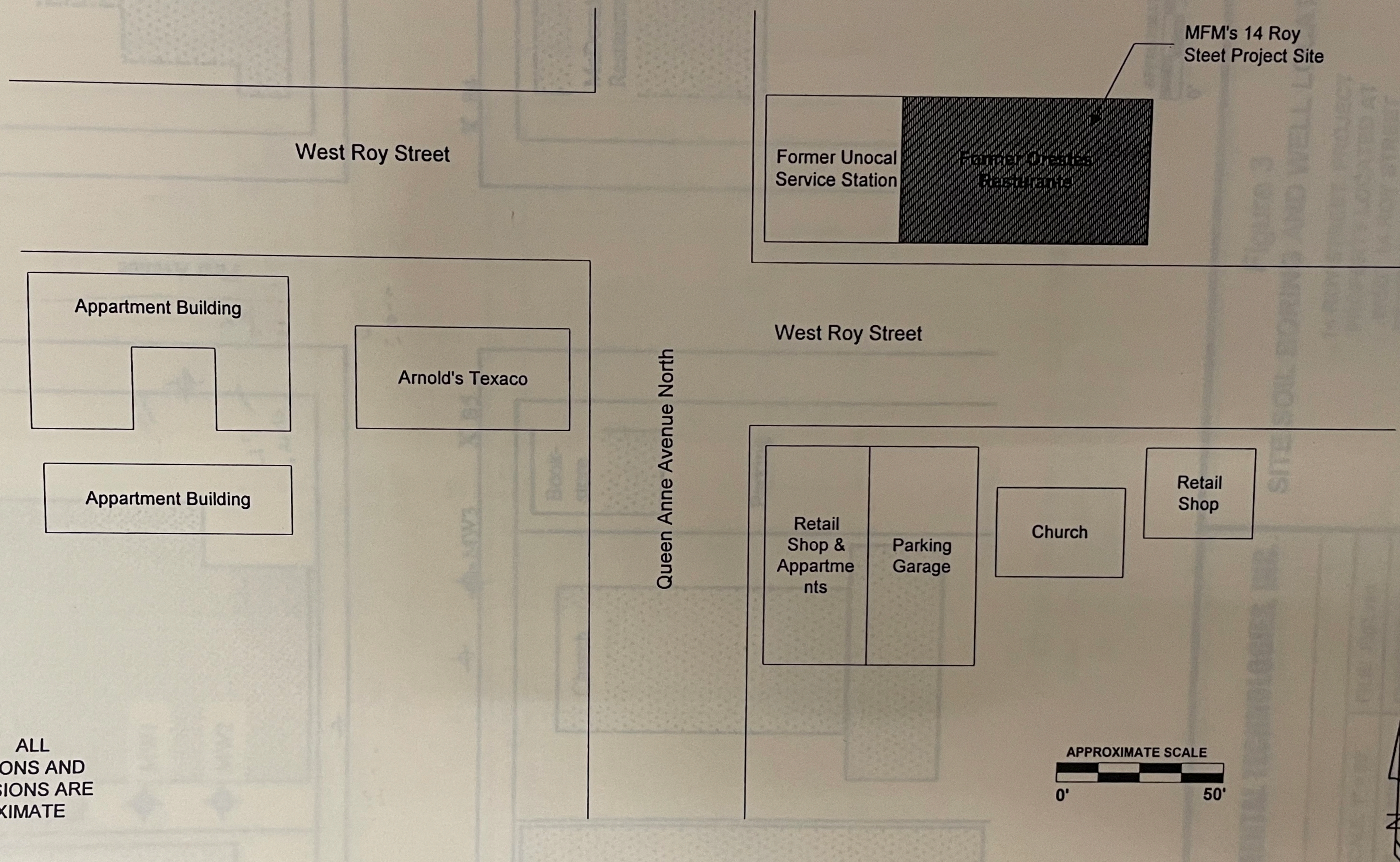
FILE: FIG1.VSD

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Figure 1
USGS MAP

14 ROY STREET ROY STREET PROJECT
PROPERTY LOCATED AT
WEST 14 ROY STREET
SEATTLE, WASHINGTON

NOTE: ALL
LOCATIONS AND
DIMENSIONS ARE
APPROXIMATE



Kleen ENVIRONMENTAL TECHNOLOGIES, INC.

PROJECT NO.: 7043

DESIGNED BY: TJC

SCALE: 1" = 20'

FILE: Fig4.vsd

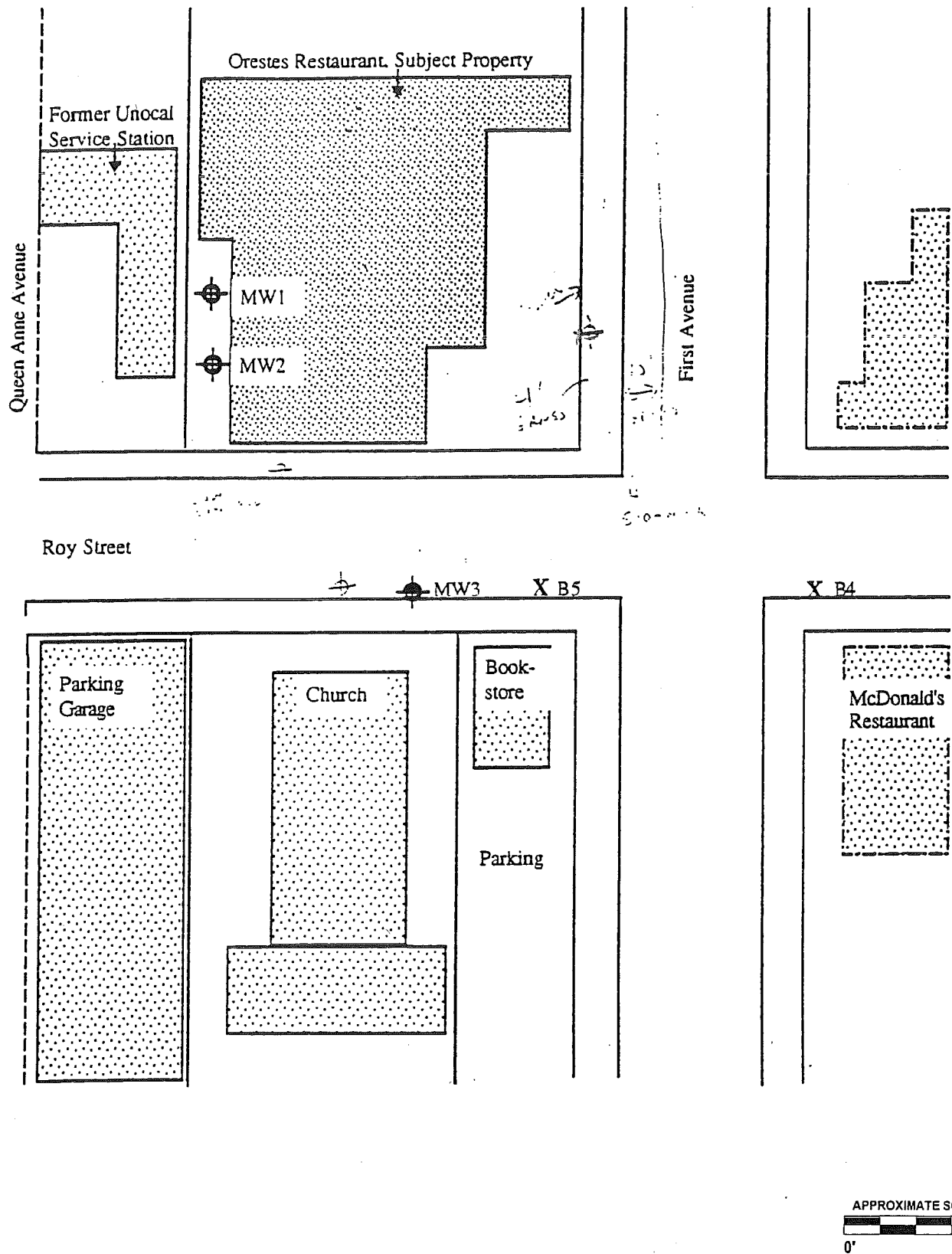
DRAWN BY: TJC

DATE : 7/20/98

CHECKED BY:

Figure 2
SITE AND SURROUNDING AREA

14 ROY STREET PROJECT
PROPERTY LOCATED AT
WEST 14 ROY STREET
SEATTLE, WASHINGTON



Kleen ENVIRONMENTAL TECHNOLOGIES, INC.

PROJECT NO.: 7043

DESIGNED BY: TJC

DRAWN BY: TJC

SCALE: 1" = 50'

DATE: 7/20/98

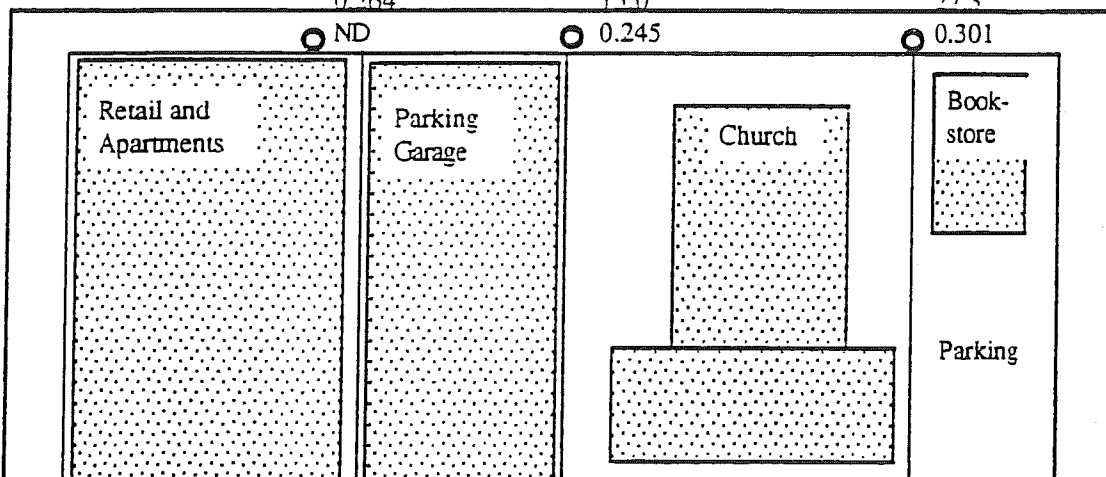
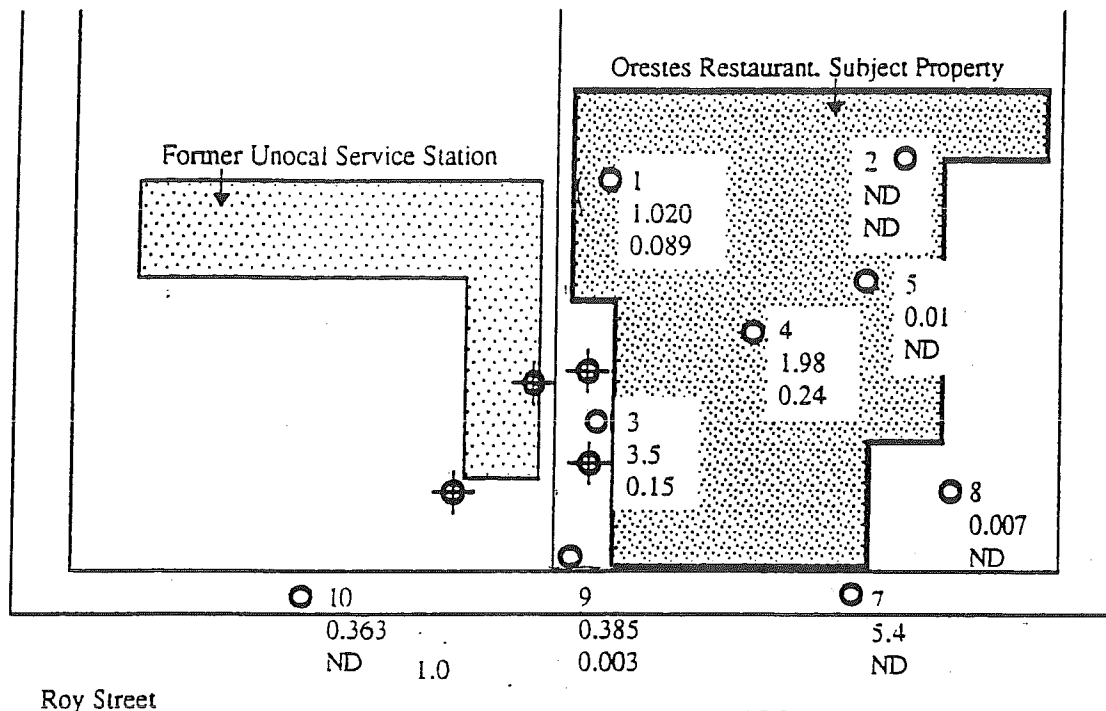
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Figure 3
SITE SOIL BORING AND WELL LOCATIONS

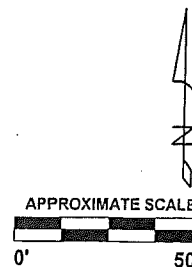
14 ROY STREET PROJECT
PROPERTY LOCATED AT
WEST 14 ROY STREET
SEATTLE, WASHINGTON

Queen Anne Avenue



LEGEND

- 11 ○ Soil Gas Sample Locations and Sample Number
- 0.246 PCE Concentration in ng/L
- ND TCE Concentration in ng/L



Kleen ENVIRONMENTAL TECHNOLOGIES, INC..

PROJECT NO.: 7043

DESIGNED BY: TJC

SCALE: 1" = 50'

FILE: Fig4.vsp

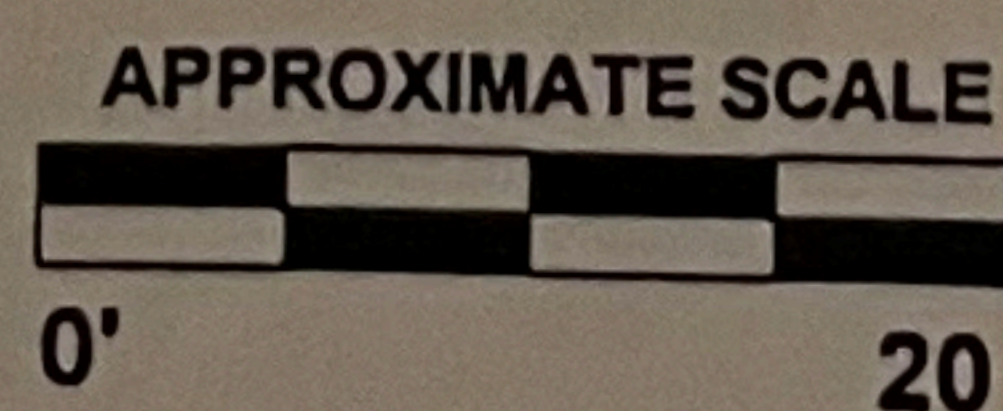
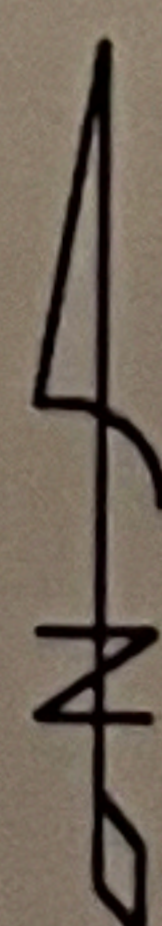
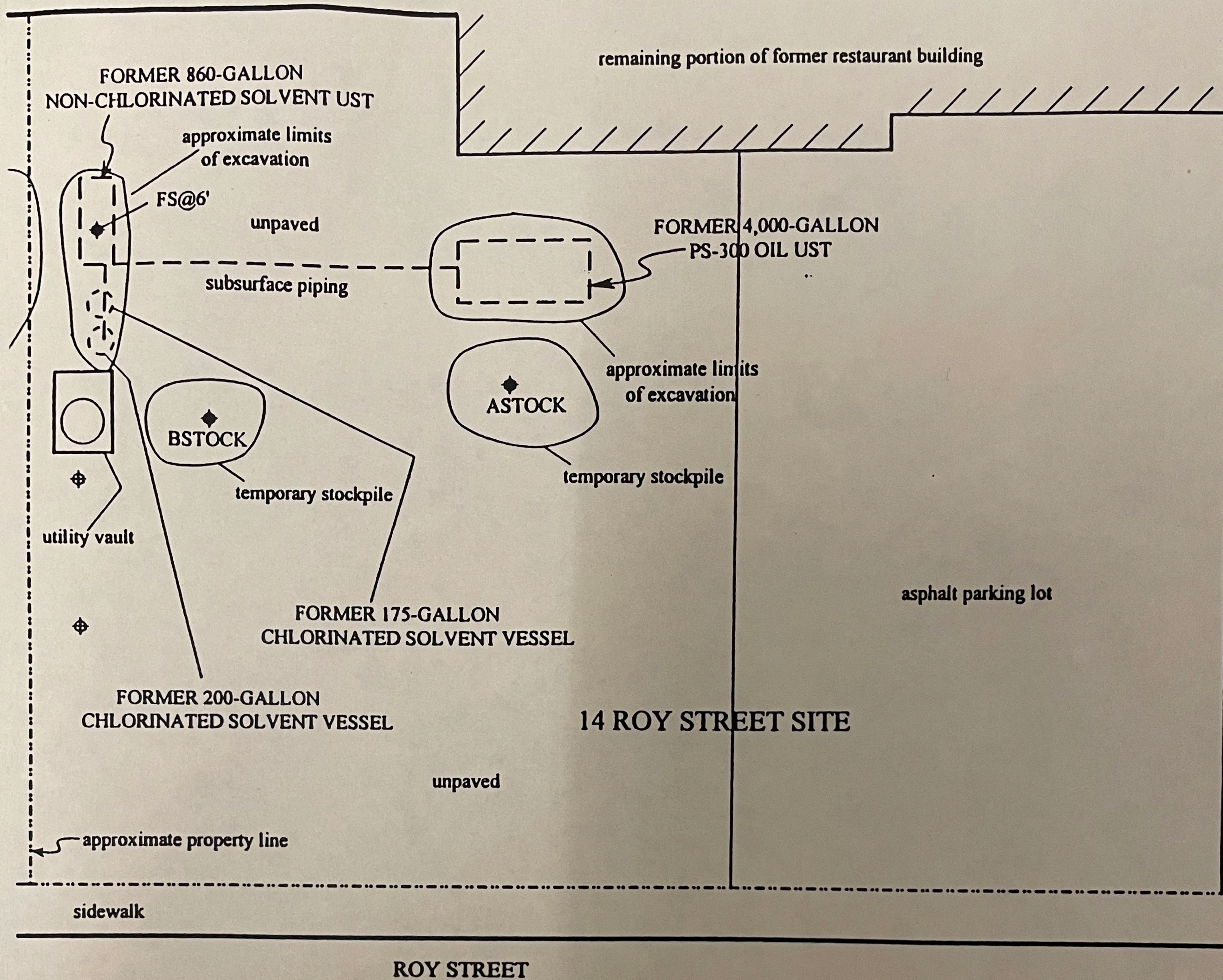
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Figure 4
SITE SOIL GAS PROBE LOCATIONS

14 ROY STREET PROJECT
PROPERTY LOCATED AT
WEST 14 ROY STREET
SEATTLE, WASHINGTON



Kleen ENVIRONMENTAL TECHNOLOGIES, INC..

PROJECT NO.: 7043

DESIGNED BY: TJC

DRAWN BY: TJC

SCALE: 1" = 20'

DATE: 7/20/98

FILE: Fig4.vsd

CHECKED BY:

Figure 5
SITE FORMER UST LOCATIONS

14 ROY STREET PROJECT
PROPERTY LOCATED AT
WEST 14 ROY STREET
SEATTLE, WASHINGTON