Summary Report
I-5 - Reconstruct Interchange at NE 134th

Prepared for
Washington State Department of Transportation
Vancouver, Washington

May 6, 2011
17782-01

HARTCROWSER

This page is intentionally left blank
for double-sided printing.

Summary Report
I-5 - Reconstruct Interchange at NE 134th

Prepared for
Washington State
Department of Transportation
Vancouver, Washington

May 6, 2011
17782-01

Prepared by
Hart Crowser, Inc.

Ross Stainsby, LHG
Senior Associate

1700 Westlake Avenue North, Suite 200
Seattle, Washington 98109-6212
Fax 206.328.5581
Tel 206.324.9530

This page is intentionally left blank
for double-sided printing.

CONTENTS

SUMMARY REPORT
I-5 - RECONSTRUCT INTERCHANGE AT NE 134TH
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
VANCOUVER, WASHINGTON

1.0 INTRODUCTION

We understand the Washington State Department of Transportation (WSDOT) is considering purchasing a portion of the Vista Mart property to accommodate a road widening project. The site was a retail gasoline station that is currently not in operation. The Washington State Department of Ecology reports that the underground storage tanks (USTs) are empty and temporarily closed in place. A sampling and analysis plan (SAP) has been prepared as part of the environmental support services to determine if there is petroleum contamination associated with the property prior to WSDOT acquisition (Hart Crowser 2011). Our understanding of this project is based on the WSDOT Architectural & Engineering Scope of Work, dated February 28, 2011.

The purpose and objectives of the sampling and analysis program is to determine if groundwater is contaminated and the approximate volume of soil exceeding the Washington State Model Toxic Control Act (MTCA) Method A cleanup levels.

2.0 SITE LOCATION

The Vista Mart is located at 13908 NE 20th Avenue in Vancouver, Washington (Figure 1). The site is located on the northwest corner of the intersection of NE 20th Avenue and NE 17th Avenue (Figure 2). The portion of the property to be purchased is approximately 250 feet long by 15 to 30 feet wide along NE 20th Avenue and 120 feet long by 0 to 30 feet wide along NE 17th Avenue. The right of way lines provided by WSDOT shown on Figure 2 are approximate and indicate that the portion purchased by WSDOT may encroach partly over the UST area.

3.0 SITE BACKGROUND AND HISTORY

The site has been identified by the Washington State Department of Ecology (Ecology) Toxics Cleanup Program, and is on their Confirmed and Suspected Contamination Site List. The site name is listed as "L & C Deli" and "Vista Mart" under two Ecology ID numbers. Site address 13908 NE 20th Avenue has an

Ecology ID number 1035 and Underground Storage Tank (UST) number 7176. Its status was listed as "Removed from Hazardous Sites List" on November 1, 1993. Site address 13905 NE 20th Avenue has an Ecology ID number of 007176. It is presumed that both ID numbers are for the same UST system.

We understand that Ecology imposed an enforcement order, which required remediation of the site in the early 1990s, because of a petroleum release. Ecology site records indicate that remediation of soil and groundwater contamination has occurred since 1991. However, it is believed that soil and groundwater petroleum contamination remain. We also understand that the MTCA Method A cleanup levels that were in effect at the time of the enforcement order remain in effect for the site.

4.0 GEOLOGY AND HYDROGEOLOGY

The geology encountered during push-probe investigations varied across the site. The soil under the asphalt ranged from sandy Gravel (Fill) to gravelly Silt with Silt, Clay, and Sand units below. The Silt and Clay units are prominent in the northern push-probe explorations (PP-4, PP-9, and PP-10 and in the southern push probe locations (PP-2 and PP-3). The soils near the UST and pump island have a Silt unit over a Sand unit, except for PP-8, which encountered a Sand unit over a Silt unit. The thickness of each unit varies across the site.

Groundwater was encountered at depths ranging from 4.5 to 12.5 feet below ground surface (bgs) during the push-probe explorations. The groundwater appears to be perched water on top of the Silt unit. Based on regional topography, groundwater likely flows to the southeast.

5.0 SUMMARY OF INVESTIGATION ACTIVITIES

5.1 Direct-Push Probe Investigation

ESN Northwest, Inc. of Olympia, Washington, completed ten direct push-probe explorations, PP-1 through PP-10 on March 25, 2011. These probes were located within the area to be purchased by WSDOT and near all four sides of the UST area. Two probes (PP-2 and PP-3) were located within the roadway to evaluate for possible off-site contaminant migration which may impact future road and utility construction. The push-probes were continuously sampled to depths of approximately 12 to 16 feet bgs. The exploration locations are shown on Figure 2 and boring logs are provided in Appendix A.

Before this subsurface investigation, we contacted One-Call to locate utilities in the public right-of-way (ROW) and contracted with a private utility locating company to locate potential utilities on private property.

After the samples were collected, the probe locations were backfilled and abandoned in general accordance with the State of Washington Administrative Code on Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 WAC).

Investigation-derived waste associated with this environmental investigation was stored in labeled drums, pending receipt of laboratory results, waste designation, and appropriate disposal.

5.2 Soil Sampling and Analytical Results

Hart Crowser collected and field screened continuous soil samples from direct push probes PP-1 through PP-10 at 4-foot-depth intervals. Field screening included a combination of photoionization detector (PID) tests, sheen tests, and visual observations.

Ten soil samples were collected, one from each push-probe. In general, the soil samples from the groundwater interface were selected for chemical analysis. The samples collected from push-probes PP-2, PP-5, and PP-6 had field indications of potential contamination.

All soil samples were submitted to Apex Labs (Apex) of Tigard, Oregon for chemical analysis of diesel- and oil-range petroleum hydrocarbons by NWTPH-Dx; gasoline-range petroleum hydrocarbons by NWTPH-Gx; benzene, ethylbenzene, toluene, and total xylenes (BETX) by EPA Method 8021; and lead by EPA Method 6010C.

Soil Analytical Results

Soil analytical results were compared to the current MTCA Method A cleanup levels (Table 1). However, since the Vista Mart site is under an Ecology enforcement order, a brief evaluation of the results in comparison to the 1991 MTCA Method A cleanup levels are also provided in Table 1 and further discussed in Section 6 of this report.

Soil sample PP-5-7 was reported to contain gasoline-range petroleum hydrocarbons at 198 mg/kg, exceeding the MTCA Method A cleanup level of 30 mg/kg. BETX was also detected in the sample, however, the benzene concentration of 1.10 mg/kg was the only compound detected above its

respective cleanup level (0.03 mg/kg). Soil sample PP-5-7 was also reported to contain diesel- and oil- range petroleum hydrocarbons at 1,630 mg/kg and 109 mg/kg respectively, below MTCA Method A cleanup levels of 2,000 mg/kg.

Soil sample PP-2-7.5 and PP-6-6 were reported to contain benzene at 0.0901 mg/kg and 0.470 mg/kg, exceeding the MTCA Method A cleanup level of 0.30 mg/kg.

The analytical results for the direct push-probe soil samples are summarized in Table 1. The results of our review of chemical data quality and laboratory reports are provided in Appendix B.

5.3 Groundwater Sampling and Analytical Results

Groundwater samples were collected from temporary 3-foot miniwells installed in each of the ten shallow push probe explorations, PP-1 through PP-10. One sample from each location was submitted to Apex for chemical analysis of diesel-, oil-, gasoline-range petroleum hydrocarbons, and BETX. Five groundwater samples (PP-2, and PP-5 through PP-8) were also analyzed for total lead. Details of the Hart Crowser grab groundwater sampling procedures can be found in the SAP (Hart Crowser 2011).

Due to the low permeability of the soil and the limited groundwater available in the perched water zones, groundwater sample volumes were limited and, typically, were highly turbid.

Groundwater Analytical Results

Groundwater analytical results were compared to the current MTCA Method A cleanup levels (Table 2). Since the Vista Mart site is under an Ecology enforcement order we have also provided the 1991 MTCA Method A cleanup levels.

Groundwater samples PP-2, PP-5, and PP-6 were reported to contain gasoline-range petroleum hydrocarbons exceeding the current MTCA Method A cleanup level of 800 ug/l at 2,550, 10,900, and 2,300 ug/l, respectively.

Groundwater samples PP-2, PP-5, and PP-6 were also reported to contain diesel-range petroleum hydrocarbons at 2,550, 10,900, and 2,300 ug/l, exceeding the MTCA Method A cleanup level of 500 ug/l. However, the laboratory reported that the diesel results in samples PP-2 and PP-6 were due to overlap from hydrocarbons eluting primarily in the gasoline range.

Groundwater sample PP-5 was also reported to contain oil-range petroleum hydrocarbons at 915 ug/l, which exceeds the current MTCA cleanup level of 500 ug/l. However, the laboratory indicated that the sample PP-5 oil results were likely due to hydrocarbons eluting primarily in the diesel range.

Groundwater samples PP-5 and PP-6 were reported to contain benzene at concentrations above the current MTCA Method A cleanup level of 5 ug/l at 2030, and 724 ug/l, respectively.

All five total lead groundwater sample concentrations exceeded the current MTCA Method A cleanup level of 0.015 ug/l. These exceedances are likely due to the turbidity of the samples and are not reflective of the actual total lead concentrations in the groundwater.

The analytical results for the push-probe grab groundwater samples are summarized in Table 2. The results of our review of chemical data quality and laboratory reports are provided in Appendix B.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The soil and groundwater sample analytical results, as compared to the current MTCA Method A cleanup levels and our field observations, indicate that petroleum hydrocarbon contamination is present at push-probe locations PP-2, PP-5, and PP-6.

6.1 Right-of-Way Acquisition Area

Based on our findings in the right-of-way acquisition area and experience at similar sites, we estimate that there is approximately 400 tons (assume 1,800 square feet and 4 feet thick) of petroleum contaminated soil that exceeds current MTCA Method A unrestricted use soil cleanup levels. The estimated cost to excavate and dispose of petroleum contaminated soil and backfill with imported material typically is between $120 and $170 per ton. The estimated cost to excavate and backfill this area is approximately $48,000 to $68,000.

Should WSDOT remediate contaminated soils within the proposed right-of-way, we understand the Ecology Enforcement Order requires soils to be cleaned up to the 1991 MTCA Method A cleanup levels. Concentrations of heavy oil in samples PP-1-6 and PP-10-13 were 210mg/kg and 216 respectively, which is slightly above the 1991 MTCA cleanup level of 200 mg/kg. These concentrations are typically reduced when laboratories are directed to perform a silica gel cleanup to eliminate possible organic interference.

If the 1991 MTCA Method A cleanup levels were used, based on our findings in the right-of-way acquisition area and experience at similar sites, we assume, there is, approximately 500 tons of petroleum contaminated soil. The fee to excavate and dispose of petroleum contaminated soil and backfill with imported material typically costs between $120 and $170 per ton. The estimated cost to excavate and backfill this area is approximately $60,000 to $85,000.

6.1 UST Removal

Should WSDOT consider removing the USTs, the typical cost for removing of the USTs and associated piping (not including the pumps) is approximately $30,000 to $50,000. Based on our findings and experience at similar sites, we would assume, that there is, at a minimum 800 tons of petroleum contaminated soil. The fee to excavate and dispose of petroleum contaminated soil and backfill with imported material typically costs between approximately $120 and $170 per ton. Therefore, the cost to remove the USTs, dispose of the petroleum contaminated soil, and backfill the excavation would be between approximately $126,000 and $186,000.

7.0 REFERENCES

Ecology, 2007. Model Toxics Control Act (MTCA) cleanup regulation, chapter 173-340 WAC.

Hart Crowser, 2011. Sampling and Analysis Plan Reconstruct Interchange at NE134th, Prepared for the Washington State Department of Transportation, March 9, 2011.

J:\Jobs\1778201\Summary Report\Summary Report.doc

Table 1 - Analytical Results for Soil Samples

Sample ID	Method A Cleanup Levels		PP-1-6	PP-2-7.5	PP-3-6	PP-4-6	PP-5-7	PP-6-6	PP-7-7	PP-8-6.5	PP-9-9	PP-10-13
Sampling Date	Current	1991	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11
BTEX in mg/kg												
Benzene	0.03	0.5	0.0166 U	**0.0901**	0.02 U	0.0224 U	**1.1**	**0.47**	0.0171 U	0.0216 U	0.0219 U	0.0203 U
Ethylbenzene	6	40	0.0332 U	0.991	0.0399 U	0.0448 U	0.379	0.0314 U	0.0341 U	0.0433 U	0.0437 U	0.0406 U
Toluene	7	20	0.0663 U	0.0867 U	0.0799 U	0.0896 U	0.251	0.0628 U	0.0683 U	0.0865 U	0.0874 U	0.0812 U
Xylenes, total	9	20	0.0995 U	0.63	0.12 U	0.134 U	0.883	0.0942 U	0.102 U	0.13 U	0.131 U	0.122 U
Lead in mg/kg	250	250		10.5			5.5	3.53	10.4		12.9	
TPH in mg/kg												
Diesel Range Organics	2,000	200	24.4 T	17.4 U	17.3 U	18.1 U	1630	12.1 U	14.6 U	15.9 U	18.1 T	18.7 T
Oil Range Organics	2,000	200	210	34.7 U	34.6 U	36.2 U	109	24.2 U	29.2 U	39.6 T	405	216
Gasoline Range Organics	30/100[a]	100	6.63 U	13.6	7.99 U	8.96 U	**198**	6.28 U	6.83 U	8.65 U	8.74 U	8.12 U

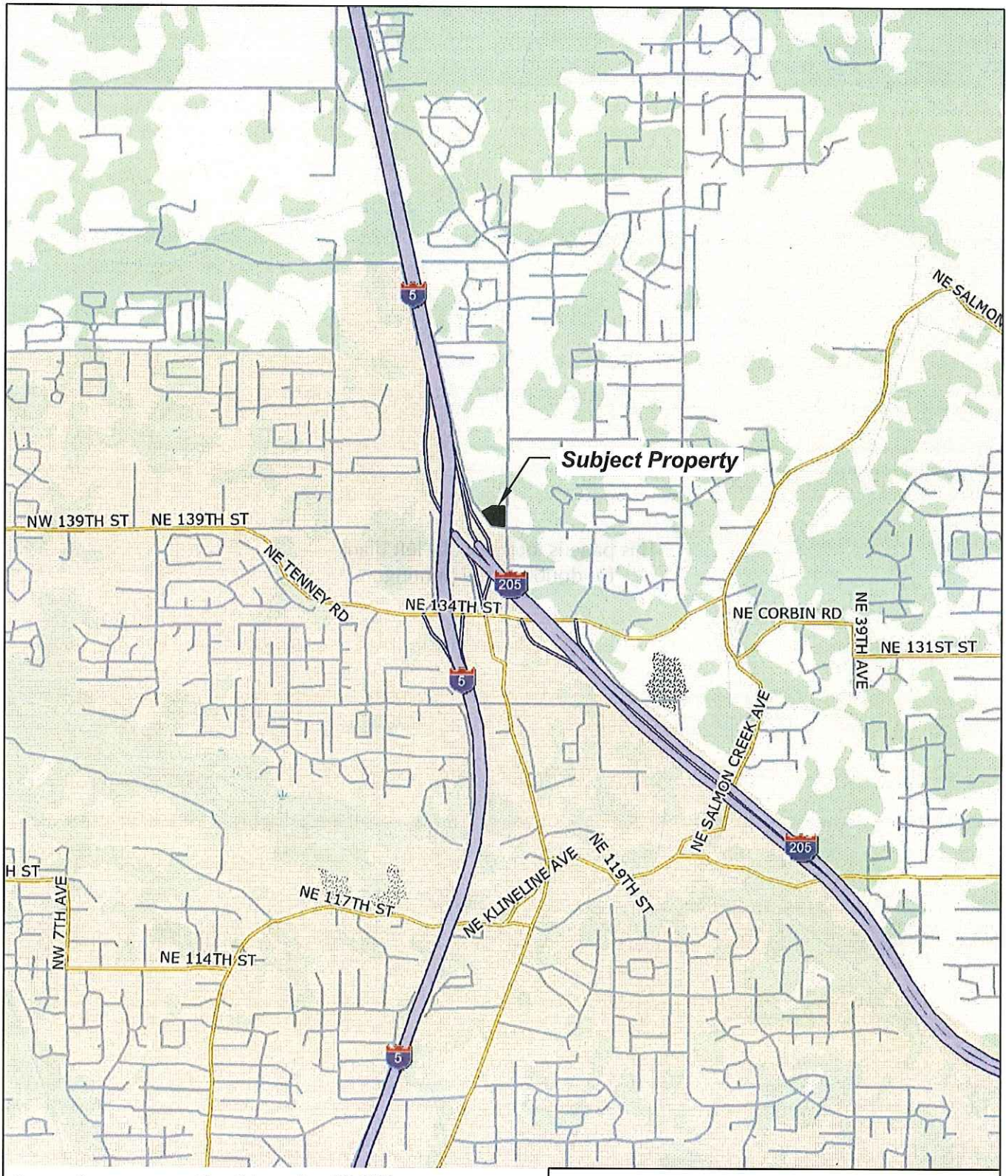
[a] 100 mg/kg when no benzene present and the total of ethylbenzene, toluene, and xylene are less than the 1% mixture of the gasoline mixture.
30 mg/kg for all other gasoline mixtures.

The TPH results for Diesel Range Organics and Oil Range Organics have been reported to the Method Detection Limit (MDL)
All other analyte values have been reported to the Reporting Limit (RL).
U = Not detected at the reporting limit indicated.
T = Value is between the MDL and MRL.
Bold - Concentration exceeds current MTCA Method A Cleanup Levels.
Box - Concentration exceeds 1991 MTCA Method A Cleanup Levels.

Table 2 - Analytical Results for Water Samples

Sample ID	Method A Cleanup Levels		PP-1	PP-2	PP-3	PP-4	PP-5	PP-6	PP-7	PP-8	PP-9	PP-10
Sampling Date	Current	1991	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11	3/25/11
BTEX in ug/L												
Benzene	5	5	0.25 U	3.58	0.25 U	0.25 U	**2030**	**724**	4.04	0.3 UJ	0.3 UJ	0.25 U
Ethylbenzene	750	700	0.5 U	102	0.5 U	0.5 U	59.8	4.07	0.5 U	0.5 UJ	0.5 UJ	0.5 U
Toluene	1000	1000	1 U	2.53	1 U	1 U	78.8	1.25	1 U	1 UJ	1 UJ	1 U
Xylenes, total	1000	1000	1.5 U	205	1.5 U	1.5 U	99.6	1.5 U	1.5 U	1.5 UJ	1.5 UJ	1.5 U
Lead in mg/L	0.015	0.005		0.217			0.0344	0.0472	0.208	0.766		
TPH in ug/L												
Diesel Range Organics	500	1000	122 U	**522**	120 U	155 T	**13900**	**620**	250 T	134 U	130 U	134 U
Oil Range Organics	500	1000	244 U	253 U	239 U	245 U	**915**	236 U	281 U	269 U	260 U	269 U
Gasoline Range Organics	800/1000[a]	1000	100 U	**2550**	100 U	100 U	**10900**	**2300**	108	100 UJ	100 UJ	100 U

[a] 800 µg/l if benzene is present in groundwater. 1,000 µg/l if no detectable benzene in groundwater.
The TPH results for Diesel Range Organics and Oil Range Organics have been reported to the Method Detection Limit (MDL).
All other analyte values have been reported to the Reporting Limit (RL).
U = Not detected at the reporting limit indicated.
J = Estimated value.
T = Value is between the MDL and MRL.
Bold - Concentration exceeds current MTCA Method A Cleanup Levels.
Box - Concentration exceeds 1991 MTCA Method A Cleanup Levels.



Source: Base map prepared from DeLorme Topo 7.0, 2007.

0 2000 4000

Scale in Feet

N

WSDOT Vista Mart
Vancouver, Washington

Vicinity Map

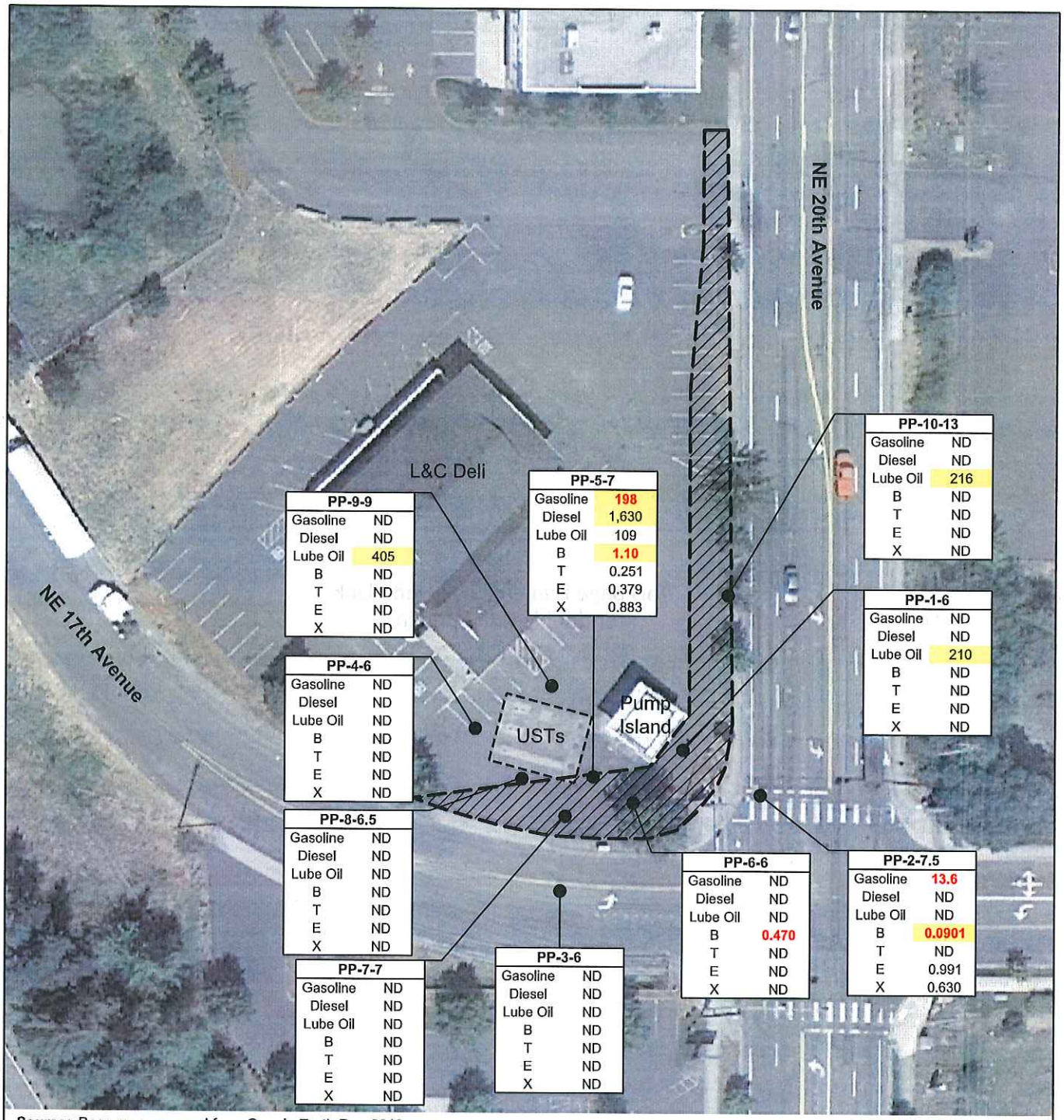
17782-01 5/11

HARTCROWSER

Figure 1

EAL 05/6/11 1778201-001.dwg

This page is intentionally left blank
for double-sided printing.



Source: Base map prepared from Google Earth Pro, 2010.

PP-1 ● Push Probe Location and Number

Proposed Portion of Property to be Purchased by WSDOT

0 60 120

Scale in Feet

Soil Concentrations in mg/kg:

Gasoline	198
Diesel	1,630
Lube Oil	109
B	1.10
T	0.251
E	0.379
X	0.883

Gasoline-Range Hydrocarbons
Diesel-Range Hydrocarbons
Oil-Range Hydrocarbons
Benzene
Toluene
Ethylbenzene
Xylene

N

ND = Concentration not Detected Above Method Detection Limit
Red Text Indicates Concentrations Exceed Current MTCA Cleanup Levels
Yellow Fill Indicates Concentrations Exceed 1991 MTCA Cleanup Levels

WSDOT Vista Mart
Vancouver, Washington

Soil Concentrations

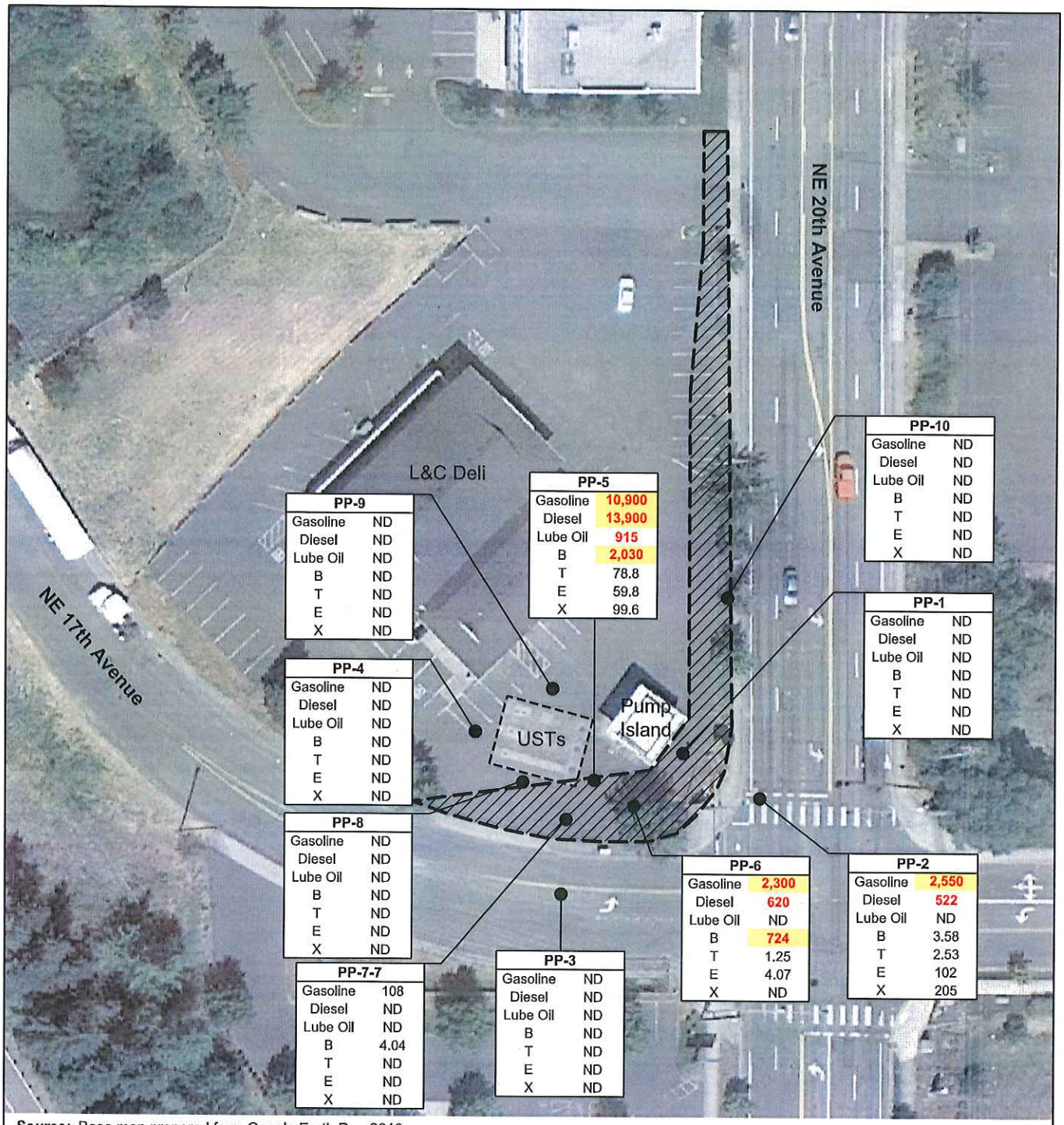
17782-01 5/11

HARTCROWSER

Figure **2**

JAB 05/6/11 1778201-006 (Soil Concentrations).dwg

This page is intentionally left blank
for double-sided printing.



Source: Base map prepared from Google Earth Pro, 2010.

PP-1 ● Push Probe Location and Number

Proposed Portion of Property to be Purchased by WSDOT

0 60 120

Scale in Feet

Groundwater Concentrations in µg/L:

Gasoline	10,900
Diesel	13,900
Lube Oil	915
B	2,030
T	78.8
E	59.8
X	99.6

Gasoline-Range Hydrocarbons
Diesel-Range Hydrocarbons
Oil-Range Hydrocarbons
Benzene
Toluene
Ethylbenzene
Xylene

N

ND = Concentration not Detected Above Method Detection Limit
Red Text Indicates Concentrations Exceed Current MTCA Cleanup Levels
Yellow Fill Indicates Concentrations Exceed 1991 MTCA Cleanup Levels

WSDOT Vista Mart
Vancouver, Washington

Groundwater Concentrations

17782-01 5/11

HARTCROWSER

Figure 3

JAB 05/6/11 1778201-007 (GW Concentrations).dwg