CLEANUP ACTION PLAN

Smith-Kem Ellensburg, Inc. Site,
Ellensburg, WA
FSID 12832256, CSID 4257

May 2023

Issued by the Department of Ecology
Under Agreed Order DE 12908

Washington Department of Ecology
Toxics Cleanup Program
Central Regional Office
Union Gap, WA

Executive Summary

This document presents the Washington State Department of Ecology's (Ecology's) draft Cleanup Action Plan (CAP) for the Smith-Kem Ellensburg Inc. (Smith-Kem) site (Site) located at 200 S. Railroad Avenue in Ellensburg, Washington. A CAP is required as part of the site cleanup process under Chapter 173-340 of the Washington Administrative Code (WAC), which is promulgated under the Model Toxics Control Act (MTCA) cleanup regulations. This draft CAP describes the Selected Cleanup Action for this Site and sets forth the requirements that the cleanup action must meet. It will be revised as appropriate by Ecology following receipt of public comment.

The Smith-Kem property (property) is zoned as "heavy industrial" and located in Kittitas County (parcel no. 226833) on approximately 2 acres with a surface covered with compacted imported gravel. The Site is bounded to the north by vacant properties and to the south by various light-industrial and other commercial businesses. To the east is the BNSF Railway Company rail yard and the rail spur that comes onto the eastern portion of the property. To the west of S. Railroad Avenue is a rural residential property that is zoned as "Residential Suburban."

The Site is relatively flat with an approximate elevation at 1,500 feet above mean sea level. The general topography of the area slopes slightly toward the south. The nearest bodies of surface water include Mercer Creek, approximately 225 feet west of the Site, and Wilson Creek, approximately 125 feet east of the Site.

Starting in the mid-1920s, Shell Oil Products US (Shell) operated a bulk fuel facility on the property and continued operations until the early 1970s. From 1948 until 1972, Shell leased a portion of the property to James R. and Jean Smith (Smiths) to conduct their agricultural products business. The Smiths operated under the Shell Chemical Company brand during that time and provided fertilizers, pesticides, and herbicides. The Smiths, and later, Smith-Kem, conducted fertilizer blending and pesticide storage at the Site until 2015. The McGregor Company began leasing the property in 2015 and operates a fertilizer blending and pesticide storage operation.

In 2008, Ecology identified the Site as a MTCA site based on an investigation that found elevated levels of total petroleum hydrocarbons (TPH) in soil and groundwater. Several investigations between 2007 and 2020 documented the presence of pesticides, chlorinated herbicides, nitrate, and ammonia in soil or groundwater in addition to TPH. Ecology entered into Agreed Order No. DE 12908 with Shell and Smith-Kem (two of the potentially liable parties for the Site) in 2016.

A Remedial Investigation (RI)/Feasibility Study (FS), which was submitted to Ecology in October 2021 and approved by Ecology in January 2022, evaluated the most appropriate cleanup action alternatives for the Site (Floyd|Snider 2021). To support the development of cleanup action alternatives in the FS, remediation levels (RELs) were developed for soil to identify the contaminant concentrations at which different cleanup actions are taken. Proposed soil RELs will result in achievement of the Remedial Action Objectives using a combination of source removal and soil containment. Four cleanup action alternatives were evaluated, which included combinations of the following:

- Excavation of surface soil and placement of an asphalt cap where concentrations in soil are greater than RELs and cleanup levels (CULs)
- Excavation of soil that exceeds direct-contact RELs, leaching RELs, and/or soil CULs
- Installation of a geosynthetic clay liner (GCL) to provide a protective barrier to remaining pesticide contamination at concentrations greater than RELs or CULs
- In situ groundwater treatment consisting of a liquid-activated carbon matrix to passively treat groundwater contamination
- Monitored natural attenuation (MNA) and groundwater monitoring
- Implementation of institutional controls (ICs), including restrictions on land use and resource use (i.e., prohibit the use of groundwater within Site boundaries, including for drinking or domestic use, irrigation, or industrial use)

Alternative 3 was identified in the FS as the Preferred Cleanup Action Alternative for the remediation of soil and groundwater at the Site because it is permanent to the maximum extent practicable, is a comprehensive cleanup action for the Site that complies with all the applicable cleanup action selection requirements under MTCA, and provides the greatest environmental benefit for the associated cost based on the Disproportionate Cost Analysis. Ecology's selected cleanup action includes the following components:

- Excavation and off-site disposal of soil in all areas of concern (AOCs) with chemical of concern (COC) concentrations greater than RELs or CULs
- Excavation to CULs in AOC 6 and an area around soil boring location FS-01
- Installation of a GCL and drainage in portions of AOC 1 and AOC 2 for protection of groundwater
- In situ groundwater treatment by injecting liquid activated carbon along the downgradient edge of AOC 5 to immobilize COCs (pesticides and TPH) in groundwater migrating from beneath the office and storage building
- Capping contaminated soil with COC concentrations greater than the RELs to protect worker direct contact exposure, including pesticide and TPH contamination beneath the office and storage building in AOC 5 and deeper TPH contamination beneath the gravel cap in AOC 4
- ICs to prohibit use of Site groundwater as drinking water or for domestic use, irrigation, or industrial use and to maintain the cap
- MNA for groundwater recovery

This executive summary was prepared for introductory purposes only, and the information provided should be used only in conjunction with the full text of this report. A complete description of the project and selected cleanup action is contained within this report.

Table of Contents

1.0 Introduction 1-1
1.1 PURPOSE 1-1
1.2 PREVIOUS STUDIES 1-2
1.3 REGULATORY FRAMEWORK 1-3
2.0 Site Description 2-1
2.1 SITE HISTORY, PROJECT BACKGROUND, AND REGULATORY OVERVIEW 2-1
2.2 HISTORICAL PROPERTY OWNERSHIP, DEVELOPMENT, OPERATIONS, AND LAND USE 2-2
2.3 GEOLOGIC AND HYDROGEOLOGIC SETTING 2-3
2.3.1 Site Geology 2-3
2.3.2 Site Hydrogeology 2-3
2.4 CONCEPTUAL SITE MODEL 2-4
2.5 AREAS OF CONCERN 2-5
3.0 Chemicals of Concern and Cleanup Standards 3-1
3.1 CHEMICALS OF CONCERN 3-1
3.2 CLEANUP STANDARDS 3-1
3.2.1 Groundwater 3-2
3.2.2 Soil 3-2
3.3 REMEDIATION LEVELS 3-4
4.0 Cleanup Action Alternatives Analysis and Selection 4-1
4.1 REMEDIAL ACTION OBJECTIVES 4-1
4.2 INITIAL SCREENING OF ALTERNATIVES 4-1
4.3 EVALUATION OF ALTERNATIVES 4-2
4.4 SELECTED CLEANUP ACTION ALTERNATIVE AND RATIONALE FOR SELECTION 4-3
4.5 MINIMUM REQUIREMENTS AND COMPLIANCE WITH MTCA 4-4
5.0 Description of Selected Cleanup Action 5-1
5.1 CLEANUP ACTION COMPONENTS 5-1
5.1.1 Soil Excavation with Off-Site Disposal 5-1
5.1.2 Geosynthetic Clay Liner 5-2
5.1.3 In Situ Groundwater Treatment 5-3

5.1.4 Groundwater Monitoring and Proposed Conditional Point of Compliance 5-3
5.1.5 Institutional Controls 5-4
5.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS 5-5
5.3 RESTORATION TIME FRAME 5-5
5.4 PROPERTY OWNERSHIP AND ACCESS 5-6
5.5 HAZARDOUS SUBSTANCES REMAINING FOLLOWING THE CLEANUP ACTION 5-6
5.6 COMPLIANCE MONITORING 5-6
5.7 CONTINGENCY ACTIONS 5-7
5.8 INSTITUTIONAL/ENGINEERING CONTROLS 5-8
5.9 SCHEDULE FOR IMPLEMENTATION 5-8
6.0 References 6-1

List of Tables

Table 1 Groundwater Chemicals of Concern, Proposed Cleanup Levels, and AOCs (embedded)
Table 2 Soil Chemicals of Concern, Proposed Cleanup Levels, POCs, and AOCs (embedded)
Table 3 Soil Chemicals of Concern and Proposed Remediation Levels (embedded)
Table 4 Cleanup Action Alternatives Summary
Table 5 Applicable or Relevant and Appropriate Requirements for the Selected Cleanup Action
Table 6 Cleanup Action Implementation Schedule (embedded)

List of Figures

Figure 1 Site Vicinity Map
Figure 2 Current Site Plan and Key Features
Figure 3 Soil and Groundwater Sample Locations and Site Boundary
Figure 4 Subject and Surrounding Property Owner-Operator Information
Figure 5 Historical Site Features
Figure 6 Conceptual Site Model
Figure 7 Areas of Concern and Site Features
Figure 8 Selected Cleanup Action Alternative

List of Abbreviations

Abbreviation	Definition
2,4-D	2,4-Dichlorophenoxyacetic acid
AO	Agreed Order
AOC	Area of concern
ARAR	Applicable or relevant and appropriate requirement
AST	Aboveground storage tank
bgs	Below ground surface
BHC	gamma-Benzene hexachloride
BNSF	BNSF Railway Company
CAP	Cleanup Action Plan
CCMP	Construction Compliance Monitoring Plan
COC	Chemical of concern
COPC	Chemicals of potential concern
CD	Consent Decree
CPOC	Conditional point of compliance
CSBC	Crushed surfacing base course
CSM	Conceptual site model
CUL	Cleanup level
CY	Cubic yard
DCA	Disproportionate Cost Analysis
DDT	Dichlorodiphenyltrichloroethane
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
FS	Feasibility Study
GCL	Geosynthetic clay liner
GMP	Groundwater Monitoring Plan
HASP	Health and Safety Plan
IC	Institutional control
LTCMP	Long-Term Compliance Monitoring Plan

Abbreviation	Definition
McGregor	The McGregor Company
MCPA	2-Methyl-4-chlorophenoxyacetic acid
µg/L	Micrograms per liter
mg/kg	Milligrams per kilogram
MNA	Monitored natural attenuation
MTCA	Model Toxics Control Act
PCUL and COPC Memo	*Development of PCULs and Identification of COPCs for Evaluation in the Remedial Investigation Report* Memorandum
PDI	Pre-design investigation
PLP	Potentially liable persons
POC	Point of compliance
property	Smith-Kem property
RAO	Remedial Action Objective
REL	Remediation level
RI	Remedial Investigation
Sage	Sage Earth Sciences
Shell	Shell Oil Products US
Site	Smith-Kem site
Smith-Kem	Smith-Kem Ellensburg, Inc.
Smiths	James R. and Jean Smith
SMP	Soil Management Plan
TEE	Terrestrial Ecological Evaluation
TPH	Total petroleum hydrocarbons
UST	Underground storage tank
VCP	Voluntary Cleanup Program
VI	Vapor intrusion
WAC	Washington Administrative Code

1.0 Introduction

This document is the Washington State Department of Ecology's (Ecology's) draft Cleanup Action Plan (CAP), which was prepared per the requirements of Agreed Order (AO) No. DE 12908 (Ecology 2016) between Ecology and the potentially liable persons (PLPs) on the AO, Shell Oil Products US (Shell) and Smith-Kem Ellensburg, Inc. (Smith-Kem). The Smith-Kem property (property) is located at 200 S. Railroad Avenue in Ellensburg, Washington (Figures 1 and 2). The Smith-Kem site (Site) has been listed in Ecology's Integrated Site Information System under Facility Site ID number 12832256 and Cleanup Site ID number 4257.

Starting in the mid-1920s, Shell operated a bulk fuel facility on the property and continued operations until the early 1970s. In 1948, Shell leased a portion of the property to Smith-Kem, a vendor of agricultural products. Shell sold the property to James R. and Jean Smith (Smiths) of Ellensburg, Washington, in 1972, and Smith-Kem continued to conduct operations on the property until March 31, 2015, when the McGregor Company (McGregor) acquired the business and assumed control of the property and several adjacent parcels as an operator. The Smiths sold the property to Ad Gro, LLC on August 5, 1996, but McGregor has had effective control of the day-to-day operations on the property since April 1, 2015.

An investigation in 2007 identified total petroleum hydrocarbons (TPH) in soil and groundwater, which led to subsequent investigations in soil and groundwater that documented elevated levels of pesticides, chlorinated herbicides, and ammonia. Based on those results, Shell and Smith-Kem were named PLPs and entered into the AO on February 29, 2016 (Ecology 2016). Remedial Investigation (RI) field activities were conducted per the AO and an Ecology-approved RI Work Plan (Work Plan; Floyd|Snider 2016) starting in 2016 and were completed in early 2020.

1.1 PURPOSE

A CAP is required as part of the site cleanup process per Washington Administrative Code (WAC) Chapter 173-340, which is promulgated under the Model Toxics Control Act (MTCA). The purpose of the draft CAP is to describe Ecology's Selected Cleanup Action (also referred to as preferred cleanup action) for a site and to provide an explanatory document for public review. In particular, this report meets the following objectives:

- Describes the Site;
- Summarizes current Site conditions;
- Summarizes the cleanup action alternatives considered in the Feasibility Study (FS) cleanup action selection process;
- Describes the Selected Cleanup Action for the Site and the rationale for selecting this alternative;
- Identifies Site-specific remediation levels (RELs), cleanup levels (CULs), and points of compliance (POC) for each hazardous substance and medium of concern for the Selected Cleanup Action;

- Identifies applicable state and federal laws for the Selected Cleanup Action;
- Identifies residual contamination remaining on the Site after cleanup and restrictions on future uses and activities at the Site to ensure continued protection of human health and the environment;
- Describes compliance monitoring requirements; and
- Presents a preliminary schedule for implementing the CAP.

Ecology has made a preliminary determination that the cleanup conducted in conformance with this CAP will comply with the requirements for selection of a cleanup action under WAC 173-340-360.

As established in WAC 173-340-200, the Site was defined in the RI report by the full vertical and lateral extent of the chemicals of concern (COCs) in soil and groundwater. The Site boundary is shown on Figure 3.

1.2 PREVIOUS STUDIES

Several investigations were conducted between 2007 and 2020 by Smith-Kem, Shell, and McGregor to assess whether TPH contamination and pesticides were present on the property. Results indicated that elevated levels of TPH, chlorinated pesticides, chlorinated herbicides, nitrate, and ammonia are present in soil and groundwater. Sampling locations from investigations between 2007 and 2020 are shown on Figure 3. The following is a list of previous investigations, which are summarized in the RI.

- In 2007, Sage Earth Sciences (Sage), on behalf of Belsaas & Smith Construction and Smith-Kem, performed a site characterization to assess TPH in soil and groundwater adjacent to the aboveground storage tank (AST) area on the property as a result of an interested purchaser inquiry (Sage 2007).
- In 2013 and 2014, Conestoga-Rovers & Associates performed site investigations and groundwater monitoring on behalf of Shell for the purpose of further assessing soil and groundwater contamination reported by Sage in 2007 (CRA 2014).
- As reported in the AO in 2014, Smith-Kem consultants Fulcrum Environmental and Nth Degree collected groundwater samples from the existing network of eight monitoring wells to investigate the presence and distribution of pesticide contamination in groundwater. A report dated August 4, 2014, indicated that groundwater samples from five of the eight monitoring wells (MW-1, MW-4, MW-6, MW-7, and MW-8) showed detections of gamma-benzene hexachloride (BHC), chlordane, endrin, endosulfan II, endrin aldehyde, and/or dieldrin (Ecology 2016).
- In April 2015, groundwater sampling was performed by Landau & Associates on behalf of McGregor to compare conditions with results of previous investigations and to establish a baseline at the start of McGregor operations at the property (Landau 2015).

- Floyd|Snider, on behalf of Smith-Kem, performed RI sampling in three phases between August 2016 and June 2018: Phase 1, Phase 2A, and Phase 2B with additional follow-up sampling completed as required by Ecology in 2019 and 2020. RI sampling was completed in accordance with the AO and WAC 173-340-350(7), which describes procedures for conducting an RI. All RI sample locations are shown on Figure 3.

Following the completion of the above investigation activities at the Site, the chemicals of concern (COCs) are adequately characterized and the conceptual site model (CSM) well-defined for the purpose of development and evaluation of remedial alternatives. The Site COCs are nitrate, nitrite, pesticides and herbicides (beta-BHC,[1] aldrin, chlordane, alpha-chlordane, total dichlorodiphenyltrichloroethane [DDT], dieldrin, toxaphene, 2,4-dichlorophenoxyacetic acid [2,4-D], 2-methyl-4-chlorophenoxyacetic acid [MCPA], atrazine, and simazine), diesel-range TPH, oil-range TPH, dioxins/furans, and lead. An RI/FS, which describes the nature and extent of the contamination and was submitted in 2021, provides the technical basis for the cleanup actions to be conducted at the Site.

1.3 REGULATORY FRAMEWORK

The Site is being managed under AO No. DE 12908, which requires the PLPs to prepare a draft CAP for the Site. The cleanup activities will be performed in accordance with all applicable or relevant and appropriate requirements (ARARs), and all appropriate permits will be obtained.

[1] In the RI/FS report, this chemical is also referred to as HCH-beta, which is a synonym for beta-BHC.

2.0 Site Description

In this document, "property" is used to refer to tax parcel 226833 (Figure 4), is located at 200 S. Railroad Avenue, and is zoned as "heavy industrial" by the City of Ellensburg (City of Ellensburg 2017; Figures 1 and 2). The property is approximately 2 acres and is bounded to the north by vacant properties and to the south by various light-industrial or commercial businesses. To the east is the BNSF Railway Company (BNSF) rail yard and the rail spur that comes onto the eastern portion of the property. To the west of S. Railroad Avenue is a rural residential property that is zoned as "Residential Suburban."

The boundary of the "Site" under MTCA is defined by where contamination has come to lie (WAC 173-340-200). The Site is defined in Section 6.0 of the RI/FS, per MTCA, and includes the property and the area surrounding the property where contamination has been confirmed, which includes a portion of the BNSF rail yard to the east and likely a small portion of the commercial property to the south (owned by Ryan Wales and referred to as the Wales property).

The property surface is covered with compacted imported gravel and is relatively flat with an approximate elevation of 1,500 feet above mean sea level. The general topography of the area slopes slightly toward the south. The nearest bodies of surface water include Mercer Creek, approximately 225 feet west of the property, and Wilson Creek, approximately 125 feet east. The surrounding City of Ellensburg, as well as most of Kittitas County, is agricultural land. A detailed description of the study area and Site setting is included in the RI/FS (Floyd|Snider 2021).

2.1 SITE HISTORY, PROJECT BACKGROUND, AND REGULATORY OVERVIEW

Upon discovery of TPH contamination during an investigation, Sage notified Ecology on July 2, 2007, that there had been a release of petroleum at the Site (Ecology 2016). Ecology subsequently reviewed the *Limited Site Characterization Report* (Sage 2007), and on May 29, 2008, Ecology site manager Richard Bassett conducted a site visit and met with the current property owner.

Following the site visit, Ecology sent a letter dated June 2, 2008, to Smith-Kem and Ad Gro recommending that the site be entered into Ecology's Voluntary Cleanup Program (VCP) or be placed under AO to characterize soil and groundwater contamination for TPH and other hazardous substances. On August 13, 2008, Ecology assigned the site a Site Hazard Assessment ranking of "3" (Ecology 2008).

The site was entered into Ecology's VCP on June 20, 2012, but was subsequently removed in October 2012 by Smith-Kem (CRA 2014). On November 15, 2012, Ecology received notification from Shell acknowledging its PLP status based on its former operation of the bulk terminal (Ecology 2016).

On March 1, 2013, Ecology notified Smith-Kem and Ad Gro of a determination of their proposed PLP status for the site (Ecology 2013). On October 31, 2014, letters were sent to Smith-Kem, Ad Gro, and Shell, notifying them all that they are PLPs under MTCA. On February 29, 2016, Shell and Smith-Kem entered into AO DE 12908 with Ecology. Although Ad Gro was notified as having potential liability under MTCA, it is not party to the AO.

The AO scope of work required the PLPs to prepare an RI Work Plan, conduct an RI, and prepare an RI report and FS report in a manner that complies with the requirements of MTCA. The RI Work Plan was completed in July 2016, and the first of three phases of the RI began in August 2016. Following the RI work, an RI/FS was prepared and submitted to Ecology in 2021 (Floyd|Snider 2021).

2.2 HISTORICAL PROPERTY OWNERSHIP, DEVELOPMENT, OPERATIONS, AND LAND USE

The following paragraphs summarize the history of ownership, development, and operations conducted on the property. A more detailed history of property operations is included in the RI/FS (Floyd|Snider 2021). Figure 5 shows the approximate locations of notable historical site features identified from Sanborn Fire Insurance maps, historical aerial photos, and previous site investigations. Additional site features, summarized below, may not be shown on Figure 5 due to limited information about precise locations of activities or structures.

Shell operated on the property as a bulk fuel distributer from approximately 1923 to 1972. According to historical property records, general operations consisted of receiving, storing, and distributing bulk fuel products, although exact details concerning unloading, storage, and operational activities are not known. Shell had at least four primary ASTs that ranged in volume from approximately 6,000 gallons to 25,000 gallons and one 600-gallon underground storage tank (UST). The ASTs were used for the storage of gasoline and diesel fuels that would come on railcars via the rail spur. A former pump house, located south of the office building, pumped fuel from the railcars into the ASTs. According to the property owner, fuel was also pumped through the aboveground product lines into holes through the roof of the office building and out to trucks for filling. Trucks would also fill their tanks by pulling up to the ASTs for direct filling. The UST was used for the storage of white gas and, later, zinc chelates.

From 1948 until 1972, Shell leased a portion of the property to the Smiths to conduct their agricultural products business. The Smiths operated under the Shell Chemical Company brand during that time and provided fertilizers, pesticides, and herbicides.

Shell's operations ceased in the early 1970s, and Smith-Kem repurposed some of the ASTs for the storage of fertilizer products. In the late 1980s, all remaining steel ASTs were replaced with ASTs made of fiberglass. The fertilizer operation expanded in the late 1970s to early 1980s, and to comply with Washington State Department of Agriculture and insurance requirements, a 70-foot-by-90-foot concrete secondary containment was constructed around the fertilizer tank farm located north of the current bulk fertilizer building (the AST containment area). During Smith-Kem operations on the property, up to six ASTs containing fertilizer products (of varying volumes), an 8,000-gallon diesel AST, and a 2,000-gallon gasoline AST were also located within the AST containment area. The diesel and gasoline ASTs were used for refueling equipment (Erickson 2016). These were installed after or concurrent with the AST containment area installation.

In 1988, the fertilizer business shifted from mostly “wet” application (i.e., anhydrous ammonia) to more “dry” application (i.e., pelletized/granular products). To accommodate the storage and mixing of fertilizers, a 5,000-square-foot building (bulk fertilizer building) was built in 1988 south of the AST containment area (Kittitas County 2015). Additionally, a designated paved wash area was constructed on the north side of the bulk fertilizer building to collect rinse water, which was stored in a polyethylene tank.

In February 1995, Smith-Kem installed a 21,000-gallon anhydrous ammonia AST, which was used until approximately 2010 when it was removed and sold.

The Smiths’ historical pesticide operations did not involve converting raw pesticide products into finished products ready for application, nor did it involve reformulating products. There are no known adjuvants, solvents, or carriers that were added to pesticides or fertilizer formulations during historical operations. Historically, pesticides were loaded onto trucks to the north of the office and storage building and to the south of the storage area, which is north of the AST containment area. In general, it is impossible to recreate an accurate product list of all herbicides and pesticides that could have been used and sold on the property given the duration and nature of the operations.

Land use at the property is currently industrial and will remain industrial based on City of Ellensburg zoning and growth plans.

2.3 GEOLOGIC AND HYDROGEOLOGIC SETTING

The geology and hydrogeology of the Site and surrounding area are particularly pertinent to the development of the CSM, the prediction of contaminant migration, and the design of the cleanup action. Therefore, the following sections provide an overview of the geology and hydrogeology, with additional detail provided in the RI/FS (Floyd|Snider 2021).

2.3.1 Site Geology

Soil borings on the property and in its vicinity identified shallow soils consisting of unconsolidated gravel and cobbles with varying amounts of sand and silt. These soils were observed from the surface to at least 20 feet below ground surface (bgs), which is the maximum depth that soils were sampled during RI activities. Silt content generally increases on the northern half of the property with layers of dark brown silt and some organic matter in shallow soils (i.e., between 0 and 5 feet bgs), which is consistent with this area being part of a floodway or wetland prior to development. This silt unit is not continuous across the property; however, varying amounts of silt in sandy and gravelly soils were observed in the top 5 feet of soils. All Site soils are considered to have been deposited as recent alluvium in the floodplain of the Yakima River.

2.3.2 Site Hydrogeology

A shallow unconfined aquifer is typically encountered on the property at depths ranging from 3 to 6 feet bgs. The annual average groundwater table is at 3.5 feet bgs, with greater depths to water (ranging between 4 and 5 feet bgs) on the BNSF property near the rail spur. This is consistent with the higher surface elevation of the BNSF property, which is approximately 1 to 1.5 feet higher than the property. The groundwater table has a shallow horizontal gradient of about 0.002 feet per foot and fluctuates throughout the year, with highs observed during early spring (March) and lows observed during late summer (August) and winter (January).

The Site is located within the Kittitas sub-basin. A 2011 report prepared by Golder Associates on behalf of the US Bureau of Reclamation on the Yakima River Basin determined that the regional groundwater flow direction within this sub-basin is generally to the south-southwest on the east side of the Yakima River (Golder 2011). The groundwater flow direction is generally south-southwest (Figure 3), and a review of other Ecology sites in the Ellensburg area (e.g., Circle K Stores 2701136, Devere & Sons Distributing, and A1 Petroleum & Propane) shows the same southwesterly regional groundwater flow direction.

Nearby surface water bodies include Mercer Creek to the west and Wilson Creek to the southeast. These creeks are approximately 225 and 125 feet away from the Site, respectively, and eventually discharge into the Yakima River, which is about 0.9 miles southwest of the Site.

2.4 CONCEPTUAL SITE MODEL

A CSM of contaminant sources and migration pathways at the Site is included as Figure 6.

Current and former Site uses, including pesticide and fertilizer handling and storage, and the historical transfer and storage of bulk petroleum fuels, resulted in contamination at the Site. Historical site features are shown on Figure 5. Potential sources of contamination include the following:

- Direct releases from equipment washing operations
- Generation of by-products during burning operations
- Direct releases from material storage, use, and handling
- Leaks and spills from equipment, tanks, and machinery
- Leaks and spills during fueling and fuel transfer operations at the rail spur or between ASTs and trucks
- Grading of the ground surface to maintain gravel surfaces
- Infiltration of precipitation and overland flow through contaminated soil, causing leaching into groundwater

As a result of these releases, the COCs are nitrate, nitrite, pesticides and herbicides (beta-BHC, aldrin, chlordane, alpha-chlordane, total DDT, dieldrin, toxaphene, 2,4-D, MCPA, atrazine, and simazine), diesel-range TPH, oil-range TPH, dioxins/furans, and lead. These releases have migrated downward from the surface through the soil to groundwater. Most contaminated soil is close to the surface, typically between 0 and 5 feet bgs, with limited areas of contamination observed down to 10 feet bgs. COCs have spread laterally in groundwater and the groundwater plumes have been largely defined.

The following sections identify COCs in both soil and groundwater and summarize the human health and environmental concerns.

A total of 11 groundwater COCs were identified based on an evaluation of data with respect to the proposed CULs defined in the RI/FS, and 12 chemicals were identified as soil COCs based on evaluation of data with respect to the proposed CULs. Therefore, soil and groundwater are the two media of concern at the Site.

Proposed groundwater CULs were developed to be protective of human health via drinking water exposure. Proposed groundwater CULs must be met at the standard POC; that is, at all wells throughout the Site to the maximum depth where contamination is present. However, per MTCA (WAC 173-340-720(8)), where it can be demonstrated that it is not practicable to meet the CULs throughout the Site within a reasonable restoration time frame using all practicable methods of treatment, Ecology may approve a conditional point of compliance (CPOC) that is as close as practicable to the source area, and typically not extending past the property boundary. The use of a CPOC is proposed as part of the Selected Cleanup Action.

Twelve chemicals were identified as soil COCs: seven legacy pesticides (aldrin, dieldrin, chlordane, alpha-chlordane, total DDT, beta-BHC, and toxaphene); two active-use pesticides (atrazine and simazine); total diesel- and oil-range TPH; dioxins/furans; and lead. The impacted soil presents the following pathways of exposure: direct contact, leaching to groundwater, and soil vapor.

The POC for ambient and indoor air is Site-wide; however, vapor intrusion (VI) from subsurface contaminants will occur only in enclosed spaces and structures. An initial VI assessment was completed in 2019 to assess whether VI posed an immediate risk to occupants of the office building onsite. The vapor sampling data obtained in 2019 indicate that TPH soil concentrations under the Office and Storage Building do not pose a significant risk to building occupants and the VI pathway is not active. Thus, soil vapor does not require active mitigation.

Under MTCA, exposure of terrestrial organisms to impacted soils must be evaluated by performing a Terrestrial Ecological Evaluation (TEE) as described in WAC 173-340-7491. For ecological risk assessment, MTCA allows the use of a site-specific POC depth per WAC 173-340-7490(4)(a). The site-specific POC developed in the RI/FS is equivalent to a depth of 0 to 6 feet bgs for the direct contact pathway protective of ecological receptors. This corresponds to the depth of the soil biologically active zone, which is assumed to extend to a depth of 6 feet bgs per WAC 173-340-7490(4)(a).

2.5 AREAS OF CONCERN

Based on the nature and extent of COCs, six areas of concern (AOCs) were defined in the RI and are summarized on Figure 7. The Site boundary is shown on Figure 3. This Site boundary includes all areas where contamination associated with Site activities has been identified at concentrations greater than the CULs, as summarized in Section 3.0.

AOCs were developed based on the nature and extent of soil COCs. A brief summary of the COCs in soil and groundwater and the depth of contamination for each AOC is presented in this section along with a description of physical features that will affect the cleanup action or design and additional pre-design data needs that may affect the boundary extent in certain AOCs. Additional data needed for each AOC is also summarized below and will be addressed in a pre-design investigation (PDI) work plan. COCs in groundwater exist outside the described AOCs. In addition, dieldrin and nitrate in groundwater extend past the property boundary at the southwest corner of the Site. Exceedances of groundwater and long-term monitoring will be addressed as part of the cleanup action. The AOCs and relevant site features are shown on Figure 7. The AOCs are summarized below, and further details are included in the RI.

AOC 1: AOC 1 contains multiple pesticides, TPH, and dioxins/furans in soil at concentrations greater than CULs to a maximum known depth of 8 feet bgs and multiple pesticides, TPH, and nitrate/nitrite in groundwater at concentrations greater than CULs. AOC 1 is along the eastern property edge and extends onto the BNSF property. Remedial actions in this AOC will need to include a buffer from the active BNSF rail spur. Elevated concentrations of pesticides are present along the northern edge of AOC 1, and additional data collection is needed to better define the northern boundary prior to design of the cleanup action.

AOC 2: AOC 2 contains multiple pesticides in soil at concentrations greater than CULs to a maximum known depth of 7 feet bgs and dieldrin and nitrate in groundwater at concentrations greater than CULs. High concentrations of dieldrin are not fully bounded in soil within AOC 2, and additional data will be collected to define the northern and southern boundaries during PDI activities. The containment area (west) and bulk fertilizer building (south) near AOC 2 define these boundaries. AOC 2 is also along the eastern property edge and extends onto the BNSF property. Remedial actions in this AOC would need to include a buffer from the active BNSF rail spur. The containment area and bulk fertilizer building constrains the southwestern boundary of AOC 2.

AOC 3: Multiple pesticides and dioxins/furans are present in AOC 3 in soil to a maximum known depth of 5 feet bgs. There are no groundwater impacts in AOC 3. Additional data collection is needed to better define the lateral extent of off-site dioxin/furan contamination along the southwestern boundary of AOC 3 prior to design of the cleanup action. AOC 3 is along the southeastern edge of the property, and remedial actions in this AOC would need to include a buffer from the active BNSF rail spur and access to the adjoining property for data collection and cleanup.

AOC 4: AOC 4 contains multiple pesticides and TPH in soil at concentrations greater than CULs to a maximum known depth of 5 feet bgs for pesticides and 9 feet bgs for TPH. Dieldrin and nitrate/nitrite in groundwater are greater than CULs in AOC 4. Elevated concentrations of dieldrin are present along the western edge of AOC 4, and additional data collection is needed to better define this boundary of AOC 4 prior to design of the cleanup action. The containment area and bulk fertilizer building constrain the eastern boundary of AOC 4.

AOC 5: AOC 5 contains multiple pesticides and TPH in soil at concentrations greater than CULs to a maximum known depth of 7 feet bgs for pesticides and TPH (TPH may extend as deep as 12 feet bgs). In groundwater, multiple pesticides, TPH, and nitrates/nitrites are present at concentrations greater than their respective CULs. Elevated concentrations of dieldrin are present in the northwest corner of AOC 5, and additional data collection is needed to better define the extent of COCs prior to design of the cleanup action. AOC 5 contains part of the office and storage building, a concrete pad for truck loading and unloading, and the northern edge of the containment area. The office and storage building is an older structure that has underlying contamination, which was considered during the evaluation of cleanup action alternatives. The containment area constrains the southern boundary of AOC 5.

AOC 6: AOC 6 is characterized by shallow dieldrin and toxaphene in soil at concentrations greater than the CULs to a maximum depth of 2.5 feet bgs. Groundwater contamination is not present in this AOC. The eastern portion of AOC 6 extends beneath the machine shop, and underlying shallow soil contamination was considered during the evaluation of cleanup action alternatives.

Additional data to refine the AOC boundaries will be collected as part of a PDI prior to submittal of the Engineering Design Report (EDR), which will detail the actions and extent of cleanup activities.

3.0 Chemicals of Concern and Cleanup Standards

This section provides a summary of the COCs and cleanup standards established for the Site.

3.1 CHEMICALS OF CONCERN

Chemicals of potential concern (COPCs) for the Site were initially identified by comparing Site data to preliminary CULs developed with direction from Ecology in 2020. The CUL development process is described in the *Development of PCULs and Identification of COPCs for Evaluation in the Remedial Investigation Report* Memorandum (PCUL and COPC Memo), which is provided as Attachment C.4 to the RI/FS (Floyd|Snider 2020). In brief, preliminary CULs are protective of all active or potentially active exposure pathways at the Site using conservative assumptions about land use and potential exposure. Any chemical that exceeded its preliminary CUL in either soil or groundwater was retained as a COPC for further evaluation in the RI/FS.

In the RI/FS, groundwater data were compared to these preliminary CULs to identify COCs. Eleven chemicals became groundwater COCs: nitrate, nitrite, eight pesticides and herbicides (beta-BHC, aldrin, chlordane, dieldrin, toxaphene, 2,4-D, MCPA, and atrazine), and diesel- and oil-range TPH.[2]

Soil data were also evaluated relative to direct contact preliminary CULs described in the RI/FS to identify COCs. Additionally, soil data for any chemical that became a COC in groundwater were compared to preliminary CULs protective of the groundwater to identify soil COCs for the leaching pathway. Twelve chemicals became soil COCs: seven legacy pesticides (aldrin, dieldrin, chlordane, alpha-chlordane, total DDT, beta-BHC, and toxaphene); two active-use pesticides (atrazine and simazine); total diesel- and oil-range TPH; dioxins/furans; and lead. Lead exceeds the proposed CUL by a factor greater than 2 times the CUL at only one location (MW-12).

3.2 CLEANUP STANDARDS

As per the cleanup standards defined under MTCA, the CUL must be attained at the POC and must consider any additional regulatory requirements that may apply (WAC 173-340-200). Proposed CULs were developed in the RI/FS for each chemical that was identified as a COC and are summarized below for soil and groundwater where the COC is present with respect to each AOC. POCs for groundwater and soil were established in accordance with MTCA (WAC 173-340-720, WAC 173-340-740, and WAC 173-340-7490(4)(a)) and are described below.

[2] In the RI, the CUL of 500 micrograms per liter (µg/L) was compared to separate fractions of diesel-range and oil-range TPH. Ecology has since required that diesel-range and oil-range TPH results be summed and compared to a CUL of 500 µg/L. The final groundwater CUL will be applied to combined diesel-range and oil-range TPH results for future assessments of groundwater quality.

3.2.1 Groundwater

Groundwater CULs were developed for each chemical that was identified as a COC in the RI/FS and are presented in Table 1. Proposed groundwater CULs are numerically equivalent to the preliminary CULs developed in the PCUL and COPC Memo (RI/FS Attachment C.4). However, the planned cleanup action will not result in groundwater meeting CULs within a reasonable restoration time frame at a standard POC. Because it has been demonstrated under WAC 173-340-350 through WAC 173-340-380 that it is not practicable to meet the CUL throughout the Site within a reasonable restoration time frame, a CPOC is appropriate and must be set as close as practicable to the source of contamination.

Table 1
Groundwater Chemicals of Concern, Proposed Cleanup Level, and AOCs

Chemical	Proposed CUL (µg/L)	AOCs Where Contamination is Present
Miscellaneous Substances		
Nitrate	10,000	Site wide
Nitrite	1,000	AOC 1, AOC 5
Legacy Pesticides		
Aldrin	0.0026	AOC 1
beta-BHC	0.049	AOC 1, AOC 5
Chlordane	2.0	AOC 1
Dieldrin	0.0055	Site wide
Toxaphene	0.80	AOC 1, AOC 5
Active Use Pesticides and Herbicides		
2,4-D	70	AOC 1
Atrazine	3.0	Site wide
MCPA	8.0	AOC 1, AOC 5
Total Petroleum Hydrocarbons		
Diesel- and Oil-range TPH	500 (1)	AOC 1, AOC 5

Note:

1 Ecology has required that diesel-range and oil-range TPH results be summed and compared to a CUL of 500 µg/L for any future assessments of TPH in groundwater. In the draft CAP, the nature and extent of TPH contamination is described separately for diesel-range and oil-range TPH across the Site.

3.2.2 Soil

Soil cleanup standards were developed to be protective of both the highest beneficial use of groundwater (as drinking water) and of human and ecological exposure via the direct contact pathway. The proposed CUL protective of the leaching pathway is referred to as the "leaching CUL." The standard POC for the leaching pathway is 0 feet bgs to the maximum depth where contamination is present. The proposed CUL protective of the direct contact pathway is referred to as the "direct contact CUL." For protection of human health, the standard MTCA POC for the direct contact pathway of 0 to 15 feet bgs is applied across the Site. For protection of ecological receptors, a site-specific POC of 0 to 6 feet bgs for the direct contact pathway is applied across the Site. The proposed CUL for each chemical considers each of these pathways along with the location and depth of contamination present at the Site, such that proposed CULs are protective of all pathways for each chemical.

Soil COCs and proposed cleanup standards are summarized in Table 2. Because legacy pesticides are generally of concern in soil relative to the leaching pathway, data for each of the legacy pesticides are used to delineate specific areas that could either be an ongoing source leaching to groundwater or risk to human health via the direct contact pathway, using empirical demonstrations of groundwater quality as appropriate for each chemical and AOC.

Table 2
Soil Chemicals of Concern, Proposed Cleanup Levels, POCs, and AOCs

Chemical	Proposed CUL (mg/kg)	Pathway/Basis of Proposed CUL	Depth of Soil that Exceeds Proposed CULs within the Point of Compliance (1)
Metals			
Lead	250	Direct Contact/MTCA Method A	AOC 4: 0–2 feet bgs (2)
Legacy Pesticides			
Aldrin	0.0067	Leaching/WAC Eq. 747-1	AOC 1: 0–7 feet bgs (3)
	0.059	Direct Contact/ MTCA Method B	AOC 2: 0–4 feet bgs AOC 5: 0–2 feet bgs
beta-BHC	0.0067	Leaching/WAC Eq. 747-1	AOC 1: 0–6 feet bgs AOC 2: 0–5 feet bgs
Chlordane	1.1	Leaching/WAC Eq. 747-1	AOC 1: 0–7 feet bgs
	2.9	Direct Contact/MTCA Method B	AOC 2: 0–4 feet bgs AOC 4: 0–1 feet bgs
alpha-Chlordane	2.9	Direct Contact/MTCA Method B	AOC 1: 0–2 feet bgs
Dieldrin	0.0067	Leaching/WAC Eq. 747-1	AOC 1, 2, 5: 0–7 feet bgs (3) AOC 4: 0–5 feet bgs
	0.063	Direct Contact/MTCA Method B	AOC 3: 0–6 feet bgs AOC 6: 0–2.5 feet bgs
Total DDT	2.9	Direct Contact/MTCA Method B	AOC 3: 0–4 feet bgs
Toxaphene	0.84	Leaching/WAC Eq. 747-1	AOC 1 and 2: 0–6 feet bgs AOC 5: 0–4 feet bgs (3)
	0.91	Direct Contact/MTCA Method B	AOC 3: 0–2 feet bgs AOC 4: 0–4 feet bgs

Chemical	Proposed CUL (mg/kg)	Pathway/Basis of Proposed CUL	Depth of Soil that Exceeds Proposed CULs within the Point of Compliance [1]
Active-Use Pesticides			
Atrazine	4.3	Direct Contact/MTCA Method B	AOC 2: 0–4 feet bgs
Simazine	8.3	Direct Contact/MTCA Method B	AOC 2: 0–4 feet bgs
Total Petroleum Hydrocarbons [4]			
Total Diesel-and Oil-Range TPH	460	Direct Contact/TEE	AOC 2: 0–6 feet bgs AOC 4: 0–6 feet bgs AOC 5: 0–6 feet bgs FS-01: 0-1 feet bgs
	2,000	MTCA Method A	AOC 4: 6–9 feet bgs [5] AOC 5: 6–12 feet bgs [5]
Dioxins/Furans			
Dioxins/Furans	0.000013	Direct Contact/MTCA Method B	AOC 3: 0–2 feet bgs

Notes:

1 This table lists the maximum depth of contamination requiring remediation for each chemical. The standard POC for the direct contact pathway is 0–15 feet bgs; the standard POC for the leaching pathway is throughout the soil column. If deeper contamination is encountered during remedial activities, the POC depth will be expanded as appropriate.

2 Lead exceeds the soil proposed CUL in two samples from two locations (FS-08 and MW-12) at a maximum depth of 2 feet bgs. Deeper samples at each location bound the depth of contamination. The Ecology-approved data gaps memorandum concludes that lead contamination is bounded at a depth of 2 feet bgs based on detected results collected site wide.

3 Maximum depth of contamination will be confirmed as necessary during remedial design.

4 The proposed CULs for TPH are protective of the direct contact and leaching pathways. The POC for the TEE criterion of 460 mg/kg is 0 to 6 feet bgs. The POC for the MTCA Method A criterion of 2,000 mg/kg is 0 to 15 feet bgs.

5 TPH contamination exceeding the MTCA Method A criterion (direct contact criterion for protection of human health) by a factor greater than 2 is present in soil deeper than 6 feet bgs. The depth of contamination in this AOC reflects the standard MTCA POC for protection of human health.

Abbreviation:

mg/kg Milligrams per kilogram

3.3 REMEDIATION LEVELS

In accordance with WAC 173-340-200, a REL “means a concentration of a hazardous substance in soil, air, water, or sediment above which a particular cleanup action component will be required as part of a cleanup action at a site.” RELs are, by definition, concentrations that exceed cleanup standards and can be used when a combination of cleanup action components are necessary to achieve CULs at a POC. RELs may also be used where soil containment (i.e., under a cap) is part of the cleanup action alternative; therefore, components of the Selected Cleanup Action will use RELs to meet the cleanup standards at a POC. A cleanup action that uses RELs must meet the requirements of MTCA, including a cleanup action that uses permanent solutions to the maximum extent practicable and provides for a reasonable restoration time frame. Soil RELs were established for some COCs in the FS for the Selected Cleanup Action. Groundwater RELs are not proposed at the Site.

Soil RELs for select Site COCs are presented in Table 3.

Table 3
Soil Chemicals of Concern and Proposed Remediation Levels

Chemical	Proposed REL (Leaching) mg/kg	Proposed REL (Direct Contact) mg/kg
Legacy Pesticides		
Aldrin	0.13	0.43
beta-BHC	0.13	--
Chlordane	22	21
alpha-Chlordane	--	21
Dieldrin	0.13	0.46
Total DDT	--	22
Toxaphene	17	6.7
Active-Use Pesticides		
Atrazine	--	32
Simazine	--	61
Total Petroleum Hydrocarbons		
Diesel-range TPH	3,800	--
Oil-range TPH	8,700	--
Dioxins/Furans		
Dioxins/furans	--	0.000094

Note:
-- Not applicable

The proposed RELs, in combination with institutional controls (ICs), will achieve the long-term goal of compliance with the groundwater CULs at the CPOC.

During engineering design, a Long-Term Compliance Monitoring Plan (LTCMP) will be developed that meets the requirements of WAC 173-340-410. In this plan, cleanup action and monitoring requirements will be evaluated where soil RELs are used. Performance and confirmation monitoring will be developed during engineering design and reported in the EDR.

4.0 Cleanup Action Alternatives Analysis and Selection

Remedial technologies were reviewed and considered to address both soil and groundwater contamination at the Site and to meet the Remedial Action Objectives (RAOs). A preliminary technology screening was completed in the RI/FS to eliminate technologies that do not meet RAOs applicable to the Site, are not technically feasible, or do not address the types of contamination present.

This section identifies the RAOs and summarizes the retained remedial technologies for cleanup of the site-specific COCs for soil (lead, aldrin, beta-BHC, chlordane, dieldrin, total DDT, toxaphene, atrazine, alpha-chlordane, simazine, diesel-range TPH, oil-range TPH, and dioxins/furans) and groundwater (nitrate, nitrite, aldrin, beta-BHC, chlordane, dieldrin, toxaphene, 2,4-D, atrazine, MCPA, diesel-range TPH, and oil-range TPH).

4.1 REMEDIAL ACTION OBJECTIVES

RAOs for the Site were developed in the RI/FS to specifically identify goals that should be accomplished to meet the minimum requirements of the MTCA cleanup regulations (WAC 173-340). RAOs define the objectives that must also be met by the cleanup action to ensure substantive compliance with ARARs. RAOs for the Site include the following:

- Remediate soil and groundwater to protect human and ecological receptors from exposure to Site contamination that exceeds applicable CULs.
    - Remove unacceptable human health risk resulting from direct contact with contaminated soil or groundwater.
    - Remove unacceptable potential human health risk from consumption of drinking water.
    - Remove unacceptable future potential human health risk from indoor VI of TPH contamination.
- Comply with local, state, and federal laws (ARARs; WAC 173-340-710) and site-specific cleanup standards.
- Provide compliance monitoring to evaluate the effectiveness of the Selected Cleanup Action and to determine that the cleanup standards are met.
- Remediate contaminants in a method that does not interfere with or restrict proposed future use of the Site as an industrial parcel.

4.2 INITIAL SCREENING OF ALTERNATIVES

A preliminary screening of the remedial technologies was completed in the FS in accordance with WAC 173-340-350(8)(b). The objective of the screening was to remove technologies from further evaluation if they clearly did not meet the minimum requirements of the RAOs or had a disproportionate cost based on the Site conditions. Based on this preliminary screening step completed in the FS, the following technologies were retained for further consideration as part of the proposed alternatives in the FS:

- ICs
- Monitored natural attenuation (MNA)
- Engineering controls
- Surface capping
- Source removal by excavation and landfill disposal
- In situ groundwater treatment

The above retained technologies were evaluated for each AOC and then aggregated into four Site-wide alternatives (Alternatives 1 through 4) in the FS. Additional details on all the technologies evaluated are in the FS.

4.3 EVALUATION OF ALTERNATIVES

The retained technologies were aggregated into four cleanup action alternatives for soil and groundwater contamination at the Site and compiled into Site-wide alternatives. Each alternative was evaluated to determine a preferred alternative (Selected Cleanup Action) and the details of the evaluation process and components are included in Sections 9.0 through 12.0 of the RI/FS. The alternatives are summarized in Table 4 and include the following elements:

Elements Common to All Alternatives

- MNA of groundwater and establishment of a long-term Groundwater Monitoring Plan (GMP).
- ICs for contamination remaining in place beneath permanent site features.
- Establishment of a CPOC along the downgradient (southwest) property boundary.
- Excavation to CULs in AOC 6 and around FS-01.

Alternative 1

- Excavate a minimum of 1 foot of soil everywhere onsite south of AOC 6 and replace with an asphalt cap including installation of a stormwater conveyance and treatment system.
- Maintain the office and storage building as a cap to underlying contaminated soil.

Alternative 2

- Remove soil with COC concentrations greater than commercial worker direct contact RELs for pesticides and dioxins/furans[3], RELs for TPH, and CULs for other COCs (lead and pesticides without established RELs).

[3] If pre-design data show that contamination in AOC 3 extends off-property, then excavation off-property will be designed to meet CULs

- Cap contaminated soil with pesticide concentrations greater than leaching RELs (portions of AOC 1 and AOC 2 and throughout AOC 4) with a geosynthetic clay liner (GCL) that will include stormwater conveyance features to direct infiltrated precipitation to respective drainage trenches, which will drain to a single collection manhole.
- In situ groundwater treatment of liquid activated carbon matrix along the downgradient edge of AOC 5.
- Maintain the office and storage building as a cap to underlying contaminated soil.

Alternative 3

- Remove soil with COC concentrations greater than leaching RELs for pesticides, RELs for TPH and dioxins/furans and CULs for other COCs (lead and pesticides without established RELs).
- Cap contaminated soil with pesticide concentrations greater than leaching CULs in areas with exceedances of groundwater CULs (portions of AOC 1 and AOC 2) with a GCL that will include stormwater conveyance features to direct infiltrated precipitation to respective drainage trenches, which will drain to a single collection manhole.
- In situ groundwater treatment of liquid activated carbon matrix along the downgradient edge of AOC 5.
- Maintain the office and storage building as a cap to underlying contaminated soil.

Alternative 4

- Remove soil with COC concentrations greater than CULs to the maximum extent practicable for all COCs. The office and storage building would be demolished to access contaminated soil beneath the building.

4.4 SELECTED CLEANUP ACTION ALTERNATIVE AND RATIONALE FOR SELECTION

Each of the four alternatives were screened using mandatory MTCA threshold requirements provided in WAC 173-340-360(2)(a) and other MTCA requirements for evaluation described in WAC 173-340-360(2)(b). These four alternatives were also evaluated according to the MTCA Disproportionate Cost Analysis (DCA) procedures (WAC 173-340-360(3)(e)) to compare the costs and benefits of the cleanup alternatives and identify the alternative that is permanent to the maximum extent practicable.

Following consideration of the FS and technical consultations, Ecology has determined that Alternative 3 is the Selected Cleanup Action for the Site. Alternative 3 provides the greatest environmental benefit for the associated cost based on the DCA presented in the FS. The Selected Cleanup Action for the remediation of soil and groundwater at the Site meets Site RAOs (summarized in Section 4.1) and provides the greatest level of environmental benefit per dollar spent, making it the most permanent cleanup action to the maximum extent practicable. The Selected Cleanup Action also meets the MTCA threshold requirements described in Section 4.5.

The Selected Cleanup Action includes the following activities that will be applied to AOCs at the Site, as shown on Figure 8. The key cleanup elements are:

- Excavation and off-site disposal of soil in AOCs 1 through 5 with COC concentrations greater than the following:
  - Leaching-based RELs for pesticides
  - RELs for TPH and dioxins/furans[4]
  - CULs for lead and pesticides without an established REL
- Excavation and off-site disposal of soil in AOC 6 and the area around FS-01 to CULs
- Installation of a GCL and drainage in portions of AOC 1 and AOC 2 where soil remains in place at depth with concentrations greater than the leaching CUL
- In situ groundwater treatment by injecting liquid-activated carbon along the downgradient edge of AOC 5 to immobilize contaminants (pesticides and TPH) in groundwater migrating from beneath the office and storage building
- Capping contaminated soil with COC concentrations greater than the RELs to protect worker direct contact exposure, including pesticide and TPH contamination beneath the office and storage building in AOC 5 and deeper TPH contamination beneath the gravel cap in AOC 4
- ICs prohibiting use of Site groundwater as drinking water or for domestic use, irrigation, or industrial use and maintaining the cap
- MNA for groundwater recovery and implementation of a GMP

4.5 MINIMUM REQUIREMENTS AND COMPLIANCE WITH MTCA

The FS included an evaluation of compliance with the minimum requirements set forth in WAC 173-340-360(2)(a) through WAC 173-340-360(2)(f). The Selected Cleanup Action, Alternative 3, is a comprehensive final remedy that complies with all the applicable cleanup action selection requirements under MTCA. Specifically, the Selected Cleanup Action meets the minimum requirements under WAC 173-340-360(2)(a) as follows:

- **Protects Human Health and the Environment.** The Selected Cleanup Action will protect human health and the environment in both the short and long term. The cleanup action will permanently reduce the identified risks presently posed to human health and the environment through a combination of source area removal, in situ groundwater treatment, capping, ICs, and natural attenuation.

[4] If pre-design data show that contamination in AOC 3 extends off-property, then excavation off-property will be designed to meet CULs.

- **Complies with Cleanup Standards.** The Selected Cleanup Action is expected to comply with the cleanup standards for soil at the POCs and for groundwater at the CPOCs within a reasonable time frame.
- **Complies with Applicable State and Federal Laws.** The Selected Cleanup Action is expected to comply with all state and federal laws and regulations.
- **Provides Compliance Monitoring.** The Selected Cleanup Action will include compliance monitoring for soil and groundwater to assess the effectiveness and permanence of each element of the cleanup action.

The Selected Cleanup Action also meets the other requirements under WAC 173-340-360(2)(b), as follows:

- **Uses Permanent Solutions to the Maximum Extent Practicable.** The Selected Cleanup Action uses excavation, capping, installation of a GCL, and in situ groundwater treatment, which will remove, treat, or immobilize a large portion of the existing contaminant mass in the subsurface and effectively protect groundwater and prevent contaminant migration off-property.
- **Provides for Reasonable Restoration Time Frame.** The restoration time frame for groundwater at the CPOC is expected to be 10 years from completion of construction.
    - RELs, and to an extent CULs, for soil COCs are expected to be met following completion of soil excavation, which is expected to take approximately 2 months from the start of construction.
- **Considers Public Concerns.** This draft document is being presented to the public and stakeholders for public review and comment. The RI/FS report is also available to the public. Any comments received during the public comment period will be reviewed by Ecology prior to issuance of a final CAP and addressed in a responsiveness summary. The final CAP will incorporate modifications, as needed, based on public comment.

Because this cleanup action relies on a CPOC due to the impracticality of attaining CULs throughout the Site, it is not considered a permanent groundwater cleanup action under WAC 173-340-360(2)(c)(i). However, the Selected Cleanup Action does meet the following requirements for nonpermanent groundwater cleanup actions under WAC 173-340-360(2)(c)(ii):

- **Treatment or Removal of the Source.** Source area soil will be treated and removed in all AOCs, and the installation of a GCL and drainage in portions of AOC 1 and AOC 2 will help protect groundwater from any remaining soil sources.

5.0 Description of Selected Cleanup Action

The cleanup action proposed by Ecology for implementation at the Site is shown on Figure 8 and is a combination of multiple components, which are described in detail below. More specific plans will be developed in the EDR, which will be prepared after conducting a PDI and prior to implementation of the cleanup action.

5.1 CLEANUP ACTION COMPONENTS

The cleanup action is comprised of soil excavation with off-site disposal, installation of a GCL, in situ groundwater treatment, MNA for groundwater, and ICs, as described below.

5.1.1 Soil Excavation with Off-Site Disposal

Contaminated soil will be removed from all of the AOCs and an area around FS-01 (Figure 8), using standard excavation methods. Excavated soil will be transported to a Subtitle C or a permitted Subtitle D landfill for disposal, as appropriate, based on the soil data and the criteria in WAC 173-303. Excavated areas will be backfilled with clean imported fill and restored with a gravel surface. Prior to final surfacing, a GCL will be installed beneath AOC 1 and AOC 2 (see Section 5.1.2). Removal of contaminated soil to proposed CULs or RELs is anticipated to bring groundwater into compliance with proposed CULs at the proposed CPOC within a 10 year restoration time frame. Prior to initiating excavation, monitoring wells located within the excavation/shoring footprint will be decommissioned per WAC 173-160-460 (Figure 8). Wells to decommission may include MW-4, MW-5, MW-7, MW-8, MW-11, MW-12, and MW-13. The specific wells to be abandoned and potentially replaced will be finalized in consultation with Ecology after the PDI activities and detailed in the EDR.

Specific details regarding excavation is described below. Actual excavation limits may differ from the depths or lateral dimensions specified to remove soils with COC concentrations greater than applicable CULs or RELs, as determined by future compliance sampling. The current scope of the Selected Cleanup Action is based on the data presented in the RI/FS report (Floyd|Snider 2021). Several areas will include additional data collection as part of the PDI, as indicated in the text italicized below.

- **AOC 1:** Soil will be excavated in three zones to remove pesticides, TPH, and dioxins/furans to the applicable RELs or CULs. The western zone will be excavated to 5 feet bgs, the center zone will be excavated to 8 feet bgs, and the eastern zone will be excavated to 4 feet bgs. Dewatering and shoring or lay back of side slopes may be necessary to complete the excavation. The total estimated volume of soil removal from AOC 1 is 850 cubic yards (CY). *Additional pre-design data collection will likely be required to define the northern AOC 1 boundary between AOC 1 and the machine shop.*
- **AOC 2:** Soil from this area will be excavated from two zones to remove pesticides at concentrations greater than the applicable RELs or CULs. A small footprint in the southern portion of AOC 2 will be excavated to 6 feet bgs, and the remaining area will

be excavated to 4 feet bgs. Approximately 530 CY of soil will be removed in total. Dewatering and shoring are not anticipated to be necessary to complete the excavation. *Additional pre-design data collection will likely be required to define the northern and southern edges of AOC 2.*

- **AOC 3:** Soil will be excavated to remove pesticides and dioxins/furans at concentrations greater than the applicable RELs or CULs to a depth of 2 feet bgs. The total estimated volume of soil removal from AOC 3 is 220 CY. Dewatering and shoring are not anticipated to be necessary to complete the excavation. *Additional pre-design data collection will likely be required to define the southwestern edge of AOC 3 where shallow dioxins/furans have not been fully delineated.*
- **AOC 4:** Excavation in AOC 4 will remove soil with pesticides, TPH, and lead at concentrations greater than the applicable RELs and CULs to a depth of 5 feet bgs corresponding to a total estimated volume of 860 CY of soil removed. Dewatering and shoring are not anticipated to be necessary to complete the excavation. *Additional pre-design data collection will likely be required to define the western AOC 4 boundary.*
- **AOC 5:** Excavation in AOC 5 will remove TPH and pesticides at concentrations greater than the applicable RELs and CULs to a depth of 5 feet bgs. The total estimated volume of soil removal from AOC 5 is 60 CY. Dewatering and shoring are not anticipated to be necessary to complete the excavation.
- **AOC 6:** Surface exceedances of pesticide CULs will be removed from AOC 6 to a depth of 2.5 feet bgs. The total estimated volume of soil removal from AOC 6 is 50 CY. Dewatering and shoring are not anticipated to be necessary to complete the excavation.
- **FS-01:** Approximately 10 CY of surface soil will be excavated around the boring location FS-01 to remove TPH at concentrations greater than the CUL.

5.1.2 Geosynthetic Clay Liner

A GCL would be installed in portions of and around AOC 1 and AOC 2 (15,650 square feet) to provide additional protection of groundwater in this area with the greatest concentrations of COCs in groundwater. The intent of the GCL is to minimize infiltration into groundwater, which will control plume migration and provide an added source control in high-traffic, ongoing bulk fertilizer operational areas. The GCL would be extended beyond the area of known contamination as an added protective measure. The surface layer will be excavated in areas where the GCL will be placed outside excavation footprints to an approximate depth of 1.5 feet bgs. The GCL will be installed with multiple layers of gravel and geosynthetic material to provide structure and security against accidental breaches. A cross-section of the GCL installation is shown on Figure 8. Composite gravel and liner recommendations were developed based on experience with similar projects and conversations with GCL manufacturers.

Prior to installing the GCL, a 4-inch layer of sand would be placed and compacted to provide a level base. The GCL would be installed over the sand in the footprint shown on Figure 8. The GCL can be purchased as premade rolled mats, which can be efficiently unrolled over the area and hydrated to expand in place. The GCL will be covered with 4 inches of crushed surfacing base course (CSBC), a 10-ounce high-visibility (orange-colored) geosynthetic fabric, and a second 4-inch layer of CSBC to provide structural integrity to the GCL. A 6-ounce high-visibility indicator layer will be placed over the CSBC and is intended as a visual cue to warn operators before more critical underlying fabrics are damaged. The final and top/surface layer will consist of a minimum of 4 inches of CSBC to restore the surface grade elevation. Periodic repairs to the gravel surface will be necessary as part of the long-term operations, maintenance, and monitoring. Specific inspection and maintenance requirements will be included in a Soil Management Plan (SMP), which will be included in the LTCMP.

The GCL will be constructed with a gentle slope to direct infiltrated water to a drainage trench along the eastern property boundary. This trench would have a perforated underdrain within the GCL footprint and would be filled with gravel to convey surface runoff and shallow subsurface flow from above the GCL. Outside of the GCL footprint, the conveyance lines would be solid conveyance pipe to prevent exfiltration of collected surface water to other areas of the Site.

Collected infiltrated water would be conveyed to a single collection manhole in the southeastern corner of the facility to provide pretreatment of water by encouraging sedimentation. Following pre-treatment, water will infiltrate into a swale that will be created at the existing culvert and surrounding riprap area in the southeastern corner of the Site, shown on Figure 7. Final location will be determined as a part of the final design. Overflow water may go toward an existing culvert at the adjacent property line.

5.1.3 In Situ Groundwater Treatment

In situ groundwater treatment will be conducted along the downgradient western edge of AOC 5 to address TPH and pesticides at concentrations greater than respective CULs in groundwater migrating from beneath the office and storage building. A proprietary mixture of liquid activated carbon, such as PlumeStop, will be injected under low pressure into the subsurface using a direct push drill rig to provide even distribution within the target groundwater treatment zone (which is expected to be 5 to 15 feet bgs). The colloidal matrix will coat soil particles to increase the adsorption of groundwater contaminants and act as a passive treatment zone to immobilize contaminants and passively treat groundwater as it flows downgradient.

5.1.4 Groundwater Monitoring and Proposed Conditional Point of Compliance

MNA for groundwater is a component of the Selected Cleanup Action after the removal of the soil source contamination. As part of MNA, groundwater monitoring will be required after cleanup action implementation throughout the groundwater plume to document that natural attenuation is occurring and to evaluate groundwater concentration trends. The GMP will describe long-term post-construction groundwater monitoring and adaptive management to ensure the long-term protectiveness of the Selected Cleanup Action, and the GMP will detail the process for the MNA evaluation. In addition, a monitoring well network will be established as part of the GMP that will include locations for performance monitoring for the components of the cleanup action (e.g., excavation, in situ groundwater treatment, and MNA). Selected monitoring wells located in source areas (e.g., MW-4) may be replaced post-cleanup to evaluate performance of the cleanup action. Additional wells may be installed for performance and compliance monitoring, as warranted based on post-cleanup conditions and in consultation with Ecology. Groundwater compliance will be determined based on a comparison of groundwater data to proposed CULs at the proposed CPOC.

A CPOC is recommended for this Site because of widespread pesticide and nitrate/nitrite contamination; multiple COCs in groundwater exceed their respective CULs by an order of magnitude or more and are not technically feasible to naturally attenuate within a reasonable restoration time frame. The maximum compliance result of dieldrin in groundwater was 0.88 µg/L at MW-04, which is 160 times the proposed groundwater CUL of 0.0055 µg/L. Nitrate, which is a COC only in groundwater had a maximum compliance result of 220,000 µg/L at MW-06, which is more than 20 times the proposed CUL of 10,000 µg/L. These CULs are based on protection of groundwater as drinking water; the use of groundwater as drinking water will be prohibited on the property by the proposed ICs.

Consistent with WAC 173-340-720(8)(c), the proposed CPOC for groundwater is as close as practicable to the source of contamination, along the western edge of the property (refer to Figure 8). Compliance at the CPOC would be measured by direct sampling of groundwater in monitoring wells that are along this boundary. Existing monitoring wells MW-2, MW-3, MW-10, MW-12, and MW-14 provide the basis for the proposed CPOC. Additional monitoring wells may be added to the monitoring well network, as needed and in consultation with Ecology, to demonstrate compliance. The post-cleanup action monitoring well network will be defined in the GMP, which will be prepared as part of the LTCMP. Well decommissioning and replacement activities will be proposed in the EDR after the PDI activities.

5.1.5 Institutional Controls

ICs, in the form of an environmental covenant, will be required for the property and will require a deed restriction that restricts future uses of the property. ICs will prohibit the use of groundwater as drinking water at the property. ICs will also prohibit the use of groundwater for domestic use, irrigation, or industrial use. ICs will also require implementation of an Ecology-approved SMP specifying soil management procedures for future subsurface work in areas where contamination at concentrations greater than CULs is present. The SMP, which will be prepared as part of the LTCMP, will define specific source areas and depths where soil contamination that remains in place at concentrations greater than proposed CULs would limit land use. Any activities that would be proposed within these restricted areas will require compliance with the SMP, which will outline health and safety protocols along with soil handling, management procedures, and notification requirements. The SMP will include measures for routine inspection and maintenance of remedial elements such as the GCL and monitoring wells. These procedures will be applicable to any future development or maintenance that involves ground-disturbing activities. The SMP will also outline procedures if existing structures are removed in the future that may have potential subsurface contamination at concentrations greater than CULs (refer to

Section 5.7 for potential contingency actions). Where an environmental covenant is required, Ecology will, in consultation with the property owner, prepare the environmental covenant consistent with WAC 173-340-440, RCW 64.70, and Attachment A of Toxics Cleanup Program Procedure 440A.

5.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

In the RI/FS, an evaluation of the ARARs was completed for each cleanup alternative. Compliance with ARARs is a minimum requirement for cleanup actions. ARARs are often categorized as location-specific, action-specific, or chemical-specific, as described below. The ARARs for the Selected Cleanup Action are summarized in Table 5.

- **Location-Specific ARARs** are requirements that are applicable to the specific area where the Site is located and can restrict the performance of activities, including cleanup actions, solely because they occur in specific locations.
- **Action-Specific ARARs** are requirements that are applicable to certain types of activities that occur, or technologies that are used during the implementation of cleanup actions. Waste disposal regulations are an example of an action-specific ARAR.
- **Chemical-Specific ARARs** are applicable to the types of contaminants present at the Site. The cleanup of contaminated media at the Site must meet the proposed CULs developed under MTCA; these CULs are considered chemical-specific ARARs.

The Selected Cleanup Action complies with all applicable ARARs. Location-specific ARARs will be met through compliance with all applicable state and federal regulations based on the physical location of the Site. Action-specific ARARs will be met through implementation of construction activities in compliance with all applicable construction-related requirements such as disposal for excavated soil. Chemical-specific ARARs will be met through compliance with proposed CULs and RELs.

The cleanup actions will be conducted under a Consent Decree (CD) or AO with Ecology and is exempt from the state and local ARAR procedural requirements, such as permitting and approval requirements. However, all applicable permits required to conduct the cleanup actions will be determined and obtained following the PDI activities and submittal of the EDR.

5.3 RESTORATION TIME FRAME

RELs, and to an extent CULs, for soil COCs are expected to be met following completion of soil excavation, which is expected to take approximately 2 months from the start of construction. ICs and an SMP will be implemented to manage future exposures. The restoration time frame for groundwater at the CPOC is expected to be 10 years from completion of construction.

Performance monitoring will consist of semiannual groundwater monitoring. This monitoring will assess COC concentrations for up to 10 years after remedial activities have been completed. The final confirmation monitoring will be performed on a quarterly basis for one year or four quarters. The trigger to initiate quarterly compliance sampling will begin when the trends in groundwater contaminant concentrations are stable or decreasing and the contaminant concentrations reach the applicable cleanup levels for the COCs at the points of compliance. Specific details for long-term groundwater monitoring will be included in a GMP. The GMP will describe post-construction groundwater monitoring and adaptive management to ensure the long-term protectiveness of the remedy and will be part of a LTCMP for the Site, which will be prepared as part of engineering design.

5.4 PROPERTY OWNERSHIP AND ACCESS

The property is currently owned by Ad Gro and has been leased to McGregor since 2015. McGregor uses the property to conduct its agricultural product distribution business and they are responsible for all current operations at the facility. Cleanup action implementation will need to be closely coordinated with McGregor (or with the current tenant if McGregor terminates their lease) to minimize disruption to their operations.

The Selected Cleanup Action would involve pre-design sample collection to define the southern boundary of AOC 3 and, depending on the results, potential excavation on the southern adjacent Wales property currently occupied by Habitat for Humanity. An access agreement would need to be obtained from the property owner prior to any work on that property.

In addition, there is a BNSF rail spur located along the eastern property boundary. Cleanup along the rail spur will either require offset to accommodate a standard buffer from the rail for protection, or a permit will need to be obtained from BNSF to conduct cleanup actions immediately adjacent to the rail.

5.5 HAZARDOUS SUBSTANCES REMAINING FOLLOWING THE CLEANUP ACTION

The majority of soil containing COCs will be excavated except for areas beneath the cap, which include the office and storage building in AOC 5, which covers TPH- and pesticide-contaminated soil, and the new gravel surface in AOC 4, which covers deeper TPH-contaminated soil. The SMP will document the areas where soil COCs remain in place above CUL and will be part of a LTCMP for the Site.

The proposed technologies will serve to remove source material and block infiltration of stormwater in areas with the greatest concentrations of these COCs in groundwater; however, these substances will remain in groundwater until natural attenuation occurs.

5.6 COMPLIANCE MONITORING

Compliance monitoring to ensure the protectiveness of the Selected Cleanup Action will be implemented in accordance with WAC 173-340-410, Compliance Monitoring Requirements. Detailed monitoring elements for construction will be described in a Construction Compliance Monitoring Plan (CCMP), which will be prepared as part of remedial design. The CCMP will include a Health and Safety Plan (HASP), Sampling and Analysis Plan, and Quality Assurance Project Plan for monitoring and sample collection during remedy implementation. The CCMP will be included as an appendix to the EDR, which will describe the approach and criteria for the engineering design of soil and groundwater cleanup actions at the Site. A post-cleanup LTCMP will describe required long-term operations, maintenance, and monitoring after implementation of the cleanup action to ensure the long-term protectiveness of the cleanup action, and it will include a GMP, SMP, and an updated HASP.

The objectives of compliance monitoring, as stated in WAC 173-340-410, are as follows:

- **Protection Monitoring** is used to evaluate whether human health and the environment are adequately protected during construction of the Selected Cleanup Action and post-construction monitoring. Protection monitoring requirements will be described in Site-specific HASPs that address worker activities during remedy construction and post-construction monitoring.
- **Performance Monitoring** is used to confirm that the Selected Cleanup Action has attained cleanup standards and other performance standards. Performance monitoring will be conducted throughout each phase of construction to document that cleanup goals are being achieved. For example, selected monitoring wells located in source areas (e.g., MW-4) may be replaced post-remedy to evaluate remedy performance.
- **Confirmational Monitoring** is used to confirm the long-term effectiveness of the cleanup action. Confirmation monitoring will include long-term monitoring to document that CULs continue to be attained.

5.7 CONTINGENCY ACTIONS

Contingency actions may be required if additional risk reduction measures are needed after cleanup action implementation. Specific details regarding contingency actions will be outlined in the EDR, and contingency action triggers will be updated, as needed, after cleanup action implementation in the LTCMP. The contingency measures for the Site are anticipated to include the following:

- Source control efforts to control potential ongoing nitrate and nitrite contributions to groundwater associated with current fertilizer handling operations. There are no data that quantify the ongoing contribution from current operations; therefore, it will be important to assess the potential for ongoing contributions post-cleanup. Following installation of the GCL, surface water that infiltrates to the GCL will be conveyed to a collection manhole at the southeastern property line. Water that is conveyed to this manhole can be sampled to determine if an ongoing nitrate/nitrite source exists. If it is determined that fertilizer handling onsite is an ongoing source of nitrate/nitrite in groundwater and post-cleanup groundwater concentrations of nitrate/nitrite are not adequately improving, as measured at the proposed CPOC, then a contingency source control evaluation will be done to propose additional best management practices for the Site.

- Pesticide and TPH contamination are present in soil beneath the office and storage building. If future property development includes removal of this building, then excavation may be necessary to remove contaminated soil beneath this structure. Specific details regarding this contingency will be included in the SMP.
- The southern boundary of AOC 5 and the western boundary of AOC 2 have not been fully delineated due to the presence of the AST containment area. If future property development includes removal of the AST containment area, then additional investigation may be necessary to determine if contamination is present beneath this structure, which could warrant excavation. Investigation and evaluation details regarding this contingency will be included in the SMP.

5.8 INSTITUTIONAL/ENGINEERING CONTROLS

Institutional or engineering controls are a necessary component of the remedial design. Specific ICs for the Site would include restrictions on land use, resource use (i.e., prohibit the use of groundwater within Site boundaries as drinking water, domestic water, irrigation, or industrial uses), and provisions for maintaining the GCL as a barrier to subsurface soil contamination, if warranted. In addition, as stated in Section 5.1.5, an SMP would be prepared as part of the ICs to identify where contaminated soil remains onsite. Any activities that would be proposed within these restricted areas would require compliance with the SMP, which would outline health and safety protocols along with soil handling and management procedures. The SMP will also provide details for routine inspection and maintenance of remedial elements (such as the cap, the drainage system, and monitoring wells) and will be part of the LTCMP for the Site.

5.9 SCHEDULE FOR IMPLEMENTATION

Table 6 below presents the anticipated schedule for the remaining project design milestones, project implementation, completion reporting, and long-term groundwater monitoring. Cleanup actions conducted under a CD or AO with Ecology are exempt from the state and local ARAR procedural requirements; however, a SEPA checklist will be developed and submitted for public comments after the public comment period and finalization of the CAP. Any additional permits that may be required, such as Site Development Permit or Critical Area Determination Waiver, will be developed and submitted during the preparation of the EDR. The following estimated durations are provided for discussion and planning purposes only:

Table 6
Cleanup Action Implementation Schedule

Implementation Step	Estimated Duration
Submit Public Review Draft CAP to Ecology	Within 45 calendar days of receipt of Ecology’s Comments on the Agency Review Draft CAP
Public Comment Period for Draft CAP	30 days

Implementation Step	Estimated Duration
Finalize and Submit Final CAP	Within 45 calendar days of receipt of Ecology's comments on the Public Review Draft CAP
Draft PDI Work Plan	Within 90 Days of effective date of CD or AO
Finalize PDI Work Plan	30 days after receipt of Ecology's final comments
Implement PDI	Initiate within 45 days of Ecology approval of final PDI Work Plan
Preparation of a Draft EDR and PDI Results	Within 180 days of effective date of CD or AO
Finalize EDR and preparation of all applicable permits	90 days after receipt of Ecology final comments
Remedial Action Construction; assume duration of 3 to 4 months, summer months only	Initiate within 120 days of Ecology approval of the EDR or after permit acquisition and contractor notice to proceed
Submit Draft Remedial Action Completion Report (RACR) and LTCMP	180 days following construction completion
Submit Final RACR and LTCMP	45 days after receipt of Ecology's final comments
Implement Final LTCMP	In accordance with schedules established in the Final LTCMP; groundwater compliance monitoring to begin no later than 1 year after construction completion

6.0 References

Conestoga-Rovers & Associates (CRA). 2014. *Subsurface Investigation Report: Smith-Kem Facility, 200 Railroad Avenue South, Ellensburg, Washington*. Prepared for Shell Oil Products US. 29 September.

City of Ellensburg. 2017. *Comprehensive Plan.* Ordinance Number 4785. 18 December.

Erickson, Andrew. 2016. Telephone conversation between Andrew Erickson, Smith-Kem, and Allison Geiselbrecht, Floyd|Snider. Seattle, Washington. 22 February. Finalized 29 April.

Floyd|Snider. 2016. *Smith-Kem Site Remedial Investigation Work Plan*. Prepared for Foster Pepper LLC, Seattle, Washington, and Shell Oil Products US, Carson, California. July.

_____. 2020. *Development of PCULs and Identification of COPCs for Evaluation in the Remedial Investigation Report*. Memorandum from Emily Jones, PE, Floyd|Snider, to John Mefford, Washington State Department of Ecology. 30 October.

_____. 2021. *Smith-Kem Remedial Investigation and Feasibility Report 2021.* Prepared for PKG Law, P.S. October.

Golder Associates Inc. 2011. *Yakima River Basin Study: Groundwater Infiltration Appraisal-Level Study Technical Memorandum*. Prepared on behalf of the U.S. Bureau of Reclamation. Contract No. 08CA10677A ID/IQ, Task 4.13. March.

Kittitas County Tax Assessor (Kittitas County). 2015. Historical Property Record Cards. File No. 7880. Files accessed December.

Landau Associates. 2015. *RE: April 2015 Groundwater Sampling and Analysis, Smith-Kem Ellensburg, 2001 South Railroad Avenue, Ellensburg, Washington, Parcel No. 226833, Facility/Site ID No. 12832256.* Letter from Timothy L. Syverson, Landau, to Valerie Bound, Washington State Department of Ecology Toxics Cleanup Program. 8 July.

Sage Earth Sciences, Inc. (Sage). 2007. *Limited Site Characterization Report for the Smith-Kem, Inc. Facility, 200 Railroad Avenue, Ellensburg, WA*. Prepared for Belsaas & Smith Construction. 26 July.

Washington State Department of Ecology (Ecology). 2008. *Site Hazard Assessment for Smith-Kem Facility, 200 Railroad Avenue, Ellensburg, WA*. Site visit conducted by Richard Bassett, Ecology. 13 August.

_____. 2013. *RE: Determination of Potentially Liable Person Status*. Letter from Valerie Bound, Ecology Toxics Cleanup Program, to Andy Erickson, Smith-Kem Ellensburg, Inc. & Ad Gro, LLC. 10 May.

_____. 2016. Agreed Order No. DE 12908. In the Matter of Remedial Action by: Shell Oil Products US, Smith-Kem Ellensburg, Inc. 29 February.

Smith-Kem Site

Draft Cleanup Action Plan

Tables

Table 4
Cleanup Action Alternatives Summary

Cleanup Action Area	Alternative 1	Alternative 2	Alternative 3	Alternative 4
AOC 1	**Surface Soil Excavation and Asphalt Cap** (210 CY soil; 5,060 SF asphalt)	**Excavate to Direct Contact RELs** (690 CY, 5–8 ft bgs) **Install GCL** (90 CY soil; 4,550 SF GCL)	**Excavate to Leaching RELs** (850 CY, 4–8 ft bgs) **Install GCL** (50 CY soil; 4,550 SF GCL)	**Excavate to CULs** (1,500 CY, 8 ft bgs)
AOC 2	**Surface Soil Excavation and Asphalt Cap** (170 CY soil; 4,150 SF asphalt)	**Excavate to Direct Contact RELs** (500 CY, 4 ft bgs) **Install GCL** (50 CY soil; 4,150 SF GCL)	**Excavate to Leaching RELs** (530 CY, 4–6 ft bgs) **Install GCL** (50 CY soil; 4,150 SF GCL)	**Excavate to CULs** (930 CY, 6 ft bgs)
AOC 3	**Surface Soil Excavation and Asphalt Cap** (120 CY soil; 2,920 SF asphalt)	**Excavate to Direct Contact RELs** (220 CY, 2 ft bgs)	**Excavate to Leaching RELs** (220 CY, 2 ft bgs)	**Excavate to CULs** (540 CY, 4–6 ft bgs)
AOC 4	**Surface Soil Excavation and Asphalt Cap** (190 CY soil; 4,600 SF asphalt)	**Excavate to Direct Contact RELs** (250 CY, 5 ft bgs) **Install GCL Cap** (190 CY soil; 4,600 SF GCL)	**Excavate to Leaching RELs** (860 CY, 5 ft bgs) **Gravel Cap** (4,600 SF)	**Excavate to CULs** (1,070 CY, 5–9 ft bgs)
AOC 5	**Surface Soil Excavation and Asphalt Cap** (70 CY soil; 1,620 SF asphalt)	**Excavate to Direct Contact RELs** (60 CY, 5 ft bgs) **In Situ Groundwater Treatment**	**Excavate to Leaching RELs** (60 CY, 5 ft bgs) **In Situ Groundwater Treatment**	**Excavate to CULs** (1,270 CY, 7–12 ft bgs)
AOC 6	**Excavate to CULs** (50 CY, 2 ft bgs)	**Excavate to CULs** (50 CY, 2 ft bgs)	**Excavate to CULs** (50 CY, 2 ft bgs)	**Excavate to CULs** (50 CY, 2 ft bgs)
FS-01	**Excavate to CULs** (10 CY, 1 ft bgs)	**Excavate to CULs** (10 CY, 1 ft bgs)	**Excavate to CULs** (10 CY, 1 ft bgs)	**Excavate to CULs** (10 CY, 1 ft bgs)
Outside AOCs	**Install Asphalt Cap** (990 CY soil; 29,300 SF asphalt)	**Install GCL** (500 CY soil; 9,000 SF GCL)	**Install GCL** (390 CY soil; 6,950 SF GCL)	**None**
Restoration Time Frame	*20–25 years*	*15 years*	*10 years*	*5 years*
Cost	***$2,508,000***	***$2,087,000***	***$2,107,000***	***$3,173,000***
Total Soil Excavation (CY)	1,810	2,610	3,070	5,370

Abbreviations:

AOC Area of concern
bgs Below ground surface
CUL Cleanup level
CY Cubic yard
ft Feet
GCL Geosynthetic Clay Liner
REL Remediation level
SF Square feet

Table 5
Applicable or Relevant and Appropriate Requirements for the Selected Cleanup Action

Standard, Requirement, or Limitation [(1)]	Description
Location-Specific ARARs [(2)]	
City of Ellensburg Critical Areas Regulations (EMC Chapter 15.620 [Wetlands] and EMC Chapter 15.650 [Fish and Wildlife Habitat Conservation Areas])	These chapters establish regulations pertaining to development within or adjacent to designated critical areas. The subject property is located approximately 125 feet west of Wilson Creek, 220 feet east of Mercer Creek, and 125 feet north of a freshwater forested/shrub wetland. The City of Ellensburg regulates all development activities within 300 feet of stream and wetland resources.
National Historic Preservation Act (16 USC 470 et seq.; 36 CFR parts 60, 63, and 800)	This program sets forth a national policy of historic preservation and provides a process that must be followed to ensure that impacts of actions on archaeological, historic, and other cultural resources are protected.
Action-Specific ARARs [(3)]	
State Environmental Policy Act (RCW 43.21C, WAC 197-11)	Establishes the state's policy for protection and preservation of the natural environment. Applies to cleanup actions conducted under MTCA; Ecology will be the lead agency for this effort.
Resource Conservation and Recovery Act (42 USC 6921-6949a; 40 CFR Part 268, Subtitles C and D)	Establishes requirements for the identification, handling, and disposal of hazardous and non-hazardous waste.
Dangerous Waste Regulations (RCW 70.105; WAC 173-303)	Establishes regulations that are the state equivalent of RCRA requirements for determining whether a solid waste is a state dangerous waste. This regulation also provides requirements for the management of dangerous wastes.
Solid Waste Disposal Act (42 USC Sec. 6901-6992; 40 CFR 257-258) Federal Land Disposal Requirements (40 CFR 268)	Protects health and the environment and promotes conservation of valuable material and energy resources. The Solid Waste Disposal Act establishes a framework for regulation of solid waste disposal. Federal land disposal requirements promulgated under the authority of the Solid Waste Disposal Act set minimum safety requirements for landfills including limitations on storage and land disposal for hazardous substances.
Department of Transportation Hazardous Materials Regulations (49 CFR 172)	Regulates the safe and secure transportation of hazardous materials, including documentation and handling requirements for shipping.
Washington Minimum Functional Standards for Solid Waste Handling (WAC 173-304)	Sets minimum functional standards for the proper handling of all solid waste materials originating from residences, commercial, agricultural, and industrial operations, as well as other sources.
Washington Solid Waste Handling Standards (RCW 70.95 and WAC 173-350)	Establishes minimum standards for handling and disposal of solid waste. Solid waste includes wastes that are likely to be generated as a result of site remediation, including contaminated soils, construction and demolition wastes, and garbage.
Washington Water Pollution Control Law (RCW 90.48; WAC 173-216, WAC 173-220) National Pollution Discharge Elimination System (CWA Part 402)	Washington has been delegated authority to issue NPDES permits. CWA Section 301, 302, and 303 require states to adopt water quality standards and implement a NPDES permitting process. The Washington Water Pollution Control Law and regulations address this requirement.
City of Ellensburg Noise Ordinance (EMC Chapter 5.60)	Project construction shall comply with the noise limitations set forth in City of Ellensburg's noise ordinance.
Noise Control Act of 1974 (RCW 70.107, WAC 173-60)	Establishes maximum noise levels on a state level; the local noise ordinance regulations prevail given that they are more restrictive than the regulations set forth for the state.
Washington State Underground Injection Control Program (WAC 173-218)	Washington is authorized under CWA Sections 144 through 147 to administer a statewide Underground Injection Control program to protect groundwater by regulating the discharge of fluid from injection wells including temporary injection points.
Washington Minimum Standards for Construction and Maintenance of Wells (RCW 18.104, WAC 173-160 and 173-162)	Requirements are applicable to construction of monitoring wells and soil borings, and establishes training standards for well contractors and operators
City of Ellensburg Site Development Permit (EMC 15.250.020)	City of Ellensburg Site Development Permits authorize the following activities: paving, grading, clearing, filling, tree removal, on-site utility installation, stormwater facility installation […]. All excavation, paving, and utility and stormwater facility installation work will require substantive compliance with the Site Development Permit requirements and any supporting technical memorandums (e.g., City of Ellensburg Storm Standards for design and installation of stormwater facilities).
Federal, State, and Local Air Quality Protection Programs State Implementation of Ambient Air Quality Standards NWAPA Ambient and Emission Standards Regional Standards for Fugitive Dust Emissions Toxic Air Pollutants	Regulations promulgated under the federal Clean Air Act (42 USC 7401) and the Washington State Clean Air Act (RCW 70.94) govern the release of airborne contaminants from point and non-point sources. State and local air pollution control authorities such as the Ecology Central Regional Office and City of Ellensburg have also set forth regulations for implementing these air quality requirements. These requirements may be applicable to the Site for the purposes of demolition or dust control.

Table 5
Applicable or Relevant and Appropriate Requirements for the Selected Cleanup Action

Standard, Requirement, or Limitation [(1)]	Description
Chemical-Specific ARARs [(4)]	
Model Toxics Control Act (WAC 173-340)	Establishes Washington administrative processes and standards to identify, investigate, and clean up facilities where hazardous substances are located.
Drinking Water Standards—State MCLs (WAC 246-290-310)	Establishes standards for contaminant levels in drinking water for water system purveyors.
Water Quality Standards for Groundwaters of the State of Washington (WAC 173-200)	Implements the Water Pollution Control Act and the Water Resources Act of 1971 (90.54 RCW).

Notes:

1 Projects conducted under an Agreed Order are exempt from the procedural requirements of most state and local permits (RCW 70.105D.090); however, the remedial actions must still comply with the substantive requirements of the exempt permits.

2 Location-specific ARARs are requirements that are applicable to the specific area where the Site is located, and can restrict the performance of activities, including cleanup actions, solely because they occur in specific locations.

3 Action-specific ARARs are requirements that are applicable to certain types of activities that occur or technologies that are used during the implementation of cleanup actions.

4 Chemical-specific ARARs are applicable to the types of contaminants present at the Site. The cleanup of contaminated media at the Site must meet the CULs developed under MTCA; these CULs are considered chemical-specific ARARs.

Abbreviations:

ARAR Applicable or relevant and appropriate requirement
CFR Code of Federal Regulations
CUL Cleanup level
CWA Clean Water Act
Ecology Washington State Department of Ecology
EMC Ellensburg Municipal Code
MCL Maximum Contaminant Level
MTCA Model Toxics Control Act
NPDES National Pollutant Discharge Elimination System
NWAPA Northwest Air Pollution Authority
RCRA Resource Conservation and Recovery Act
RCW Revised Code of Washington
USC U.S. Code
WAC Washington Administrative Code

Smith-Kem Site

Cleanup Action Plan

Figures

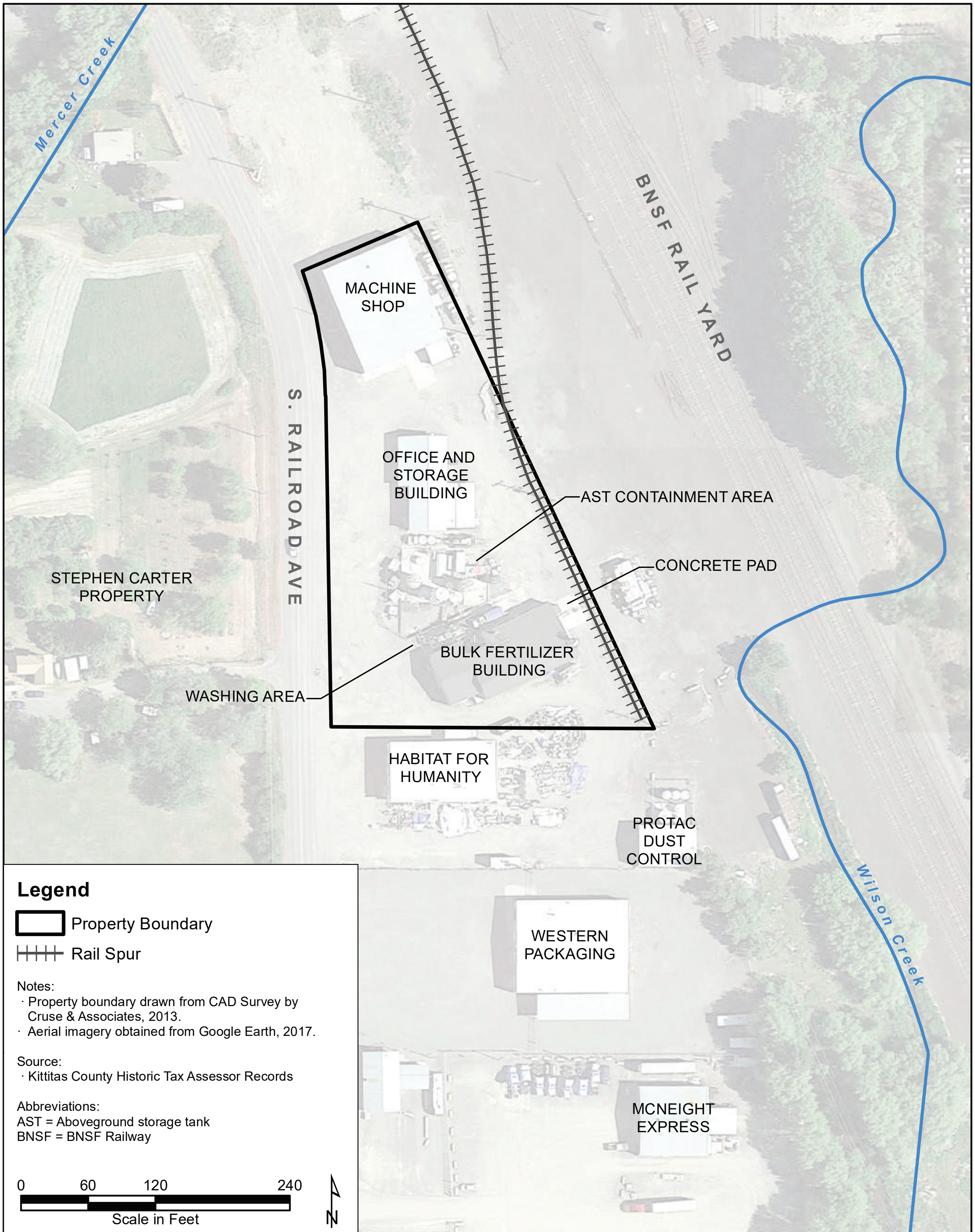
Notes:
- Property boundary drawn from CAD Survey by Cruse & Associates, 2013.
- Aerial imagery obtained from ESRI, 2016.

FLOYD | SNIDER
strategy ▪ science ▪ engineering

Cleanup Action Plan
Smith-Kem Site
Ellensburg, Washington

Figure 1
Site Vicinity Map

I:\GIS\Projects\PKG-SmithKem\MXD\DCAP\Figure 1 Site Vicinity Map.mxd
2/22/2022

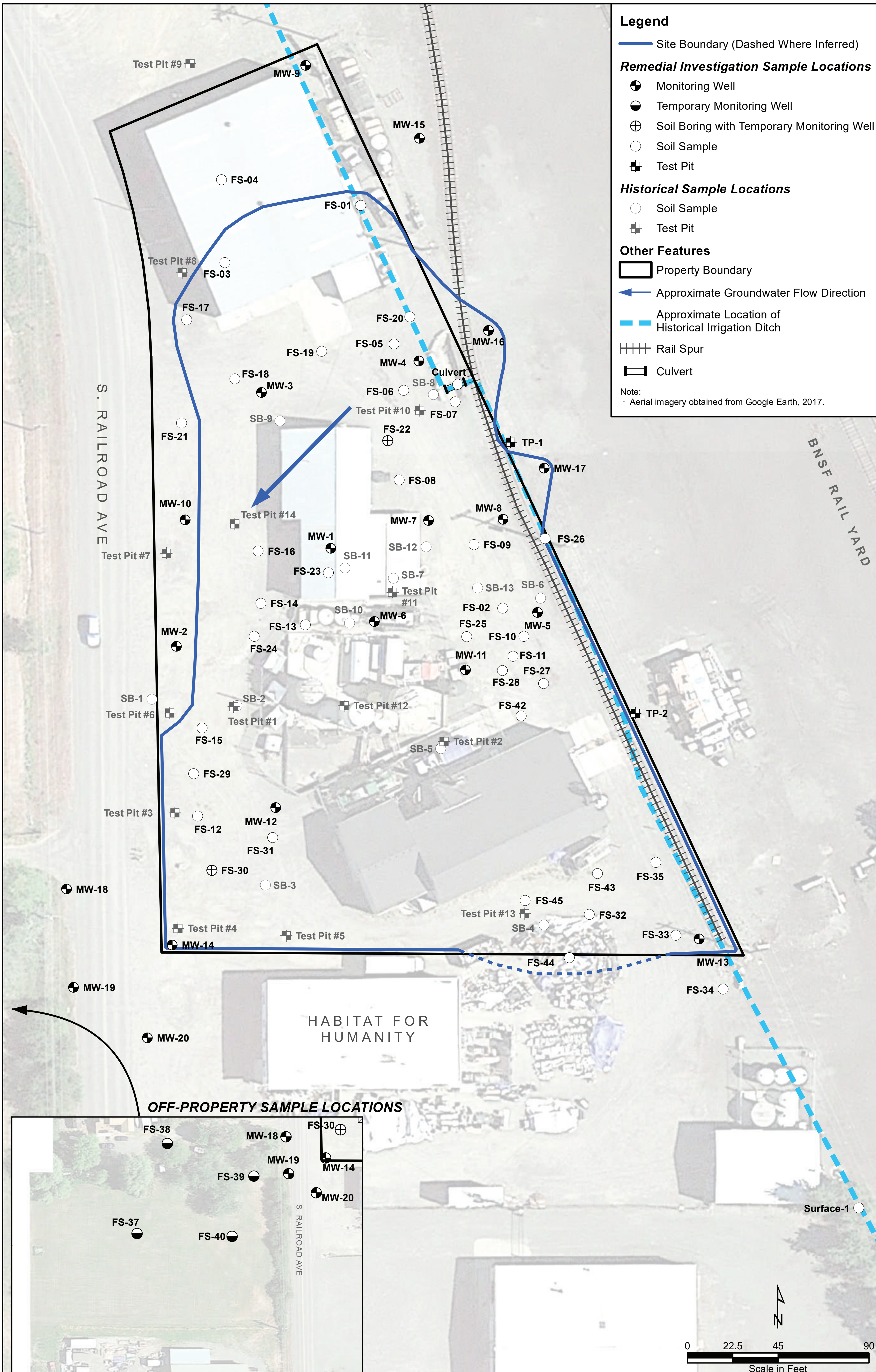


FLOYD | SNIDER
strategy ▪ science ▪ engineering

Cleanup Action Plan
Smith-Kem Site
Ellensburg, Washington

Figure 2
Current Site Plan
and Key Features

I:\GIS\Projects\PKG-SmithKem\MXD\DCAP\Figure 2 Current Site Plan and Key Features.mxd
2/22/2022

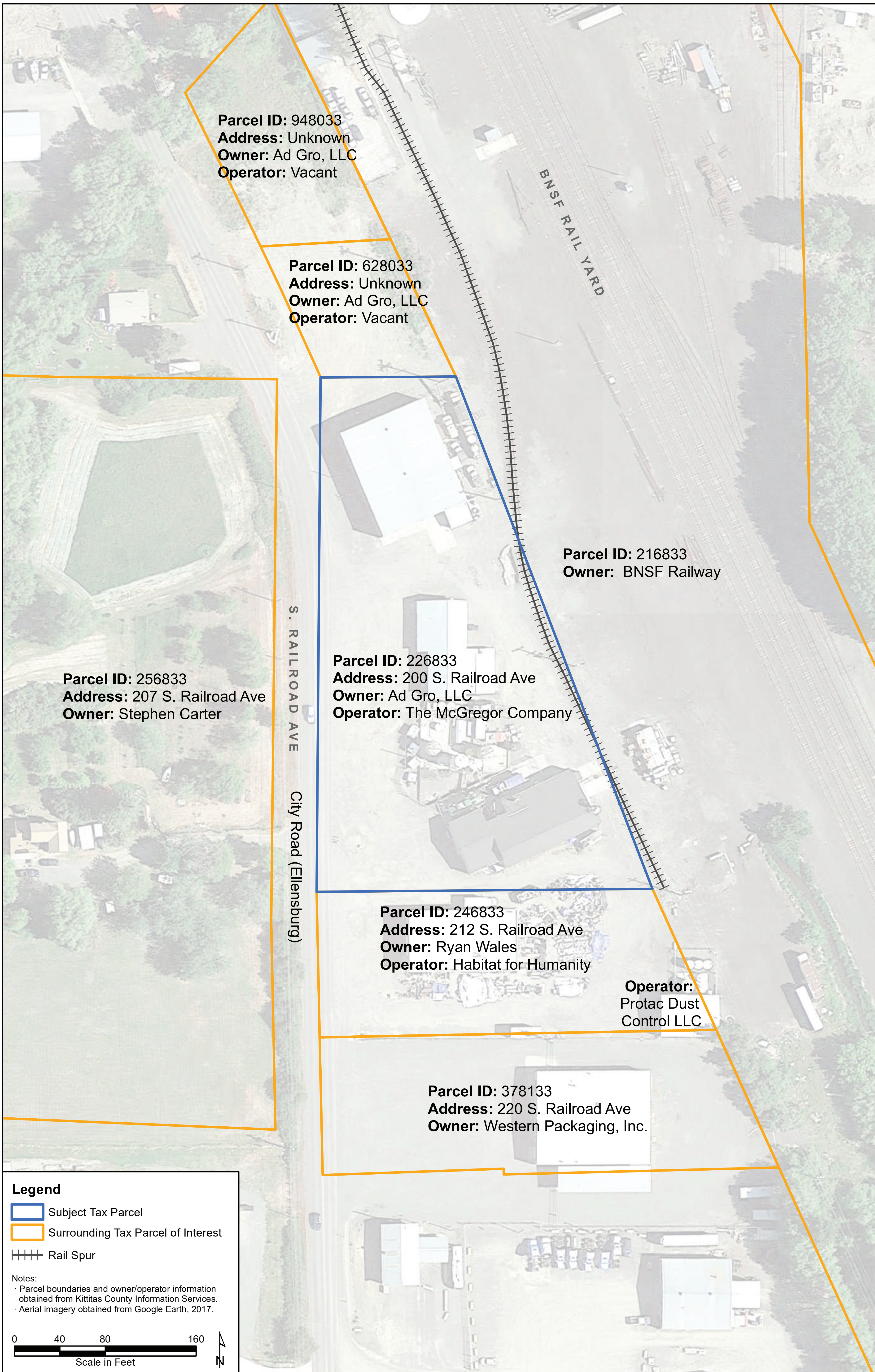


FLOYD | SNIDER
strategy ▪ science ▪ engineering

Cleanup Action Plan
Smith-Kem Site
Ellensburg, Washington

Figure 3
Soil and Groundwater Sample Locations and Site Boundary

I:\GIS\Projects\PKG-SmithKem\MXD\DCAP\Figure 3 Soil and GW Sample Locs and Site Boundary.mxd
2/22/2022

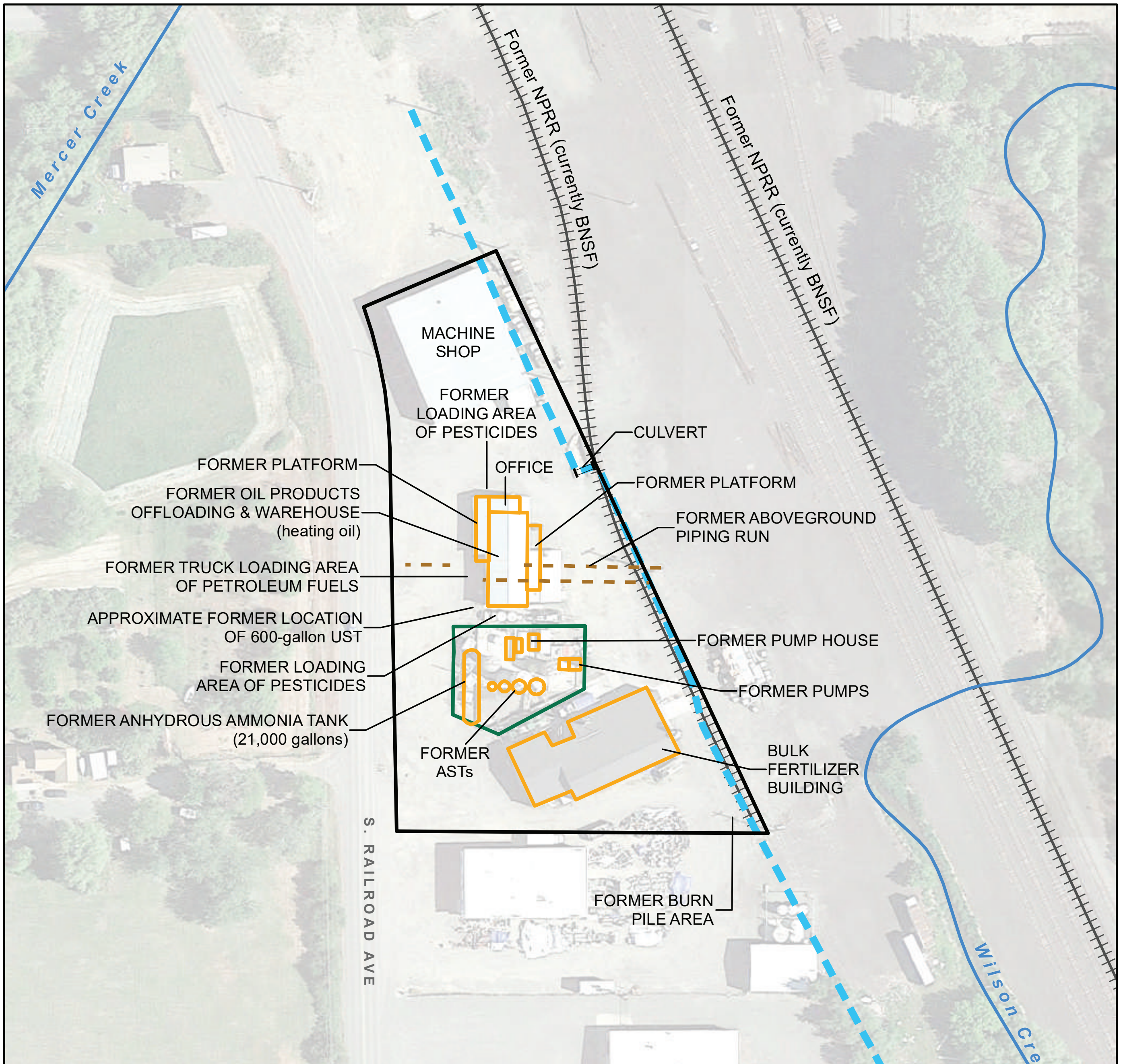


FLOYD | SNIDER
strategy ▪ science ▪ engineering

Cleanup Action Plan
Smith-Kem Site
Ellensburg, Washington

Figure 4
Subject and Surrounding Property Owner-Operator Information

I:\GIS\Projects\PKG-SmithKem\MXD\DCAP\Figure 4 Subject and Surrounding Property Owner-Operator Information.mxd
2/24/2022



Legend

- AST Containment Area
- Approximate Structure Footprint
- Approximate Location of Historical Irrigation Ditch
- Property Boundary

0 60 120 240
Scale in Feet
N

Notes:
- Due to incomplete records, all historical features should be considered approximate.
- Property boundary drawn from CAD Survey by Cruse & Associates, 2013.
- Orthoimagery obtained from Google Earth, 2017.

Sources:
- Kittitas County Historic Tax Assessor Records.
- Sanborn Maps 1928, 1948.
- Historical aerial photographs.

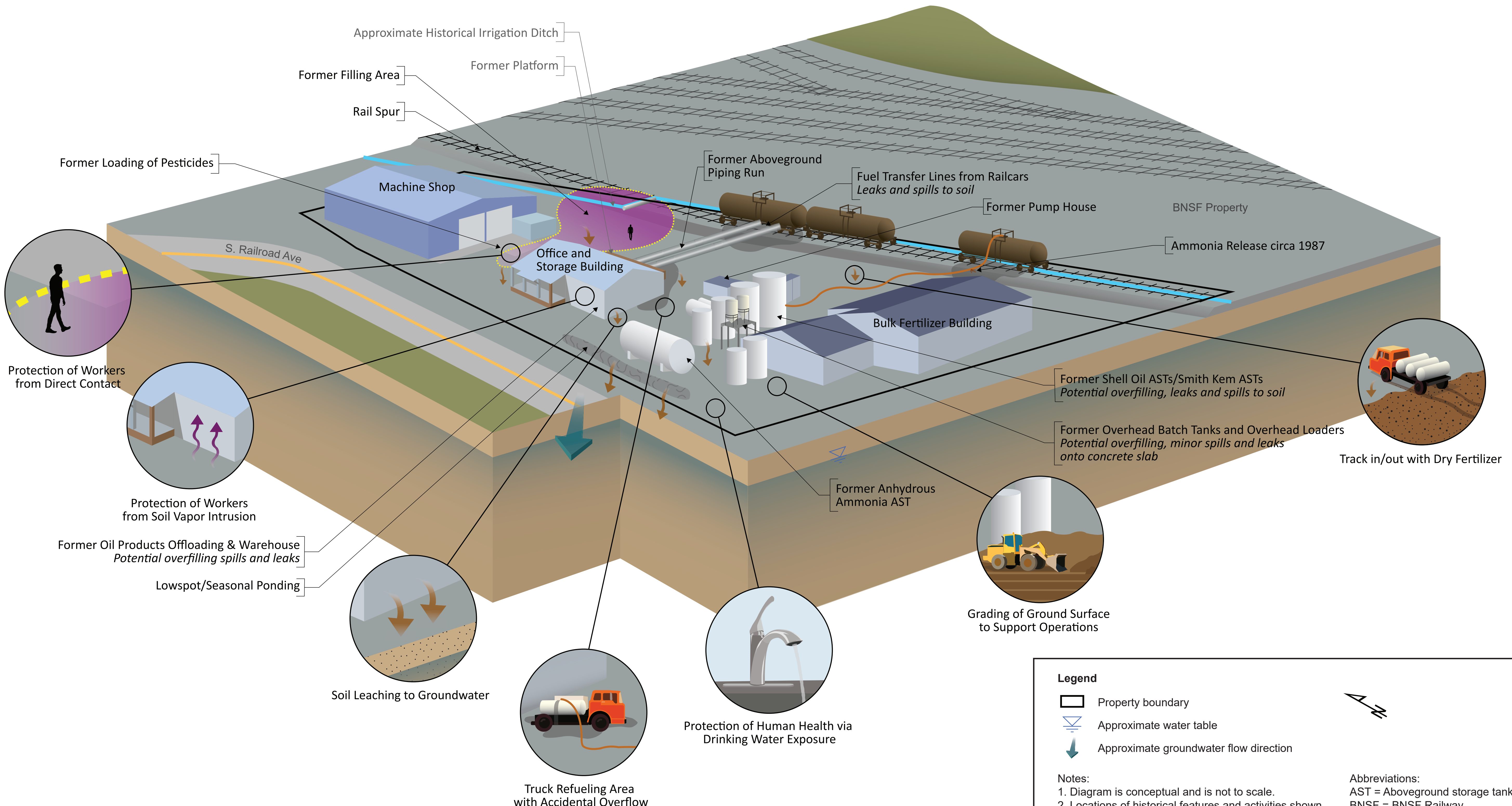
Abbreviations:
AST = Aboveground storage tank
BNSF = BNSF Railway
NPRR = Northern Pacific Railroad
UST = Underground storage tank

FLOYD | SNIDER
strategy ▪ science ▪ engineering

Cleanup Action Plan
Smith-Kem Site
Ellensburg, Washington

Figure 5
Historical Site Features

I:\GIS\Projects\PKG-SmithKem\MXD\DCAP\Figure 5 Historical Site Features.mxd
2/22/2022



Legend

- Property boundary
- Approximate water table
- Approximate groundwater flow direction

Notes:
1. Diagram is conceptual and is not to scale.
2. Locations of historical features and activities shown are approximate due to limited historical records.
3. Diagram presents all known current and historical transport pathways and current and future exposure pathways and contaminant migration.

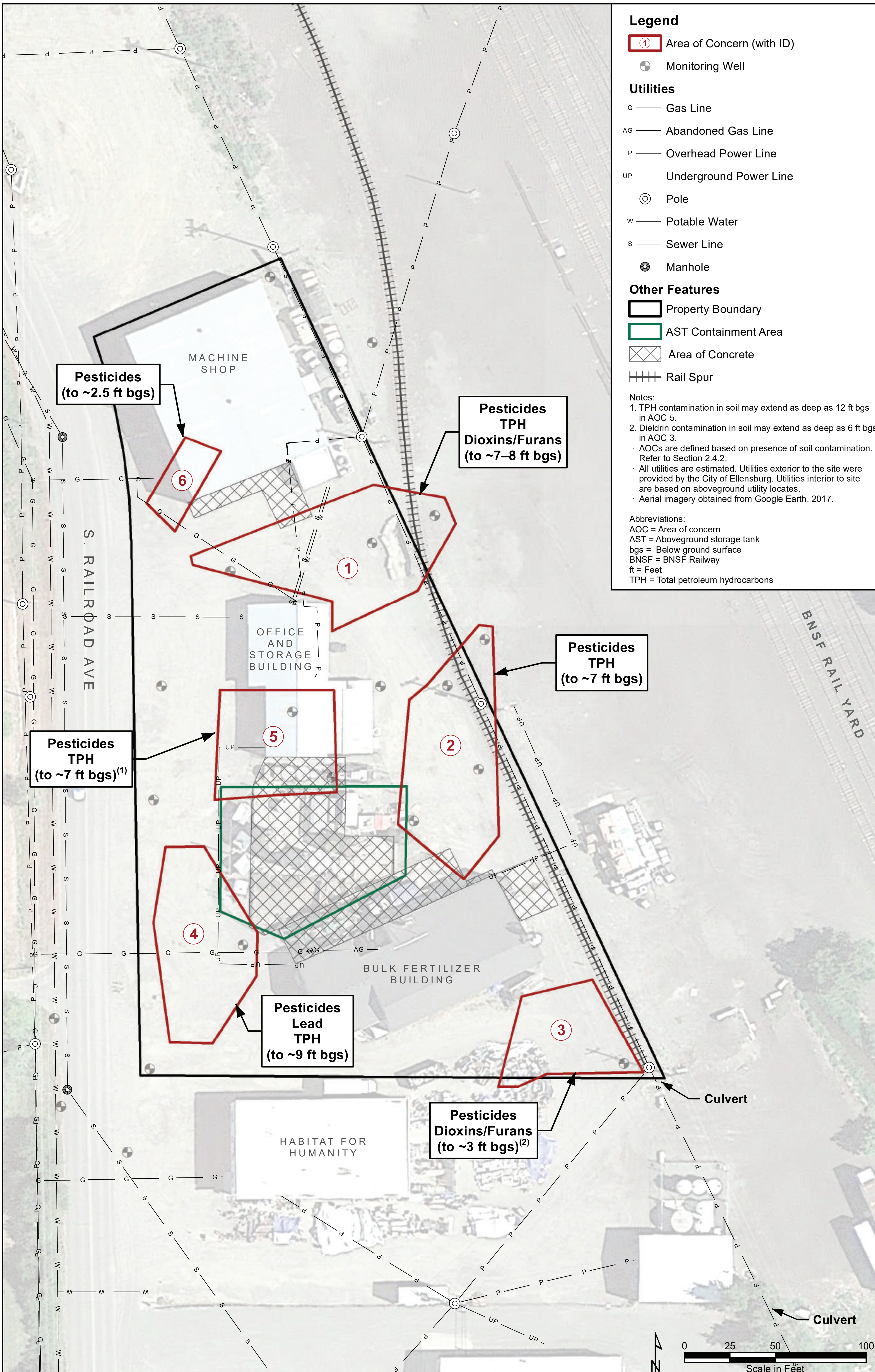
Abbreviations:
AST = Aboveground storage tank
BNSF = BNSF Railway
UST = Underground storage tank

FLOYD | SNIDER
strategy ▪ science ▪ engineering

Cleanup Action Plan
Smith-Kem Site
Ellensburg, Washington

Figure 6
Conceptual Site Model

I:\GIS\Projects\PKG-SmithKem\AI\Draft Cleanup Action Plan\Figure 6 Conceptual Site Model.ai
02/23/2022

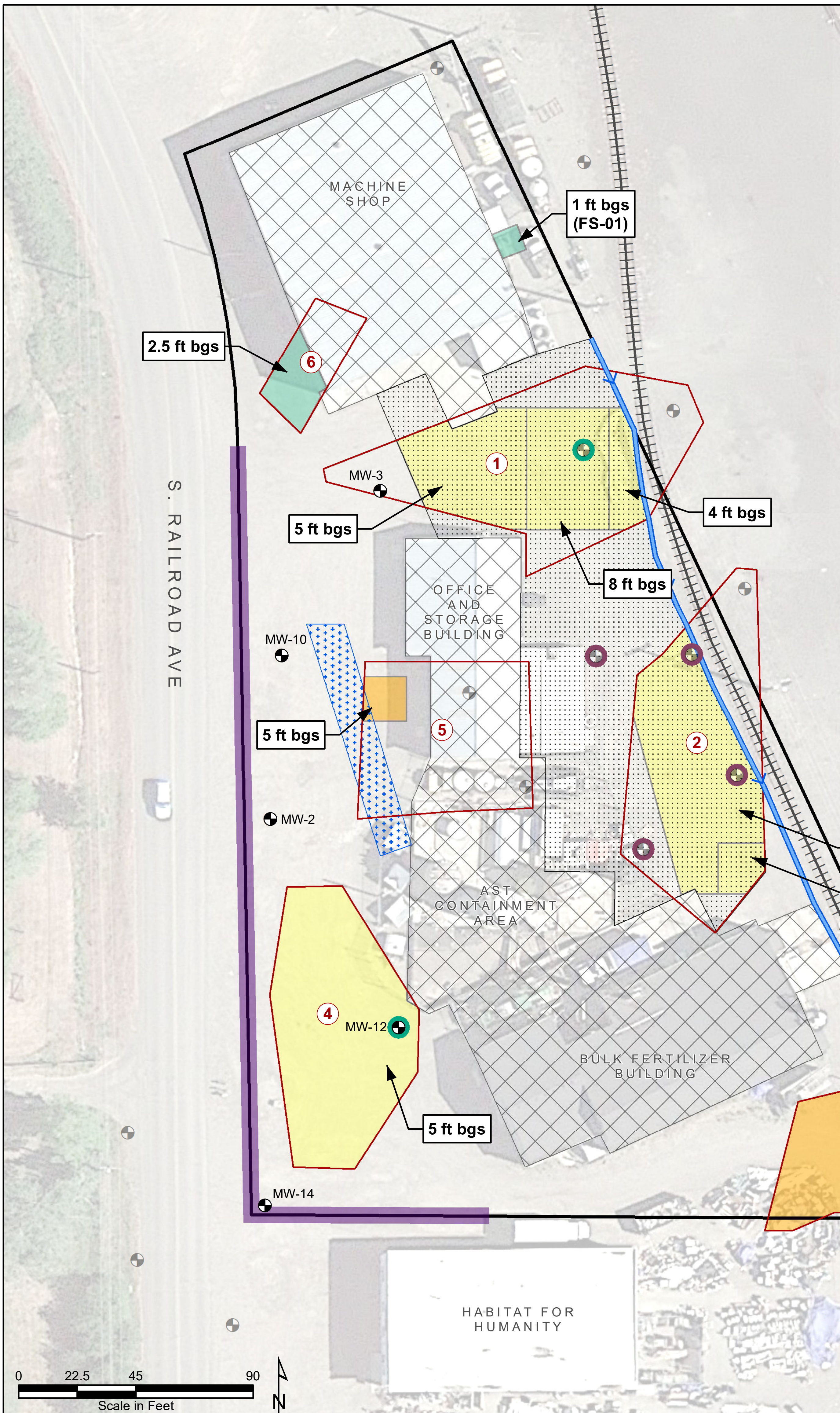


FLOYD | SNIDER
strategy • science • engineering

Cleanup Action Plan
Smith-Kem Site
Ellensburg, Washington

Figure 7
Areas of Concern and Site Features

I:\GIS\Projects\PKG-SmithKem\MXD\DCAP\Figure 7 Areas of Concern and Site Features.mxd
2/22/2022



Legend

- Proposed CPOC
- Area of Concern (with ID)
- Proposed CPOC Monitoring Well
- Monitoring Well
- Monitoring Well to be Potentially Abandoned and Reinstalled
- Monitoring Well to be Potentially Abandoned
- Manhole

Other Features

- Property Boundary
- Rail Spur

Notes:
- Cleanup along the rail spur will require offset from the rail for protection or a permit will need to be obtained from BNSF to conduct cleanup actions immediately adjacent to the rail.
- Final excavation area extent will be determined by confirmation sampling.
- Aerial imagery obtained from Google Earth, 2017.

Abbreviations:
AOC = Area of concern
AST = Aboveground storage tank
bgs = Below ground surface
CPOC = Conditional point of compliance
CSBC = Crushed surfacing base course
CUL = Cleanup level
CY = Cubic yards
ft = Feet
GCL = Geosynthetic clay layer
REL = Remediation level

Total Volume of Soil Removal (CY)
AOC 1: 850
AOC 2: 530
AOC 3: 220
AOC 4: 860
AOC 5: 60
AOC 6: 50
FS-01: 10
Outside AOCs (GCL Area): 390

Alternative 3 (Selected Cleanup Action)

Excavate to CULs

Excavate and dispose of soil at off-site landfill. Backfill with clean fill and gravel surface.

- AOC 6
- FS-01

Excavate to Direct Contact RELs

Excavate and dispose of soil at off-site landfill. Backfill with clean fill and gravel surface.

Note: If pre-design data show that contamination in AOC 3 extends off-property, then excavation off-property will be designed to meet the CULs.

- AOC 3
- AOC 5

Excavate to Leaching RELs

Excavate and dispose of soil at off-site landfill. Backfill with clean fill and gravel surface.

- AOC 1
- AOC 2
- AOC 4

Protect Existing Structures

Existing buildings and concrete pavement to remain as cap.

In Situ Groundwater Treatment

Inject trademarked colloidal activated carbon matrix (PlumeStop™) to create a passive treatment zone.

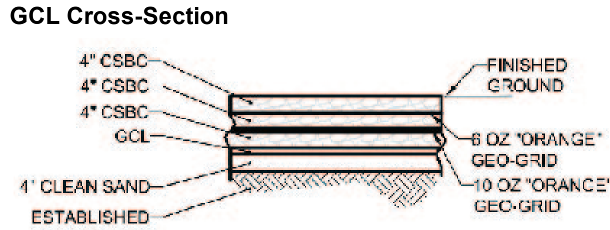
Geosynthetic Clay Liner

Install GCL as barrier for protection of groundwater from residual soil contamination.

Drainage System

Collect infiltrated precipitation drainage from the GCL and convey to a collection manhole at the southeast corner of the property.

GCL Cross-Section



Not to Scale.

Note: GCL cross-section provided by PBS Engineering and Environmental Inc.

FLOYD | SNIDER
strategy ▪ science ▪ engineering

Cleanup Action Plan
Smith-Kem Site
Ellensburg, Washington

Figure 8
Selected Cleanup Action Alternative

EXHIBIT C

Scope of Work and Schedule

Deliverable/Action	Schedule for Completion
Draft Pre-Design Investigation (PDI) Work Plan	Within 90 Days of effective date of CD
Finalize PDI Work Plan	30 days following receipt of Ecology comments on the agency draft PDI Work Plan
Implement PDI	Initiate within 45 days of Ecology approval of final PDI Work Plan
Prepare agency draft EDR and PDI Results report	Within 180 days of effective date of CD
Finalize EDR and prepare all applicable permits	90 days after receipt of Ecology final comments on draft EDR and PDI Results report
Remedial Action Construction; assume duration of 3 to 4 months, summer months only	Initiate within 120 days of Ecology approval of the EDR or after permit acquisition and contractor notice to proceed
Submit agency draft Remedial Action Completion Report (RACR) and Long-Term Compliance Monitoring Report (LTCMP), including a Soil Management Plan (SMP) and a Groundwater Monitoring Plan (GMP)	180 days following construction completion
Submit Environmental Covenant (Ecology) to Kittitas County	Within 240 days following construction completion
Submit Final RACR and LTCMP	45 days after receipt of Ecology's final comments on draft RACR and LTCMP
Implement Final LTCMP	In accordance with schedules established in the Final LTCMP; groundwater compliance monitoring to begin no later than 1 year after construction completion