

TECHNICAL MEMORANDUM

TO: Eugene Radcliff – Washington State Department of Ecology

cc: Karen Deal – Lakeside Industries
Nnamdi Madakor – Washington State Department of Ecology
Richelle Perez – Washington State Department of Ecology

FROM: Gerald Portele, Principal Environmental Scientist

DATE: March 17, 2016

RE: **ADDITIONAL SUBSURFACE INVESTIGATION, ELEVATION SURVEY,
AND HYDRAULIC EVALUATION APPROACH
LAKESIDE INDUSTRIES ABERDEEN SITE
ABERDEEN, WASHINGTON
FARALLON PN: 525-006**

Farallon Consulting, L.L.C. (Farallon) has prepared this Technical Memorandum on behalf of Lakeside Industries to outline the purpose, objectives, and methods to accomplish additional work at the Lakeside Industries property at 2400 Sargent Boulevard in Aberdeen, Washington (herein referred to as the Site) (Figure 1). The additional work includes an additional subsurface investigation, an elevation survey, and a hydraulic evaluation of potential impacts from the installation of a sheet pile wall proposed for the Site.

The purpose of the additional work to be conducted at the Site is to address comments regarding the *Remedial Investigation and Feasibility Study Report, Lakeside Industries Aberdeen Site, 2400 Sargent Boulevard, Aberdeen, Washington* dated June 2015, prepared by Farallon (RI/FS Report), in the letter regarding Opinion on Proposed Cleanup dated July 30, 2015, prepared by the Washington State Department of Ecology (Ecology) for Lakeside Industries (Opinion Letter). The additional work presented herein was developed following a meeting to discuss the Opinion Letter that was held on September 16, 2015 with representatives of Lakeside Industries, Farallon, and Ecology.



BACKGROUND

The Site has been owned by Lakeside Industries and has operated as a hot-mix asphalt batch plant since 1985. Prior to Lakeside Industries' ownership, the Site was owned and operated by Chevron USA, Inc. (formerly Standard Oil Company, referred to herein as Chevron) as a bulk fuel facility between 1922 and 1985. The initial phase of the remedial investigation (RI) conducted by Farallon in January 2009 identified a release of petroleum-based products to soil and groundwater from historical sources at the Site. Additional phases of the RI were conducted in 2011 and 2013 to further delineate identified contamination and to gather data needed to develop, evaluate, and recommend a cleanup action alternative for the Site. The boring and monitoring well locations pertaining to the investigations conducted at the Site between 2009 and 2013 are shown on Figure 2. Environmental investigations conducted at the Site as part of the RI/FS from 2009 through 2013 included:

- Installation and collection of soil samples from borings B1 through B16 in January 2009;
- Installation and collection of soil and reconnaissance groundwater samples from borings B17 through B35 in April 2011;
- Installation and collection of soil and reconnaissance groundwater samples from borings B36 through B44, and installation and collection of soil samples from the borings for monitoring wells MW-1 through MW-17 at the Site in July 2011;
- Completion of a tidal study that included measurement of groundwater elevations in monitoring wells MW-6 through MW-10 in December 2011;
- Excavation of test pits TP1 and TP2 in March 2012 to evaluate the construction, depth, and foundation embedment characteristics of the concrete retaining wall present along much of the southern Site boundary;
- Installation and collection of soil samples from boring B45 and the boring for monitoring well MW-18 in April 2013;
- Installation and collection of soil samples from borings B46 through B54 and from the borings for monitoring wells MW-19 through MW-21 in August 2013; and
- Collection of groundwater samples from monitoring wells MW-1 through MW-17 in August 2011 and March 2012, from monitoring well MW-18 in April 2013, and from monitoring wells MW-19 through MW-21 in August 2013.

Concentrations of petroleum-based constituents detected in soil and groundwater samples collected during the RI activities exceeded Washington State Model Toxics Control Act Cleanup Regulation (MTCA) cleanup levels, as established in Chapter 173-340 of the Washington Administrative Code (WAC 173-340). The sources of petroleum products are associated with historical bulk fuel facility operations at the Site. The constituents of concern (COCs) detected at concentrations exceeding MTCA Method A cleanup levels in RI soil samples included total petroleum hydrocarbons as gasoline-range organics (GRO), as diesel-range organics (DRO), and as oil-range organics (ORO); benzene; ethylbenzene; naphthalene compounds identified as



1-methylnaphthalene and 2-methylnaphthalene; carcinogenic polycyclic aromatic hydrocarbons (cPAHs) (quantified as a total toxic equivalent concentration); arsenic; cadmium; lead; and mercury. The COCs reported at concentrations exceeding MTCA Method A cleanup levels in RI groundwater samples included GRO, DRO, ORO, and benzene.

The initial phase of the RI was performed as an independent remedial action in accordance with MTCA, as established in WAC 173-340-515. Subsequent phases of the RI were conducted in accordance with WAC 173-340-350 under the Ecology Voluntary Cleanup Program (VCP). The Site has been assigned VCP Identification No. SW1161 by Ecology.

SCOPE OF WORK

The following section presents the details of the proposed additional subsurface investigation, elevation survey and locations, and the approach to further evaluate the hydraulic influence of installing an environmental sheet pile barrier along the Site boundary.

SUBSURFACE INVESTIGATION

In the Opinion Letter and subsequent September 2015 meeting, Ecology identified the need to further refine the vertical extent of soil contamination exceeding MTCA cleanup levels in the areas proximate to the southern Site boundary adjacent to the Chehalis River. Soil borings installed in this area at the Site between 2009 and 2013 were advanced to depths ranging from 8 to 20 feet below ground surface (bgs), and soil samples collected at a maximum depth of 13.2 bgs. To further delineate the vertical extent of soil contamination exceeding MTCA cleanup levels in this area, seven direct-push borings will be advanced at the Site to facilitate soil sample collection to a maximum depth of approximately 20 feet bgs. A minimum of one sample from each boring location will be collected from the native silt material that has been identified underlying the Site. The rationale for the selected boring locations and field methods is presented below.

Boring Locations

Borings will be located near the southern Site boundary adjacent to the Chehalis River to confirm the vertical extent of soil contamination at the Site. The proposed boring locations are shown on Figure 2. The rationale for the location of each of the proposed borings is provided below.

- Boring B55 will be advanced in the western portion of the Site in the vicinity of monitoring well MW-17 and former boring B40 where DRO and ORO were detected at concentrations exceeding the MTCA Method A cleanup level in a soil sample collected from 5.5 feet bgs;
- Boring B56 will be advanced in the vicinity of former boring B8 where DRO, ORO, and cPAHs were detected at concentrations exceeding the MTCA Method A cleanup level in a soil sample collected from 2 feet bgs;



- Borings B57 and B58 will be advanced west and south of former boring B6 where DRO and ORO were detected at concentrations exceeding the MTCA Method A cleanup level in a soil sample collected from 5 feet bgs;
- Boring B59 will be advanced south of former boring B3 where DRO and ORO were detected at concentrations exceeding the MTCA Method A cleanup level in a soil sample collected from 2 feet bgs;
- Boring B60 will be advanced south of former boring B24 where DRO and ORO were detected at concentrations exceeding the MTCA Method A cleanup level in a soil sample collected from 2 feet bgs; and
- Boring B61 will be advanced in the vicinity of monitoring well MW-18 and former borings B53 and B45 where DRO, ORO, GRO, benzene, and ethylbenzene were detected at concentrations exceeding the MTCA Method A cleanup level in one or more samples collected at depths ranging from 5 to 12 feet bgs.

Soil Sampling and Analysis

Prior to initiating subsurface activities, Farallon will retain a private utility-locating contractor to clear the boring locations for subsurface utilities. In addition, each boring location will be cleared to a depth of 5 feet bgs using hand tools.

The borings will be advanced using a direct-push drilling rig. Drilling support will be provided by Holt Services, Inc. of Edgewood, Washington. Soil samples will be collected from the ground surface to approximately 20 feet bgs or a minimum of 3 feet below the surface of the native silt underlying the Site, whichever occurs first. During the advancement of the borings, the lithology encountered will be logged in accordance with the Unified Soil Classification System and ASTM Standard D2488-06, *Standard Practice for Description and Identification of Soils*. Evidence of potential contamination such as elevated photoionization detector (PID) readings, unusual odor, discoloration, or sheen will be noted.

Non-dedicated sampling equipment will be decontaminated prior to use. Field personnel will wear disposable nitrile gloves while performing sample collection activities, and will change gloves between successive samples to prevent cross-contamination. Soil samples will be collected directly from the decontaminated split-spoon sampler. A portion of each sample will be placed into a clean resealable bag for field-screening for the presence of volatile organic vapors using a PID. Samples to be retained for laboratory analysis will be placed immediately into laboratory-supplied sample containers. The sample containers will be completely filled to eliminate headspace and immediately sealed with Teflon-lined screw caps. In addition to logging lithologic conditions, other soil conditions, including soil moisture content; physical indications of potential contamination (i.e., odor, staining and/or sheen); and PID field-screening results will be recorded as appropriate on soil boring/well construction logs, on soil sample logs, and in field notes. Additional field observations such as the presence of water-bearing zones or lenses that may assist in the characterization of subsurface conditions will be recorded in the field notes.



Soil sample containers will be labeled with a unique sample identifier that will include the sample depth, date, time of sample collection, sample preservative (if any), and analytical method. The samples will then be logged on a Chain of Custody form and the containers placed into a chilled cooler and transported under standard chain-of-custody protocols to the analytical laboratory. Soil samples collected for analysis for volatile compounds will be collected in accordance with U.S. Environmental Protection Agency (EPA) Method 5035A protocols to reduce the potential loss of volatile compounds during sample collection. Borings will be abandoned by filling with hydrated bentonite chips and patching the location to match existing ground surface conditions.

Up to three soil samples from each boring will be submitted for laboratory analysis for GRO, DRO, and ORO by Northwest Methods NWTPH-Gx and NWTPH-Dx; and benzene, toluene, ethylbenzene, and xylenes by EPA Method 8021B, with one sample collected from each boring from the native silt material underlying the facility. Additional samples may be collected for laboratory analysis based on visual and/or olfactory observations of potential contamination and the presence of volatile organic vapors as determined using a PID. Up to seven soil samples will be collected for analysis for cPAHs by EPA Method 8270D/SIM from the base of each boring and/or from areas that exhibit field indications of petroleum hydrocarbon contamination. If no evidence of petroleum hydrocarbons in soil is observed in the field, soil samples will be collected from depths that correlate with the depths of field or laboratory evidence of petroleum hydrocarbons in soil observed in nearby former borings.

The final boring locations will be based on access and logistical considerations such as the presence of overhead or buried utilities. Following completion of the soil sampling, the data generated will be incorporated into Site plan maps depicting the extent of contamination at the Site previously presented in the RI/FS Report.

ELEVATION SURVEY

Discussions with Ecology regarding the Opinion Letter in September 2015 included the need to document the elevation of sediments within the intertidal zone in the adjoining Chehalis River immediately south of the existing retaining wall and riprap barrier along the southern Site boundary. The purpose of the additional survey is to document the elevation of sediments at up to eight locations within the intertidal zone in the adjoining Chehalis River immediately south of the existing retaining wall and riprap barrier along the southern Site boundary relative to the elevation of previously identified native silt material underlying the Site. In addition, ground surface elevation information will be obtained from select locations along the northern Site boundary to support the hydraulic evaluation to be conducted as a part of this phase of work at the Site. The proposed survey locations are shown on Figure 2. Surveying services will be provided by Berglund, Schmidt, and Associates of Hoquiam, Washington. A Farallon Engineer will accompany the surveyors to the Site. Following receipt of the survey information for the areas south of the Site, cross-sections will be prepared that will incorporate the areas south-adjacent to the Lakeside Industries facility on the Site to augment the site conceptual model previously developed and presented in the RI/FS Report.



HYDRAULIC EVALUATION

An evaluation will be conducted to further assess the potential influence on Site hydraulic conditions of installing an environmental sheet pile wall along the southern Site boundary as outlined in the preferred cleanup action alternative presented in the RI/FS Report. The assessment will be conducted to identify further considerations for design of the barrier and to aid in evaluating if potential adverse conditions may arise following installation. If necessary, the evaluation will include identification of potential mitigation measures that would be appropriate to mitigate potential adverse influences.

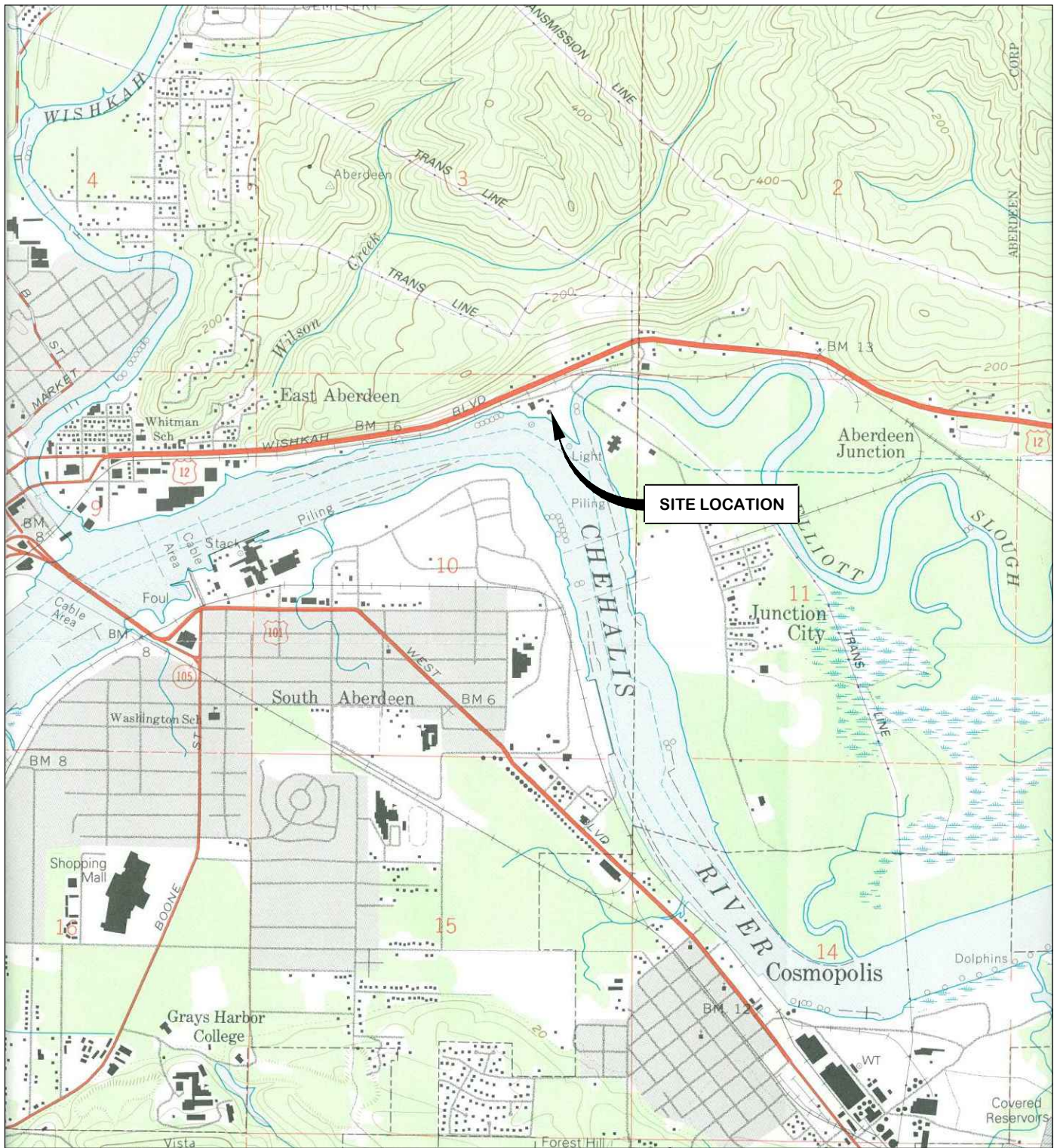
The hydraulic evaluation will use the information obtained during the additional surveying to be conducted at the Site and the cross-sections to be developed based on the surveying and lithologic information derived from the borings to be completed in the areas proximate to the existing retaining wall. This information will be used to assess alternatives for managing groundwater elevations at the Site, which may include upland drainage improvements such as installation of an interception trench in the up-gradient portions, modifications to the proposed barrier configuration, use of a barrier drainage system, and other protection or treatment measures as needed. The information obtained from the evaluation will be used in the preparation of an augmentation to the existing RI/FS Report.

SCHEDULE

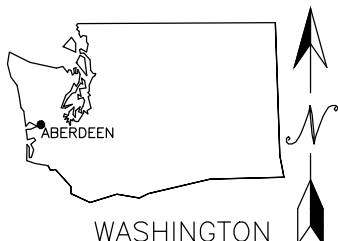
Farallon will implement the above scope of work upon receipt of approval from Ecology. Field work will be scheduled to commence within 1 week of receipt of approval from Ecology pending the availability of the drilling and surveying subcontractors. The survey work is anticipated to take 1 day to complete and soil sampling work is anticipated to take approximately 2 days to complete. The findings of the additional field activities will be compiled and included in the augmentation to the existing RI/FS Report for submittal to Ecology.

Attachments: Figure 1, *Site Location Map*
Figure 2, *Historical Features and Sampling Location Map*

JP:bjj



REFERENCE: 7.5 MINUTE USGS QUADRANGLE ABERDEEN, WASHINGTON. DATED 1957 AND PHOTOREVISED 1994





Washington
Issaquah | Bellingham | Seattle

Oregon
Portland | Bend | Baker City

California
Oakland | Sacramento | Irvine

FARALLON
CONSULTING

Quality Service for Environmental Solutions | farallonconsulting.com

FIGURE 1
 SITE LOCATION MAP
 LAKESIDE INDUSTRIES
 ABERDEEN SITE
 ABERDEEN, WASHINGTON

FARALLON PN: 525-006

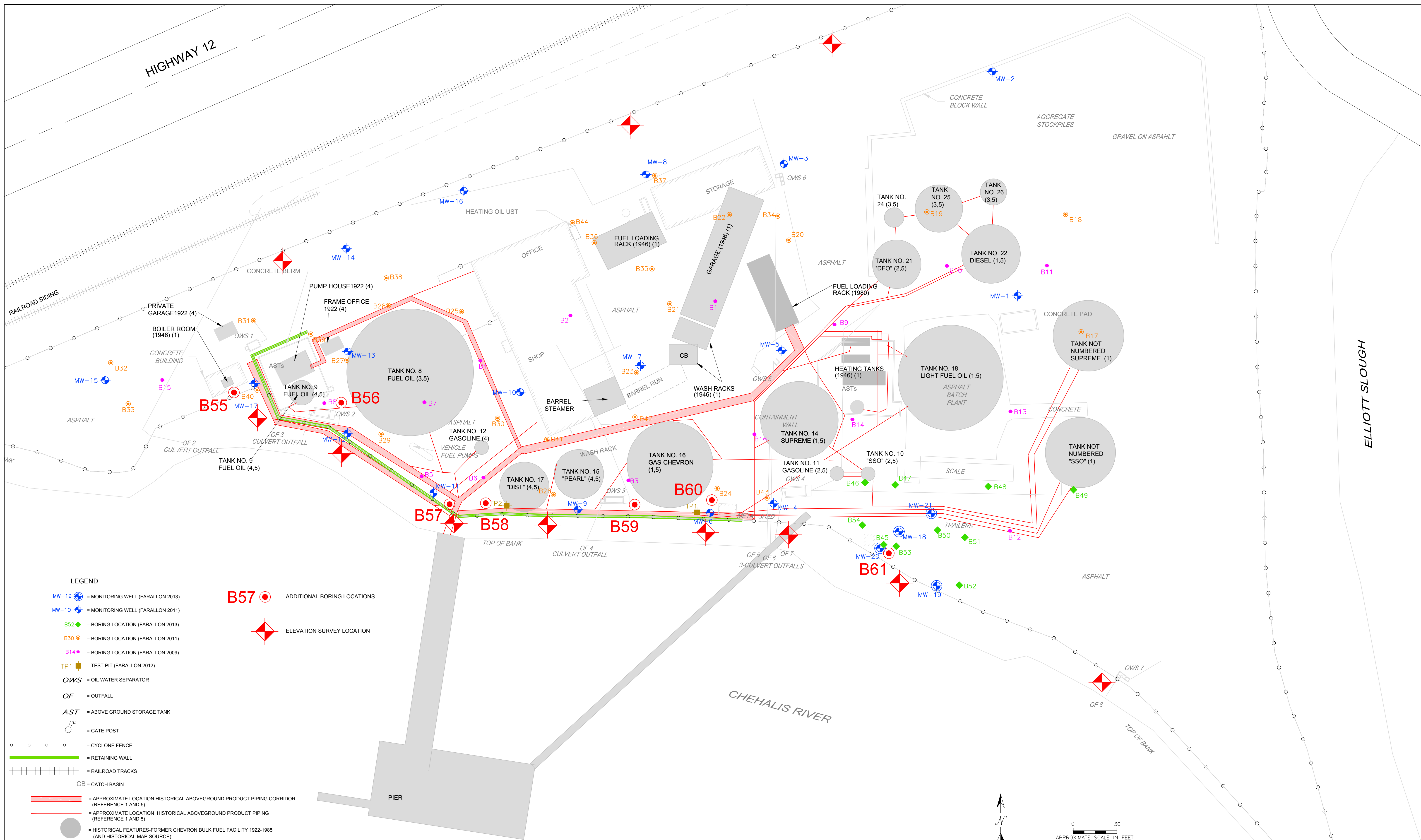
Drawn By: DEW

Checked By: RC

Date: 1/7/2016

Disk Reference: 525006

HIGHWAY 12



LEGEND

MW-19 = MONITORING WELL (FARALLON 2013)

MW-10 = MONITORING WELL (FARALLON 2011)

B52 = BORING LOCATION (FARALLON 2013)

B30 = BORING LOCATION (FARALLON 2011)

B14 = BORING LOCATION (FARALLON 2009)

TP1 = TEST PIT (FARALLON 2012)

OWS = OIL WATER SEPARATOR

OF = OUTFALL

AST = ABOVE GROUND STORAGE TANK

GP = GATE POST

○ = CYCLONE FENCE

— = RETAINING WALL

++++ = RAILROAD TRACKS

CB = CATCH BASIN

— = APPROXIMATE LOCATION HISTORICAL ABOVEGROUND PRODUCT PIPING CORRIDOR (REFERENCE 1 AND 5)

— = APPROXIMATE LOCATION HISTORICAL ABOVEGROUND PRODUCT PIPING (REFERENCE 1 AND 5)

● = HISTORICAL FEATURES-FORMER CHEVRON BULK FUEL FACILITY 1922-1985 (AND HISTORICAL MAP SOURCE);

B57

ADDITIONAL BORING LOCATIONS



ELEVATION SURVEY LOCATION

1. STANDARD OIL COMPANY OF CALIFORNIA, ABERDEEN, WASH., PROPOSED IMPROVEMENTS, AUGUST 25, 1946 LABELED 3-ABER-004-00
2. UNTITLED HAND-DRAWN FIGURE LABELED 3-ABER-004-00-BACK
3. STANDARD OIL OF CALIF. BULK PLANT, SEWAGE DISPOSAL SYSTEM, JULY 19, 1971 LABELED 3-ABER009-00
4. STANDARD OIL COMPANY TACOMA-WASH., TOPOGRAPHIC MAP OF ABERDEEN MARINE STATION AT ABERDEEN WASH., OCTOBER 12, 1922 LABELED 4-ABER-002-00
5. STANDARD OIL COMPANY OF CALIFORNIA ENGINEERING DEPT., ABERDEEN, WASH. GROUND PLAN, OCTOBER 30, 1974

ELLIOTT SLOUGH

CHEHALIS RIVER

0 30
APPROXIMATE SCALE IN FEET

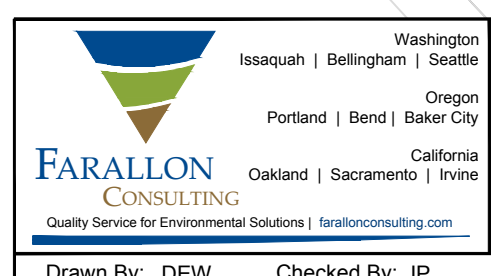


FIGURE 2
HISTORICAL FEATURES AND
SAMPLING LOCATION MAP
LAKESIDE INDUSTRIES
ABERDEEN SITE
ABERDEEN, WASHINGTON
FARALLON PN: 525-006

Date: 1/9/2016 Disk Reference: 525006b