

# Feasibility Study

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Tiki Car Wash

Facility Site ID: 2352

Cleanup Site ID: 5096

*Prepared for:*

## **Washington State Department of Ecology**

Toxics Cleanup Program

Northwest Regional Office

Shoreline, Washington

December 12, 2025

Project No. M0592.06.001

*Prepared by:*

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**M A U L  
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# Feasibility Study

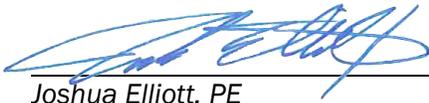
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*The material and data in this report were prepared under the supervision and direction of the undersigned.*

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# Abbreviations

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AS	air sparging
bgs	below ground surface
BTEX	benzene, ethylbenzene, toluene, and total xylenes
CAP	cleanup action plan
CD	Consent Decree No. 93-2-07710
CFR	Code of Federal Regulations
the City	City of Bellevue
COC	contaminant of concern
CSM	conceptual site model
CUL	cleanup level
cy	cubic yard
Ecology	Washington State Department of Ecology
EFR	enhanced fluid recovery
FPS	feasibility pilot study
ISCO	in situ chemical oxidation
IWAS	in-well air stripping
MFA	Maul Foster & Alongi, Inc.
MTCA	Model Toxics Control Act
NPDES	National Pollutant Discharge Elimination System
POC	point of compliance
the Property	11909 NE 8th Street, Bellevue, Washington 98005
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RI	remedial investigation
ROI	radius of influence
SEPA	State Environmental Policy Act
the Site	Tiki Car Wash site (Facility Site ID 2352, Cleanup Site ID 5096)
SVE	soil vapor extraction
TEE	terrestrial ecological evaluation
TRF	TRF Capital, LLC.
USC	United States Code

# 1 Introduction

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On behalf of the Washington State Department of Ecology (Ecology), Maul Foster & Alongi, Inc. (MFA) and Akana have prepared this draft feasibility study (FS) report for the Tiki Car Wash site (the Site). The Tiki Car Wash property is located at 11909 NE 8th Street in Bellevue, Washington (the Property) (see Figure 1-1). The Site is defined by the extent of contamination caused by the release of hazardous substances from the Property. That portion of the Site not on the Property is termed Off-Property in this report. The Site is listed in Ecology's cleanup database as Facility Site ID 2352 and Cleanup Site ID 5096.

## 1.1 Regulatory Framework

On March 29, 1993, Tiki Enterprises and Ecology entered Consent Decree No. 93-2-07710 (CD), which outlined the remedial action to be performed to address contamination at the Site in three phases:

- Phase I: remedial investigation (RI) and FS
- Phase II: cleanup action plan (CAP), and
- Phase III: implementation of the CAP

On-Property and Off-Property investigation activities leading to the eventual RI are described in Section 1.4. In April 2023, Leidos completed the final RI report, documenting total petroleum hydrocarbon and benzene, ethylbenzene, toluene, and total xylenes (BTEX) impacts to soil and groundwater at the Site (Leidos 2023a). A draft FS was also prepared for the Site (Leidos 2023b) but was not finalized. In January 2024, MFA prepared an RI Amendment to address several data gaps and reporting omissions identified by Ecology following completion of the RI (MFA 2024a).

In March 2024, MFA prepared and submitted a work plan for a feasibility pilot study (FPS) to inform the applicability of groundwater circulation wells and in-well air stripping (IWAS) in the context of Site conditions (MFA 2024b). MFA completed the FPS activities and submitted a summary report to Ecology in January 2025 (MFA 2025).

This FS is intended to support the CAP and final remedy selection for the Site and was prepared consistent with the Model Toxics Control Act (MTCA) requirements (Washington Administrative Code [WAC] 173-340-351 through 370).

## 1.2 Purpose and Objectives

The purpose of this FS is to support the selection of a cleanup action that complies with WAC 173-340-360 through 370. To achieve this, the FS provides final cleanup levels (CULs) (based on the preliminary CULs proposed in the RI), identifies remedial action objectives (RAOs), and develops and evaluates a range of cleanup alternatives to determine the most effective approach for the Site.

This FS relies on data generated from site investigations to date to support an evaluation of potential cleanup actions for the Site.

### 1.3 Location and Current Property Conditions

The approximately 0.59-acre Property is located at 11909 NE 8th Street in Bellevue, Washington (see Figure 1-2). The Property is bounded by NE 8th Street to the north, by a private parcel currently leased to Bassett Furniture to the east (formerly Bartell Drugs), by a paved roadway/alley and parking lot to the south, and by the Infiniti of Bellevue and Enterprise Car Rental parcels to the west.

### 1.4 Property History and Previous Investigations

Since 1971, the Property has operated as a gas station, car wash, and convenience store. Four single-walled steel underground storage tanks historically existed at the Property: three installed in 1971 and the fourth installed in 1979.

According to the CD, on June 7, 1990, Ecology received a report that a release of petroleum hydrocarbons may have taken place at the Property. Hart Crowser, on behalf of Tiki Enterprises, Inc., drilled one monitoring well and nine soil borings on the Property. Additionally, two monitoring wells, three test pits, and two soil borings were installed on the north end of the TRF Capital, LLC (TRF) property. Analysis of the soil and groundwater samples collected from these locations indicated the presence of BTEX at concentrations exceeding MTCA Method A CULs.

A series of wells and soil borings were completed on the Site between 1992 and 1995. In 1995, Ecology installed an air sparging (AS) and soil vapor extraction (SVE) soil and groundwater remediation system as part of an interim action along the west and south edges of the Property. The system reportedly was prone to shutdowns due to water accumulation in the system's knockout drum. Operation of the AS/SVE system was eventually discontinued sometime between 1996 (Leidos 2023) and 2000 (EA 2008) due to a lack of funding.

In 2007, seven monitoring wells were installed both On Property and Off-Property and in 2008, an 8-hour enhanced fluid recovery (EFR) event was completed on the Property by Ecovac Services (EA 2007, 2008). EFR was performed using a vac truck at five monitoring well locations (MW-29, MW31, MW32, MW-33, and MW-35) to extract both vapor-phase hydrocarbons and groundwater from the wells. Ecovac Services reported that 103 pounds of petroleum hydrocarbons were removed during this field event, with vapor-phase hydrocarbon removal rates ranging from 0.6 to 45 pounds per hour. This EFR event is detailed in the *Enhanced Fluid Recovery Pilot Test Report* (EA 2008).

In 2017 the State of Washington removed the lien on the Property and terminated the CD. Ecology then took over the cleanup responsibility for the Site.

In 2022, Ecology initiated a new RI, performed by Leidos on behalf of Ecology (Leidos 2023a). MFA prepared an RI Amendment (MFA 2024) to address the data gaps and omissions identified by Ecology following completion of the RI.

### 1.5 Conceptual Site Model

A conceptual site model (CSM) was prepared in the RI report (Leidos 2023a) with additional commentary provided in the RI Amendment (MFA 2024).

## 1.5.1 Contaminants of Concern

As described in the RI and RI Amendment, contaminants of concern (COCs) in different environmental media include the following:

**Table 1-1: COCs by Environmental Media**

COCs	Groundwater	Soil	Soil Vapor
Benzene	X	X	X
Ethylbenzene	X	X	X
Toluene	X	X	X
Total xylenes	X	X	X
Diesel-range hydrocarbons	X	X	X
Gasoline-range hydrocarbons	X	X	X

## 1.5.2 Current and Future Land Use

Current land use at the Property is an active gas station, car wash, and convenience store. Land use in the Off-Property portions of the Site include parking lots, a car rental facility, a parking garage for Infiniti of Bellevue (car dealer) and a car rental agency.

The gas station and support facilities are scheduled for demolition in 2026. Future land use of the Property is unidentified, but can be either commercial or residential use based on current zoning.

## 1.5.3 Exposure Pathways and Potential Receptors

As shown in Table 1-1 above, impacted media at the Site includes soil, groundwater, and soil vapor. COCs associated with petroleum have been detected in soil, groundwater, and soil vapor samples collected at the Site. These impacted media may also be considered secondary contaminant sources. The potential exposure pathways associated with each medium/source are discussed below and are presented in Figure 1-3.

### 1.5.3.1 Potential Receptors and Exposure Pathways

Soil impacts extend from at least 5 feet below ground surface (bgs) to over 15 feet bgs. While the Property and a large majority of the Site is currently paved, soil could become an exposure pathway to future workers or residents if construction or development activities expose impacted soil. Impacted soil is considered to be a potential direct-contact exposure pathway. Potential human health receptors include:

- Occupational workers and/or residents (including visitors)
- Construction workers, and
- Excavation workers

Potable water is provided by the City of Bellevue (the City). The local perched aquifer is not used for domestic water supply and future uses of groundwater are not expected. Ecology's Well Log database does not contain records of any domestic-use wells within one mile of the Site (Ecology 2025). The nearest surface water body is Lake Bellevue, over 750 feet to the north of the Site. However, there are no environmental covenants for the properties that comprise the Site that restrict

the use of groundwater for drinking water. The following pathways are potentially complete for human health receptors (see Figure 1-3):

- Direct skin contact with, incidental ingestion of, and inhalation of windborne particulates from chemically impacted shallow soil.
- Inhalation of indoor air vapors emanating from soil or groundwater with volatile chemical impacts
- Dermal contact with, incidental ingestion of, or inhalation of vapors emanating from chemically impacted shallow groundwater encountered in excavations below the water table, or ingestion of groundwater, if used for potable water.

### 1.5.3.2 Potential Soil Vapor Exposure Pathways

The RI concludes that previous sub-slab and ambient air sampling at the Property indicate that the soil vapor to indoor air pathway does not represent a potential exposure pathway (Leidos 2023a). A large majority of the Site is paved and adjacent buildings are outside of the plume area.

## 1.5.4 Preliminary Cleanup Levels

As soil contamination is limited to petroleum products and petroleum additives and the Site is in an area that is zoned for commercial and residential use, MTCA Method A Unrestricted Land Use and Method B CULs are appropriate. The Site does not meet any of the criteria listed in WAC 173-340-741(2), so the Site satisfies the terrestrial ecological evaluation (TEE) exclusion criteria and soil CULs do not need to be protective of terrestrial ecological receptors. A TEE form is included in Appendix A.

Preliminary soil CULs are as follows:

**Table 1-2: Preliminary CULs for Soil**

COCs	Cleanup Level (milligrams per kilogram)	Cleanup Level Source
Benzene	0.0300	MTCA Method A CUL for Soil
Ethylbenzene	6.00	MTCA Method A CUL for Soil
Toluene	7.00	MTCA Method A CUL for Soil
Total xylenes	9.00	MTCA Method A CUL for Soil
Diesel-range hydrocarbons	2,000	MTCA Method A CUL for Soil
Gasoline-range hydrocarbons	30.0	MTCA Method A CUL for Soil

### 1.5.4.1 Groundwater

Groundwater CULs are based on the highest beneficial use and the reasonable maximum exposure expected to occur under both current and potential future Site use. Under MTCA 173-340-720, drinking water is the beneficial use requiring the highest groundwater quality. Therefore, exposure to contaminants through ingestion and other domestic uses represent the reasonable maximum exposure for all sites unless the groundwater at the site can be demonstrated to be not potable. Preliminary groundwater CULs were retained from the RI and are as follows:

**Table 1-3: Preliminary CULs for Groundwater**

COCs	Cleanup Level (micrograms per liter)	Cleanup Level Source
Benzene	5.00	MTCA Method A CUL for Groundwater
Ethylbenzene	700	MTCA Method A CUL for Groundwater
Toluene	1,000	MTCA Method A CUL for Groundwater
Total xylenes	1,000	MTCA Method A CUL for Groundwater
Diesel-range hydrocarbons	500	MTCA Method A CUL for Groundwater
Gasoline-range hydrocarbons	800	MTCA Method A CUL for Groundwater

## 1.5.5 Points of Compliance

### 1.5.5.1 Soil Points of Compliance

The soil point of compliance (POC) is the depth at which soil CULs must be attained for a site to comply with cleanup standards.

### 1.5.5.2 Groundwater Points of Compliance

The standard groundwater POC is the location at which groundwater CULs must be attained for a site to comply with cleanup standards. This is defined as the uppermost level of the saturated zone to the lowest depth potentially affected. This definition implies that contaminated groundwater will reach CULs throughout the Site within a reasonable restoration time frame. As described in the RI report (Leidos 2023a), the local perched aquifer is not currently used for drinking water and is not expected to be used for future domestic water supply. Groundwater POCs will consist of the monitoring well network, which will include existing wells.

### 1.5.5.3 Soil Vapor Points of Compliance

For compliance based on vapor migration, the soil vapor POC extends from the ground surface down to the uppermost saturated groundwater zone. This ensures that volatile contaminants do not pose indoor air risks. The soil vapor POC is appropriate for occupied structures that will remain within the Site.

## 1.5.6 Applicable Local, State and Federal Laws

The potentially applicable regulations for addressing and implementing cleanup action alternatives at the Site. The potential regulations focus on federal, state, and local statutes, regulations, criteria, and guidelines. The types of potential regulations evaluated for the Site include contaminant-, location-, and action-specific, as defined in the following paragraphs. Each type of potential regulation is evaluated in Table 1-4, and applicable regulations are listed below.

Remedial actions conducted by Ecology are exempt from the procedural requirements of certain state and local laws (WAC 173-340-710[9][b]). Ecology shall ensure compliance with substantive requirements and provide an opportunity for comment by the public and by the state agencies and local governments that would otherwise implement these laws.

### Contaminant-specific Regulations

Contaminant-specific regulations are usually health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of numerical contaminant values that are recognized by regulatory agencies as protective of human health and the environment. Applicable contaminant-specific regulations include:

- **Washington State MTCA.** (Revised Code of Washington [RCW] 70A.305; Chapter 173-340 WAC) MTCA regulates soil, groundwater, and indoor air CULs.

### Action-specific Regulations

Action-specific regulations are relevant to specific cleanup action methods and technologies, and to actions conducted to support cleanup. Action-specific regulations dictate how certain activities, such as treatment, disposal practices, and media monitoring programs, must be conducted. Typically, these regulations are not fully defined until a preferred cleanup action has been selected and refined. However, considering the range of potential action-specific regulations early in the process can help focus the selection a preferred cleanup action alternative. Applicable action-specific regulations include:

- **National Pollutant Discharge Elimination System (NPDES).** Chapter 173-220 WAC establishes a state permit program, applicable to the discharge of pollutants and other wastes and materials to the surface waters of the state, operating under state law as a part of NPDES created by Section 402 of the federal Water Pollution Control Act. NPDES construction stormwater permits are required for construction sites of one acre or larger (Chapter 173-220 WAC).
- **Clean Air Act.** The United States Clean Air Act (42 United States Code [USC] § 7401 et seq. and 40 Code of Federal Regulations [CFR] Part 50) and Washington Clean Air Act and Implementing Regulations (RCW 70A.15; Chapter 173-400 WAC) to protect ambient air quality by limiting air emissions and taking reasonable precautions to prevent fugitive dust from becoming airborne, which are applicable to cleanup action alternatives involving construction and soil handling.
- **U.S. Resource Conservation and Recovery Act (RCRA).** 42 USC § 6901 et seq., Subtitle D—Managing Municipal and Solid Waste (40 CFR Parts 257 and 258), and Washington Solid Waste Handling Standards (RCW 70A.205; Chapter 173-350 WAC) to establish guidelines and criteria for management of non-hazardous solid waste, which are applicable to cleanup action alternatives involving off-Site disposal of contaminated soil designated as non-hazardous waste. Washington Solid Waste Handling Standards (RCW 70.95 and WAC 173-351 and 173-304), establishes minimum standards for handling and disposing of solid waste, including contaminated soils, construction and demolition debris, and garbage generated during site remediation.
- **Federal Occupational Safety and Health Administration.** Regulations pertaining to hazardous waste sites are addressed under 29 CFR 1910.120, the Hazardous Waste Operations and Emergency Response Standard. This standard applies to cleanup and corrective actions, as well as to operations involving hazardous wastes, that are conducted at a permitted treatment, storage, and disposal facility, unless the employer can demonstrate that the operations do not involve employee exposure or the reasonable possibility of employee exposure to safety or health hazards.
- **Washington Industrial Safety and Health Act.** Regulations pertaining to hazardous waste sites are addressed under RCW 49.17, Chapter 296-24 WAC, Hazardous Waste Operations. This standard applies to cleanup and corrective actions at MTCA-regulated sites.

- **Underground Injection Control.** WAC 173-218 prescribes regulations for cleanup actions that include injection of biological or chemical oxidants into injection wells or trenches.
- **Washington State Environmental Policy Act (SEPA).** The State of Washington administers and enforces a program equivalent to the federal National Environmental Policy Act. SEPA (RCW 43.21C) provides the framework for agencies to consider the environmental consequences of a proposal before acting. It also gives agencies the ability to condition or deny a proposal because of identified likely significant adverse impacts. The act is implemented through the SEPA Rules and Procedures (WAC 197-11).
- **Noise Control Act of 1974.** Maximum environmental noise levels have been determined and are contained in WAC 173-60 and City Code Chapter 9.18. Approved procedures for measurement of environmental noise are contained in WAC 173-58.
- **Land-Disturbing Activity.** City Code 23.76.035 requires a permit for fill and/or excavation totaling over 50 cubic yards (cy).
- **Minimum Standards for Construction and Maintenance of Wells.** Washington State has developed minimum standards for the construction of water and monitoring wells and the decommissioning of wells (RCW 18.104; WAC 173-160).

### Location-specific Regulations

Location-specific regulations are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in a specific location. Some examples of special locations are floodplains, wetlands, historic sites, and sensitive ecosystems or habitats. Applicable location-specific regulations include:

- **U.S. Archaeological and Historic Preservation Act.** The Archaeological and Historic Preservation Act (16 USC § 469, 470 et seq.; 36 CFR Parts 65 and 800) and Washington Archaeological Sites and Resources regulations (RCW 27.44, 27.48, and 27.53; Chapter 25-48 WAC) establish requirements to preserve and recover significant artifacts, preserve historic and archaeological properties and resources, and minimize harm to national landmarks.

## 2 Alternatives

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### 2.1 Remedial Action Objectives

RAOs for the Site were developed based on information from the RI and CSM (Section 1.5). This section identifies goals to protect human health and the environment as the basis for developing and evaluating cleanup alternatives.

Based on the CSM (Figure 1-3), the RAOs for the Site include:

- Mitigating COCs in soil that exceed CULs for direct contact to an occupational worker/resident, construction worker, or potential visitor.
- Mitigating COCs in groundwater that exceed CULs for ingestion, dermal contact, or inhalation to an occupational worker/resident, construction worker, or potential visitor.

- Further minimize the potential for future building indoor air to be impacted by contaminated soil or groundwater. The RI identified the soil vapor to indoor air and groundwater to indoor air pathways as precluded, stating there is no incremental risk from sub-slab contamination to the current convenience store on the Property (Leidos 2023a). Satisfying the soil and groundwater RAOs will further minimize the potential for vapor intrusion into future buildings.

General response actions are measures that will satisfy the RAOs. The following general response actions were identified for the Site:

- **No Action:** No action serves as a baseline for comparison with other potential remedial actions
- **Institutional Controls:** Institutional controls are legal or administrative measures or actions that prevent and control exposure to hazardous substances.
- **Engineering Controls:** Engineering controls are physical measures that prevent or minimize exposure to hazardous substances or reduce the mobility or migration of hazardous substances.
- **Treatment:** Treatment is the permanent and substantial elimination or reduction in toxicity, mobility, or volume of hazardous substances through in situ or ex situ technologies.
- **Excavation/Disposal:** Excavation and disposal includes removing contaminated soil from an existing location and placing the soil in another area in a capped consolidation area with institutional controls or transport and disposal at a permitted offsite landfill.
- Any combination of the above, as appropriate

## 2.2 Technology Screening

Remedial technologies considered in this evaluation were screened based on the balancing of remedy selection factors (effectiveness, implementability, relative cost, and implementation risk for the given contamination characteristics). The initial screening was conducted using the Federal Remediation Technologies Roundtable *Technologies Screening Matrix* (FRTR 2025) to ensure that a sufficient number and range of remedial technologies are identified for screening.

### 2.2.1 Soil Technologies

Technologies considered for addressing soil contamination include institutional controls, engineering controls, monitored natural attenuation, in situ treatment (via in situ chemical oxidation [ISCO] or enhanced aerobic degradation), excavation and offsite disposal, SVE, and recirculating wells/IWAS.

### 2.2.2 Groundwater Technologies

Technologies considered for addressing groundwater contamination include institutional controls, engineering controls, monitored natural attenuation, in situ chemical treatment, source removal by excavation, SVE, and recirculating wells/IWAS.

## 2.3 On-Property Model Remedy

The Property owners have expressed their desire to terminate operation of the existing business at the Property and prepare for redevelopment. To this end, Ecology has agreed to implement a full removal of soil exceeding the preliminary CULs up to the soil POC within the Property boundary. Full removal of source material to the maximum extent practicable is an Ecology-established model

remedy for petroleum contaminated sites (Ecology 2017). During the design phase, the total cost for on-Property model remedy implementation will be determined; however, this cost will not affect the CAP. Full soil removal to 15 feet bgs is expected to generate up to approximately 16,000 cubic yards of petroleum-contaminated soil and is anticipated to be complete in late summer/early fall 2026.

An evaluation of the eligibility criteria for the groundwater model remedy provides the following:

- Geographic Area: The Site is in Washington State.
- Release Confirmation and Ecology Notification: Ecology has been notified of the release.
- Affected Media: Site characterization activities to date confirm that neither surface water nor sediment have been impacted by the release. As described in the RI (Leidos 2023a), the groundwater to surface water pathway is precluded because the nearest surface water body (Lake Bellevue) is over 750 feet north and upgradient of the Site.
- Contaminant Types: Contaminant types are limited to compounds typically found in petroleum products. The COCs for the Site are described in the RI (Leidos 2023a), RI Amendment (MFA 2024a), and Section 1.5.1 of this FS and are consistent with this criterion.
- Emergency/Interim Actions: Emergency or interim actions are not required at this time.
- TEE: The Site satisfies the TEE exclusion criteria, as described in Section 1.5.4 and Appendix A.
- Remedy Selection:
  - The primary remedy selection is source removal within the Property boundary to the soil POC, followed by the placement of clean backfill. Impacted soil will be disposed at a permitted Washington Class 2<sup>1</sup> or RCRA Subtitle D landfill.
  - Secondary remedy components include the removal and treatment of groundwater during excavation dewatering; and may include enhanced aerobic degradation for the treatment of residual soil contamination through the placement of an oxygen release compound prior to placement of backfill.
- Impacts to Water Supply Wells: As described above, there are no domestic water supply wells within one mile of the Site, and the Site has not caused impacts above a practical quantitation limit to a well that is used for drinking water purposes.
- Proximity to Private Wells: There are no known private wells within 250-feet of the Site.

After implementing the model remedy the following criteria will be met:

- Free Product Removal: Free product observed during the FPS in the central portion of the Property at MW-31 will be fully removed during excavation within the Property boundary.
- Soil: Petroleum-contaminated soil removal and offsite disposal will satisfy the soil RAO and the compliance criteria at the soil POC.
- Groundwater: Groundwater removal and treatment during excavation and dewatering operations will capture all petroleum-contaminated groundwater within the Property boundary, satisfying the groundwater RAO. Disturbed construction residuals may be treated through enhanced aerobic degradation.

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<sup>1</sup> Consideration will be given to the need for treatment prior to placement in a Class 2 landfill. Remedial design should also evaluate the suitability to use thermal desorption to levels that satisfy MTCA Method A CULs followed by backfill in the excavation. The evaluation would need to address environmental, geotechnical, and logistical requirements.

- Soil Vapor Intrusion: The complete removal of soil and groundwater impacts to a depth of 15 feet bgs within the Property boundary will achieve the indoor air RAO and demonstrate future compliance with air cleanup standards for future buildings at the Property.

As such, and as described in WAC 173-340-390, further evaluation of the On-Property remedy and a disproportionate cost analysis (DCA) are not required.

## 2.4 Cleanup Alternatives for Off-Property

Soil and groundwater cleanup technologies were combined into six cleanup alternatives for the Off-Property portion of the Site. These cleanup action alternatives provide a range of potential approaches for meeting the cleanup goals and are described below.

### 2.4.1 Alternative 1: Excavation and Off-Site Disposal of Soil Impacts, In Situ Treatment

Alternative 1 includes excavation, offsite disposal of soil above the CULs, and treatment of groundwater via ISCO outside of the soil excavation footprint to mitigate groundwater exceedances. A cost estimate summary is included as Table 2-1 and a more detailed cost estimate is provided in Appendix B.

#### **Excavation:**

Soil with concentrations exceeding CULs will be excavated. Utilities (stormwater, water, and sanitary sewer) will have to be temporarily managed within the excavation area. Approximately 9,600 cy of soil will be excavated from the area shown in Figure 2-1. The area and depth of excavation will be further refined by design-phase sampling. The excavated soil will be disposed of at a permitted Washington Class 2<sup>2</sup> or RCRA Subtitle D landfill. The excavated areas will be backfilled with imported, clean structural fill and surface features (e.g. asphalt, concrete sidewalk, curbs and gutters, and other parking lot features) and utilities will be restored.

#### **In Situ Treatment:**

Areas with groundwater concentrations exceeding CULs outside of the excavation footprint will be treated by ISCO where shown in Figure 2-1. ISCO is assumed to include one round of chemical oxidant injections. The specific ISCO reagents, dosing, and polishing treatments will be refined further during design.

#### **Groundwater Monitoring:**

Groundwater monitoring is proposed to assess remedy effectiveness. Three monitoring wells will be added to the existing monitoring well network, which will be utilized as POCs. Monitoring will continue until groundwater concentrations meet CULs; for cost estimating purposes, six monitoring events are assumed with twice annual monitoring in year 1 and quarterly monitoring in year 2. Compliance monitoring will begin no sooner than 6 months after the completion of amendment application.

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<sup>2</sup> Consideration will be given to the need for treatment prior to placement in a Class 2 landfill, remedial design should also evaluate the suitability to use thermal destruction to levels that satisfy MTCA Method A CULs followed by backfill in the excavation, if the material can satisfy environmental and geotechnical requirements.

## 2.4.2 Alternative 2: Targeted Soil Excavation and In Situ Treatment

Alternative 2 includes targeted soil excavation, offsite disposal of excavated soil, and in situ treatment via ISCO outside of the soil excavation footprint to mitigate soil and groundwater exceedances. A cost estimate summary is included as Table 2-2 and a more detailed cost estimate is provided in Appendix B.

### **Excavation:**

Accessible soil with the highest concentrations of contaminants (south of the Property, roughly between MW-30, MW-35, and MW-38) will be excavated. Utilities (stormwater and water) will have to be temporarily managed within the excavation area. Approximately 3,200 cy of soil will be excavated from the area shown in Figure 2-2. This area was selected to include soil with the highest concentrations of contaminants in the Off-Property portion of the Site while minimizing impacts to significant utilities to the east and west of the excavation. The area and depth of excavation will be further refined by design-phase sampling. The excavated soil will be disposed of at a permitted Washington Class 2 or RCRA Subtitle D landfill. The excavated areas will be backfilled with imported, clean structural fill and surface features (e.g. asphalt, concrete sidewalk, curbs and gutters, and other parking lot features) and utilities will be restored.

### **In Situ Treatment**

Areas with soil and groundwater concentrations exceeding CULs outside of the excavation footprint (see Figure 2-2) will be treated in situ via ISCO. Because ISCO will be used to address soil impacts as well as groundwater, Alternative 2 includes up to 2 rounds of injections over a period of 12 months (an additional round of injections when compared to Alternative 1). The specific ISCO reagents and dosing will be refined further during design.

### **Groundwater Monitoring:**

Groundwater monitoring is proposed to assess remedy effectiveness. The existing well network will be used for POCs augmented by an estimated three additional monitoring wells anticipated to be installed as part of design-phase sampling. Monitoring will continue until groundwater concentrations meet CULs; for cost estimating purposes, a 2-year monitoring period was assumed with twice annual monitoring in year 2 and quarterly monitoring in year 3. Compliance monitoring will begin no sooner than 6 months after the last ISCO injections.

## 2.4.3 Alternative 3: In Situ Treatment

Alternative 3 includes in situ treatment via ISCO and institutional controls to prevent exposure of contaminated soil and mitigate groundwater exceedances. A cost estimate summary is included as Table 2-3 and a more detailed cost estimate is provided in Appendix B.

### **In Situ Treatment:**

Soil and groundwater with concentrations exceeding CULs (see Figure 2-3) will be treated by ISCO—approximately the area shown in Figure 2-3. The area for ISCO will be further refined by design-phase sampling. ISCO is assumed to include up to 2 rounds of injections over a period of 12 months. The specific in situ treatment reagents and dosing will be refined further during design.

### **Groundwater Monitoring:**

Groundwater monitoring is proposed to assess remedy effectiveness. The existing well network will be used for POCs augmented by an estimated three additional monitoring wells anticipated to be installed as part of design-phase sampling. Monitoring will continue until groundwater

concentrations meet CULs; for cost estimating purposes, an eight-year monitoring period was assumed with twice annual monitoring in years 3 through 7 and quarterly monitoring in year 8. Compliance monitoring will begin no sooner than 6 months after the last ISCO injections.

#### **2.4.4 Alternative 4: Recirculating Wells/In-Well Air Stripping**

Alternative 4 includes the installation of recirculating wells with IWAS (the technology evaluated during the FPS) to treat contamination via active groundwater recovery and treatment to mitigate groundwater and soil exceedances of CULs. A cost estimate summary is included as Table 2-4 and a more detailed cost estimate is provided in Appendix B.

##### **Recirculating Wells:**

Recirculating wells will be installed in the area indicated in Figure 2-4. The area for well installation and spacing will be further refined by design-phase sampling. Based on the current understanding of Off-Property soil and groundwater contamination, and the radius of influence (ROI) of 25 to 30 feet observed for SVE during the FPS (MFA 2025), approximately 13 recirculating wells will be required. Recirculating wells will be supplied with compressed air and vapor extraction from a central facility with valving at each well to allow tuning of the compressed air and vapor extraction flows. Vapors will pass through a redundant activated carbon absorption system prior to discharge to ambient air.

##### **Groundwater Monitoring:**

Groundwater monitoring is proposed to assess remedy effectiveness. The existing well network will be used for POCs augmented by an estimated three additional monitoring wells anticipated to be installed as part of design-phase sampling. Monitoring would likely be performed on an annual basis while the recirculating wells are in operation (assumed for four years). Following this operational period, monitoring is assumed on a semiannual basis to continue until groundwater concentrations decrease below CULs; for cost estimating purposes, a ten-year monitoring period was assumed with quarterly monitoring during year 10 to demonstrate compliance.

#### **2.4.5 Alternative 5: Institutional Controls and Monitored Natural Attenuation**

Alternative 5 relies on natural biodegradation and attenuation to achieve cleanup objectives. Because this Alternative does not meet threshold and other requirements, as described further in Section 3.1.1, no cost estimate is provided.

##### **Groundwater Monitoring:**

Groundwater monitoring is proposed to assess remedy effectiveness. The existing well network will be used for POCs augmented by an estimated three additional monitoring wells. Monitoring will likely start at a twice annual frequency. Monitoring will continue until groundwater concentrations meet CULs as established by a final year of quarterly monitoring.

##### **Institutional Controls:**

Institutional controls will be implemented to establish administrative protections to document site conditions and prevent exposure. Institutional controls will restrict the use of groundwater, establish cap monitoring and maintenance requirements, and the preparation of a site management plan to outline procedures for handling contaminated media.

## 2.4.6 Alternative 6: No Action

Alternative 6 is included as a baseline condition only and is not considered a long-term solution for remediation at the Site; there is no expected cost associated with this alternative. This alternative would not include any activities to remove, treat, monitor, or manage contamination at the Site and potential risk to receptors would remain.

# 3 Detailed Evaluation and Selection of Alternatives – Off-Property

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## 3.1 Threshold and Other Requirements

Criteria used to evaluate Off-Property cleanup alternatives are defined in WAC 173-340-360; threshold requirements include the following:

- **Protect Human Health and the Environment**—The alternatives must provide for overall protection of human health—including likely vulnerable populations and overburdened communities—and the environment.
- **Comply with Cleanup Standards**—The alternatives must comply with cleanup standards established in WAC 173-340-700 through 173-340-760.
- **Comply with Applicable State and Federal Laws**—The alternatives must comply with both applicable requirements and requirements determined to be relevant and appropriate as defined through WAC 173-340-710. Additionally, the alternatives must address local, state, and federal laws related to environmental protection, health and safety, transportation, and disposal.
- **Prevent or Minimize Present and Future Releases**—The alternatives must prevent or minimize both present and future releases of hazardous substances, while also preventing their migration in the environment.
- **Provide Resilience to Climate Change Impacts**—The alternatives must provide for resilience to climate change impacts that could reduce or preclude long-term effectiveness.
- **Provide Compliance Monitoring**—The alternatives must provide compliance monitoring as established under WAC 173-340-410 and WAC 173-340-720 through 173-340-760. There are three types of compliance monitoring: protection, performance, and confirmational.
- **Not Rely Primarily on Institutional Controls and Monitoring**—The alternatives for a site, or portion thereof, must not rely primarily on institutional controls and monitoring if it is technically possible to implement a more permanent cleanup action.
- **Not Rely Primarily on Dilution and Dispersion**—Unless the incremental costs of any active remedial measures over the costs of dilution and dispersion grossly exceed the incremental degree of benefits of active remedial measures over the benefits of dilution and dispersion, the alternatives shall not rely primarily on dilution and dispersion.

- **Provide for a Reasonable Restoration Time Frame**—The alternatives must provide a reasonable restoration time frame as described in WAC 173-340-360(4). Factors to consider for the restoration time frame include the potential risk to human health and the environment with the consideration of vulnerable populations and overburdened communities, practicability of the remedy, long-term effectiveness, and current site uses.
- **Use Permanent Solutions to the Maximum Extent Practicable**—A DCA can be conducted per WAC 173-340-360(5). The DCA will include evaluations of protectiveness, permanence, cost, and effectiveness over the long term; management of short-term risks; and technical and administrative implementability.
- **Public Concerns**—The alternatives must consider general public concerns and Indian tribes' rights and interests for Ecology-conducted or Ecology-supervised cleanup actions consistent with WAC 173-340-600.

### 3.1.1 Elimination of Alternatives from the Disproportionate Cost Analysis

Alternatives 5: Institutional Controls and Monitored Natural Attenuation and 6: No Action were eliminated from the DCA as they do not meet the minimum thresholds identified above. Neither alternative provides for a reasonable restoration timeframe and Alternative 6 would not provide for the protection of human health and the environment. Alternative 5 relies primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action.

## 3.2 Disproportionate Cost Analysis Ranking Criteria

### 3.2.1 Protectiveness

Protectiveness is defined by WAC 173-340-360(5)(d)(i) as:

The degree to which the alternative protects human health and the environment, including likely vulnerable populations and overburdened communities. When assessing protectiveness, consider at least the following: the degree to which the alternative reduces existing risks; the time required for the alternative to reduce risks at the site and attain cleanup standards; the on-site and offsite risks remaining after implementing the alternative; and improvement of the overall environmental quality.

Alternative 1 received a score of 5 for protectiveness. Alternative 1 would permanently remove contaminated soil present in the Off-Property portion of the Site and chemically destroy contamination outside of the excavation footprint. The time required to reduce risks at the Site and attain cleanup standards is expected to be the shortest for Alternative 1. On-Site risks remaining after construction would be minimal and would be verified by compliance monitoring.

Alternative 2 also received a score of 5 for protectiveness. Alternative 2 would permanently remove soil with the highest concentrations of contaminants and chemically destroy contamination outside the excavation footprint. The time required to reduce risks at the Site and attain cleanup standards is expected to be slightly longer than for Alternative 1 but much less than Alternatives 3 and 4. On-Site risks remaining after construction would be minimal and would be verified by compliance monitoring.

Alternative 3 received a score of 4 for protectiveness. Alternative 3 would chemically destroy contamination in soil and groundwater. However, unlike Alternatives 1 and 2, in situ processes alone would be used to reduce risks at the Site and achieve cleanup standards. Given the heterogeneous soil conditions (alternating sands and silts) observed at the Site, there is less certainty in the ability to deliver amendments effectively into all zones. The time for achieving CULs in soil and groundwater is expected to be longer than for alternatives that involve soil excavation and offsite disposal.

Alternative 4 receive a score of 3 for protectiveness. Alternative 4 would remove contamination in soil and groundwater through air stripping and biodegradation (by the introduction of oxygen into groundwater recirculation cells). Like Alternative 3, Alternative 4 would rely on in situ processes alone to reduce risks at the Site and achieve cleanup standards. However, given the heterogeneous soil conditions described above, there is uncertainty regarding the ROI observed during the FPS. This alternative would rely on groundwater advection (and, on finer scales, dispersion and diffusion) to facilitate biodegradation and/or drive contamination from soil to groundwater for treatment. The time for achieving CULs in soil and groundwater is expected to be longer for Alternative 4 than for Alternative 3.

### 3.2.2 Permanence

Permanence is defined by WAC 173-340-360(5)(d)(ii) as:

The degree to which the alternative permanently reduces the toxicity, mobility, or mass of hazardous substances, including: the adequacy of the alternative in destroying the hazardous substances; the reduction or elimination of hazardous substance releases and sources of releases; the degree of irreversibility of waste treatment process; and the characteristics and quantity of treatment residuals generated.

Alternative 1 received the highest score for permanence of 4.5 as it would physically remove approximately 9,600 cy of contaminated soil, ISCO would further destroy contaminant mass in groundwater outside the excavation area. The achievement of RAOs would be verified by groundwater compliance monitoring.

Alternative 2 received a score of 4 for permanence as it would physically remove approximately 3,200 cy of soil with the highest concentrations of contaminants, and ISCO would further destroy contaminant mass in soil and groundwater outside the excavation area. The achievement of RAOs would be verified by groundwater compliance monitoring.

Alternative 3 received a score of 3 for permanence as ISCO would destroy contaminant mass in soil and groundwater and the achievement of RAOs would be verified by compliance monitoring. Since Alternative 2 would not directly remove contaminated soil from the Site, it is judged to be less permanent than Alternatives 1 and 2.

Alternative 4 received a score of 2.5 for permanence as contaminant mass would be both removed from soil and groundwater by SVE/IWAS and degraded over time by biodegradation. Achievement of RAOs would be verified by compliance monitoring but, as the processes required for contaminant mass reduction are expected to the score is slightly lower than Alternative 2.

### 3.2.3 Effectiveness Over the Long Term

Effectiveness over the long term is defined by WAC 173-340-360(5)(d)(iii) as:

The degree to which the alternative is likely to be effective over the long term, including for likely vulnerable populations and overburdened communities. When assessing the long-term effectiveness of the alternative, consider at least the following: the degree of certainty that the alternative will be successful; The reliability of the alternative during the period of time hazardous substances are expected to remain on-site at concentrations that exceed cleanup levels; the resilience of the alternative to climate change impacts; the magnitude of residual risk with the alternative in place; and the effectiveness of controls required to manage treatment residues or remaining wastes.

Alternative 1 received a score of 5 for effectiveness over the long term. Alternative 1 would immediately remove soil with concentrations that exceed CULs present in the Off-Property portion of the Site. ISCO treatment would then further destroy contaminant mass in groundwater shortly after excavation.

Alternative 2 received a score of 4.5 for effectiveness over the long term. Alternative 2 would immediately remove soil with the highest concentrations of contaminants present in the Off-Property portion of the Site. ISCO treatment would then further destroy contaminant mass in soil and groundwater shortly after excavation.

Alternative 3 received a score of 2 for effectiveness over the long term. The ISCO treatment of soil and groundwater would destroy contaminant mass, converting hazardous substances largely to carbon dioxide and water. The success of the ISCO treatment would be verified by compliance monitoring. The period of time that hazardous substances are expected to remain on-Site at concentrations exceeding CULs longer than for Alternatives 1 and 2. As it is possible that a mass of contamination in lower conductivity portions of the subsurface could remain untreated by ISCO, and the overall volume of soil with high concentrations of contaminants to be treated by ISCO is much higher for Alternative 3 than Alternatives 1 or 2, Alternative 3 is ranked lower than those two Alternatives.

Alternative 4 received a score of 2 for effectiveness over the long term. SVE would physically remove contaminant mass from soil and groundwater where it would be sorbed to activated carbon. The success of the recirculating wells/IWAS would be verified by compliance monitoring. As the period of time that hazardous substances are expected to remain on-Site at concentrations exceeding CULs is longer for Alternative 4 when compared to the other alternatives, and the potential for contaminant mass to remain in lower conductivity portions of the subsurface is similar to Alternative 3, Alternative 4 is ranked slightly lower than Alternative 3.

### **3.2.4 Management of Implementation Risks**

Management of implementation risks is defined by WAC 173-340-360(5)(d)(iv) as:

The risks to human health and the environment, including likely vulnerable populations and overburdened communities, associated with the alternative during construction and implementation, and the effectiveness of the alternative to manage such risks.

Alternative 1 received a score of 2 for management of implementation risks. Alternative 1 would involve the excavation of a large volume of soil and the subsequent trucking of that soil to a landfill. While best management practices like covering exposed soils while they are not being actively worked would be implemented, contaminant mass would likely volatilize from exposed soils into the ambient air. Alternative 1 would also require significant excavation dewatering and the above grade

handling/treating of that water prior to discharge, to either the sanitary sewer or to a storm drain. Alternative 1 would require engineering controls (e.g. fencing, traffic control) during construction.

Alternative 2 received a score of 3 for management of implementation risks. Alternative 2 would involve the excavation of soil, but a much smaller volume of soil than Alternative 1. While best management practices like covering exposed soils while they are not being actively worked would be implemented, contaminant mass would likely volatilize from exposed soils into the ambient air. Alternative 2 would also require excavation dewatering and the above grade handling/treating of that water prior to discharge, to either the sanitary sewer or to a storm drain. Alternative 2 would require engineering controls (e.g. fencing, traffic control) during construction.

Alternative 3 received a score of 4 for management of implementation risks. Aside from risks associated with handling the ISCO reagents themselves, Alternative 2 would have the shortest construction duration at the Site and would not involve the exposure of contaminated soil or groundwater.

Alternative 4 received a score of 3.5 for management of implementation risks. Alternative 3 would require the temporary exposure of potentially contaminated soils during trenching for compressed air supply and vapor extraction lines. Alternative 3 would also include the discharge of air from the vapor extraction system. Alternative 3 would rely on a redundant activated carbon system to treat extracted soil vapors prior to discharge.

### **3.2.5 Technical and Administrative Implementability**

Technical and administrative implementability is defined by WAC 173-340-360(5)(d)(v) as:

The ability to implement the alternative, including consideration of: the technical difficulty of designing, constructing, and otherwise implementing the alternative in a reliable and effective manner, regardless of cost; the availability of necessary offsite facilities, services, and materials; administrative and regulatory requirements; scheduling, size, and complexity; monitoring requirements; access for construction operations and monitoring; and integration with existing facility operations and other current or potential remedial actions.

Alternative 1 received a score of 2.5 for technical and administrative implementability. Alternative 1 would require a detailed shoring design to prevent potential impacts to the adjacent Infinity of Bellevue building as well as portions of NE 7th Street and the TRF parking lot outside of the excavation area. Alternative 1 would involve significant impacts during construction on the use of the properties involved. The excavation area would require the temporary closure of NE 7th Street, the northernmost drive aisle and associated parking spots of the TRF parking lot, and the southeast entrance to the Infinity of Bellevue parking garage. A significant area would also be required to house treatment equipment for excavation dewatering, potential stockpiling of excavated soil, and a drive path for trucks to be loaded with soil for offsite disposal as well as to deposit backfill materials. As the excavation area identified for Alternative 1 was selected to maximize soil removal, Alternative 1 involves significant impacts on local utilities, including the temporary rerouting and reconstruction of a number of private storm sewer lines, a City sanitary sewer (that is listed as an 8-inch- to 10-inch-diameter concrete pipe on the City's Map Viewer [City of Bellevue 2025]), and a City water main (listed as an 8-inch-diameter ductile iron pipe on the City's Map Viewer) (see Figure 2-1). Once the excavation, roadway and parking lot restoration, and ISCO injections are complete, activity on the Site would be limited to periodic groundwater monitoring.

Alternative 2 received a score of 3 for technical and administrative implementability. Alternative 2 would require a detailed shoring design to prevent potential impacts to portions of NE 7th Street and the TRF parking lot outside of the excavation area. Alternative 2 would involve impacts to local access of affected properties during construction, albeit to a lesser degree than Alternative 1. The excavation area would require the temporary closure of a portion of NE 7th Street and a portion of the northernmost drive aisle and associated parking spots of the TRF parking lot. An area would be required to house treatment equipment for excavation dewatering, potential stockpiling of excavated soil, and a drive path for trucks to be loaded with soil for offsite disposal as well as to deposit backfill materials. While the excavation area identified for Alternative 2 was selected to maximize the removal of soil with the highest concentrations of contaminants while minimizing conflict with existing utilities, Alternative 2 would nevertheless involve the temporary rerouting and reconstruction of a private storm sewer line in NE 7th Street (listed as an 8-inch-diameter line on the City's Map Viewer) and a City water main (listed as an 8-inch-diameter ductile iron pipe on the City's Map Viewer) (see Figure 2-2). Once the excavation, roadway and parking lot restoration, and ISCO injections are complete, activity on the Site would be limited to periodic groundwater monitoring.

Alternative 3 received a score of 4 for technical and administrative implementability. The ISCO reagents involved and the injection equipment required to implement this alternative are readily available from commercial vendors. Alternative 3 would not require the rerouting of utilities and would have minimal permitting requirements. The impact of the drilling/injection rig on existing operations would be minimal at any given time and would be expected to be easily managed. Once the ISCO injections are complete, activity on the Site would be limited to periodic groundwater monitoring.

Alternative 4 received a score of 3.5 for technical and administrative implementability. The materials and equipment required to implement Alternative 4 are readily available and the technology is mature. While Alternative 4 is not expected to require the rerouting of utilities, trenching across drive aisles and in parking spots would be required. This would temporarily disrupt traffic in NE 7th Street and the TRF parking lot, albeit to a much lower extent than for Alternatives 1 and 2. A location for the centralized treatment equipment (compressor, blower, control panel, activated carbon vessels) would need to be identified and agreed to. Alternative 4 would also require periodic monitoring and maintenance of the system components (on a more frequent basis and in more locations than the groundwater monitoring required for the other two alternatives).

### **3.2.6 Cost**

All alternatives have significant design and implementation costs. The probable cost for alternatives, based on current understanding of soil and groundwater contamination extents, are listed below and are summarized in Table 2-1 through 2-4. Each alternative includes a 30 percent contingency and a probably cost range of -30 to +50 percent.

Alternative 1—Excavation and Off-Site Disposal of Soil Impacts, ISCO: \$7,549,000 (Table 2-1)

Alternative 2—Targeted Soil Excavation and ISCO: \$4,263,000 (Table 2-2)

Alternative 3—ISCO: \$3,397,000 (Table 2-3)

Alternative 4—Recirculating Wells/IWAS: \$2,519,000 (Table 2-4)

### 3.2.7 DCA Procedure

In accordance with MTCA's disproportionality test, costs are disproportionate to benefits if the incremental costs of an alternative over that of a lower cost alternative exceed the incremental degree of benefits achieved by that alternative over that of the lower cost alternative. MTCA prescribes that this disproportionality test proceeds in the direction of decreasing permanence (from the most permanent alternative to the next most permanent alternative). Table 3-1 provides a summary of the DCA results.

MFA modified the default 20% weighting for all DCA criteria to 30% each for protectiveness and permanence and 10% each for implementation risk management and implementability. Ecology's selection of the full removal of source material model remedy for the on-Property portion of the Site is protective and permanent to the maximum extent practicable, while having relatively high implementation and implementability risks. In evaluating the off-Property alternatives, MFA assumed a similar preference for protectiveness and permanence while deprioritizing implementation risk management and implementability.

As Alternative 1 is judged to be the most permanent alternative and Alternative 2 the next most permanent alternative, they are the first pair of alternatives to be considered. The incremental cost between Alternative 1 and Alternative 2 is \$3,286,000 (77%) and the incremental weighted benefit is 0.10 (2.4%). The ratio of the incremental cost percentage to incremental benefit percentage is 32 (greater than 1). Alternative 1 is disproportionately costly for the benefits gained and is discarded.

The incremental cost between Alternative 2 and the next most permanent alternative (Alternative 3) is \$866,000 (25%) and the incremental weighted benefit is 0.90 (27%). The ratio of the incremental cost percentage to incremental benefit percentage is 0.93 (less than 1). Alternative 2 is not disproportionately costly for the benefits gained when compared to the next most permanent alternative. As such, Alternative 2 is selected and further analysis of Alternatives 3 and 4 is not required.

## 4 Remedy Selection

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### 4.1 On-Property

The remedy selected for the On-Property portion of the Site is demolition of existing infrastructure/buildings and the model remedy of excavation and offsite disposal of soil exceeding CULs down to the soil POC. An in situ treatment compound is planned to be added to the base of the excavation backfill to further manage residual contamination. Implementation of the model remedy for the On-Property portion of the Site will address the RAOs. As stated above, the total cost for on-Property model remedy implementation will be generated during the design phase but will not affect the CAP.

## 4.2 Off-Property

As determined by the DCA, the preferred alternative for the Off-Property portion of the Site is Alternative 2. Alternative 2 consists of targeted soil excavation, offsite disposal of excavated soil, and ISCO treatment outside of the soil excavation footprint to achieve CULs in soil and groundwater. Implementation of this cleanup action alternative will address the RAOs. This analysis was developed using the most current understanding of environmental conditions for the Off-Property portion of the Site. Additional soil and groundwater sampling is planned to further inform design of the cleanup action.

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# Limitations

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

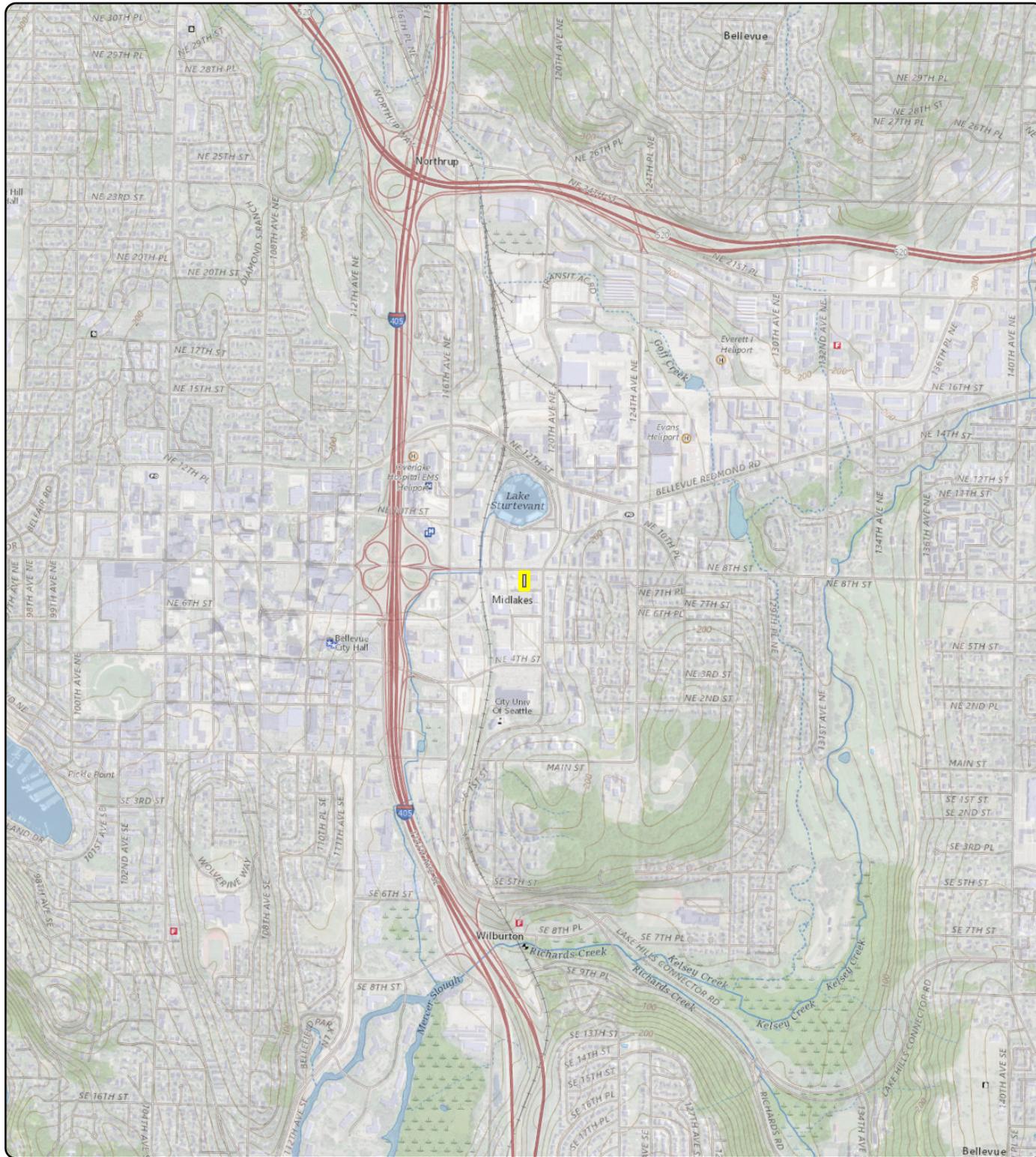
Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices,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

# Figures

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MAUL  
FOSTER  
ALONGI



**Notes**  
 U.S. Geological Survey 7.5-minute topographic quadrangle (2020): Mercer Island.  
 Township 25 north, range 5 east, section 33.

**Data Source**  
 Boundary for parcel 3325059180 obtained from King County.

**Legend**

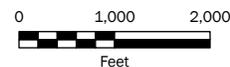
 Property Boundary

**Figure 1-1  
Vicinity Map**

Tiki Car Wash  
 11909 NE 8th Street  
 Bellevue, WA

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**Figure 1-2  
Property Features**

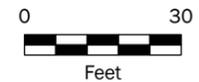
Tiki Car Wash  
11909 NE 8th Street  
Bellevue, WA

**Legend**

-  Monitoring Well
-  FPS Work Area
-  UST (Approximate)
-  Property Boundary
-  Parcel

**Notes**

FPS = feasibility pilot study.  
UST = underground storage tank.



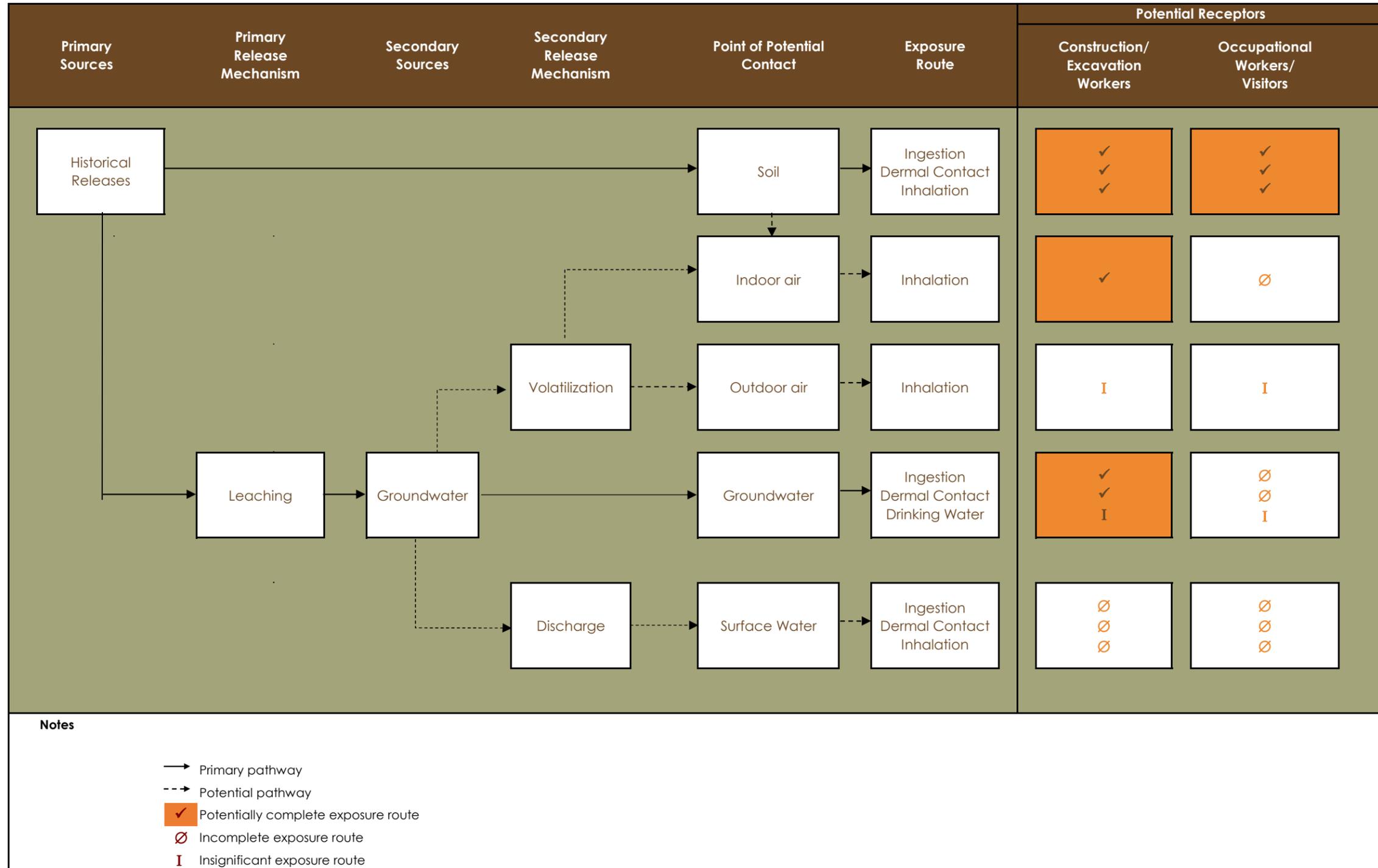
**Data Sources**

Aerial photograph obtained from Google; parcel data obtained from King County; approximate UST locations obtained from *Report of May 1996 Groundwater Sampling and Analysis* (Enviros 1996).

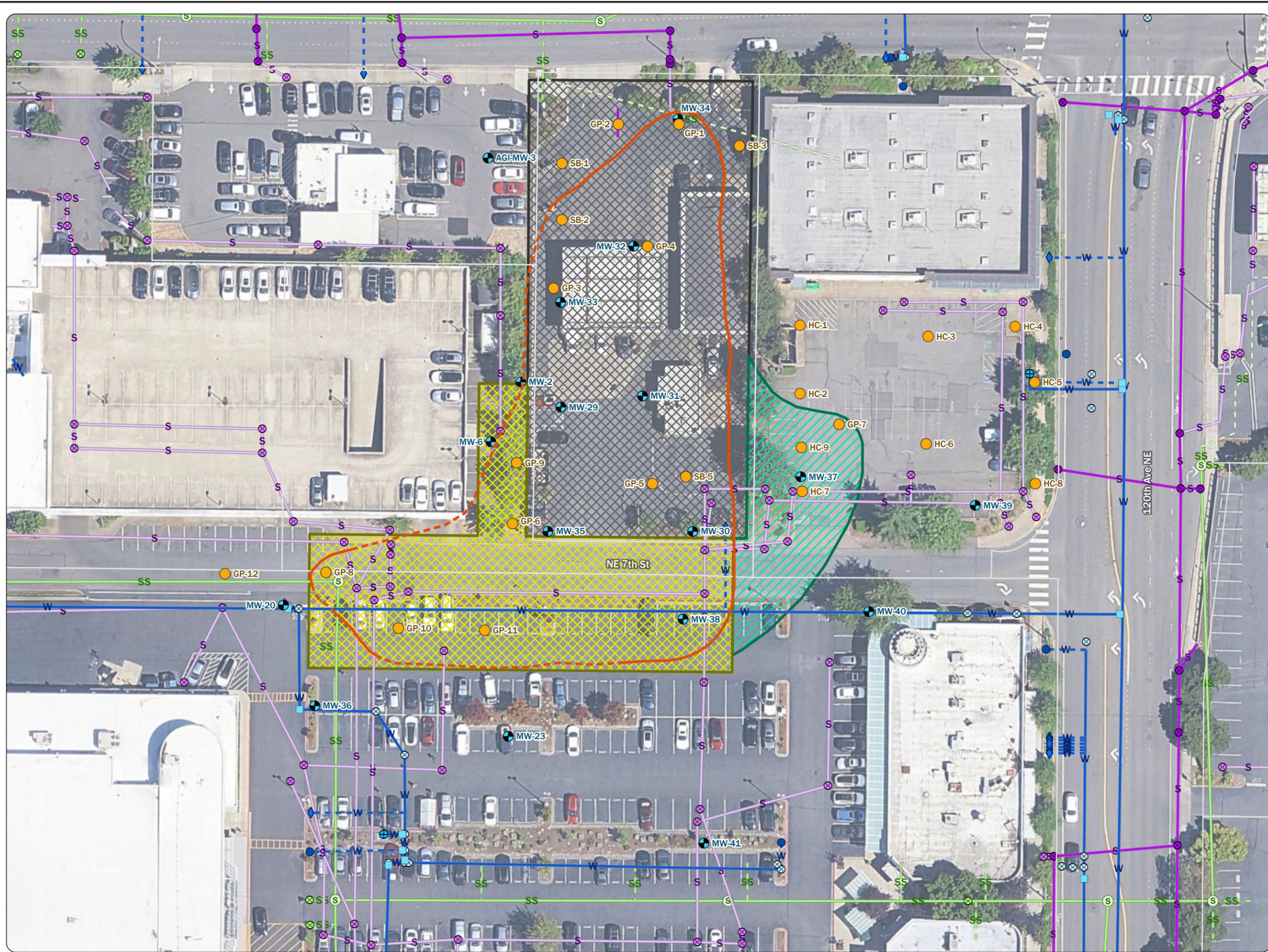


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**Figure 1-3  
Conceptual Site Model  
Tiki Car Wash Site, Bellevue, Washington  
Washington State Department of Ecology**



Path: C:\Workspace\0\_MFA\_Projects\M0592\_06\_001\Proj\M0592\_06\_001\_Remediation\_Alternatives.aprx [Fig 2-1 Remediation Alt 1]  
Print Date: 12/10/2025  
Reviewed By: elliot  
Produced By: jrobarts  
Project: M0592\_06\_001



**Figure 2-1**  
**Remediation Alternative 1**

Tiki Car Wash  
11909 NE 8th Street  
Bellevue, WA 98005

**Legend**

- Injection Area
- Excavation Area
- Excavation to 15 feet Below Ground Surface
- Monitoring Well
- Soil Boring/Temporary Well

**Approximate Extent of Soil Contamination**

- Inferred Boundary
- Boundary

**Water Utilities**

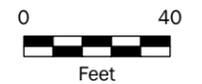
- Valve
- Connection
- Hydrant
- Fitting
- Control Valve
- Lateral Line
- Main

**Stormwater Utilities**

- Structure
- Private Structure
- Private Gravity Main
- Gravity Main

**Sanitary Sewer Utilities**

- Manhole
- Fitting
- Private Lateral Line
- Lateral Line
- Gravity Main
- Parcel

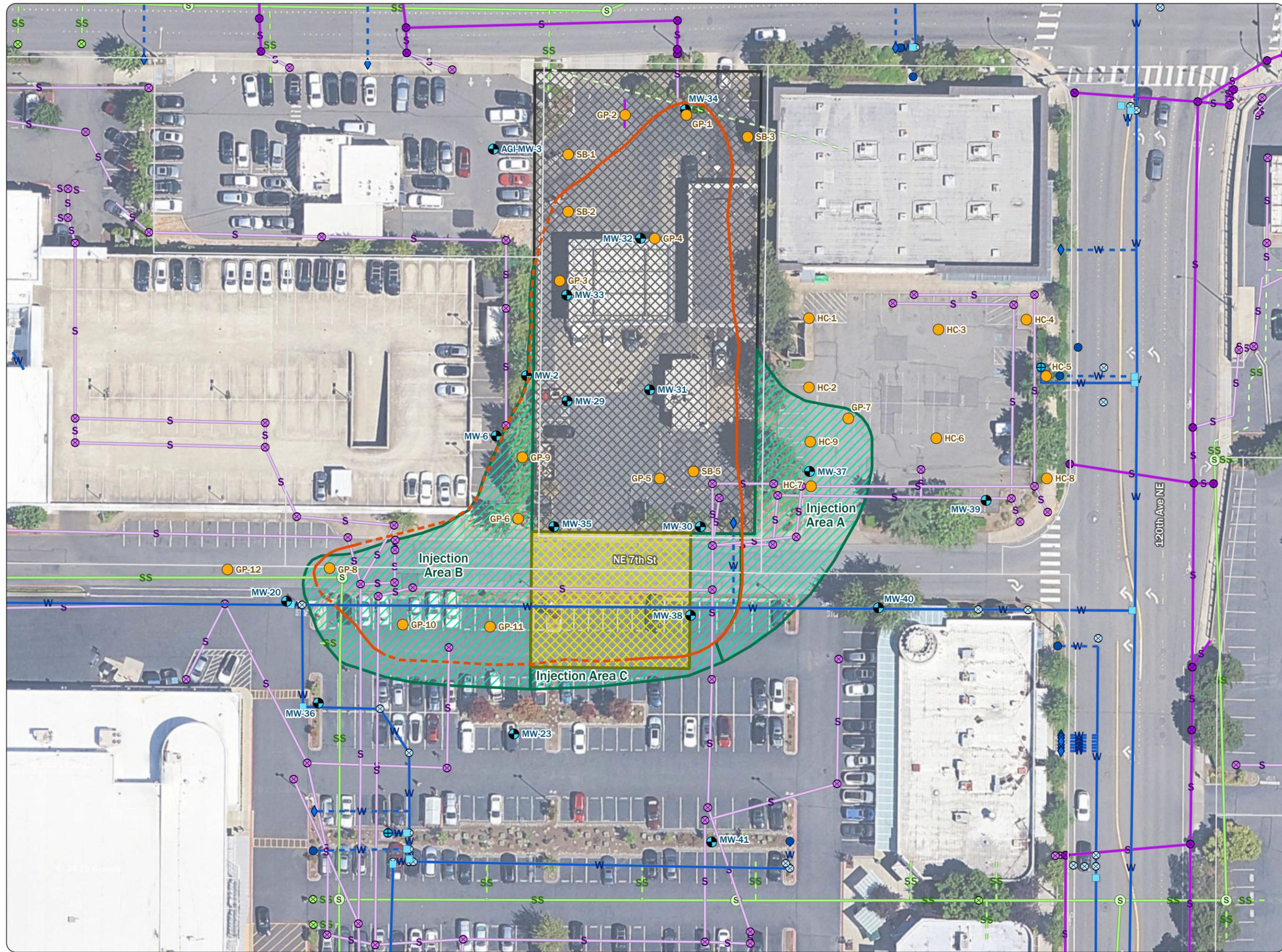


**Data Sources**  
Aerial photograph (2025) obtained from Google; parcel data (2025) obtained from King County; sample locations (2023) obtained from Leidos; utilities (2025) obtained from the City of Bellevue.

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Path: C:\Workspaces\0\_MFA\_Projects\M0592\_06\_001\Proj\M0592\_06\_001\_Remediation\_Alternatives.aprx [Fig 2-2 Remediation Alt 2]  
Print Date: 12/19/2025  
Reviewed By: jelliott  
Produced By: jrobarts  
Project: M0592\_06\_001



### Figure 2-2 Remediation Alternative 2

Tiki Car Wash  
11909 NE 8th Street  
Bellevue, WA 98005

#### Legend

- Injection Area
- Excavation Area
- Excavation to 15 feet Below Ground Surface
- Monitoring Well
- Soil Boring/Temporary Well

#### Approximate Extent of Soil Contamination

- Inferred Boundary
- Boundary

#### Water Utilities

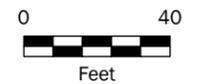
- Valve
- Connection
- Hydrant
- Fitting
- Control Valve
- Lateral Line
- Main

#### Stormwater Utilities

- Structure
- Private Structure
- Private Gravity Main
- Gravity Main

#### Sanitary Sewer Utilities

- Manhole
- Fitting
- Private Lateral Line
- Lateral Line
- Gravity Main
- Parcel

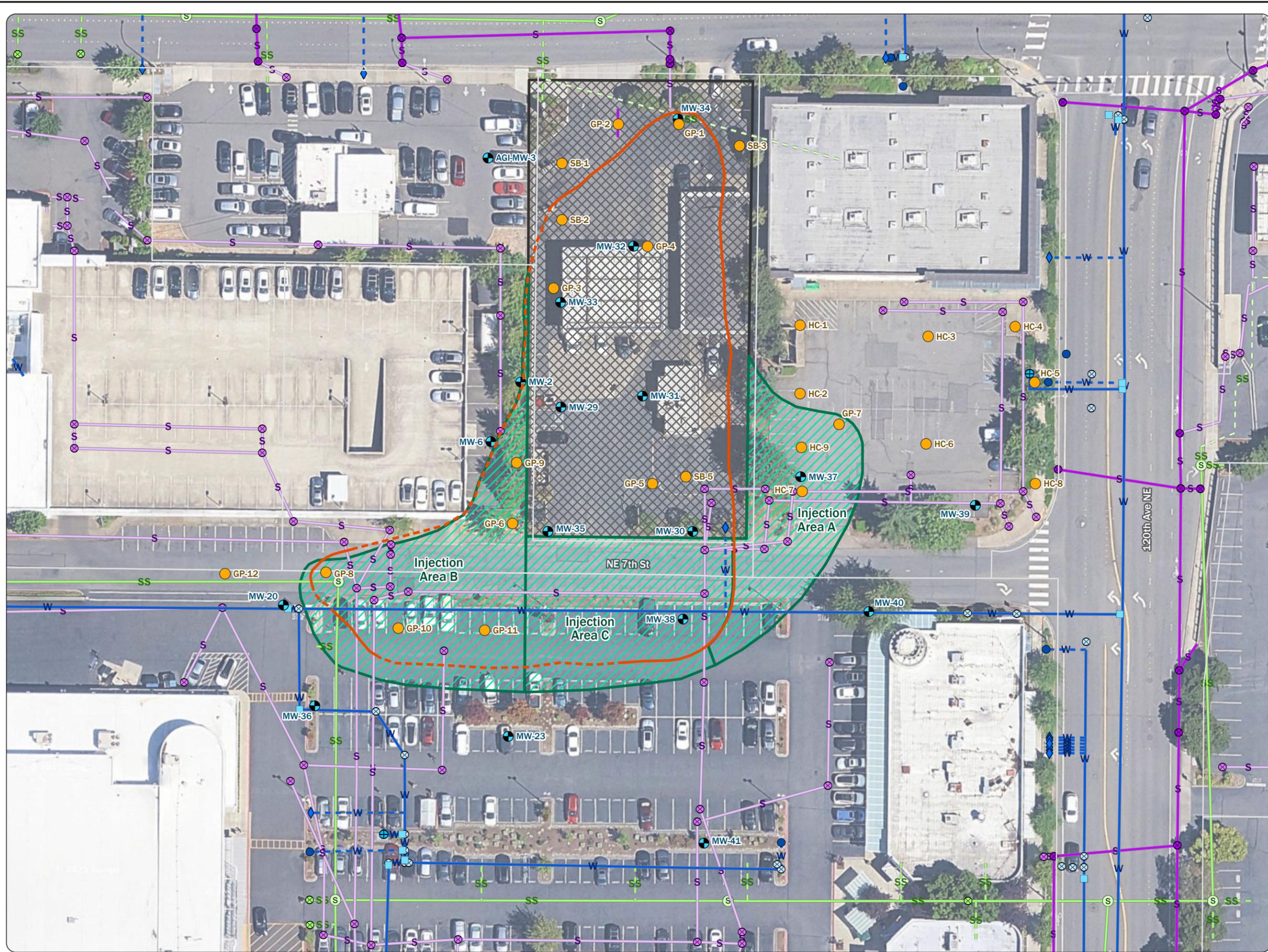


**Data Sources**  
Aerial photograph (2025) obtained from Google; parcel data (2025) obtained from King County; sample locations (2023) obtained from Leidos; utilities (2025) obtained from the City of Bellevue.

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Path: C:\Workspace\0\_MFA\_Projects\M0592\_06\_001\Proj\M0592\_06\_001\_Remediation\_Alternatives.aprx [Fig 2-3 Remediation Alt 3] Print Date: 12/19/2025 Reviewed By: jellott Produced By: jroberts Project: M0592\_06\_001



### Figure 2-3 Remediation Alternative 3

Tiki Car Wash  
11909 NE 8th Street  
Bellevue, WA 98005

#### Legend

- Injection Area
- Excavation to 15 feet Below Ground Surface
- Monitoring Well
- Soil Boring/Temporary Well

#### Approximate Extent of Soil Contamination

- Inferred Boundary
- Boundary

#### Water Utilities

- Valve
- Connection
- Hydrant
- Fitting
- Control Valve
- Lateral Line
- Main

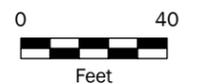
#### Stormwater Utilities

- Structure
- Private Structure
- Private Gravity Main
- Gravity Main

#### Sanitary Sewer Utilities

- Manhole
- Fitting
- Private Lateral Line
- Lateral Line
- Gravity Main

Parcel



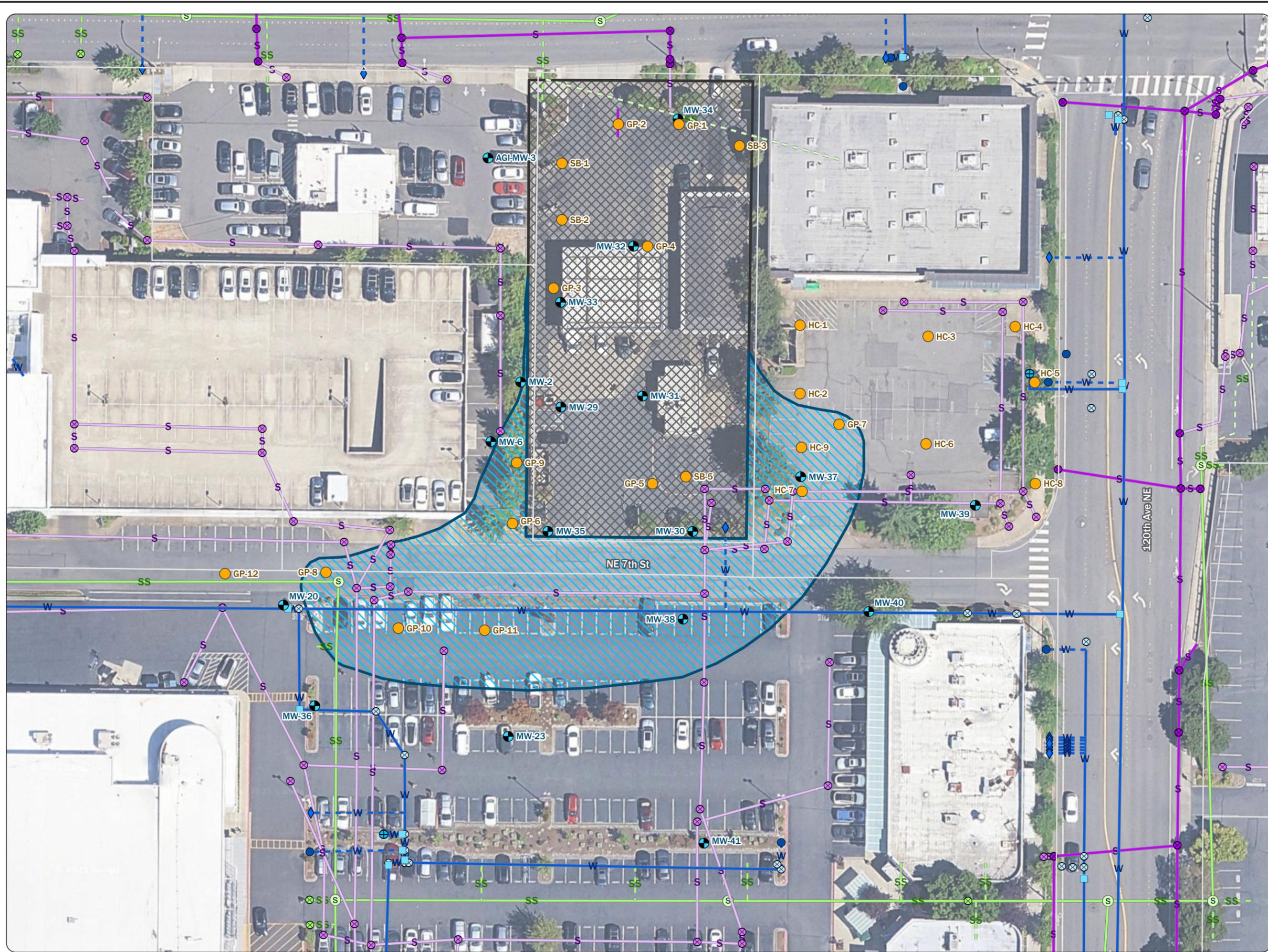
#### Data Sources

Aerial photograph (2025) obtained from Google; parcel data (2025) obtained from King County; sample locations (2023) obtained from Leidos; utilities (2025) obtained from the City of Bellevue.

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Path: C:\Work\space\0\_MFA\_Projects\M0592\_06\_001\Proj\M0592\_06\_001\_Remediation\_Alternatives.aprx [Fig. 2-4 Remediation Alt. 4]  
Print Date: 12/10/2025  
Reviewed By: elliot  
Produced By: jrobarts  
Project: M0592\_06\_001



### Figure 2-4 Remediation Alternative 4

Tiki Car Wash  
11909 NE 8th Street  
Bellevue, WA 98005

#### Legend

- Well Area
- Excavation to 15 feet Below Ground Surface
- Monitoring Well
- Soil Boring/Temporary Well

#### Water Utilities

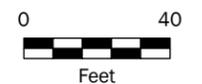
- Valve
- Connection
- Hydrant
- Fitting
- Control Valve
- Lateral Line
- Main

#### Stormwater Utilities

- Structure
- Private Structure
- Private Gravity Main
- Gravity Main

#### Sanitary Sewer Utilities

- Manhole
- Fitting
- Private Lateral Line
- Lateral Line
- Gravity Main
- Parcel



**Data Sources**  
Aerial photograph (2025) obtained from Google; parcel data (2025) obtained from King County; sample locations (2023) obtained from Leidos; utilities (2025) obtained from the City of Bellevue.

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# Tables

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**Table 1-4**  
**Potential Regulations**  
**Tiki Car Wash, 11909 NE 8th Street, Bellevue, Washington**  
**Washington State Department of Ecology**

Authority	Resource	Implementing Laws/Regulations	Applicable	Applicability
<b>Contaminant-Specific</b>				
State	Soil	Washington State MTCA (RCW 70A.305; Chapter 173-340 WAC)	Yes	MTCA soil cleanup levels are applicable.
State	Groundwater	Washington State MTCA (RCW 70A.305; Chapter 173-340 WAC)	Yes	MTCA groundwater cleanup levels are applicable.
State	Indoor Air	Washington State MTCA (RCW 70A.305; Chapter 173-340 WAC)	Yes	MTCA indoor air cleanup levels are applicable.
Federal	Drinking Water	National Primary Drinking Water Regulations	Yes	National primary drinking water regulations are applicable for benzene, ethylbenzene, toluene, and xylenes.
<b>Action-Specific</b>				
Federal/State	Surface Water	National Pollutant Discharge Elimination System (NPDES) Federal Water Pollution Control Act (CWA; 33 USC § 1342, Section 402) and Implementing Regulations  Washington State Construction Stormwater General Permit (RCW 90.48; Chapter 173-220 WAC)	Yes	The NPDES program establishes requirements for point source discharges, including stormwater runoff. These requirements would be applicable for any point source discharge of stormwater during construction or following cleanup.
Federal	Surface Water	Federal Water Pollution Control Act--Water Quality Certification (CWA; 33 USC § 1341, Section 401) and Implementing Regulations	Yes	Section 401 of the CWA provides that applicants for a permit to conduct any activity involving potential discharges into waters or wetlands shall obtain certifications from the state stating that discharges will comply with applicable water quality standards. Any discharges to the City of Bellevue's stormwater conveyance system and/or surface water will be managed under the state program. In addition, ambient surface water quality criteria are considered screening criteria.
Federal	Air	Clean Air Act (42 USC § 7401 et seq.; 40 CFR Part 50)	Yes	The federal Clean Air Act creates a national framework designed to protect ambient air quality by limiting air emissions.

**Table 1-4  
Potential Regulations  
Tiki Car Wash, 11909 NE 8th Street, Bellevue, Washington  
Washington State Department of Ecology**

Authority	Resource	Implementing Laws/Regulations	Applicable	Applicability
<b>Action-Specific (cont.)</b>				
State	Air	Washington Clean Air Act and Implementing Regulations (Chapter 173-400-040[8] WAC)	Yes	These regulations require the owner or operator of a source of fugitive dust to take reasonable precautions to prevent fugitive dust to becoming airborne and to maintain and operated the source to minimize emissions. These regulations are applicable to all alternatives during construction.
Local	Air	Puget Sound Clean Air Agency	Yes	This requirement is similar to the Clean Air Act above but is more localized, addressing performance standards for land uses within King County. The Puget Sound Clean Air Agency regulations cover specific air quality issues within its regional jurisdiction. These air quality standards and pollution control regulations are applicable to remedial action alternatives involving construction.
Federal/State	Solid Waste	Transportation of Hazardous Materials (49 CFR Parts 105 to 177) Washington Transportation of Hazardous Materials (Chapter 446-50 WAC)	No	Transportation of hazardous waste or materials is required to meet state and federal requirements. These requirements are likely not applicable because soil will likely not be designated as hazardous waste.
Federal/State	Solid Waste	RCRA (42 USC § 6901 et seq.). Subtitle C-- Hazardous Waste Management (40 CFR Parts 260 to 279) Dangerous Waste Regulations (Chapter 173-303 WAC)	No	Subtitle C of RCRA pertains to the management of hazardous waste. These requirements are likely not applicable because soil will likely not be designated as hazardous waste. The soil at the site does not meet dangerous waste criteria.
Federal	Solid Waste	RCRA (42 USC § 6901 et seq.). Subtitle D-- Managing Municipal and Solid Waste (40 CFR Parts 257 to 258)	Yes	Subtitle D of RCRA establishes a framework for management of nonhazardous solid waste. These regulations establish guidelines and criteria from which states develop solid waste regulations. These requirements are applicable to the remediation alternatives that involve off-site disposal of impacted soil.

**Table 1-4**  
**Potential Regulations**  
**Tiki Car Wash, 11909 NE 8th Street, Bellevue, Washington**  
**Washington State Department of Ecology**



Authority	Resource	Implementing Laws/Regulations	Applicable	Applicability
<b>Action-Specific (cont.)</b>				
State	Solid Waste	Washington State Solid Waste Handling Standards (RCW 70.95; Chapter 173-500 WAC)	Yes	Washington State Solid Waste Handling Standards apply to facilities and activities that manage solid waste. The regulations set minimum fictional performance standards for proper handling and disposal of solid waste; describe responsibilities of various entities; and stipulate requirements for solid-waste-handling facility location, design, construction, operation, and closure. These requirements are applicable to remediation alternatives that involve off-site disposal of impacted soil.
Federal/State	Solid Waste	Land Disposal Restrictions (40 CFR Part 268) (Chapter 173-303-140 WAC)	No	Best management practices for waste disposal are required to meet state and federal requirements. It is not anticipated that the remediation alternatives will generate waste that meets dangerous waste criteria as defined by WAC 173-303-140.
Federal/State	Remedy Construction	Federal Occupational Safety and Healthy Administration (29 CFR Parts 1904, 1910, and 1926) Washington Industrial Safety and Health Act (RCW 49.17; Chapter 296-24 WAC)	Yes	Site worker and visitor health and safety requirements established by the Washington Industrial Safety and Health Act are to be met during implementation of the remedial action.
State	Remedy Construction	UIC Program (Chapter 173-218 WAC)	Yes	UIC regulations apply to remedial action alternatives that include injection of biological or chemical oxidants into injection wells or trenches. These requirements are applicable for Alternatives 1 and 2.
State	Remedy Construction	Accreditation of Environmental Laboratories (RCW 43.21A.230 and WAC 173-50)	Yes	Required persons or organizations submitting analytical data under the purview of Ecology, Department of Health, and other entities, to use environmental laboratories which are accredited.
State	Remedy Construction	SEPA (RCW 43.21C; Chapter 197-11 WAC)	Yes	A SEPA review identifies and analyzes environmental impacts associated with the selected remedial action alternative. A SEPA review is required for local permitting and pursuant to MTCA.

**Table 1-4**  
**Potential Regulations**  
**Tiki Car Wash, 11909 NE 8th Street, Bellevue, Washington**  
**Washington State Department of Ecology**

Authority	Resource	Implementing Laws/Regulations	Applicable	Applicability
<b>Action-Specific (cont.)</b>				
State/Local	Remedy Construction	Washington Noise Control (RCW 70A.20; Chapter 173-60 WAC)  City of Bellevue Noise Control Ordinance (City of Bellevue Code Chapter 9.18)	Yes	Potentially relevant, depending on construction activities and equipment selected. Construction activities will be limited to normal working hours, to the extent possible, to minimize noise impacts.
Local	Remedy Construction	Clearing and Grading Permit (City of Bellevue Code 23.76.035)	Yes	Projects that involve fill and/or excavation of more than 50 cubic yards (total of fill and excavation added together) require a Clearing and Grading Permit from the City of Bellevue.
State	Groundwater	Minimum Standards for Construction and Maintenance of Wells (RCW 18.104; Chapter 173-160 WAC)	Yes	Washington state has developed minimum standards for constructing water and monitoring wells, and for the decommissioning of wells. These regulations are applicable since there are existing monitoring wells at the Site.
Federal	Endangered Species, Critical Habitats	Migratory Bird Treaty Act (50 CFR Part 10.13)	Yes	The Migratory Bird Treaty Act makes it unlawful to kill migratory birds by any means unless permitted by regulations. Implementing the remedial action in conformance with MTCA will protect wildlife, including migratory birds. Any nesting habitat removed will be performed outside of nesting season. Consequently, no additional actions are needed to conform to the Migratory Bird Treaty Act.
<b>Location-Specific</b>				
Federal/State	Historic Areas	Archaeological and Historic Preservation Act (16 USC § 496,470 et seq.; 36 CFR Parts 65 and 800)  Washington Archaeological Sites and Resources (RCW 27.44, 27.48, and 27.53; Chapter 25-48 WAC)	Yes	Actions must be taken to preserve and recover significant artifacts, preserve historic archaeological properties and resources, and minimize harm to national landmarks. There are no known historic or archaeological sites on the Property.

**Table 1-4**  
**Potential Regulations**  
**Tiki Car Wash, 11909 NE 8th Street, Bellevue, Washington**  
**Washington State Department of Ecology**

Authority	Resource	Implementing Laws/Regulations	Applicable	Applicability
<b>Location-Specific (cont.)</b>				
Federal	Endangered Species, Critical Habitats	ESA (16 USC § 1531-1544) and Implementing Regulations	No	The ESA protects species of fish, wildlife, and plants that are listed as threatened and/or endangered. It also protects designated critical habitat for listed species. This is not applicable based on a terrestrial ecological evaluation performed for the Property.
State	Aquatic Lands	Aquatic Lands Management--Washington State (RCW 79.90; Chapter 332-30 WAC)	No	The Aquatic Lands Management law develops criteria for managing state-owned aquatic lands. Aquatic lands are to be managed to promote uses and protect resources as specified in the regulations. The remediation alternatives are not on state-owned aquatic lands.
State	Public Lands	Public Lands Management (RCW 79.02)	No	Activities on public lands are restricted, regulated, or proscribed. The remediation alternatives do not occur on state-owned public land.
State	Shorelines and Surface Water	Shoreline Management Act of 1971 (RCW 90.58) and Implementing Regulations	No	Actions are prohibited within 200 feet of shorelines of statewide significance unless permitted. This is not applicable to the Property.
State	Wetlands	Shoreline Management Act of 1971 (RCW 90.58) and Implementing Regulations	No	It is required that construction or management of property in wetlands minimize potential harm, avoid adverse effects, and preserve and enhance wetlands. The remediation alternatives are not located in delineated wetlands.
<b>Notes</b> CFR = Code of Federal Regulations. CWA = Clean Water Act. ESA = Endangered Species Act. MTCA = Model Toxics Control Act. NPDES = National Pollutant Discharge Elimination System. RCRA = Resource Conservation and Recovery Act. RCW = Revised Code of Washington. UIC = underground injection control. USC = United States Code. WAC = Washington Administrative Code.				

**ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST**

<b>Table 2-1: Alternative 1: Excavation and Off-Site Disposal of Soil Impacts, In Situ Treatment</b>		 <p><b>MAUL FOSTER ALONGI</b></p> <p>2815 2nd Avenue, Suite 540 Seattle, WA 98121 206-858-7620 (p) www.maulfoster.com</p>
Project:	Tiki Car Wash Feasibility Study	
Client:	Washington State Department of Ecology	
Project No./Task:	M0592.06.001	
Prepared By:	J. Elliott	
Checked By:	J. Hansen	
Date:	10/31/2025	
<b>Cost Estimate Summary—Feasibility Level</b>		
<b>Schedule A—</b>	Mobilization and Site Preparation	\$ 510,000
<b>Schedule B—</b>	Excavation and Offsite Disposal	\$ 3,864,000
<b>Schedule C—</b>	In Situ Chemical Oxidation	\$ 140,000
<b>Schedule D—</b>	Permitting	\$ 75,000
<b>Schedule E—</b>	Administrative Costs	\$ 1,105,000
<b>Schedule F—</b>	Monitoring and Periodic Costs	\$ 113,000
<b>Schedule G—</b>	Contingency	\$ 1,742,000
	<b>Total:</b>	<b>\$ 7,549,000</b>

**ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST**

<b>Table 2-2: Alternative 2: Targeted Excavation, In Situ Treatment</b>		 <p><b>MAUL FOSTER ALONGI</b></p> <p>2815 2nd Avenue, Suite 540 Seattle, WA 98121 206-858-7620 (p) www.maulfoster.com</p>
Project:	Tiki Car Wash Feasibility Study	
Client:	Washington State Department of Ecology	
Project No./Task:	M0592.06.001	
Prepared By:	J. Elliott	
Checked By:	J. Hansen	
Date:	10/31/2025	
<b>Cost Estimate Summary—Feasibility Level</b>		
<b>Schedule A—</b>	Mobilization and Site Preparation	\$ 270,000
<b>Schedule B—</b>	Excavation and Offsite Disposal	\$ 1,307,000
<b>Schedule C—</b>	In Situ Chemical Oxidation	\$ 841,000
<b>Schedule D—</b>	Permitting	\$ 50,000
<b>Schedule E—</b>	Administrative Costs	\$ 700,000
<b>Schedule F—</b>	Monitoring and Periodic Costs	\$ 111,000
<b>Schedule G—</b>	Contingency	\$ 984,000
<b>Total:</b>		<b>\$ 4,263,000</b>

**ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST**

<b>Table 2-3: Alternative 3: In Situ Chemical Treatment</b>		 <p><b>MAUL FOSTER ALONGI</b></p> <p>2815 2nd Avenue, Suite 540 Seattle, WA 98121 206-858-7620 (p) www.maulfoster.com</p>
Project:	Tiki Car Wash Feasibility Study	
Client:	Washington State Department of Ecology	
Project No./Task:	M0592.06.001	
Prepared By:	J. Elliott	
Checked By:	J. Hansen	
Date:	10/31/2025	
<b>Cost Estimate Summary—Feasibility Level</b>		
<b>Schedule A—</b>	Mobilization and Site Preparation	\$ 173,000
<b>Schedule B—</b>	In Situ Chemical Oxidation	\$ 1,568,000
<b>Schedule C—</b>	Permitting and Institutional Controls	\$ 15,000
<b>Schedule D—</b>	Administrative Costs	\$ 627,000
<b>Schedule E—</b>	Monitoring and Periodic Costs	\$ 230,000
<b>Schedule F—</b>	Contingency	\$ 784,000
	<b>Total:</b>	<b>\$ 3,397,000</b>

**ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST**

<b>Table 2-4: Alternative 4: Recirculating Wells/In-Well Air Stripping</b>		 <p><b>MAUL FOSTER ALONGI</b></p> <p>2815 2nd Avenue, Suite 540 Seattle, WA 98121 206-858-7620 (p) www.maulfoster.com</p>
Project:	Tiki Car Wash Feasibility Study	
Client:	Washington State Department of Ecology	
Project No./Task:	M0592.06.001	
Prepared By:	J. Elliott	
Checked By:	J. Hansen	
Date:	10/27/2025	
<b>Cost Estimate Summary—Feasibility Level</b>		
<b>Schedule A—</b>	Mobilization and Site Preparation	\$ 124,000
<b>Schedule B—</b>	Recirculating Wells/In-Well Air Stripping	\$ 910,000
<b>Schedule C—</b>	Permitting and Institutional Controls	\$ 50,000
<b>Schedule D—</b>	Administrative Costs	\$ 390,000
<b>Schedule E—</b>	Monitoring and Periodic Costs	\$ 464,000
<b>Schedule F—</b>	Contingency	\$ 581,000
	<b>Total:</b>	<b>\$ 2,519,000</b>

**Table 3-1**  
**Disproportionate Cost Analysis Results**  
**Tiki Car Wash Feasibility Study**  
**Washington State Department of Ecology**



Site Information		Alternative name and present value of total cost of each alternative				
Site Name:	Alternative Name	Alt 1	Alt 2	Alt 3	Alt 4	
Tiki Car Wash	Cost (\$ in millions)	7.55	4.26	3.40	2.52	
CSID:	Cost-Estimate Confidence Range	High (+)%	50%			
5096		Low (-)%	30%			
Benefit Inputs						
DCA Benefit Criteria		Weight (%)	Scores (relative degrees of benefit)			
Protectiveness		30%	5.0	5.0	4.0	3.0
Permanence		30%	4.5	4.0	3.0	2.5
Long-term effectiveness		20%	5.0	4.5	2.0	2.0
Implementation Risk Management		10%	2.0	3.0	4.0	3.5
Implementability		10%	2.5	3.0	4.0	3.5
Total weighted degrees of benefit		100%	4.30	4.20	3.30	2.75
Cost Effectiveness (million dollars per total weighted degrees of benefit)						
Cost Effectiveness (\$/B)			\$1.76	\$1.01	\$1.03	\$0.92

# Appendix A

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## Terrestrial Ecological Evaluation Form



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# Voluntary Cleanup Program

## Washington State Department of Ecology Toxics Cleanup Program

### TERRESTRIAL ECOLOGICAL EVALUATION FORM

Under the Model Toxics Control Act (MTCA), a terrestrial ecological evaluation is necessary if hazardous substances are released into the soils at a Site. In the event of such a release, you must take one of the following three actions as part of your investigation and cleanup of the Site:

1. Document an exclusion from further evaluation using the criteria in WAC 173-340-7491.
2. Conduct a simplified evaluation as set forth in WAC 173-340-7492.
3. Conduct a site-specific evaluation as set forth in WAC 173-340-7493.

When requesting a written opinion under the Voluntary Cleanup Program (VCP), you must complete this form and submit it to the Department of Ecology (Ecology). The form documents the type and results of your evaluation.

**Completion of this form is not sufficient to document your evaluation. You still need to document your analysis and the basis for your conclusion in your cleanup plan or report.**

If you have questions about how to conduct a terrestrial ecological evaluation, please contact the Ecology site manager assigned to your Site. For additional guidance, please refer to <https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Terrestrial-ecological-evaluation>.

#### Step 1: IDENTIFY HAZARDOUS WASTE SITE

Please identify below the hazardous waste site for which you are documenting an evaluation.

Facility/Site Name: Tiki Car Wash

Facility/Site Address: 11909 NE 8th Street, Bellevue, Washington 98007

Facility/Site No: 2352

VCP Project No.: N/A

#### Step 2: IDENTIFY EVALUATOR

Please identify below the person who conducted the evaluation and their contact information.

Name: Justin Hansen

Title: Environmental Scientist

Organization: Maul Foster & Alongi, Inc.

Mailing address: 2815 2nd Ave, Suite 540

City: Seattle

State: WA

Zip code: 98121

Phone: 206-556-2022

Fax:

E-mail: [jhansen@maulfoster.com](mailto:jhansen@maulfoster.com)

### Step 3: DOCUMENT EVALUATION TYPE AND RESULTS

#### A. Exclusion from further evaluation.

##### 1. Does the Site qualify for an exclusion from further evaluation?

- Yes    *If you answered "YES," then answer **Question 2**.*
- No or Unknown    *If you answered "NO" or "UNKNOWN," then skip to **Step 3B** of this form.*

##### 2. What is the basis for the exclusion? Check all that apply. Then skip to **Step 4** of this form.

Point of Compliance: WAC 173-340-7491(1)(a)

- All soil contamination is, or will be,\* at least 15 feet below the surface.
- All soil contamination is, or will be,\* at least 6 feet below the surface (or alternative depth if approved by Ecology), and institutional controls are used to manage remaining contamination.

Barriers to Exposure: WAC 173-340-7491(1)(b)

- All contaminated soil, is or will be,\* covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.

Undeveloped Land: WAC 173-340-7491(1)(c)

- There is less than 0.25 acres of contiguous<sup>#</sup> undeveloped<sup>±</sup> land on or within 500 feet of any area of the Site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.
- For sites not containing any of the chemicals mentioned above, there is less than 1.5 acres of contiguous<sup>#</sup> undeveloped<sup>±</sup> land on or within 500 feet of any area of the Site.

Background Concentrations: WAC 173-340-7491(1)(d)

- Concentrations of hazardous substances in soil do not exceed natural background levels as described in WAC 173-340-200 and 173-340-709.

\* An exclusion based on future land use must have a completion date for future development that is acceptable to Ecology.

± "Undeveloped land" is land that is not covered by building, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil.

# "Contiguous" undeveloped land is an area of undeveloped land that is not divided into smaller areas of highways, extensive paving, or similar structures that are likely to reduce the potential use of the overall area by wildlife.

## B. Simplified evaluation.

### 1. Does the Site qualify for a simplified evaluation?

- Yes *If you answered "YES," then answer **Question 2** below.*
- No or Unknown *If you answered "NO" or "UNKNOWN," then skip to **Step 3C** of this form.*

### 2. Did you conduct a simplified evaluation?

- Yes *If you answered "YES," then answer **Question 3** below.*
- No *If you answered "NO," then skip to **Step 3C** of this form.*

### 3. Was further evaluation necessary?

- Yes *If you answered "YES," then answer **Question 4** below.*
- No *If you answered "NO," then answer **Question 5** below.*

### 4. If further evaluation was necessary, what did you do?

- Used the concentrations listed in Table 749-2 as cleanup levels. *If so, then skip to **Step 4** of this form.*
- Conducted a site-specific evaluation. *If so, then skip to **Step 3C** of this form.*

### 5. If no further evaluation was necessary, what was the reason? Check all that apply. Then skip to **Step 4** of this form.

#### Exposure Analysis: WAC 173-340-7492(2)(a)

- Area of soil contamination at the Site is not more than 350 square feet.
- Current or planned land use makes wildlife exposure unlikely. Used Table 749-1.

#### Pathway Analysis: WAC 173-340-7492(2)(b)

- No potential exposure pathways from soil contamination to ecological receptors.

#### Contaminant Analysis: WAC 173-340-7492(2)(c)

- No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations that exceed the values listed in Table 749-2.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays, and institutional controls are used to manage remaining contamination.

**C. Site-specific evaluation.** A site-specific evaluation process consists of two parts: (1) formulating the problem, and (2) selecting the methods for addressing the identified problem. Both steps require consultation with and approval by Ecology. See WAC 173-340-7493(1)(c).

**1. Was there a problem?** See WAC 173-340-7493(2).

- Yes    *If you answered “YES,” then answer **Question 2** below.*
- No    *If you answered “NO,” then identify the reason here and then skip to **Question 5** below:*
- No issues were identified during the problem formulation step.
  - While issues were identified, those issues were addressed by the cleanup actions for protecting human health.

**2. What did you do to resolve the problem?** See WAC 173-340-7493(3).

- Used the concentrations listed in Table 749-3 as cleanup levels. *If so, then skip to **Question 5** below.*
- Used one or more of the methods listed in WAC 173-340-7493(3) to evaluate and address the identified problem. *If so, then answer **Questions 3 and 4** below.*

**3. If you conducted further site-specific evaluations, what methods did you use?**

*Check all that apply. See WAC 173-340-7493(3).*

- Literature surveys.
- Soil bioassays.
- Wildlife exposure model.
- Biomarkers.
- Site-specific field studies.
- Weight of evidence.
- Other methods approved by Ecology. If so, please specify:

**4. What was the result of those evaluations?**

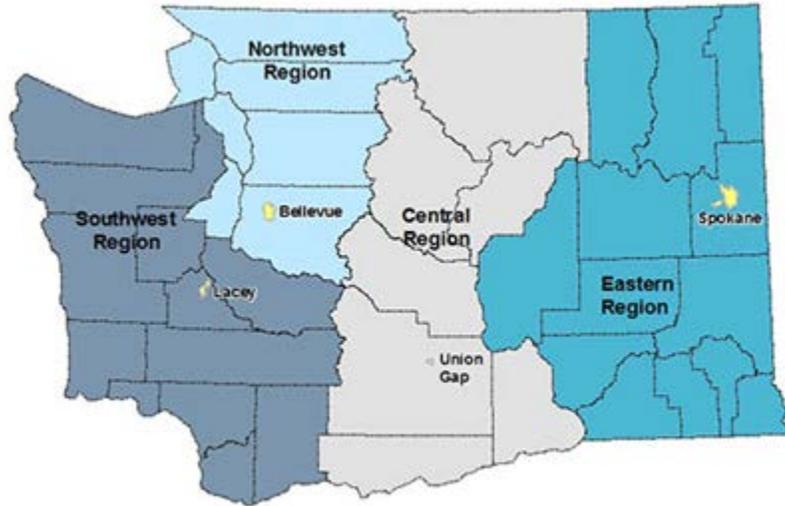
- Confirmed there was no problem.
- Confirmed there was a problem and established site-specific cleanup levels.

**5. Have you already obtained Ecology’s approval of both your problem formulation and problem resolution steps?**

- Yes    If so, please identify the Ecology staff who approved those steps:
- No

## Step 4: SUBMITTAL

Please mail your completed form to the Ecology site manager assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.



<b>Northwest Region:</b> Attn: VCP Coordinator 3190 160 <sup>th</sup> Ave. SE Bellevue, WA 98008-5452	<b>Central Region:</b> Attn: VCP Coordinator 1250 West Alder St. Union Gap, WA 98903-0009
<b>Southwest Region:</b> Attn: VCP Coordinator P.O. Box 47775 Olympia, WA 98504-7775	<b>Eastern Region:</b> Attn: VCP Coordinator N. 4601 Monroe Spokane WA 99205-1295

If you need this publication in an alternate format, please call the Toxics Cleanup Program at 360-407-7170. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call 877-833-6341.

# Appendix B

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## Detailed Cost Estimates



MAUL  
FOSTER  
ALONGI

**ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST - ALTERNATIVE 1**

Maul Foster Alongi, Inc.

<b>Schedule A</b>					
Mobilization and Site Preparation		Quantity	Unit	Unit Cost	Total Cost
A.1	Mobilization (10%)	1	LS	\$ 410,400.00	\$ 410,400.00
A.2	Traffic Control	1	LS	\$ 50,000.00	\$ 50,000.00
A.3	Temporary Erosion and Sediment Control	1	LS	\$ 50,000.00	\$ 50,000.00

**Subtotal Schedule A (rounded to the nearest thousand): \$ 510,000**

<b>Schedule B</b>					
Excavation and Offsite Disposal		Quantity	Unit	Unit Cost	Total Cost
B.1	Shoring	18,500	SF	\$ 27.00	\$ 499,500.00
B.2	Dewatering and Water Treatment	1	LS	\$ 450,000.00	\$ 450,000.00
B.3	Excavation and Handling	9,639	CY	\$ 55.00	\$ 530,145.00
B.4	Soil Transportation and Disposal	14,458	TON	\$ 100.00	\$ 1,445,800.00
B.5	Structural Backfill Import	15,080	TON	\$ 30.00	\$ 452,400.00
B.6	Placement and Compaction of Backfill	9,425	CY	\$ 15.00	\$ 141,375.00
B.7	Asphalt Paving	359	TON	\$ 145.00	\$ 52,055.00
B.8	Concrete Sidewalk	122	SY	\$ 105.00	\$ 12,810.00
B.9	Curb & Gutter	690	LF	\$ 65.00	\$ 44,850.00
B.10	Utility Management/Replacement	1	LS	\$ 200,000.00	\$ 200,000.00
B.11	Parking Lot Restoration	1	LS	\$ 30,000.00	\$ 30,000.00
B.12	Reinstall Monitoring Well 38	1	LS	\$ 5,000.00	\$ 5,000.00

**Subtotal Schedule B (rounded to the nearest thousand): \$ 3,864,000**

<b>Schedule C</b>					
In Situ Chemical Oxidation		Quantity	Unit	Unit Cost	Total Cost
C.1	Chemical Treatment Products	1	LS	\$ 100,000.00	\$ 100,000.00
C.2	Injections	1	LS	\$ 40,000.00	\$ 40,000.00

**Subtotal Schedule C (rounded to the nearest thousand): \$ 140,000**

<b>Schedule D</b>					
Permitting		Quantity	Unit	Unit Cost	Total Cost
D.1	Permitting	1	LS	\$ 75,000.00	\$ 75,000.00

**Subtotal Schedule D (rounded to the nearest thousand): \$ 75,000**

<b>Schedule E</b>					
Administrative Costs		Quantity	Unit	Unit Cost	Total Cost
E.1	Project Management (6%)	1	LS	\$ 184,100.00	\$ 184,100.00
E.2	Remedial Design (12%)	1	LS	\$ 368,200.00	\$ 368,200.00
E.3	Construction Management (18%)	1	LS	\$ 552,300.00	\$ 552,300.00

**Subtotal Schedule E (rounded to the nearest thousand): \$ 1,105,000**

<b>Schedule F</b>					
Discount Rate:		3.42%			
Monitoring and Periodic Costs		Quantity	Unit	Unit Cost	Total Cost
F.1	Twice-annual Groundwater Monitoring (Year 1)	1	YR	\$ 40,000.00	\$ 38,677.24
F.2	Quarterly Groundwater Monitoring (Year 2)	4	EA	\$ 20,000.00	\$ 74,796.44

**Subtotal Schedule F (rounded to the nearest thousand): \$ 113,000**

**ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST - ALTERNATIVE 2**

Maul Foster Alongi, Inc.

<b>Schedule A</b>					
Mobilization and Site Preparation		Quantity	Unit	Unit Cost	Total Cost
A.1	Mobilization (10%)	1	LS	\$ 219,800.00	\$ 219,800.00
A.2	Traffic Control	1	LS	\$ 25,000.00	\$ 25,000.00
A.3	Temporary Erosion and Sediment Control	1	LS	\$ 25,000.00	\$ 25,000.00
<b>Subtotal Schedule A (rounded to the nearest thousand):</b>					<b>\$ 270,000</b>
<b>Schedule B</b>					
Excavation and Offsite Disposal		Quantity	Unit	Unit Cost	Total Cost
B.1	Shoring	5,825	SF	\$ 27.00	\$ 157,275.00
B.2	Dewatering and Water Treatment	1	LS	\$ 200,000.00	\$ 200,000.00
B.3	Excavation and Handling	3,167	CY	\$ 55.00	\$ 174,185.00
B.4	Soil Transportation and Disposal	4,750	TON	\$ 100.00	\$ 475,000.00
B.5	Structural Backfill Import	4,954	TON	\$ 30.00	\$ 148,620.00
B.6	Placement and Compaction of Backfill	3,096	CY	\$ 15.00	\$ 46,440.00
B.7	Asphalt Paving	107	TON	\$ 145.00	\$ 15,515.00
B.8	Concrete Sidewalk	61	SY	\$ 105.00	\$ 6,405.00
B.9	Curb & Gutter	370	LF	\$ 65.00	\$ 24,050.00
B.10	Reconstruct 8" Storm Line	110	LF	\$ 75.00	\$ 8,250.00
B.11	Reconstruct 8" Water Line	110	LF	\$ 280.00	\$ 30,800.00
B.12	Parking Lot Restoration	1	LS	\$ 15,000.00	\$ 15,000.00
B.13	Reinstall Monitoring Well 38	1	LS	\$ 5,000.00	\$ 5,000.00
<b>Subtotal Schedule B (rounded to the nearest thousand):</b>					<b>\$ 1,307,000</b>
<b>Schedule C</b>					
In Situ Chemical Oxidation		Quantity	Unit	Unit Cost	Total Cost
C.1	Chemical Treatment Products - Round 1	1	LS	\$ 394,000.00	\$ 394,000.00
C.2	Injections - Round 1	1	LS	\$ 75,000.00	\$ 75,000.00
C.3	Chemical Treatment Products - Round 2	1	LS	\$ 294,000.00	\$ 294,000.00
C.4	Injections - Round 2	1	LS	\$ 78,000.00	\$ 78,000.00
<b>Subtotal Schedule C (rounded to the nearest thousand):</b>					<b>\$ 841,000</b>
<b>Schedule D</b>					
Permitting		Quantity	Unit	Unit Cost	Total Cost
D.1	Permitting	1	LS	\$ 50,000.00	\$ 50,000.00
<b>Subtotal Schedule D (rounded to the nearest thousand):</b>					<b>\$ 50,000</b>
<b>Schedule E</b>					
Administrative Costs		Quantity	Unit	Unit Cost	Total Cost
E.1	Project Management (6%)	1	LS	\$ 116,600.00	\$ 116,600.00
E.2	Remedial Design (12%)	1	LS	\$ 233,200.00	\$ 233,200.00
E.3	Construction Management (18%)	1	LS	\$ 349,700.00	\$ 349,700.00
<b>Subtotal Schedule E (rounded to the nearest thousand):</b>					<b>\$ 700,000</b>
<b>Schedule F</b>					
Discount Rate:		3.42%			
Monitoring and Periodic Costs		Quantity	Unit	Unit Cost	Total Cost
F.1	Quarterly Groundwater Monitoring (Year 2)	4	EA	\$ 20,000.00	\$ 74,796.44
F.2	Twice-annual Groundwater Monitoring (Year 3)	1	YR	\$ 40,000.00	\$ 36,161.50
<b>Subtotal Schedule F (rounded to the nearest thousand):</b>					<b>\$ 111,000</b>
<b>Schedule G</b>					
Contingency		Quantity	Unit	Unit Cost	Total Cost
G.1	Contingency (30%)	1	LS	\$ 983,700.00	\$ 983,700.00
<b>Subtotal Schedule G (rounded to the nearest thousand):</b>					<b>\$ 984,000</b>

**ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST - ALTERNATIVE 3**

Maul Foster Alongi, Inc.

<b>Schedule A</b>					
Mobilization and Site Preparation		Quantity	Unit	Unit Cost	Total Cost
A.1	Mobilization (10%)	1	LS	\$ 158,300.00	\$ 158,300.00
A.2	Traffic Control	1	LS	\$ 15,000.00	\$ 15,000.00
<b>Subtotal Schedule A (rounded to the nearest thousand):</b>					<b>\$ 173,000</b>
<b>Schedule B</b>					
In Situ Chemical Oxidation		Quantity	Unit	Unit Cost	Total Cost
B.1	Chemical Treatment Products - Round 1	1	LS	\$ 700,000.00	\$ 700,000.00
B.2	Injections - Round 1	1	LS	\$ 154,000.00	\$ 154,000.00
B.3	Chemical Treatment Products - Round 2	1	LS	\$ 600,000.00	\$ 600,000.00
B.4	Injections - Round 2	1	LS	\$ 114,000.00	\$ 114,000.00
<b>Subtotal Schedule B (rounded to the nearest thousand):</b>					<b>\$ 1,568,000</b>
<b>Schedule C</b>					
Permitting and Institutional Controls		Quantity	Unit	Unit Cost	Total Cost
C.1	Permitting	1	LS	\$ 15,000.00	\$ 15,000.00
<b>Subtotal Schedule D (rounded to the nearest thousand):</b>					<b>\$ 15,000</b>
<b>Schedule D</b>					
Administrative Costs		Quantity	Unit	Unit Cost	Total Cost
D.1	Project Management (6%)	1	LS	\$ 104,500.00	\$ 104,500.00
D.2	Remedial Design (12%)	1	LS	\$ 208,900.00	\$ 208,900.00
D.3	Construction Management (18%)	1	LS	\$ 313,400.00	\$ 313,400.00
<b>Subtotal Schedule E (rounded to the nearest thousand):</b>					<b>\$ 627,000</b>
<b>Schedule E</b>					
Discount Rate:		3.42%			
Monitoring and Periodic Costs		Quantity	Unit	Unit Cost	Total Cost
E.1	Twice-annual Groundwater Monitoring (Years 3-7)	5	YR	\$ 40,000.00	\$ 169,238.17
E.2	Quarterly Groundwater Monitoring (Year 8)	4	EA	\$ 20,000.00	\$ 61,129.90
<b>Subtotal Schedule F (rounded to the nearest thousand):</b>					<b>\$ 230,000</b>

**ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST - ALTERNATIVE 4**

Maul Foster Alongi, Inc.

<b>Schedule A</b>					
Mobilization and Site Preparation		Quantity	Unit	Unit Cost	Total Cost
A.1	Mobilization (10%)	1	LS	\$ 94,000.00	\$ 94,000.00
A.2	Traffic Control	1	LS	\$ 20,000.00	\$ 20,000.00
A.3	Temporary Erosion and Sediment Control	1	LS	\$ 10,000.00	\$ 10,000.00

**Subtotal Schedule A (rounded to the nearest thousand): \$ 124,000**

<b>Schedule B</b>					
Recirculating Wells/In-Well Air Stripping		Quantity	Unit	Unit Cost	Total Cost
B.1	Install Wells	13	EA	\$ 7,500.00	\$ 97,500.00
B.2	Centralized Equipment (compressors, blowers, GAC vessels)	1	LS	\$ 500,000.00	\$ 500,000.00
B.3	Instrumentation	1	LS	\$ 75,000.00	\$ 75,000.00
B.4	Control Panel and Electrical	1	LS	\$ 50,000.00	\$ 50,000.00
B.5	Sawcutting for Trenching	1	LS	\$ 7,500.00	\$ 7,500.00
B.6	Excavation and Handling	70	CY	\$ 25.00	\$ 1,750.00
B.7	Soil Transportation and Disposal	105	TON	\$ 100.00	\$ 10,500.00
B.8	Compressor lines, piping, instrumentation wiring, and valving	1	LS	\$ 150,000.00	\$ 150,000.00
B.9	Trench Backfill (Concrete Encasement)	54	CY	\$ 150.00	\$ 8,100.00
B.10	Asphalt Paving	30	TON	\$ 145.00	\$ 4,350.00
B.11	Sidewalk, curb, and gutter restoration	1	LS	\$ 5,000.00	\$ 5,000.00

**Subtotal Schedule B (rounded to the nearest thousand): \$ 910,000**

<b>Schedule C</b>					
Permitting and Institutional Controls		Quantity	Unit	Unit Cost	Total Cost
C.1	Permitting	1	LS	\$ 50,000.00	\$ 50,000.00

**Subtotal Schedule D (rounded to the nearest thousand): \$ 50,000**

<b>Schedule D</b>					
Administrative Costs		Quantity	Unit	Unit Cost	Total Cost
D.1	Project Management (6%)	1	LS	\$ 65,000.00	\$ 65,000.00
D.2	Remedial Design (12%)	1	LS	\$ 130,100.00	\$ 130,100.00
D.3	Construction Management (18%)	1	LS	\$ 195,100.00	\$ 195,100.00

**Subtotal Schedule E (rounded to the nearest thousand): \$ 390,000**

<b>Schedule E</b>					
Discount Rate:		3.42%			
Monitoring and Periodic Costs		Quantity	Unit	Unit Cost	Total Cost
E.1	Annual Groundwater Monitoring (Year 0 - 4)	5	YR	\$ 20,000.00	\$ 93,601.31
E.2	Annual System Maintenance (Year 0 - 4)	5	YR	\$ 50,000.00	\$ 234,003.28
E.3	Twice-annual Groundwater Monitoring (Years 5-9)	4	EA	\$ 20,000.00	\$ 79,115.08
E.4	Quarterly Groundwater Monitoring (Year 10)	4	EA	\$ 20,000.00	\$ 57,153.74

**Subtotal Schedule F (rounded to the nearest thousand): \$ 464,000**