December 4, 2008

Chuck Cline
Washington State Department of Ecology
P.O. Box 47775
Olympia, Washington 98504

Re: Maple Lane School Historical Investigation and Current Site Condition Summary (Revised)
7476-07

Dear Mr. Cline:

On behalf of the Washington Department of Social and Health Services (DSHS), we are submitting this revised letter report for the Maple Lane School Site (Facility No. 63149499) located in Centralia, Washington, to support obtaining a No Further Action determination under the Washington State Department of Ecology's (Ecology) Voluntary Cleanup Program (VCP). We initially submitted the VCP application and supporting documents to Ecology in December of 2007. Based on your initial review comments provided to Mr. Chuck Cole of DSHS in February 2008 and the results of our July 9, 2008, meeting, we have revised this letter report to better support Ecology's review of our NFA determination request.

This letter report includes a detailed summary of the diesel release from the former underground storage tank (UST), subsequent investigations, cleanup activities, and current site conditions. We have prepared this detailed letter report in an effort to expedite Ecology's review of existing reports on the subject property. Because we believe site conditions satisfy MTCA Method A cleanup requirements for protectiveness of human health and the environment, our goal is to receive an opinion letter stating that no further actions are necessary.

SITE BACKGROUND

The Maple Lane School (the site) is located at 20311 Old Highway 9 SW in Centralia, Washington (Figure 1). A 6,000-gallon fiberglass UST was installed on site in approximately 1980 for use as a backup fuel source for the boiler plant. The diesel UST was located southeast of the boiler plant in a grassy mound, adjacent to the back entrance of the building (Figure 2). In May of 1997, facility personnel realized that approximately 600 gallons of product were missing from the UST a few days

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after it having been refilled. The fuel supplier emptied the UST to prevent further losses and conducted a tank tightness test. A release was confirmed, and Ecology was notified.

On June 25, 1997, Olympus Environmental, Inc. (Olympus) removed the UST. A small hole was observed approximately 14 inches from the top of the UST (located about 4 feet below grade as installed). Olympus observed some isolated diesel-impacted soils around the fill spout and weathered and fresh diesel-impacted soils beneath the UST (about 9 feet below grade). Based on the use of the UST and the location of the hole observed in the tank, diesel releases up to 600 gallons at a time may have occurred. Because the UST was used for backup, these releases would have occurred when the UST was refilled and not immediately used. Approximately 40 cy of diesel-impacted soil were removed from beneath the UST. The tank removal excavation extended to about 13 feet below grade but did not extend further due to slope stability concerns. Olympus collected three side wall samples (A, B, and C) and two excavation floor samples (D and E), which were analyzed for diesel-range organics (DRO) by Ecology Method NWTPH-Dx. The three side wall samples had DRO concentrations at or below the 2,000 mg/kg MTCA Method A cleanup level for diesel-range petroleum (Table 1). Analytical results for the two floor soil samples indicate that DRO-impacted soils remained at concentrations up to 20,000 mg/kg, which exceeds the MTCA Method A cleanup level of 2,000 mg/kg. The UST was disposed of off site by Coastal Tank Cleaning, Inc. of Seattle. A project timeline is included on Figure 3.

INITIAL SITE INVESTIGATIONS

Unless otherwise noted, groundwater and soil samples during the initial investigations were analyzed by the following methods:

- Diesel- and oil-range total petroleum hydrocarbons by Ecology Method NWTPH-Dx;
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021B; and
- Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270D-SIM.

On July 11, 1997, Olympus advanced an additional soil boring directly through the former release area to better define the depth of soil impacted by the DRO release (sample location E). Observations began at a depth of approximately 9 feet, the depth of the base of the former UST. What appeared to be fresh diesel was observed in soil from the depth interval of 12.3 to 16.7 feet. What appeared to be weathered diesel was observed in soil samples from about 19 feet down to the water table, which was encountered at a depth of 31.1 feet. Two soil samples from location E (BORE-4D and BORE-8H) were collected and submitted for DRO analysis; the groundwater samples were also analyzed for BTEX. Soil samples collected from depth intervals 18.8 to 19.8 feet

(BORE-4D) and 28.8 to 30.3 feet below grade (BORE-8H) contained DRO concentrations of 16,000 and 5,100 mg/kg, respectively (Table 1).

In February 1998, Nowicki & Associates (Nowicki) installed four monitoring wells to depths of 30 to 35 feet. Monitoring wells MW1 and MW2 were installed on the grassy mound about 20 feet north and east of the former UST and monitoring wells MW3 and MW4 were installed in the driveway, 20 feet south (well MW3) and 60 feet southwest (well MW4) of the former UST (Figure 2). Monitoring well MW4 was damaged and, therefore, abandoned. Monitoring well MW5 was installed about 30 feet east of former MW4 in October 1998 as a replacement. Soil samples from monitoring well borings MW3 (at 24.5 feet), MW4 (at 28.5 feet), and MW5 (at 20.5 feet) contained DRO concentrations of 3,170, 3,310, and 9,000 mg/kg, respectively, above the MTCA Method A cleanup level of 2,000 mg/kg. The soil sample from the MW3 boring at a depth of 29.8 feet contained a DRO concentration of 820 mg/kg (Table 1).

Nowicki began quarterly groundwater monitoring in March of 1998 and completed the first six quarterly monitoring events. The sampling procedure consisted of first purging the wells using a pump, followed by groundwater sample collection using a stainless steel or polyethylene bailer. Nowicki submitted groundwater samples for analysis of diesel- and oil-range total petroleum hydrocarbons.

In November 1999, Nowicki advanced six additional soil borings (SB-1 through SB-6) to better define the extent of DRO-impacted soil. Soil samples from these borings were submitted for diesel- and oil-range organic analyses and soil samples from SB-5 (advanced in the location of the former UST) at 30 feet below grade were also submitted for BTEX and PAH analyses. This boring was completed as monitoring well MW6. The highest DRO concentration (26,000 mg/kg) was detected in a soil sample from boring SB-6 immediately above the water table at a depth of 25 feet below grade (Table 1). According to Nowicki, "the sample was collected in the second attempt and may not represent the true average diesel concentration in the soil," indicating that the sample may have been contaminated or otherwise compromised. As shown in Table 1, xylenes and five non-carcinogenic PAHs were also detected in the soil boring samples at concentrations below MTCA Method A cleanup levels.

Soil boring SB-5, located in the former UST excavation, was completed as monitoring well MW6. In February 2000, Michael Lam of Nowicki assessed the groundwater conditions in MW6 and noted that free-phase product was not measurable. However, Mr. Lam observed "heavy oil sheen," the presence of "oil droplets clinging to the outer wall of the bailer," and noted a "very strong diesel odor." He also visually inspected the wetland and slough areas located downgradient (south) of the boiler plant and observed no evidence of oil sheen on the sloped ground surface. He was not able to sample surface water from the slough due to low water levels.

Hart Crowser completed the seventh quarterly groundwater monitoring sampling event in November 2001. Due to low water levels, MW1 was not sampled. Monitoring wells MW2 and MW6 contained only 1 foot of standing water and were sampled using a bailer, which resulted in poor quality, silty samples. Sufficient groundwater was available in monitoring wells MW3 and MW5 to use low-flow sampling techniques, which minimizes well disturbance, decreases the potential for silt collection, and thereby improves overall sample quality. Groundwater samples were submitted for DRO, BTEX, and PAH analyses. DRO was only detected in MW6 at a concentration of 44 mg/L; analytes were non-detect in other wells (Tables 2 and 3).

Hart Crowser collected three surface water (SW-1 through SW-3) and five sediment samples (SD-1 through SD-5) from approximately 140 feet along the slough to assess potential DRO impacts from the UST release. DRO was non-detect in these eight samples, although a heavy oil-range organic concentration of 340 mg/kg was detected in sediment sample SD-1 (Table 4). The apparent high naturally occurring organic content in the slough sediment could have interferred with the NWTPH analysis, resulting in false hits or artificially high concentrations. In addition, this detection of heavy oil-range organics appeared to be unrelated to the UST diesel release as heavy oil-range organics were not previously detected on the site.

ADDITIONAL SITE INVESTIGATIONS AND CLEANUP ACTIONS

Hart Crowser installed five wellpoints (WP-1, WP-2, WP-3A, WP-3B, and WP-4) along the slough to establish consistent and representative sampling locations for groundwater entering the slough from the former UST area. Wellpoints WP-3A and WP-3B were installed downgradient of the former UST area, while WP-1, WP-2, and WP-4 were installed cross-gradient of the expected groundwater discharge location (Figure 2). Wellpoints were advanced until sufficient groundwater was encountered to collect a representative sample. Refusal prevented WP-3A from reaching the required depth; therefore, WP-3B was advanced between WP-3A and the slough. WP-3A was left in place as a possible high water monitoring location during future monitoring events. The wellpoint top of casing (TOC) elevations were surveyed relative to a local benchmark and existing monitoring well elevations.

WP-1 was intended to be a sampling location at the downgradient end of the slough. Based on site topography and heavy vegetation on the slope, WP-1 was located on the east side of the access road across from the lift station (Figure 2). Groundwater samples from WP-1 collected in September 2001 contained a total cPAH concentration of 0.65 ug/L, which exceeds the MTCA Method A cleanup level for cPAHs of 0.1 ug/L. However, these exceedances were not representative of site groundwater conditions for several reasons. First, it was difficult to collect representative groundwater samples from WP-1 due to low yield and extremely high turbidity.

Second, analysis of site groundwater elevations suggested that WP-1 likely contained perched water located between the native soil and fill used to construct the embankment of the access road, not site groundwater. Because WP-1 provided no physical or chemical data useful in understanding the UST lease or impacted area, it was not monitored during subsequent quarterly groundwater monitoring events and was decommissioned in December 2002.

Quarterly Groundwater Monitoring September 2001 to December 2004

Hart Crowser conducted fourteen quarterly groundwater monitoring events from the third quarter 2001 to the fourth quarter 2004 (Table 2). Groundwater samples were collected from all monitoring wells and wellpoints (Figure 2), as conditions permitted, and were submitted for analysis of the following:

- Diesel- and oil-range total petroleum hydrocarbons by Ecology Method NWTPH-Dx;
- Inorganic ions nitrite, nitrate, and sulfate by EPA Method 300A; and
- Total suspended solids (TSS) by EPA Method 160.2;

with select samples also submitted for analysis of:

- BTEX by EPA Method 8021B; and
- PAHs by EPA Method 8270D-SIM.

Following confirmation that DRO-impacted groundwater did not extend to the slough, wellpoint sampling frequency was reduced to include seasonal high and low groundwater conditions only. The quarterly monitoring events also initially included sampling and analysis of on-site stockpile material from the removal of the UST. However, after March 2002 stockpile sampling and analysis ceased because data indicated MTCA Method A cleanup levels had been achieved (Table 5). Stockpile soil was recommended for use as on-site fill.

Monitoring well MW6 was the only sample location with MTCA Method A exceedances during quarterly groundwater monitoring events prior to the installation of MW7 (see below), with groundwater DRO concentrations ranging from non-detect to 78 mg/L (Table 2). Elevated suspended solid concentrations were also consistently observed in MW6 groundwater, because of the fine-grained nature of the soil at this location. MW6 was redeveloped in December 2001 in an effort to remove silty material that had presumably accumulated in the well, but MW6 groundwater samples again contained gray silty sediment during the quarterly monitoring event in June 2002. The highest DRO concentration (MW6, 78 mg/L) was observed during the June 2002 groundwater sampling event, again likely the result of DRO-impacted silt in the sample. Monitoring well MW6

was investigated in December 2002 using a down borehole camera but no cracks or physical abnormalities were observed.

Groundwater elevations in monitoring wells and wellpoints were also collected as a part of the quarterly groundwater monitoring events (Table 6). Representative groundwater elevation contours based on water levels measured during the most recent July 2007 monitoring event are indicated on Figure 2. Groundwater elevation contours consistently indicated that groundwater flows from the UST release area toward the slough.

Monitored Natural Attenuation

Natural attenuation is a term that describes the combined effect of natural processes (e.g., biodegradation, dispersion, and dilution) that collectively reduce constituent concentrations over time. Indigenous subsurface microorganisms may couple DRO oxidation to reduction of dissolved oxygen (DO), nitrate, and sulfate to gain energy for growth, thereby "biodegrading" DRO. To monitor natural attenuation in site groundwater, we have monitored changes in concentrations of DO, nitrate, nitrite, sulfate, and DRO concentrations.

DO concentrations in groundwater upgradient of the former UST (MW1 and MW2) have varied between 3 and 6 mg/L, while DO concentration in source area groundwater (MW6) averaged 1.3 mg/L (Table 3). This relative decrease in DO concentrations suggests biodegradation through predominantly aerobic processes. Average DO concentrations downgradient of the former UST (MW3 and MW5) were 5 and 6 mg/L, respectively. This relative increase in DO concentrations downgradient suggests that there may be less oxygen demand at these locations, associated with less DRO-impacts. Lower groundwater DO concentrations in wellpoints located along the slough are likely associated with high naturally occurring organic content typical of sedimentary environments.

Nitrate may be used as an alternate electron acceptor for biodegradation of DRO. Nitrate concentrations in groundwater upgradient of the former UST (MW1 and MW2) have varied between 2.3 and 4.3 mg/L, while nitrate concentrations in source area groundwater (MW6) have varied between 0.2 and 2.1 mg/L (Table 7). Nitrite is a very unstable compound; therefore, any detection of nitrite is indicative of nitrate reduction. Nitrite has only been detected in monitoring well MW6, indicating nitrate reduction in the DRO source zone. Nitrite has also been detected in wellpoints WP-1, WP-3B, and WP-4; however, this is likely a result of decomposition of the naturally occurring organic matter typical of sedimentary environments.

Following depletion of nitrate and other more energetically favorable electron acceptors, sulfate may serve as an alternate electron acceptor for microbial DRO oxidation. Sulfate concentrations

have remained relatively constant in site groundwater, indicating sulfate reduction is not a significant microbial process (Table 7).

Hydrogen Peroxide Injections

The following quantities and concentrations of hydrogen peroxide were injected into MW6 to oxidize residual DRO and, thereby, to reduce contaminant mass in the vicinity of the former UST:

- **May 2003,** 300 gallons of 10 percent hydrogen peroxide;
- **September 2003,** 300 gallons of 35 percent hydrogen peroxide; and
- **March 2004,** 350 gallons of 35 percent hydrogen peroxide.

These injections took place in accordance with Ecology's Underground Injection Control Program requirements (site registration number 20070). Injection flow rates were adjusted to mound up to 10 feet of head within the well casing, which was intended to maximize treatment of shallow soil in the targeted source zone surrounding MW6. Repeated injections of hydrogen peroxide improved the aesthetic quality of the groundwater, eliminated petroleum odor, and ultimately reduced contaminant mass.

RECENT SITE INVESTIGATIONS

Previous DRO exceedances of MTCA Method A cleanup levels for groundwater were only observed in MW6. Due to persistent problems with sediment accumulation in MW6, possibly due to well construction issues, monitoring well MW7 was installed to replace MW6 in April 2005 at an adjacent location (approximately 5 feet away). A soil sample (S-5) from the MW7 boring at a depth of 22.5 feet below grade (above groundwater table) contained a DRO concentration of 1,500 mg/kg (Table 1). An additional soil sample (S-7) collected from the MW7 boring at a depth of 32.5 feet below grade (below groundwater table) contained a DRO concentration of 4,800 mg/kg, as well as a total naphthalene concentration of 9.9 mg/kg (Table 1). This soil sample was selected for chemical analysis because it appeared to be the most highly petroleum-impacted interval within boring MW7. Examination of the NWTPH-Dx chromatograms indicates that the residual diesel contamination associated with these soil samples was fairly weathered and was depleted in some of the more mobile, lower molecular weight hydrocarbons.

DRO concentrations were lower in soil boring samples collected from MW7 than those detected in MW6 prior to the hydrogen peroxide treatments. Whereas DRO concentrations of 7,400 and 8,600 mg/kg were noted in MW6 soil samples collected at depths of 20 and 30 feet below ground

surface, respectively (Table 1), DRO concentrations within this same approximate depth interval in MW7 ranged from 1,500 to 4,800 mg/kg.

Well MW7 was developed directly following installation and was sampled the following month in May 2005. Groundwater samples collected from MW7 in May 2005 and October 2005 contained elevated concentrations of both diesel and TSS (Table 2). Because diesel can sorb to fine particles that contribute to TSS, it is possible that elevated diesel concentrations in MW7 samples were associated with TSS and not ambient groundwater. Results of a regression analysis confirmed that diesel and TSS concentrations were significantly correlated in MW6 and MW7 groundwater samples (Table 8). Based on this correlation, we began a program of developing well MW7 after sampling to remove TSS from the well casing in preparation for the next sampling round. Diesel concentrations in groundwater from well MW7 have not exceeded MTCA Method A cleanup levels since we began this well development practice. Semi-annual sampling and analysis of well MW7 began in May 2006 and continued until July 2007.

We discussed these and other findings with Ecology in March 2007, and expressed our desire to achieve a letter of no further action at the site. Ecology suggested that we perform one additional round of groundwater sampling and analysis at well MW7 (completed March 2007), followed by a comprehensive round of groundwater sampling and analysis after the first of the fiscal year. Groundwater samples collected from wells MW1, MW2, MW3, MW5, and MW7 on July 23, 2007, were non-detect for diesel, BTEX, and PAH compounds (Tables 2 and 3).

COMPLIANCE WITH MTCA REQUIREMENTS FOR NO FURTHER ACTION

Since discovery of the leaking UST and subsequent removal of 40 cy of DRO-impacted soil in 1997, there have been no additional petroleum releases at the site. Sediment sampling locations and monitoring wells were placed upgradient of the source zone (MW2), within the source zone (MW6, subsequently replaced by MW7), downgradient of the source zone (MW1, MW3, MW4, and MW5 [replaced MW4]), and in the slough (WP-1, WP-2, WP-3B, and WP-4) to collect sufficient data to formulate an understanding of contaminant distribution and potential migration on the site. Results of the extensive site soil and groundwater characterization performed by Hart Crowser and others over the last 10 years have shown that DRO did not migrate extensively from the source zone and did not reach the slough. The following section describes current site conditions and provides justification for taking "no further action" prior to site closure.

Exposure Pathways

Direct Contact Pathway. Diesel released from the UST migrated downward via gravity through the unsaturated soil directly beneath the UST, ultimately reaching the groundwater table at a depth of approximately 30 feet below ground surface. While diesel is relatively immobile in unsaturated soil, it floats on the groundwater table and can be transported along the groundwater surface, thus creating a "smear zone" in the soil at the water table. Indeed, elevated DRO concentrations were detected downgradient in MW3, MW4, and MW5 soil boring samples at depths ranging from 20 to 30 feet, corresponding to the groundwater table smear zone (Table 1). Other than the source zone, we would not expect to find UST-associated DRO impacts in soil at depths less than 17 feet because the minimum depth to groundwater measured on site is 17 feet below ground surface (MW5, December 2001, Table 6). Other than soil samples collected from the initial UST excavation and boring location E, no DRO impacts have been observed at depths less than 15 feet below ground surface on the site.

DRO-impacted soil remained directly beneath the former UST at depths greater than 13 feet but select data suggest that these impacts have attenuated to meet MTCA Method A requirements. For example, a single soil sample from boring SB-5 (advanced in the location of the former UST in 1999) at a depth of 10 feet below grade was non-detect for DRO. MW6 also received multiple injections of hydrogen peroxide in 2003 and 2004, which reduced contaminant mass in the source zone. MW7 was installed in April 2005 following these injections and field screening (including field photoionization testing) revealed no signs of impacts at depths less than 22 feet. The soil sample collected from this location (S-5 22 feet depth, Table 1) contained a DRO concentration of 1,500 mg/kg, which is below the MTCA Method A cleanup level for soils. These data collectively suggest that DRO-impacted soil remains on site at depths greater than 15 feet. Thus, available site data indicate that direct contact is not a potential exposure pathway.

Terrestrial Ecological Evaluation. Per WAC 173-340-7490(4)(b) and WAC 173-340-7491(a), the site satisfies the standard point of compliance for soil contamination and is exempt from requirements for institutional controls and a separate terrestrial ecological evaluation.

Soil Vapor Pathway. Weathered diesel has few to no volatile constituents and, therefore, poses no risk of vapor migration through soil. Indeed, inspection of the chromatogram resulting from NWTPH-Dx analysis of a MW7 groundwater sample collected in October 2005 confirmed the presence of high molecular weight hydrocarbons typical of weathered diesel. In addition, BTEX compounds were consistently below detection limits in site groundwater (Table 2) and site soil samples (Table 5). Therefore, soil vapor is not considered to be a potential exposure pathway for this site.

Soil to Groundwater Pathway. Based on historical groundwater impacts observed at the site, the soil to groundwater pathway is considered to be a potential exposure pathway and was the focus of remedial actions completed at the Maple Lane site. The multiple hydrogen peroxide injections performed in 2003 and early 2004 improved the aesthetic quality of the groundwater, eliminated petroleum odor, and ultimately reduced subsurface contaminant mass.

Under MTCA (WAC 173-340-747[3]), Ecology has established seven methods that may be used to evaluate compliance with groundwater protection criteria including using partitioning models, leaching tests, and empirical demonstrations. For the Maple Lane site, we have selected use of the empirical approach outlined in WAC 173-340-747(9) including demonstrating that measured groundwater concentrations are less than or equal to applicable groundwater cleanup levels and measured soil concentrations will not cause exceedances of these groundwater cleanup levels in the future (i.e., system is at equilibrium). Multiple lines of evidence indicate that residual weathered diesel occurrences in site soils no longer pose a risk to groundwater quality.

- First, except for MW6 and MW7 within the source area, groundwater DRO concentrations in site monitoring wells and wellpoints have not exceeded the MTCA Method A cleanup level of 0.5 mg/L since August 19, 1999. No exceedances of Method A drinking water cleanup levels for volatile aromatics (BTEX) or naphthalenes have been observed in site groundwater. Due to the fine-grained nature of the soil, MW6 groundwater frequently contained elevated DRO and elevated suspended solids concentrations. It was difficult to collect representative groundwater samples from monitoring well MW6 so it was ultimately replaced by MW7, where suspended solids were also problematic. A regression analysis confirmed that concentrations of DRO and suspended solids were significantly correlated in MW6 and MW7 groundwater samples (Table 8). Thus, Hart Crowser began a practice of redeveloping MW7 following each sampling event in preparation for the following sampling event. Since this practice of well development began in December 2005, DRO has been either non-detect or detected at concentrations below MTCA Method A cleanup levels in MW7 groundwater samples. Results of an additional comprehensive groundwater sampling and analysis event, performed per Ecology's suggestion in July 2007, confirmed that DRO, BTEX, and PAH concentrations remain non-detect in site monitoring wells.

- Second, DRO concentrations in site soil are below the estimated residual saturation concentration for silty sand (13,333 mg/kg, Ecology 2001). Although the observed DRO concentration of 4,800 mg/kg in soil at the water table from MW7 exceeds the MTCA Method A cleanup level for soil of 2,000 mg/kg, this cleanup level was established based on residual saturation conditions in coarse gravel and, therefore, is highly conservative. The DRO soil exceedance of 4,800 mg/kg was detected in a silty sand layer and is well below the residual saturation for middle distillates (weathered diesel) in silty sand of 13,333 mg/kg (Ecology 2001),

thus demonstrating that soil concentrations will not result in NAPL accumulation on or in groundwater per WAC 173-340-747(10)(d)(ii). . Given that no measureable free phase product has been encountered in site monitoring wells since the hydrogen peroxide injections were completed provides further evidence that residual diesel soil concentrations do not exceed residual saturation.

- Third, observed diesel concentrations in both soil and groundwater appear to be decreasing over time. Since the original source of the diesel release was removed over 10 years ago, this trend is expected to continue. Therefore, no future exceedances of groundwater cleanup criteria are anticipated.

Compliance with Cleanup Standards

Following completion of remedial actions at the Maple Lane site, groundwater protection is the only potential exposure pathway of concern. An empirical demonstration conducted per WAC 173-340-747(9) has demonstrated that residual diesel concentrations in site soils will not cause contamination of groundwater at concentrations exceeding applicable cleanup levels either through dissolved or residual phase transport. In addition, natural attenuation indicators suggest that biodegradation is occurring and concentrations will continue to decrease through natural attenuation over time.

REFERENCES

Ecology 2001. Concise Explanatory Statement, for Amendments to the Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC. Prepared by the Washington State Department of Ecology Toxics Cleanup Program. Publication 01-09-043. Olympia, Washington. February 12, 2001.

LIMITATIONS

Work for this project was performed, and this letter report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of the Washington Department of Social and Health Services for specific application to the referenced property. This letter report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

All MTCA cleanup levels included in this report are provided for comparison purposes only and are based on our understanding of cleanup levels required by Ecology for similar projects. They do not represent MTCA interpretations. By using them for comparison purposes, we are not implying that remedial actions at this site are required under MTCA. Specific MTCA interpretations may involve separate calculations and determinations upon which a range of cleanup standards may be established by Ecology.

Any questions regarding our work and this letter report, the presentation of the information, and the interpretation of the data are welcome and should be referred to the undersigned.

We trust that this letter report meets your needs.

Sincerely,

HART CROWSER, INC.

Mike Ehlebracht

MIKE EHLEBRACHT, LHG
Principal Geochemist

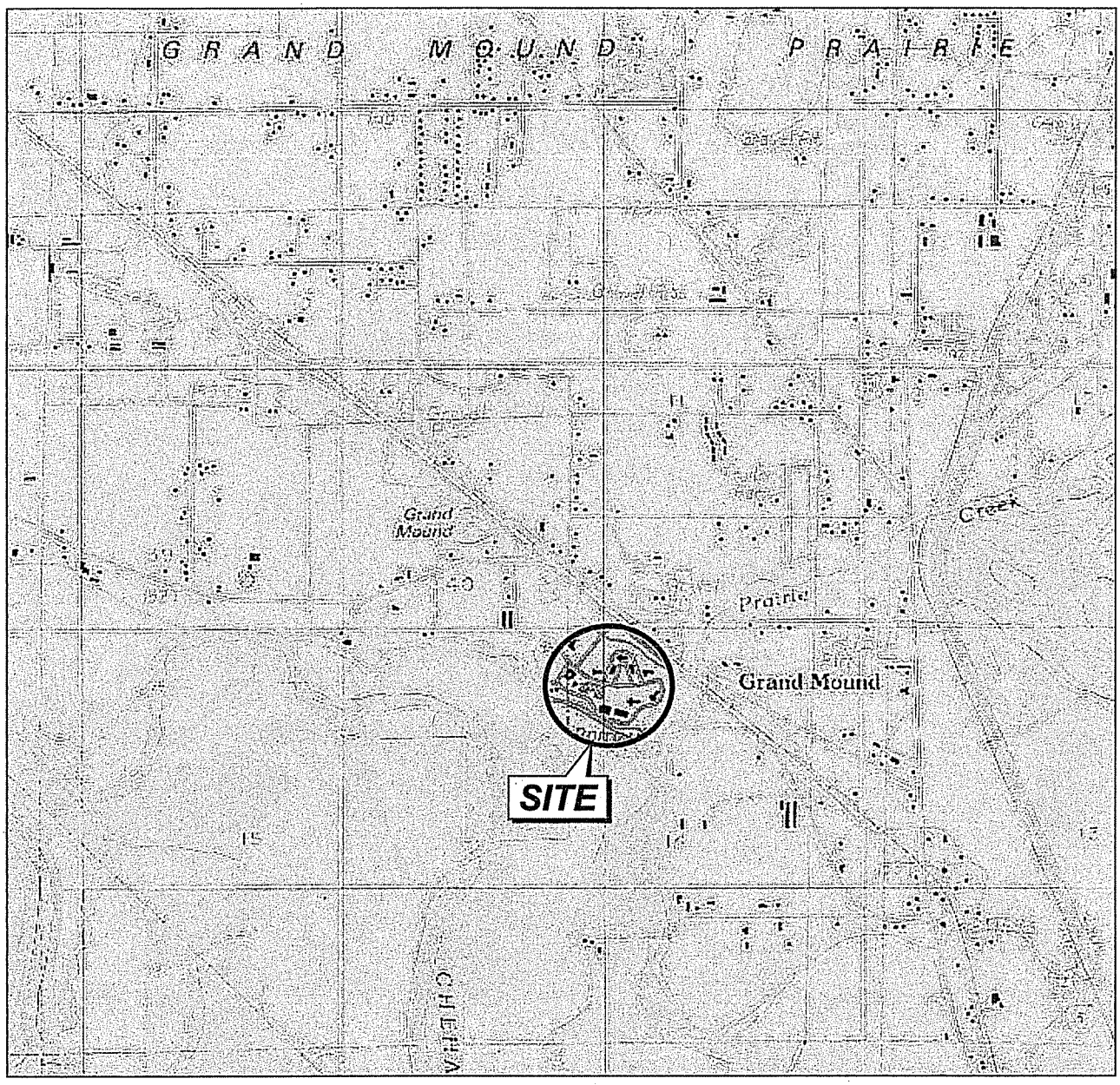
William B. Abercrombie

WILLIAM B. ABERCROMBIE
Principal

Attachments:
Table 1 - Analytical Results for Soil Samples
Table 2 - Analytical Results for Groundwater Samples - TPH-Dx and BTEX
Table 3 - Analytical Results for Groundwater Samples - PAHs
Table 4 - Analytical Results for Sediment, Surface Water, and Slag Samples
Table 5 - Analytical Results for Stockpile Soil Samples
Table 6 - Relative Groundwater Elevation Data
Table 7 - Analytical Results for Groundwater Samples - Inorganic Anions
Table 8 - Results of Outlier t-test, Regression Analysis, and r2 Significance Test
Figure 1 - Vicinity Map
Figure 2 - Site Plan with Sample Locations
Figure 3 - Project Timeline

cc: Chuck Cole, Washington Department of Social and Health Services, Maple Lane School

Vicinity Map



0 2000 4000

Scale in Feet

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Figure 1

Site Plan with Sample Locations
Maple Lane School

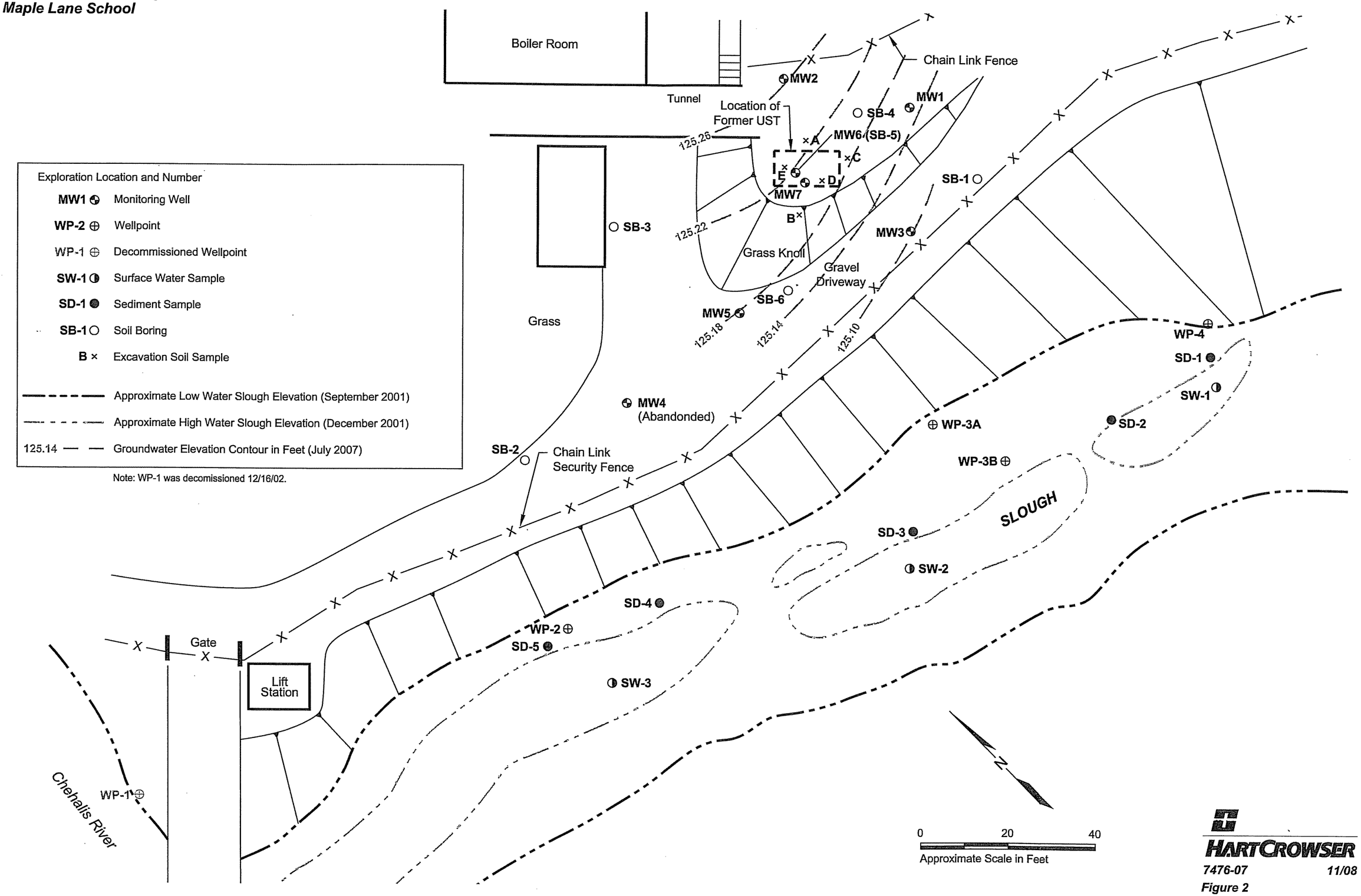

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Figure 2

Project Timeline

1997. Employees note leaking UST. Estimated releases occurred when tank was filled initially 1980 (600 gal) and again in 1997 (600 gal). Following tank removal by Olympus in June 1997, a small hole was observed ~ 14" from the top.

February 1998. Nowicki & Associates installed four monitoring wells (MW1-MW4). Soils from MW3 and MW4 contained diesel-range organics (DRO).

October 1998. Nowicki & Associates installed MW5 to replace MW4, which was damaged. Soil from MW5 contained DRO (9,000 mg/kg).

November 1999. Nowicki & Associates advance six soil borings and establishes boring SB5 as monitoring well MW6. Soil from boring SB-6 contained elevated DRO (26,000 mg/kg).

November 2000. Hart Crowser collects surface water and sediment samples from the slough and collects groundwater samples from wells MW1, MW2, MW3, MW5 and MW6. No DRO contamination is observed in slough samples.

January 2001. Hart Crowser observes 44 mg/L DRO concentrations in MW6 groundwater following bailing to sample due to low water levels. A potential correlation with suspended solids in sample and DRO concentrations is noted.

September 2001. Quarterly GW sampling begins

Hart Crowser installs wellpoints WP1 through WP4 to monitor DRO migration toward the slough. Samples from wellpoints were non-detect for DRO and BTEX, except for WP4 where BTEX was detected below MTCA cleanup levels.

Vopak, Inc. transported drums containing investigation-derived waste off site.

WP1 contained cPAHs in exceedance of MTCA cleanup levels but due to its location, this exceedance was likely due to Chehalis River and not representative of site. WP1 was intended as a down-gradient monitoring location.

Slag was found on slope and did not to contain metals.

December 2001. MW6 redeveloped before sampling

June 2002. Highest DRO exceedance of MTCA Method A levels in MW6 (78 mg/L). Again, high levels of suspended solids and apparent bentonite from broken well were implicated in the high DRO concentrations. (reported Sept 2002)

December 2002. WP1 was decommissioned in accordance with WAC 173-160-381(2)(a).

MW6 was inspected with a down borehole camera to identify the source of silty material apparently accumulating in the well. No cracks or physical abnormalities were observed. (reported April 2003)

Because groundwater in MW6 is the only remaining location of MTCA Method A exceedance for DRO, wellpoints sampling frequency was reduced.

May 2003. Hydrogen peroxide (300 gallons, 10 percent) was injected into MW6 to oxidize residual mass of diesel-range organics.

September 2003. Hydrogen peroxide (300 gallons, 35 percent) was injected into MW6 to oxidize residual mass of diesel-range organics. (reported Nov 2003)

March 2004. Hydrogen peroxide (350 gallons, 35 percent) was injected into MW6 to oxidize residual mass of diesel-range organics.

September 2004. Under direction from Ecology, Thurston County Health Dept. performed a site hazard assessment and was given a ranking of 3, where 1 is the highest risk and 5 is the lowest risk. (reported Sept 2004)

April 2005. Monitoring well MW7 was installed to replace MW6 in the immediate vicinity of the former UST. The well was screened from 25 to 45 feet below grade. Soil samples collected from well installation at a depth of 32.5 ft below grade (below groundwater table) contained DRO 4,800 mg/kg, as well as naphthalene.

May 2005. First round of semi annual groundwater monitoring sampling and analysis of MW7.

December 2004. Last round of quarterly groundwater monitoring events occurred, totaling fourteen.

July 2007. Comprehensive sampling of MW1, MW2, MW3, MW5, and MW7. All samples non-detect for diesel.

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Figure 3