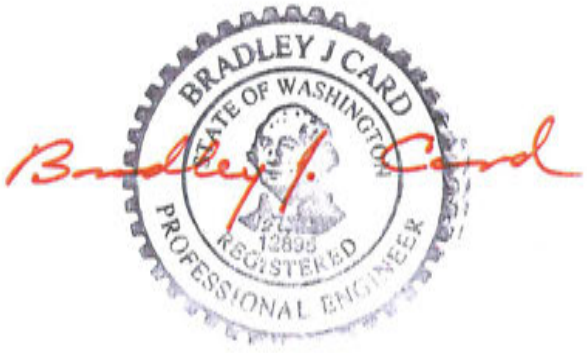
REMEDIAL INVESTIGATION WORK PLAN

TIDRICK'S QUALITY TRANSMISSION
1802 South 1st Street, Yakima, WA
(FS ID No. 543, CU ID No. 6497)

Prepared For:
Washington State Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, WA 98902



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Job No. 14006
Prepared by

PLSA Engineering & Surveying
1120 West Lincoln Avenue
Yakima, Washington 98902
(509) 575-6990

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1.0 INTRODUCTION

The objective of this Remedial Investigation (RI) is to evaluate the current nature and extent of contamination related to past land use practices at the Tidrick's Quality Transmission Site. These practices were associated with automotive repair and service facilities and included the use of two drywells, one waste oil underground storage tank (UST), and two gasoline USTs.

2.0 SITE BACKGROUND

2.1 Description and History of Site

The Tidrick's Quality Transmission Site is located at 1802 South 1st Street near its intersection with West Mead Avenue, Yakima, Washington. The Site is identified by geographic coordinates: Latitude 46° 34' 38.3988", Longitude -120° 29' 32.0352" or by Public Land Survey: South half of Section 30, T. 13 N., R 19 E, Willamette Meridian (Figure 1).

The history of this Site is not well known. The following narrative is derived from records stored at the Washington State Department of Ecology (Ecology): At the time of Ecology's first initial investigation, the site was identified as Carlos Motors, Inc., a used car dealership specializing in detailing older model cars. This business operated at this location from approximately 1967 until about 1993. Two drywells and three USTs existed on the property in conjunction with this business. The length of time the drywells and USTs were in use is unknown; however, the drywells were active for at least 20 years.

On July 21, 1992, Ecology received a complaint of oil dumping on the site. Upon completing its preliminary investigation, Ecology concluded that a release had occurred and notified the property owner of a further action determination. Prior to the performance of a site hazard assessment, Carlos Motors was replaced by Tidrick's Quality Transmission as the business entity operating at this address. According to local telephone directories, Tidrick's Quality Transmission was listed at this address beginning approximately November 1993.

In May 1994, limited soil sampling was performed during the site hazard assessment and releases were confirmed in the vicinity of the two drywells and the waste oil UST (Figure 2). In September of that year, Cayuse Environmental (Cayuse), an environmental consulting company hired by the former property owner, decommissioned three USTs on the site. Cayuse also initiated an independent remedial action in association with the removal of one of the two drywells (south drywell) and the release from the waste oil UST. The interim action consisted of soil removal.

In October and November 1994, the scope of the interim action was expanded in the areas surrounding the waste oil UST and the south drywell. The scope of work also included remedial action to address soil contamination in the north drywell. Approximately 700 tons of petroleum contaminated soils (PCS) were reported to have been removed and disposed at the former Rabanco landfill in Roosevelt. However, no receipts or other supporting documentation are known to exist to verify the removal and proper disposal of the PCS.

Ecology review of the remedial action report concluded that the site characterization was incomplete due to the type and nature of the contamination. Analyses of the soil initially excavated in the vicinity of the waste oil UST and the north drywell exhibited concentrations of chlorinated solvents including tetrachloroethene (PCE) and trichloroethene (TCE) above Model Toxics Control Act (MTCA) Method A soil cleanup levels. Although soil had been over excavated in the vicinity of the waste oil UST and the two drywells, no analyses for chlorinated solvents were performed on the soil confirmational samples. Additionally, an undetermined quantity of PCS was left intact under the former garage/paint shop building (west building) during removal of the north drywell.

In March 2007, the site underwent a second Toxics Cleanup Program (TCP) initial investigation in conjunction with a Dangerous Waste Compliance inspection by the Hazardous Waste and Toxics Reduction Program. The joint investigations were prompted by visible evidence of improper storage and handling of generated waste streams. Numerous examples of releases to the ground with resultant contamination of the soil and conveyance to the stormwater drain were documented during the investigations. The business operating on the site at that time was Tidrick's Quality Transmission.

During the TCP initial investigation, limited soil sampling was performed in the shallow subsurface. Two grab samples were collected and analysis of both samples showed contaminant concentrations that exceeded the MTCA Method A soil cleanup level for heavy oil range organics. Other contaminants detected in the soil above compliance levels included lead.

3.0 PROPERTY LOCATION AND DESCRIPTION

3.1 Property Location

The site is listed as assessor Parcel Number 191331-11012 located at 1802 South 1st Street Yakima, Washington, 98903. The property is approximately 1.57 acres in size. The north and east properties boundaries are defined by Mead Avenue and South 1st Street, respectively (Figure 1). The west and south property lines are bounded by land currently leased to the Yakima County Sheriff s Department.

3.2 Property Description

The legal description of the property is listed as: That portion of the Northwest ¼ of the Northwest ¼ of the Northeast ¼ of the Northeast ¼ of Section 31, Township 13 North, Range 19, E.W.M., described as follows: Beginning at the point of intersection of the South line of Mead Avenue and the Westerly line of State Road No. 3; thence Southeasterly along said Westerly line 300 feet; thence West parallel with the South line of Mead Avenue 249.2 feet; thence North 183.6 feet; thence West 1 foot; thence North to the South line of said Mead Avenue; thence East to the point of beginning. (Parcel No. 191331-11012).

Two commercial structures and a paved parking lot formerly existed on the property. Assessor records documented that a building was constructed in 1935, presumably the main one, and the

associated building was built in 1940. In December 2013 and January 2014, the two buildings and the asphalt pavement were demolished and removed from the site.

4.0 PRIOR SITE INVESTIGATION SUMMARY

4.1 Soil Investigation

In September 1994, Cayuse performed a site assessment with the removal of three USTs and initiated the removal of contaminated soils from releases at the waste oil UST and the south drywell. In October and November of that year, Cayuse expanded the scope of work to assess the north drywell and to excavate contaminated soils from the waste oil UST area and the two drywells (Figure 2).

Sampling and Analysis Deficiencies
The site assessment and interim soil removal action presented many deficiencies in site characterization and post-removal soil confirmational sampling.

The two USTs located at the north portion of the site were listed as gasoline USTs but little or no detail is known concerning whether the tanks had contained other chemicals such as heating oil. Upon removal of these two tanks, Cayuse reported there were no obvious signs of release. Three confirmational soil samples were obtained from each tank cavity, two from the sidewalls and one at the bottom of the excavation at a maximum depth of five feet below ground surface (bgs). The soil samples were analyzed for gasoline-range organics by WTPH-G and lead by EPA Method 6010. Based on these analyses there were no signs of gasoline releases from the USTs; however, the required testing should have routinely included analysis for volatile organic compounds (benzene, ethylbenzene, toluene, xylenes or BTEX).

The report also did not document investigation of the fuel distribution piping system associated with both gasoline USTs. The report did not describe any removal of the piping system or associated dispensers. According to the *Guidance on Site Checks and Site Assessments for Underground Storage Tanks* (February 1991), soil samples should have been obtained to assess the dispenser and piping areas for all required analyses.

In contrast, the initial soil samples obtained from the waste oil UST area and two drywells were analyzed by WTPH-418.1. Also, the soil excavation depths for cleanup at each of the drywells and the waste oil UST area were dictated by petroleum contamination as determined from samples analyzed by that method. The shortcoming of this analytical method is that it does not identify the type of petroleum hydrocarbon in the sample but yields only a total recoverable petroleum hydrocarbon value. Analyses should have been performed to identify the specific types of petroleum hydrocarbons potentially present in the waste oil mixture or possibly disposed through the drywell system. The confirmational samples are compliant for petroleum hydrocarbons if the contamination was diesel-range or heavy oil-range hydrocarbons. If gasoline-range organics were present, the confirmational samples were not in compliance. The appropriate analyses would have included WTPH-HCID and where petroleum hydrocarbons were identified as present, quantified through WTPH-Gx or WTPH-Dx, respectively.

Chlorinated solvents and other volatile organic compounds

The characterization analysis in 1994 was inadequate since all of the required testing was not performed or only a portion of the analytical results were reported. A limited number of initial soil samples from the waste oil UST area and the south drywell area were analyzed by EPA Method 8260 but the laboratory report only shows the analysis as a chlorinated solvent scan and does not list detections or concentrations of benzene, toluene, ethylbenzene, or xylenes as constituents that were assessed. The samples from these two areas should have been screened for BTEX with the analytical results listed in the laboratory report. Detections of these constituents would have yielded information potentially indicative of a release containing fresh or less weathered gasoline to supplement hydrocarbon identification analysis if it had been conducted.

Other appropriate soil analysis should have included EPA Method 8270 to assess semi-volatile organics including such possible contaminants as naphthalene and carcinogenic polyaromatic hydrocarbons (cPAHs). Only one sample from the waste oil UST (#9422-09) and one sample from the south drywell (9422-12) were assessed via Method 8270. Analysis of both samples showed values of naphthalene near the compliance level for protection of groundwater for drinking water purposes; however, the values were flagged as estimates since the values were detected above the method detection limit but below the reporting limits.

Soil samples taken from the north drywell area were only analyzed for petroleum hydrocarbons by WTPH-418.1 Modified. Other analytical methods to screen for potential constituents were not performed on these samples. According to the notes associated with MTCA Table 830-1, the waste oil category applies to unknown petroleum products and mixtures of petroleum and nonpetroleum substances. As such, testing is required in a sufficient number of samples to determine whether a possibly associated chemical is present at concentrations of concern.

In 2007, an additional but very limited investigation was performed to assess surface contamination due to poor business housekeeping practices associated with the historical land use. Two grab samples of soil were collected from the shallow subsurface at a depth of three to six inches bgs. One soil sample was collected near the south fence line in the vicinity of the southwest corner of the property. This sample exhibited a concentration of lube oil at 2,200 mg/kg. Analysis for chlorinated solvents was also conducted but the results were reported as estimates or as non-detections. Metals analyses were not performed on this sample. The other grab sample of soil is described in the next section (Metals).

The confirmational analyses for the areas where soil was removed also did not account for chlorinated solvents and possibly other contaminants although the initial sampling showed concentrations of several chlorinated solvents in soil above compliance levels. Subsequent analysis for chlorinated solvents following soil removal was not conducted nor were required screening analyses under MTCA Table 830-1 performed. Analyses including EPA Method 8260 and 8270 will be performed to screen for possible constituents that have the potential to migrate due to high solubility.

Metals

The initial soil samples obtained from the waste oil UST as well as two samples from the south drywell were analyzed for metals; however, the soil samples were prepared by a leaching method

typically used with waste profiling for disposal purposes. The laboratory analytical sheets indicated that EPA Method 1311 (TCLP) was used prior to analysis of the samples by EPA Method 6010. MTCA does allow for the derivation of soil concentrations protective of groundwater based on a leaching test. Per WAC 173-340-747(7), these analytical results are appropriate when determining the leachability of contaminants from a soil sample and to evaluate the soil leaching to groundwater pathway. For the soil concentrations to be protective of groundwater, the leaching test effluent concentrations shall be less than or equal to ten (10) times the applicable groundwater cleanup level established under WAC 173-3470-720. The analytical results showed that three of the soil samples failed the leaching test (sample nos. 9422-7, 9422-8 and 9422-12) for lead.

The direct contact exposure pathway should also have been evaluated at that time by performing EPA Method 6000 or 7000 series to determine contaminant concentrations in comparison to MTCA Method A or Method B cleanup levels. Assessment of the direct contact exposure pathway would not include EPA Method 1311 as a sample preparatory method prior to analysis.

During the limited site investigation in 2007, only one of the two grab samples of soil was analyzed for metals along with NWTPH-Dx. Analytical results showed that the sample obtained along the east wall near the southeast corner of the garage/paint shop (west building) had exceedances of lead (480 mg/kg) and lube oil (6,300 mg/kg).

In any event, the soil sampling for characterization and cleanup confirmational sampling were insufficient to determine if the soil concentrations were protective of human health for either of the two applicable exposure pathways for metals. Consequently, confirmational sampling and analysis for metals is required at the following areas: near the former waste oil UST, the north and south drywells, and the area where the PCS was left intact under the building.

4.2 Groundwater Investigation

The maximum depth of soil excavation was 14 feet bgs during the interim action in 1994. Groundwater was not assessed since it was not encountered; however, the field work was performed in late October and early November after the area-wide irrigation had been shut down and groundwater is expected to be near its low level. However, information from various sources indicates that groundwater in the area can be relatively shallow and the estimated depth to groundwater is variable:

- The USGS National Water Information System website records the shallow groundwater table ranging from 6 feet to 28 feet bgs (average = ~17.5 feet bgs, Sec. 30, T.13N., R.19E.)
- Information from the Ecology well log database indicates that the static water level varies from 8 feet to 30 feet bgs.
- The nearest Yakima Railroad Area (YRRA) shallow screened monitoring wells show groundwater levels from 8 to 10 feet bgs.
- A site adjacent to the south, Crop King/Woods Industries, has two monitoring wells that indicate that the static groundwater level is 7 feet bgs.

Additional groundwater characteristics can be inferred from the Yakima Railroad Area study. The study shows groundwater fluctuation is generally two feet between low and high water base with groundwater flow in the shallow aquifer easterly to southeasterly.

During the independent remedial action, PCS was left intact under the southeast corner of the garage/paint shop (west building). The analytical values in the adjacent excavation were below the default residual saturation values for petroleum. However, the PCS appears to be closely associated with the north drywell as shown on the remedial action site diagram. Consequently, there is the likely presence of a mixture of petroleum hydrocarbons and other contaminants including chlorinated solvents. Also, there may have been commingling of the impacted areas associated with the waste oil release and the north drywell. This supports additional inquiry for possible impact to groundwater.

Further investigation of groundwater is recommended due to the former use of the dry wells and the known releases from the waste oil UST. Additional support for assessment is provided by the unknown length of time that the dry wells were in use and duration of the waste oil releases.

5.0 SCOPE OF INVESTIGATION

The primary objective of the monitoring well sampling and analysis is the determination of the nature and extent of contamination from releases to the environment in the areas of concern. The main areas of concern are the source areas that include the former locations of the two drywells and the waste oil UST. Additional but minor areas of concern include the two gasoline USTs and near-surface contamination as determined during the limited soil sampling associated with the second initial investigation performed by Ecology.

5.1 Data Quality Objectives

A reconstruction of the previous investigations and interim cleanup action was required to determine the data gaps and to guide current site evaluation to assess compliance with the cleanup standards. During this process, site limitations were recognized and are mainly associated with poor documentation by the previous consultant and the 20 year period that has elapsed since their work in 1994. Other limitations are imposed by substrate characteristics that may negatively impact the adequacy of soil sampling

During monitoring well drilling, soil samples will be collected for analysis for the chemical species of concern. Should contaminants be found in groundwater or drilling cuttings, the monitoring well location would provide information to help determine location for subsequent soil sampling. After monitoring wells are installed, groundwater samples will be obtained during low and high water conditions to characterize groundwater for seasonal variations in flow and contaminant concentrations.

5.2 Utility Locates and Other Required Notifications

At least three days prior to subsurface investigations, the Northwest Utility Notification Center (1-800-424-5555 or 811) will be contacted so that the locations of public utilities will be marked. If as-built diagrams are available, these will also be consulted to assist in placement of proposed boring or trenching locations. Additionally, a private utility locating service will scan all tentative boring locations to verify clearance. Based on clearance from utilities, the boring locations will be adjusted as necessary.

Start cards (Notice of Intent) will be submitted to the Water Resources Section of the Department of Ecology 72 hours prior to drilling for all proposed soil borings 10 feet or deeper below ground surface.

5.3 Sampling and Analysis Plan

The purpose of the Sampling and Analysis Plan is to establish the methodology for the collection of data that meets the Data Quality Objectives of this project.

The site characterization will consist of soil sampling during monitoring well drilling and ground water sampling representing both the seasonal high and low elevations. This component will be assessment of groundwater characteristics such as groundwater levels and analytical results including groundwater screening and compliance data.

In lieu of extensive soil sampling, installation of groundwater monitoring wells and limited soil sampling is proposed to assess the site for current contamination. The limited soil sampling will focus on metals and relatively non-volatile (less volatile) contaminants to assess the direct contact exposure pathway. The soil leaching to groundwater pathway will be assessed by a suite of analyses to include volatile organic chemicals, less volatile chemicals, and metals.

The necessity of assessment for possible groundwater impacts is gauged through evaluation of site characteristic as follows:

- Verifiable records that only a small quantity of petroleum products were released;
- Thorough soil testing showing the soil contamination has not significantly migrated;
- Predominantly fine-textured soils in the area of soil contamination (dominated by silt or clay);
- Considerable depth to groundwater (more than 50 feet from the ground surface);
- Release only of products less prone to migration (diesel or heavy oil).

The characteristics of this site do not allow any exemption from groundwater sampling. However, if contaminants are detected then monitoring wells must be sampled to further assess groundwater impact. See Figure 1: Areas of Proposed Investigation.

5.3.1 Field Screening and Sampling of Soil

Surface/shallow subsurface
One area of the site represents that portion believed to have had a semi-impervious or pervious surface cover.

This are is located at the southwest portion of the site which is bounded by the west fenceline, the south wall of the former garage and the edge of the former asphalt pavement.

The surface will be visually assessed to locate areas of heavy oil staining. Limited areas of surficial staining may be scraped and conformational soil sampling will be performed to verify compliance for petroleum hydrocarbons. Any metal contamination should be incidental to waste oil release, so in addition to NWTPH-Dx, metal analysis will be performed to assess for cadmium, chromium, nickel, zinc, and lead.

Subsurface Soil Sampling

Since the point of compliance for the direct contact exposure pathway extends from the surface down to 15 feet below ground surface, soil samples will be obtained from the soil profile in that interval between the known extent of previous excavation down to 15 foot depth and extending to the soil/groundwater interface, if necessary.

Soil sampling during monitoring well drilling will be performed if the boring location is situated within a former source area. Additional soil borings will be collected in the waste oil UST area, and the north drywell and south drywell areas. The samples may be collected in that interval from 9 to 15 feet below ground surface (bgs) in the waste oil UST area and in the south drywell area. The samples in the north drywell area will be collected in that interval from 8 to 15 feet bgs.

During drilling or open excavation, detailed logs of subsurface conditions will be recorded. Initially, all soil will be field screened visually for staining and by other field methods that may include but is not limited to the following: sheen test, headspace readings (vapor analysis) using a photoionization detector (PID) or a flame ionization detector (FID).

If groundwater is encountered during advancement of a monitoring well boring, a soil sample will be obtained from the soil core near the soil/water interface.

5.4 Groundwater Sampling

Depth to groundwater in the area is variable depending on the information source:

- The USGS National Water Information System website records the shallow groundwater table ranging from 6 feet to 28 feet bgs (average = ~17.5 feet bgs, Sec. 30, T.13N., R.19E.)
- Information from the Ecology well log database indicates that the static water level varies from 8 feet to 30 feet bgs.
- The nearest Yakima Railroad Area (YRRA) shallow screened monitoring wells show groundwater levels from 8 to 10 feet bgs.
- A site adjacent to the south, Crop King/Woods Industries, has two monitoring wells that indicate that the static groundwater level is 7 feet bgs.

Based on the Yakima Railroad Area study, the groundwater fluctuation is generally two feet between low and high water. The same study shows groundwater in the shallow aquifer generally flows easterly or southeasterly.

5.4.1 Monitoring Well Construction and Development

A minimum of three monitoring wells will be installed. Proposed locations for the monitoring wells are indicated on the site diagram and are based, in part, on the former source areas. Monitoring well locations are scheduled for the northwest corner, and south side of the property near the existing oil/water separator.

Construction and specifications of the monitoring wells will follow the requirements as stated in Chapter 173-160 WAC (Minimum Standards for Construction and Maintenance of Wells) and the commonly accepted industry standards for installation of wells that will produce representative groundwater samples. The well casing will consist of 2-inch diameter Schedule 40 polyvinyl chloride (PVC). The screen will consist of a five foot section having 10 slot (0.010 inch) openings flush threaded with riser. The filter pack will consist of *10/20* silica sand deposited from the bottom of the screen to one foot above the top of the screen. The remainder of the annulus space will be filled with *3/8* inch bentonite chips to the bottom of a steel, flush-mounted well monument and finished with concrete.

The project schedule for monitoring well compliance sampling will be based on the completion of well development. The wells will be developed by surge block and pumping until the fines have dissipated (water is clear).

5.4.2 Survey of Monitoring Well Location and Elevation

All monitoring wells will be surveyed by a licensed surveying firm. For each monitoring well, the vertical elevation of the reference point marked on the top of the PVC casing for water levels should be measured to within 0.01 foot relative to the North American Vertical Datum of 1988 (NAVD88). The horizontal location of borings and monitoring wells will be measured to within 1.0 foot.

Monitoring well elevation measurements will be measured to a reference point marked at the top of the PVC well casing to the nearest 0.01 foot relative to the North American Vertical Datum of 1988 (NAVD88). Water levels should be measured to within 0.01 foot from this reference point on the casing.

If a property boundary survey is required, the horizontal datum will conform to the North American Datum of 1983, updated in 1991 (NAD83 (1991)).

5.4.3 Monitoring Well Sampling

Groundwater is estimated to be found at approximately within 20 feet bgs. Groundwater static level will be measured and recorded and in-situ grab groundwater samples will be collected for the required analyses.

Three monitoring wells are planned. A drill rig such as air rotary will advance a boring to assess groundwater level and possible contaminant concentrations in each well. One well is planned to be located in the vicinity of the drywell/waste oil UST area on the downgradient side. Another boring will be placed in an area near the waste oil UST and the north drywell. The third monitoring well is planned to be placed in the upgradient northwest corner of the property.

Groundwater samples will be collected at these locations for screening purposes and the entire suite of analyses for waste oil will be performed on these samples to determine if impact had occurred.

Groundwater sampling of the monitoring wells will conform to the guidelines set forth in the *Guidance on Remediation of Petroleum Contaminated Sites.* The initial groundwater sampling results from the monitoring wells will dictate the frequency of sampling. Prior to sampling, the field personnel will coordinate with the laboratory to ensure sampling protocols including recommended sample volume, holding times, and proper storage.

Groundwater elevation measurements will be recorded from each well prior to sampling. The ground water levels will be measured to within 0.01 foot from the reference point on the casing. Samples will be collected by the low-flow purge and sampling method.

Groundwater samples will generally be collected unfiltered. The possible exception is the collection of samples for metals analysis. If turbidity is high, collect both unfiltered (for total metals analysis) and field filtered (for dissolved metals analysis). Once filtered, the sample should be preserved as per laboratory instructions.

Samples for organic contaminants will be unfiltered during collection.

Sufficient groundwater samples will be collected and screened for the following: petroleum hydrocarbons, volatile petroleum compounds (BTEX), fuel additives and blending compounds (MTBE, EDB, EDC), carcinogenic PAHs, naphthalenes, metals (cadmium, chromium, nickel, zinc, and lead), PCBs, and halogenated VOCs.

Groundwater samples for petroleum hydrocarbons will be initially analyzed with NWTPH-HCID, and then quantified by NWTPH-Gx, NWTPH-Dx as necessary.

5.4.4 Groundwater Monitoring Well Decommissioning

The groundwater monitoring wells will be decommissioned per Chapter 173-160 WAC (Minimum Standards for Construction and Maintenance of Wells) only after receiving written approval from Ecology.

5.5 Management of Investigative Wastes

Regulated investigation derived wastes (IDW) such as soil cuttings generated during drilling and sampling activities will be containerized in 55-gallon, US Department of Transportation (DOT) approved drums. Decontamination water and purge water from the groundwater monitoring wells will be stored in additional 16 or 55-gallon DOT-approved drums.

The onsite storage of regulated IDW shall not exceed 90 days. All regulated IDW will be temporarily staged onsite until profiling analyses are performed. Representative samples will be collected to profile the soil/drill cuttings and any groundwater. The drums will be labeled with the date, type and source of the materials contained. Non-regulated IDW including nitrile gloves, visqueen sheeting, Teflon lined polyethylene tubing may be disposed as standard municipal waste.

Management of IDW will be documented in the Remedial Investigation report. The documentation will include disposal arrangements and laboratory analytical results for waste profiling.

For soil, the requirements in Chapter 173-350-300 WAC (Collection and Transportation Standards for Solid Waste) shall apply. Receipts documenting off-site disposal should be retained by the property owner.

5.6 Laboratory Analyses

Soil and groundwater samples will be submitted to a laboratory accredited for the required analyses. If the laboratory is not accredited for a particular analysis, the analysis can be performed by another laboratory that is accredited for that method. However, a chain-of-custody shall be completed to document the transfer. The receiving laboratory shall note sample conditions and anomalies in the samples, e.g., if air bubbles are present in the 40-ml VOA groundwater vials.

Final documentation shall indicate the preservation and storage of samples, if the samples were analyzed within their respective holding times for particular analyses, and any discrepancies noted that may affect the quality of the samples.

The soil and groundwater samples taken in the vicinity of the waste oil UST should be analyzed for volatile organic compounds (BTEX), fuel additives and blending compounds (MTBE, EDB, EDC), carcinogenic PAHs, metals, PCBs, and halogenated VOCs. The required analyses for waste oil releases are outlined in Table 1 below. Since the same contaminants may be expected to potentially exist in the drywell area, the drywell soils and groundwater shall also be assessed by the listed analyses.

The analyses for fuel additives including BTEX, EDB, EDC, and MTBE are not required on all soil and groundwater samples; however, sufficient analyses should be performed to cover each area of concern.

For soil:

- NWTPH-HCID, if detections then quantification by NWTPH-Gx and NWTPH-Dx;
- EPA Method 8260 to assess VOCs, MTBE, EDC, EDB, and halogenated VOCs (chlorinated VOCs);
- EPA Method 8270 for carcinogenic PAHs, naphthalene;
- EPA Method 8082 for PCBs;
- EPA Method 6000 or 7000 Series or equivalent analytical method for metals (cadmium, chromium, nickel, lead and zinc).
- EPA Method 5035 for collection of soils for volatile organic compounds analysis (This is the preferred method for collection of VOC samples but it is understood that this method may be difficult depending on grain size, etc. Difficulties in sample recovery and collection should be noted in field notebook. If a VOA vial cannot be used, a 4 or 8 ounce soil jar will be filled completely to minimize headspace.)

TCLP will only be used for waste profiling as a preparatory procedure prior to the appropriate analytical method for metals.

For groundwater:

- NWTPH-HCID, if detections then quantification by NWTPH-Gx and NWTPH-Dx;
- EPA Method 8260 to assess VOCs, MTBE, EDC, and halogenated VOCs (chlorinated VOCs);
- EPA Method 504.1 for EDB;
- EPA Method 8270 for carcinogenic PAHs, naphthalene;
- EPA Method 8082 for PCBs;
- EPA Method 6000 or 7000 Series or equivalent analytical method for metals (cadmium, chromium, nickel, lead and zinc).

Table 1. Required/Recommended Analyses for Waste Oil Release & Unknown Mixtures (modified from Table 830-1, Chapter 173-340 WAC)

Chemical	Analytical Method	
	Soil	Groundwater
Volatile Petroleum Compounds		
Benzene	EPA Method 8260	EPA Method 8260
Toluene	EPA Method 8260	EPA Method 8260
Ethylbenzene	EPA Method 8260	EPA Method 8260
Xylenes	EPA Method 8260	EPA Method 8260
Fuel Additives & Blending Compounds		
EDB	EPA Method 8260	EPA Method 504.1
EDC	EPA Method 8260	EPA Method 8260
MTBE	EPA Method 8260	EPA Method 8260
Total lead & other additives	EPA 6000 or 7000 Series	EPA 6000 or 7000 Series
Other Petroleum Components		
Carcinogenic PAHs	EPA Method 8270 SIM	EPA Method 8270 SIM
Naphthalenes	EPA Method 8270	EPA Method 8270

Chemical	Analytical Method	
Other Compounds		
PCBs	EPA Method 8082	EPA Method 8082
Halogenated Volatile Organic Compounds	EPA Method 8260	EPA Method 8260
Metals (lead included as additive)		
Cadmium	EPA 6000 or 7000 Series	EPA Method SW 7131
Chromium (Total)	EPA 6000 or 7000 Series	EPA 6000 or 7000 Series
Nickel	EPA 6000 or 7000 Series	EPA 6000 or 7000 Series
Zinc	EPA 6000 or 7000 Series	EPA 6000 or 7000 Series

6.0 QUALITY ASSURANCE PROJECT PLAN

The primary objective of the QAPP is to assure that a sufficient number of samples are collected to gain quality analytical information for the Tidrick Quality Transmission site, to evaluate the various environmental media of concern, and to determine whether there is a risk of offsite contamination transport.

6.1 Personnel

PLSA co-project managers and principal sampling personnel, Brad Card P.E. and Scott Garland P.E., are responsible for assuring that all on-site personnel are trained to properly carry out information included in this SAP and QAPP and that all resources are made available to meet the investigation objectives.

The PLSA health and safety officer is Scott Garland P.E., who is responsible for identifying and mitigating potential hazards while field work is being performed and insuring health and safety procedures are implemented and followed.

Ecology personnel will be onsite to observe field activities including monitoring well installation and soil borings.

6.2 Documentation

A complete record of field activities will be maintained. Documentation necessary to meet quality assurance (QA) objectives for this project includes field notes and field forms, borehole logs, sample container labels, and chain-of-custody (COC) forms. The field documentation will provide descriptions of all sampling activities, sampling personnel, and weather conditions. All modifications, decisions, and/or corrective actions to the study design and procedures identified in the SAP will be recorded in the field documents with a signature and date.

Daily activities will be recorded. Information recorded will include the following:

- Date, time, place, and location of sampling
- Onsite personnel and visitors
- Daily safety discussion and any safety issues

- Quality control samples (i.e., duplicate samples, trip blanks, etc.)
- Field measurements and their units
- Observations about site, location, and samples (weather, current, odors, appearance, etc.)
- Equipment decontamination verification

Field logbooks are intended to provide sufficient data and observations to enable participants to reconstruct events that occur during project field activities. Entries should be factual, detailed, and objective. If an error is made, the individual responsible may make corrections simply by crossing out the error and entering the correct information. The erroneous information should not be obliterated. All corrections must be initialed and dated. All documentation, including voided entries, must be maintained within project files. Photocopies or electronic scans of the field logbooks will be made at the end of each field event and maintained in the project file. Boring logs will be used to record geological and well installation observations and data. Soil sampling information (sample ID, depth, time) will also be recorded on these logs.

Sample collection data sheets will be completed for each groundwater sample location. Sample data sheets will contain date and time of sample collection, sample number, sample location, field measurements (e.g., pH, conductivity, temperature), and analyses collected. Sample labels will be attached to each sample container. Labels will contain the sample number, date and time of sample collection, analyses requested, and information on sample preservation. Chain-of-custody forms will accompany all samples shipped to the analytical laboratory. In addition to containing a record of sample information, chain-of-custody forms will contain the signature of the sample shipper and will document the date and time that samples were shipped. Upon receipt at the laboratory, the chain-of-custody record will be compared with the samples received, any discrepancies will be noted, and the form will be signed and dated by an authorized laboratory representative and a copy returned to the sender.

6.3 Analytical Methods

Analytical methods may be found in Section 5.6 of this Plan.

6.4 Laboratory QA/QC and Data Submittals

Laboratory quality control (QC) samples will include the following, as relevant to each analytical method:

- Method blanks
- Laboratory control samples
- Matrix spikes/matrix spike duplicates
- Laboratory duplicates
- Trip blanks (optional)

The laboratory quality control will include the use of appropriate duplicates, laboratory control samples, matrix spikes/duplicates, and method blanks. The laboratory deliverable will include a case narrative, a description of data qualifiers and the accompanying laboratory analysis data sheets will provide reporting limits and dilutions.

Laboratory data will be provided in both, hard copy and electronic file to PLSA and will consist of laboratory narratives, chain-of-custody documentation, quality control documentation containing method blank results, and QA summary forms. The narrative should note any deviations from the sample handling protocols as previously established by the laboratory. The sample handling protocols should note conformance to preservation methods such as storage in a cooler with blue ice or equivalent to a temperature of 4 degrees Celsius. Also, the presence of air bubbles in groundwater VOA vials should be noted.

Laboratory deliverables will include an electronic data deliverable formatted to meet the submittal requirements of Ecology's Environmental Information Management (EIM) database.

6.5 Field QA/QC Measures

Samples will be considered acceptable to the field manager if sufficient quantity of material is recovered to adequately and appropriately represent the target depth interval. Examples of unacceptable samples or sample locations include soil samples with largely coarse-grained material (coarser than sand), refusal before extending below major contaminant depths, and water samples that are extremely turbid. For cases of poor recovery or refusal or lack of physical access, the PLSA field manager or project manager will discuss with the Ecology site manager to decide whether data completeness has been affected significantly enough to require moving boring locations or resampling.

Field QC samples will also be collected to gauge the quality of samples being collected; these include the following:

Field duplicates will be collected to assess natural variability in the sampled soil and groundwater matrix. One soil and one groundwater field duplicate will be collected per 20 samples from each medium or one per medium for each field sampling day of this investigation, whichever is greater. This sample will allow the relative percent difference to be calculated, to gauge the variability in the sampling and analysis processes.

OPTIONAL: Trip blanks will be submitted with every sample shipment in which samples are being analyzed for volatile organics including BTEX + MTBE, EDB, EDC and NWTPH-Gx. One trip blank, consisting of laboratory-supplied organic-free water, will be included in each cooler and analyzed upon receipt for the same constituents as the environmental samples.

6.6 Containers, Preservatives, and Holding Times

Sample containers will be certified clean from the laboratory. Sufficient volume of soil and groundwater will be collected to perform all required analyses as listed in Table 1. Also, sufficient volume will be collected if additional analyses are needed, for instance, when screening for hydrocarbon type by NWTPH-HCID and, if present, quantify by NWTPH-Gx and NWTPH-Dx.

Since the sample preservation and storage, desired sample volume, and the minimum sample volume may vary between laboratories, the laboratories will be consulted prior to sampling and

document if deviating from this table. Also, if the samples are chilled to the required storage temperature but are not preserved by acid then the holding time will be shorter. The handling and storage of the samples will be documented.

Table 2. Recommended Bottle Type, Preservation, and Holding Times for Samples

Analysis	Medium	Container	Preservation	Holding Time
NWTPH-HCID	groundwater	1-500 ml amber; 2-40 ml glass VOA vials	Cool to 4^0 C	7 days
	soil	2-4 oz clear wide mount jar	Cool to 4^0 C	14 days
NWTPH-Gx	groundwater	2-40 ml VOA glass vials with HCl	Cool to 4^0 C	14 days
	soil	2-40 ml VOA glass vials with methanol	Cool to 4^0 C	14 days
NWTPH-Dx	groundwater	2-500 ml amber	Cool to 4^0 C	14 days
	soil	2-40 oz clear wide mouth jar	Cool to 4^0 C	14 days
BTEX	groundwater	3-40 ml VOA glass vials with HCl	Cool to 4^0 C	14 days
	soil	3-40 ml VOA glass vials with methanol	Cool to 4^0 C	14 days
	groundwater			
	soil			
	groundwater			
	soil			

6.7 Sample Numbering

Each soil and groundwater sample will be clearly labeled using unique sample identifiers as follows:

Subsurface soils (SB)
The sample numbering for the soil samples will be the generic alpha-numeric designation, SB-xx-yy, where "xx" is the boring number and "yy" is the depth of the top of the sampled interval measured in feet below ground surface, for example, SB-01-05.

Note that the general convention on sample numbering for each dash-separated segment is a two digit number with a "0" as a placeholder if the number is less than 10. This applies to all of the types of sample numbers as shown in the examples.

Groundwater grab sample from temporary well points (TW)
The sample numbering for the groundwater samples from temporary well points will be the generic alpha-numeric designation, TW-xx-mmddyy, where "xx" is the boring number and "mmddyy" is the date of collection, for example, TW-04-051809.

Groundwater sample from monitoring well (MW)
The sample numbering for the groundwater samples from monitoring wells will be the generic alpha-numeric designation, MW-xx-mmddyy, where "xx" is the monitoring well number and "mmddyy" is the date of collection, for example, MW-12-051809.

Trip blanks: ***TB-mmddyy-x*** **(for example, TB-0521809-2)**
Where "mmddyy" is the date and "x" is the sequential number of this type of sample prepared on the same day.

6.8 Field Equipment Calibration

Field instruments, including a photo-ionization detector (PID) and a field portable x-ray fluorescent (XRF) unit will be calibrated prior to use each day according to the manufacturer's recommended procedure using the appropriate calibration standards. Recalibration may be needed during the day after a significant gap of time, or if the instrument does not give reliable readings (such as does not zero out). All calibration of such instruments will be recorded in the field log book. Any instrument issues should be recorded in field book.

6.9 Sample Storage and Delivery Procedures

At a minimum, all samples will be stored in insulated coolers and preserved by cooling with ice to a temperature of 4° to 6° Celsius. During receipt of samples, the receiving laboratory shall note any discrepancies in its narrative. This narrative should form part of the record in addition to the chain-of-custody.

Maximum sample holding and extraction times for the required analyses will be adhered to by field personnel and the analytical laboratories. Sample preservatives such as HCl or methanol shall be used for any samples if extraction or analysis cannot be performed within the proper holding time and as appropriate for that particular analysis.

6.10 Chain-of-Custody Procedures

Chain of custody (COC) forms will ensure that all collected samples are properly documented and traceable through storage, transport, and analysis. When all line items on the form are completed or when the samples are relinquished, the person with custody will sign and date the form, list the time, and confirm the completeness of all descriptive information and required analyses.

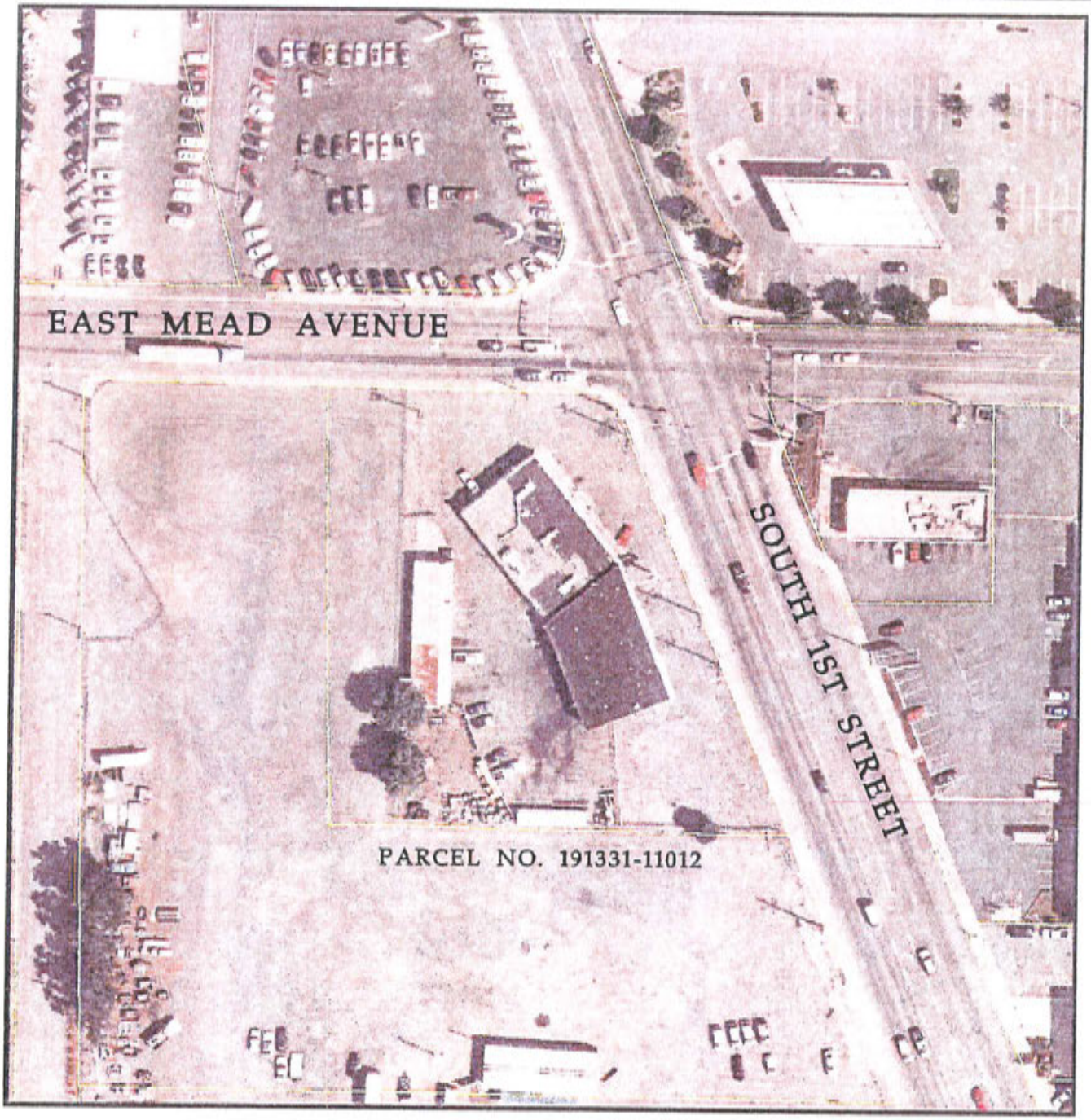
Samples will be retained in the field crew's custody until samples are delivered or shipped to the appropriate laboratory by PLSA personnel. The field COC terminates when the laboratory receives the samples. The field sample custodian should retain a copy of the completed, signed COC form(s) for the project files. If the laboratory sends samples for additional analyses then another chain of custody should record the subsequent transfers. Each laboratory should complete a narrative describing the condition of the samples received.

7.0 REFERENCES

Cayuse Environmental (1994), *Removal of two gasoline storage tanks and one used oil tank located at the corner of 1st Ave. and Mead in Yakima, WA.* Underground storage tank closure report.

U.S. Environmental Protection Agency (2008), *Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods SW-846.*

Contents of site file including notes describing the 1992 and 2007 initial investigations to include the Manchester Laboratory report and the Site Hazard Assessment report.

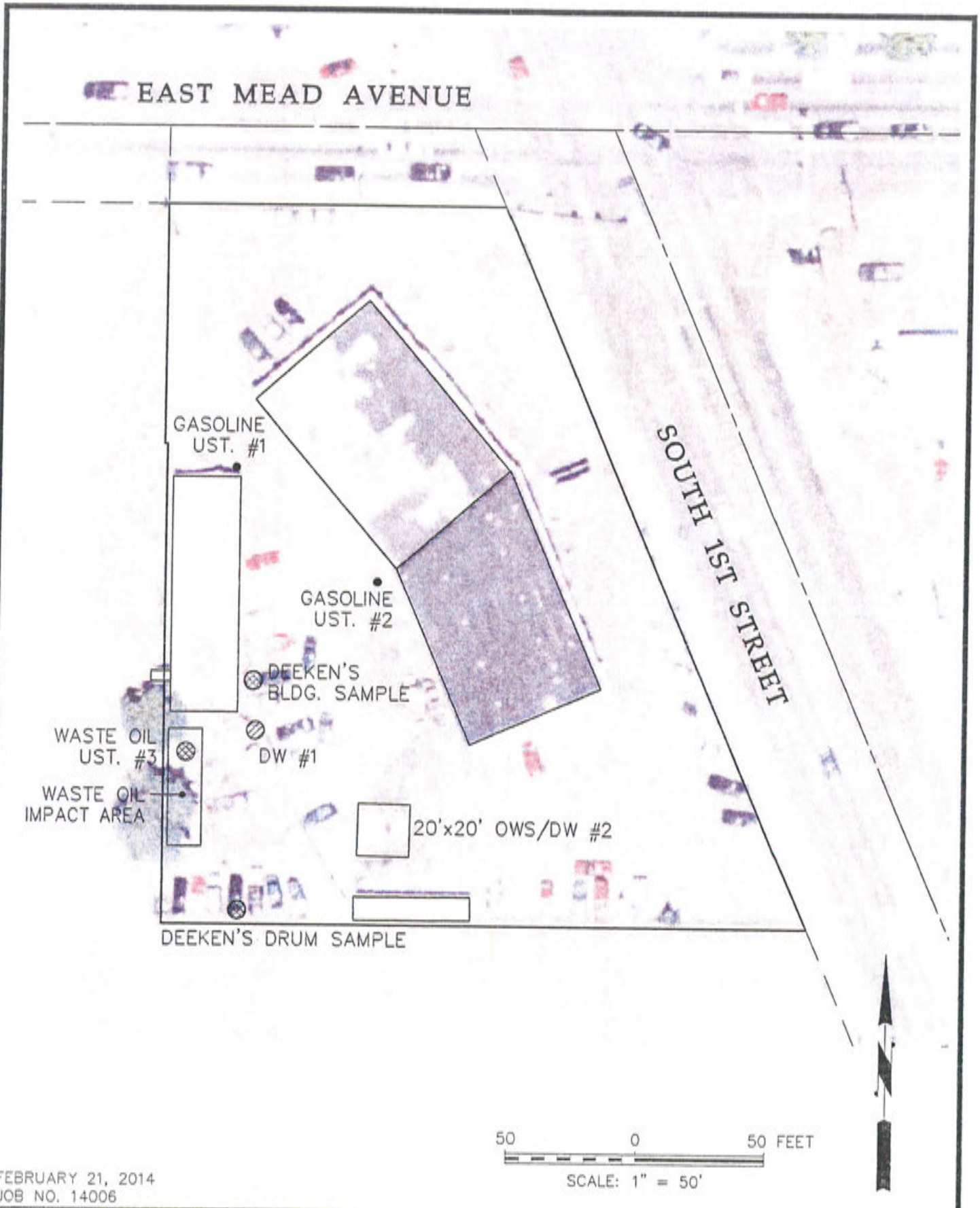


FEBRUARY 21, 2014
JOB NO. 14006

PLSA

ENGINEERING-SURVEYING-PLANNING
1120 WEST LINCOLN YAKIMA, WASHINGTON (509) 575-6990

FIGURE 1 - GENERAL SITE DIAGRAM
1802 SOUTH 1st STREET
YAKIMA, WASHINGTON
PREPARED FOR
DEREK & ASSOCIATES



FEBRUARY 21, 2014
JOB NO. 14006

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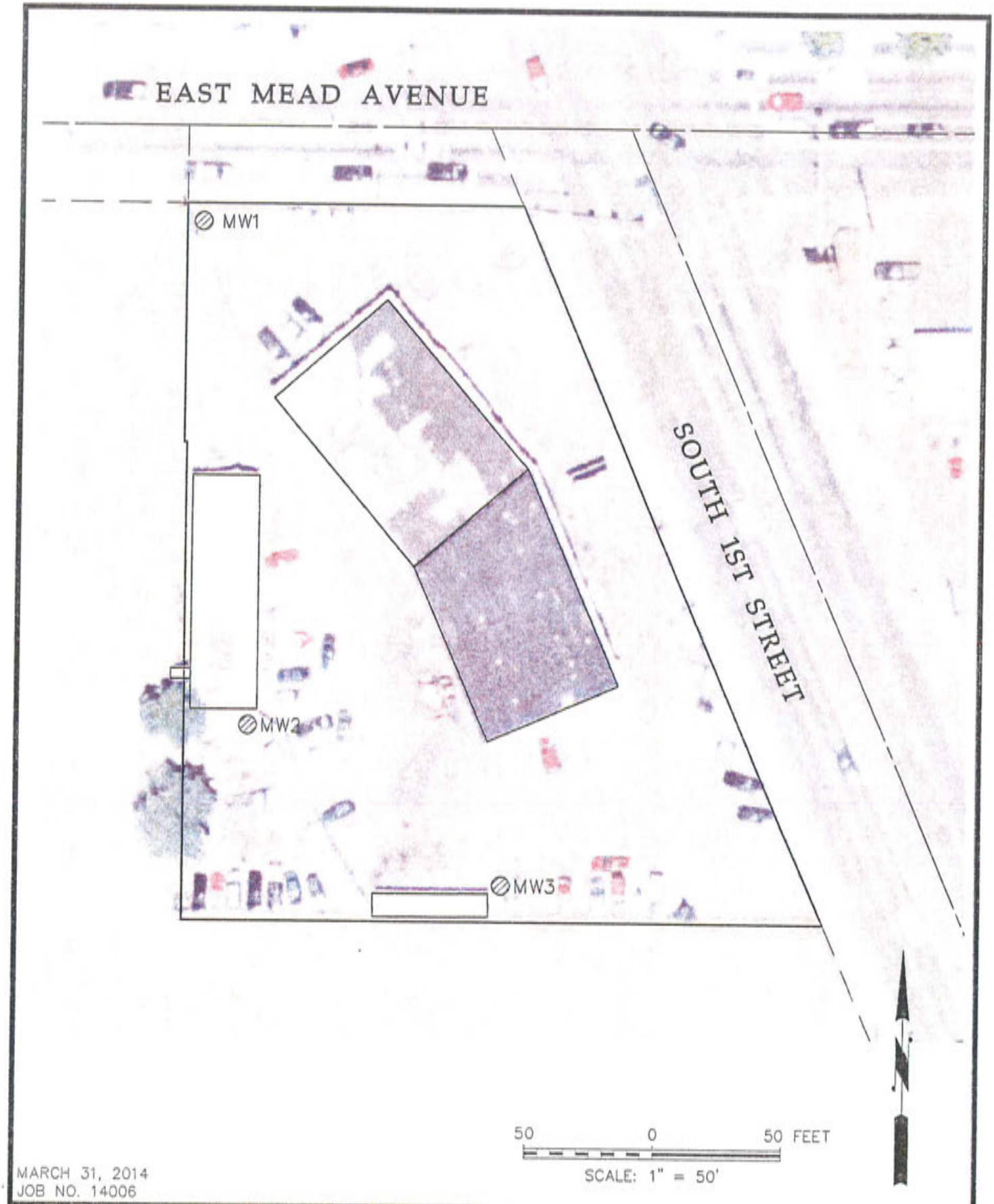
FIGURE 2 - SITE DIAGRAM AREA OF CONCERN
1802 SOUTH 1st STREET
YAKIMA, WASHINGTON
PREPARED FOR
DEREK & ASSOCIATES



MARCH 31, 2014
JOB NO. 14006

PLSA

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FIGURE 3 - MONITORING WELL LOCATIONS
1802 SOUTH 1st STREET
YAKIMA, WASHINGTON
PREPARED FOR
DEREK & ASSOCIATES

APPENDIX A

PLSA HEALTH AND SAFETY PLAN
TIDRICK'S QUALITY TRANSMISSION

GENERAL INFORMATION
CLIENT: Dereck & Associates
PROJECT MANAGER: John Mefford, Washington State Department of Ecology, Brad Card P.E. and Scott Garland P.E., PLSA Engineering & Surveying
SITE NAME: Tidrick's Quality Transmission
SITE LOCATION: 1802 South 1st Street, Yakima, WA
PURPOSE OF FIELD VISIT(S): Collect groundwater samples and soil samples
DATE OF VISIT(S): First Quarter 2014
Article I. Site Characteristics

AREA DESCRIPTION

The site is located at 1802 South 1st Street, Yakima, WA. The site is a former automotive repair facility that is bordered by Mead Avenue (runs east-west) and South 1st Street on the east. Commercial property borders on the south and east/

Possible Contaminate Characteristics

a) Waste Type(s)

Liquid X Solid X Sludge Gas Dust X__

b) Characteristics

Corrosive Ignitable Radioactive Volatile _
Toxic Reactive Unknown x_ Other __

Article II. Hazard Evaluation

CHEMICAL HAZARDS

Based upon review of the previous assessments, potential chemical hazards on the site include petroleum products from historic underground storage tanks (USTs).
Site personnel are trained in hazard recognition and will use personal protective equipment (PPE) appropriate to the potential hazards.

a) Air Monitoring

Direct read air monitoring equipment may be employed to screen for contaminants and toxic or flammable atmospheres prior to collecting samples if the project manager, or site supervisor, deems it appropriate.

b) General Safety Hazards

Sampling at the proposed sites will be unlikely to pose any unanticipated safety hazard to workers. The proposed scheme involves subsurface water and soil sampling.
If sampling will be performed along roads and alleys, personnel will don "OSHA Orange" vests and traffic control measures will be initiated. The site supervisor will identify any site-specific hazards during pre-job safety meetings. The site supervisor will update employees if site hazards change.

The most likely hazards to be encountered are those commonly encountered on many work-sites (heat stress, working around machinery, noise, etc.). All PLSA employees performing field work on this project will comply with the most current Health and Safety Manual and Health and Safety Standard Operating Procedures for PLSA. Each employee has been provided access to this manual.

Article III. Work Practices

Workers will comply with all PLSA Health and Safety Manual rules. Workers will comply with all state and federal regulations.

PERSONAL PROTECTIVE EQUIPMENT

Section 100.5 of the most current Health and Safety Manual and Health and Safety Standard Operating Procedures for PLSA addresses PPE selection:

- A Class A, B, or C hard hat as appropriate to the site,
- Steel-toed, steel shank work boots,
- Hearing protection, and
- Safety Glasses.

DECONTAMINATION PROCEDURES

a) Personnel

Before leaving the sample area, thoroughly wash hands and face with soap and water before eating, drinking, or smoking. If water is not available use pre-moistened towelettes to wash face and hands.

Do not track contaminated soils and dust off-site.

b) Samples

After the sample containers are filled they will be sealed shut, marked with indelible marker, and any excess dirt will be wiped from the outside of the sample containers before they are stored. Sample containers will be transported in suitable sealed containers placed in stable containers that can be securely closed.

c) Disposal of Materials Generated On-Site

Collect trash and non-hazardous waste and place it in appropriate trash receptacles for municipal trash pick up. Potentially contaminated materials will be separated, sealed in chemically compatible containers, and labeled for appropriate off-site disposal.

d) Safety Equipment and Materials

Each sampling team will have access to a first aid kit, clean water, paper cups, and premoistened towelettes. Site supervisors will ensure appropriate safety gear is available for site operations. The site supervisor will also be equipped with a cell phone in case of an emergency requiring outside assistance.

Article IV. Emergency Procedures

If an injury occurs, take the following steps:

- Prevent further injury and notify the site supervisor.
- Initiate first aid and get medical attention for the injured person immediately.
- Depending on the type and severity of the injury, call for medical attention.
- Prepare an incident report.
- The crew chief / site safety officer will assume charge during a medical emergency.

a) Local Emergency Phone Numbers

Ambulance: 911
Hospital:
Yakima Regional Medical & Cardiac Center (509) 575-5000 (non-emergency) 911 (emergency department)
110 South 9th Avenue
Yakima, WA 98944
Poison Control Center: 800-222-1222
Sheriff/Police: 911
(509) 575-6200 (City of Yakima
Police Dept. non-emergency)

Fire Department: 911
(509) 837-3999 (non-emergency)
b) Emergency Contacts
8 am to 5 pm: PLSA office (509) 575-6990

Article V. Site Organization

Map/Sketch Attached YES Site Secured NO
Perimeter Identified YES
EMERGENCY ROUTE
Driving directions to Yakima Regional Medical & Cardiac Center (Hospital)
Total Travel Estimates: about 15 minute / 0.48 miles
1. Start out going WEST on **E Mead Avenue** toward **S 10th Avenue**.
2. Take the 1st LEFT onto **S 10th Avenue.**
3. Turn SLIGHT RIGHT onto **Walnut Street**.
4. **Enter Yakima Regional Parking Lot**.


Drive via S 1st St and E Walnut St · 2.6 mi
6 min
Hide traffic
List all steps
Preview steps
Traffic
Fast
Slow
Drive 6 min
2.6 mi
Yakima Regional Hospital
Drive 7 min
2.8 mi
Drive 6 min
2.5 mi
1802 S 1st St
Kana Winery
E Yakima Ave
W Lincoln Ave
Yakima Valley Community College
Country Shopping Center
Map data ©2014 Google 2000 ft