Phase 3 Remedial Investigation Report

Simplot Grower Solutions

Sunnyside, Washington
March 2023

Prepared for
J.R. Simplot Company

Phase 3 Remedial Investigation Report

Simplot Grower Solutions
South 300 1st Street
Sunnyside, Washington 98944

March 2023

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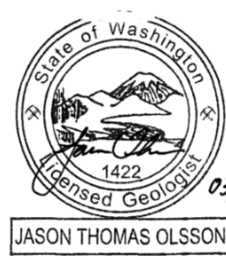

03/13/2023

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Acronyms

°F	degrees Fahrenheit
AMSL	above mean sea level
AO	Agreed Order
bgs	below ground surface
CLARC	Cleanup Levels and Risk Calculation
COPC	chemicals of potential concern
CRBG	Columbia River Basalt Group
DRO	diesel range organics
Ecology	Washington State Department of Ecology
EDB	ethylene dibromide
EPA	U.S. Environmental Protection Agency
FS	feasibility study
GPR	ground-penetrating radar
GRO	gasoline range organics
IHS	indicator hazardous substances
MCPP	2-methyl-4-chlorophenoxy-2-propionic acid
mg/Kg	milligrams per kilogram
mL/min	milliliters per minute
MTBE	methyl tert-butyl ether
MTCA	Models Toxic Control Act
NWTPH	northwest total petroleum hydrocarbons
PAH	polynuclear aromatic hydrocarbons
PCE	tetrachloroethylene
PID	photo-ionization detector
PLP	potentially liable person
POGW	protective of groundwater
ppm	parts per million
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RI	remedial investigation
RPD	relative percent difference
Sage	Sage Earth Science
SGS	Simplot Grower Solutions
Simplot	J.R. Simplot Company
SVH	soil vapor headspace
SVOC	semi-volatile organic carbons
TPH	total petroleum hydrocarbons
USGS	U.S. Geological Survey
UST	underground storage tank
VOC	Volatile organic carbons
WAC	Washington Administrative Code

1 Introduction

This *Phase 3 Remedial Investigation* (RI) report describes field activities and analytical results to support a remedial investigation and feasibility study (RI/FS) that J.R. Simplot Company (Simplot) is conducting at the Simplot Grower Solutions (SGS) facility at South 300 1st Street, Sunnyside, Washington (**Figure 1** and **Figure 2**). The RI/FS is a requirement of Agreed Order (AO) number 16446 between Simplot and the Washington State Department of Ecology (Ecology). Ecology will consider the RI/FS complete when it meets the requirements described the Model Toxics Control Act (MTCA) Cleanup Regulation (Washington Administrative Code [WAC] 173-340). This Phase 3 RI characterizes site conditions to the degree necessary to complete a feasibility study (FS) and select a cleanup action option, as described in WAC 173-340-360 through 173-340-390, because of the presence of several chemicals of potential concern (COPC) in soils and groundwater at the SGS facility.

1.1 Objectives

The objective of the Phase 3 RI is to transition the project lifecycle from the investigative phase toward an FS, and subsequently, the remediation phase of work at the site. To achieve this objective, this Phase 3 RI report summarizes and references historical site investigations conducted between 2007 and 2021 (**Table A** in Section 3.2 summarizes activities conducted at the site from 2007 through 2021) and more recent site investigation results from a May 2022 Tier 2 soil vapor intrusion assessment and August 2022 geophysical survey and soil sampling. This Phase 3 RI includes information on sample type, sample location, sample procedures, analytical methods, and results.

Analytical results are compared to July 2022 Washington Cleanup Levels and Risk Calculation (CLARC) levels (Ecology 2022a). Sampling activities were conducted in general accordance with the *Tier 2 Vapor Intrusion Work Plan – Combined Sampling and Analysis Plan (SAP) / Quality Assurance Project Plan (QAPP) for Interim Phase 3 Remedial Investigation Activities* (HDR 2022a) and the *Phase 3 Remedial Investigation Work Plan – Combined Sampling and Analysis Plan (SAP) / Quality Assurance Project Plan (QAPP) for Phase 3 Remedial Investigation Activities* (HDR 2022b).

1.2 Report Organization

This report includes the following sections:

- Section 1: Introduction – introduces the project, RI/FS objective, and Phase 3 goals.
- Section 2: Physical Characteristics of the Study Area – describes geological and hydrogeological conditions at the site.
- Section 3: Summary of Previous Investigation activities – summarizes previous investigations conducted at the site as far back as 2007 and as recently as 2021.
- Section 4: RI Phase 3 Field Activities and Results – summarizes field activities conducted in spring and summer 2022 and presents sample analytical results and interpretation.
- Section 5: Conceptual Site Model – describes nature and extent of contamination – compiles investigation results and describes the extent of soil and groundwater contamination at the site.

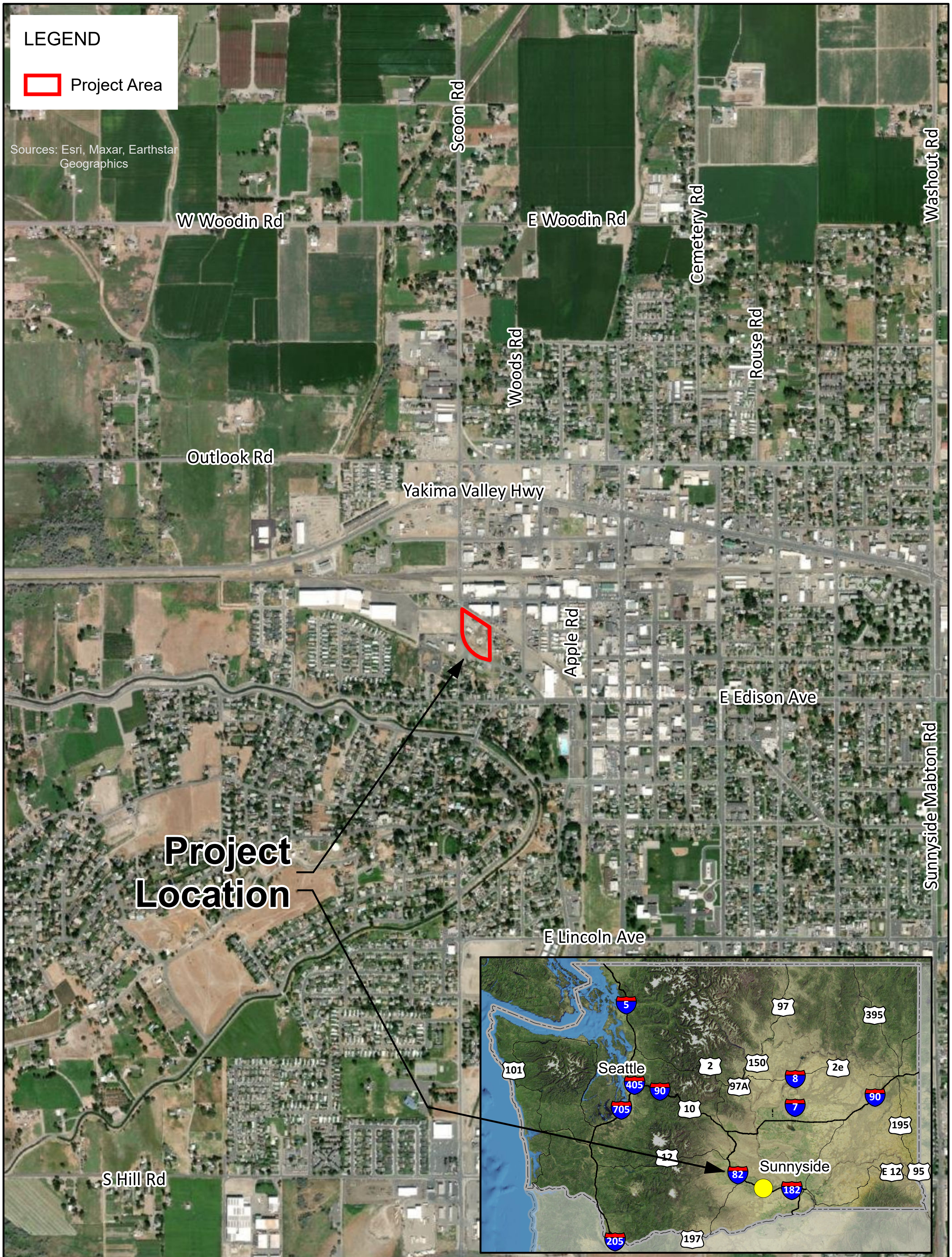
- Section 6: Source Areas – describes the apparent contamination source areas at the site.
- Section 7: Groundwater – describes the apparent groundwater contamination at the site.
- Section 8: Discussion and Recommendations – summarizes RI Phase 1, Phase 2, Phase 2.5, and Phase 3 results and makes recommendations for advancement to the FS portion of the project.

1.3 Site Description and History

Simplot owns the SGS facility at 300 South 1st Street, Sunnyside, Washington. The property includes Yakima County parcel numbers 22102523444, 22102523445, and 22102523446. The 2.7-acre, irregularly-shaped site contains two buildings: a modular office building and a warehouse. The site is mostly unpaved, except for a small, paved parking area near the modular office structure. Nitrates and ammonia were found in groundwater adjacent to the site during an investigation associated with the nearby Bee-Jay Scales site in 2007 (SECOR 2007). Additional contaminants were found in soil and groundwater at the facility in 2009, as presented in the *Preliminary Site Investigation Report* (HDR 2009a). Site contaminants were found to include nitrates and ammonia, volatile organic compounds (VOCs), heavy metals, herbicides, and petroleum-related contaminants that were reported at levels above MTCA cleanup levels. On October 1, 2008, Simplot received an Early Notice Letter from Ecology regarding the potential release of hazardous substances from the SGS Sunnyside facility. Ecology's findings were based on information provided by Stantec associated with investigation and remediation activities at the Bee-Jay Scales site one block north of the Simplot facility (**Figure 1** and **Figure 2**). Ecology encouraged Simplot to enter into a voluntary cleanup agreement to address potential site contamination. In response to the Early Notice Letter and a follow-up meeting with Ecology on March 19, 2009, the site entered into Ecology's Voluntary Cleanup Program (VCP) on May 19, 2009.

Based upon credible evidence, Ecology issued a Potentially Liable Person (PLP) status letter to Simplot, dated November 2, 2018, pursuant to Revised Code of Washington (RCW) 70.105D.040, .020(26), and WAC 173-340-500. After providing notice and opportunity for comment, and concluding that credible evidence supported a finding of potential liability, Ecology issued a determination that Simplot is a PLP under RCW 70.105D.040 and notified Simplot of this determination by letter, dated December 17, 2018.

In 2019, Ecology proposed two options to Simplot: to fast track the remediation over a one-year timeframe or enter into an administrative order (AO). Simplot chose the latter and on June 26, 2019, Simplot entered into AO number 16446 between Simplot and Ecology. The AO required Simplot to conduct a remedial investigation, feasibility study, and a draft cleanup action plan (DCAP) for the site.



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VICINITY MAP
Figure 1

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SIMPLOT GROWER SOLUTIONS, SUNNYSIDE, WA

HDR Simplot

0 200 Feet

SITE DETAIL MAP
Figure 2

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SIMPLOT GROWER SOLUTIONS, SUNNYSIDE, WA

2 Physical Characteristics of the Study Area

2.1 Area Setting

The SGS site and the City of Sunnyside are located in a relatively flat valley that rises in topography to Snipes Mountain to the southwest and hilly areas to the north. The elevation of the SGS site is approximately 740 feet above mean sea level (AMSL). According to the U.S. Geological Survey (USGS) 2020 quadrangle map for Sunnyside, Washington, the base of Harrison Hill is located approximately 500 feet southwest of the site; Snipes Mountain is located approximately 1.5 miles southwest of the site and has an approximate elevation of 990 feet AMSL. The Yakima River is located approximately 6 miles south of the SGS site.

2.2 Land Use

Land use in the general area of the site (**Figure 2**) has included agricultural warehouses, lumber yards, coal storage, and railroad transportation starting in the early 1900s. The former owners of an agricultural distribution facility, operated from the early 1960s to 1986s at the current Bee-Jay Scales site, are currently under an AO with Ecology for remedial action (AO Number DE 02TCPCR-3932). Bee-Jay Scales, Inc. (tractor trailer repair) and Hickenbottom & Sons, Inc. (fruit warehousing) currently own and operate the Bee-Jay Scales site.

Currently, land use directly east and south of the SGS site is primarily residential. The Yakima County Public Works building and maintenance yard, which includes a fuel station, is located southwest of the site. The maintenance yard, which sits hydrogeologically up-gradient of the site, houses two active underground storage tanks (USTs) (UST ID 8033) – one single-walled 6,000-gallon diesel UST and one single-walled, 6,300-gallon gasoline UST, which were both installed on August 1, 1987 (Ecology 2022b). While there is no leaking underground storage tank (LUST) event associated with these USTs, dispenser sumps were replaced on October 5, 2018. Fuel systems of this vintage commonly have undocumented releases. To the north and northeast of the SGS site is a railroad line followed by the Milne Fruit Products processing facility.

2.3 Geology

2.3.1 Regional Geology

The SGS site is located within the Yakima Fold Belt of the Columbia Basin Province in Washington (DNR 2022). The Yakima Fold Belt is a region of high folding and faulting and is one of the three subprovinces of the Columbia Plateau. Sunnyside is located within the Yakima River Basin and is located along the fold axis of the Wapato Syncline (Vaccaro et al. 2009). Area surface geology consists of mostly unconsolidated to weakly consolidated basin-fill deposits, generally of the Ellensburg Formation, which are made up of terrace, alluvial, glacial, flood, lacustrine, and loess deposits. Underlying the basin-fill deposits and exposed in the higher elevation areas farther outside of the valleys is the Columbia River Basalt Group (CRBG).

2.3.2 Site Specific Geology

According to published geologic maps, the Project site is underlain by late Pleistocene to Holocene eolian deposits or Pleistocene to Holocene aged loess (Ql) (DNR 1993 and 1994, respectively). Ql is described as eolian silt and fine sand (DNR 1994). Eolian deposits are described as pale orange to brown silt and fine sand with locally containing multiple caliche layers and tephra beds (DNR 1993).

Based on the Natural Resources Conservation Service (NRCS) soil maps, the SGS site is mainly comprised of Outlook fine sandy loam with Cleman very fine sandy loam comprising the eastern and southern margins of the SGS site; both soil types together make up 100 percent of the soil composition on the SGS site (USDA 2023). These soils possess moderately high to high hydraulic conductivity, moderate to high water capacity, and the depth to the water table for these soils is greater than 80 inches. The Cleman soils are well drained, while the Outlook soils are somewhat poorly drained. The remaining mapped soils in the area are Warden fine sandy loams of varying slopes located to the south of the SGS site.

Borings that HDR oversaw for Simplot at the site during previous investigations (**Table A**) revealed that site lithology includes predominantly brown clayey silt with fill materials up to 2 feet thick. The observed soils underlining the site fill materials are consistent with the published geologic and soil maps.

2.4 Surface Water Hydrology

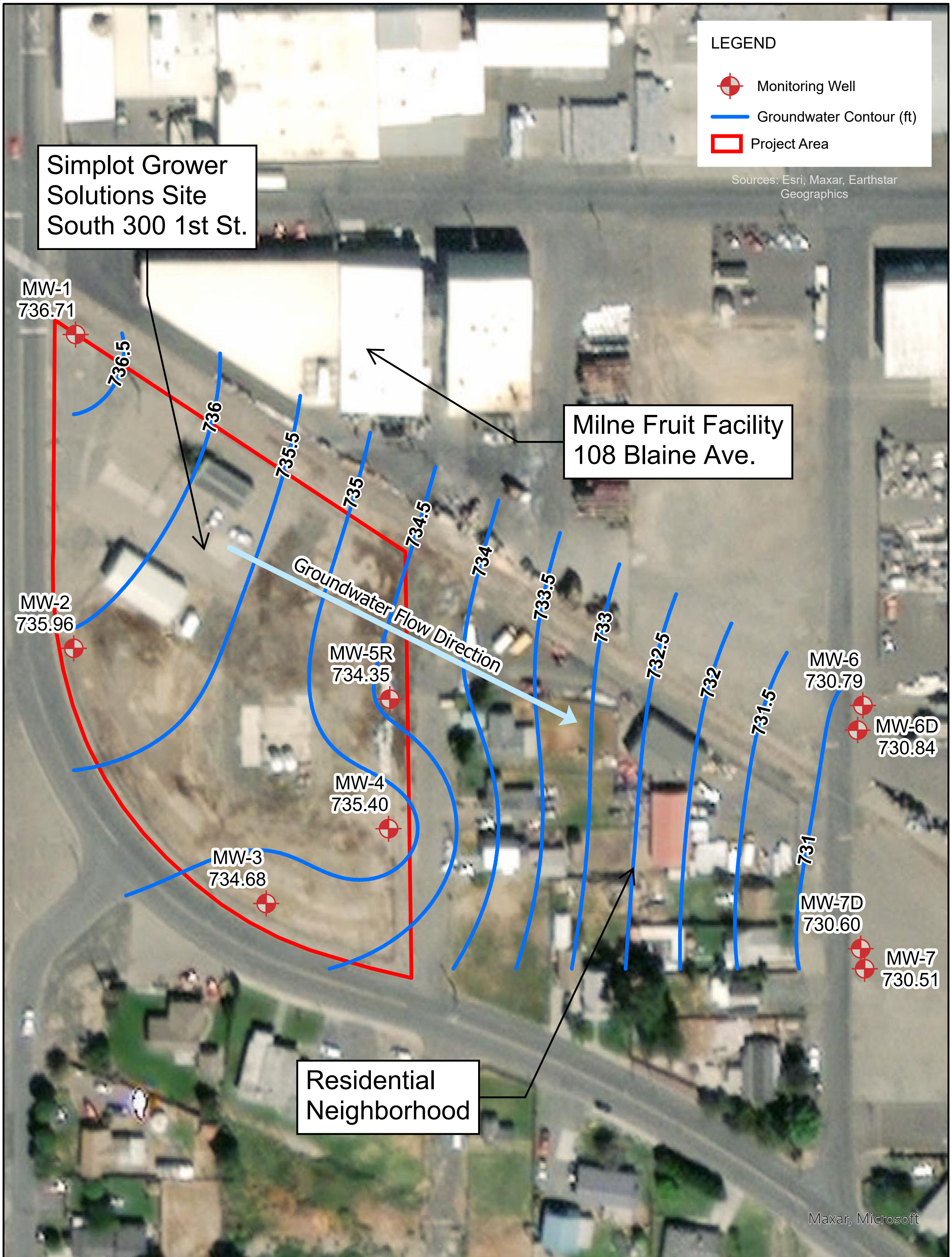
Surface water features in the area include the Snipes Mountain Lateral Canal located approximately 880 feet south of the site. The Yakima River, a tributary of Columbia River, is located approximately 6 miles south of the site. Additionally, there is an unnamed drainage or irrigation ditch approximately 212 feet southwest of the site that discontinues at South 1st Street. Aerial imagery depicts indicators of remnants of this ditch that may have been historically filled and piped, or was developed to be an underground canal (HDR 2013a). Manholes exist along the trajectory of the ditch, but it is unknown where this ditch discharges.

2.5 Hydrogeology

According to Vaccaro et al (2009), groundwater in the area is found within the unconsolidated basin-fill deposits and the CRBG (generally within the interbeds, flow surfaces, and fracture zones in the CRBG flows). Hydraulic characteristics of the aquifers in the area are diverse due to the high diversity of the basin fill and CRBG deposits. Groundwater in the area is found as either confined or unconfined and water levels in the area have some fluctuation on a seasonal basis due to irrigation activities and variations in precipitation.

Based on field activities conducted at the site, depth to groundwater ranges between approximately 4 to 10 feet below ground surface (bgs) throughout the site, with groundwater directions ranging to the east to the southeast, with gradients ranging from 0.0071 feet per foot (ft/ft) to 0.02640 ft/ft, depending on the season. Based on groundwater sampling conducted in September 2021 as part of Phase 2.5 RI, groundwater at the site flows east-southeast at a gradient of 0.0071 feet per foot (ft/ft). In comparison, the calculated shallow groundwater flow direction in April and July 2013 was to the east and a gradient of 0.009 ft/ft (HDR 2013b). Subsequent water level elevations by HDR determined the groundwater flow direction to be to the southeast at a gradient of 0.026 ft/ft (HDR 2019b) and 0.02640 ft/ft (HDR 2021a). Off site work by others reported the groundwater flow to the east with a gradient of 0.008 ft/ft (Stantec 2011). In addition, groundwater level measurements taken during September 2021 at the downgradient and off site monitoring wells (MW-6, MW-6D, MW-7, and MW-7D) indicate that there is minimal to no vertical gradient present between the shallow and deep wells (HDR 2022c).

A groundwater contour map from the Phase 2.5 RI (September 2021) is presented in **Figure 3**. Copies of the boring logs completed at the site during the August 2022 Phase 3 RI activities are included in Appendix D and described further in Section 4.3.1.



HDR 0 100 Feet

SEPTEMBER 2021 GROUNDWATER ELEVATION CONTOURS

Figure 3

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SIMPLOT GROWER SOLUTIONS, SUNNYSIDE, WA

3 Summary of Previous Investigation Activities

The following sections summarize previous investigations at the facility. Refer to the *Remedial Investigation Work Plan* (HDR 2019a) for additional details on site setting and previous investigations.

3.1 Historical Site Investigations

Site investigations date back to 2007 and have consisted of GeoProbe investigations, groundwater monitoring well installation and investigation, soil vapor investigations, and soil excavation of source material. Sampling locations have been mostly on site with eight off site borings and four off site monitoring wells. Samples have commonly been analyzed for VOCs, semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), metals, nitrate, ammonia, and herbicides. Groundwater and soil sample results have typically been compared to the most restrictive MTCA Method 1 CLARC screening levels that were available at the time of the investigations. **Table A** presents the investigations in chronological order with a summary of the findings. Refer to the reports listed for analytical methods, laboratory reports, photographs, soil boring logs, and other investigation-related documentation. COPCs for soil and groundwater are presented in Tables 8 and 9 in Appendix B. **Figure A** in Appendix A shows the locations of current and historical investigation boring hole locations and existing monitoring well locations.

3.2 Indicator Hazardous Substances

Per WAC 173-340-703, potential indicator hazardous substances (IHS) for soil and groundwater have been identified for the site. IHS are developed by comparing investigation data from 2007 through 2022 to July 2022 CLARC screening levels. IHS for soil included multiple COPCs, generally categorized as VOCs, SVOCs, metals, TPH, and herbicides. IHS for groundwater included multiple COPCs, generally categorized as VOCs, polynuclear aromatic hydrocarbons (PAHs), metals, gasoline and diesel range organics (GROs and DROs), and herbicides. IHS for air was a single VOC - benzene.

Specific COPCs for soil are summarized in Tables D and E in Section 6, for groundwater in Table E in Section 7, and full details on COPCs are listed in **Table 8** and **Table 9** in Appendix B. The physical extents of contamination in soil and groundwater are discussed in Section 6 and represented in Figures B (soil) and C (groundwater) series in Appendix A.

Table A. Site Investigation Timeline and Summary

Investigation and Date	Summary of Findings	Relevant Documents
2007 SECOR Investigation (SECOR), Spring 2007	Off site groundwater investigation to further assess the extent of groundwater impacts associated with the Bee-Jay Scales site, located one block north of the Simplot facility. Three borings located off site adjacent to the east were advanced to approximately 20 feet below ground surface (bgs) using a GeoProbe hydraulic push probe. Stantec collected groundwater samples from temporary groundwater monitoring wells and the depths to groundwater varied from 10 and 20 feet bgs, and had them analyzed for arsenic, alkalinity, chloride, nitrate-N, ammonia-N, phosphate, sulfate, iron, herbicides, manganese, pH, and volatile organic compounds (VOCs). The report identified the following constituents with screening level exceedances: nitrate-N, sulfate, chloride, iron, 1,2-dichloroethane, 1,2-dichloropropane, arsenic, benzene, Dinoseb, and ammonium-N.	*Phase III Remedial Investigation Report for the Bee-Jay Scales Site.* October 26, 2007. (SECOR 2007). *Storm Drain Assessment Results for the Bee-Jay Scales Site*. July 17, 2012. (Stantec 2012)
2009 Geoprobe Investigation, September 23 and 24, 2009	A total of 13 borings were advanced across the site from which soil and groundwater samples were collected. Two soil samples and one groundwater sample were collected from each boring. Soil samples were analyzed for VOCs, chlorinated herbicides, Resource Conservation and Recovery Act (RCRA) metals, nitrate-N, and ammonium-N. Arsenic exceedances were present in the northern portion of the site at depths of 0-5.5 feet bgs. No other soil constituents were identified with screening level exceedances. Groundwater depths were approximately 4 to 8 feet bgs. Groundwater samples were collected and analyzed for VOCs, RCRA metals, herbicides, and inorganic ions (Cl, SO_4), nitrate-N, and ammonium-N. The report identified the following groundwater constituents with screening level exceedances: benzene, bromodichloromethane, 1,2-dichloroethane, 1,2-dichloropropane, ethylbenzene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, total xylenes, arsenic, barium, lead, 2,4-D, nitrate, sulfate, and chloride. Groundwater exceedances were present in all boring holes.	*Preliminary Site Investigation Work Plan* (HDR 2009b) *Preliminary Site Investigation Report* (HDR 2009a)
2011 Groundwater Monitoring Well Installation, March 15 and 16, 2011	Site investigation activities included the installation of five groundwater monitoring wells (MW-1, MW-2, MW-3, MW-4, and MW-5), well development, well surveying, and the first round of quarterly groundwater sampling. Water levels measured from the completed wells on March 17, 2011, ranged from 6.73 to 8.46 feet bgs. Wells were installed and soil samples collected on March 15 and 16, 2011. One soil sample was collected from each MW boring using a split-spoon sampling method and were analyzed for VOCs, polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), nitrate-N, and ammonia-N. Reported compounds were limited to ammonia-N, nitrate-N, 2-chlorotoluene, diesel range organics (DRO), and residual range organics (RRO); however, none of the soil samples exceeded screening levels.	*Monitoring Well Construction and Sampling Work Plan* (HDR 2010) *Monitoring Well Construction and Sampling Report* (HDR 2011)

Table A. Site Investigation Timeline and Summary

Investigation and Date	Summary of Findings	Relevant Documents
Quarterly Groundwater Monitoring, March 2011 – 2018	Groundwater sampling was conducted between March 2011 and September 2018 on a quarterly basis. Samples were analyzed for VOCs, chlorinated herbicides, RCRA metals, PAHs, TPH, nitrate-N, and ammonium-N. Groundwater sampling was conducted on the following dates: • March 17, 2011 • June 30, 2011 • September 15, 2011 • December 5, 2012 • April 4, 2013 • July 24, 2013 • October 9, 2013 • October 28, 2014 • April 29, 2015 • October 14, 2015 • April 19, 2016 • October 31, 2016 • May 3, 2017 • December 28, 2017 • April 25, 2018 • September 11, 2018 During the most recent sampling event conducted in September 2018, arsenic, lead, and nitrate-N were reported at concentrations above screening levels. Arsenic exceedances were reported in all on- and off site monitoring wells. Nitrate-N exceedances were reported in MW-4, 5R, 6, and 7, which are located in the east portion of the site and downgradient of the site. Lead exceedances were only reported in MW-7, which is off site and downgradient (east) of the site. **Table 6** in Appendix B summarizes groundwater monitoring results from 2011 – 2021. Refer to Figures C-1 through C-15 in Appendix A for a distribution and summary of exceedance locations. Exceedances included the following – VOCs: 1,2,4-trimethylbenzene, 1,2-dichloroethane, 1,2-dichloropropane, acrolein, benzene, and 1,2,3-trichloropropane. SVOCs: 1-methylnaphthalene. Metals: arsenic, cadmium, lead, selenium, barium, and chromium. Herbicides: MCPP and Dinoseb. TPH: GRO and DRO. Anions: Nitrate-N.	*Draft Data Summary Report* (HDR 2019b)

Table A. Site Investigation Timeline and Summary

Investigation and Date	Summary of Findings	Relevant Documents
2012 and 2013 Source Removal, Drain Evaluation, and Additional Monitoring Well Installation	**Source Removal:** In December 2012, approximately 155 cubic yards of soil were excavated (20 x 22 x 9.5 feet deep) from a former rinse area near the northeast corner of the site, which had shown elevated levels of nitrate and ammonium in previous investigations. Depth to groundwater at the time of the excavation was about 9.5 feet bgs. Contaminated soils were excavated, stockpiled, and removed from the site. Confirmation soil samples were collected from the excavation pit sides and bottom (8 wall samples, 2 bottom samples, 10 total samples). Soil samples were analyzed for VOCs, chlorinated herbicides, nitrate-N, and ammonium-N. No soil samples collected from the sides or bottom of the excavation exceeded screening levels. **Additional Monitoring Well Installation and Sampling:** In November 2012, two off-site monitoring wells were installed downgradient of the Simplot Grower Solutions site (MW-6 and MW-7) along South 3rd Street. Additionally, on-site monitoring well MW-5 was abandoned due to the soil excavation, and MW-5R was installed on site to replace MW-5. HDR collected a composite soil sample from the cuttings for off-site wells MW-6 and 7, and a composite sample from cuttings from MW-5R. Soil samples were analyzed for VOCs, chlorinated herbicides, nitrate-N, and ammonium-N. Only nitrate-N and ammonium-N were reported, and levels did not exceed screening levels. Seven groundwater monitoring wells were sampled on December 5, 2012 and analyzed for VOCs, PAHs, chlorinated herbicides, TPH, RCRA metals, nitrate + nitrate-N, and ammonium-N. The report identified the following groundwater constituents with screening level exceedances: arsenic (all wells except off-site MW-6 and 7), nitrate-N (MW-3, 4, and 5), 1,2-dichloropropane (MW-4), and 1,2-dichloroenthane (MW-5R). **Drain Evaluation:** In April 2013, a subsurface drain study was conducted to determine if the shallow groundwater at the site was entering the existing subsurface drain systems (old under-drain system, irrigation district drain system, city stormwater drain system, and industrial wastewater drain system). Groundwater samples collected from drainpipes and manholes located downgradient from the site were analyzed for chloride, sulfate, total phosphorus, nitrate, and ammonium. Total phosphorus was the only groundwater constituent with screening level exceedances. Exceedances were present in cross-gradient (north of site) and downgradient (east of site) storm drains.	*Source Removal, Drain Evaluation, Monitoring Well Construction, and Sampling Work Plan* (HDR 2012) *Source Removal, Drain Evaluation, Monitoring Well Construction, and Sampling Report* (HDR 2013a) *Supplemental Drain Evaluation and Monitoring Well Sampling Report* (HDR 2013b)

Table A. Site Investigation Timeline and Summary

Investigation and Date	Summary of Findings	Relevant Documents
Phase 1 Remedial Investigation, January 2020	A total of 15 borings were completed as part of Phase 1 remedial investigation (RI) activities. Borings were drilled January 28 through January 30, 2020. Twenty-one groundwater samples were collected from the borings and were analyzed for VOCs, northwest total petroleum hydrocarbons gasoline range organics (NWTPH-GRO), ethylene dibromide (EDB), chlorinated herbicides, NWTPH-DRO, RCRA metals, dissolved mercury, chloride, sulfate, nitrate-N, and ammonium-N. The report identified the following groundwater constituents with screening level exceedances: benzene, 1,2-dichloroethane, 1,2-dichloropropane, naphthalene, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, EDB, arsenic, 2,4-D, 2-methyl-4-chlorophenoxyacetic acid (MCPA), and nitrate-N. Exceedances were generally observed in samples from the eastern half of the site, with the exception of arsenic, which exceeded at all boring locations. In addition to the direct push activities, groundwater samples were collected from monitoring wells on 1/31/2020 to determine depth to groundwater and to confirm groundwater flow direction. Groundwater samples were analyzed for VOCs, NWTPH-GRO, EDB, chlorinated herbicides, NWTPH-DRO, RCRA metals, dissolved mercury, chloride, sulfate, nitrate-N, and ammonium-N. The report identified the following groundwater constituents with screening level exceedances: nitrate-N, 1,2-dichloroethane, 1,2-dichloropropane, and arsenic. All samples from the on- and off site wells had at least one constituent exceedance.	*Remedial Investigation Work Plan* (HDR 2019a) *Phase 1 Sampling and Analysis Plan* (HDR 2019c) *Phase 1 Remedial Investigation Report* (HDR 2020a)
Phase 2 Remedial Investigation, December 2020	A total of 15 borings (8 on-site, 7 off site) were completed as part of Phase 2 RI activities. Borings were drilled between 12/7/2020 and 12/17/2020. Groundwater samples were collected from the borings at depths of 8-12 feet bgs. Soil boring cuttings were screened using a photo-ionization detector (PID). High PID readings (>100 parts per million [ppm]) were observed in borings located near the two on-site buildings at depths of 8 to 12 feet bgs. No soil samples were collected as part of Phase 2 RI activities. In addition to the direct push activities, groundwater samples were collected on 12/11/2020 from the seven monitoring wells associated with the site. All groundwater samples (direct push and monitoring well) were analyzed for VOCs, NWTPH-GRO, EDB, chlorinated herbicides, NWTPH-DRO, RCRA metals, dissolved mercury, chloride, sulfate, nitrate-N, and ammonium-N. The report identified the following groundwater constituents with screening level exceedances: 1,1,2-trichloroethane, 1,2,4-trimethylbenzene, 1,2-dichloroethane, 1,2-dichloropropane, 1,2,3-trichloropropane, 1,3,5-trimethylbenzene, benzene, m-Xylene & p-Xylene, naphthalene, o-xylene, EDB, gasoline, #2 diesel, 2,4-D, MCPA, arsenic, and nitrate-N. Exceedances were reported at all wells and at all borings.	*Sampling and Analysis Plan: Phase 2 Remedial Investigation Activities* (HDR 2020b) *Phase 2 Remedial Investigation Report* (HDR 2021a)

Table A. Site Investigation Timeline and Summary

Investigation and Date	Summary of Findings	Relevant Documents
Phase 2.5 Remedial Investigation (Summer through Winter 2021)	The following activities were conducted as part of the Phase 2.5 RI activities: **Monitoring well installation (two wells) and soil testing at two off site locations (July 29-30, 2021):** Two new downgradient monitoring wells (MW-6D and MW-7D) were installed to a depth of approximately 37 feet below ground surface (bgs) to obtain groundwater data from a deeper zone below where the previously installed wells (MW-6 and MW-7) are screened. Two soil samples were collected from each well boring (one just above the vadose zone and one within the vadose zone) and were analyzed for VOCs, EDB, chlorinated herbicides, RCRA metals, nitrate-N, ammonia-N, NWTPH-GRO, and NWTPH-DRO. The report identified the following soil constituents with screening level exceedances: nitrate-N, 2-methyl-4-chlorophenoxy-2-propionic acid (MCPP), and arsenic. **Monitoring well sampling (9/14/2021):** Groundwater samples were collected from the nine wells associated with the site and were analyzed for VOCs, EDB, chlorinated herbicides, RCRA metals, nitrate-N, ammonia-N, NWTPH-GRO and NWTPH-DRO. The report identified the following groundwater constituents with screening level exceedances: arsenic, 1,2-dichloropropane, MCPP, and nitrate-N. Exceedances were present in on-site MW-3, MW-4, and MW-5R, which are located along the east fence line (downgradient), and at off site, downgradient MW-6D and MW-7D. **On-site Soil Vapor Headspace Screening Investigation and Soil Suitability Testing (11/8-10/2021):** Thirty-eight direct push borings were taken on a 50-foot centered grid within the site boundary. PID readings were taken for all borings. PID readings ranged from 444.1 ppm at SVH2.5-05, located in the northeast corner of the site, to <1.0 ppm in most other borings. PID readings of >1 ppm were observed in borings located in the center and northeast corner of the site. During the headspace investigation, three soil samples were collected from five borings (15 total samples), 3 located on the east boundary, one located on the south boundary, and 1 in the southern 1/3 of the site. The goal was to assess soils for suitability to support vegetative growth as part of evaluating potential remedial actions for the site. Soil samples were analyzed for nitrate-N, ammonia-N, phosphorus, potassium, sulfate, boron, % organic matter, pH, electrical conductivity, zinc, manganese, copper, iron, calcium, magnesium, sodium, sodic absorption ratio, cation exchange capacity and bicarb. Based on the results of the sampling, it was determined that phytoremediation would be of limited efficacy due to high salt levels, low organic matter, and small area availability. **Off Site Tier 1 Soil Vapor Intrusion Assessment (11/10/2021)**: Five direct push borings were taken off site in the residential area directly east (downgradient) of the site. Soil vapor samples were collected from each boring at approximately 4 feet bgs in 6-liter steel SUMMA canisters and were analyzed for VOCs via U.S. Environmental Protection Agency (EPA) Method TO-15. An ambient air blank sample was collected simultaneously with soil vapor sampling. One analyte, 1,3-butadiene, was reported at a level higher than the Washington Cleanup Levels and Risk Calculation (CLARC) Deep Soil Gas Method B Cancer level. 1,3-butadiene is produced through the processing of petroleum and is mainly used in the production of synthetic rubber, and could have been present due to the friction from drilling heating up o-rings or other components and likely resulting in emissions of 1,3-butadiene. No other constituents exceeded screening levels.	*Sampling and Analysis Plan: Phase 2.5 Remedial Investigation Activities* (HDR 2021b) *Phase 2.5 Remedial Investigation Report* (HDR 2022c)

4 Phase 3 RI

4.1 Methodology

Field investigation activities were designed to meet investigation objectives described in the AO and the *Remedial Investigation Work Plan* (HDR 2019a). Field investigation activities were conducted in general accordance with the *Tier 2 Vapor Intrusion Work Plan – Combined Sampling and Analysis Plan (SAP) / Quality Assurance Project Plan (QAPP) for Interim Phase 3 Remedial Investigation Activities* (HDR 2022a) and the *Phase 3 Remedial Investigation Work Plan – Combined Sampling and Analysis Plan (SAP) / Quality Assurance Project Plan (QAPP) for Phase 3 Remedial Investigation Activities* (HDR 2022b), which were reviewed and approved by Ecology on April 22, 2022 and July 29, 2022, respectively. On behalf of Simplot, HDR conducted the following activities as part of the Phase 3 RI activities:

- Tier 2 Vapor Intrusion Investigation
- Geophysical Survey and Soil Investigation

The Tier 2 vapor intrusion investigation component of the Phase 3 RI was conducted from May 11 to May 12, 2022. The geophysical survey and soil investigation components of the Phase 3 RI were conducted from August 15, 2022, through August 26, 2022.

4.1.1 Tier 2 Vapor Intrusion

Based on elevated photo-ionization detector (PID) readings observed during the Phase 2.5 RI, and the proximity of buildings (less than 100 feet from the high PID readings in the northeast corner of the site) (HDR 2022c), Simplot conducted a Tier 2 vapor intrusion investigation that included a combination of sub-slab soil gas sampling, indoor air sampling, and outdoor ambient air sampling at the two on-site buildings. Refer to Section 3.1 for a summary of off site vapor conditions observed during the Phase 2.5 RI.

Per Ecology Vapor Intrusion Guidance (Ecology 2022b), “At least one sampling event should be scheduled when the building is likely to be depressurized with respect to the subsurface. Often this event is scheduled for the winter heating season, when temperatures inside the building are significantly higher than outdoor air temperatures.” The Tier 2 vapor intrusion investigation was conducted on May 11 and 12, 2022, when outdoor temperatures were cooler, and indoor temperature differentials were at least 30 degrees Fahrenheit (°F) higher than the anticipated outdoor temperatures. Indoor air temperatures during the investigation were maintained at around 88°F, and outdoor temperatures were around 54°F, achieving a temperature differential of 34°F. See Vapor Sampling Data Sheets in Appendix D for sample collection details.

The Tier 2 vapor investigation consisted of:

- Installation and sampling sub-slab soil gas via temporary sub-slab soil gas sampling points inside the buildings
- Indoor air sampling
- Ambient air sampling (outdoors)

HDR conducted a pre-investigation product inventory survey one week prior to the vapor intrusion investigation inside each building to identify potential sources of VOCs that could have interfered with the investigation results. Products stored on site included 2- and 3-gallon containers of insecticides and herbicides and cleaning solvents. Specific chemicals observed included Roundup™ herbicide, Pine-sol™ cleaner, Renuzit™ air fresheners. Facility staff reported that Roundup had been applied around the building. During the product inventory survey, VOCs were not detected by the PID meter. Natural gas is used to heat the warehouse and modular office building.

HDR collected nine samples that were analyzed for the Tier 2 vapor intrusion activities. The sampling locations are presented in **Figure A** in Appendix A.

- Three interior sub-slab or crawl space soil vapor samples (SS-2-220511, SS-1-220511, and CS-20220511)
- Three indoor air samples; two inside the warehouse and one inside the modular office structure (IA-W1-20220511, IA-W2-20220511, and IA-M-20220511)
- One outdoor ambient air sample (AMB-20220512)
- Two quality assurance/quality control (QA/QC) samples (SS-DUP-220511 and IA-DUP-20220511)

Sub-slab vapor samples were collected to characterize the nature and extent of soil vapor contamination immediately beneath the concrete foundation slab of the warehouse-type structure. The office building is a modular structure. The area below the office building is similar to a crawl space. Soil gases were collected by inserting the Summa canister horizontally through an opening in the building's crawl space. Field forms in Appendix D document soil gas sample collection.

Co-located indoor air samples were collected concurrently with sub-slab or crawl space sampling to characterize indoor air quality and identify potential exposures within the buildings. One outdoor ambient air sample was collected up wind of and in between the two buildings to characterize site-specific background outdoor air conditions. See **Figure A** in Appendix A for air sample locations.

Two sub-slab soil gas sampling points were installed through the interior slab on grade concrete floor in the warehouse building. Following installation, the points were allowed to equilibrate for approximately 24 hours prior to sampling. Following the manufacturer's standard operating procedures (SOP), a Vapor Pin™ sub-slab soil-gas sampling device was installed in each of the holes. Water dams were used to prevent the breakthrough of vapors from the building interior into the sub-slab vapor samples. In addition, a shroud was placed over the sampling equipment and a leak detection gas (helium) was used to detect leakage in the sampling train.

Prior to sampling and to further assess potential breakthrough at the surface, a plastic dome shroud was place over the soil gas implant sample locations as well as the soil gas sampling train. Helium was introduced into the shroud via a bottle of compressed helium; a minimum target shroud concentration of approximately 10,000 parts per million (ppm) was maintained during sampling activities. The tracer gas concentrations were measured in both the shroud and in the soil gas removed during sample train purging using a calibrated MGD-2002 Helium Leak Detector. During the purging activities, three tracer tests were performed in the field. The purpose of the field tracer tests is to document that the target shroud helium concentrations were being maintained and that the concentrations of tracer gas measured from the sampling train were not indicative of "breakthrough" or a leaking sampling train. Shroud concentrations were measured to be at least 10,000 ppm for all three tracer tests. No elevated helium readings (i.e., above 25 ppm) were detected in the soil gas purge stream during the three tracer gas tests. Per the July 2015 California Department of Toxic Substances Control (DTSC) Active Soil Gas Investigation guidance document (DTSC 2015), a sampling train tracer gas measurement of 5 percent or less of the minimum shroud concentration is acceptable. Therefore, based on the quantitative field-testing results, there was no evidence of a leak in the sample train. Once the sampling train was confirmed to be leak free, the soil gas samples were collected. The highest tracer gas measurement during the test was 1.5 percent, indicating there was no significant tracer gas in the samples collected.

Sub-slab and indoor air samples were collected using 1-liter and 6-liter Summa canisters, respectively, and analyzed for the compounds on the U.S. Environmental Protection Agency (EPA) TO-15 list of analytes. The samples were analyzed by Eurofins Air Toxics LLC, Folsom, California. The laboratory provided flow regulators, polytetrafluoroethylene (PTFE) tubing, and stainless steel "T" connectors for collecting duplicate samples and presetting the flow regulators to collect sub-slab soil gas samples at intake flow rates of 200 milliliters per minute (mL/min) or less. Indoor air samples were collected using a dedicated flow controller set to collect the sample over an approximate 8-hour time interval. Due to a faulty 8-hour flow controller/blockage, the ambient air sample was collected at an intake flow rate of approximately 200 mL/min.

Photos from sampling are contained within Appendix E.

4.1.2 Utility Clearance and Geophysical Survey

Prior to advancing ground disturbance activities, Simplot contacted Washington One Call (1-800-424-5555) to locate public utilities. Borings were moved at least 2 feet away from underground utilities.

HDR retained Sage Earth Science (Sage) to conduct a geophysical survey using combinations of metal detection/magnetics (time domain electromagnetic induction [TDEMI]) and ground penetrating radar (GPR) techniques to identify subsurface anomalies such as potential locations of historical USTs and/or other buried infrastructure/anomalies as potential source areas, and to help guide boring placements for the soil investigation component of the Phase 3 RI. Sage performed TDEMI/Geonics EM61 and GPR surveys, and two direct current (DC) resistivity tests to characterize soil electrical properties to a depth of 40 feet. Field resistivity testing was conducted as part of pre-remedial design data collection. Metal detection/magnetics techniques were completed on the entire site on August 15, 2022. Following metal detection/magnetics, GPR scans were conducted on August 16, 2022, at identified anomaly areas and within an approximately 15,000-square-foot area in the northeast corner of the site where elevated PID readings were identified during the 2.5 RI.

4.1.3 Environmental Borings

The Phase 3 RI included advancing a total of 36 soil borings using a GeoProbe (direct push) drill rig. Some of the pre-planned boring locations were repositioned to investigate subsurface anomalies and buried utilities found during the geophysical survey (Section 4.2). Table B summarizes the field observations at each boring location and provides the rationale for selecting samples for laboratory analysis. In general, soil boring locations were selected based on the following:

- At prior soil vapor headspace (SVH) screening locations SVH-2.5-01, SVH-2.5-02, SVH-2.5-05, SVH-2.5-06, SVH-2.5-07, SVH-2.5-08, SVH-2.5-14, and SVH-2.5-15, with the highest PID readings,
- Where subsurface anomalies were found, and
- Where initial boring locations exhibited field evidence of soil contamination (PID meter reading; olfactory; visual)

Soil screening, using a PID, was completed at each location and as an aid to help identify soil sample collection intervals. The soil boring locations are presented in **Figure A** in Appendix A. Soil boring logs are presented in Appendix D. PID readings were taken for the borings and included in the boring logs. Photos from sampling are contained within Appendix E.

Following the geophysical survey, soil contamination was delineated within areas of high PID readings (≥100 ppm), identified as part of the Phase 2.5 RI, with boring placements biased toward highest PID readings, which were in the northern half of the site. Additional borings were repositioned and used to investigate those anomalies. In total, 36 borings were advanced on the site via a direct push drill rig to maximum depths of approximately 15 feet bgs. Soil screening and sampling was completed as part of Phase 3 RI activities.

Holt Services, Inc., a Washington State-licensed driller, performed subcontracted drilling services, using direct-push drilling equipment. Soil samples were collected from the soil borings using a 5-foot macro-core sampler. Drilling equipment was cleaned using a high-pressure washer prior to beginning the project and between boring locations. Sampling equipment was cleaned using an Alconox® wash and potable water before beginning the project and before collecting each soil sample.

In each location, soil samples were collected continuously from the ground surface to the total depth of each boring to document soil type, color, relative moisture content, and evidence of impacts (e.g., odors, discoloration or staining, etc.). Soil samples were field screened with a photoionization detector (PID; Mini-RAE 3000) to detect the presence of VOCs.

4.1.4 Soil Sample Collection

The soil borings were advanced to a maximum depth of 15 feet bgs to facilitate soil sampling. From the 36 locations, 48 soil samples were collected. Sample selection was based on evidence of contamination such as high PID readings (≥100 ppm), petroleum and chemical odors, and sheens, or to obtain data for locations that may represent the horizontal and vertical limits of contamination (delineation samples). **Table B**, below, lists the boring locations, samples collected from each, and the rationales behind collecting and analyzing each sample selected.

Table B. Phase 3 Soil Boring Location Rationale

Boring Location ID	Depth to GW (ft bgs)	Highest PID Reading (ppm) (depth [ft bgs])	Sample(s) Collected	Rationale for Collection
BH1	8	979.5 (10-12.5)	PS3Soil-BH1-10.5-12.5-20220822-0 PS3Soil-BH1-12.5-15-20220822-0	Highest PID reading, strong petroleum odor Vertical delineation
BH3-2	8.5	24.8 (0-1)	PS3Soil-BH2-7.5-10-20220822-0	No significant field evidence of subsurface impacts. Horizontal and vertical delineation
BH3-3	8.5	979.6 (10-12.5)	PS3Soil-BH3-10-12.5-20220822-0 PS3Soil-BH3-12.5-15-20220822-0	Highest PID reading Vertical delineation
BH3-4	8.5	46.7 (5-7.5)	PS3Soil-BH4-10-12.5-20220822-0	No significant field evidence of impacts. Horizontal and vertical delineation
BH3-5	8.5	1,559 (5-7.5)	P3Soil-BH5-5-7.5-20220822-0 P3Soil-BH5-13.5-15-20220822-0	Highest PID reading, strong petroleum odor Vertical delineation
BH3-6	8.5	989.2 (5-10)	P3Soil-BH6-13-15-20220822-0	Strong odor, PID at 852 ppm at 12-13 ft. bgs
BH3-7	9	333.6 (10-11)	P3Soil-BH7-10-11-20220823-0	Highest PID, petroleum odor
BH3-8	9	150.8 (12.5-15)	P3Soil-BH8-10-11-20220823-0	Highest PID, Petroleum odor
BH3-9	8.5	213.5 (13-15)	P3Soil-BH9-10-13-20220823-0 P3Soil-BH9-13-15-20220823-0	Petroleum odor Highest PID, petroleum odor
BH3-10	8.5	5.5 (0-1)	None	No field evidence of impact
BH3-11	8.5	142.9 (10-12.5)	P3Soil-BH11-1-5-20220823-0 P3Soil-BH11-10-12.5-20220823-0	Highest PID, petroleum odor
BH3-12	8.5	71.1 (12.5-15)	P3Soil-BH12-12.5-15-20220823-0	Highest PID, petroleum odor
BH3-13	8.5	131.1 (14-15)	P3Soil-BH13-14-15-20220823-0	Chlorine-like odor to 14 ft. bgs Highest PID, petroleum odor at 14 – 15 ft, bgs
BH3-14	8.5	1,487 (13-15)	P3Soil-BH14-13-15-20220823-0	Highest PID, chlorine-like and petroleum odors
BH3-15	8.5	402.4 (12-15)	P3Soil-BH15-12-15-20220823-0	Highest PID, slight odor to 12 ft. bgs
BH3-16	8.5	5.1 (10-15)	P3Soil-BH16-1-5-20220823-0	No field evidence of impact, horizontal delineation
BH3-17	8.5	21.5 (13-15)	P3Soil-BH17-13-15-20220823-0	No field evidence of impact, horizontal delineation
BH3-18	8.5	172.3 (14-15)	P3Soil-BH18-14-15-20220823-0	Highest PID, petroleum odor
BH3-19	9	44.6 (9-10)	P3Soil-BH19-5-9-20220824-0 P3Soil-BH19-9-10-20220824-0	No field evidence of impacts. Horizontal and vertical delineation
BH3-20	9	2,852 (12-13)	P3Soil-BH20-9-10-20220824-0 P3Soil-BH20-12-13-20220824-0	Petroleum odor Highest PID, petroleum odor

Table B. Phase 3 Soil Boring Location Rationale

Boring Location ID	Depth to GW (ft bgs)	Highest PID Reading (ppm) (depth [ft bgs])	Sample(s) Collected	Rationale for Collection
BH3-21	10	2,711 (12.5-15)	P3Soil-BH21-3-5-20220824-0 P3Soil-BH21-12.5-15-20220824-0	Slight chemical odor Highest PID, strong petroleum odor
BH3-22	10	2,613 (12-15)	P3Soil-BH22-0-5-20220824-0 P3Soil-BH22-12.5-15-20220824-0	No field evidence of impact, horizontal delineation Highest PID, petroleum odor
BH3-23	10	2,552 (12.5-15)	P3Soil-BH23-12.5-15-20220824-0	Highest PID, petroleum odor
BH3-24	9	1,793 (13-14.5)	P3Soil-BH24-2-5-20220824-0 P3Soil-BH24-13-14.5-20220824-0	No field evidence of impact, horizontal delineation Highest PID, strong petroleum odor
BH3-25	10	1,023 (13-15)	P3Soil-BH25-10-13-20220824-0	High PID (853.4 ppm), petroleum odor
BH3-26	10	1,611 (12-13)	P3Soil-BH26-0-2-20220824-0 P3Soil-BH26-12-13-20220824-0	No field evidence of impact, horizontal delineation Highest PID, sheen, petroleum and fertilizer odors
BH3-27	9	258 (10-15)	P3Soil-BH27-0-1-20220825-0	No field evidence of impact, horizontal delineation
BH3-28	9	965.7 (10-13)	P3Soil-BH28-10-13-20220825-0	Highest PID, petroleum odor, greasy
BH3-29	9	33.8 (10-13)	P3Soil-BH29-0-3-20220825-0	No field evidence of impact, horizontal delineation
BH3-30	9	113.7 (5-10)	P3Soil-BH30-5-10-20220825-0	Slight fertilizer odor
BH3-31	9	1,965 (14-15)	P3Soil-BH31-5-7.5-20220825-0 P3Soil-BH31-12-14-20220825-0	Slight petroleum odor Highest PID, strong petroleum odor
BH3-32	9	53.1 (2-5)	P3Soil-BH32-2-5-20220825-0	No field evidence of impact, horizontal delineation
BH3-33	9	80.8 (3-5)	P3Soil-BH33-1-3-20220825-0	No field evidence of impact, horizontal delineation
BH3-34	10	6.2 (0-1)	P3Soil-BH34-14-15-20220826-0	No field evidence of impacts. Horizontal and vertical delineation
BH3-35	9	25.6 (5-10)	P3Soil-BH35-5-10-20220826-0	No field evidence of impacts. Horizontal and vertical delineation
BH3-36	9	1,392 (13-15)	P3Soil-BH36-10-13-20220826-0 P3Soil-BH36-13-15-20220826-0	Petroleum odor Highest PID, petroleum odor

GW = groundwater; PID = photoionization detector; ppm = parts per million; ft bgs = feet below ground surface

Soil samples were collected following the EPA Method 5035 sampling method procedures. Method 5035 involves the use of a soil syringe or similar tool to take a small 5-gram sample, which is extruded into a pre-weighed, 40-milliliter (mL) vial containing a preservative (methanol). If there were no field observations of potential impact or elevated PID readings, the sample was collected from soils deemed most likely to be impacted, based on lithology.

The samples were placed in laboratory-prepared containers, labeled, and placed on ice in a cooler. The sample coolers and completed chain-of-custody forms were relinquished to Pace Analytical, Mount Juliet, Tennessee (Pace), a Washington-certified laboratory, for analysis on a standard turnaround.

After completing field activities, temporary investigation locations were plugged and abandoned in accordance with applicable state requirements by filling them with hydrated bentonite chips and then capping with asphalt patch, concrete patch, or gravel as appropriate to match the surrounding surfaces.

4.1.5 Laboratory Analytical Methods

Pace analyzed soil samples for the following constituents, which are summarized in **Table 2**, Appendix B:

- VOCs by EPA Method 8260D
- Northwest Volatile Petroleum Products by Methods NWTPH-GX and NWTPH-DX
- Chlorinated herbicides by EPA Method 8151A
- Arsenic and cadmium by EPA Method 6010C
- Nitrate-Nitrite-Nitrogen by EPA Method 353.2

Pace analyzed air samples for the following constituents, which are summarized in **Table 3**, Appendix B.

- VOCs by EPA Method TO-15

4.2 Field Investigation Results

4.2.1 Site Lithology and Hydrogeology

In general, subsurface soils observed in the soil borings consisted of fill material (comprised of variable mixtures of asphalt, gravel, concrete, and sand) up to 5 feet in thickness, underlain by variable mixtures of native silts, sands, and some clay to the maximum depths explored. Rapid dilatancy was observed near the vadose zone due to the silty soil below the gravel surface layer, evidenced by fine grained tight silty soils. The boring logs (Appendix C) detail the observed soil types. Groundwater was encountered during field activities at depths of approximately 8 to 10 feet bgs, within the borings extended to 15 feet. The observed soils are consistent with previous HDR site investigations and the published geological and soil maps.

4.2.2 Field Screening

Elevated PID readings (≥100 ppm) and unusual odors were detected in the soil samples collected from most borings (see **Table B** above). The highest PID reading was identified in probe BH3-20 at a depth of 13 feet, which is considered the saturated zone, with a reported PID response of 2,852 ppm. A soil sample (BH3-20 @ 12-13) was collected from this interval and submitted for labo ratory analyses. The field screening results are summarized on the boring logs in Appendix C and in **Table B**. Elevated PID readings (≥100 ppm) were generally observed at depths of 5 to 15 feet bgs, with the highest readings located around 13 feet bgs. In many borings (14 of 36 borings), PID readings at 15 feet bgs were lower than the readings at 10 to 13 feet bgs. Low PID readings (≤100 ppm) were observed in the 0-5 feet bgs depth range of the borings with the exception of BH3-5 and BH3-31, where PID readings were 1,074 ppm and 119.4 ppm, respectively.

4.2.3 Geophysical Survey

The geophysical survey did not identify evidence of USTs. Notable subsurface findings include an isolated small object to the southeast of the office structure and two areas of buried debris – one in the northeast corner of the property and one to the south, near the area previously excavated known as the Former Rinse Area. The survey noted that this second buried debris area had been previously disturbed. Several linear underground utilities were also located, including one utility that could not be identified in the northern portion of the site. Figure 3-8 in the August 2022 Sage geophysical site investigation (Appendix F) depicts these findings on aerial imagery.

4.3 Analytical Results

The following tables in Appendix B present the laboratory analytical results for the Phase 3 RI:

- **Table 4a:** Indoor Air and Ambient Air Samples Compared to CLARC Screening Levels (for on-site soil vapor samples). Results are compared to the lower of the CLARC Air Screening Levels Method B Cancer or Non-Cancer levels, Method C Cancer or Non-Cancer levels, and Commercial Worker Cancer or Non-Cancer levels.
- **Table 4b**: Sub-slab and Crawl Space Samples Compared to CLARC Screening Levels (for on-site soil vapor samples). Results are compared to the lower of the CLARC Sub-slab Method B Cancer or Non-Cancer levels, Method C Cancer or Non-Cancer levels, and Commercial Worker Cancer or Non-Cancer levels.
- **Table 5a**: Phase 3 Soil Investigation Results. Results are compared to the lowest of the CLARC soil screening levels.
- **Table 5b**: Summary of Soil Sample Detections and Exceedances Compared to Screening Levels. Includes historic data.
- **Table 6**: Detected Monitoring Well Sample Results – 2011 to 2021. Comprehensive table of project reported analytes in groundwater from permanent monitoring wells.
- **Table 7:** Normalized Qualifier Table created by HDR based on interpolation of lab qualifiers for the database.
- **Table 8:** Summary of Screening Level Exceedances for Soil Constituents
- **Table 9:** Summary of Screening Level Exceedances for Groundwater Constituents

4.3.1 Tier 2 Soil Vapor / Indoor Air Quality Results Summary

Tier 2 soil vapor samples were analyzed for VOCs via EPA Method TO-15 and the results were compared to the most restrictive of the CLARC Air Method B Cancer or Non-cancer screening levels. There is no CLARC Air Method A list. None of the samples resulted in levels reported higher than the screening levels with the exception of the two indoor air samples collected inside the warehouse building, IA-W1-20220511 and IA-W2-20220511. These two samples had concentrations above screening levels for benzene. See **Tables 4a** and **4b** in Appendix B for a summary of air sample results compared to screening levels.

4.3.2 Soil Sample Results Summary

On August 22 to 26, 2022, HDR collected 48 soil samples from 36 boring holes at depths of 0 to 15 feet bgs, using a direct push drill rig. Samples were labeled, sealed, placed in a cooler, and shipped to Pace Analytical in Mount Juliet, Tennessee.

Soil sample results were compared to CLARC Soil Method A or B Cancer or Non-cancer, whichever was the most restrictive screening level; site-specific cleanup objectives will be proposed in the upcoming feasibility study. Soil constituents that resulted in levels exceeding the screening level included acetone, 2,4-Dichlorophenoxyacetic acid, dinoseb, cumene, benzene, methyl ethyl ketone, methyl isobutyl ketone, Methyl tert-butyl ether (MTBE), n-butylbenzene, n-propylbenzene, sec-butylbenzene, tert-butylbenzene, tetrachloroethylene (PCE), tolulene, 1,2-dichloropropane, 1,1,2-trichloroethane, 1,2,3-trichlorobenzene, 1,2,3-trichloropropane, 1-methyl naphthalene, 2-methyl naphthalene, naphthalene, 1,2,4-trimethylbenzene, ethylbenzene, 1,2-dichloroethane, 1,2,3-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2,4-trichlorobenzene, total xylenes, iron, manganese, arsenic, cadmium, and northwest total petroleum hydrocarbons gasoline range organics (NWTPH-GRO).

Table 5a in Appendix B shows Phase 3 RI sample results compared to the CLARC screening levels by compound.

4.3.2.1 Polynuclear Aromatic Hydrocarbons

PAHs were reported in one or more soil samples collected from the following borings:

- P3 SOIL BH1-10-12.5-20220822-0
- P3 SOIL BH1-12.5-15-20220822-0
- P3 SOIL BH2-7.5-10-20220822-0
- P3 SOIL BH3-10-12.5-20220822-0
- P3 SOIL BH5-13.5-15-20220822-0
- P3 SOIL BH7-10-11-20220823-0
- P3 SOIL BH8-12.5-15-20220823-0
- P3 SOIL BH9-13-15-20220823-0
- P3 SOIL BH11-10-12.5-20220823-0
- P3 SOIL BH12-12.5-15-20220823-0
- P3 SOIL BH13-14-15-20220823-0
- P3 SOIL BH14-13-15-20220823-0
- P3 SOIL BH15-12-15-20220823-0
- P3 SOIL BH16-1-5-20220823-0
- P3 SOIL BH17-13-15-20220823-0
- P3 SOIL BH18-14-15-20220823-0
- P3 SOIL BH19-9-10-20220824-06
- P3 SOIL BH20-9-10-20220824-06
- P3 SOIL BH20-12-13-20220824-06
- P3 SOIL BH21-3-5-20220824-06
- P3 SOIL BH21-12.5-15-20220824-06
- P3 SOIL BH22-0-5-20220824-06
- P3 SOIL BH22-0-5-20220824-06
- P3 SOIL BH23-12.5-15-20220824-06
- P3 SOIL BH24-2-5-20220824-06
- P3 SOIL BH24-13-14.5-20220824-06
- P3 SOIL BH26-0-1-20220824-06
- P3 SOIL BH26-10-13-20220824
- P3 SOIL BH26-12-13-20220824-06
- P3 SOIL BH28-10-15-20220825-0
- P3 SOIL BH31-5-7.5-20220825-0
- P3 SOIL BH31-12-14-20220825-0
- P3 SOIL BH34-14-15-20220826-0
- P3 SOIL BH36-10-13-20220826-0
- P3 SOIL BH36-13-15-20220826-0

Detected PAHs in these borings were benzo(a)anthracene, benzo(a)pyrene, acenaphthene, phenanthrene, fluorene, 1-methyl naphthalene, naphthalene, 2-methyl naphthalene, anthracene, pyrene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, benzo(b)fluoranthene, fluoranthene, and chrysene.

The sample identification protocol defined in the *Phase 3 Remedial Investigation Work Plan – Combined SAP/QAPP for Phase 3 Remedial Investigation Activities* (HDR 2022b) determined the second and third numbers in the sample name to be the depths of soil sample collection. Based on the sample names and the soil boring logs in Appendix D, detections were generally found in the 7.5- to 15-foot range (vadose and saturated zones), with some detections in shallow soil at BH3-16, BH3-21, BH3-22, BH3-24, and BH3-26, which are located in the area east and southeast of the modular office building.

The following soil PAH constituents exceeded CLARC screening levels:

- 1-methyl naphthalene
- naphthalene
- 2-methyl naphthalene
- benzo(g,h,i)perylene

The reported soil sample analytical results are summarized and compared to the lowest CLARC soil screening levels in **Table 5** of Appendix B. The laboratory analytical reports and chain-of-custody records are attached in Appendix D.

PAH exceedance of the CLARC soil screening levels in soil samples collected during the Phase 3 RI were observed in Borings BH3-1, BH3-3, BH3-5, BH3-7, BH3-8, BH3-9, BH3-11, BH3-12, BH3-13, BH3-14, BH3-15, BH3-18, BH3-19, BH3-20, BH3-21, BH3-22, BH3-23, BH3-24, BH3-26, BH3-28, BH3-31, BH3-34, and BH3-36 at depths of 0 to 15 feet bgs. These borings are located in the northern half of the site. More specifically, they are located in the area near the northwest corner of the warehouse building, the area in between the warehouse and modular office building, and the general northeast area of the site.

4.3.2.2 Volatile Organic Compounds

VOC constituents were reported in one or more soil samples collected from borings with the exception of borings BH3-10 and BH3-25. Detected VOC constituents are 1,1,2-trichloroethane, 1,2,3-trichlorobenzene, 1,2,3-trichloropropane, 1,2,3-trimethylbenzene, 1,2,4-trichlorobenzene, 1,2,4-trimethylbenzene, 1,2-dichlorobenzene, 1,2-dichloroethane, 1,2-dichloroethane, 1,2-dichloroethane, 1,2-dichloroethane, 1,2-dichloroethane, 1,3,5-trimethylbenzene, 1,4-dichlorobenzene, acetone, benzene, chlorobenzene, cumene, ethylbenzene, methyl ethyl ketone, methyl isobutyl ketone, MTBE, n-propylbenzene, p-isopropyltoluene, sec-butylbenzene, tert-butylbenzene, PCE, toluene, total xylenes, and trichlorofluoromethane,

The following soil VOC constituents exceeded screening levels:

- 1,1,2-Trichloroethane
- 1,2,3-Trichlorobenzene
- 1,2,3-Trichlorobenzene
- 1,2,3-Trichloropropane
- 1,2,3-Trimethylbenzene
- 1,2,4-Trichlorobenzene
- 1,2,4-Trimethylbenzene
- Ethylbenzene
- Methyl ethyl ketone
- Methyl isobutyl ketone
- MTBE
- n-Butylbenzene
- n-Propylbenzene
- sec-Butylbenzene

- 1,2-Dichloroethane
- 1,3,5-Trimethylbenzene
- Acetone
- Benzene
- Cumene
- tert-Butylbenzene
- PCE
- Toluene
- Total Xylenes

The reported soil sample analytical results are summarized and compared to the lowest CLARC soil screening levels in **Table 5a** of Appendix B. The laboratory analytical reports and chain-of-custody records are attached in Appendix D.

Exceedances for one or more of the constituents listed above were observed in Borings BH3-1, BH3-2, BH3-3, BH3-5, BH3-6, BH3-7, BH3-8, BH3-9, BH3-11, BH3-12, BH3-13, BH3-14, BH3-15, BH3-16, BH3-17, BH3-19, BH3-20, BH3-21, BH3-22, BH3-23, BH3-24, BH3-26, BH3-27, BH3-28, BH3-31, and BH3-36. Exceedances were generally present at depths of 7.5 to 15 feet bgs (vadose and saturated zones) with the exception of shallow contamination (2-5 feet bgs) at BH3-16, BH3-21, BH3-16, BH3-21, BH3-22, and BH3-24, BH3-26, BH3-27, BH3-30, and BH3-31. These borings are located in the northern half of the site. More specifically, they are located in the area near the northwest corner of the warehouse building, in between the warehouse and modular office building, and the general northeast area of the site.

4.3.2.3 Herbicides

Herbicide constituents (Dinoseb, 2,4-Dichlorophenoxyacetic acid (2-4, D), and Dicamba) were reported in one or more of the soil samples collected from BH3-12, BH3-13, BH3-16, BH3-18, BH3-26, and BH3-36 (0 to 15 bgs), which are located in the northeast corner of the site and in between the warehouse and modular office building (only BH3-36). The reported concentrations of these herbicide compounds exceed screening levels for Dinoseb in BH3-16 (1 to 5 feet bgs) and at BH3-36 (10 to 13 feet bgs) and for 2,4-D in BH3-13 (14 to 15 feet bgs), BH3-18 (14 to 15 feet bgs), BH3-26 (12 to 13 feet bgs), and BH3-36 (10 to 13 feet bgs). Dicamba levels did not exceed screening levels. Herbicides were not reported in the soil samples collected from any other borings.

The reported soil sample analytical results are 25ummaryzed and compared to the lowest CLARC soil screening levels in **Table 5a** of Appendix B. The laboratory analytical reports and chain-of-custody records are attached in Appendix D.

4.3.2.4 Metals

Resource Conservation and Recovery Act (RCRA) metal constituents, arsenic and cadmium, as well as iron and manganese, were reported and exceeded screening levels in most soil samples, except samples collected from BH3-10 and BH3-25. Exceedances were present at depths of 0 to 15 feet bgs, indicating metals contamination is present across most of the northern half of the site.

The reported soil sample analytical results are summarized and compared to the lowest CLARC soil screening levels in **Table 5a** of Appendix B. The laboratory analytical reports and chain-of-custody records are attached in Appendix D.

4.3.3 Data Quality Control

Data management and documentation included checking all QA/QC parameters, including holding times, method blanks, surrogate recoveries, spike recoveries, field and laboratory duplicates, completeness, laboratory control samples, and chain-of-custody forms. After the data was checked, it was entered into the project database with any assigned data qualifiers. Qualifiers assigned by the laboratory and HDR are presented in **Table 7**, Appendix B. Data was determined to be overall useable for interpretation.

4.3.3.1 Sampling Procedures

Pace Analytical analyzed soil and soil vapor samples for the following constituents:

- Soil VOCs by EPA Method 8260D
- Northwest Volatile Petroleum Products by Methods NWTPH-GX and NWTPH-DX
- Chlorinated herbicides by EPA Method 8151A
- Arsenic and cadmium by EPA Method 6010C
- Nitrate-Nitrite-Nitrogen by EPA Method 353.2
- Air VOCs by EPA Method TO-15

4.3.3.2 Holding Times

A total of 48 soil samples were submitted to Pace Analytical, including a field duplicate sample. Holding times were met for the analytes with the exception of the following samples:

- P3 SOIL BH1-10-12.5-20220822-0 (PAHs)
- P3 SOIL BH1-12.5-15-20220822-0 (PAHs)
- P3 SOIL BH2-7.5-10-20220822-0 (PAHs)
- P3 SOIL BH3-10-12.5-20220822-0 (PAHs)
- P3 SOIL BH3-12.5-15-20220822-0 (PAHs)
- P3 SOIL BH4-10-12.5-20220822-0 (PAHs)
- P3 SOIL BH5-5-7.5-20220822-0 (PAHs)
- P3 SOIL BH5-12.5-15-20220822-0 (PAHs)
- P3 SOIL BH6-13-15-20220822-0 (PAHs)
- P3 SOIL BH19-9-10-20220824-06 (PAHs)
- P3 SOIL BH20-9-10-20220824-06 (PAHs)
- P3 SOIL BH20-12-13-20220824-06 (PAHs)
- P3 SOIL BH21-3-5-20220824-06 (PAHs)
- P3 SOIL BH21-12.5-15-20220824-06 (PAHs)
- P3 SOIL BH22-0-5-20220824-06 (PAHs)
- P3 SOIL BH22-12.5-15-20220824-06 (PAHs)
- P3 SOIL BH23-12.5-15-20220824-06 (PAHs)
- P3 SOIL BH24-2-5-20220824-06 (PAHs)
- P3 SOIL BH24-13-14.5-20220824-06 (PAHs)
- P3 SOIL BH26-10-13-20220824 (PAHs)
- P3 SOIL BH26-0-1-20220824-06 (PAHs)
- P3 SOIL BH26-12-13-20220824-06 (PAHs)
- P3 SOIL BH7-10-11-20220823-0 (PAHs)
- P3 SOIL BH8-12.5-15-20220823-0 (PAHs)
- P3 SOIL BH9-13-15-20220823-0 (PAHs)
- P3 SOIL BH11-10-12.5-20220823-0 (PAHs)
- P3 SOIL BH12-12.5-15-20220823-0 (PAHs)
- P3 SOIL BH13-14-15-20220823-0 (PAHs)
- P3 SOIL BH14-13-15-20220823-0 (PAHs)
- P3 SOIL BH15-12-15-20220823-0 (PAHs)
- P3 SOIL BH16-1-5-20220823-0 (PAHs)
- P3 SOIL BH17-13-15-20220823-0 (PAHs)
- P3 SOIL BH18-14-15-20220823-0 (PAHs)
- P3 SOIL BH27-0-1-20220825-0 (VOCs, NWTPHDX, PAHs)
- P3 SOIL BH28-10-15-20220825-0 (VOCs, NWTPHDX, PAHs)
- P3 SOIL BH29-0-3-20220825-0 (VOCs, NWTPHDX, PAHs)
- P3 SOIL BH30-5-10-20220825-0 (VOCs, NWTPHDX, PAHs)
- P3 SOIL BH31-5-7.5-20220825-0 (VOCs, NWTPHDX, PAHs)
- P3 SOIL BH31-12-14-20220825-0 (VOCs, NWTPHDX, PAHs)
- P3 SOIL BH32-2-5-20220825-0 (VOCs, NWTPHDX, PAHs)
- P3 SOIL BH33-1-3-20220825-0 (VOCs, NWTPHDX, PAHs)
- P3 SOIL BH34-14-15-20220826-0 (VOCs)
- P3 SOIL BH35-5-10-20220826-0 (VOCs)
- P3 SOIL BH36-10-13-20220826-0 (VOCs)
- P3 SOILBH36-13-15-20220826-0 (VOCs)

Hold times were not met for the samples from Borings 1 through 18 because when initial TPH results were received, it was determined that additional analysis for PAH was warranted. Analysis of additional samples held in reserve was performed; however, due to timing between when the initial data set was reported and the additional analyses were requested, some samples were analyzed beyond the laboratory analytical hold times.

4.3.3.3 Duplicate Field Samples

A sub-slab soil vapor duplicate sample was secured from SS-1-220511 (duplicate: IA-DUP-20220511), and an air duplicate sample collected in the Tier 2 vapor investigation (May 2022). The results of the duplicate samples are presented in **Tables 4a** and **4b** in Appendix B. The relative percent difference (RPD) limit is 50 percent for all analytes. The air duplicate is within the acceptable range with the exception of the following constituents:

- Carbon disulfide
- Chloromethane
- Ethylbenzene
- 4-Ethyltoluene
- Methylene chloride
- Toluene
- Total xylenes

All other analytes were below 50 percent RPD. The analytes outside the acceptable RPD range represent 10 percent of all analytes. Based on the low percentage of analytes outside of RPD, the dataset was determined to be overall useable for the purpose of the project.

5 Conceptual Site Model

5.1 Conceptual Site Model

An important objective of the RI/FS is to develop a better understanding of potential sources (primary and secondary) of contaminants, release mechanisms, and exposure pathways, so that a conceptual model can be developed.

5.1.1 Type and Source of Contamination

The IHS for the site are presented in Section 3.2 and further discussed in Section 6. IHS were developed for soil, groundwater, and air.

5.1.2 Transport and/or Migration Pathways

Transport and/or migration pathways define those mechanisms by which humans and aquatic and terrestrial ecological receptors are exposed to a chemical released from a site. A pathway is comprised of four elements:

- A source and mechanism for release of a chemical into the environment
- A transport medium (e.g., soil, air, and water)
- A point of potential human or aquatic or terrestrial ecological contact (exposure point)
- A human or aquatic or terrestrial ecological exposure route (ingestion, inhalation, dermal contact)

A conceptual site model for the SGS facility is presented in **Table C** and summarizes the environmental pathways to exposed individuals, and routes of entry into the body for each medium of exposure. The media of concern are soil, groundwater, and air.

No aquatic or terrestrial ecological receptors were identified. The site is surrounded by paved roads, industrial/commercial properties, and residential development. No environmentally-sensitive natural resources are present on site or in the site vicinity. Such resources typically include wetlands, surface water bodies, forested natural areas, and habitat for threatened and endangered species.

5.1.2.1 Soil Pathways

5.1.2.1.1 Petroleum Source Area

The isoconcentration maps of petroleum constituents indicate that a petroleum release or release(s) occurred in the area to the north-northeast of the warehouse building.

Groundwater was encountered between 8.5 to 10 feet bgs. The highest PID readings in the soil borings tended to be below the water table but above the bottom of the borings at 15 feet. It is likely the depth between the water table and the bottom of the borings is a smear zone where contaminants that are lighter than water, such as petroleum products, float on the water table; the depth to which varies by several feet over a typical year. This smear zone also acts as a pathway for contaminants to migrate to deeper groundwater and to migrate downgradient.

There is a lack of evidence of petroleum impacts at shallow depths, with petroleum impacts beginning 6 feet bgs or more, which impacted the deeper vadose and shallow saturated zones but not the uppermost several feet of soil. Dermal contact and potential inhalation during subsurface construction activities are complete exposure pathways for petroleum-contaminated soil should construction occur on site.

5.1.2.1.2 Non-Petroleum Source Area

Historically, the site was used as an agricultural product distribution facility, and agricultural chemical containers were stored and rinsed on site over unpaved surfaces.

Although soil at the location known as the former rinse area was remediated (HDR 2012), it is possible that rinsing empty containers also occurred at other nearby areas as the rinse area was not specifically designated for such activities and did not have a hard boundary (i.e. concrete wall). Unlike the petroleum source area, the non-petroleum source area appears to have originated at the ground surface. Contaminants in rinse water likely infiltrated the unpaved surface and were carried to the water table during precipitation events. These chemicals did not float on the water table but dissolved in groundwater. Dermal contact and potential inhalation during subsurface construction activities are complete exposure pathways for non-petroleum-contaminated soil should construction occur on site. Because non-petroleum contaminant releases were surficial, the potential also exists for inadvertent dermal contact, inhalation, and ingestion of surface soil as complete exposure pathways.

5.1.2.2 Groundwater Pathways

There are no known potable wells on site. The City of Sunnyside provides potable water to the site and surrounding area. If undocumented private wells exist in the area between the site and the downgradient wells, there could be complete exposure pathways for ingestion, dermal contact, and inhalation with contaminated groundwater originating on the site.

Groundwater discharge to surface water is not expected to be an exposure pathway. In April 2013, HDR conducted a subsurface drain study to determine if the shallow groundwater at the site was entering the existing subsurface drain systems (old under-drain system, irrigation district drain system, city stormwater drain system, and industrial wastewater drain system) (HDR 2013a, HDR 2013b). Groundwater samples collected from drainpipes and manholes located downgradient from the site were analyzed for chloride, sulfate, total phosphorus, nitrate, and ammonium. Total phosphorus was the only groundwater constituent with screening level exceedances. Exceedances were present in cross-gradient (north of site) and downgradient (east of site) storm drains.

The only confirmed exposure pathway for contaminated groundwater would be dermal contact with the shallow aquifer if construction activities occurred in the future on site or nearby.

5.1.2.3 Vapor Intrusion and Sub-slab Air Pathways

The exposure pathway for air is vapor intrusion from petroleum-contaminated soil and groundwater. Benzene was the only constituent exceeding screening levels from two samples collected during the on-site Tier 2 vapor intrusion investigation (samples IA-W1-20220511 and IA-W2-20220511). These samples were collected from indoor air inside the warehouse building, which is proximate to the highest detected benzene concentrations in both soil and groundwater. The warehouse is primarily used for storage of agricultural implements. Staff do not occupy the warehouse for extended periods of time, and typically would include staff opening roll up doors to pick up or drop off equipment. Trapped vapors, if present, would likely dissipate almost immediately upon opening the roll up doors. Regardless of current use, WAC 173-340-708 requires “Cleanup levels and remediation levels shall be based on estimates of current and future resource uses and reasonable maximum exposures expected to occur under both current and potential future site use conditions." Therefore, vapor intrusion to indoor air is a complete inhalation exposure pathway.

5.1.2.4 Fate and Transport Parameters, Decay Rates, and Exposure Factors

In general, the default and most conservative parameters were selected for the risk evaluation model for the site. Specifically, the decay rates of contaminants, human health exposure factors, and fate and transport parameters for direct contact, groundwater, and enclosed space vapor intrusion were left unchanged.

Table C. Conceptual Site Model for Simplot Grower Solutions Site

Primary Source	Indicator Hazardous Substances	Primary Source Release Mechanism	Secondary Source	Secondary Source Release Mechanism	Pathway	Potential Exposure Routes	On Site Exposure Pathway Complete?		Off Site Exposure Pathway Complete?	
							Current	Future	Current	Future
Former petroleum storage and/or dispensing	VOCs, SVOCs, Petroleum Constituents (GRO, DRO), Metals	Unknown (potential spill(s) and/or unknown AST or UST)	Subsurface Soil	Infiltration/ leaching	Groundwater	Ingestion	No	Yes	Yes[1]	Yes
						Inhalation	No	Yes	Yes	Yes
						Dermal Contact	No	Yes	Yes	Yes
				Soil Disturbance (unpaved areas/construction)	Subsurface Soil	Ingestion	No	Yes	No	Yes
						Inhalation	No	Yes	No	Yes
						Dermal Contact	No	Yes	No	Yes
				Volatile emission	Volatilization/ vapor intrusion	Inhalation	Yes	Yes	No	Yes
Former rinse area (NE corner of property), other similar areas	Herbicides, Nitrate-N, Ammonia, Metals, VOCs, SVOCs	Discharge of rinse water from chemical containers to ground surface	Surface Soil	Infiltration/ leaching	Groundwater	Ingestion	No	Yes	Yes[1]	Yes
						Inhalation	No	Yes	Yes	Yes
						Dermal Contact	No	Yes	Yes	Yes
				Soil Disturbance (unpaved areas/construction)	Surface Soil	Ingestion	Yes	Yes	No	Yes
						Inhalation	Yes	Yes	No	Yes
						Dermal Contact	Yes	Yes	No	Yes
				Volatile emission	Volatilization/ vapor intrusion	Inhalation	No	Yes	No	Yes
Contaminated groundwater	VOCs, SVOCs, Metals, Petroleum Constituents (GRO, DRO)	Dissolved contaminants migrating deeper and downgradient	Adsorbed contaminants to soil in saturated zone	Further dissolution/ desorption	Groundwater	Ingestion	No	Yes	Yes[1]	Yes
						Inhalation	No	Yes	Yes	Yes
						Dermal Contact	No	Yes	Yes	Yes
				Discharge to Surface Water	Irrigation and Drainage System[2]	Ingestion	No	No	No	No
						Inhalation	No	No	No	No
						Dermal Contact	No	No	No	No
				Volatile emission	Volatilization/ vapor intrusion	Inhalation	Yes	Yes	No	Yes

[1]The current pathway is complete only if undocumented, private potable wells exist. The City of Sunnyside's only source of drinking water is groundwater, but it is extracted from deep wells 0.5 miles from the site.

[2]See HDR April 2013 drainage study (HDR 2013b).

VOCs = volatile organic compounds; SVOCs = semi-volatile organic compounds; GRO = gasoline range organics; DRO = diesel range organics; UST = underground storage tank; AST = aboveground storage tank

6 Source Areas

An apparent source area is located in the north portion of the site, specifically near and in between the warehouse and modular office buildings and east of both buildings, at depths of 0 to 15 feet bgs. The apparent source area is comprised of Source Area 1 – Petroleum Release and Source Area 2 – Agricultural Chemical Release, which are areas of contaminated soil in the northern half of the site near and in between the existing buildings. The horizontal and vertical extent of contamination and specific COPCs were used to define these source areas, which are discussed in detail in below sections 6.1 and 6.2.

To further aid in understanding the nature and extent of contamination in soil and groundwater, isocontour maps were created for soil and groundwater and are presented in Appendix A. Groundwater and soil isoconcentration maps, produced in ArcGIS Pro, used three primary interpolation methods – kriging, inverse distance weighted, and nearest neighbor. Each interpolation method generates a raster surface by estimating analyte concentrations between points where samples were not taken. Contours are created based on the raster surface values, and isoconcentration polygons are derived from the contour matching the exceedance limit and other large markers. For soil and groundwater, these isoconcentration maps were created for analytes that had greater than or equal to six exceedances for all investigations in an effort to limit the number of maps created. Any analyte with an exceedance is considered a COPC, and the final COPCs are listed in **Table 8** and **Table 9** in Appendix B. Groundwater isoconcentrations may continue off site based on these interpolation methods; however, there is insufficient data to confirm groundwater contamination exists off site. The dashed line on the groundwater maps represents where isoconcentrations were inferred based on professional judgement.

Figure A in Appendix A presents the locations of the borings for all investigations. **Figure B-1** through **Figure B-12** in Appendix A present concentration maps of soil contaminants that had more than six exceedances across all investigations. **Figure A-13** and **Figure A-14** present soil summary maps for SVOCs and VOCs, respectively. Based on these summary maps, soil contamination is present in the north portion of the site, specifically near and in between the warehouse and modular office buildings and east of both buildings.

6.1 Source Area 1 – Petroleum Release

This section describes the apparent petroleum release at the site. IHS in soil include VOCs, SVOCs, metals, TPH, and herbicides. Based on values in **Table 8** (Appendix B), contamination is present at depths of 0 to 15 feet bgs. **Table 8** in Appendix B summarizes cleanup level exceedances for COPCs in groundwater from the earliest investigation to the most recent.

6.1.1 Field Investigation Results

Table D presents petroleum constituent exceedances in soil.

Table D. Petroleum Constituent Exceedances in Soil

Indicator Hazardous Substances	Analyte	CLARC Screening Level	Number of Exceedances[1]	Minimum Exceedance	Maximum Exceedance
		(mg/Kg)			
VOCs	1,2-Dichloroethane	0.0016	7 (10%)	0.00239	0.107
	1,2,3-Trimethylbenzene	0.073	21 (35%)	0.0913	111
	1,2,4-Trimethylbenzene	0.072	22 (32%)	0.296	495
	1,3,5-Trimethylbenzene	0.071	22 (32%)	0.0945	142
	Xylenes, Total	0.83	13 (22%)	0.977	1,070
	Toluene	0.27	1 (1%)	249	249
	Benzene	0.0017	34 (50%)	0.00198	15.7
	Cumene	0.79	11 (16%)	0.827	13.2
	Ethylbenzene	0.34	5 (7%)	0.434	118
	Methyl tert-butyl ether (MTBE)	0.0072	1 (1%)	0.0098	0.0098
PAH	Gasoline Range Organics (GRO)	30	24 (47%)	33.1	9,090
	Naphthalene	0.24	33 (49%)	0.244	44.65
	1-Methyl naphthalene	0.0042	27 (57%)	0.00736	1.03
	2-Methyl naphthalene	0.088	17 (36%)	0.116	2.08

[1]Number in parentheses represents the percent of exceedances for the dataset, which is presented in Table 8 in Appendix B.
CLARC = Washington Cleanup Levels and Risk Calculation; mg/Kg = milligrams per kilogram

6.1.2 Nature and Extent of Contamination

The original source of the petroleum release is unknown. Most petroleum constituent exceedances in soil occur in the vadose zone above the water table and in the smear zone (lowest and highest depths to water), but not in surface soils or the upper vadose zone. Findings are based on field observations (high PID readings, petroleum odors, sheens in soil samples) and lab analytical results at these depths. Based on the types of petroleum constituents with exceedances, the release was most likely gasoline, although there is also evidence of diesel in groundwater. The focus of the release is likely at the north side (rear of the warehouse building) where maximum concentrations are prevalent. This petroleum release has impacted shallow groundwater on site with some limited excursions off site at the eastern edge of the plume within 2nd Street.

Benzene-contaminated soil vapor has resulted in vapor intrusion inside the warehouse, but at no other locations, including off site locations.

6.1.3 Transport and Migration Pathways

Transport and migration pathways are discussed in Section 5.1.2.1.1 and presented in **Table C**. Dermal contact and potential inhalation during subsurface construction activities are complete exposure pathways for petroleum-contaminated soil should construction occur on site.

6.1.3.1 Potential Receptors

Potential exposure routes are presented in **Table C** and include ingestion, inhalation, and dermal contact. Access to the site is via locked gates, which limit public access; personnel on site are typically SGS employees. There is no current extraction of groundwater on site or active soil disturbance activities. Impacts are currently within the subsurface. Potential receptors in future may incl ude construction workers and other site workers in the event of ground disturbance, dewatering activities, and similar. As noted previously in Section 5.1.2.3, the warehouse is primarily used for storage of agricultural implements. Staff do not occupy the warehouse for extended periods of time, and typically would include staff opening roll up doors to pick up or drop off equipment. Trapped vapors, if present, would likely dissipate almost immediately upon opening the roll up doors.

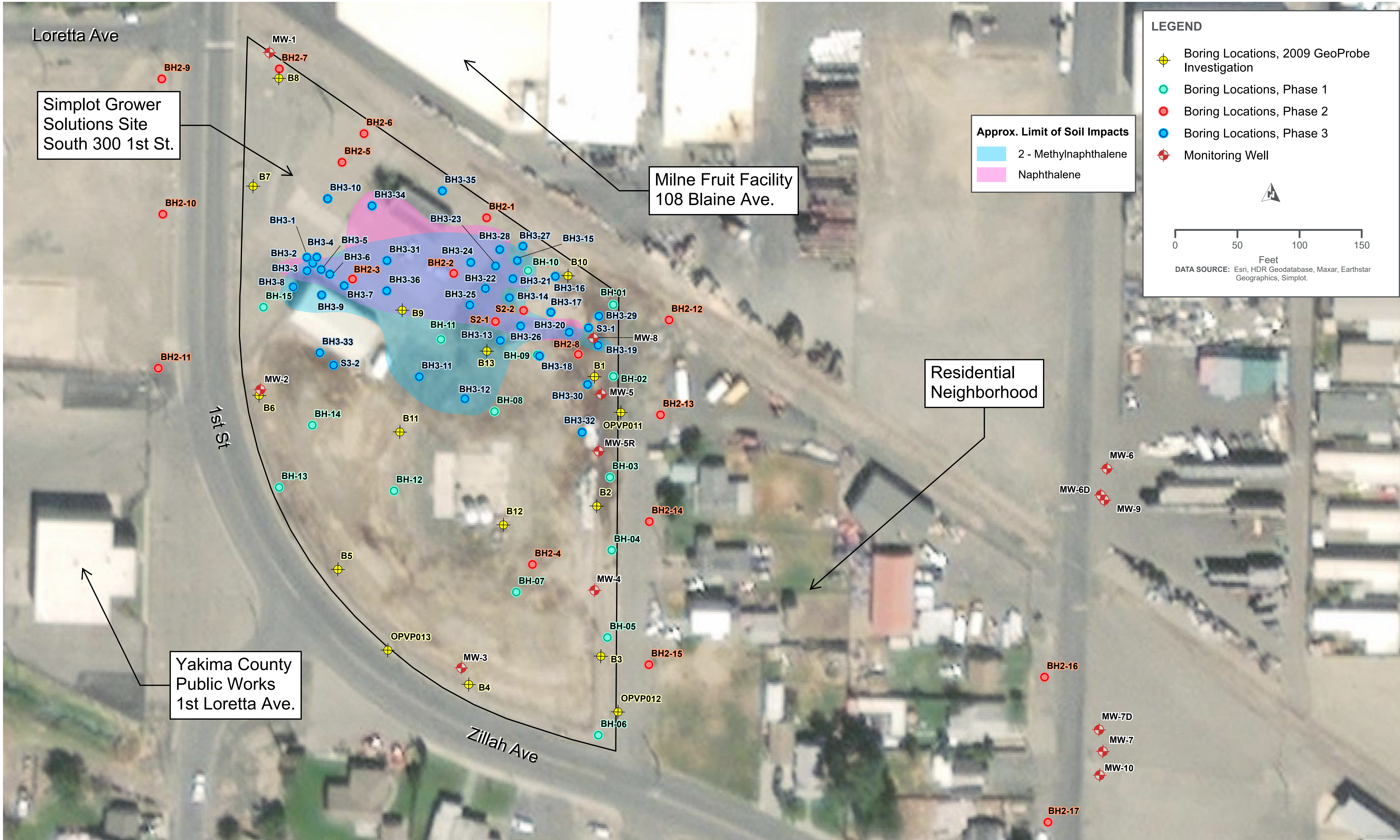
Current exposures to potential off site receptors are limited because access to the site is restricted to personnel accessing the site via locked gates. While unlikely, soil exposures to off site receptors could be possible in the event soil dust emissions were uncontrolled during construction activities. Exposure to groundwater via ingestion, inhalation, and dermal contact are also unlikely because there is no current known extraction of the shallow groundwater in the vicinity of the site; and would only be considered complete if undocumented private wells exist in the area between the site and the downgradient wells that would be set in a shallow aquifer zone with potential for contaminated groundwater. Additionally, Tier 1 vapor intrusion investigation results did not indicate contaminated soil vapor or air are present off site, indicating the pathway is not complete for off site receptors of this source area. This is likely because the fine-grained soils beneath the site have mostly kept contaminated groundwater from migrating off site.

6.1.3.2 Screening Criteria

For the surface and subsurface soil investigation, soil results were compared to the most conservative of the July 2022 CLARC screening levels, which was most often the Protective of Groundwater (POGW), Saturated screening levels, except for GRO, which does not have a POGW value. GRO was compared to the CLARC Table column Method A, Unrestricted (**Table 8**, Appendix B).

For the Tier 2 vapor intrusion investigation, indoor air results were compared to the most conservative of the CLARC Indoor Air Method B, Cancer or Non-Cancer, Indoor Air Method C Cancer or Non-Cancer, and Indoor Air Commercial Worker Cancer and Non-Cancer screening levels (**Table 4a**, Appendix B).

For the Tier 2 vapor intrusion investigation, sub-slab soil vapor results were compared to the most restrictive CLARC Sub-slab Method B, Cancer or Non-Cancer, Sub-slab Method C Cancer or Non-Cancer, or Sub-slab Commercial Worker Cancer or Non-Cancer screening levels (**Table 4b**, Appendix B).



TPH - SOIL ISOCONTOUR SUMMARY

SIMPLOT GROWER SOLUTIONS, SUNNYSIDE, WASHINGTON

FIGURE 4

6.2 Source Area 2 – Agricultural Chemical Release

Most of the non-petroleum compounds in soil are ingredients or manufacturing intermediates in pesticides, herbicides, and fumigants.

6.2.1 Field Investigation Results

Table E presents non-petroleum constituent exceedances in soil.

Table E. Non-Petroleum Constituent Exceedances in Soil

Indicator Hazardous Substances	Analyte	CLARC Screening Level	Number of Exceedances[1]	Minimum Exceedance	Maximum Exceedance
		(mg/Kg)			
VOCs	1,1,2-Trichloroethane	0.0011	2 (3%)	0.00315	0.12
	1,2,3-Trichlorobenzene	0.011	2 (3%)	0.0365	0.26
	1,2,3-Trichloropropane	1.5E-07	1 (1%)	0.00607	0.00607
	1,2,4-Trichlorobenzene	0.029	2 (3%)	0.209	0.236
	1,2-Dichloropropane	0.0017	2 (3%)	0.0028	0.003
	Tetrachloroethylene (PCE)	0.0028	6 (9%)	0.00343	0.0262
	Acetone	2.1	2 (3%)	18.7	26.9
	n-Butylbenzene	0.71	15 (22%)	1.07	19.3
	tert-Butylbenzene	1	1 (1%)	1.52	1.52
	n-Propylbenzene	0.88	14 (21%)	0.898	48.7
	sec-Butylbenzene	1.3	2 (3%)	1.9	12.9
	Methyl ethyl ketone	1.4	1 (2%)	5.22	5.22
	Methyl isobutyl ketone	0.19	3 (5%)	0.496	0.932
Metals	Cadmium (potable groundwater & surface water)	0.035	54 (92%)	0.0758	3.6
	Arsenic	0.15	53 (90%)	2.86	15
	Barium	83	4 (44%)	170	250
	Selenium	0.26	4 (44%)	3.3	5.7
	Iron	7.6	3 (100%)	9,750	37,600
	Manganese (diet - e.g., fish consumption)	3.3	3 (100%)	291	871
Herbicides	Dinoseb	0.032	2 (3%)	0.083	0.171
	2,4-Dichlorophenoxyacetic acid	0.022	6 (9%)	0.0254	0.221

[1]Number in parentheses represents the percent of exceedances for the dataset, which is presented in Table 8 in Appendix B.
CLARC = Washington Cleanup Levels and Risk Calculation; mg/Kg = milligrams per kilogram

6.2.2 Nature and Extent of Contamination

Most of the non-petroleum compounds in soil are ingredients or manufacturing intermediates in pesticides, herbicides, and fumigants, although maximum concentrations of agriculture-associated constituents are mostly less than 1 milligrams per kilogram (mg/kg) in soil. Arsenic was the most prevalent with 57 exceedances in soil samples, although the highest concentration of 15.7 mg/kg is only slightly more than two times the state background concentration of 7 mg/kg. The sources of the non-petroleum contaminants are the former rinse area, a portion of which has been excavated (HDR 2012), and similar activities that occurred at other areas of the site, which resulted in non-point source type of releases to surface soil. Although not as obvious as the petroleum source area, the non-petroleum source area overlaps and is generally in the area between the two buildings and more prevalently, the east side of the property.

Soil contaminants, 1,2-dichloropropane, ethylene dibromide, and 1,2,3-trichloropropane, have reached the depth of the water table as evidenced by groundwater exceedances for these chemicals. The non-petroleum constituents in soil or groundwater have not resulted in vapor intrusion.

6.2.3 Transport and Migration Pathways

Transport and migration pathways are discussed in Section 5.1.2 and presented on **Table C**. Unlike the petroleum source area, the non-petroleum source area appears to have originated at the ground surface. Contaminants in rinse water likely infiltrated the unpaved surface and were carried to the water table during precipitation events. These chemicals did not float on the water table but dissolved in groundwater.

6.2.3.1 Potential Receptors

Potential exposure routes are presented on **Table C**, and include ingestion, inhalation, and dermal contact. Access to the site is via locked gates, which limit public access; personnel on site are typically SGS employees. There is no current extraction of groundwater on site or active soil disturbance activities. Impacts are currently within the subsurface. Potential receptors in future may include construction workers and other site workers in the event of ground disturbance, dewatering activities, and similar.

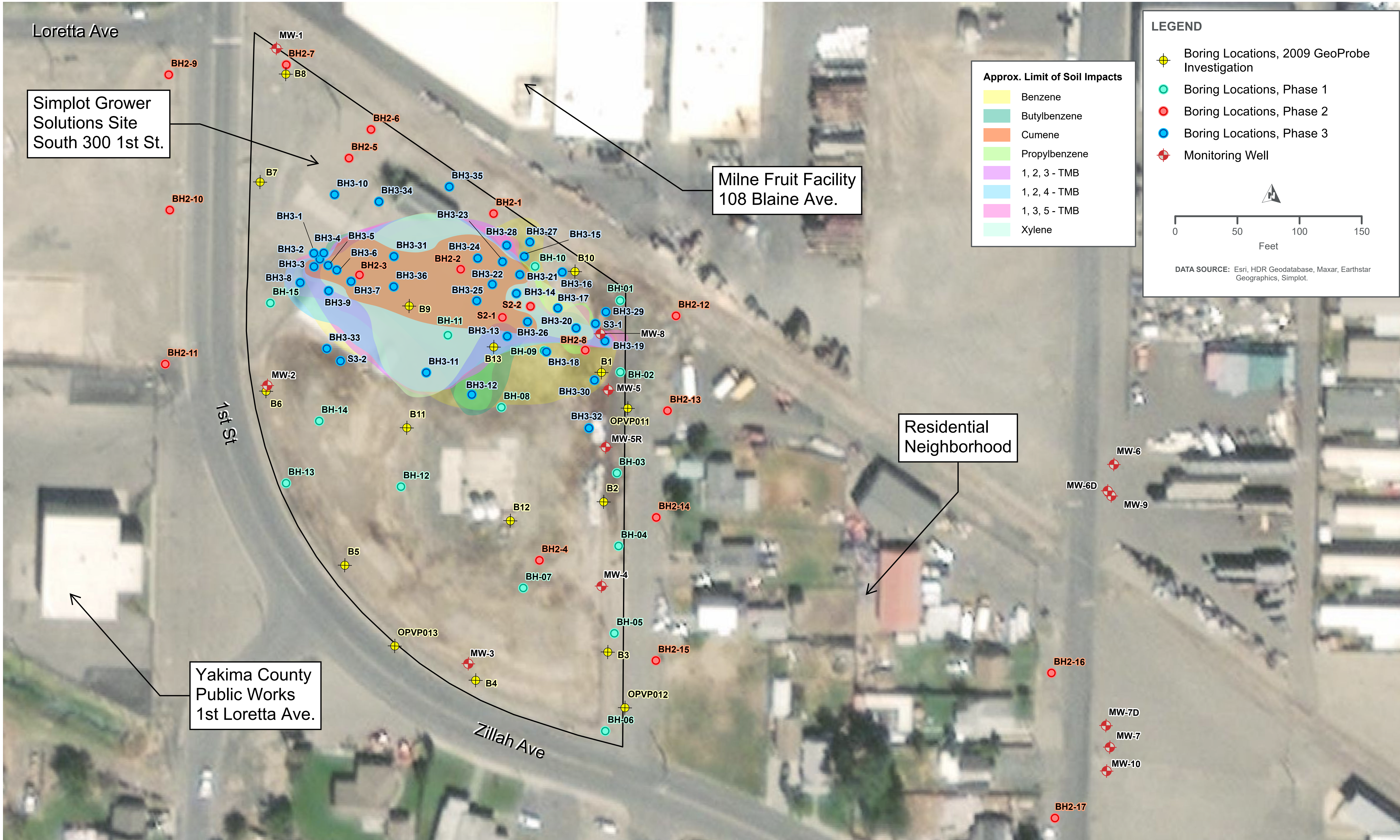
Current exposures to potential off site receptors are limited because access to the site is restricted to personnel accessing the site via locked gates. While unlikely, soil exposures to off site receptors could be possible in the event soil dust emissions were uncontrolled during construction activities. Exposure to groundwater via ingestion, inhalation, and dermal contact are also unlikely because there is no current known extraction of the shallow groundwater in the vicinity of the site; and would only be considered complete if undocumented private wells exist in the area between the site and the downgradient wells that would be set in a shallow aquifer zone with potential for contaminated groundwater. Additionally, Tier 1 vapor intrusion investigation results did not indicate contaminated soil vapor or air are present off site, indicating the pathway is not complete for off site receptors of this source area. This is likely because the fine-grained soils beneath the site have mostly kept contaminated groundwater from migrating off site.

6.2.3.2 Screening Criteria

For the surface and subsurface soil investigation, soil results were compared to the most conservative of the July 2022 CLARC screening levels, which was most often the POGW, Saturated screening levels, except for GRO, which does not have a POGW value. GRO was compared to the CLARC Table column Method A, Unrestricted (**Table 8**, Appendix B).

For the Tier 2 vapor intrusion investigation, indoor air results were compared to the most conservative of the CLARC Indoor Air Method B, Cancer or Non-Cancer, Indoor Air Method C Cancer or Non-Cancer, and Indoor Air Commercial Worker Cancer and Non-Cancer screening levels (**Table 4a**, Appendix B).

For the Tier 2 vapor intrusion investigation, sub-slab soil vapor results were compared to the most restrictive CLARC sub-slab Method B, Cancer or Non-Cancer, sub-slab Method C Cancer or Non-Cancer, or sub-slab Commercial Worker Cancer or Non-Cancer screening levels (**Table 4b**, Appendix B).



HDR Simplot

VOC - SOIL ISOCONTOUR SUMMARY

SIMPLOT GROWER SOLUTIONS, SUNNYSIDE, WASHINGTON

FIGURE 5

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SIMPLOT SUNNYSIDE REMDIAL INVESTIGATION PHASE 3

7 Groundwater

7.1.1 Field Investigation Results

Table F. Groundwater Constituents

Indicator Hazardous Substances	Analyte	CLARC Screening Level	Number of Exceedances[1]	Minimum Exceedance	Maximum Exceedance
		(µg/L)			
Comingled Constituents[2]					
VOCs	1,1,2-Trichloroethane	0.77	2 (1%)	7.5	8.7
	1,2-Dichloroethane	0.48	51 (24%)	0.68	490
	1,2,3-Trichloropropane	0.00038	8 (4%)	0.069	12
	1,2-Dichloropropane	1.2	49 (23%)	1.4	340
	Benzene	0.8	28 (13%)	1.1	11,000
	Bromodichloromethane	0.71	2 (1%)	1.5	5
	Ethylbenzene	700	1 (0.5%)	1,800	1,800
	Total Xylenes	1,000	4 (3%)	2,000	3,700
Metals	Arsenic	7	183 (88%)	7	450
	Cadmium (potable groundwater & surface water)	5	11 (5%)	5.3	20
PAHs	1-Methyl naphthalene	1.5	6 (9%)	2.5	4.3
	Naphthalene	160	9 (4%)	170	790
	Gasoline Range Organics (GRO)	1,000	14 (11%)	1,300	30,000
Unique Constituents[3]					
VOCs	Ethylene dibromide (EDB)	0.01	5 (2%)	0.022	250
	1,1,2,2-Tetrachloroethane	0.22	1 (0.5%)	0.77	0.77
Herbicides	2-methyl-4-chlorophenoxy-2-propionic acid (MCPP)	16	6 (4%)	33	44,000
PAHs	Residual Range Organics (RRO)	500	4 (3%)	820	3,500
	Diesel Range Organics (DRO)	500	22 (17%)	590	22,000
Metals	Chromium	50	6 (3%)	52	260
	Lead	15	24 (12%)	15.6	210

[1]Number in parentheses represents the percent of exceedances for the dataset, which is presented in Table 8 in Appendix B.
[2]Comingled constituents are those that also resulted in exceedances in soil.
[3]Unique constituents did not result in exceedances in soil, only groundwater.
CLARC = Washington Cleanup Levels and Risk Calculation; µg/L = micrograms per liter

7.1.2 Nature and Extent of Contamination

IHS in groundwater included VOCs, PAHs, metals, GRO and DRO, and herbicides. **Figure C-1** through **Figure C-12** in Appendix A present isoconcentration maps of groundwater contaminants that had more than six exceedances across all investigations. COPCs without a corresponding map had exceedance locations that overlapped a COPC with a corresponding map, with the exception of the metals in soil, which are discussed in detail in Section 8.1.4. **Figure C-13**, **Figure C-14**, and **Figure C-15** present soil summary maps for herbicides, TPH, and VOCs, respectively. Based on thes e figures, groundwater contamination is present across the site, as well as off site up- and down-gradient. **Table 9** in Appendix B presents a summary of cleanup level exceedances for COPCs in groundwater from the earliest investigation to the most recent. The fine-grained soils beneath the site have mostly kept contaminated groundwater from migrating off site. Only three groundwater contaminants were detected in far downgradient monitoring wells – arsenic, MCPP (MW-7D), and 1-methyl naphthalene.

Arsenic appears to be an area-wide groundwater contaminant. Arsenic concentrations in upgradient groundwater are generally higher than those downgradient, although the highest groundwater arsenic concentrations are found on-site near the former rinse area, indicating both upgradient and on-site contributing sources. MCPP and 1-methyl naphthalene only reported one exceedance each in downgradient groundwater; however, unlike arsenic, neither of these contaminants are present in upgradient groundwater. MCPP concentrations in on-site groundwater (highest 23,000 micrograms per liter [µg/L]) are several orders of magnitude higher than the exceedance in the off site, downgradient well MW-7D (33 µg/L). Given the residential land use between the site and the downgradient well, it is possible that the MCPP in the off site well originated on the site, although MCPP is found in common household weed killing products. In contrast to MCPP, there is no appreciable difference in the on-site and downgradient groundwater concentrations of 1-methylnaphthalene (3.9 µg/L on site, 4.3 µg/L off site). Other groundwater contaminants such as benzene, 1,2-dichloroethane, 1,2-dichloropropane, DRO, GRO, EDB, naphthalene 1,2,3-trichloropropane, and total xylenes appear to originate on site with the highest groundwater concentrations between the buildings or at the eastern portion of the property near the former rinse area.

7.1.3 Transport and Migration Pathways

Transportation and migration pathways are detailed in Section 5.1.2.2 and **Table B**.

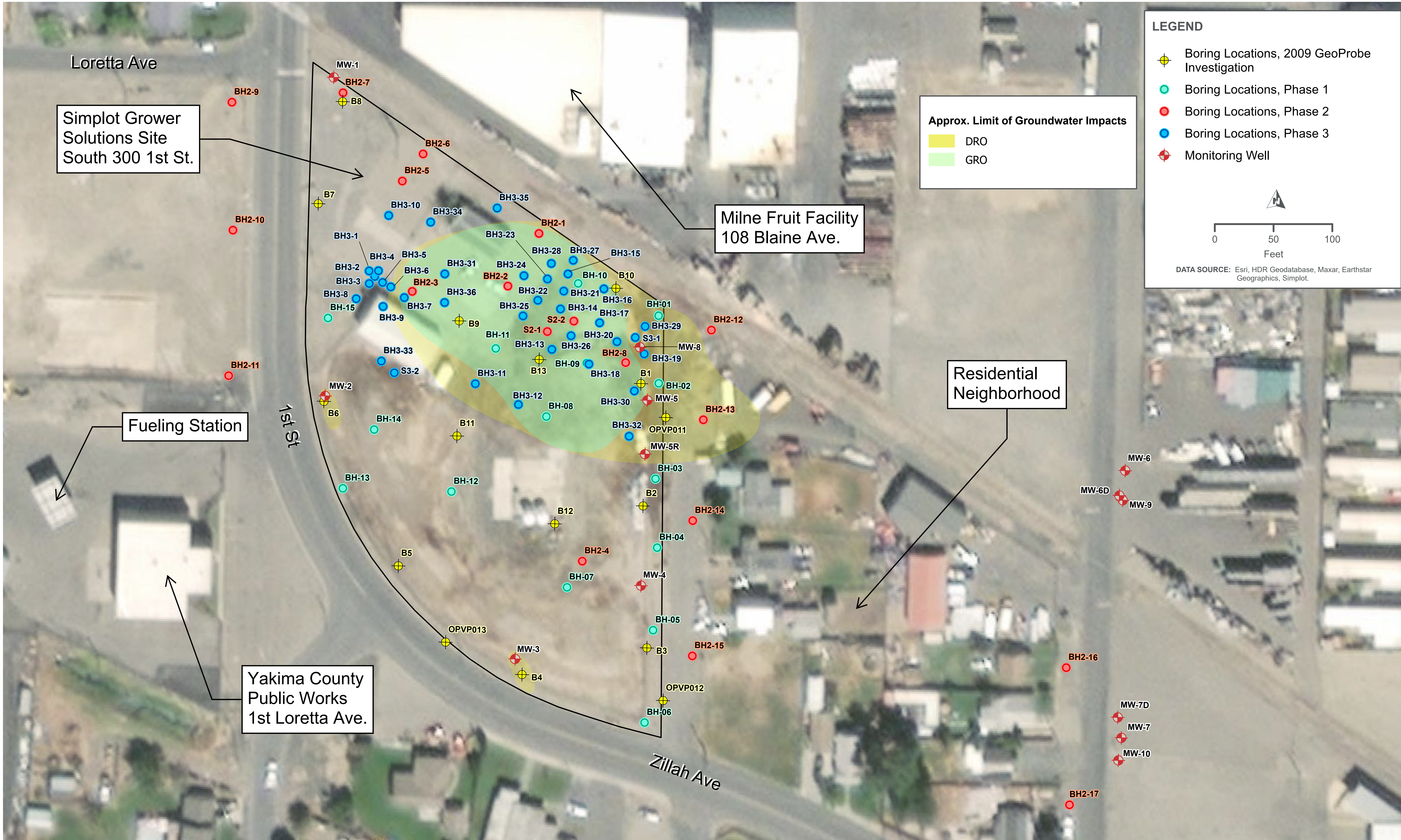
7.1.3.1 Potential Receptors

Potential exposure routes are presented in **Table B** and include ingestion, inhalation, and dermal contact. Access to the site is via locked gates, which limit public access; personnel on site are typically SGS employees. There is no current extraction of groundwater on site or active soil disturbance activities. Potential receptors in future may include construction workers and other site workers in the event of ground disturbance, dewatering activities, and similar.

Current exposures to potential off site receptors are also limited because access to the site is restricted to personnel accessing the site via locked gates, which would further reduce potential tampering and access to on-site monitoring wells, which have locked caps. Exposure to groundwater via ingestion, inhalation, and dermal contact are also unlikely because there is no current known extraction of the shallow groundwater in the vicinity of the site; and would only be considered complete if undocumented private wells exist in the area between the site and the downgradient wells that would be set in a shallow aquifer zone with potential for contaminated groundwater. Additionally, Tier 1 vapor intrusion investigation results did not indicate contaminated soil vapor or air are present off site, indicating the pathway is not complete for off site receptors of this source area. This is likely because the fine-grained soils beneath the site have mostly kept contaminated groundwater from migrating off site.

7.1.3.2 Screening Criteria

Groundwater results were compared to the most restrictive MTCA Method 1 CLARC screening levels that were available at the time of investigation, except for arsenic, which was compared to Washington State background. The lowest CLARC Screening Level and source is listed in **Table 9** in Appendix B.



TPH - ISOCONTOUR SUMMARY

SIMPLOT GROWER SOLUTIONS, SUNNYSIDE, WASHINGTON

FIGURE 6

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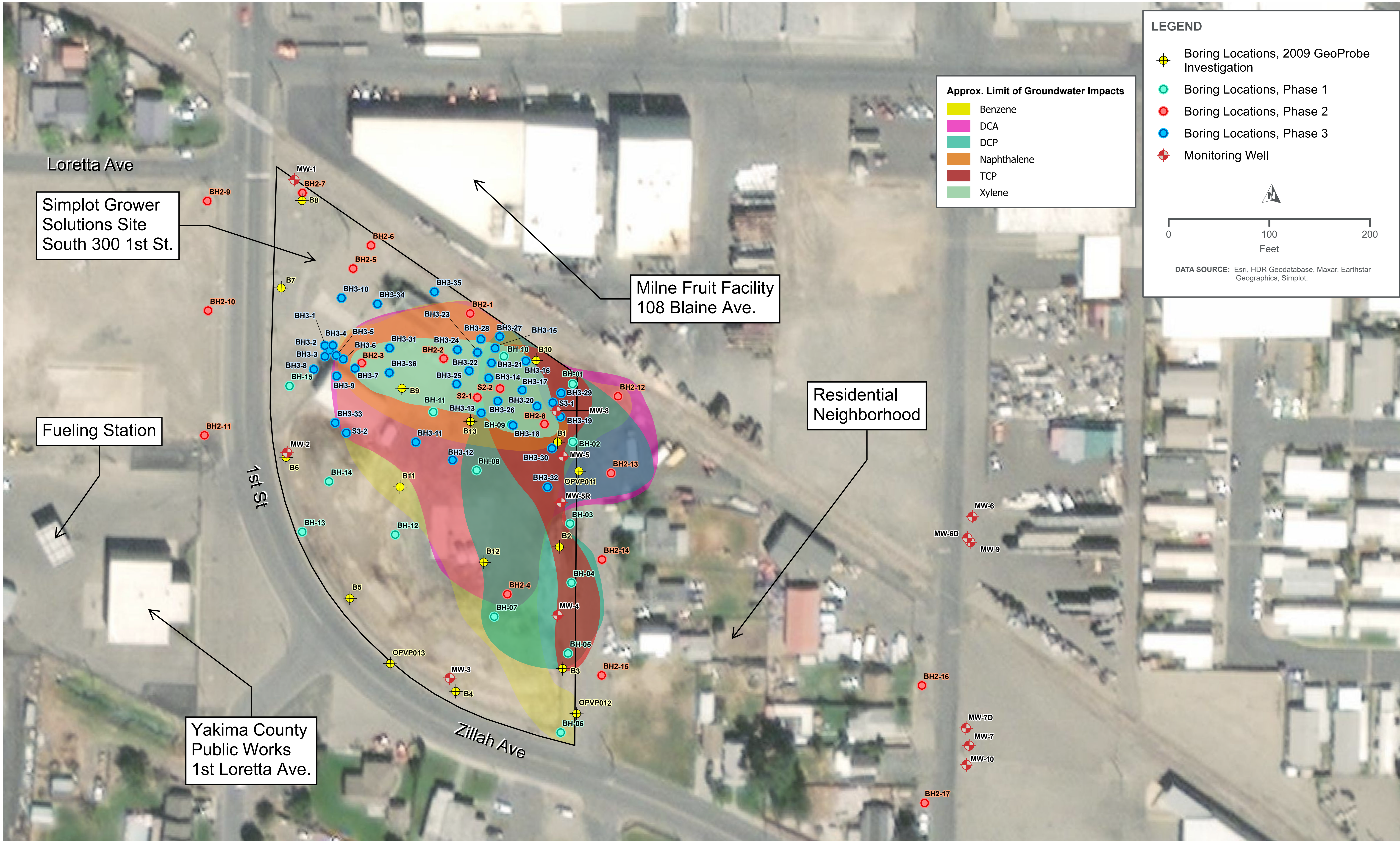

VOC - ISOCONTOUR SUMMARY

SIMPLOT GROWER SOLUTIONS, SUNNYSIDE, WASHINGTON

FIGURE 7

HDR Simplot

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SIMPLOT SUNNYSIDE REMDIAL INVESTIGATION PHASE 3

8 Discussion and Recommendations

Simplot conducted multiple investigations from 2009 through 2022 to determine the nature and extent of groundwater, soil vapor, and soil contamination present at the site. The data presented in **Table 8** and **Table 9** in Appendix B summarize the COPCs for the site, while IHS for soil and groundwater are defined in Section 3.2. Tier 1 vapor intrusion investigation results did not indicate contaminated soil vapor or air are present off site.

No primary sources (e.g., undocumented UST or other storage tank) remain on site, as demonstrated by the geophysical survey findings. Two secondary sources, contaminated soil and groundwater in the shallow aquifer, remain on site. Because of the volatile nature of many of the COPCs, it is postulated that the primary and much of the secondary sources of this material have dissipated, and what remains on site are the last remaining remnants of old releases, possibly from former aboveground storage tanks (ASTs) containing agricultural chemicals.

8.1 Horizontal and Vertical Contamination Extents

Contaminated soil within the site extends as far south as Phase 1 RI BH-08, as far north as Phase 3 RI BH3-27, as far east as Phase 3 RI BH3-19, and as far west as Phase 3 RI BH3-8 (**Figure B1** through **Figure B14**, Appendix A) at depths of 0-15 feet bgs. This is considered the source area, which appears to have originated from two types of releases described in the following sections.

8.1.1 Subsurface Soil Releases

It is unknown if there was a former UST at the site. The geophysical survey did not find evidence of an existing UST. Based on the history of the site and the concentrations of benzene reported in soil and groundwater in this area, it is apparent there was a petroleum release that has impacted subsurface soils.

8.1.2 Surface Soil Releases

Containers of agricultural products such as herbicides and fertilizers were filled and sold on site. Empty containers are also stored on site and based on observations of surficial staining, there is potential evidence that undocumented rinsing and other undocumented activities have occurred that have resulted in these observations of the stained unpaved ground surface.

Contaminated groundwater is likely the result of surface and subsurface soil contamination in the source area with some contribution from upgradient sources. Contaminated groundwater in the shallow aquifer extends as far south as MW-3, as far north as MW-1, as far east as MW-7, and as far west as MW-2 (**Figure C1** through **Figure C15**, Appendix A). The vertical and lateral extents of contaminated groundwater beyond these monitoring wells are unknown. Analytes have not been reported in the deep monitoring wells (MW-6D and MW-7D) with the exception of one exceedance for MCPP and arsenic, which was reported in Phase 2.5 RI. This suggests contamination may be primarily limited to the shallow aquifer. Shallow aquifer flow characterization indicates flow direction from the SGS site is east-southeast.

8.1.3 Potential Impacts to Drinking Water

The City of Sunnyside provides drinking water for the site and the surrounding area. The source of drinking water is groundwater. The city maintains eight municipal wells (Well Numbers 6 through 13).

Well No. 10 appears to be cross-gradient from the site (approximately 0.5 miles east of the site), and Well No. 6 appears to be down-gradient from the site (approximately 1 mile southeast of the site). Well No. 10 is screened at 1,202 feet bgs, and Well No. 6 is screened at 523 feet bgs, according to the City of Sunnyside 2016 Water System Plan (Sunnyside 2016).

Two deep monitoring wells, MW-6D and MW-7D, were installed off site and down-gradient from the site in 2021 to a depth of approximately 37 feet bgs to obtain groundwater data from a deeper zone below where the previously installed wells (MW-6 and MW-7) are screened. MW-6D is screened from 26 to 36 feet bgs, and MW-7D is screened from 27 to 37 feet bgs, much shallower than the municipal wells. The monitoring wells were sampled in July and September 2021 as part of Phase 2.5 RI activities. Arsenic and MCPP were reported at levels exceeding CLARC screening levels. MCPP is a common general use herbicide found in many household weed killers and lawn fertilizers. It is unknown if MCPP detections are a result of on-site activities or other herbicide activities in the area. Arsenic levels may be due to background levels in soil, which is further discussed in Section 8.1.4.1 below. No other COPCs were reported above screening levels, indicating groundwater contamination may be limited to the on-site shallow aquifer, and activities at the site are not impacting the public water drinking system.

8.1.4 Background Metals

Arsenic, barium, cadmium, and selenium were the only RCRA metals to exceed CLARC screening levels. For all metals, the CLARC screening level used for comparison was groundwater protection. In addition to screening RCRA metal levels to CLARC, results were also screened against statewide background concentrations that were developed as part of a multi-year Ecology and USGS study to determine natural background concentrations of metals in surficial soil throughout Washington State (Ecology 1994).

8.1.4.1 Arsenic

Arsenic in soil is found throughout the site with no specific focus or pattern of distribution. Concentrations exceeded CLARC screening levels in 58 of 59 total samples. Washington state-wide 90th percentile arsenic concentration is 7 mg/Kg (Ecology 1994) and the average arsenic level at the site is 7.8 mg/Kg, only slightly higher than background levels. The lowest concentration of arsenic was reported at Phase 3 RI BH3-20 at a depth of 9 to 10 feet bgs, which resulted in 2.86 mg/Kg of arsenic. BH3-20 is located in the northeast corner of the site. The highest concentration of arsenic was reported at Phase 3 RI BH3-1 at a depth of 12.5-15 feet bgs, with a result of 15 mg/Kg of arsenic. BH3-1 is located directly northwest of the warehouse building. Higher levels of arsenic (≥10 mg/Kg) were also reported off site in the soil borings from the development of MW-6D and MW-7D at depths of 8 to 12 feet bgs, indicating the presence of arsenic is possibly ubiquitous in the area and may not be a result of on-site activities alone. This is further evidenced by the arsenic exceedances in groundwater at Phase 2 BH-9, BH-10, and BH-11 (**Figure C-1** in Appendix C), which are located upgradient from the site.

8.1.4.2 Barium

Barium in soil is below background levels for the area. Barium concentrations exceeded CLARC levels in all soil samples (9 of 9 total samples). As part of the statewide study, barium background concentrations were only developed in the Spokane Basin. The 90th percentile barium concentration in the Spokane Basin is 255 mg/Kg and the average barium level at the site is 174 mg/Kg, well below the background concentration. The lowest concentration of barium was reported during the

2012 excavation of source material, which was located in the northeast corner of the site along the eastern fence line, was 140 mg/Kg. The highest concentration of barium was reported off site in the soil borings from the development of MW-7D at a depth of 8 feet bgs. The concentration at this sample was 250 mg/Kg.

8.1.4.3 Cadmium

Cadmium concentrations at the site are generally lower than background levels for the area. Cadmium concentrations exceeded CLARC levels in all soil samples (59 of 59 total samples). Washington state-wide 90th percentile cadmium concentration is 0.99 mg/Kg and the average cadmium concentration at the site is 0.45 mg/Kg, well below background levels. The lowest concentration of cadmium was reported at Phase 3 RI BH3-9 at a depth of 13-10 feet bgs, which resulted in 0.0758 mg/Kg of cadmium. BH3-9 is located northwest of the warehouse building. The highest concentration of cadmium was reported at Phase 3 RI BH3-22 at a depth of 0 to 5 feet bgs, with a result of 3.24 mg/Kg of cadmium. BH3-22 is located directly southeast of the modular office building. Higher levels of cadmium (≥1 mg/Kg) were also reported in BH3-16, which is located in the northeast corner of the site, near the north fence line, at a depth of 1 to 5 feet bgs, and at samples collected during the 2012 excavation of source material, which was located in the northeast corner of the site along the eastern fence line.

8.1.4.4 Selenium

Selenium background concentrations could not be developed as part of the statewide study because the standard detection limits used were too high (5 to 15 mg/Kg). Only 14 soil samples from the Ecology study were used to develop the 90th percentile background level of 0.78 mg/Kg using the atomic absorption analysis. Selenium concentrations at the site exceeded CLARC levels in all soil samples (9 of 9 total samples). Washington state-wide 90th percentile selenium concentration is 0.78 mg/Kg and the average selenium level at the site is 4.68 mg/Kg, above background levels (Ecology 1994). The lowest concentration of selenium was reported off site in the soil borings from the development of MW-6D at a depth of 10 feet bgs, which resulted in 3.3 mg/Kg of selenium. The highest concentration of selenium was reported samples collected during the 2012 excavation of source material, which was located in the northeast corner of the site along the eastern fence line, with a result of 5.0 mg/Kg of selenium.

8.2 Recommendations

Sufficient data has been collected through multiple investigations to complete the RI phase of the project. Therefore, it is recommended that Simplot proceed to a FS, potentially with additional data collected in the future as part of a pre-design investigation (PDI) to augment the existing data depending on the remedial action(s) selected. Elements of the FS will include evaluation of interim remedial measures, identification and initial screening of remedial alternatives, development of clean up levels and remedial action objectives, a recommended remedial alternative, and a draft cleanup action plan and schedule.

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