

REMEDIAL ACTION COMPLETION REPORT

FORMER CREAM WINE/CARNATION PROPERTY
Facility Site No. 46552166, Cleanup Site No. 4863



Prepared for
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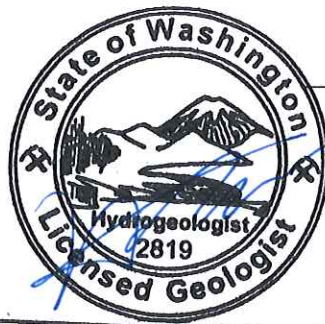
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*The material and data in this report were prepared
under the supervision and direction of the undersigned.*

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ACRONYMS AND ABBREVIATIONS

| | |
|--------------|---|
| bgs | below ground surface |
| cis-1,2 DCE | cis-1,2 dichloroethene |
| CUL | cleanup level |
| DVM | data validation memoranda |
| Ecology | Washington State Department of Ecology |
| FSDS | field sampling data sheet |
| IHS | indicator hazardous substance |
| ISCR | in situ chemical reduction |
| MDL | method detection limit |
| MFA | Maul Foster & Alongi, Inc. |
| MNA | monitored natural attenuation |
| MRL | method reporting limit |
| MTBE | methyl tert butyl ether |
| MTCA | Model Toxics Control Act |
| µg/L | micrograms per liter |
| NTU | nephelometric turbidity unit |
| PCE | tetrachloroethene |
| Port | Port of Sunnyside |
| PPCD | Prospective Purchaser Consent Decree |
| the Property | 111 East Lincoln Avenue, Sunnyside, Washington |
| RAP | remedial action plan |
| SDG | sample delivery group |
| SES | Sound Environmental Strategies Corporation |
| TCLP | toxicity characteristic leaching procedure |
| TOC | total organic carbon |
| USEPA | U.S. Environmental Protection Agency |
| UST | underground storage tank |
| VOC | volatile organic compound |
| VVM | Valley View Market |
| VVM site | extent of contamination associated with the release from the UST formerly located on the VVM property |
| WHC | Washington Hills Cellars |

1 INTRODUCTION

On behalf of the Port of Sunnyside (the Port), Maul Foster & Alongi, Inc. (MFA) has prepared this report describing the completion of the soil and groundwater remedial actions at the former Cream Wine/Carnation property located at 111 East Lincoln Avenue in Sunnyside, Washington (the Property) (see Figure 1). Cleanup activities were conducted at the Property under a Prospective Purchaser Consent Decree (PPCD No. 12-2-04237-9) with Washington State Department of Ecology (Ecology) oversight (Facility Site No. 46552166 and Cleanup Site No. 4863). Remedial actions were required to address soil and groundwater contamination identified at the Property during the focused site assessment (MFA, 2012).

Excavation and removal of impacted soil and in situ chemical reduction (ISCR) in groundwater were selected as the preferred remedies, in accordance with the focused site assessment findings (MFA, 2012). In a pilot study, groundwater was treated on a small scale in order to assess the effectiveness of the selected groundwater remedy; however, post-injection monitoring results indicate that the pilot study treatment has effectively decreased tetrachloroethene (PCE), the only indicator hazardous substance (IHS) for the Property, concentrations in groundwater to below the cleanup level (CUL). Therefore, MFA does not recommend full-scale treatment and recommends that future activities may be limited to compliance monitoring.

The soil remedial action and the groundwater treatment were completed in accordance with the cleanup action plan (Ecology, 2012) and the remedial action plan (RAP) that was reviewed and approved by Ecology (MFA, 2013b). The soil remedial action consisted of excavation, on-site soil management, and off-site disposal of contaminated soil; and placement of clean backfill. Bestebreuer Bros. Construction, Inc. performed the soil excavation remedial action tasks, with oversight from MFA, in November 2013. The groundwater treatment consisted of injections of an ISCR reagent into existing wells, followed by two post-injection monitoring events. Cascade Drilling, LLP performed the groundwater injections, with oversight from MFA, in September 2013; MFA conducted groundwater monitoring in November 2013 and February 2014. The post-injection monitoring results indicate that the in situ treatment has effectively remediated groundwater and that additional treatment is not required. Groundwater monitoring will continue until the required four consecutive quarters of compliance with associated CULs is demonstrated.

2 BACKGROUND

2.1 Property Location and Background

The Property is located in Yakima County, Washington, at 111 East Lincoln Avenue in Sunnyside, and is zoned heavy industrial. The Property comprises approximately 4.58 acres and is located in

section 36, township 10 north, and range 22 east of the Willamette Meridian, on tax lot 221036-22006 (see Figure 1).

The Property is bordered by Lincoln Avenue and residential areas to the north; industrial development to the south; First Street, a residential area, and Valley View Market (VVM) to the west; and a commercial development to the east (Ken's Auto Wash & Quick Lube). The VVM property located at 107 West Lincoln Avenue, Sunnyside, Washington, once operated a retail gasoline service station and a dry cleaner or laundry. A release from the underground storage tank (UST) system associated with the former retail gasoline station on the VVM property resulted in petroleum contamination in soil and groundwater and was the focus of a recently completed site cleanup. The extent of contamination associated with the release from the UST formerly located on the VVM property is referred to in this document as the "VVM site." Petroleum-contaminated groundwater associated with the VVM site migrated onto the Property and was the focus of groundwater remediation efforts. Ecology recently issued a No Further Action determination for the VVM site (Facility Site No. 24231643 and Cleanup Site No. 5744). Features associated with the VVM site remediation that were formerly present on the Property, including recovery wells and a remediation building housing components of the groundwater remediation system, were recently decommissioned or demolished and removed, with oversight from SoundEarth Strategies (formerly doing business as Sound Environmental Strategies Corporation [SES]). Groundwater monitoring wells associated with former VVM site investigations remain on the Property and are being used for groundwater treatment and monitoring activities associated with the cleanup of the Property (see Figure 2).

The Property is currently vacant and has two primary buildings (see Figure 2):

- **Main Building:** The main building on the Property was originally used for milk plant operations and later for winery operations and covers approximately 36,309 square feet. It is composed of many rooms, including processing rooms, a storage room, cold rooms, a boiler room, office rooms, rest rooms, a warehouse area, and a product-testing laboratory. The building structure consists of various materials, including wood, metal, brick, and concrete block. There are two production wells (Well No. 1 and the Washington Hills Cellars [WHC] well) inside the building.
- **Storage Building:** An approximately 200-square-foot building located south of the main building was formerly used for storage of chemicals. It has a concrete floor and is constructed of concrete blocks.

A remediation building covering approximately 200 square feet was formerly located west of the main building. It was removed in October 2013 as part of decommissioning of the VVM site remediation system.

A truck repair building was formerly located on the southwest corner of the Property. The building has been removed, but the concrete foundation remains.

The Property is generally flat and is mostly paved, with localized unpaved areas to the north of the main building and on the eastern end of the Property. Unpaved areas are generally covered with

landscaped grass and a few trees. The Port installed a stormwater infiltration swale on the southeast portion of the Property in 2011.

2.2 Property History

The Property was originally developed for use as an evaporated milk plant by the Morning Milk Company, which operated on the Property from approximately 1942 to 1946. Carnation acquired the Property and operated from approximately 1946 to 1986. The Port bought the Property in 1986 and leased the facility to a winery in 1988, then sold it to the Seitz family in 1990. In 1992 the Property was bought by WHC and was used as a winery. Federal Agricultural Mortgage Corporation foreclosed on the Property in 2007 because WHC was unable to make loan payments. Cream Wine leased the Property for operation of a winery in 2007 and vacated it in 2010. The Property has remained vacant and unused since 2010. The Port acquired the Property in December 2012 after executing a PPCD.

Environmental investigations have been conducted on the Property since 2006 to assess groundwater impacts resulting from the UST release from the VVM site. In 1996, TOC Holdings Company (also known as “Time Oil”) discovered petroleum hydrocarbon contamination on the VVM property during installation of cathodic protection on the UST system. Time Oil initiated a remedial investigation for the VVM site and discovered that the release had resulted in migration of petroleum hydrocarbons in groundwater onto the Property (SES, 2009). Time Oil installed a dual-phase extraction groundwater remediation system in May 2000 on the VVM property and the Property. The remediation system operated between August 2000 and August 2006. Following operation of the remediation system, petroleum hydrocarbon concentrations observed in groundwater were below Ecology’s Model Toxics Control Act (MTCA) Method A CULs; however, methyl tert butyl ether (MTBE) and benzene concentrations above CULs remained (SES, 2010). In 2010, Time Oil completed in situ chemical oxidation treatment of groundwater to address the MTBE and benzene contamination (SES, 2010).

Groundwater monitoring was conducted on the VVM site on a quarterly to semiannual basis between March 1997 and December 2008. Quarterly groundwater monitoring was conducted for a subset of the monitoring wells from 2010 to 2012 to monitor concentrations of MTBE and benzene following in situ treatment. The most recent round of groundwater monitoring showed that groundwater CULs were being met; therefore, Ecology issued a No Further Action determination for the VVM site in July 2013 (Ecology, 2013).

During the VVM site investigation, PCE was detected in groundwater on the Property. The source of the PCE contamination was not conclusively identified in investigations associated with the VVM site but was determined not to be associated with the VVM site (Ecology, 2009b). The former dry cleaner at the VVM property and a former truck shop on the Property were identified as potential sources of PCE in groundwater. MFA conducted additional investigations in 2012 and 2013 to identify the source(s) of PCE impacts on the Property and to further characterize the nature and extent of PCE impacts, including characterizing the surface of the lower groundwater confining unit and evaluating groundwater flow paths, and to evaluate impacts associated with potential environmental conditions identified during the 2011 Phase I environmental site assessment (MFA,

2011). In addition to the PCE impacts, the following features were identified as potential environmental conditions:

- Potential soil and/or groundwater contamination associated with drains in the storage building and truck washing area, from a pipe draining into the stormwater swale, and from a former wastewater line that may have discharged to an open drainage ditch along the south property boundary
- Potential soil and/or groundwater contamination associated with a former coal pit and bunker fuel UST

The results of the 2012 and 2013 investigations are presented in the 2012 focused site assessment report (MFA, 2012) and the pre-remedial action sampling results letter (MFA, 2013a).

2.3 Environmental Conditions

The potential environmental conditions identified in the Phase I environmental site assessment (MFA, 2011) were investigated during the focused site assessment. The only IHS identified in soil was lead, which was limited to one exceedance of the MTCA Method A CUL in shallow soil in the vicinity of the storage building (GP08 at 1.0 foot below ground surface [bgs]). Lead contamination was found to extend vertically to a depth between 1.0 and 5 feet bgs, but no deeper than 5 feet bgs. Additional sampling was conducted on May 29, 2013, to further characterize the lateral extent of lead contamination (MFA, 2013a). Lead-impacted soil was not observed to extend north or south beyond the footprint of the storage building and was believed to be limited in extent to the east and west, based on the presence of structures in the vicinity of the observed exceedance. This information was used to estimate the volume of soil requiring removal; however, confirmation samples were collected from the excavation boundaries to confirm that all lead-impacted soil was removed (see Section 3.2).

The only IHS identified in groundwater during the focused site assessment was PCE (MFA, 2012). A fate and transport analysis conducted as part of the focused site assessment indicated a single-event, single-source release of PCE that most likely originated from the former dry cleaner at the upgradient VVM property. Historical and recent data indicate that there is a strong declining trend in PCE concentrations, and PCE has not been detected in groundwater downgradient of the Property (MFA, 2012). Additional sampling would be required to confirm the PCE source; however, additional data are not expected to change the current interpretation of PCE decay and the downgradient plume extent. Therefore, it was deemed unnecessary to gather and analyze such data before proceeding with the property cleanup.

PCE exceedances were observed along the western edge and in the southwest corner of the Property. PCE exceedances were not observed outside the property boundaries, with one exception: PCE was detected outside the property boundary at MW08 in 2008. However, PCE was not detected in the most recent sample collected from MW08 during the November 2013 performance monitoring event (see Section 5.2). As discussed in Section 5.2, a groundwater sample was not collected from MW08 during the February 2014 monitoring event because the available water column was insufficient for sampling.

PCE concentrations generally increase with increasing depth, with the highest concentrations observed at the top of the lower confining unit. However, PCE is believed to be confined to the upper aquifer, not migrating to the deeper groundwater unit, as there appears to be no groundwater flow between the units (MFA, 2012).

During the focused site assessment, MTBE was detected in groundwater at a concentration above the MTCA Method A CUL. However, MTBE is not an IHS for the Property and is a known groundwater contaminant associated with the VVM site. In addition, during the focused site assessment investigation, MTBE was detected in only approximately 6 percent of the groundwater samples collected on the Property and was observed to exceed its CUL in only one sample (MFA, 2012); and MTBE was not detected during the November 2013 or February 2014 monitoring events (see Table 1). Therefore, given the low frequency of detection, the fact that it originates from an off-property source (there are no known or suspected sources of MTBE on the Property), and the fact that it is a known chemical of concern associated with the VVM site, MTBE is not considered an IHS for the Property.

During the focused site assessment, PCE was detected in groundwater at concentrations exceeding the Ecology vapor-intrusion-to-indoor-air Method B groundwater screening level of 1 microgram per liter ($\mu\text{g}/\text{L}$) (Ecology, 2009a). However, the groundwater-to-indoor-air exposure pathway was deemed to be incomplete and soil vapor samples were not collected as part of the focused site assessment or the pre-remedial action sampling (MFA, 2012, 2013a). Concentrations of PCE in indoor or outdoor air were determined likely to be below risk levels, considering the relatively thick unsaturated zone and the relatively low concentrations of PCE observed in groundwater. Vapors disperse rapidly in outdoor air, and PCE concentrations above the vapor-intrusion-to-indoor-air groundwater screening level are generally present in deep groundwater; therefore, PCE was determined not to pose a vapor intrusion risk.

In addition, PCE has not been detected in groundwater sample locations adjacent to existing buildings, which indicates that PCE in groundwater does not extend beneath any existing buildings; development plans currently do not include constructing buildings over areas within the footprint of the PCE groundwater plume; and PCE was not detected above the vapor screening level of 1 $\mu\text{g}/\text{L}$ in the most recent (February 2014) post-injection monitoring samples, with one exception: the PCE concentration detected at MW18 was slightly above the vapor screening level (see Section 5.2). PCE concentrations likely will continue to decline by natural attenuation and by the ongoing action of the groundwater treatment such that concentrations are expected to decrease below the vapor screening level throughout the Property (see Section 5.2). Monitoring of PCE concentrations relative to the vapor screening level will be continued in order to evaluate compliance throughout the Property over the long term; however, based on the currently available information, vapor is not likely to pose a human health risk at the Property and vapor-related development restrictions will not be required.

3 REMEDIATION OF CONTAMINATED SOIL

The soil remedial action consisted of excavation of soil with lead concentrations above the MTCA Method A unrestricted land use CUL of 250 milligrams per kilogram; confirmation sampling from the excavation boundaries; backfilling the excavation; and transporting the contaminated material off site for disposal. Pre-remedial action soil samples collected in May 2013 were used to delineate the excavation boundaries, as described in the RAP (MFA, 2013b). Photographs showing contaminated material excavation and backfilling activities are presented in Appendix A.

3.1 Site Preparation and Layout

Before soil removal activities began, MFA staff delineated the remedial action excavation area, located in the vicinity of soil boring GP08, in accordance with the RAP (MFA, 2013b).

3.2 Soil Excavation

Soil within the remedial action excavation boundaries was removed with a trackhoe excavator, placed in a lined container on site while waste profiling was completed for disposal purposes, then disposed of at an off-site landfill.

The soil was excavated to the approximate depths and extents indicated on the RAP design drawings (MFA, 2013b). Approximately 11 cubic yards (15 tons) of soil was removed from an approximately 130-square-foot area to a depth of approximately 3 feet bgs (see Figure 3).

The following confirmation samples were collected from the excavation sidewalls and floors, in accordance with the procedures put forth in the RAP (MFA, 2013b):

- One sample was collected from the floor of the excavation (SS4-S-3.0).
- Sidewall confirmation samples were collected from each wall, approximately halfway between the floor of each excavation and the original ground surface (SS1-S-1.5, SS2-S-1.5, SS3-S-1.5, and SS5-S-1.5, all at approximately 1.5 feet bgs).
- Confirmation samples were submitted to Specialty Analytical in Clackamas, Oregon, for analysis.
- Total lead concentrations observed in confirmation samples were compared to CULs on a sample-by-sample basis to evaluate compliance.

Field sampling data sheets (FSDSs) are provided in Appendix B.

3.3 Soil Management and Disposal

Excavated soil was temporarily stored on site in a lined roll-off container, pending disposal characterization results. The liner was provided in case the material was found to be hazardous upon characterization for disposal. A five-point composite sample was collected from the container for laboratory analysis and waste profiling. The composite sample was collected by MFA and submitted to Specialty Analytical for toxicity characteristic leaching procedure (TCLP) lead analysis.

The soil was found to be below the TCLP limit for lead (see Table 2) and was therefore disposed of as nonhazardous waste at Columbia Ridge Landfill in Arlington, Oregon.

3.4 Backfill

Once the analytical results were received, indicating that contaminant concentrations in confirmation samples met CULs, the excavation was backfilled to match the existing grade, using 1.25-inch crushed rock up to 3 to 4 inches from finish grade, then 5/8-inch minus crushed rock as a finish course. The material was provided by Central Premix in Sunnyside, Washington. The material was placed in 8-inch lifts and compacted using a jumping jack, in accordance with the project specifications (MFA, 2013b).

4 GROUNDWATER PILOT STUDY

ISCR was recommended in the RAP for treatment of PCE CUL exceedances in groundwater (MFA, 2013b). A pilot study was conducted to evaluate the effectiveness of the selected remedy on a comparatively small scale and to evaluate the need for full-scale treatment. The pilot study consisted of injecting an ISCR reagent into existing wells, followed by two post-injection monitoring events.

Prior to the injections, a groundwater sampling event was conducted in May 2013 to evaluate PCE concentrations and the groundwater flow direction in support of the groundwater remedy selection (MFA, 2013a). Based on the PCE and monitored natural attenuation (MNA) parameter concentrations observed during the May 2013 event, ISCR was chosen as the preferred treatment methodology for the pilot study, and the following wells were selected for use as injection points: MW08, MW11, MW17, MW18, and MW19 (see Figure 4). The ISCR reagent EHC[®]-L was used for the pilot study injections. Detailed information on the EHC-L product and the treatment volume and reagent quantity estimates was provided in the RAP (MFA, 2013b).

The pilot study was conducted on September 24 and 25, 2013, and consisted of the following steps:

- Four hundred and twenty pounds (50 gallons) of EHC-L liquid (a 25 percent emulsion of carbon substrate), delivered in 55-gallon drums, was mixed with 24.5 pounds of ferrous iron powder.

- The resulting mixture was diluted with 150 gallons of water (a fourfold dilution), designed to target 20 percent of the total volume of water in the groundwater source area.
- Two to three batches of the diluted mixture were injected at each injection point for a total of 12 batches or 5,040 pounds of EHC-L. Three batches were injected into the two locations with the highest observed PCE concentrations (MW17 and MW18); two batches were injected into the remaining injection points.
- Water levels and field water quality parameters were monitored in nearby observation wells during injection to evaluate the radius of influence of the injected reagent. No significant changes in water quality or water levels were observed during the injections.

Following the pilot study, two monitoring events were conducted. A performance monitoring event was conducted on November 13 and 14, 2013, seven weeks following injection. The first compliance monitoring event was conducted on February 19, 2014, 21 weeks following injection.¹ Groundwater samples were collected from the monitoring wells used as injection points as well as from monitoring wells selected for long-term monitoring in order to assess the pilot study effectiveness and establish a baseline for future compliance monitoring (see Figure 4). As discussed in Section 5.2, a groundwater sample was not collected from MW08 during the February 2014 monitoring event because the available water column was insufficient for sampling.

Groundwater samples were collected using low-flow sampling techniques, and water levels and water quality parameters were measured prior to sample collection (see Tables 3 and 4). FSDSs are provided as Appendix B.

Groundwater analytical results are summarized in Table 1. Samples were analyzed for the following:

- Volatile organic compounds (VOCs) by U.S. Environmental Protection Agency (USEPA) Method 8260B
- MNA parameters (analyzed only during the November 2013 event, as discussed below):
 - Sulfate, chloride, nitrate-nitrogen by USEPA Method 300.0
 - Total organic carbon (TOC) by USEPA Method SM5310B
 - Total metals (calcium, iron, magnesium, and manganese) by USEPA Method 6010C

The original intent was to use the water quality and MNA parameter results and groundwater levels to evaluate hydrogeological conditions relevant for selecting additional treatment. However, following review of the PCE results from November 2013 and February 2014, it was determined that additional treatment would not be required (see Sections 5.2 and 6.2). Therefore, MNA parameters were not analyzed during the February 2014 monitoring event.

¹ As noted in the RAP (MFA, 2013a), a minimum of four to six weeks between treatment and sampling is recommended. Allowing additional time between the injections and monitoring provides more time for the treatment to take effect.

5 SAMPLING RESULTS

Soil and groundwater laboratory analytical reports are provided in Appendix C. Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they meet data quality objectives. Data validation memoranda (DVMs), summarizing data validation procedures, usability of data, and deviations from field and/or laboratory methods, are included in Appendix C. The data were validated and are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

5.1 Soil Confirmation Sampling

Table 2 summarizes laboratory analytical results for soil confirmation samples and the TCLP composite sample collected from the excavated soil. Lead was detected in all of the confirmation samples, but the concentrations were well below the MTCA A CUL. TCLP lead was not detected in the composite sample.

5.2 Groundwater Monitoring

Water levels observed during the post-injection monitoring events indicate that groundwater is flowing toward the southeast (see Figures 4 and 5), which is consistent with previous observations (MFA, 2012). This observation supports the selection of monitoring wells MW19 and MW20 for monitoring conditions at the downgradient property boundary.

During the February 2014 monitoring event, the water column in well MW08 was only 0.05 foot thick (see FSDS, Appendix B). Because of the limited availability of water, the well was repeatedly pumped dry during sampling attempts and a sample was not collected. The cause of the shallow water column was determined to be sediment buildup in the well. A water level measurement tape was used to measure the total depth to bottom of each monitoring well, which was then compared to the installation depths provided on the well logs (MFA, 2012) to estimate the depth of sediment buildup (see Table 3). The estimated sediment thicknesses range from approximately 1 to 4 feet, with the exception of well MW11, which had an observed sediment thickness of only 0.09 foot. The thickest sediment buildup was observed in well MW08.

Depth to bottom measurements were not collected during the pre-injection monitoring event, and therefore sediment thickness data are not available for comparison to the post-injection event, but the groundwater treatment is not suspected contributing to the sediment buildup. The EHC-L reagent is a liquid emulsion and soluble ferrous compound powder mixture that was mixed with water fourfold before injection (see Section 4). It is possible that iron may have precipitated out from the reagent, but that is unlikely, considering the relatively low iron concentrations in the diluted mixture. The more likely cause is sediment from the aquifer slowly accumulating in the wells over time. The wells were installed as early as 1997 (well logs were included in the focused site assessment report [MFA, 2012]). The aquifer material is a sandy silt to silty sand, the finer particles of which

may readily accumulate in the bottom of the wells. Redevelopment of the wells is recommended to remove the accumulated sediment so that more water is available for future monitoring events. The integrity of the well caps and monument seals will also be evaluated during redevelopment activities to ensure that sediment is not entering the wells from the ground surface.

During the November 2013 event, groundwater samples collected from all injection wells (MW08, MW11, MW17, MW18, and MW19) appeared cloudy and milky (see FSDSs in Appendix B) and the corresponding turbidity readings were elevated (greater than 1,000 nephelometric turbidity units [NTUs]; see Table 4). During the February 2014 event, samples from the injection wells appeared less cloudy and the turbidity readings were significantly lower (ranging from 22.34 to 140 NTUs), with the exception of MW18, for which the turbidity reading was again greater than 1,000 NTUs (see Appendix B and Table 4). Enduring emulsified reagent in the wells is the suspected cause of the elevated turbidity.

It is not likely that sediment buildup in the wells is a contributing factor, given that the visual appearance of the turbid samples was similar to the injected product and that sediment buildup was also observed in a well that was not used for injection (MW20). Approximately 2.5 feet of sediment was measured in well MW20, and turbidity readings for this well have been consistently at or below 3 NTUs (see Tables 3 and 4 and MFA, 2013a). The ongoing presence of the EHC-L reagent indicates that groundwater treatment remains active, and the decrease in turbidity from November 2013 to February 2014 indicates that the reagent is dispersing throughout the aquifer as intended. Redevelopment of the wells will not only remove accumulated sediment, but should also reduce the sample turbidity by removing emulsified product that may be congested within the well casing.

MFA recommends redeveloping monitoring wells to be included in future compliance monitoring events. The redevelopment method will be chosen in the field, based on the observed effectiveness of the various industry-standard techniques used, but likely will consist of surging using either a bailer or a pump (e.g., inertial pump or peristaltic pump), or both, followed by pumping. Following redevelopment, monitoring wells will be allowed a minimum of 24 hours to return to equilibrium conditions prior to sampling.

Dilutions were required for the highly turbid samples in order to reduce matrix interference during analysis (see DVMs, Appendix C). As a result, the method reporting limits (MRLs) for VOCs, including PCE, were elevated in some cases. The MRL for PCE was elevated above the MTCA A CUL of 5 µg/L in the samples collected from wells MW11, MW17, MW18, and MW19 during the November 2013 monitoring event, and in the samples collected from wells MW11 and MW18 during the February 2014 monitoring event (see Table 1). In order to evaluate the PCE data relative to the CUL, the data were also reported to the method detection limit (MDL) as estimated (i.e., “J-flagged”) values. At MFA’s request, Specialty Analytical issued an addendum laboratory report with PCE results reported to the MDL for those samples with MRLs above the CUL (sample delivery group [SDG] No. 1403110) (see Appendix C). These estimated PCE results are used in the evaluation of remedy effectiveness and CUL compliance, as discussed below; however, the PCE data that were submitted to Ecology’s Environmental Information Management database (a requirement under the PPCD) were reported to the MRL, consistent with the original laboratory reports (see SDG Nos. 1311171 and 1402203 in Appendix C). PCE concentrations during the post-injection monitoring events were lower in all wells sampled compared to the May 2013 pre-injection

sampling event (see Figure 6).² In addition, PCE degradation products were detected during both events (see Table 1):

- cis-1,2 Dichloroethene (cis-1,2 DCE) was detected in four of the six wells sampled in November 2013.
- cis-1,2 DCE and vinyl chloride were detected in one out of the five wells sampled in February 2014.³

Prior to treatment, PCE degradation products had not been observed in groundwater on the Property. The presence of PCE degradation products confirms that the ISCR treatment is effectively reducing PCE.

Before treatment, PCE was observed to be attenuating, as evidenced by declining PCE concentration trends (MFA, 2012). The ISCR treatment appears to have effectively reduced PCE concentrations further, as evidenced by the lower, post-treatment concentrations and the presence of PCE degradation products. PCE concentrations likely will continue to decline because of the combined effects of ISCR and natural processes; the ISCR reagent was observed in groundwater collected from the injection wells and likely will continue to react and reduce concentrations. Given the apparent effectiveness of the pilot study treatment and considering that the ISCR reagent will continue to react, no additional treatment is recommended.

MNA and other water quality parameters for groundwater were evaluated in order to establish post-treatment baseline redox conditions (see Tables 1 and 4) and to understand the distribution of EHC-L.⁴ In general, pH levels, dissolved oxygen concentrations, and oxidation-reduction potential measurements were lower in the post-treatment samples. These data confirm that conditions favorable for the intended treatment mechanism (i.e., ISCR) have successfully been established.

Concentrations of TOC and metals were generally higher in the post-treatment data set.⁵ TOC and iron are direct measurements of distribution of the organic and inorganic components (respectively) of EHC-L. Conductivity and turbidity data also confirm distribution of EHC-L. The elevated results for these parameters confirm that EHC-L has not been rapidly diluted by groundwater flow.

Concentrations of competing electron acceptors (e.g., nitrate and sulfate) were relatively high before in situ treatment, but not insurmountable with ISCR (MFA, 2013a). Dissolved oxygen concentrations decreased slightly posttreatment, indicating that conditions are progressing toward a

² Note that PCE results, as shown in Figure 5, were reported to the MRL when the MRL was below the CUL; results with an MRL above the CUL were reported as estimated (i.e., “J-flagged”) values to the MDL.

³ Only five wells were sampled in February 2014; MW08 was not sampled because of sediment accumulation in the well.

⁴ As discussed in Section 4, the February 2014 samples were not analyzed for MNA parameters.

⁵ Note that dissolved metals were analyzed in the pretreatment samples, but total metals were analyzed in the posttreatment samples because of the high sample turbidity. The high sample turbidity, caused by the presence of the EHC-L product, made sample filtration time-consuming and costly. Given that the turbidity observed in the pretreatment samples was low (generally no more than 3 NTUs), it was determined that total metals concentrations likely consisted primarily of dissolved-phase metals and therefore were comparable to dissolved metals concentrations.

reducing environment. Posttreatment nitrate and sulfate concentrations were comparable to pretreatment concentrations, but are anticipated to decrease as ISCR continues. In general, the MNA data set indicates that EHC-L has been successfully distributed to the aquifer and that ISCR is ongoing. No additional treatment is recommended at this time; therefore, MNA parameters will no longer be monitored.

PCE concentrations in groundwater on the Property have been reduced because of natural attenuation and the groundwater treatment and are not likely to rebound without a contributing source. No soil or groundwater sources of PCE that would contribute to groundwater impacts on the Property have been identified. PCE has not been detected in monitoring wells located upgradient of MW08 since 2005 (SES, 2013), and PCE was not detected in soil samples collected from the Property (MFA, 2012). In addition, PCE showed a strong declining concentration trend prior to treatment; this trend is likely to continue post-treatment. Therefore, rebound is not expected and no additional treatment is recommended.

In addition to PCE, its degradation products, and the MNA parameters, the following VOCs were detected in groundwater: 2-butanone, acetone, benzene, carbon disulfide, chloroform, cis-1,2 DCE, trichlorofluoromethane, 1,2,4-trimethylbenzene, chloromethane, ethylbenzene, methylene chloride, naphthalene and xylenes (see Table 1). These VOCs were not detected in samples collected during the pre-injection monitoring event (MFA, 2013a) and, given that PCE is the only IHS for the Property, these constituents were not compared to CULs.

Two compounds—2-butanone and acetone—are produced during fermentation of the organic carbon component of EHC-L and are confirmation that ISCR is occurring.

Benzene, ethylbenzene, and xylenes are chemicals of concern associated with the VVM site. These compounds have been reported below CULs since 2008 (SES, 2013) and were not detected during the pre-injection monitoring event (MFA, 2013a). During the November 2013 monitoring event, benzene was detected above its MTCA Method A CUL of 5 µg/L in five of the six wells sampled (see Table 1). However, the benzene concentrations observed during the February 2014 event were below the CUL. Ethylbenzene and xylenes were not detected in November 2013, but were detected during the February 2014 event at concentrations below their MTCA Method A CULs of 700 µg/L and 1,000 µg/L, respectively.

The only monitoring well that did not exhibit a benzene spike in November 2013 was MW20, which is the only well that was not used as an injection point. Additional information would be needed to conclusively identify the cause of this temporary spike in benzene concentrations, but one hypothesis is that the injections resulted in a temporary rise in water levels in the immediate vicinity of the injection wells, flushing out benzene absorbed to soil. Given that benzene is not an IHS for the Property and that benzene concentrations have decreased to below the CUL, no additional action is recommended at this time. However, MFA will monitor benzene during future compliance monitoring events.

The source of the other detected VOCs is unknown, but some are commonly found in the atmosphere and/or drinking water supplies and may be attributable to the use of public supply water that was used to dilute the reagent prior to injection (e.g., chloroform, trichlorofluoromethane,

chloromethane). Detected VOC concentrations were below applicable MTCA Method A or B CULs, with the exception of benzene (as discussed above) and methylene chloride. Methylene chloride was not detected during the pre-injection monitoring event (MFA, 2013a) and was detected in only one post-injection sample (see Table 1); however, the MRLs were also above the MTCA Method A CUL. Given that methylene chloride is not an IHS associated with the Property and given the infrequency of detection post-injection (one of 13 samples, or 8 percent), no action is recommended at this time. However, MFA will monitor methylene chloride during future compliance monitoring events.

6 CLEANUP LEVEL COMPLIANCE

6.1 Soil

CULs were met in all confirmation samples collected at the final excavation boundaries. Lead concentrations in soil remaining on site are in compliance with the CUL, and therefore no further remedial action is necessary.

6.2 Groundwater

Before treatment, PCE was detected above the MTCA Method A CUL of 5 µg/L in two wells: MW17 and MW18 at 7.2 µg/L and 13 µg/L, respectively (MFA, 2013a). Following treatment, PCE was detected above the Method A CUL in only one well in November 2013 (MW19 at 8.60 µg/L), and all detections were below the Method A CUL in February 2014 (see Table 1 and Figure 6). This observed decline in PCE concentrations likely is due to the combined effects of the groundwater treatment and natural attenuation processes. Pre-treatment monitoring results from 2005 to 2013 show a strong declining trend for PCE (see Figure 7). The monitoring results collected posttreatment correspond with this observed trend and demonstrate that PCE concentrations are in compliance with the CUL. Therefore, the groundwater remedy is complete and no additional treatment is recommended.

During the November 2013 event, PCE concentrations in four of the six wells sampled exceeded the Ecology vapor-intrusion-to-indoor-air Method B groundwater screening level of 1 µg/L; during the February 2014 event, PCE in only one location (MW18) exceeded the screening level (see Table 1 and Figure 6). According to Ecology vapor intrusion guidance, groundwater is not generally considered a vapor intrusion source if contamination is not present in shallow groundwater at the water table or in perched zones above the water table (Ecology, 2009a). PCE concentrations were observed to be generally below detectable limits in shallow groundwater and greater in deeper groundwater, as evidenced by samples collected from borings advanced in association with the focused site assessment (MFA, 2012). It should be noted that, as the monitoring wells are generally screened across the water table and into deeper groundwater, samples collected from the wells are

representative of a mixture of shallow and deep groundwater.⁶ Therefore, the PCE concentrations observed likely are representative of a mixture of shallow (lower PCE concentrations) and deep (higher PCE concentrations) groundwater and are not representative of shallow groundwater for the purposes of screening for the vapor-intrusion-to-indoor-air pathway.

Representative shallow groundwater samples collected from borings during the focused site assessment indicate that shallow groundwater does not pose a risk to indoor air (MFA, 2012). Furthermore, buildings on the Property are currently vacant and current property redevelopment plans include situating buildings on the northern portion of the Property, where the plume is absent (i.e., where PCE was not detected). Therefore, the groundwater-to-indoor-air exposure pathway is deemed incomplete. PCE concentrations, as measured during compliance monitoring events, will be compared to the vapor screening level on an annual basis, at a minimum, in accordance with the cleanup action plan (Ecology, 2012). Potential risks associated with vapor conditions will be considered if site development plans change and if PCE concentrations persist at concentrations above the vapor screening level.

Compliance monitoring will continue on a quarterly schedule until PCE concentrations are reported below the CUL for four consecutive quarters. At that point, a request will be made to discontinue the compliance monitoring. Future monitoring events will include the compliance monitoring wells specified in the RAP (MW08, MW17, MW19, and MW20 [MFA, 2013b]) and well MW18. Monitoring wells MW11 and MW18 were included in the post-injection monitoring at Ecology's request. These wells are not included in the compliance monitoring network, as described in the Ecology-approved RAP (MFA, 2013b). PCE concentrations in wells MW11 and MW18 show a declining trend (see Figure 7) and were below the CUL during both post-injection monitoring events (see Table 1). The PCE concentration in well MW11 was also below the vapor screening level during the February 2014 event; therefore, MW11 will not be included in future monitoring events. The PCE concentration in well MW18, on the other hand, exceeded the vapor screening level during both post-injection monitoring events and is located in close proximity to the existing building; therefore, MW18 will be included in future monitoring events in order to evaluate potential vapor risks.

Compliance monitoring samples will be analyzed for the full suite of VOCs, and monitoring of non-PCE VOC detections will continue; however, only PCE concentrations will be used to assess compliance with its CUL, as specified in the cleanup action plan (Ecology, 2012) and the RAP (MFA, 2013b).

⁶ During sample collection, the tubing was placed at the midpoint of the screened interval, or at the midpoint of the water column if the top of the water table was below the top of the screen. The monitoring wells are generally screened between 15 and 30 feet bgs.

7 RECOMMENDATIONS

MFA recommends that groundwater monitoring of VOCs be continued on a quarterly basis in accordance with the RAP (MFA, 2013b) until PCE concentrations are reported below the CUL for four consecutive quarters and a determination is made that monitoring may be discontinued. MFA recommends that the compliance monitoring wells be redeveloped prior to the next monitoring event, which is scheduled for mid-May 2014. Based on the favorable results from the pilot study, no additional groundwater treatment is warranted or recommended at this time. No further remedial action is necessary for soil.

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

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TABLES



Table 1
Groundwater Analytical Results
Former Cream Wine/Carnation Property
Port of Sunnyside
Sunnyside, Washington

| Location: | MW08 | MW11 | | MW17 | | | | MW18 | | MW19 | | MW20 | | |
|------------------------------------|----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| Sample Name: | MW08 | MW11 | MW11 | MW17 | MWDUP | MW17 | MW17DUP | MW18 | MW18 | MW19 | MW19 | MW20 | MW20 | |
| Collection Date: | 11/14/2013 | 11/14/2013 | 02/19/2014 | 11/13/2013 | 11/13/2013 | 02/19/2014 | 02/19/2014 | 11/14/2013 | 02/19/2014 | 11/13/2013 | 02/19/2014 | 11/13/2013 | 02/19/2014 | |
| | MTCA Method A/B CUL (µg/L) | | | | | | | | | | | | | |
| Anions (mg/L) | | | | | | | | | | | | | | |
| Chloride | | 67.8 | 78.0 | -- | 54.8 | -- | -- | -- | 75.0 | -- | 45.2 | -- | 82.6 | -- |
| Nitrogen, Nitrate as N | | 12.7 | 27.8 | -- | 18.0 J | 17.2 J | -- | -- | 16.5 J | -- | 13.4 J | -- | 97.4 J | -- |
| Sulfate | | 50.0 | 179 | -- | 178 | -- | -- | -- | 181 | -- | 142 | -- | 106 | -- |
| Total Metals (mg/L) | | | | | | | | | | | | | | |
| Calcium | | 317.1 | 716.5 | -- | 714.1 | -- | -- | -- | 435.0 | -- | 1545 | -- | 771 | -- |
| Iron | | 186.2 | 1316 | -- | 695.4 | -- | -- | -- | 1124 | -- | 1313 | -- | 0.05000 U | -- |
| Magnesium | | 91.75 | 223.1 | -- | 205 | -- | -- | -- | 201.3 | -- | 236.8 | -- | 258.4 | -- |
| Manganese | | 21.25 | 43.34 | -- | 80.98 | -- | -- | -- | 37.44 | -- | 121.3 | -- | 0.038 | -- |
| Total Organic Carbon (mg/L) | | | | | | | | | | | | | | |
| Total Organic Carbon | | 3100 | 42800 | -- | 25400 | -- | -- | -- | 50300 | -- | 35400 | -- | 143 | -- |
| VOCs (µg/L) | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| 1,1,1-Trichloroethane | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| 1,1,2,2-Tetrachloroethane | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| 1,1,2-Trichloroethane | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| 1,1-Dichloroethane | | 1 U | 10 U | 3 U | 10 U | 10 U | 0.3 U | 0.3 U | 10 U | 3 U | 10 U | 0.3 U | 1 U | 0.3 U |
| 1,1-Dichloroethene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| 1,1-Dichloropropene | | 1 U | 10 U | 3 U | 10 U | 10 U | 0.3 U | 0.3 U | 10 U | 3 U | 10 U | 0.3 U | 1 U | 0.3 U |
| 1,2,3-Trichlorobenzene | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| 1,2,3-Trichloropropane | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| 1,2,4-Trichlorobenzene | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| 1,2,4-Trimethylbenzene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.6 | 1 U | 0.5 U |
| 1,2-Dibromo-3-chloropropane | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| 1,2-Dibromoethane | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| 1,2-Dichlorobenzene | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| 1,2-Dichloroethane | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| 1,2-Dichloropropane | | 1 U | 10 U | 3 U | 10 U | 10 U | 0.3 U | 0.3 U | 10 U | 3 U | 10 U | 0.3 U | 1 U | 0.3 U |
| 1,3,5-Trimethylbenzene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| 1,3-Dichlorobenzene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| 1,3-Dichloropropane | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| 1,4-Dichlorobenzene | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| 2,2-Dichloropropane | | 1 U | 10 U | 3 U | 10 U | 10 U | 0.3 U | 0.3 U | 10 U | 3 U | 10 U | 0.3 U | 1 U | 0.3 U |
| 2-Butanone | 4800 | 10 U | 361 | 563 | 524 | 562 | 462 | 612 | 475 | 439 | 1010 | 348 | 10 U | 10 U |
| 2-Chlorotoluene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |

Table 1
Groundwater Analytical Results
Former Cream Wine/Carnation Property
Port of Sunnyside
Sunnyside, Washington

| Location: | MW08 | MW11 | | MW17 | | | | MW18 | | MW19 | | MW20 | | |
|-------------------------|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|
| Sample Name: | MW08 | MW11 | MW11 | MW17 | MWDUP | MW17 | MW17DUP | MW18 | MW18 | MW19 | MW19 | MW20 | MW20 | |
| Collection Date: | 11/14/2013 | 11/14/2013 | 02/19/2014 | 11/13/2013 | 11/13/2013 | 02/19/2014 | 02/19/2014 | 11/14/2013 | 02/19/2014 | 11/13/2013 | 02/19/2014 | 11/13/2013 | 02/19/2014 | |
| | MTCA Method A/B CUL (µg/L) | | | | | | | | | | | | | |
| 2-Hexanone | | 10 U | 100 U | 100 U | 100 U | 100 U | 10 U | 10 U | 100 U | 100 U | 100 U | 10 U | 10 U | 10 U |
| 4-Chlorotoluene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| 4-Isopropyltoluene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| 4-Methyl-2-pentanone | | 20 U | 200 U | 200 U | 200 U | 200 U | 20 U | 20 U | 200 U | 200 U | 200 U | 20 U | 20 U | 20 U |
| Acetone | 7200 | 335 | 500 U | 562 | 500 U | 500 U | 288 | 281 | 500 U | 352 | 500 U | 187 | 50 U | 80.8 |
| Acrylonitrile | | 5 U | 50 U | 50 U | 50 U | 50 U | 5 U | 5 U | 50 U | 50 U | 50 U | 5 U | 5 U | 5 U |
| Benzene | 5 | 6.43 | 31.9 | 3 U | 18.4 | 28.7 | 0.4 | 0.41 | 34.7 | 3 U | 28.2 | 0.42 | 0.3 U | 0.3 U |
| Bromobenzene | | 1 U | 10 U | 3 U | 10 U | 10 U | 0.3 U | 0.3 U | 10 U | 3 U | 10 U | 0.3 U | 1 U | 0.3 U |
| Bromodichloromethane | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| Bromoform | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| Bromomethane | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| Carbon disulfide | 800 | 15.7 | 42.9 | 15.1 | 27.8 | 30.4 | 1.03 | 1.04 | 25.3 | 25 | 34 | 15.2 | 2 U | 1 U |
| Carbon tetrachloride | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| Chlorobenzene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| Chlorobromomethane | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| Chloroethane | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| Chloroform | 80 | 2 | 10 U | 3 U | 10 U | 10 U | 0.3 U | 0.3 U | 10 U | 3 U | 17 | 1.02 | 1 U | 0.3 U |
| Chloromethane | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 34.5 | 10 U | 0.5 U | 1 U | 0.5 U |
| cis-1,2-Dichloroethene | 16 | 1.47 | 10 U | 3 U | 12.9 | 13.7 | 0.3 U | 0.3 U | 14.4 | 11.2 | 13.6 | 0.3 U | 1 U | 0.3 U |
| cis-1,3-Dichloropropene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| Dibromochloromethane | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| Dibromomethane | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| Dichlorodifluoromethane | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| Ethylbenzene | 700 | 1 U | 10 U | 5 U | 10 U | 10 U | 0.79 | 0.95 | 10 U | 5 U | 10 U | 0.91 | 1 U | 0.76 |
| Freon 113 | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| Hexachlorobutadiene | | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| Isopropylbenzene | | 1 U | 10 U | 3 U | 10 U | 10 U | 0.3 U | 0.3 U | 10 U | 3 U | 10 U | 0.3 U | 1 U | 0.3 U |
| m,p-Xylene | 1000 | 2 U | 20 U | 10 U | 20 U | 20 U | 5.89 | 7.04 | 20 U | 10 U | 20 U | 6.77 | 2 U | 3.89 |
| Methyl tert-butyl ether | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| Methylene chloride | 5 | 20 U | 200 U | 200 U | 200 U | 200 U | 20 U | 20 U | 200 U | 362 | 200 U | 20 U | 20 U | 20 U |
| Naphthalene | 1600 | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1.3 | 1 U | 1 U |
| n-Butylbenzene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| n-Propylbenzene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| o-Xylene | 1000 | 1 U | 10 U | 3 U | 10 U | 10 U | 2.11 | 2.48 | 10 U | 3 U | 10 U | 2.1 | 1 U | 1.65 |
| sec-Butylbenzene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |

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Groundwater Analytical Results
Former Cream Wine/Carnation Property
Port of Sunnyside
Sunnyside, Washington

| Location: | MW08 | MW11 | | MW17 | | | | MW18 | | MW19 | | MW20 | | |
|--|----------------------------|------------|---------------|----------------|---------------|---------------|------------|-------------|---------------|---------------|---------------|-------------|------------|-------------|
| Sample Name: | MW08 | MW11 | MW11 | MW17 | MWDUP | MW17 | MW17DUP | MW18 | MW18 | MW19 | MW19 | MW20 | MW20 | |
| Collection Date: | 11/14/2013 | 11/14/2013 | 02/19/2014 | 11/13/2013 | 11/13/2013 | 02/19/2014 | 02/19/2014 | 11/14/2013 | 02/19/2014 | 11/13/2013 | 02/19/2014 | 11/13/2013 | 02/19/2014 | |
| | MTCA Method A/B CUL (µg/L) | | | | | | | | | | | | | |
| Styrene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| tert-Butylbenzene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| PCE | 5 | 1 U | 10 U | 10 U | 10 U | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| Toluene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| trans-1,2-dichloroethene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| trans-1,3-Dichloropropene | | 1 U | 10 U | 5 U | 10 U | 10 U | 0.5 U | 0.5 U | 10 U | 5 U | 10 U | 0.5 U | 1 U | 0.5 U |
| Trichloroethene | | 1 U | 10 U | 3 U | 10 U | 10 U | 0.3 U | 0.3 U | 10 U | 3 U | 10 U | 0.3 U | 1 U | 0.3 U |
| Trichlorofluoromethane | 2400 | 1 U | 10 U | 10 U | 10.1 | 10 U | 1 U | 1 U | 10 U | 10 U | 10 U | 1 U | 1 U | 1 U |
| Vinyl chloride | | 1 U | 10 U | 3 U | 10 U | 10 U | 0.3 U | 0.3 U | 10 U | 13 | 10 U | 0.3 U | 1 U | 0.3 U |
| Total Xylenes | 1000 | ND | ND | ND | ND | ND | 8 | 9.52 | ND | ND | ND | 8.87 | ND | 5.54 |
| PCE evaluated to MDL (µg/L) | | | | | | | | | | | | | | |
| PCE | 5 | NA | 4.40 J | 0.700 J | 4.10 J | 4.00 J | NA | NA | 4.90 J | 2.10 J | 8.60 J | NA | NA | NA |
| NOTES: | | | | | | | | | | | | | | |
| CULs are provided for detected constituents only. Method B values are provided when Method A value was not available. No MTCA Method A or B values are available for 1,2,4-trimethylbenzene. | | | | | | | | | | | | | | |
| Detections are shown in bold . | | | | | | | | | | | | | | |
| PCE evaluated to MDL for samples that were diluted. | | | | | | | | | | | | | | |
| -- = not analyzed. | | | | | | | | | | | | | | |
| CUL = cleanup level. | | | | | | | | | | | | | | |
| J = Result is an estimated value. | | | | | | | | | | | | | | |
| MDL = method detection limit. | | | | | | | | | | | | | | |
| mg/L = milligrams per liter (parts per million). | | | | | | | | | | | | | | |
| MTCA = Model Toxics Control Act. | | | | | | | | | | | | | | |
| µg/L = micrograms per liter (parts per billion). | | | | | | | | | | | | | | |
| NA = not applicable. | | | | | | | | | | | | | | |
| ND = not detected. | | | | | | | | | | | | | | |
| PCE = tetrachloroethene. | | | | | | | | | | | | | | |
| Total xylenes = sum of m,p-xylene and o-xylene. | | | | | | | | | | | | | | |
| U = Analyte not detected at or above method reporting limit. | | | | | | | | | | | | | | |
| VOC = volatile organic compound. | | | | | | | | | | | | | | |

Table 2
Soil Analytical Results
Former Cream Wine/Carnation Property
Port of Sunnyside
Sunnyside, Washington

| | | | | | | |
|---|------------------|-------------|-------------|------------|------------|------------|
| Location ID: | SS1 | SS2 | SS3 | SS4 | SS5 | SS-COMP |
| Sample Name: | SS1-S-1.5 | SS2-S-1.5 | SS3-S-1.5 | SS4-S-3.0 | SS5-S-1.5 | COMP-S |
| Sample Date: | 11/14/2013 | 11/14/2013 | 11/14/2013 | 11/14/2013 | 11/14/2013 | 11/14/2013 |
| Sample Depth (ft bgs): | 1.5 | 1.5 | 1.5 | 3 | 1.5 | 1.5-3.0 |
| CUL | | | | | | |
| Total Metals (mg/kg) | | | | | | |
| Lead | 250 ^a | 78.4 | 11.1 | 158 | 135 | 106 |
| TCLP Metals (mg/L) | | | | | | |
| Lead | 5 ^b | -- | -- | -- | -- | -- |
| NOTES: Detections shown in bold . -- = not analyzed. CUL = cleanup level. ft bgs = feet below ground surface. mg/kg = milligrams per kilogram (parts per million). mg/L = milligrams per liter (parts per million). TCLP = toxicity characteristic leaching procedure. U = Result is non-detect at or above method reporting limit. ^a Model Toxics Control Act Method A unrestricted land use, WAC 173-340-900, table 740-1. ^b Resource Conservation and Recovery Act maximum concentration. | | | | | | |

**Table 3
Water Level Data
Former Cream Wine/Carnation Property
Port of Sunnyside
Sunnyside, Washington**

| Location ID | MP Elevation (feet) | Datum | Measurement Date | Depth to Water (feet) | Groundwater Elevation (feet) | Total Well Depth (feet) | Measured Depth to Bottom (feet) | Approximate Thickness of Sediment Buildup in Well (feet) |
|-------------|---------------------|---------|------------------|-----------------------|------------------------------|-------------------------|---------------------------------|--|
| MW08 | 755.12 | NAVD 88 | 11/14/2013 | 20.70 | 734.42 | -- | -- | -- |
| | | | 02/19/2014 | 21.07 | 734.05 | 25 | 21.12 | 4 |
| MW11 | 752.48 | NAVD 88 | 11/14/2013 | 21.34 | 731.14 | -- | -- | -- |
| | | | 02/19/2014 | 21.59 | 730.89 | 30 | 29.61 | 0.4 |
| MW17 | 751.25 | NAVD 88 | 11/13/2013 | 21.56 | 729.69 | -- | -- | -- |
| | | | 02/19/2014 | 21.27 | 729.98 | 30 | 28.99 | 1 |
| MW18 | 751.61 | NAVD 88 | 11/14/2013 | 21.49 | 730.12 | -- | -- | -- |
| | | | 02/19/2014 | 21.33 | 730.28 | 30 | 28.55 | 1 |
| MW19 | 751.59 | NAVD 88 | 11/13/2013 | 21.90 | 729.69 | -- | -- | -- |
| | | | 02/19/2014 | 21.83 | 729.76 | 30 | 27.40 | 3 |
| MW20 | 751.18 | NAVD 88 | 11/13/2013 | 22.79 | 728.39 | -- | -- | -- |
| | | | 02/19/2014 | 22.92 | 728.26 | 30 | 27.59 | 2 |

NOTES:
-- = not analyzed.
MP = measuring point.
NAVD 88 = North American Vertical Datum of 1988.

Table 4
Water Quality Data
Former Cream Wine/Carnation Property
Port of Sunnyside
Sunnyside, Washington

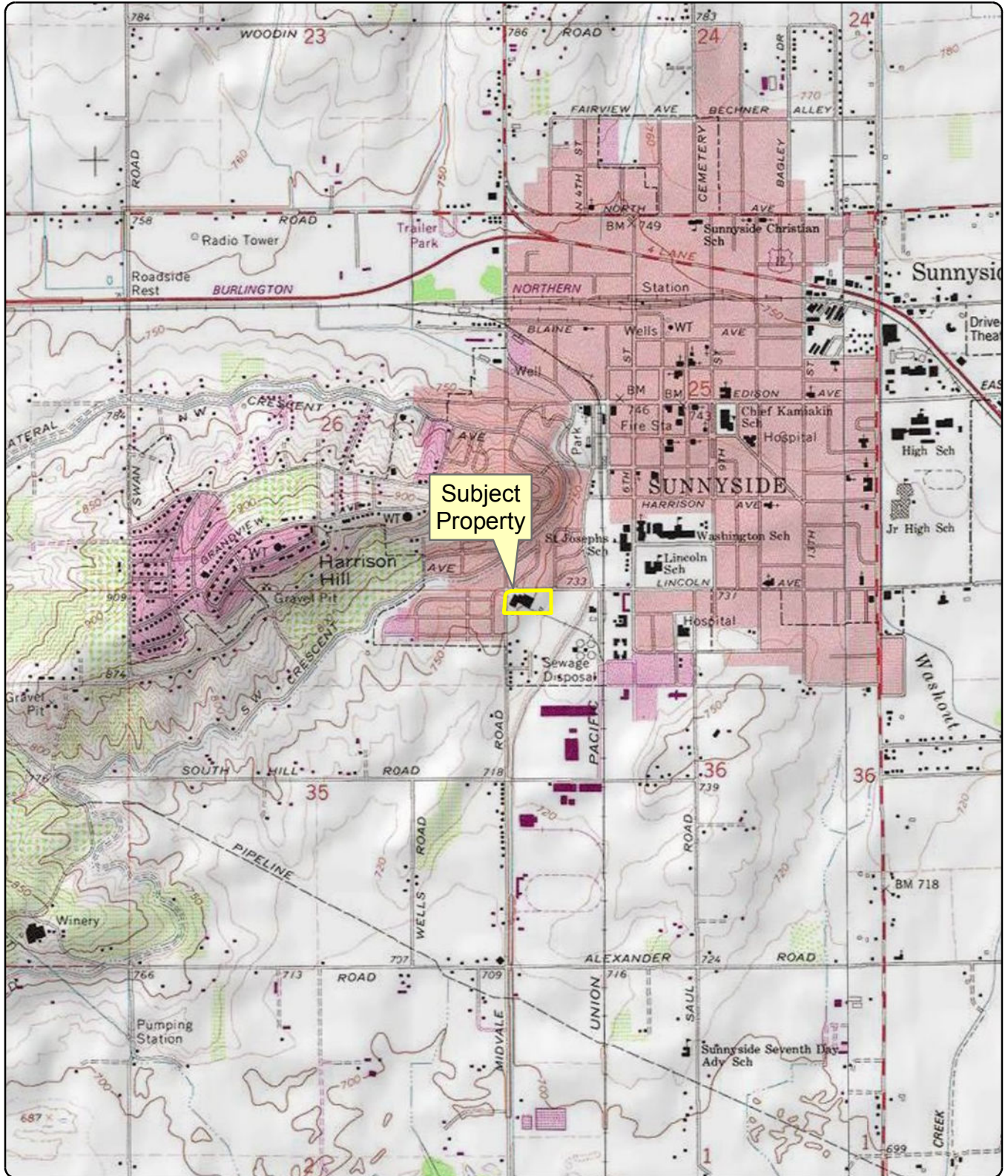
| Location ID | Screened Interval (ft bgs) | Date | Time | pH (SU) | Temperature (deg. C) | Conductivity ($\mu\text{s}/\text{cm}$) | DO (mg/L) | ORP (mV) | Turbidity (NTU) |
|-------------|----------------------------|------------|-------|---------|----------------------|--|-----------|----------|-----------------|
| MW08 | 5 to 25 | 11/14/2013 | 14:30 | 6.11 | 14.79 | 3174 | 1.71 | -14.4 | > 1,000 |
| MW11 | unknown | 11/14/2013 | 12:15 | 4.87 | 16.14 | 4399 | 0.81 | -70.3 | > 1,000 |
| | unknown | 02/19/2014 | 16:30 | 5.31 | 16.18 | 5007 | 0.70 | -268.6 | 140 |
| MW17 | 15 to 30 | 11/13/2013 | 16:00 | 5.16 | 16.55 | 4280 | 2.59 | -107.2 | > 1,000 |
| | 15 to 30 | 02/19/2014 | 10:30 | 5.13 | 16.28 | 5754 | 0.27 | -321 | 46.31 |
| MW18 | 15 to 30 | 11/14/2013 | 10:00 | 4.70 | 17.12 | 4708 | 1.30 | -41.5 | > 1,000 |
| | 15 to 30 | 02/19/2014 | 12:00 | 5.18 | 15.20 | 8740 | 0.64 | -160.6 | > 1,000 |
| MW19 | 14.5 to 29.5 | 11/13/2013 | 18:00 | 5.02 | 16.20 | 5032 | 1.20 | -114.8 | > 1,000 |
| | 14.5 to 29.5 | 02/19/2014 | 9:00 | 5.48 | 15.23 | 5767 | 0.41 | -352 | 22.34 |
| MW20 | 14.5 to 29.5 | 11/13/2013 | 14:30 | 7.02 | 14.34 | 1284 | 1.65 | 120.5 | 3.05 |
| | 14.5 to 29.5 | 02/19/2014 | 9:30 | 7.02 | 14.69 | 1321 | 0.89 | 121 | 2.65 |

NOTES:

deg. C = degrees Celsius.
DO = dissolved oxygen.
ft bgs = feet below ground surface.
mg/L = milligrams per liter.
 $\mu\text{s}/\text{cm}$ = microsiemens per centimeter.
mV = millivolts.
NTU = nephelometric turbidity units.
ORP = oxidation-reduction potential.
SU = standard units.

FIGURES



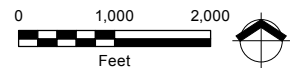


Site Address: 111 E Lincoln Ave, Sunnyside, Washington
 Source: US Geological Survey (1990) 7.5-minute
 topographic quadrangle: Sunnyside
 Section 36, Township 10 North, Range 22 East

Figure 1
Property Location
 Former Cream Wine/
 Carnation Property
 Port of Sunnyside
 Sunnyside, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for, legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.



Project: 0346.04.02 Produced By: J. Schane Approved By: J. Pounds Print Date: 1/10/2014 Path: X:\0346.04\Projects\Completion\ReportFig2_Property Features.mxd

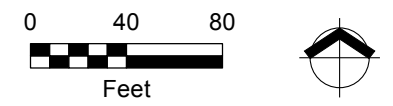


Figure 2
Property Features
Former Cream Wine/
Carnation Property
Port of Sunnyside
Sunnyside, Washington

Legend

- Monitoring Well
- Monitoring/Recovery Well
- Production Well
- Recovery Well
- Decommissioned Well
- Boring Location
- Existing Manhole Sanitary Sewer
- Former Wastewater Line/
Former Open Ditch
- Discharge Line from
Remediation Building
- Property Boundary
(Approximate)
- Tax Lots (Approximate)

Note: Sample locations were surveyed by Gray's Survey and Engineering on June 18 and 19, 2012. The locations of other site features are approximate.



Source: Aerial photograph obtained from ESRI, Inc. ArcGIS Online.








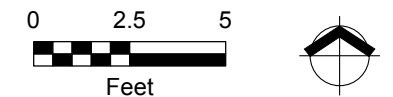
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Figure 3 Soil Excavation Area and Sample Locations

Former Cream Wine/
Carnation Property
Port of Sunnyside
Sunnyside, Washington

Legend

-  Confirmation Sample Location (Approximate)
-  Pre-Remediation Sample Location
-  Excavation Extent (Approximate)
-  Property Boundary (Approximate)
-  Tax Lots (Approximate)



Source: Aerial photograph (June 2011) obtained from Esri ArcGIS Online



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Figure 4
Groundwater Elevation
Contours - November 2013

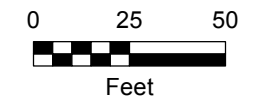
Former Cream Wine/
 Carnation Property
 Port of Sunnyside
 Sunnyside, Washington

Legend

- Injection Point
- Injection Point & Long-Term Monitoring Well
- Long-Term Monitoring Well
- MW17** Well ID and
729.69 Groundwater Elevation in feet
- Approximate Direction of Groundwater Flow
- Groundwater Elevation Contour
- Property Boundary (Approximate)
- Tax Lots (Approximate)

Notes:

1. Well locations were surveyed by Gray's Survey and Engineering on June 18 and 19, 2012.
2. Groundwater elevations were measured on November 13 and 14, 2013.



Source: Aerial photograph (June 2011) obtained from Esri ArcGIS Online



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Figure 5
Groundwater Elevation
Contours - February 2014

Former Cream Wine/
 Carnation Property
 Port of Sunnyside
 Sunnyside, Washington

Legend

- Injection Point
- Injection Point & Long-Term Monitoring Well
- Long-Term Monitoring Well
- MW08** Well ID and
734.05 Groundwater Elevation in feet
- Approximate Direction of Groundwater Flow
- Groundwater Elevation Contour
- Property Boundary (Approximate)
- Tax Lots (Approximate)

Notes:

1. Well locations were surveyed by Gray's Survey and Engineering on June 18 and 19, 2012.
2. Groundwater elevations were measured on February 19, 2014.



Source: Aerial photograph (June 2011) obtained from Esri ArcGIS Online



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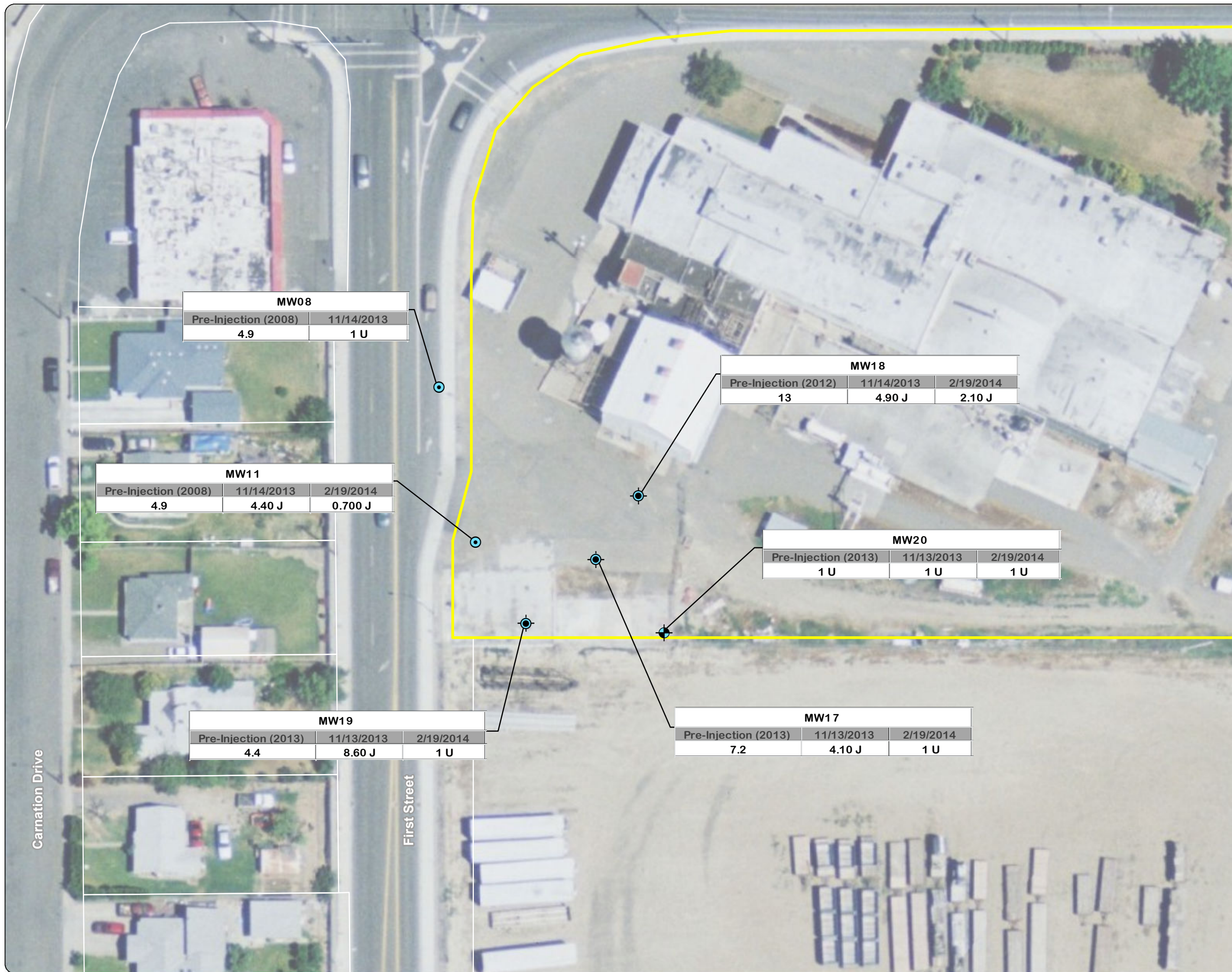


Figure 6
Groundwater PCE Results

Former Cream Wine/
Carnation Property
Port of Sunnyside
Sunnyside, Washington

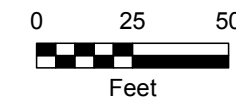
Legend

- Injection Point
- Injection Point & Long-Term Monitoring Well
- Long-Term Monitoring Well
- Property Boundary (Approximate)
- Tax Lots (Approximate)

| Location ID |
|-------------|
| Sample Date |
| PCE (ug/L) |

Notes:

1. Sample locations were surveyed by Gray's Survey and Engineering on June 18 and 19, 2012. The locations of other site features are approximate.
2. Performance monitoring was conducted on 11/13/13 and 11/14/13. The first compliance monitoring event was conducted on 2/19/14.
3. Historical data were obtained from SoundEarth Strategies, 2013 and MFA, 2013a.
4. CUL = cleanup level
5. Model Toxics Control Act Method A CUL for PCE = 5 µg/L.
6. µg/L = micrograms per liter.
7. PCE = tetrachloroethene.
8. U = Analyte was not detected at or above method reporting limit.
9. J = result is an estimated value.

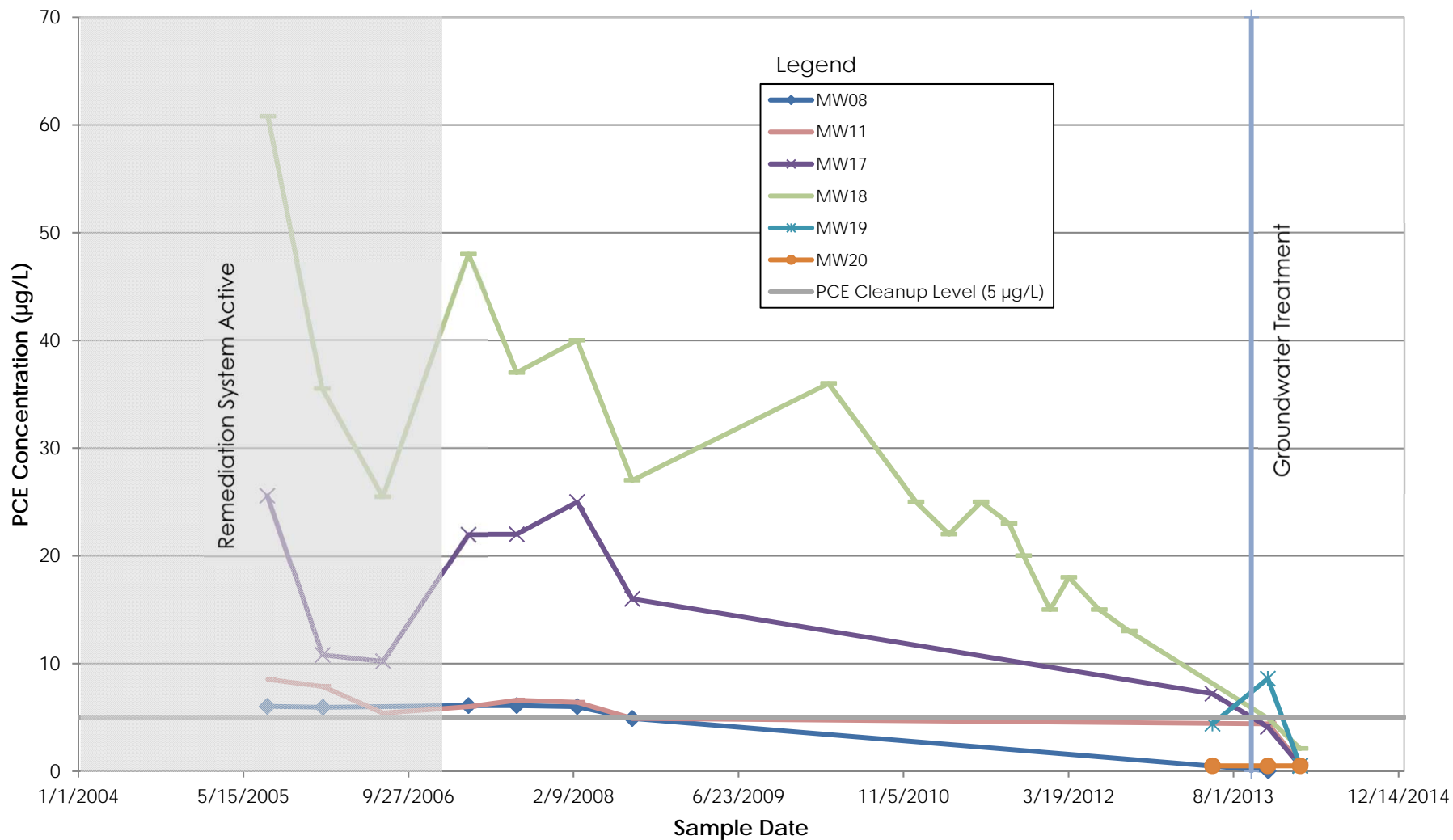


Source: Aerial photograph (June 2011) obtained from Esri ArcGIS Online



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Figure 7
Groundwater PCE Trend Plot
Former Cream Wine/Carnation Property
Port of Sunnyside
Sunnyside, Washington



Notes:
PCE = tetrachloroethene.
µg/L = micrograms per liter.
Historical concentration data obtained from SES, 2013; MFA, 2012; and MFA, 2013a.