Cleanup Action Plan
Stubblefield Salvage Yard

595 Offner Road, Walla Walla
Facility Site ID 1367331, Cleanup Site ID 4121

Toxics Cleanup Program

Washington Department of Ecology
Spokane, Washington

June 2025

Document Information

This document is available in the Department of Ecology's [Stubblefield Salvage Yard cleanup site webpage][1].

Related Information

- Cleanup site ID: 4121
- Facility site ID: 1367331

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Toxics Cleanup Program[2]

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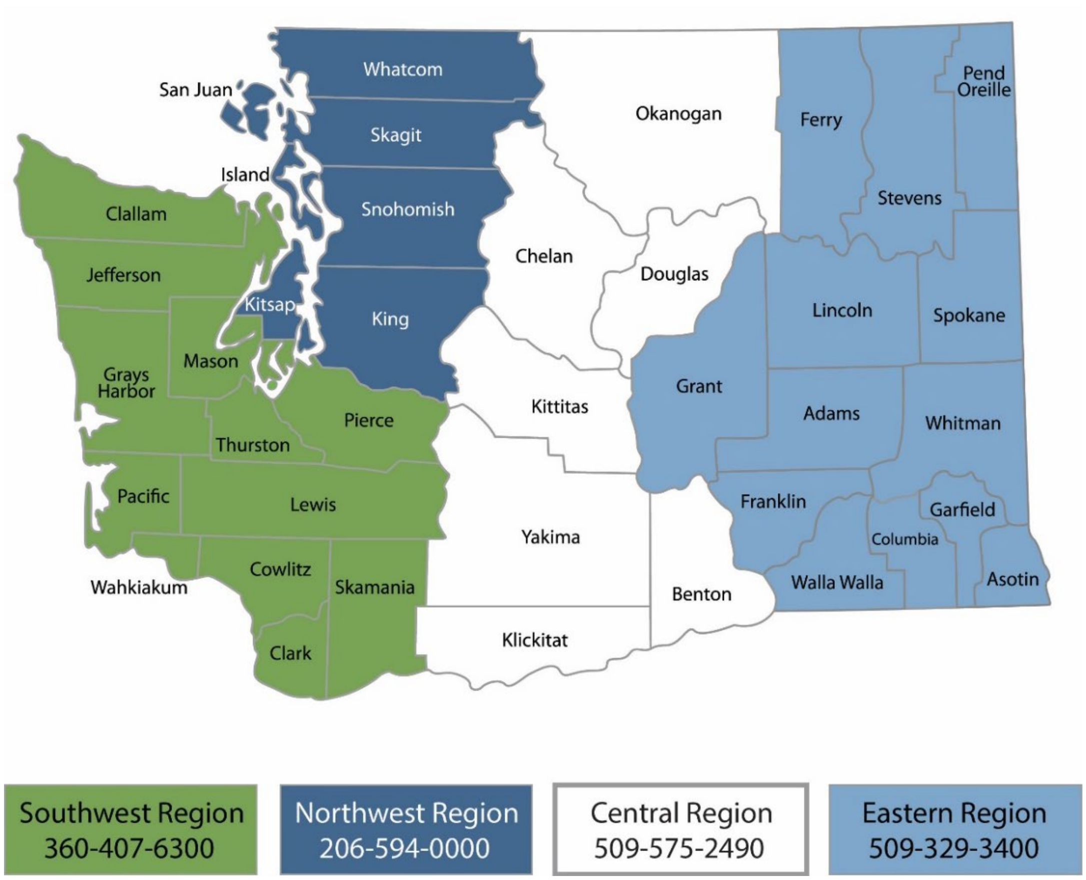
[1] https://apps.ecology.wa.gov/cleanupsearch/site/4121
[2] https://ecology.wa.gov/About-us/Who-we-are/Our-Programs/Toxics-Cleanup
[3] https://ecology.wa.gov/ADA

Department of Ecology's Regional Offices

Map of Counties Served



Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 47600 Olympia, WA 98504	360-407-6000

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Introduction

This report presents the Washington Department of Ecology's (Ecology) proposed cleanup action for the Stubblefield Salvage Yard (Site). The general location of the Site is shown in Figure 1. Site map in Appendix A.

Ecology is responsible for selecting the cleanup action and completing the Cleanup Action Plan (CAP). The selected cleanup action is intended to fulfill the requirements of the Model Toxics Control Act (MTCA) and is a required part of the cleanup process under the following regulations and statute:

- MTCA, Chapter 70A.305 Revised Code of Washington (RCW).
- MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC).

The cleanup action decision is based on the Remedial Investigation/Feasibility Study (RI/FS) and other relevant documents in the administrative record. Ecology has named Konen Properties, Lenora Thompson, Stephen Stubblefield, Deborah Stubblefield, and Adena Hodgins as potentially liable persons (PLPs).

The purpose of the CAP is to identify the proposed cleanup action for the Site and to provide an explanatory document for public review that:

- Describes the history of operations, ownership, and activities at the Site
- Summarizes nature and extent of contamination
- Summarizes the cleanup action alternatives considered in the remedy selection process
- Identifies site-specific cleanup levels (CULs) and points of compliance for each hazardous substance and medium of concern for the proposed cleanup action
- Identifies applicable state and federal laws for the proposed cleanup action
- Describes the selected cleanup action for the site and the rational for selecting this alternative
- 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
- Discusses any required compliance monitoring and institutional controls
- Presents the schedule for implementing the CAP

Declaration

Ecology has selected this remedy because it will be protective of human health and the environment. Furthermore, the selected remedy is consistent with the State of Washington's preference for permanent solutions, as stated in RCW 70A.305.040(1)(b). However, we will consider all public input before making the CAP final.

Applicability

Cleanup standards specified in this CAP are applicable only to the Stubblefield Salvage Yard Site. They were developed as a part of an overall remediation process under Ecology oversight using the authority of MTCA and should not be considered as setting precedents for other sites.

Administrative record

The documents used to make the decisions discussed in this CAP are on file in the administrative record for the Site. Major documents are listed in the References section. The entire administrative record for the Site is available for public review by appointment at Ecology's Eastern Regional Office, located at 4601 N. Monroe Street, Spokane, Washington, 99205-1295. Results from applicable studies and reports are summarized to provide background information pertinent to the CAP. These studies and reports include:

- Time-Critical Removal Action Report, 2012
- Stubblefield Site Assessment Work Plan, November 2018
- Remedial Investigation/Feasibility Study Report, August 2020

Cleanup process

Cleanup conducted under the MTCA process requires the PLPs or Ecology to prepare specific documents. These procedural tasks and resulting documents, along with the MTCA section requiring their completion, are listed below with a brief description of each task.

- Public Participation Plan (WAC 173-340-600) — summarizes the methods that will be implemented to encourage coordinated and effective public involvement. Ecology prepares this document.
- RI/FS (WAC 173-340-350) — documents the investigations and evaluations conducted at the Site from the discovery phase to the RI/FS document. The RI collects and presents information on the nature and extent of contamination and the risks posed by the contamination. The FS presents and evaluates Site cleanup alternatives and may propose a preferred cleanup alternative. The documents are usually prepared by the PLPs, accepted by Ecology, and undergo public comment.
- CAP (WAC 173-340-380) — sets cleanup standards for the Site, and selects the cleanup actions intended to achieve the cleanup standards. Ecology issues the document, and it undergoes public comment.

- Engineering Design Report, Construction Plans and Specifications (WAC 173-340-400) — outlines details of the selected cleanup action, including any engineered systems and design components from the CAP. These may include construction plans and specifications with technical drawings. The PLPs usually prepare the document, and Ecology approves it. Public comment is optional.
- Operation and Maintenance Plan(s) (WAC 173-340-400) — summarizes the requirements for inspection and maintenance of remediation operations. They include any actions required to operate and maintain equipment, structures, or other remedial systems. The PLPs usually prepare the document, and Ecology approves it.
- Cleanup Action Report (WAC 173-340-400) — provides details on the cleanup activities along with documentation of adherence to or variance from the CAP following implementation of the cleanup action. The PLPs usually prepare the document, and Ecology approves it.
- Compliance Monitoring Plan (WAC 173-340-410) — details the monitoring activities required to ensure the cleanup action is performing as intended. The PLPs usually prepare the document, and Ecology approves it.

Site Background

The Site is approximately 11 acres owned by Konen Properties and is vacant (Figure 2, Appendix A). It is bounded by Mill Creek to the north, Myra Road to the west, a residence and undeveloped land to the south, and undeveloped land to the west (Figure 1, Appendix A).

History

The Site was formerly the eastern part of a larger property that operated as a fat-rendering plant from 1945 until 1950. It was then turned into a salvage yard operated by Stubblefield Salvage and Recycling, LLC until 2010. The operation consisted of the processing, salvage, and recycling of various wastes, including but not limited to used oil, batteries, automotive and hydraulic fluids, drums, and metallic objects. In 1995, the western 20 acres was sold to Walla Walla County, and in 2008 the Walla Walla County Department of Public Works purchased an additional western 9 acres. After each sale, operations were consolidated down to the remainder of the parcel, leaving the current 11-acre property.

Investigations

Various complaints were made to Ecology in 1987, 1992, 1996, 1999, 2000, and 2001 for mismanaged wastes, illegal dumping, and open burning of wastes. Ecology's Hazardous Waste and Toxics Reduction Program completed several inspections at the facility in 1999, 2002, 2006, and 2007. During these inspections, numerous violations were documented including hydraulic fluid leaks from business equipment, improper handling of used oil, spent and crushed

batteries, incinerator ash, automotive fluids, bulging drums, and unpermitted burning of waste. Enforcement letters were sent to the operators after these compliance inspections.
Site inspections by the U.S. Environmental Protection Agency (EPA) found oil-stained soil, unlabeled drums, several large open-top tanks containing liquid waste, and uncontrolled wastes including transformers.

In 2007, the Hazardous Waste and Toxics Reduction Program referred the Site to the Toxics Cleanup Program, and an Early Notice Letter was sent to the owners notifying them that a release of hazardous substances had occurred on the facility, and that a Site Hazard Assessment would be performed. The Site Hazard Assessment resulted in a ranking of 1 (highest hazard) based on Site condition observations.

In 2009, Ecology referred the Site to the EPA for a removal site evaluation. From 2009 through 2012, seven field visits and soil, groundwater, and waste samples verified the need for a time-critical removal action. Two targeted remedial events in 2009 and 2012 were performed in areas with uncontrolled releases; the first to mitigate uncontrolled drums, excavate stained soils, and remove asbestos-containing material and the second to remove 61 drums of hazardous waste for off-site disposal.

In 2013, EPA performed a non-time-critical removal action to address remaining contamination. Nearly 13,000 tons of non-hazardous waste and 711 tons of hazardous waste were excavated and disposed off-site, including an area of lead-contaminated soil and several propane cylinders and tanks. While many objectives were achieved, the EPA clearly acknowledged contamination remained on-site above cleanup levels (CULs) for residential properties.

Physical characteristics

Topography and climate

The Site elevation is around 850 feet above mean sea level. The surface topography is generally flat in the southern half of the property, and then dips sharply approximately 10 feet about 200 feet south of Mill Creek. The surrounding land is primarily agricultural or vacant, with residential developments to the south. The Walla Walla water treatment plant is to the west, and a small area of commercial development is north of Mill Creek. The region is characterized as a Mediterranean climate with dry summers and mild wet winters, receiving 12 to 16 inches of precipitation annually, mostly in the form of rain. The annual mean temperature is about 53° F.

Mill Creek bounds the north edge of the Site and was channelized in the late 1940s for flood control purposes. A riprap levee bounds each side of the creek, and cross weirs have been placed in the channel at 100-foot spacing. The bulk of the Mill Creek channel is concrete, but the concrete ends about 0.9 miles upstream of the site at 9th Avenue.

Regional geology and hydrogeology

The geology in the vicinity of the Site consists of alluvial deposits overlying Columbia Basin basalts. Alluvial deposits consist of younger fine-grained sediments placed by wind or water, underlain by older consolidated clay, silt, sand, and gravel.

At the Site, there is a shallow unconfined alluvial aquifer consisting of interbedded fine silt and sand, silty sand, and gravels. The hydraulic conductivities can vary from 6.3 to 169 feet per day, with a geometric mean of 53 feet per day. Depths are approximately 8 to 17 feet below ground surface, with flow generally to the northwest towards Mill Creek.

Remedial Investigation

An RI (GeoEngineers 2020) was performed to assess the nature and extent of remaining contamination. The Site was broken up into several investigation areas based on the activities that took place. Four areas were delineated: Area A was a former process area that had hazardous material storage and spills; Area B was a waste burning area; Area C was for miscellaneous storage of drums and engine parts; and Area D held the former residence and office for the business (Figure 2, Appendix A). Soil and groundwater samples were collected and analyzed for a combination of metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), and pesticides. The analyses performed were dependent on the area and its historic use. Table 1 (Appendix B) shows which areas received which analyses.

Soil

Ecology completed 19 test pits and 28 direct-push borings with a total of 94 samples to evaluate potential soil contamination (Figure 3, Appendix A). Additionally, six soil samples were collected while drilling four monitoring wells. Test pits were excavated to depths ranging from 5.5 to 16.5 feet; two samples were collected from each test pit, the first at a depth of 2–3 feet and the second at a depth of 5–8 feet. TP-8 had only one sample at a depth of 7 feet, and TP-19 had a third sample at a depth of 8 feet. Direct-push borings were installed to depths of 3–5 feet; all had two samples collected, the first at a shallower depth of 0–2 feet, and the second from 3–5 feet. The results are in Tables 3 through 6 (Appendix B) and Figure 4 (Appendix A).

Area C showed the most contamination, with the most types of contaminants discovered and the most at levels above CULs.

Area A (37 samples) had one above the CUL for lead and four above for PAHs. The lead sample was about double the CUL. The PAH samples had three that were only slightly above the CUL, and one that was five times the CUL.

Area B (16 samples) had 2 above for lead, 2 above for PAHs, and 1 above for PCB. One lead sample was about double the CUL, and the other was 27 milligrams per kilogram (mg/kg) above the CUL. The PAH samples were 1.5 and 2 times the CUL. The PCB sample was about 2.5 times the CUL.

Area C (43 samples) had one above for diesel, 2 above for lead, 2 above for chromium, 2 above for cadmium, 11 above for PAHs, and 2 above for PCB. The diesel sample exceeded the CUL at 510 mg/kg. One chromium sample was four times the CUL, and the other was 1.5 times the CUL. Cadmium samples were three times and 1.5 times the CUL. PAH exceedances ranged from just slightly above the CUL to 14 times the CUL. About half the samples were below three times the CUL. PCB samples were five times the CUL and almost 1.5 times the CUL.

Area D (4 samples) had one above for lead and two above for PAHs. The lead sample was about six times the CUL, and the PAH samples were 1.5 and nearly 3 times the CUL.

Groundwater

Four groundwater monitoring wells were installed to evaluate potential groundwater contamination, one upgradient and three downgradient (Figure 3). Groundwater was evaluated for the same suite of chemicals as soil. Groundwater elevations were also measured to determine flow direction and gradient. Two groundwater monitoring events were conducted in December 2018 and March 2019. The results are in Table 2.

Many contaminants were detected at the Site, but none were above CULs. Therefore, groundwater is not contaminated and does not need to be addressed in the cleanup action. The chemicals detected in groundwater are carried forward into the soil screening to ensure concentrations in soil are protective of any future potential leaching pathways.

Risks to human health and environment

The Site is zoned as urban planned community in the City of Walla Walla. Properties to the north and west are zoned highway commercial, and properties to the south and east are a mix of residential neighborhood and light industrial/commercial.

Human exposure could occur through direct contact with or ingestion of contaminated surface/subsurface soil or dust in the air, and inhalation of dust. Trespass is possible due to the Site’s proximity to Mill Creek and the lack of any fencing or signage. Additionally, a mixed-use development is planned at the site, including businesses and apartments. The likelihood of exposure would increase with the presence of full-time residents. Potential current and future exposed populations include construction workers, trespassers, residents, and customers of any businesses.

The terrestrial ecological evaluation evaluates risk to environmental receptors on Page 12.

Cleanup Standards

MTCA requires establishing cleanup standards for individual sites. The two primary components of cleanup standards are CULs and points of compliance. CULs determine the concentration at which a substance does not threaten human health or the environment. All media exceeding a cleanup level is addressed through a cleanup remedy that prevents exposure to the contaminated material. Points of compliance represent the locations on the site where CULs must be met.

Overview

The process for establishing CULs involves the following:

- Determining if methods A, B, or C are applicable
- Developing CULs for individual contaminants in each media
- Determining which contaminants contribute the majority of the overall risk in each media (indicators)
- Adjusting the CULs downward for carcinogenic substances based on total site risk of 1×10^{-5}, and for a hazard index of 1 for non-carcinogenic substances, if necessary

MTCA provides three options for establishing CULs: methods A, B, and C.

- Method A may be used to establish CULs at routine sites or sites with relatively few hazardous substances.
- Method B is the standard method for establishing CULs and may be used to establish CULs at any site.
- Method C is a conditional method used when a CUL under Method A or B is technically impossible to achieve or may cause significantly greater environmental harm. Method C also may be applied to qualifying industrial properties.

MTCA defines the factors used to determine whether a substance should be retained as an indicator for the Site. When defining CULs at a site contaminated with several hazardous substances, Ecology may eliminate contaminants contributing a small percentage of the overall threat to human health and the environment. WAC 173-340-703(2) provides a substance may be eliminated from further consideration based on:

- The toxicological characteristics of the substance which govern its ability to adversely affect human health or the environment relative to the concentration of the substance
- The chemical and physical characteristics of the substance which govern its tendency to persist in the environment
- The chemical and physical characteristics of the substance which govern its tendency to move into and through the environment

- The natural background concentration of the substance
- The thoroughness of testing for the substance
- The frequency of detection
- The degradation by-products of the substance

Site use

The evaluation of CULs and ecological exposures depends on the nature of the Site use. Options under MTCA are either an unrestricted property or an industrial property. Industrial properties are defined in WAC 173-340-200; the definition includes properties characterized by transportation areas and facilities zoned for industrial use. Industrial properties are further described in WAC 173-340-745(1) by the following factors:

- People do not normally live on industrial property
- Access by the public is generally not allowed
- Food is not grown/raised
- Operations are characterized by chemical use/storage, noise, odors, and truck traffic
- Ground surface is mostly covered by buildings, paved lots and roads, and storage areas
- Presence of support facilities serving the industrial facility employees and not the public

The Site is not zoned industrial and has plans for redevelopment that will include residential space. Therefore, unrestricted CULs will be applied.

Terrestrial ecological evaluation

WAC 173-340-7490 requires site managers to perform a terrestrial ecological evaluation (TEE) to determine the potential effects of soil contamination on ecological receptors. A site may be excluded from a TEE if any of the following are met:

- All contaminated soil is or will be located below the point of compliance
- All contaminated soil is or will be covered by physical barriers such as buildings or pavement
- The site meets certain requirements related to the nature of on-site and surrounding undeveloped land
- Concentrations of hazardous substances in soil do not exceed natural background levels

All remedial actions proposed for the Site involve removing all contaminated soils and/or covering them with physical barriers. Therefore, the Site is excluded from the TEE.

Site cleanup levels

The RI/FS and previous investigations have documented soil contamination at the Site. Since it was determined the Site will move forward as a property with unrestricted site use (Section 4.2) and all contaminants exceeding CULs are present in the Method A Unrestricted table, Method A CULs will apply to soil.

Tables 7 and 8 show screening of indicators based on detection frequencies for groundwater and soil. If contaminants are detected at a low frequency (generally 5% or less), they are not carried forward to CUL development. Tables 9 and 10 show the CUL screening for groundwater and soil. Since no groundwater concentrations exceed CULs, groundwater is not contaminated, and soil CULs do not have to consider protection of groundwater.

Soil detections were compared to all relevant cleanup levels (Method A and B). After comparison of all CULs to maximum detected concentrations, the only contaminants that exceeded any CULs were on the Method A list. Therefore, Method A is appropriate to apply to the Site. Since the Site uses Method A and only has one contaminated media, no adjustments are necessary for overall Site risk. Indicators for the Site are diesel, PCBs, PAHs as benzo(a)pyrene, cadmium, chromium, and lead.

Point of compliance

MTCA defines the point of compliance as the point or points where CULs shall be attained. Once CULs are met at the point of compliance, the Site is no longer considered a threat to human health or the environment.

WAC 173-340-740(6) gives the point of compliance requirements for soil. The standard soil point of compliance for indicator parameters based on human health protection is established at a depth of 15 feet below ground surface, and for ecological receptor protection at a depth of 6 feet below ground surface. Since soil CULs are based on protection of human health and background, the soil point of compliance will be set at 15 feet below ground surface throughout the Site.

Cleanup Action Selection

Remedial action objectives

Remedial action objectives describe the actions necessary to protect human health and the environment by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route. They are developed considering the characteristics of the contaminated media, the characteristics of the hazardous substances present, migration and exposure pathways, and potential receptor points.

Soil has been contaminated by past activities at the Site. People may be exposed to contaminated soil via direct contact with or ingestion of contaminated surface/subsurface soil or dust in the air, or inhalation of dust. Potential human receptors include construction workers, trespassers, future residents, and future customers of any businesses.

Given these potential exposure pathways, the following are the remedial action objectives for the Site:

- Prevent or minimize direct contact, ingestion, inhalation, or uptake of contaminated soil by humans or ecological receptors.
- Prevent or minimize the potential for erosion to mobilize contaminated soil.
- Prevent or minimize the potential for infiltration of precipitation or runoff through contaminated soil.

Cleanup action alternatives

Cleanup alternatives to meet these remedial action objectives are evaluated as part of the RI/FS. The FS evaluated multiple alternatives for addressing all contaminated media at the Site. The following three alternatives are based on the proposals Ecology's consultant made in the FS.

Alternative 1: Complete excavation

This alternative involves the complete excavation of all soils above CULs and disposal at an offsite permitted landfill. The soil volume is estimated to be 21,000 cubic yards. Sampling would be performed to confirm all contaminated soils have been removed. Figure 5 shows the area that would be excavated to depths between 2 and 5 feet.

Alternative 2: Limited excavation, consolidation, and capping

This alternative involves excavating all soil contaminated with petroleum hydrocarbons and PCBs and disposing it at an offsite permitted landfill. The soil volume is estimated to be 2,000 cubic yards. All remaining contaminated soils would be consolidated on the north side of the Site, graded, compacted, and capped with impermeable pavement or a minimum of 1 foot of clean soil. Sampling would be performed to confirm all contaminated soils have been removed or capped. Figure 6 shows the areas receiving each action. An environmental covenant would be required because some contamination would remain under a cap.

Alternative 3: Limited excavation and capping

This alternative would excavate all soil contaminated with petroleum hydrocarbons and PCBs and dispose it at an offsite permitted landfill, just as in Alternative 2. However, instead of consolidating remaining soils, they would be capped in place with either impermeable pavement or a minimum of 1 foot of clean soil. Figure 7 shows the areas receiving each action. An environmental covenant would be required because some contamination would remain under caps.

Regulatory requirements

MTCA sets forth the minimum requirements and procedures for selecting a cleanup action. A cleanup action must meet each of the minimum requirements specified in WAC 173-340-360(3).

General requirements

WAC 173-340-360(3)(a) sets forth the following general requirements for the cleanup action:

- Protect human health and the environment, including likely vulnerable populations and overburdened communities
- Comply with cleanup standards (see Page 11)
- Comply with applicable state and federal laws (see Page 18)
- Prevent or minimize present and future releases and migration of hazardous substances
- Provide resilience to climate change impacts that have a high likelihood of occurring and severely compromising its long-term effectiveness
- Provide for compliance monitoring
- Not rely primarily on institutional controls and monitoring if it’s technically possible to implement a more permanent cleanup action
- Not rely primarily on dilution and dispersion over active remediation, unless the incremental costs grossly exceed the incremental benefits
- Provide for a reasonable restoration time frame
- Use permanent solutions to the maximum extent practicable

Action-specific requirements

WAC 173-340-360(3)(b) includes the following requirements that apply to the Site. The Site must:

- Use institutional controls (WAC 173-340-440)
- Provide financial assurances (WAC 173-340-440(11))
- Provide for periodic reviews (WAC 173-340-420(2))

Media-specific requirements

WAC 173-340-360(3)(c) includes the following requirement that applies to the Site. A soil cleanup action must treat, remove, or contain contamination on properties that qualify as a residential area based on current use or potential future use based on local plans.

Public concerns and Tribal rights and interests

Because Ecology is conducting this cleanup action, public concerns and Tribal rights and interests will be considered.

Determination of reasonable restoration time frame

An evaluation of whether a cleanup action alternative provides a reasonable restoration time frame must be conducted unless a model remedy is selected as the cleanup action. WAC 173-340-360(4) provides evaluation factors to determine whether a cleanup action has a reasonable restoration time frame.

- Potential risks posed by the site to human health and the environment, including likely vulnerable populations and overburdened communities.
- Practicability of achieving a shorter restoration time frame. A restoration time frame is not reasonable if an active remedial measure with a shorter restoration time frame is practicable.
- Long-term effectiveness of the alternative. A longer restoration time frame may be reasonable if the alternative has a greater degree of long-term effectiveness than one that primarily relies on on-site or off-site disposal, isolation, or containment.
- Current and potential future use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site.
- Availability of alternative water supplies.
- Likely effectiveness and reliability of institutional controls.
- Ability to control and monitor migration of hazardous substances from the site.
- Toxicity of the hazardous substances at the site.
- Natural processes that reduce concentrations of hazardous substances and have been documented to occur at the site or under similar site conditions.
- For Ecology-led and Ecology-supervised cleanup actions, public concerns identified under WAC 173-340-600 (13) and (14) and Indian Tribes' rights and interests.

Determining permanent to the maximum extent practicable

WAC 173-340-360(5) describes the requirements and procedures for determining whether a cleanup action uses permanent solutions to the maximum extent practicable (PMEP). A permanent solution meets CULs without further action being required at the site other than the disposal of residue from treating hazardous substances.

To determine whether a cleanup action uses PMEP, a disproportionate cost analysis is conducted. This analysis compares the costs and benefits of the cleanup action alternatives and involves considering several factors, including:

- Protectiveness
- Permanence
- Long-term effectiveness
- Management of implementation risk
- Implementability
- Cost

The comparison of benefits and costs may be quantitative but will often be qualitative and require the use of best professional judgment.

The procedure to perform the PMEP analysis involves comparing the most permanent alternative to the next most permanent and determining if the costs outweigh the benefits in that pair. If they do, the less permanent alternative is compared to the next most permanent alternative and compared again. This continues until the costs do not outweigh the benefits. This evaluation can be done quantitatively/graphically or can be done qualitatively.

Cleanup action expectations

WAC 173-340-370 sets forth the following expectations for developing cleanup action alternatives and selecting cleanup actions. These expectations represent the types of cleanup actions Ecology considers likely results of the remedy selection process; however, we recognize there may be some sites where cleanup actions conforming to these expectations are not appropriate.

- Treatment technologies will be emphasized at sites with liquid wastes, areas with high concentrations of hazardous substances, or with highly mobile and/or highly treatable contaminants
- To minimize the need for long-term management of contaminated materials, hazardous substances will be destroyed, detoxified, and/or removed to concentrations below CULs throughout sites with small volumes of hazardous substances
- Engineering controls, such as containment, may need to be used at sites with large volumes of materials with relatively low levels of hazardous substances where treatment is impracticable
- To minimize the potential for migration of hazardous substances, active measures will be taken to prevent precipitation and runoff from coming into contact with contaminated soil or waste materials
- When hazardous substances remain on-site at concentrations that exceed CULs, they will be consolidated to the maximum extent practicable to minimize the potential for direct contact and migration of hazardous substances

- For sites adjacent to surface water, active measures will be taken to prevent/minimize releases to that water; dilution will not be the sole method for demonstrating compliance
- Natural attenuation of hazardous substances may be appropriate at sites under certain specified conditions (see WAC 173-340-370(7))
- Cleanup actions will not result in a significantly greater overall threat to human health and the environment than other alternatives

Applicable, relevant, and appropriate state and federal laws, and local requirements

WAC 173-340-710(1) requires all cleanup actions to comply with all applicable local, state, and federal law. It further states the term "applicable state and federal laws" shall include legally applicable requirements and requirements the department determines "…are relevant and appropriate requirements" (ARARs). This section discusses applicable state and federal law, ARARs, and local permitting requirements that were considered and were of primary importance in selecting cleanup requirements. If other requirements are identified later, they will be applied to the cleanup actions.

MTCA provides an exemption from the procedural requirements of several state laws and from any laws authorizing local government permits or approvals for remedial actions conducted under a consent decree, order, or agreed order (RCW 70A.305.090). However, the substantive requirements of a required permit must be met. The procedural requirements of the following state laws are exempted:

- Ch. 70A.15 RCW, Washington Clean Air Act
- Ch. 70A.205 RCW, Solid Waste Management—Reduction and Recycling
- Ch. 70A.300 RCW, Hazardous Waste Management
- Ch. 77.55 RCW, Construction Projects in State Waters
- Ch. 90.48 RCW, Water Pollution Control
- Ch. 90.58 RCW, Shoreline Management Act of 1971
- Any laws requiring or authorizing local government permits or approvals for the remedial action

WAC 173-340-710(4) sets forth the criteria Ecology evaluates when determining whether certain requirements are relevant and appropriate for a cleanup action. ARARs for the cleanup alternatives at this Site are discussed in the next section. Local laws, which may be more stringent than state and federal laws, will govern where applicable.

Evaluation of cleanup action alternatives

The requirements and criteria outlined in the Regulatory Requirements section on page 15 are used to conduct a comparative evaluation of the cleanup action alternatives and to select a cleanup action from those alternatives. Table 12 provides a summary of the ranking of the cleanup alternatives against the various criteria.

Regulatory requirements

General requirements

All alternatives would protect human health and the environment, comply with cleanup standards, comply with applicable state and federal laws, prevent or minimize future releases and migration, not rely primarily on institutional controls and monitoring, and not rely primarily on dilution/dispersion over active remediation.

Climate change impacts were estimated at a high level using the Climate Mapping for a Resilient Washington webtool,[4] funded by the State of Washington and developed by the University of Washington. The webtool generally predicts increases in temperature and precipitation. These will increase the chance for erosion, flooding events, and wildfire likelihood. Flooding will likely be mitigated by the controlled flow in Mill Creek, which leaves erosion as the highest potential to impact the cleanup. Erosion can be mitigated by required regular Site inspections and repairs, appropriate Site grading before and after any development, and use/maintenance of stormwater swales.

There are three types of compliance monitoring: protection, performance, and confirmational. Protection monitoring is designed to protect human health and the environment during the construction and operation and maintenance phases of the cleanup action. Performance monitoring confirms the cleanup action has met cleanup and/or performance standards. Confirmational monitoring confirms the long-term effectiveness of the cleanup action once cleanup standards have been met or other performance standards have been attained. All alternatives would comply with WAC 173-340-410 as they would require varying levels of all three types of compliance monitoring. A Compliance Monitoring Plan will be prepared along with design documents, which will be available for public comment.

A discussion of reasonable restoration time frame and PMEP begins on page 20.

Action-specific requirements

Alternatives 2 and 3 would use institutional controls in the form of an environmental covenant providing restrictions on current and future use of the property, since contaminated soils would be left behind. The covenant would be designed to protect engineered covers over any contaminated soil that remains on the site and ensure Ecology will be involved in any future redevelopment of the property.

[4] https://cig.uw.edu/resources/analysis-tools/climate-mapping-for-a-resilient-washington/

For alternatives 2 and 3, periodic reviews would also occur at a minimum frequency of every five years to ensure continued protection of human health and the environment, and compliance with the environmental covenant.

Media-specific requirements

Since the Site qualifies as a residential area based on current and potential future use, soil cleanup actions must treat, remove, or contain contamination. All three alternatives meet this requirement.

Public concerns and Tribal rights and interests

To understand and consider public concerns, Ecology presented the draft RI/FS for public review and comment. This CAP will also undergo public review and comment.

Ecology shared the draft CAP with the Nez Perce Tribe, Umatilla Confederated Tribes, and Yakama Nation prior to the public comment period and invited their questions and input.

Ecology received one comment on the RI/FS from the City of Walla Walla expressing concerns about the impact of the cleanup and future development on stormwater runoff and Mill Creek. Our response is captured in the Response to Comments,[5] but generally states the cleanup design will minimize potential stormwater runoff and infiltration through soil contamination, and should not impact Mill Creek.

Alternative 1 would best address the city's concerns by removing all contamination, thereby eliminating concerns about residual contamination impacting the creek. Alternative 2 would rank next highest by consolidating remaining contamination, which would better address concerns by reducing the footprint of contamination. Alternative 3 would rank slightly lower by leaving the largest residual contamination footprint but would still adequately address stormwater and infiltration concerns. All three alternatives would not have impacts to Mill Creek.

Determination of reasonable restoration time frame

WAC 173-340-360(4) describes the requirements and procedures for determining whether a cleanup action provides for a reasonable restoration time frame, as required under subsection (3)(a)(ix). The factors used to determine whether a cleanup action provides a reasonable restoration time frame are in WAC 173-340-360(4)(c).

All alternatives would have the same restoration time frame, as the actions would meet cleanup standards immediately upon completion. Alternatives 2 and 3 would be less preferred since they would rely on institutional controls to sustain restoration. All alternatives are consistent with or meet the factors provided for evaluating this criterion.

The implementation time frame would be similar for all three alternatives. All could occur within several months of a single construction season.

[5] https://apps.ecology.wa.gov/cleanupsearch/document/99798

Determining permanent to the maximum extent practicable

WAC 173-340-360(5) describes the procedure for determining PMEP, as required under subsection (3)(a)(x).

To determine whether a cleanup action uses PMEP, the disproportionate cost analysis specified in the regulation is used. The analysis compares the costs and benefits of the cleanup action alternatives and involves the consideration of several factors. The comparison of costs and benefits may be quantitative but will often be qualitative and require the use of best professional judgment.

Protectiveness

Protectiveness measures the degree to which existing risks are reduced, time required to reduce risk and attain cleanup standards, on- and off-site risks resulting from implementing the alternative, and improvement of overall environmental quality.

All alternatives would be protective. All would attain cleanup standards and improve overall environmental quality. However, alternatives 2 and 3 would rank less because some contamination exceeding CULs would remain on-site. All would have risks associated with their implementation, but the highest risk would be due to moving contamination off-site, which is included in all alternatives, so it doesn't significantly affect the rankings.

Permanence

Permanence evaluates the degree to which the alternative reduces the toxicity, mobility, or mass of hazardous substances, including the adequacy of the alternative in destroying the hazardous substance(s), the reduction or elimination of releases or sources of releases, the degree of irreversibility of any treatment process, and the characteristics and quantity of any treatment residuals.

Alternative 1 would have the highest degree of permanence because all contaminated soil would be removed. The other two alternatives also equivalently reduce mobility by capping lower concentration contaminated soil left in place but reduce the mass by a lesser amount.

Long-term effectiveness

Long-term effectiveness measures the degree to which the alternative is likely to be effective over the long term, including for likely vulnerable populations and overburdened communities. It considers the degree of certainty, the reliability of the alternative during the period that hazardous substances will remain above cleanup levels, the resilience of the alternative to climate change impacts, the magnitude of residual risk after implementation, and the effectiveness of controls required to manage remaining wastes.

Alternative 1 would rank the highest as all contaminated soil would be removed from the site. Alternatives 2 and 3 rank less than Alternative 1 but are fairly equivalent in their degree of long-term effectiveness. Alternative 2 would rank slightly higher because it would reduce the footprint of the area needing long-term maintenance.

Management of implementation risk

Short-term risk measures the risks related to an alternative during construction and implementation, including likely vulnerable populations and overburdened communities, and the effectiveness of measures that will be taken to manage such risks.

Short-term risk at the Site would be directly proportional to the amount of soil handling that occurs. Soil handling creates dust and the potential for exposure during the cleanup action. Since Alternative 3 involves the least amount of soil handling, it would rank the highest. Alternatives 2 and 1 would then follow, with increasing levels of soil handling.

Technical and administrative implementability

Implementability considers whether the alternative is technically possible; the availability of necessary off-site facilities, services, and materials; administrative and regulatory requirements; scheduling; size; complexity; monitoring requirements; access for operations and monitoring; and integrations with existing facility operations.

All alternatives are implementable at the Site. They are technically possible, have infrastructure to support them, and have similar size and access needs. Alternatives 2 and 3 would have administrative and regulatory requirements due to the need for maintenance, institutional controls, and monitoring. Alternative 1 ranks the highest, followed by alternatives 2 and 3 which are ranked equivalently.

Cost

An evaluation of cleanup costs must include both construction and post-construction costs, including for the design life and in the future. Cleanup costs are estimated based on design assumptions for each alternative. Although the costs are estimates based on design assumptions that might change, the relative costs can be used for this evaluation. For a detailed description of the costs involved with each alternative, please refer to the FS.

Alternative 1 would involve excavating all soils exceeding CULs and disposing them at an off-site permitted landfill. Costs include work plan/design preparation, mobilization, excavation, hauling, disposal, analytical costs, monitoring, and final report preparation. The estimate for this alternative is $2,930,852.

Alternative 2 involves removing soil contaminated with petroleum and PCBs, disposing at a permitted off-site landfill, and consolidation and capping of remaining soil. It includes costs for work plan/design preparation, mobilization, excavation, hauling, disposal, analytical costs, cap material and installation, monitoring, and final report preparation. The estimate for this alternative is $807,218.

Alternative 3 is the same as Alternative 2 but does not consolidate remaining contaminated soils. The activities are equivalent, but this alternative eliminates excavating and moving a portion of remaining contaminated soils. The estimate for this alternative is $720,119.

PMEP evaluation and results

Costs are disproportionate to the benefits if the incremental costs of an alternative are disproportionate to the incremental benefits of that alternative.

Based on the analysis of the factors above, Ecology determined Alternative 1 has the highest ranking for use of PMEP, and alternatives 2 and 3 are ranked fairly equivalently. Table 12 provides a summary of the relative ranking of each alternative in the decision process. The disproportionate cost analysis shows that the additional costs of Alternative 1 don't provide enough additional benefits to justify the cost.

Cleanup action expectations

Cleanup action expectations are outlined in WAC 173-340-370 and are described in the previous section. The alternatives would address applicable expectations in the following manner:

- All alternatives will remove the most hazardous contaminants (petroleum and PCBs) and dispose off-site.
- Alternatives 2 and 3 would use engineering controls to manage large volumes of materials at lower levels of contamination.
- Alternative 2 would consolidate contaminated soils to the extent practicable.
- Alternatives 2 and 3 would take active measures to prevent precipitation and runoff from contacting contaminated soil (see details in the Selected Cleanup Action section).

ARARs

All alternatives would comply with applicable state and federal laws listed in Table 11. Local laws, which can be more stringent, will govern actions when applicable. These will be established during the design phase of the project.

Decision

Based on the analysis described above, Ecology selected Alternative 3 as the proposed remedial action for the Site. Alternative 3 meets each of the threshold requirements. Furthermore, Alternative 3 uses PMEP and balances long-term effectiveness with short-term risks. The incremental cost of Alternative 1 does not justify the incremental benefit of removing all contaminated soil.

Selected Cleanup Action

The proposed cleanup action for the Site includes excavating soils contaminated with petroleum and PCBs and transporting them via truck to a permitted disposal facility. Soils remaining on-Site contaminated with PAHs and metals will be regraded and capped with either asphalt, concrete, or a minimum of 1 foot of clean soil. If clean soil is used as the barrier, permeable marker material (such as orange construction fencing) will be required to delineate clean soil from contaminated soil. Any soil brought to the Site, either as fill for grading purposes or as a barrier, must be tested to confirm that it is clean. Soil must be tested for the constituents in Table 10 and must meet the concentrations listed there.

Since the Site will likely be redeveloped, small amounts of soil movement and consolidation may occur to ensure contaminated soil will all be below a barrier. Contaminated soil will not be allowed to be in areas where stormwater infrastructure (such as swales) are located.

Because contaminated material would remain, periodic monitoring and maintenance, institutional controls, and future periodic reviews would be required for the property.

Ecology's part of the cleanup work

Ecology will be performing a portion of the work outlined above to address the most imminent risks to human health and the environment. PCBs have higher toxicity than the other Site contaminants, and diesel is more mobile and presents a leaching risk to groundwater. Additionally, site investigations indicate that PCB and diesel contamination is generally clustered in discrete areas rather than being more widely dispersed across the site. Ecology will perform the excavation portion of the prescribed remedy, and remaining contamination will be addressed by the property owner later.

Institutional controls

Institutional controls are measures taken to limit or prohibit activities that may interfere with the integrity of a cleanup action or result in exposure to hazardous substances at the Site. These measures are required to assure the continued protection of human health and the environment and the integrity of the cleanup action when hazardous substances remain at the Site at concentrations above applicable CULs. Institutional controls can include physical measures and legal and administrative mechanisms. WAC 173-340-440 provides information on institutional controls and the conditions under which they may be removed.

Because contamination will be left behind and remediation levels will be used, an environmental covenant (in conformance with the Uniform Environmental Covenants Act, Ch. 64-70 RCW) will be required.

Institutional controls will be included in the cleanup action to address soil contamination remaining below caps.

Financial assurances

WAC 173-340-440 states that financial assurance mechanisms shall be required at sites where the selected cleanup action includes engineered and/or institutional controls. Ecology has determined that financial assurances will not be required.

Periodic review

Until CULs are met, WAC 173-340-420 states, at sites where a cleanup action requires an institutional control, a periodic review shall be completed no less frequently than every five years after the initiation of a cleanup action. Periodic reviews will be required for the Site.

References

Department of Ecology, 2020, *Response to Comments, Stubblefield Salvage Yard Remedial Investigation/Feasibility Study and Public Participation Plan.*

Department of Ecology, 2024, *Model Toxics Control Act WAC 173-340.*

GeoEngineers, 2020, *Remedial Investigation/Feasibility Study.*

Appendix A. Figures

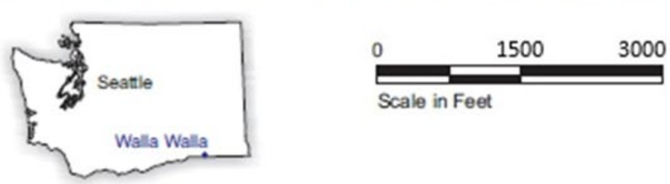

Figure 1. Site location

Figure 2. Site map and area layout

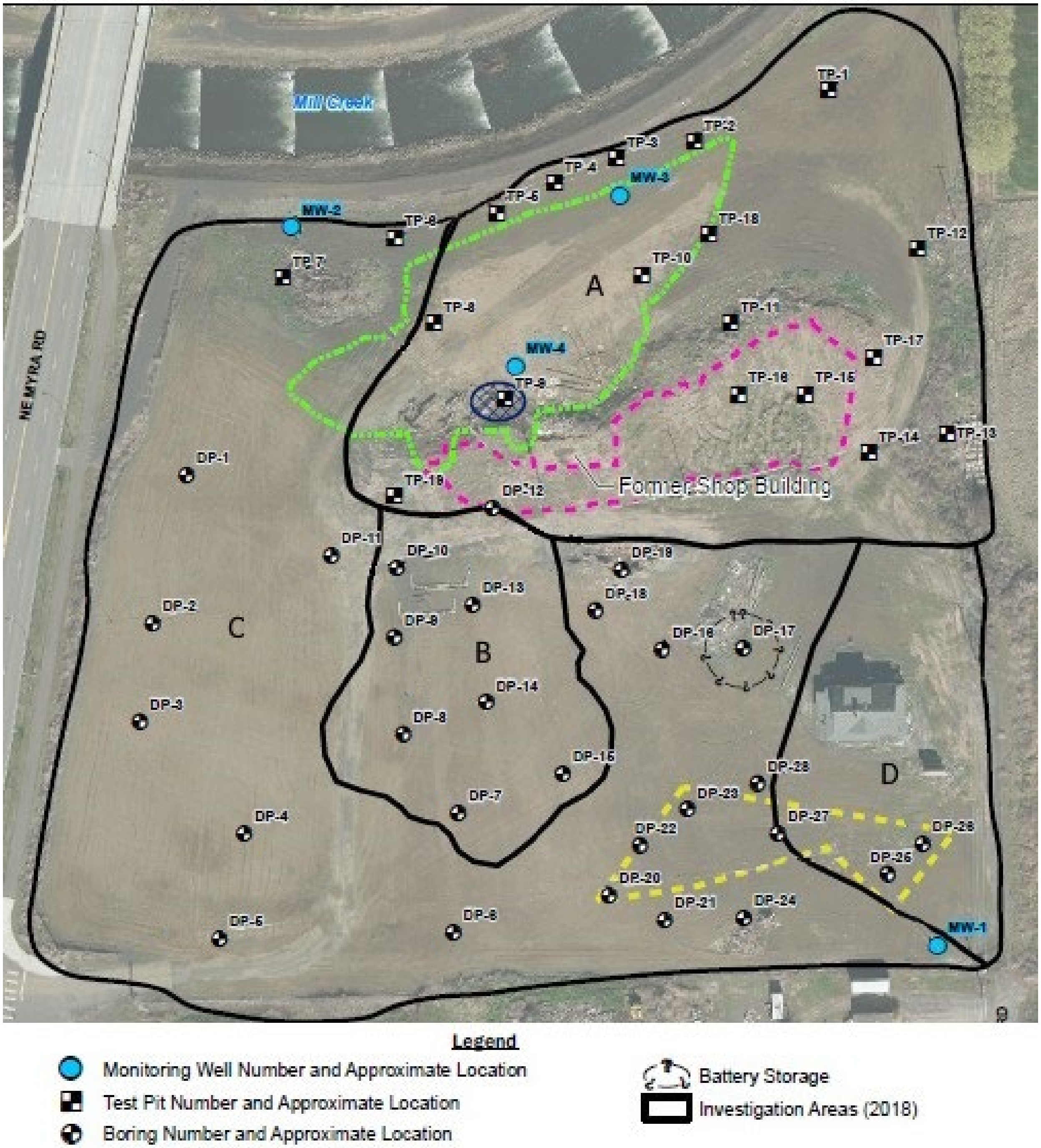

Figure 3. Remedial investigation sampling locations and monitoring well locations

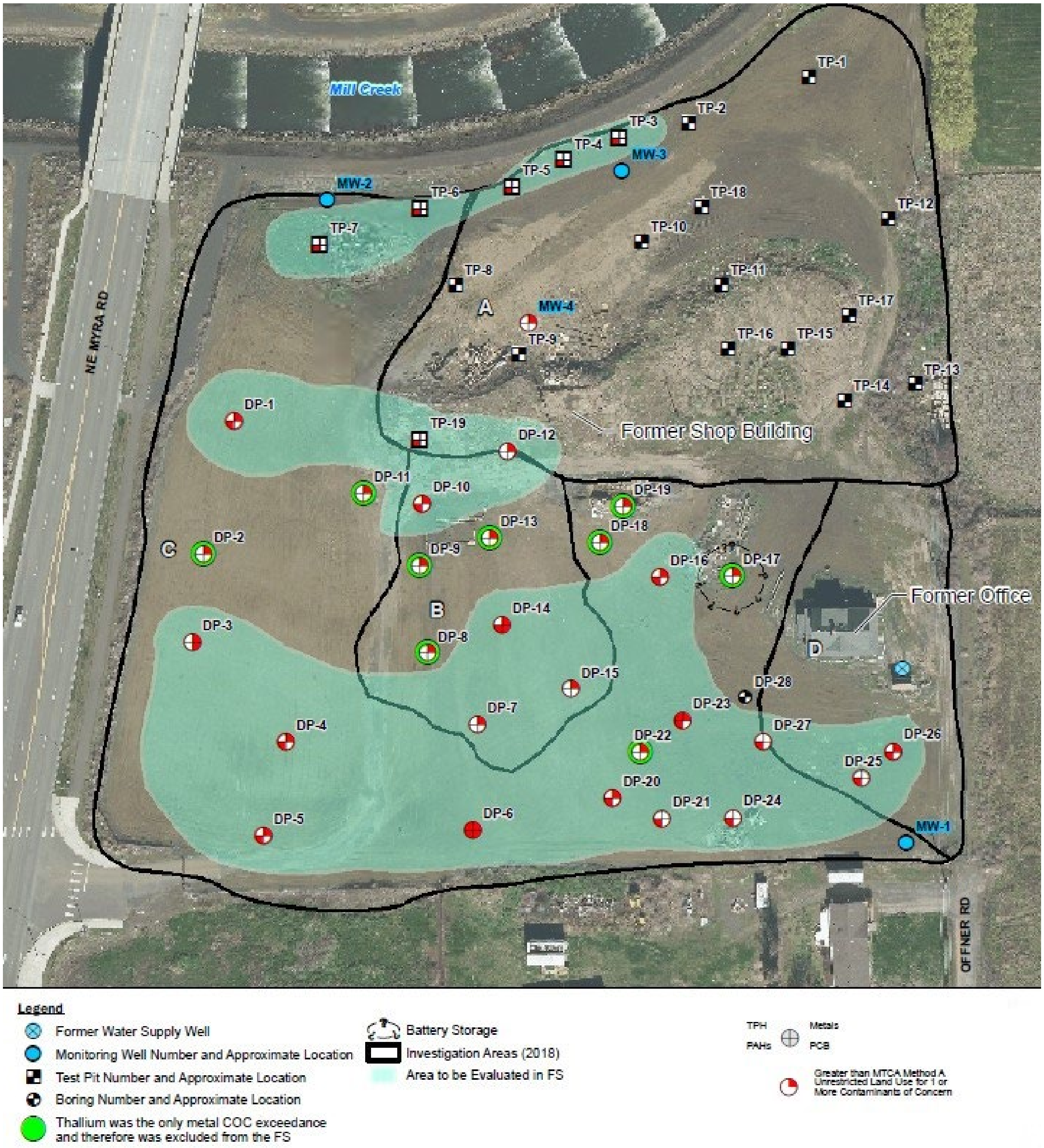

Figure 4. Remedial investigation sample results

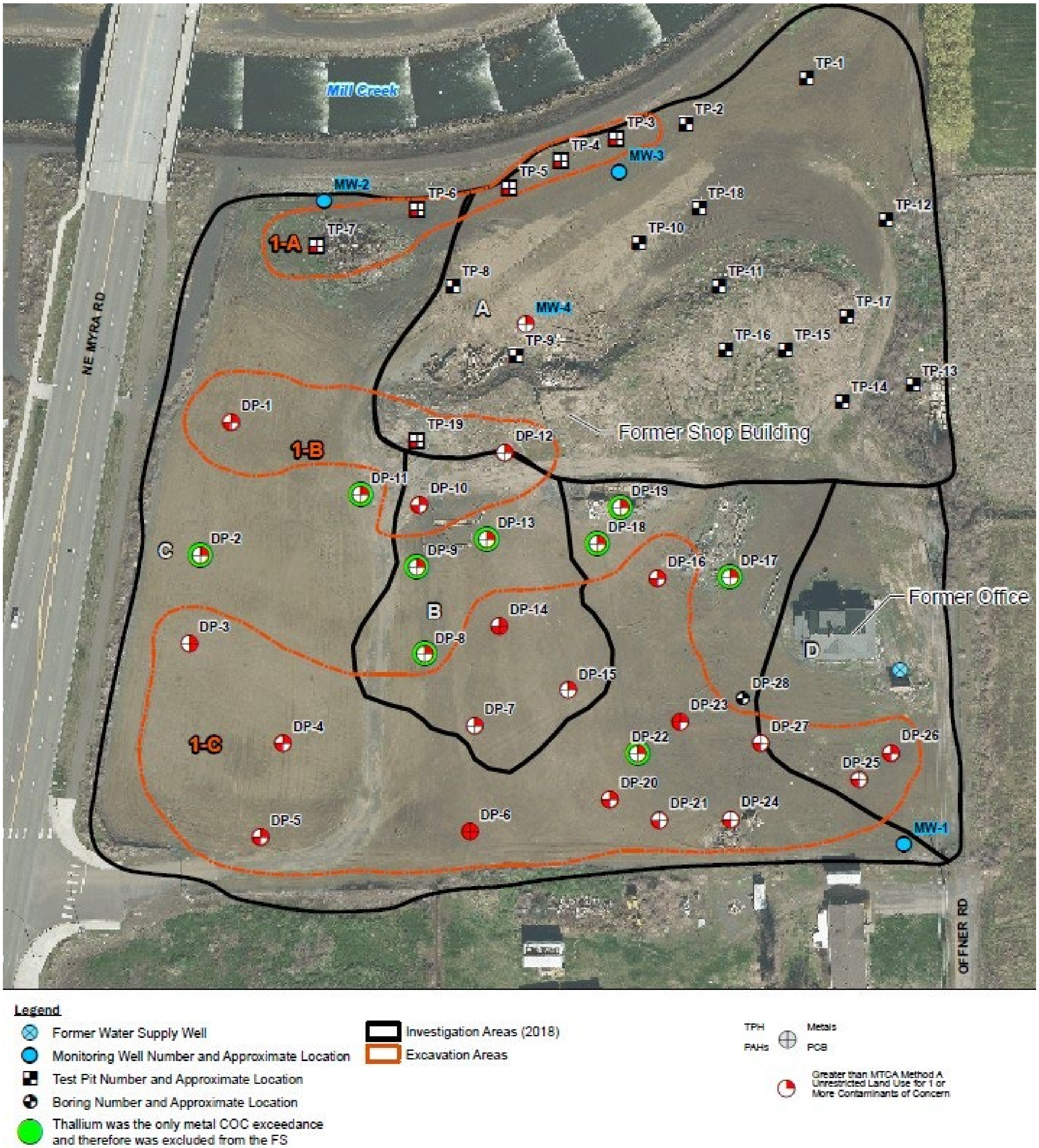

Figure 5. Alternative 1 plan

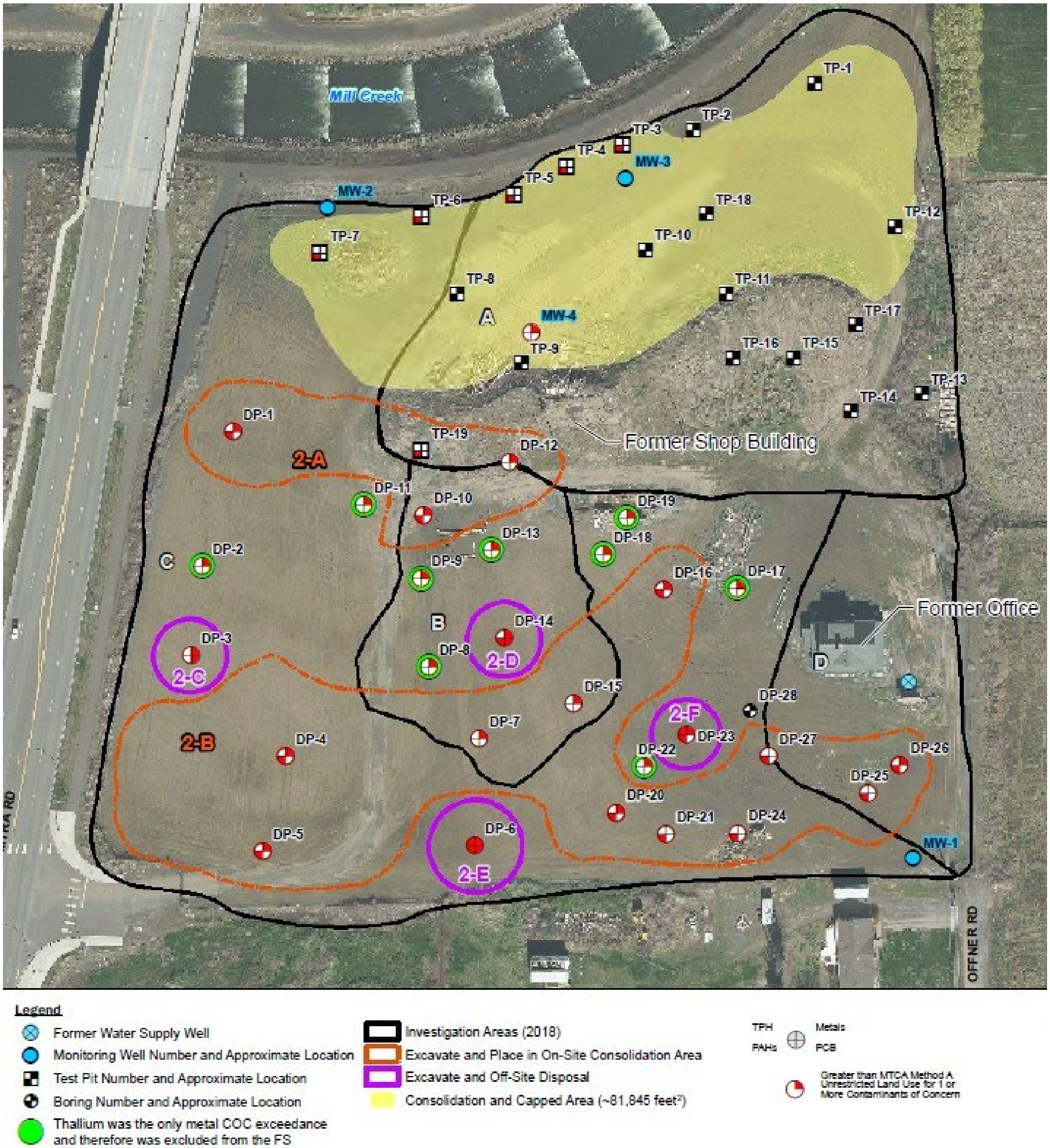

Figure 6. Alternative 2 plan

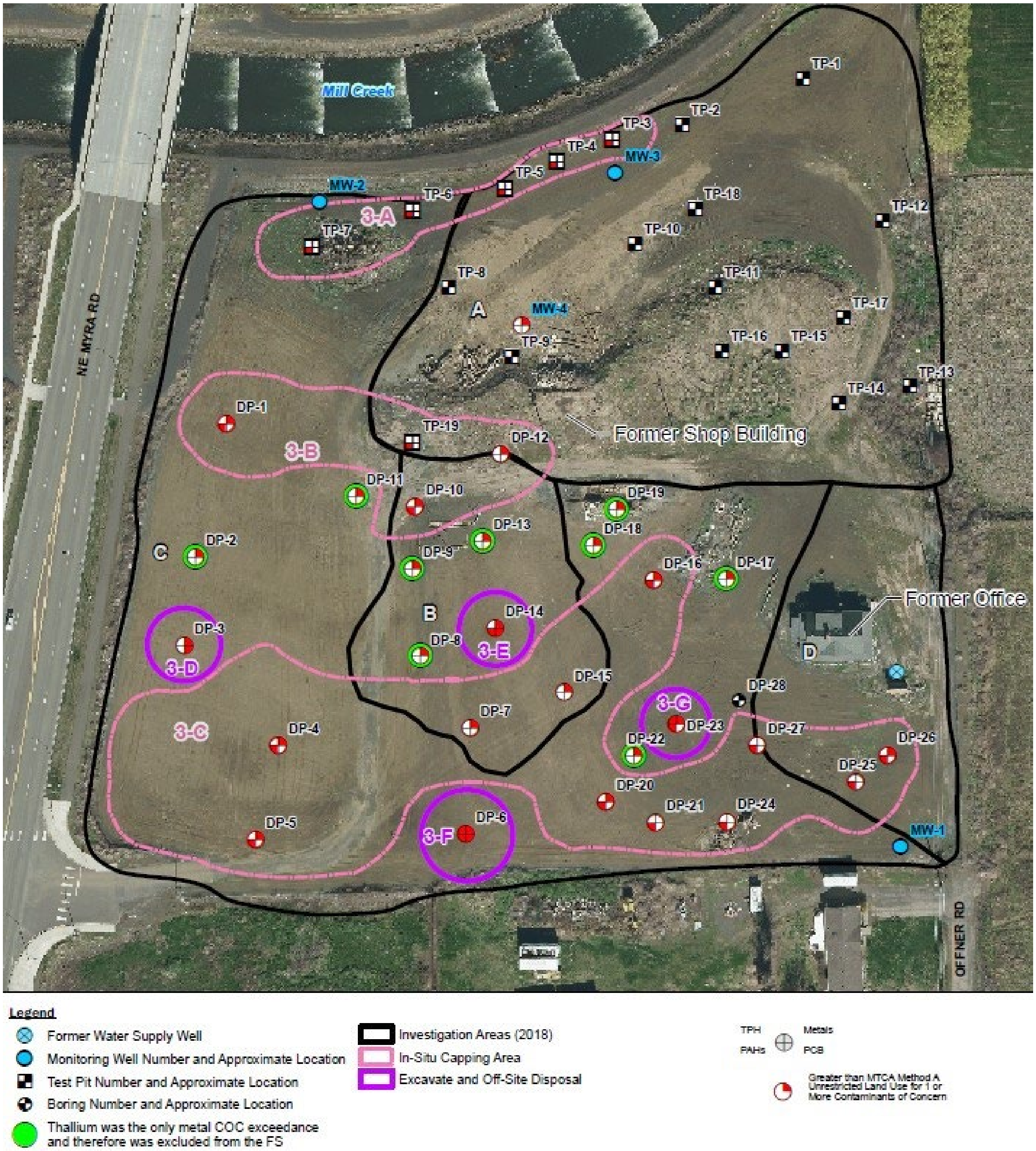

Figure 7. Alternative 3 plan

Appendix B. Tables

Table 1. Soil data summary

Site Area	Explorations	Depth (feet bgs)	Number of samples	Number of samples above CULs	Gasoline	Diesel	Motor Oil	VOCs	cPAHs	PCBs	Metals	Pesticides
Area A	1 direct push	5	2	1	X	X	X	X	X	X	E	NS
	17 test pits	8.5–16.5	34	4	X	X	X	X	E	X	X	X
	2 monitoring well borings	15	3	1	X	X	X	X	X	X	E	X
Area B	7 direct push	5	14	4	X	X	X	X	E	E	E	NS
Area C	18 direct push	3–5	36	12	X	E	X	X	E	E	E	NS
	2 test pits	5.5	4	2	X	X	X	X	E	X	X	X
	2 monitoring well borings	14–22	3	0	X	X	X	X	X	X	X	X
Area D	2 direct push	3–5	4	2	X	X	X	X	E	X	E	NS

Notes: X = at least one sample in the Site Area was analyzed for this class of contaminants
E/gray shading = at least one sample was above the cleanup level

bgs = below ground surface
cPAHs = carcinogenic polycyclic aromatic hydrocarbons
CUL = cleanup level
PCBs = polychlorinated biphenyls
VOCs = volatile organic carbons
NS = not sampled

Table 2. Groundwater monitoring results

Analyte (ug/L)	MW-1	MW-2	MW-3	MW-4
Volatile Organics				
Tetrachloroethene	0.36			
Semi-volatile organics				
Diethylphthalate			2.3	
bis(2-Ethylhexyl)phthalate			6.7	
Metals (total)				
Antimony		0.00012		
Arsenic	0.00024	0.00026	0.00034	0.0013

Notes: Groundwater was tested for petroleum hydrocarbons, metals, volatile organics, semi-volatile organics, and PCBs (polychlorinated biphenyls).
Only analytes that were detected in groundwater are shown.
The maximum detected concentration for each sampling location is shown.
A blank cell means that location had no detections.
Complete data tables are in the Remedial Investigation and Feasibility Study.

ug/L = micrograms per liter

Table 3. Area A soil results

Analyte	TP-2	TP-3	TP-4	TP-5	TP-8	TP-9	TP-10	TP-18	TP-19	MW-3
Petroleum hydrocarbons (mg/kg)										
Gasoline-range organics										1.4
Diesel-range organics		5.6	5.2	7.1	7.6	180			4.6	
Lube oil	7.8	19.1	15.4	24.5		184		6.2	12.2	
cPAHs (ug/kg)										
Acenaphthylene				55.9						
Anthracene				113						
Benzo(ghi)perylene		118	94.2	286					69.6	
Fluoranthene		272	224	846					166	
Phenanthrene		46.3	50	150					59.4	
Pyrene		305	251	949					164	
Benz[a]anthracene		164	142	531					103	
Benzo(a)pyrene		182	151	503					103	
Benzo(b)fluoranthene		195	157	566					123	
Benzo(k)fluoranthene		75.8	78.3	191						
Chrysene		159	143	528					112	
Dibenzo(a,h)anthracene				68.5						
Indeno(1,2,3-cd)pyrene		102	79.3	249					60.7	
Total cPAHs as benzo(a)pyrene		239.35	200.32	668.83					137.43	
Metals (mg/kg)										
Arsenic	1	1.4	1.9	1.3	1.1	1.1	7.6	7.8	1.5	1.3
Beryllium	0.34	0.4	0.44	0.38	0.37	0.51	0.89	1.2	0.58	
Cadmium	0.13	0.14	0.078	0.077	0.047	0.085	0.077	0.064	0.12	
Chromium (total)	3.4	6.4	8.4	6	3.7	6.8	8.5	6.7	7.2	4.1
Copper	16.7	17.9	13.9	12.1	10.9	12.6	21.8	14.9	20.5	14
Lead	19.6	29.7	13.1	21.2	6.6	3.4	3.9	6.6	14.6	3.5
Mercury	0.018	0.073	0.075	0.23	0.023		0.02	0.033	0.011	
Nickel	3.7	4.9	6.3	4.6	2.9	4.2	14	4.9	6.5	5.4
Silver	0.048	0.048	0.044	0.045			0.12			

Analyte	TP-2	TP-3	TP-4	TP-5	TP-8	TP-9	TP-10	TP-18	TP-19	MW-3
Thallium		0.27								
Zinc	63.7	61.8	49.4	56.2	35.6	53.2	44	57.4	75.4	43.5
PCBs (ug/kg)										
Aroclor 1242						194				
Pesticides (ug/kg)										
4,4'-DDD	1.6					2				
4,4'-DDE	7.6	9.9	1.6			3.8	4.6	20.2	1.4	
4,4'-DDT	2.6	27.3				3.2	0.83	2	2.4	
Aldrin						0.87				
Alpha-BHC						0.51				
Alpha-Chlordane (cis)	0.25	18.8								
Beta-BHC		15.7				0.9				
Dieldrin	0.99	4.2							1.2	
Endosulfan I	0.22	26.1								
Endosulfan II	1.2	9.8								
Endosulfan Sulfate		81.6	1.4							
Endrin Aldehyde		43.5								
Endrin Ketone		22.6								
Heptachlor						0.58				
Heptachlor Epoxide	0.32	5							0.42	
Methoxychlor		77.2								
Toxaphene	79.7								42.8	
Petroleum Hydrocarbons (mg/kg)										
Gasoline-range organics	2.7								8.8	
Diesel-range organics	85.1	5.4							334	7.5
Lube oil	127	20.6	10.5			6.5		8.5	525	13
Aromatic hydrocarbons (ug/kg)										
Toluene			21.4							22.2
Ethylbenzene					4.2					

Analyte	TP-2	TP-3	TP-4	TP-5	TP-8	TP-9	TP-10	TP-18	TP-19	MW-3
cPAHs (ug/kg)										
Acenaphthene		1.3								
Acenaphthylene		3.9								
Anthracene		1.7								
Benzo(ghi)perylene		10.8								
Fluorene		1.7								
Fluoranthene		9	82.7							
Phenanthrene		4.6	53							
Pyrene		10	88.9					39		
Benz[a]anthracene		5.6								
Benzo(a)pyrene		8.5								
Benzo(b)fluoranthene		10.6	59.8							
Benzo(k)fluoranthene		4.5								
Chrysene		6.6								
Dibenzo(a,h)anthracene		2.1								
Indeno(1,2,3-cd)pyrene		8.1								
Bis(2-Ethylhexyl) Phthalate									145	
Total cPAHs as benzo(a)pyrene		11.66	38.22					32.69		
Metals (mg/kg)										
Arsenic	5.6	1.8	1.7	1.7	1.6	2.2	3.4	1.7	2.8	1.8
Beryllium	0.11		0.79	0.54	0.51	0.53	0.94	0.62	0.57	0.99
Cadmium		0.53	0.1	0.037	0.078	0.1	0.048	0.076	0.28	
Chromium (total)	9.8	8	7.6	6.6	6.5	6.9	12.6	7.6	7.5	9.2
Copper	25.8	30.1	16.8	15.1	13.7	16.1	16.7	14.6	18.7	19.8
Lead	499	542	17.7	3.4	3.6	21.3	6.6	10.2	88.9	6
Lead (TCLP)		0.19								
Mercury	0.041		0.057			0.044		0.049	0.049	0.01
Nickel	16.8	9.4	5.6	5.3	5.8	6	9.2	5.6	5.7	7
Silver			0.064					0.098		
Thallium		3.6		0.47					0.4	
Zinc	71.6	171	88.6	46.1	45.7	54	71.3	68	94.7	67.6

Analyte	TP-2	TP-3	TP-4	TP-5	TP-8	TP-9	TP-10	TP-18	TP-19	MW-3
PCBs (ug/kg)										
Aroclor 1242	21									
Aroclor 1260	145	37.9							134	
Pesticides (ug/kg)										
4,4'-DDD			3.3						55.5	
4,4'-DDE			93.9			0.54		266	318	
4,4'-DDT			31			0.7		45.3	5.3	
Alpha-BHC									2.5	
Alpha-Chlordane (cis)			0.49						1.7	
Beta or gamma-Chlordane (trans)			1.7						5.1	
Dieldrin									3.2	
Heptachlor Epoxide			2					2.6	12.4	

Notes: Soil was tested for petroleum hydrocarbons, metals, volatile organics, semi-volatile organics, carcinogenic polycyclic aromatic hydrocarbons, and pesticides.
Only analytes that were detected in groundwater are shown.
The maximum detected concentration for each sampling location is shown.
A blank cell means that location had no detections.
Complete data tables are in the Remedial Investigation and Feasibility Study.

cPAH = carcinogenic polycyclic aromatic hydrocarbons
mg/kg = milligrams per kilogram
PCB = polychlorinated biphenyls
TCLP = toxicity characteristic leaching procedure
ug/kg = micrograms per kilogram

Table 4. Area B soil results

Analyte	DP-7	DP-8	DP-9	DP-10	DP-13	DP-14	DP-15
Petroleum hydrocarbons (mg/kg)							
Gasoline-range organics		1.7			1.3	1.5	
Diesel-range organics	5.4				7.5	114	110
Lube oil	168	15	6.5	7.1	22.8	431	377
Aromatic hydrocarbons (ug/kg)							
Benzene						7.5	12.3
Ethylbenzene			3.5			5.6	
Volatile organics (ug/kg)							
Methylene chloride						4.6	
Styrene						826	
cPAHs (ug/kg)							
1-Methylnaphthalene						1.6	
2-Methylnaphthalene						2	
Naphthalene						1.7	
Acenaphthene	1.5			2.4	0.73	7.4	
Acenaphthylene				1.1	2.6	7.3	6.6
Anthracene	6.2			22.9	2	39.4	11.5
Benzo(ghi)perylene	10.6	5		121	9.6	88	11.6
Fluorene	1.2			1.6	0.99	7.1	3.9
Fluoranthene	27.6	6.9	4	347	11.4	241	31.8
Phenanthrene	15.3	6.4		47.5	5.1	114	30.6
Pyrene	25.9	6	3.5	353	11.7	220	31.4
Benz[a]anthracene	14.5	3.6	2.2	250	7.1	150	16.5
Benzo(a)pyrene	13.4	4.1	2	196	10.5	142	16.7
Benzo(b)fluoranthene	18.2	5.6	3	272	13.8	194	18.3
Benzo(k)fluoranthene	7.5	2.4	1.6	108	5.6	77.1	7.8
Chrysene	15.3	4	2.8	263	8.8	157	12.3

Analyte	DP-7	DP-8	DP-9	DP-10	DP-13	DP-14	DP-15
Dibenzo(a,h)anthracene	2			39.6	2.5	23.2	
Indeno(1,2,3-cd)pyrene	8.4	3.8		107	6.3	71.6	9
Total cPAHs as benzo(a)pyrene	18.61	6.34	3.97	276.3	14.12	195.2	22.6
Metals (mg/kg)							
Antimony	2.9						1.6
Arsenic	2.7	2.9	1.7	1.7	2	4.8	2.8
Beryllium	0.058	0.077	0.04	0.11	0.029	0.059	0.036
Cadmium	1.4	0.34	0.26	0.22		2.5	1.1
Chromium (total)	12.4	11.7	7.5	8	6.7	18.1	8.8
Copper	113	36.9	18.6	18.5	34.8	139	74.5
Lead	107	54.1	5.3	8.7	53.7	128	277
Mercury	0.28	0.019		0.022	0.21	0.12	0.21
Nickel	13.3	10.1	8.2	7.7			
Selenium					8.6	17.6	10.5
Silver						0.19	
Thallium	3.5	3.8	4.3	3.4	0.96	1.1	0.86
Zinc	223	111	53.4	65.1	105	383	228
PCBs (ug/kg)							
Aroclor 1248					210	1620	488
Aroclor 1254	798				119		352
Aroclor 1260		70.6	66.7			868	

Notes: Soil was tested for petroleum hydrocarbons, metals, volatile organics, semi-volatile organics, cPAHs, and pesticides.
Only analytes that were detected in groundwater are shown.
The maximum detected concentration for each sampling location is shown.
A blank cell means that location had no detections.
Complete data tables are in the Remedial Investigation and Feasibility Study.

cPAH = carcinogenic polycyclic aromatic hydrocarbons
mg/kg = milligrams per kilogram
PCB = polychlorinated biphenyl
ug/kg = micrograms per kilogram

Table 5. Area C West soil results

Analyte	DP-1	DP-2	DP-3	DP-4	DP-5	DP-6	DP-11	TP-6	TP-7	MW-2
Petroleum hydrocarbons (mg/kg)										
Gasoline-range organics						2.5		2	4	
Diesel-range organics	44.6		14.1		18.7	507		15.8	14.2	
Lube oil	209	8.2	40.7	10.5	65.6	833	5.7	38.2	85.4	
Volatile organics (ug/kg)										
Acetone	931	817	858	1240	941	904				
1,2-Dichloroethane								9.3		
cPAHs (ug/kg)										
1-Methylnaphthalene	6.3									
2-Methylnaphthalene	4.4				0.85					
Naphthalene	3.3				1.2	1040				
Acenaphthene	3.2	0.79		20.7	3	1840	1.4			
Acenaphthylene	45.3				4.4		3.9			
Anthracene	43	0.71	1.1	177	21.1	6200	1.7	59.8	53.5	
Benzo(ghi)perylene	72.4		5.4	303	59.3	9160		263	88.2	
Fluorene	18.1		1.2	8.6	2.6	1970	1.8			
Fluoranthene	259	1.6	9.2	2220	195	42000	1.6	632	261	32.6
Phenanthrene	123		3.5	98.7	57.7	20100	2.7	119	102	15.4
Pyrene	235		8.7	2240	184	37000		684	278	33.1
Benz[a]anthracene	147		6.6	1380	108	20700		379	133	18.1
Benzo(a)pyrene	122		6.2	804	77	14200	1.1	412	141	19.8
Benzo(b)fluoranthene	175	0.63	9.1	1070	126	19300		0	135	19.6
Benzo(k)fluoranthene	66.4		3.5	484	48.1	8310		188	61.1	
Chrysene	161		6.2	1260	115	18900		412	120	17
Dibenzo(a,h)anthracene	26.3		1	116	12.1	1890				
Indeno(1,2,3-cd)pyrene	62.6		4.2	300	48.4	7440		230	72.5	
Total cPAHs as benzo(a)pyrene	171.3	8.59	8.7	1151.6	112.41	20153	4.24	541.82	184.29	23.89

Analyte	DP-1	DP-2	DP-3	DP-4	DP-5	DP-6	DP-11	TP-6	TP-7	MW-2
Metals (mg/kg)										
Arsenic	5.6	2.3	2.2	2.2	3.2	5.2	2.2	2	2.2	
Beryllium		0.087		0.041	0.1			0.45	0.57	
Cadmium	1.9	0.21	0.44		0.53	6.3	0.18	0.13	0.23	0.17
Chromium (total)	163	7.1	8.6	8.2	10.3	60.1	8.1	9.1	9.4	5.4
Copper	97.2	18.2	42.7	20.2	63.1	336	16.6	18	21.1	17.7
Lead	158	4.5	46.4	24.8	123	865	6.6	21.4	45.4	16
Lead (TCLP)						0.64				
Mercury	0.1		0.069	0.026	0.072	1		0.1	0.11	
Nickel	48.5	8.4	9.3	9.4	10.6	48.3	7.7	7.8	7	8.1
Silver								0.065	0.056	
Thallium	5.7	3.7	5.6	3.8	3.8	5.1	3.8			
Zinc	506	60.4	153	68.8	114	1690	61.3	73	107	65
PCBs (ug/kg)										
Aroclor 1260		17.8	1310	79.5	189				360	
Total									360	
Pesticides (ug/kg)										
4,4'-DDD									8.1	
4,4'-DDE								4	32.4	2.4
4,4'-DDT								0.89	6.8	
Aldrin									1.1	
alpha-Chlordane (cis)								0.35	1.7	
beta or gamma-Chlordane (trans)									4.5	
beta-BHC									1.8	
Dieldrin									5.7	
Endosulfan I									0.84	
Endosulfan II									2.7	
Endosulfan Sulfate								2.1	2.7	

Analyte	DP-1	DP-2	DP-3	DP-4	DP-5	DP-6	DP-11	TP-6	TP-7	MW-2
Endrin Aldehyde									5.1	
Heptachlor Epoxide									1.5	
Methoxychlor								11.2		
Toxaphene									183	

Notes: Soil was tested for petroleum hydrocarbons, metals, volatile organics, semi-volatile organics, cPAHs, and pesticides.
Only analytes that were detected in groundwater are shown.
The maximum detected concentration for each sampling location is shown.
A blank cell means that location had no detections.
Complete data tables are in the Remedial Investigation and Feasibility Study.

cPAH = carcinogenic polycyclic aromatic hydrocarbons
mg/kg = milligrams per kilogram
PCB = polychlorinated biphenyl
TCLP = toxicity characteristic leaching procedure
ug/kg = micrograms per kilogram

Table 6. Area C & D Southeast soil results

Analyte	DP-16 (Area C)	DP-17 (Area C)	DP-18 (Area C)	DP-19 (Area C)	DP-20 (Area C)	DP-21 (Area C)	DP-22 (Area C)	DP-23 (Area C)	DP-24 (Area C)	DP-25 (Area D)	DP-26 (Area D)	DP-27 (Area D)	DP-28 (Area C)	MW-1 (Area C)
Petroleum hydrocarbons (mg/kg)														
Gasoline-range organics						1.8	2.4				3.2	2.9	5.7	
Diesel-range organics				8.3		35.7		2510	14.5	8.4	11.6	14		
Lube oil	6.9			40	8.7	34.7		1670	48.5	26.7	34	28.5		
Aromatic Hydrocarbons (ug/kg)														
Toluene	12.6	11.1	6.3	8.1					31.7					
Ethylbenzene									3.8					
cPAHs (ug/kg)														
1-Methylnaphthalene				0.91					1.1	3.4	0.78			
2-Methylnaphthalene				1.2			163		1.6	1.6	0.84			
Naphthalene	56.1			0.89	83.8	2.7		27.9	1.6	4.1	0.97			
Acenaphthene				2	92.2	17.3	1.2	452	11.5	13.8	21.1	10.6		
Acenaphthylene	358			4.4	666	46.2	2.6		17.2	56.6	1.5	2.3		
Anthracene	221			24.3	197	230	7.4	1910	59.1	137	100	69.3	4.3	
Benzo(ghi)perylene	54.9			0.8	151	4.4		636	90	194	113	63.1	10.6	
Fluorene	1480		0.62	24.7	7020	494	14.7	472	9.6	31.9	16.8	11.4		
Fluoranthene	1080			11.5	2630	79.9	4.5	5430	372	584	332	234	10.3	
Phenanthrene	1260			22.4	5590	611	13.6	4800	183	428	256	182	5.5	
Pyrene	578			11.9	1510	204	5.6	4790	299	583	288	237	11.9	
Benz[a]anthracene	378			12.2	498	245	6.7	1910	118	273	175	130	7.9	
Benzo(a)pyrene	522		0.87	28.2	1190	510	13.4	1070	83.9	278	164	119	9.4	
Benzo(b)fluoranthene	224			10.9	503	204	5.4	1640	265	325	216	130	15	
Benzo(k)fluoranthene	553			15.7	1880	394	10.1	856	93.9	92.1	64.4	60	6	
Chrysene	61.3			7.2	83	58.9	1.6	1860	234	241	171	106	10.3	
Dibenzo(a,h)anthracene	208			17.7	194	173	5.6	145	34.8	40.5	37.5	18.7		
Indeno(1,2,3-cd)pyrene	543		8.76	19.95	865	364	9.96	595	80.7	11.8	101	63.2	8.1	
Total cPAHs as benzo(a)pyrene								1603	145	369	225	160	13.8	
Metals (mg/kg)	2.8	1.8	2.2	2.3	2.6	2.2	1.3							
Antimony			0.097		0.09	0.049	0.046				7.6			
Arsenic	1.9	0.23	0.15	1.5	3	0.13	0.04	2.3	1.6	1.3	1.4	1.6	1.4	2.1
Beryllium	29.7	9.2	7.5	31.5	30.1	7	9.5		0.049			0.047		0.12
Cadmium	193	23	20.8	71.7	555	21.7	18	1.4	0.46	0.045	0.18	0.4	0.24	0.16
Chromium (total)	118	5	4.5	82.5	295	184	10.7	23.1	7.2	5.5	10.8	8.1	6	11.1
Copper	0.07			0.027	0.12	0.028	0.014	473	65	16.7	98.8	52.5	46.3	16.1
Lead		9.2	8.7	21.3	20.9	6.7	7.6	91.8	79.4	8.1	1600	38.4	22	5.3
Mercury	22.5	7.8						0.057	0.051	0.02	0.047	0.047	0.032	0.011
Nickel								15.7	6.4	4.8	6.9	6.3	5.7	9.5
Silver	4	4.1	3.3	3.4	2.3	0.4	0.9				0.71			
Thallium	256	64.8	52.7	264	592	66.1	40.6	1.8	0.52	0.77	0.76	0.71	0.61	

Analyte	DP-16 (Area C)	DP-17 (Area C)	DP-18 (Area C)	DP-19 (Area C)	DP-20 (Area C)	DP-21 (Area C)	DP-22 (Area C)	DP-23 (Area C)	DP-24 (Area C)	DP-25 (Area D)	DP-26 (Area D)	DP-27 (Area D)	DP-28 (Area C)	MW-1 (Area C)
Zinc								568	94.6	43.2	70.2	102	68.7	48.5
PCBs (ug/kg)				69.5		22.9	25.7							
Aroclor 1254								625						
Aroclor 1260									58		19.3	28.8		
Pesticides (ug/kg)														
4,4'-DDE														2.6
4,4'-DDT														2.4

Notes: Soil was tested for petroleum hydrocarbons, metals, volatile organics, semi-volatile organics, cPAHs, and pesticides.
Only analytes that were detected in groundwater are shown.
The maximum detected concentration for each sampling location is shown.
A blank cell means that location had no detections.
Complete data tables are in the Remedial Investigation and Feasibility Study.

cPAH = carcinogenic polycyclic aromatic hydrocarbons
mg/kg = milligrams per kilogram
PCB = polychlorinated biphenyl
ug/kg = micrograms per kilogram

Table 7. Groundwater detection frequency

Analyte	Total samples	Number of detections	Detection frequency	Maximum concentration (ug/L)
VOCs				
Tetrachloroethene	4	1	25%	0.36
SVOCs				
Diethylphthalate	4	1	25%	2.3
bis(2-Ethylhexyl)phthalate	4	1	25%	6.7
Metals (total)				
Antimony	4	1	25%	0.00012
Arsenic	4	4	100%	0.0013

Note: Table only includes analytes that were detected.

ug/L = micrograms per liter
VOCs = volatile organic compounds
SVOCs = semi-volatile organic compounds

Table 8. Soil detection frequency

Analyte	Total samples	Number of detections	Detection frequency	Maximum concentration (mg/kg)
Petroleum hydrocarbons				
Gasoline-range organics	100	22	22%	8.8
Diesel-range organics	100	40	40%	2510
Lube oil	100	60	60%	1670
VOCs				
1,2-Dichloroethane (EDC)	96	1	1%	0.0543
1,2,3-Trichlorobenzene	96	1	1%	0.0161
Acetone	96	27	28%	1.59
Benzene	96	11	11%	0.0126
Chloromethane	96	1	1%	0.041
Ethylbenzene	96	4	4%	0.0056
Methylene Chloride	100	2	2%	0.0058
Styrene	96	1	1%	0.826
Toluene	96	3	3%	0.0317
SVOCs				
1-Methylnaphthalene	100	5	5%	0.342
2-Methylnaphthalene	100	7	7%	0.323
Acenaphthene	100	23	23%	1.84
Acenaphthylene	100	22	22%	0.316
Anthracene	100	39	39%	6.2
Benzo(ghi)perylene	100	38	38%	9.16
bis(2-Ethylhexyl)phthalate	44	1	2%	2.36
Dibutyl Phthalate	44	1	2%	2.05
Fluorene	100	27	27%	1.97
Fluoranthene	100	59	59%	42
Naphthalene	100	10	10%	1.04

Analyte	Total samples	Number of detections	Detection frequency	Maximum concentration (mg/kg)
Phenanthrene	100	39	39%	20.1
Pyrene	100	46	46%	37
cPAHs				
Benz[a]anthracene	100	42	42%	20.7
Benzo(a)pyrene	100	43	43%	14.2
Benzo(b)fluoranthene	100	48	48%	19.3
Benzo(k)fluoranthene	100	39	39%	8.31
Chrysene	100	41	41%	18.9
Dibenzo(a,h)anthracene	100	27	27%	1.89
Indeno(1,2,3-cd)pyrene	100	38	38%	7.44
Total cPAHs as benzo(a)pyrene	100	49	49%	20.153
PCBs				
Aroclor 1242	100	2	2%	0.194
Aroclor 1248	100	3	3%	1.62
Aroclor 1254	100	11	11%	5.3
Aroclor 1260	100	16	16%	1.31
Total PCBs	100	29	29%	5.3
Metals				
Antimony	100	3	3%	7.6
Arsenic	100	95	95%	7.8
Beryllium	100	61	61%	1.2
Cadmium	100	69	69%	6.3
Chromium (total)	100	100	100%	163
Copper	100	100	100%	555
Lead	100	100	100%	1600
Lead (TCLP) (mg/L)	3	2	67%	0.64
Mercury	100	57	57%	1
Nickel	100	100	100%	48.5

Analyte	Total samples	Number of detections	Detection frequency	Maximum concentration (mg/kg)
Silver	100	11	11%	0.71
Thallium	105	58	55%	0.21
Zinc	100	100	100%	1690
Pesticides				
4,4'-DDD	44	6	14%	0.0555
4,4'-DDE	44	23	52%	0.318
4,4'-DDT	44	16	36%	0.0453
Aldrin	44	2	5%	0.002
alpha-BHC	44	2	5%	0.0025
alpha-Chlordane	44	6	14%	0.0188
beta-BHC	44	3	7%	0.0157
Dieldrin	44	5	11%	0.0057
Endosulfan I	44	3	7%	0.0261
Endosulfan II	44	3	7%	0.0098
Endosulfan sulfate	44	4	9%	0.0816
Endrin aldehyde	44	2	5%	0.0435
Endrin ketone	44	1	2%	0.0226
gamma-Chlordane	44	3	7%	0.0051
Heptachlor	44	1	2%	0.0022
Heptachlor epoxide	44	8	18%	0.0124
Methoxychlor	44	2	5%	0.0772
Toxaphene	44	3	7%	0.183

Notes: Cleanup level for TCLP lead based on WAC 173-303-090(8) and WAC 173-303-090(8)(c).
For thallium, only method EPA 6020B results from on-site samples considered.

cPAH = carcinogenic polycyclic aromatic hydrocarbons
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
PCB = polychlorinated biphenyl
TCLP = toxicity characteristic leaching procedure

Table 9. Groundwater cleanup level evaluation

Analyte	Maximum concentration	Federal MCL	WA MCL	MTCA cancer risk at MCL	MTCA Hazard Quotient at MCL	Is MCL Protective?	Adjusted MCL	MTCA Method A	MTCA Method B cancer	MTCA Method B non-cancer	Applicable background	Final CUL	Indicator?	Basis
VOCs														
Tetrachloroethene	0.36	5*	5	2.4x10-7	0.104	yes		5	21	48		5	no	Less than MCL
SVOCs														
Diethylphthalate	2.3									13000*		13000	no	Less than Method B
bis(2-ethylhexyl)phthalate (BEHP)	6.7	6*	6	9.6x10-7	0.038	yes			6.3	320		6	no	See footnote
Metals (total)														
Antimony	0.00012	6*	6		0.938	yes				6.4		6	no	Less than MCL
Arsenic	0.0013	10	10	1.71×10^{-4}	2.083	no	0.058*	5	0.058	4.8	5	0.058	no	Less than adjusted MCL and less than background

Notes: All concentrations are micrograms per liter.
* = number assigned as final cleanup level
"Based on the low BEHP concentration (less than twice the cleanup level) and the low frequency of detection (only one sample), BEHP was not carried forward as an indicator of hazardous substances per WAC 173-340-720(9)"

CUL = cleanup level
MCL = maximum contaminant level (federal maximum contaminant level goals are the same as the MCL so are not included)
MTCA = Model Toxics Control Act
SVOC = semi-volatile organic compound
VOC = volatile organic compound
WA = Washington

Table 10. Soil cleanup level evaluation

Analyte	Maximum Concentration	MTCA Method A Unrestricted	MTCA Method B Cancer	MTCA Method B Non-cancer	Present in Groundwater?	If present, CUL to protect groundwater	Applicable Background	Final cleanup level (CUL)	Indicator?	Basis
Petroleum hydrocarbons										
Gasoline-range organics	8.8	30			No			30	No	less than CUL
Diesel-range organics	2,510	2,000*			No			**2,000**	**Yes**	MTCA Method A
Motor oil-range organics	1,670	2,000			No			2,000	No	less than CUL
Volatile organic compounds										
Acetone	1.59			72,000	No			72,000	No	less than CUL
Benzene	0.0126	0.03	18	320	No			0.03	No	less than CUL
Naphthalene	1.04	5		1,600	No			5	No	less than CUL
2-Methylnaphthalene	0.0044			320	No			320	No	less than CUL
Carcinogenic polycyclic aromatic hydrocarbons (cPAHs)										
Benzo(a)pyrene	14.2	0.1*	0.19	24	No			**0.1**	**Yes**	MTCA Method A
Total cPAHs as Benzo(a)pyrene	20.153	0.1*	0.14		No			**0.1**	**Yes**	MTCA Method A
PCBs (polychlorinated biphenyls)										
Aroclor 1254	5.3		0.5	0.6	No					MTCA Method A based on total
Aroclor 1260	1.31		0.5		No					MTCA Method A based on total
Total PCBs	5.3	1			No			**1**	**Yes**	MTCA Method A
Metals										
Arsenic	7.8	20	0.67	24	Yes	2.9	7	20	No	less than CUL
Beryllium	1.2			160	No		2	160	No	less than CUL
Cadmium	6.3	2*		80	No		1	**2**	**Yes**	MTCA Method A
Chromium (VI)	163	19*	0.38	240	No		42	**42**	**Yes**	background
Copper	555			3,200	No		36	3,200	No	less than CUL
Lead	1,600	250*			No		17	**250**	**Yes**	MTCA Method A
Mercury	1	2			No		0.07	2	No	less than CUL
Nickel	48.5			1,600	No		38	1600	No	less than CUL
Silver	0.71			400	No		NR	400	No	less than CUL
Thallium	0.21			0.8	No		NR	0.8	No	less than CUL
Zinc	1,690			24,000	No		86	24,000	No	less than CUL
Pesticides										
4,4'-DDD	0.0555		4.2	2.4	No			2.4	No	less than CUL
4,4'-DDE	0.318		2.9	24	No			2.9	No	less than CUL
4,4'-DDT	0.0453	3	2.9	40	No			2.9	No	less than CUL
beta-BHC	0.0157		0.56		No			0.56	No	less than CUL
Dieldrin	0.0057		0.063	4	No			0.063	No	less than CUL
Heptachlor epoxide	0.0124		0.11	1	No			0.11	No	less than CUL
Toxaphene	0.183		0.91	7.2	No			0.91	No	less than CUL

Notes: All concentrations are in milligrams per kilogram. * = number assigned as final CUL. For thallium, only EPA Method 6020B results from on-site samples were considered.

Table 11. Applicable or relevant and appropriate requirements

Cleanup Action Implementation	
Ch. 18.104 RCW Ch. 173-160 WAC Ch. 173-162 WAC	Water Well Construction Minimum Standards for Construction and Maintenance of Water Wells Rules & Regulations Governing the Licensing of Well Contractors & Operators
Ch. 70A.305 RCW Ch. 173-340 WAC	Model Toxics Control Act; MTCA Cleanup Regulation
Ch. 43.21C RCW Ch. 173-802 WAC Ch. 197-11 WAC	State Environmental Policy Act SEPA Procedures SEPA Rules
42 USC 103 40 CFR I,J	CERCLA Hazardous Waste Regulations
Ch. 173-303 WAC Ch. 173-304 WAC Ch. 173-333 WAC	Dangerous Waste Management Solid Waste Handling Standards Bioaccumulation Toxins Rule
Ch. 90.48 RCW	Water Pollution Control
16 USC 469 25 USC 32	Preservation of Historical and Archeological Data Native American Graves Protection and Repatriation
Ch. 173-60 WAC Ch. 296-62 WAC Ch. 296-155 WAC 29 CFR 1910	Noise Levels General Occupational Health Standards Safety Standards for Construction Work Occupational Safety and Health Act
Groundwater and Surface Water	
42 USC 300	Safe Drinking Water Act
33 USC 1251; 40 CFR 131; Ch. 173-201A WAC	Clean Water Act of 1977 Water Quality Standards
Ch. 70A.305 RCW Ch. 173-340 WAC	Model Toxics Control Act MTCA Cleanup Regulation
40 CFR 141 40 CFR 143	National Primary Drinking Water Standards National Secondary Drinking Water Standards
Ch. 246-290 WAC	Department of Health Standards for Public Water Supplies
Ch. 173-154 WAC	Protection of Upper Aquifer Zones
Air	
42 USC 7401; 40 CFR 50	Clean Air Act of 1977 National Ambient Air Quality Standards
Ch. 70.94 RCW; Ch. 43.21A RCW; Ch. 173-400 WAC Ch. 173-460 WAC Ch. 173-470 WAC	Washington Clean Air Act General Regulations for Air Pollution Controls for New Sources of Air Pollution Ambient Air Quality Standards for Particulate Matter
Ch. 70A.305 RCW; Ch. 173-340 WAC	Model Toxics Control Act MTCA Cleanup Regulation

Table 12. Alternative evaluation

Criteria	Alternative 1: Complete Excavation	Alternative 2: Limited Excavation, Consolidation, & Capping	Alternative 3: Limited Excavation & Capping
Protectiveness	3	2	2
Permanence	3	2	1
Long-term Effectiveness	3	2	1
Management of Implementation Risks	1	2	3
Implementability	3	2	2
Costs	$2,930,852	$807,218	$720,119

Notes: Scoring = 3 is the best, 1 is the worst.
No disproportionate weighting has been applied (all requirements have equal weight).