DRAFT FINAL CLEANUP ACTION PLAN
BOTHELL PAINT AND DECORATING SITE
BOTHELL, WASHINGTON

City of Bothell

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Washington State
Department of Ecology
Toxics Cleanup Program
Northwest Regional Office
3190 – 160th Avenue SE
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EXECUTIVE SUMMARY

This document presents the draft Cleanup Action Plan for the Bothell Paint and Decorating Site in Bothell, Washington. This draft Cleanup Action Plan was prepared by the Washington State Department of Ecology (Ecology) in collaboration with the City of Bothell (City). This plan has been prepared to meet the requirements of the Model Toxics Control Cleanup Act administered by Ecology under Chapter 173-340 of the Washington Administrative Code. This plan describes Ecology's proposed cleanup action for this site and sets forth the requirements that the cleanup must meet.

Background

The Bothell Paint and Decorating Site is located along Bothell Way NE / SR 522 west of 98th Avenue NE in Bothell, Washington. The Site was formerly a paint store, had a former sandblasting operation, and contained one petroleum underground storage tank. The City acquired properties on which the Site lies in 2008 for construction of the SR 522 realignment, and entered into an Agreed Order with Ecology in 2009. Remedial investigation activities were initiated in 2009, and finalized in 2016. Interim action soil cleanups for petroleum hydrocarbons and metals were conducted in 2010, 2013 and 2014 at the Site. Chemicals of concern at the Site following the two interim action cleanups are:

- Soil: Gasoline- and motor oil-range petroleum hydrocarbons
- Ground water: Diesel- and oil-range petroleum hydrocarbons, and arsenic

Cleanup Action Overview

The selected remedy for the Site is a combination of excavation of contaminated soils (already completed as interim actions), engineering controls (capping under roadway), institutional controls (environmental covenants restricting access to soil and ground water), and ground water monitoring for natural attenuation to achieve compliance, with the possibility of contingency action if natural attenuation does not occur at a rate and in a timeframe that is acceptable to Ecology, as described below:

a. Lot C Parcel (labeled "LOT C" in Figure 2B)

   (i) TPH (Total petroleum hydrocarbons) contaminated soil on site prior to interim actions - adopt soil excavation interim actions as the final cleanup.

b. City ROW Parcel (labeled "CITY ROW" in Figure 2B)

   (i) TPH contaminated soil on site prior to interim actions – adopt soil excavation interim actions as part of the final cleanup action.

(ii) Remnant TPH contaminated soil under roadway – leave in place and implement:
- Engineering controls – paved SR 522 roadway capping TPH-impacted soils.
- Institutional controls – implement environmental covenant.

(iii) Arsenic contaminated ground water – leave in place and implement:

- Institutional controls – implement environmental covenant. The covenant will document arsenic and the possibility of TPH contamination in ground water, prohibit withdrawal and use for any purpose other than monitoring, site investigation, or construction-related activities without prior notification and approval by Ecology.
- Monitored Natural Attenuation (MNA)
- Compliance and MNA monitoring under a Compliance Monitoring Plan.
- A contingency plan for ground water will be part of the cleanup remedy in case the ground water has not reached compliance at the end of the compliance monitoring period and statistical and MNA-based analysis indicates that compliance will not be reached in a reasonable restoration timeframe.

c. City Parcel

(i) TPH contaminated soil on site prior to interim actions – adopt soil excavation interim actions as the final cleanup action.

(ii) TPH and arsenic contaminated ground water – leave in place and implement:

- Institutional controls – implement environmental covenant. The covenant will document TPH and arsenic contamination in ground water, prohibit withdrawal and use for any purpose other than monitoring, site investigation, or construction-related activities without prior notification and approval by Ecology.
- Monitored natural attenuation (MNA)
- Compliance and MNA monitoring under a Compliance Monitoring Plan.
- A contingency plan for ground water will be part of the cleanup remedy in case the ground water has not reached compliance at the end if the compliance monitoring period and statistical and MNA-based analysis indicates that compliance will not be reached in a reasonable restoration timeframe.

DRAFT CLEANUP ACTION PLAN
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BOTHELL, WASHINGTON

1 INTRODUCTION

1.1 PURPOSE

This document is the draft Cleanup Action Plan (dCAP) for the Bothell Paint and Decorating Site (Site) generally located in Bothell, Washington. Per the Model Toxics Control Act (MTCA), a MTCA site is "any site or area where a hazardous substance … has been deposited, stored, disposed of, or placed, or otherwise come to be located." The general location of the Site is shown in Figures 1, 2A and 2B. A dCAP is required as part of the site cleanup process under Chapter 173-340 of the Washington Administrative Code (WAC), MTCA Cleanup Regulations. The purpose of the dCAP is to identify the proposed cleanup action for the Site and to provide an explanatory document for public review. More specifically, this plan:

- Describes the Site
- Summarizes current site conditions;
- Summarizes the cleanup action alternatives considered in the remedy selection process;
- Describes the selected cleanup action for the Site and the rational for selecting this alternative;
- Identifies site-specific cleanup levels and points of compliance for each hazardous substance and medium of concern for the proposed cleanup action;
- Identifies applicable state and federal laws for the proposed cleanup action;
- Identifies residual contamination remaining on the Site after cleanup and restrictions on future uses and activities at the Site to ensure continued protection of human health and the environment;
- Discusses compliance monitoring requirements; and
- Presents the schedule for implementing the CAP.

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

1.2 PREVIOUS STUDIES

Previous studies at the Site include the following:

HWA GeoSciences, 2008a, *Phase I Environmental Site Assessment, Victory Development Property, 18004 Bothell Way NE, Bothell, Washington*. Prepared for City of Bothell, April 24, 2008.

HWA GeoSciences, 2008b, *Phase I Environmental Site Assessment, Giannola Parcel / Parcel No. 9457200072, 18004 Bothell Way NE, Bothell, Washington*. Prepared for City of Bothell, April 25, 2008.

HWA GeoSciences, 2008c, *Phase II Environmental Site Assessment, Giannola Parcel/Parcel No. 9457200072, Bothell, Washington*. Prepared for City of Bothell, April 30, 2008.

HWA GeoSciences, 2008d, *Phase II Environmental Site Assessment, Victory Development Property Parcel No. 9457200081, Bothell, Washington*. Prepared for City of Bothell, April 30, 2008.

HWA GeoSciences, 2009a, *Remedial Investigation and Feasibility Study Work Plan, Bothell Paint and Decorating Facility, Bothell, Washington*. Prepared for City of Bothell, August 26, 2009. Compiled by Parametrix. As amended in Parametrix *Amendment to Remedial Investigation and Feasibility Study Work Plan, Bothell Paint and Decorating Facility, Bothell Washington* dated August 26, 2009.

HWA GeoSciences, 2009b, *Aquifer Testing and Permeability Estimates, Bothell Crossroads RI/FS, Bothell, Washington*. Prepared for City of Bothell, October 6, 2009.

HWA GeoSciences, 2011. *Documentation of Interim Action at Former Bothell Paint & Decorating Site* Prepared for City of Bothell, January 14, 2011.

HWA GeoSciences, 2014a, *Interim Action Cleanup Report, Former Bothell Paint and Decorating Site, Bothell, Washington*, Prepared for City of Bothell, March 26, 2014.

HWA GeoSciences, 2014b, Area Wide Ground Water Monitoring Network, Bothell Agreed Order Sites, Bothell, WA. Letter Dated August 20, 2014.

HWA GeoSciences, 2014c, *Interim Action Cleanup Action Report, Bothell Landing Site, Bothell, WA*, Dated September 2, 2014.

HWA GeoSciences, 2014d, *Area Wide Ground Water Monitoring, Second Round Results, Bothell Agreed Order Sites, Bothell, WA.* Letter Dated October 17, 2014.

HWA GeoSciences, 2015a *Area Wide Ground Water Monitoring, Third Round Results, Bothell Agreed Order Sites, Bothell, WA.* Letter Dated January 16, 2015.

HWA GeoSciences, 2015b, *Area Wide Ground Water Monitoring, Fourth Round Results, Bothell Agreed Order Sites, Bothell, WA.* Letter Dated April 16 2015.

Parametrix, 2009, *Bothell Paint and Decorating Remedial Investigation/Feasibility Study, Revision No. 0*. Prepared for City of Bothell, November 2009.

Parametrix, 2010a, *Technical Memorandum to Nduta Mbuthia - City of Bothell, From Ken Fellows, P.E. – Parametrix, Subject: Bothell Paint and Decorating January 2010 Chromium Sampling - Agreed Order DE 6296,* Revision 0, February 15, 2010

Parametrix, 2010b, *Interim Action Work Plan, Bothell Paint and Decorating Site, Revision No. 2*. Prepared for City of Bothell, April 2010.

1.3 REGULATORY FRAMEWORK

The dCAP is being conducted under Agreed Order DE 6296, dated February 3, 2009, as amended by Amendment No. 1 to Agreed Order, dated June 9, 2010, between the City and Ecology to address soil and ground water contamination related to historical releases of hazardous substances at the Site. Requirements under the Agreed Order include performance of a remedial investigation/feasibility study (RI/FS) and development of a dCAP.

There are no other local, state or federal regulatory actions at the site.

2 SITE DESCRIPTION

2.1 SITE HISTORY

Details of historic property use and the several site assessments performed to date at the Site can be found in HWA (2008a, b, c, d), HWA (2009b), and Parametrix (2009). The following is a summary of those assessments, some of which were carried out before the property became a formal MTCA site.

Based on studies conducted prior to the Agreed Order, a former tenant conducted sandblasting operations in the southern portion of the Site resulting in shallow soils containing metals and petroleum hydrocarbons in concentrations exceeding MTCA cleanup levels. Locations of sandblast grit from these operations are shown on Figure 3. Heavy metals in soil were from surficial deposition of sandblast grit and paint residue. Shallow petroleum soil impacts were from an air compressor blowdown pipe discharging to the ground surface in the south portion of the Site (see Figure 3). One soil sample collected in the sandblast area contained cadmium exceeding Washington State Dangerous Waste requirements (Chapter 173-303 WAC) (Ecology, 2010). Ground water samples collected in the sandblast area had lead and arsenic concentrations exceeding MTCA cleanup levels (HWA, 2008c, d).

A 1,000-gallon underground storage tank (UST) was removed in the western area of the Site in 1988 (see Figure 3). A hole in the UST was observed at the time of removal. Petroleum liquid (free product) was reported in the excavation on the surface of ground water. A soil sample collected from the sidewall of the excavation during tank removal contained petroleum hydrocarbons above MTCA cleanup levels (HWA, 2008a). Further environmental investigations were conducted by HWA (2008c, d) and Parametrix (2009) at the property. During those investigations, low concentrations of volatile organic compounds (VOCs) not exceeding MTCA cleanup levels were detected in ground water adjacent to the former leaking UST.

Interim action petroleum hydrocarbon soil cleanups were conducted in two phases; the first one in 2010; and the second one in 2013/2014, after the realignment of the SR522 roadway now crossing the Site. This phasing was necessary in order to effectively manage access to contaminated soils beneath the old (operational in 2010) and the new (operational in 2013) roadways, with minimal impacts to traffic.

2.2 HUMAN HEALTH AND ENVIRONMENTAL CONCERNS

2.2.1 Conceptual Site Model

The conceptual model for the Site identifies the primary contaminant sources, release mechanisms, transport mechanisms, secondary contaminant sources, potential pathways, and exposure routes. Existing chemical data, site characterization data, and identification of potential human and ecological receptors were used to develop the model are shown on Figure 4.

2.2.2 Primary Sources of Contamination and Primary Release Mechanisms

The primary contaminant sources are the former sand blasting facility (metals), including the compressor blowdown pipe (petroleum) and residual contamination from a leaking UST (petroleum). The primary contaminants associated with the sand blasting business include metals (cadmium, lead, chromium) and petroleum hydrocarbons (Parametrix, 2009).

Dust is the primary potential release mechanism for contaminants associated with metals in the surface soil. The source of arsenic in ground water at the Site may be surficially deposited arsenic at the Site, a naturally occurring background condition, or due to effects from petroleum hydrocarbon contamination in ground water.

2.2.3 Secondary Sources and Release Mechanisms

Secondary sources and release mechanisms, based on the RI data are limited to leaching from soil to ground water of petroleum hydrocarbons and possibly arsenic, as no air or surface water impacts were identified.

2.2.4 Pathways and Potential Receptors

Potential exposure routes for human and ecological receptors include the following:

Dermal/Direct Contact – Exposure to chemicals in soil may occur through direct contact with soil. Direct contact is a potential exposure route for current and future on-site workers or visitors. Burrowing or ground-dwelling mammals and invertebrates may be exposed directly to the soil contaminants.

Inhalation – Particulates from soil can be transported by air and inhaled by potential on-site and off-site receptors. Emissions of volatile chemicals from soil and ground water may also be transported as vapors by air. Terrestrial biota could also be exposed to chemicals volatilizing to outdoor air, but if this exposure actually occurs the duration of exposure would be expected to be relatively short. Burrowing animals may be exposed to volatile air contaminants in underground stagnant air while spending time within the burrow.

Ingestion – Ingestion of chemicals in Site soil is a primary exposure route for human and ecological receptors. Uptake by plants is also a potential exposure route.

Potentially complete exposure pathways after completion of the Interim Actions are:

Soil - TPH:

- Current/future construction/utility worker
    - Incidental soil ingestion and dermal contact

Remaining soil impacts are located under an active roadway, therefore the only potential receptors are future construction workers.

Ground water – TPH and arsenic:

- Current/future construction/utility worker:
    - Direct ingestion of contaminated ground water
- Ecological receptors
    - Dermal contact with ground water in a burrow

Remaining ground water impacts are TPH and arsenic in ground water, which is generally greater than 6 feet below grade in the areas impacted, therefore park visitors or others are unlikely to be exposed to any ground water, as there are no drinking water wells and it is not planned or legal to install any in the impacted area. The only potential human receptors would be future construction workers involved in excavation below ground water level or dewatering work.

Vapor - TPH:

- Current/future construction/utility worker:
    - Inhalation of vapors from the subsurface (ground water and soil) in outdoor air
- Ecological receptors
    - Inhalation of vapors from the subsurface (ground water and soil) in a burrow

Remaining vapor impacts are located under an active roadway, therefore the only potential human receptors would be future construction workers involved in excavation or dewatering work. Arsenic in ground water does not pose a vapor risk, therefore there are no vapor-related risks in park-zoned areas.

2.3 CLEANUP STANDARDS

2.3.1 Contaminants of concern (COCs)

2.3.1.1 Soil COCs

Based on the studies before the interim cleanups, chemicals of potential concern (COPCs) in Site soil were:

- Total petroleum hydrocarbons (TPH, gasoline-, diesel-, and motor oil-range)
- Metals (arsenic, cadmium, lead, barium, chromium silver, mercury)
- Aromatic hydrocarbons (benzene)
- Halogenated volatile organic compounds (HVOCs)
- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs)

cPAHs and benzene were detected exceeding cleanup levels during initial RI activities in 2009, at depths of 0 to 2 feet, in sample BP-26. Two samples (P-TP-24 and P-TP-27) were collected in 2012 a few feet away from BP-26 on the east and west sides, respectively, at the same depth. No cPAHs or benzene were detected above laboratory reporting limits, indicating that the original detection in BP-26 was likely surficial and localized (e.g., drips from a vehicle).

cPAHs, cadmium, lead, and mercury were detected in soils excavated during the interim actions, but no confirmation samples contained any of these compounds exceeding Site cleanup levels.

Because barium, chromium, silver, mercury, HVOCs, and cPAHs were never detected in Site soil at concentrations exceeding MTCA Method A or B cleanup levels or natural background concentrations during the two interim action cleanups, they were dropped as COPCs during subsequent RI activity. Hexavalent chromium was not detected above laboratory reporting limits (Parametrix, 2010a) and was also dropped as a COPC.

Following both interim soil cleanups, only one sample remained on Site with cleanup level exceedances: sample 180th 2-14 (shown on Figure 5) and having gasoline and oil-range petroleum hydrocarbon concentration exceeding Site cleanup levels. Sample 180th 2-14 was located under realigned SR 522 and beneath an active sewer pipe. Following the cleanups, no soil contamination remains on either Paint City Parcel or Paint Lot B (see Figures 2A and 2B for the lot locations).

Based on the above evaluation, the remaining chemicals of concern (COCs) for soil at the Site following the two interim action cleanups are:

- Total petroleum hydrocarbons (TPH) (gasoline- and motor oil-range)

2.3.1.2 Ground Water COCs

COPCs for ground water in the RI area before the interim cleanups were:

- TPH (gasoline-, diesel- and motor oil-range)
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Arsenic
- Lead

One ground water sample collected from monitoring well BPMW-6 had a lead concentration exceeding Site cleanup criteria. Samples from the other three rounds of monitoring were below cleanup levels. The one ground water sample having an elevated lead concentration is thought to be a quality control issue, therefore lead is not considered to be a COC at the Site (see Section 4.3 above).

Ground water monitoring data following the soil cleanups indicate the following COCs remain on Site:

- Diesel- and oil-range TPH
- Arsenic

2.3.2 Cleanup Levels

Cleanup levels for COCs that need to be addressed by the cleanup in affected media at the site (soil and ground water) are presented in Section 4.3.

3 CLEANUP ACTION ALTERNATIVES AND ANALYSIS

3.1 Cleanup Action Alternatives

The initial technologies screened for petroleum contaminated soil and ground water at the Site were:

- Excavation and removal
- In-situ bioremediation
- Monitored natural attenuation
- Engineering and institutional controls

The initial technologies screened for arsenic contaminated ground water at the Site were:

- Excavation and removal
- In-situ chemical fixation
- Institutional controls

Cleanup alternatives considered for the remaining petroleum contaminated soil and ground water at the Site were:

- Excavation and removal with monitored natural attenuation
- In-situ bioremediation with monitored natural attenuation and engineering / institutional controls
- Engineering and institutional controls with MNA-based compliance monitoring

Cleanup alternatives considered for arsenic contaminated ground water at the Site were:

- In-situ chemical fixation with institutional controls
- Institutional controls with compliance monitoring

A contingency plan for ground water will be part of the cleanup remedy in case the ground water has not reached compliance at the end of the compliance monitoring period.

3.2 Initial Screening of Alternatives

The selected alternative for both petroleum and arsenic impacts was engineering and institutional controls and natural attenuation with compliance monitoring, and to adopt interim actions as the final cleanup for petroleum soil impacts. The other alternatives (additional excavation and removal with monitored natural attenuation, in-situ bioremediation with monitored natural attenuation and engineering / institutional controls, and in-situ chemical fixation with institutional controls) were eliminated during the screening process due to efficacy, and cost-to-benefit ratios evaluated via a disproportionate cost analysis.

3.3 DETAILED EVALUATION OF ALTERNATIVES

The preferred alternative was recommended in accordance with remedy selection requirements under MTCA, and meets all threshold and other requirements specified in WAC 173-340-360.

The selected alternative was evaluated for compliance with the following, as detailed in the RI/FS:

- The minimum requirements in WAC 173-340-360(2)(a)&(b)
    - Protection of human health and the environment
    - Compliance with cleanup standards
    - Compliance with applicable or relevant and appropriate requirements (ARARs)
    - Provide for compliance monitoring
    - Use of permanent solutions to the maximum extent practicable (see also WAC 173-340-360(3))
    - Provide for a reasonable restoration timeframe (see also WAC 173-340-360(4))
    - Consideration of public concerns
- WAC 173-340-360(2)(c) Requirements for ground water cleanup actions
- WAC 173-340-360(2)(e) Requirements for institutional controls (see also WAC 173-340-440)

4 DESCRIPTION OF SELECTED REMEDY

4.1 Site Description

The Site was defined in the Agreed Order (prior to completion of the RI) as consisting of the extent of contamination caused by the release of hazardous substances from a former 0.79-acre property generally located at 18004 and 18005 Bothell Way NE (former King County Tax Parcel Nos. 945720-0081 and 945720-0072) and the adjacent parcel to the east. The 0.79-acre parcel was re-platted in 2011and no longer exists in its original configuration (as depicted in the Agreed Order), although the City still currently owns that land, which includes public right-of-way for the newly constructed and re-aligned SR 522, and portions of the former SR 522 and NE 180th street roadways, which now lie on two newly formed parcels north (Lot C) and south (the City Parcel) of the new roadway. Whereas the Site was originally defined as including a 0.79-acre property (which no longer exists due to re-platting of parcels and construction of the new roadway) the findings of the RI establish the Bothell Paint and Decorating Site boundaries as shown on Figures 2A and 2B.

4.2 Description of the Cleanup Action

4.2.1 Parcels within the Site

As described below, upon road construction and reparceling by the City of Bothell in 2011, the Site now lies on three separate parcels of land: the Lot C Parcel, the City Parcel, and one public roadway (the City ROW Parcel).

- **Lot C Parcel** - The north portion of the Site lies on part of a tax parcel (Parcel number 9457200081) called LOT C on Figure 2B (zoned General Commercial). The Lot C parcel has no remaining soil or ground water impacts exceeding cleanup levels.

- **City ROW Parcel** - The central portion of the Site is not a tax parcel and lies on a portion of a City Right-of-Way (new SR 522 roadway) called CITY ROW on Figure 2B. The Right-of-Way is owned by the City. The City ROW has TPH impacts to soil and arsenic impacts to ground water that exceed cleanup levels.

- **City Parcel** - The south portion of the Site lies on a portion of a tax parcel (Parcel number 9457200072) called CITY PARCEL on Figure 2B (zoned partly for park and open space use, and partly as SR522 Corridor). The City Parcel has TPH and arsenic impacts to ground water that exceed cleanup levels.

Based on the results of the remedial investigation and feasibility study conducted under MTCA and the application of the selection of remedy criteria, the preferred cleanup alternatives for contaminated soil and ground water at each area of the Site (developed in accordance with WAC 173-340-350 through 173-340-390) are:

a. Lot C Parcel

(i) TPH contaminated soil on site prior to interim actions - adopt soil excavation interim actions as the final cleanup.

b. City ROW Parcel

(i) TPH contaminated soil on site prior to interim actions – adopt soil excavation interim actions as part of the final cleanup action.

(ii) Remnant TPH contaminated soil under roadway – leave in place and implement, in accordance with Section (2) below:

- Engineering controls – paved SR 522 roadway capping TPH-impacted soils.

- Institutional controls – implement environmental covenant.

(iii) Arsenic contaminated ground water – leave in place and implement:

- Institutional controls – implement environmental covenant. The covenant will document arsenic and the possibility of TPH contamination in ground water, prohibit withdrawal and use for any purpose other than monitoring, site investigation, or construction-related activities without prior notification and approval by Ecology.

- Monitored Natural Attenuation (MNA).

- Compliance and MNA monitoring under a Compliance Monitoring Plan.

- A Contingency Plan for ground water will be part of the cleanup remedy in case the ground water has not reached compliance at the end of the compliance monitoring period and statistical and MNA-based analysis indicates that compliance will not be reached in a reasonable restoration timeframe.

c. City Parcel

(i) TPH contaminated soil on site prior to interim actions – adopt soil excavation interim actions as the final cleanup action.

(ii) TPH and arsenic contaminated ground water – leave in place and implement, in accordance with Section (2) below:

- Institutional controls – implement environmental covenant. The covenant will document TPH and arsenic contamination in ground water, prohibit withdrawal and use for any purpose other than monitoring, site investigation, or construction-related activities without prior notification and approval by Ecology.

- Monitored natural attenuation (MNA).

- Compliance and MNA monitoring under a Compliance Monitoring Plan.

  A contingency plan for ground water will be part of the cleanup remedy in case the ground water has not reached compliance at the end of the compliance monitoring period and statistical and MNA-based analysis indicates that compliance will not be reached in a reasonable restoration timeframe.

4.2.2 Compliance Monitoring, Monitored Natural Attenuation (MNA), Compliance with Cleanup Standards, Statistical and MNA-Based Analysis, Contingency Planning, and Five Year Periodic Site Reviews

a. **Compliance monitoring** – The City will implement the Compliance Ground Water Monitoring Plan in accordance with the schedule to be laid out in the final Agreed Order executed for the site.

b. **Monitored Natural Attenuation (MNA)** - Monitored Natural Attenuation (MNA) means the reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remedial objectives within a time frame that is reasonable compared to that offered by more active cleanup methods. Natural attenuation refers to a variety of physical, chemical, and/or biological processes that under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of hazardous substances in the environment. These in situ processes include: natural biodegradation; dispersion; dilution by recharge; sorption; volatilization; chemical or biological stabilization, transformation or destruction of hazardous substances (WAC 173-340-200).

(i) The main MNA performance parameters will be ground water TPH and arsenic concentrations.

(ii) MNA parameters will also be tested for, including dissolved oxygen, redox potential, pH, conductivity , temperature, nitrate, manganese (soluble), ferrous iron (soluble), sulfate, methane, and alkalinity.

c. **Compliance with cleanup standards**

(i) Compliance with cleanup levels in ground water is defined as eight (8) consecutive quarters at or below MTCA cleanup levels adopted in this cleanup plan.

(ii) If compliance with site cleanup levels for arsenic and TPH in ground water at the Site is reached within or at the end of five years, the City will not be required to conduct additional sampling, data analysis, or modeling for arsenic and TPH at the City ROW Parcel and the City Parcel.

At that time, the City may request modification of the environmental covenants for arsenic and TPH in ground water at the City ROW Parcel. The City may request lifting the environmental covenant at the City Parcel.

(iii) If compliance with site cleanup levels for arsenic and TPH at the Site is not reached within or at the end of five years the City shall take the following actions:

- If arsenic only exceeds cleanup levels, the City shall carry out the requirements of a Statistical and MNA-Based Analysis for arsenic in accordance with Section (d) below.

  The City will not be required to conduct additional sampling, data analysis, or modeling for TPH in the ground water at the City ROW Parcel and the City Parcel.

  At that time, the City may request modification of the environmental covenants to remove TPH as a chemical of concern in ground water at the City ROW Parcel and City Parcel.

- If TPH only exceeds cleanup levels, the City shall carry out the requirements of a Statistical and MNA-Based Analysis for TPH in accordance with Section (d) below.

  The City will not be required to conduct additional sampling, data analysis, or modeling for arsenic at the City ROW Parcel and the City Parcel.

  At that time, the City may request modification of the environmental covenants to remove arsenic as a chemical of concern at the City ROW Parcel and the City Parcel.

- If both TPH and arsenic exceed cleanup levels, the City shall confer with Ecology, and Ecology will decide whether the City shall carry out the requirements of a Statistical and MNA-Based Analysis in accordance with Section (d) below, or carry out the requirements of a Contingency Plan in accordance with Section (e) below.

d. **Statistical and MNA-Based Analysis.**

(i) Purpose**.** The purpose of a Statistical and MNA-Based Analysis is to ascertain whether MNA is occurring at a rate, and in a restoration timeframe, that is acceptable to Ecology.

(ii) Plan and schedule**.** The City will prepare a Statistical and MNA-Based Analyses plan and schedule for Ecology's approval. The City's plan may include one or more of the following analyses options:

- Determining the plume status with non-parametric statistical tests, graphical and regression analysis
- Estimating the bulk attenuation rate constant
- Estimating the biodegradation rate constant
- Estimating the restoration time
- Evaluating the geochemical indicators of biodegradation or other natural attenuation processes

The City may also propose additional options for Ecology's consideration.

Ecology's ultimate choice of appropriate analytic methods is not restricted to those listed above.

(iii) Implementation by City for Ecology's Approval. Upon Ecology's approval of the City's Statistical and MNA-Based Analysis plan and schedule, the City will carry out the plan and present its results to Ecology for Ecology's consideration and approval.

- If Ecology concludes, based on the City's Statistical and MNA-Based Analysis, and/or other information, that MNA is not progressing at the Site at a rate achievable in a restoration time frame that is acceptable to Ecology, the City will carry out the requirements of a Contingency Plan in accordance with Section (e) below.

- If Ecology concludes, based on the City's Statistical and MNA-Based Analysis, and/or other information, that MNA is progressing at the Site at a rate achievable in a restoration time frame that is acceptable to Ecology, Ecology may extend the MNA monitoring periods as appropriate. For exceedances of ground water arsenic only or ground water TPH only, Ecology currently expects such extended monitoring to occur as follows:

  - **Ground water arsenic exceedances only**. If only arsenic remains above cleanup levels when TPH reaches compliance, the City will perform two additional years of monitoring for arsenic.

    If compliance with site cleanup levels for arsenic at the Site is reached within or at the end of that two year period, the City will not be required to conduct additional sampling and Statistical and MNA-Based Analysis for arsenic at the City ROW Parcel and the City Parcel. The City may request modification of the environmental covenants for arsenic in ground water at the City ROW Parcel. The City may request lifting the environmental covenant at the City Parcel.

    If, at the end of two years, arsenic levels at the Site remain above cleanup levels, the City may attempt to demonstrate to Ecology that elevated levels of arsenic in the ground water represent locally high natural background levels of arsenic or are related to some other naturally-occurring variable (e.g., precipitation).

    If Ecology finds that arsenic levels at the Site represent locally high natural background levels or are related to some other naturally-occurring variable, the City will not be required to conduct additional sampling and Statistical and MNA-Based Analysis for arsenic at the City ROW Parcel and the City Parcel. At that time, the City may request modification of the environmental covenants to remove arsenic in ground water as a chemical of concern at the City ROW Parcel.

The City may request lifting the environmental covenant for the City Parcel.

If Ecology finds that arsenic levels at the Site do not represent locally high natural background levels and are not related to some other naturally-occurring variable, the City will carry out the requirements of a Contingency Plan in accordance with Section (e) below.

- **Ground water TPH exceedances only.** If only TPH remains above cleanup levels at the Site, the City will perform additional monitoring for TPH for a duration that is expected to achieve the restoration time frame calculated in the Statistical and MNA-Based Analyses.

  If, within that restoration time frame, eight successive quarters of measurements at the Site are below cleanup levels, the City will not be required to conduct additional sampling and Statistical and MNA-Based Analysis for TPH in the ground water at the City ROW Parcel and the City Parcel. At that time, the City may request modification of the environmental covenants for to remove TPH in ground water as a chemical of concern at the City ROW Parcel. The City may request lifting the environmental covenant for the City Parcel.

  If, at the end of that restoration time frame, eight successive quarters of measurements at the Site are not below cleanup levels, the City will carry out the requirements of a Contingency Plan in accordance with Section (e) below.

  Table 1 summarizes the actions to be taken based on the results of the compliance monitoring

e. **Contingency Planning**

(i) **Purpose.** A Contingency Plan for ground water is part of the cleanup remedy if MNA is not occurring at a rate, and in a restoration timeframe, that is acceptable to Ecology.

(ii) **Plan and Schedule.** If a Contingency Plan is required, the City will prepare, for Ecology's approval, a recommended plan and schedule for achieving cleanup at a rate, and in a restoration timeframe, that is acceptable to Ecology. The City's plan may include one or more of the following options:

- Continued monitoring based on a recalculated/recalibrated restoration timeframe.
- In situ bioremediation
- Chemical stabilization of arsenic. Chemical stabilization is expected to require additional laboratory testing of site ground water to speciate the arsenic, bench/lab scale testing to select appropriate treatment chemicals, pilot and tracer testing to verify cleanup viability, etc.

The City may also propose additional options for Ecology's consideration.

Ecology's ultimate choice of contingency remedial action is not restricted to those listed above.

(iii) **Work Plans and schedules.** Upon Ecology's approval of a Contingency Plan, the City will provide Ecology with one or more work plans and schedules for Ecology's consideration and approval.

(iv) **Implementation.** Upon Ecology's approval of the City's work plan(s) and schedule(s), the City will carry out the work plan.

f. **Five year periodic site reviews.** Five year periodic site reviews are a MTCA requirement for sites with environmental covenants. Ecology will assess ground water compliance at that time, in addition to the assessments described above.

4.3 CLEANUP STANDARDS AND POINT OF COMPLIANCE

Cleanup standards consist of appropriate cleanup levels applied at a defined point of compliance that meet applicable state and federal laws (WAC 173-340-700). Cleanup levels are described below.

4.3.1 Soil

Soil remediation levels proposed in the *Interim Action Work Plan* (Parametrix, 2010b) include:

- MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340, Table 740-1).
- MTCA Method B TPH Soil Cleanup Levels for direct contact and protection of ground water

An evaluation of Method B risk-based petroleum contaminated soil cleanup levels for the Site was specified in Section 3.1.1.1 of the *Compliance Monitoring Quality Assurance Project Plan* (CMQAPP) appendix of the *Interim Action Work Plan* (Parametrix, 2010b). The CMQAPP called for characterization of petroleum-impacted soil via analysis of petroleum hydrocarbon fractionation and other target compounds in order to evaluate whether the standard MTCA Method A soil cleanup levels were appropriate for the Site compared to MTCA Method B risk-based soil petroleum hydrocarbon cleanup levels. The results of the petroleum hydrocarbon fractionation analyses (NWVPH/NWEPH analysis) were input into Ecology's MTCATPH11.1 spreadsheet model to determine petroleum hydrocarbon soil cleanup levels protective of human health via direct contact and via leaching to a source of potable ground water. Evaluation of MTCA Method B risk-based cleanup levels for petroleum-impacted soil at the Site is presented in the RI. The calculated Method B cleanup levels for petroleum hydrocarbons at the Site range between 581 and 39,709 milligrams per kilogram (mg/kg) depending on the mixture of hydrocarbon fractions and specific compounds. The Method B TPH cleanup level of 581 mg/kg is a calculated value for protection of potable ground water from contamination by cPAHs based upon Ecology's three-phase partitioning model (Equation 747-1 in WAC 173-340-747). The MTCA Method A cleanup level for gasoline-range petroleum hydrocarbons without detectible benzene in soil such as at the Site is 100 mg/kg. The calculated Method B cleanup levels for diesel- and oil-range petroleum hydrocarbons at the Site range between 999 and 1,505 mg/kg depending on the mixture of hydrocarbon fractions and specific compounds.

The resulting soil remediation levels used (i.e., the more stringent of Method A or B) meet all the requirements of WAC 173-340-720 through 173-340-760 and should be considered the Site cleanup levels. Soil cleanup levels are summarized below:

Compound	Cleanup level (mg/kg)
TPH Diesel	999 B
TPH Oil	999 B
TPH Gasoline	100/30 A*

A – MTCA Method A soil cleanup level
B - MTCA Method B soil cleanup level
* Gasoline mixtures without benzene and the total of ethyl benzene, toluene and xylene are less than 1% of the gasoline mixture = 100 mg/kg
All other gasoline mixtures = 30 mg/kg

4.3.2 Ground Water

Appropriate levels of cleanup for ground water are determined by the highest beneficial use of that ground water. Shallow ground water present at the Site is not currently used for drinking water, and no water wells are located downgradient of the Site. The appropriate ground water cleanup levels for the Site are MTCA Method A for ground water for almost all the COCs; however, for ground water arsenic, a cleanup level of 10.0 micrograms per liter (µg/L) will be used based on the drinking water standard. Ground water cleanup levels are summarized below:

Compound	Cleanup level (µg/L)
TPH Gas	800
TPH Diesel	500
TPH Oil	500
Benzene	5
Toluene	1000
Ethylbenzene	700
Xylenes	1000
Arsenic	10

4.3.3 Point of Compliance

The point of compliance is the specific location(s) at which a particular cleanup level must be met in order to demonstrate compliance of a cleanup action. MTCA defines standard and conditional points of compliance.

4.3.3.1 Soil

The standard soil point of compliance under MTCA (WAC 173-340-740 (6)(b-(d))) is:

- For soil cleanup levels based on protection of ground water, the point of compliance shall be established throughout the Site
- For soil cleanup levels based on protection from vapors, the point of compliance shall be established throughout the Site from the ground surface to the uppermost ground water saturated zone
- For soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, the point of compliance shall be established in the soils throughout the Site from the ground surface to 15 feet below ground surface.

MTCA recognizes that, for cleanup actions that involve containment or capping, cleanup levels may not be met at the standard point of compliance, but the cleanup action would be determined to comply with cleanup standards provided:

- The selected remedy is permanent to the maximum extent practicable
- The cleanup action is protective of human health and terrestrial ecological receptors
- Institutional controls are implemented to limit activities that could interfere with the long-term integrity of the containment system
- Compliance monitoring and periodic reviews are conducted
- The capped or contained COCs and measures to prevent migration and contact with them are specified in a CAP

The cleanup alternatives are evaluated based on standard soil point of compliance for removal and treatment alternatives (WAC 173-340-740(6)(a)-(e), and for containment remedies (WAC 173-340-740(6)(f)).

4.3.3.2 Ground Water

The standard ground water point of compliance under MTCA (WAC 173-340-720(8)(b)) is in ground water throughout the Site from the uppermost level of the saturated zone to the lowest depth which could potentially be affected.

For this Site, the standard ground water point of compliance is proposed for petroleum hydrocarbon and arsenic impacts, i.e., ground water throughout the Site.

4.4 APPLICABLE, RELEVANT AND APPROPRIATE REQUIREMENTS

Cleanup actions under MTCA (WAC 173-340-710) require the identification of all applicable or relevant and appropriate requirements (ARARs). These requirements are defined as:

“Applicable” requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a site.

“Relevant and appropriate” requirements means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site.

The potential ARARs for the Site include three types:

- Chemical-specific
- Location-specific
- Action-specific

Chemical-specific ARARs are typically health- or risk-based values that when applied to site-specific conditions represent cleanup standards. Location-specific ARARs are related to the geographical position and/or physical condition of the site and may affect the type of remedial action selected. Action-specific ARARs are usually technology-based or activity-based requirements or limitations on actions or conditions taken with respect to specific hazardous substances. The action-specific requirements do not determine the selected remedial alternative, but indicate how or to what level a selected alternative must perform.

Potential ARARs were identified for each medium of potential concern. These potential ARARs are shown in Table 2.

4.5 RESTORATION TIMEFRAME

TPH in soil and ground water - The interim action soil cleanups (which are adopted as the final soil cleanup) were completed in 2014. The engineering controls (i.e., capping) were implemented during final SR 522 roadway construction, in 2013. Institutional controls (environmental covenant) are anticipated to be implemented once a final CAP is approved, sometime in 2017. MNA is expected to reach cleanup levels within 5 years for ground water.

Arsenic in ground water - Institutional controls (environmental covenant) and monitoring are anticipated to be implemented after the CAP is issued and approved, sometime in 2017.

If monitoring shows elevated arsenic persisting after petroleum hydrocarbon impacts have diminished for an appropriate period of time (currently expected to be two years after five years of combined TPH and arsenic monitoring), the City may attempt to demonstrate to Ecology that arsenic can be attributed to a background condition, and a request can be made to Ecology to remove the institutional controls for ground water at the site.

A contingency plan will be implemented if compliance is not achieved in the compliance monitoring period.

4.6 COMPLIANCE MONITORING

Compliance monitoring requirements (specified in WAC 173-340-410) include the following elements:

- Protection monitoring to confirm that human health and the environment are adequately protected during implementation of an alternative
- Performance monitoring to confirm that cleanup standards or other performance standards are met
- Confirmational monitoring to monitor the long-term effectiveness of the remedy after completion of the alternative

Petroleum in ground water – The engineered containment and institutional control remedy is currently expected to include MNA-based compliance monitoring by ground water monitoring for five years. Remaining diesel- and oil-range petroleum hydrocarbon impacts to ground water are in well BPMW-6. Ground water from BC-10 has been below cleanup levels and mostly non-detect for petroleum hydrocarbons for the last four quarterly monitoring events. Concentrations are low, sporadic, and isolated; therefore, limited monitoring is anticipated in order to demonstrate compliance with ground water cleanup levels.

Petroleum in storm water – Surface or storm water were not identified as a suspected or confirmed contaminated medium for this Site during the RI. However, after the RI and Interim Actions were completed, a stormwater facility consisting of a culvert and artificial stream was constructed on the Site. Some of the flow from the historic Horse Creek drainage, which was formerly mostly conveyed in stormwater pipes several hundred feet east of the Site, was diverted to a new stormwater conveyance also called Horse Creek, part of which now crosses the Site. The new Horse Creek facility (not a real creek) includes multiple segments constructed variously as pipes, lined ditches, culverts, ponds, and created or artificial streams. Some segments are lined with bentonite or polyethylene membranes to hydraulically isolate the water feature from native ground water and soil. The lined areas were selected based on the presence of known soil and ground water contamination. The segments north of the Site to the south end of the culvert under SR522 are lined.

As part of confirmation monitoring, storm water samples will be collected from the new Horse Creek facility in three locations, one upgradient of and two on the Site. Samples will be analyzed for TPH-G/BTEX, and TPH-Dx. Sampling for HVOCs may be completed as part of the Bothell Service Center site, by others. Sampling locations and details are provided in the Compliance Monitoring Plan.

Sample results from moving surface water are expected to have a high degree of variability. If the upgradient sample contains similar contaminants at similar (+/- 50%) concentrations to the on Site samples, it can be assumed that the contaminants are coming from upgradient sources, most likely urban stormwater runoff, and no further sampling or action will be taken. If results are ambiguous, additional sampling events will be conducted to obtain a more robust data set. The likelihood that any contamination is coming from soil or ground water from Paint or another MTCA site is very low, compared to the known presence of TPH in urban stormwater.

Arsenic in Ground Water - The institutional control remedy for arsenic in ground water provides for compliance monitoring by ground water monitoring for up to seven years. The frequency for arsenic will follow TPH for five years (i.e., quarterly), then (unless TPH decreases to below detection limits) will be quarterly for another two years of monitoring to determine if arsenic is naturally elevated or not. Remaining arsenic impacts to ground water are in wells BC-10, BC-11, BPMW-1, and BPMW-6.

A Compliance Monitoring Plan will be submitted as part of the Cleanup Action Plan which describes the monitoring. Compliance monitoring for the remaining petroleum hydrocarbon contamination in ground water will be statistical and MNA-based. Compliance monitoring for arsenic is currently expected to be concurrent with petroleum hydrocarbon compliance monitoring (five years), but with an extended period of quarterly monitoring to determine if the arsenic is naturally occurring or induced by the petroleum contamination (two years). Wells to be monitored are:

TPH-D, TPH–O, MNA parameters - BPMW-6, BPMW-2R (which will replace BPMW-2), BC-10

Arsenic - BPMW-6, BPMW-1, BC-10, BC-11

4.7 Schedule for Implementation

TPH in soil and ground water - The interim action soil cleanups (which are adopted as the final soil cleanup) were completed in 2014. The engineering controls (i.e., capping) were implemented during final SR 522 roadway construction, in 2013. Institutional controls (environmental covenant) are anticipated to be implemented once a final CAP is approved. Monitoring for MNA will be conducted in accordance with the schedule and process in Section 4.2.2. Combined TPH/MNA/Arsenic monitoring reports will be prepared and submitted to Ecology annually.

Arsenic in ground water - Institutional controls (environmental covenant) and monitoring are anticipated to be implemented after the CAP is issued and approved, sometime in 2017. Monitoring for MNA will be conducted in accordance with the schedule and process in Section 4.2.2. Combined TPH/MNA/Arsenic monitoring reports will be prepared and submitted to Ecology annually.

4.8 Institutional/Engineering controls

Institutional Controls will be applied to the petroleum in soil and arsenic in ground water impacts. See Section 4.2 above.

4.9 Public Participation

The dCAP will be distributed for public review and comment, with a 30-day comment period. Public participation procedures will be outlined in a Public Participation Plan prepared by Ecology.

Table 1
Decision Table for Ground Water Compliance Monitoring of TPH and Arsenic

Within or at the end of five years, if:	**Actions to be taken:**	**Comments**
TPH and Arsenic are in compliance*	LIFT environmental covenant for City Parcel. Terminate ground water compliance monitoring.	City Parcel will have an environmental covenant only for ground water.
	MODIFY environmental covenant for City ROW Parcel to take out TPH and arsenic as COCs in ground water and remove ground water restrictions.	City ROW Parcel will have an environmental covenant for soil and ground water. Residual petroleum contaminated soil remains.
TPH only in compliance	MODIFY environmental covenant for City ROW Parcel and City Parcel to take out TPH as COC in ground water.	City ROW Parcel will have an environmental covenant for soil and ground water. Residual petroleum contaminated soil remains.
	Conduct additional two years quarterly ground water monitoring for arsenic to determine if high concentrations are natural background or not. Use statistical and MNA based analysis for next steps (below).	
	Following additional monitoring, if determined to be natural, MODIFY City Parcel and City ROW Parcel environmental covenants to take out arsenic as COC. Terminate ground water compliance monitoring. If not, implement contingency plan to remediate arsenic.	

Arsenic only in compliance	MODIFY environmental covenant for City ROW Parcel and City Parcel to take out arsenic as COC in ground water only.	
	Implement statistical and MNA analysis for TPH.	
	Based on analysis, if Ecology determines reasonable restoration time can be achieved and compliance monitoring is appropriate remedy, continue TPH monitoring until compliance is achieved. If not, implement contingency plan to remediate TPH.	
Neither TPH or arsenic in compliance	Implement statistical and MNA analysis. Based on results, either implement continued compliance monitoring if a reasonable restoration time is demonstrated, or implement contingency plans to remediate TPH and arsenic.	Requires discussion and approval from Ecology.

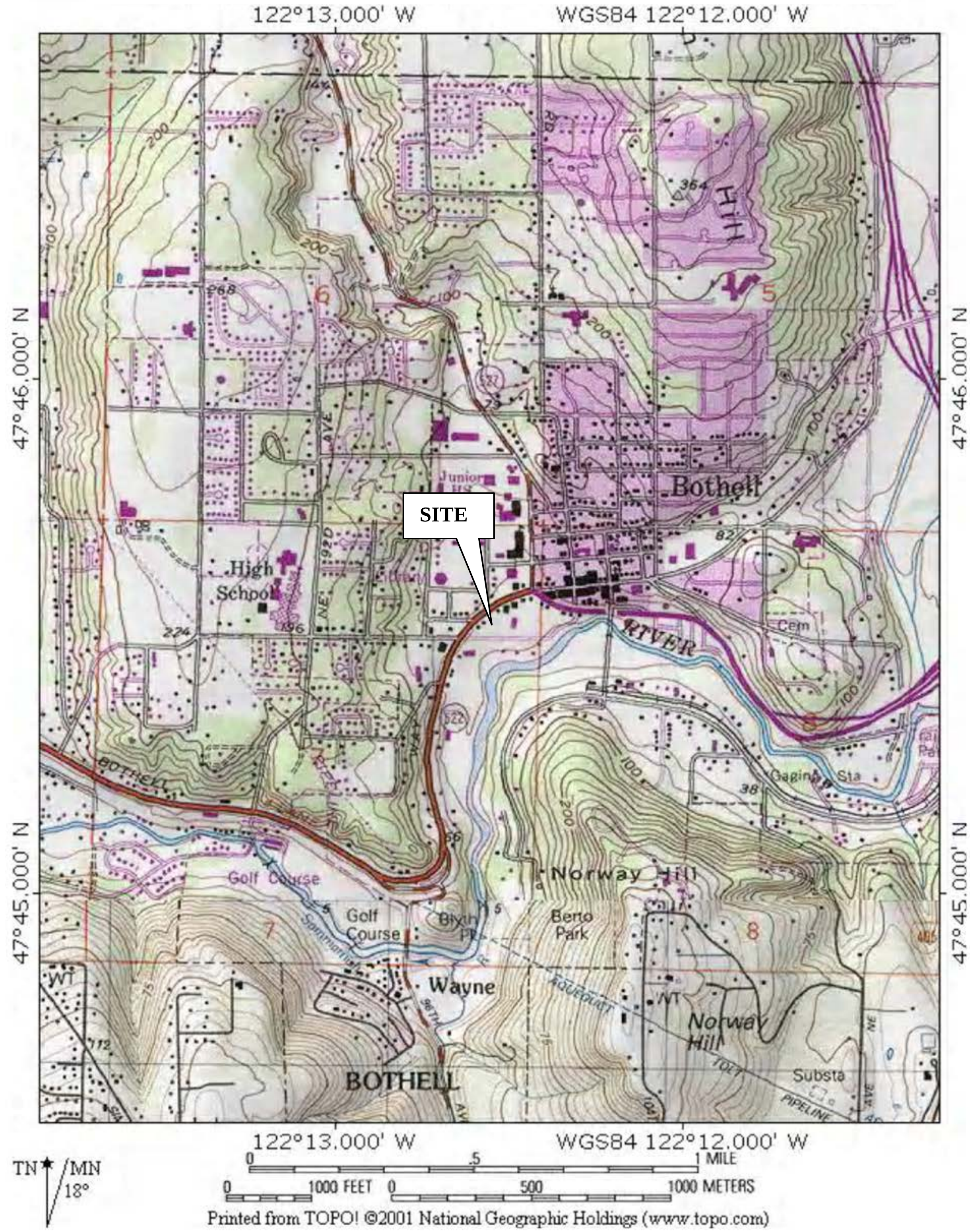
* Compliance with cleanup levels in ground water is defined as eight (8) consecutive quarters at or below MTCA cleanup levels adopted in this cleanup plan.

Table 2. Potential Applicable or Relevant and Appropriate Requirements (ARARs)

ARAR	Description	Applicability
Soil		
Model Toxics Control Act (WAC 173-340-740, -747)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for soil, including derivation of soil concentrations protective of groundwater.	MTCA cleanup levels are applicable to Site soil.
Groundwater		
Safe Drinking Water Act, Primary Drinking Water Regulations (40 Code of Federal Regulations [CFR] 141.50 and 141.61(a))	These regulations protect the quality of public drinking water supplies through regulation of chemical parameters and constituent concentrations as maximum concentration limits (MCLs).	MCLs are potentially relevant and appropriate where groundwater is a potential source of drinking water.
Model Toxics Control Act (WAC 173-340-720)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for groundwater.	MTCA cleanup levels are applicable to Site groundwater.
Surface Water		
Clean Water Act, Section 304, National Recommended Water Quality Criteria, EPA Office of Science and Technology (4304T, 2004).	There are no ambient water quality criteria for PCE for protection of freshwater organisms.	Surface water quality criteria are potentially relevant and appropriate to ambient surface water quality for point-source discharges to Horse Creek.
Clean Water Act, National Pollutant Discharge Elimination System (40 CFR Part 122) and Washington State National Pollutant Discharge Elimination System Permit Program (WAC 173-220).	The National Pollutant Discharge Elimination System (NPDES) program requires that permits be obtained for point-source discharges of pollutants to surface water. Under this regulation, a point-source discharge to a surface water body cannot cause an exceedance of water quality standards in the receiving water body outside the mixing zone.	Substantive regulatory requirements of the NPDES permit program are potentially applicable to the direct discharge of treated groundwater to a surface water body such as Horse Creek or Sammamish River.
Clean Water Act's National Toxics Rule (NTR) (40 CFR 131.36)	Provides values that have to be met for point-source discharges to surface water.	Potentially applicable to point-source discharges to Horse Creek should remedial activities cause release to surface water. If applicable, these values would have to be met at the mixing zone boundary established for the discharge.
Clean Water Act, General Pretreatment Regulations (40 CFR Part 403).	The regulations limit pollutants in wastewater discharges to sanitary sewer systems to protect publicly owned treatment works (POTWs) from accepting wastewater that would damage their system or cause them to exceed their NPDES permit discharge limits.	These regulations are potentially applicable to the discharge of treated groundwater to City of Bothell POTWs.
Washington State Water Quality Standards for Surface Waters (WAC 173-201A)	Washington State water quality standards protect freshwater aquatic life by specifying protection criteria by stretch of surface waters. WAC 173-201A provides limitations on other parameters such as turbidity, temperature, dissolved oxygen, and pH for protection of organisms. Tributaries of waters whose uses are designated salmon and trout spawning, core rearing and migration, or extraordinary primary contact recreation are protected at the same level as the waters themselves.	The substantive requirements of this regulation are potentially applicable for remedial actions affecting Horse Creek.
Washington Surface Water Quality Standards, Short-Term Modifications (WAC 173-201A-410)	Washington State provides for short-term modifications of standards for specific water bodies on a short-term basis when necessary to accommodate essential activities, respond to emergencies, or to otherwise protect the public interest.	These would be potentially applicable to remedial actions affecting Horse Creek.
Model Toxics Control Act (WAC 173-340-730)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for surface water.	MTCA cleanup levels may be applicable to the Site if remedial activities cause a release to surface water.
Air		
National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR Part 261)	Establishes specific emissions levels allowed for toxic air pollutants.	Applicable to treatment alternatives that may emit toxic pollutants to the air.
Washington Clean Air Act and Implementing Regulations (WAC 173-400; WAC 173-460; WAC 173-490)	WAC 173-400 requires air emissions at the Site boundary to fall below the acceptable source impact limit (ASIL). WAC 173-400 also requires control of fugitive dust emissions during construction and defines general emission discharge treatment requirements. WAC 173-460 requires systemic control of new sources emitting air pollutants. WAC 173-490 sets emission standards and source control for volatile organic compounds.	Applicable for air stripping/sparging remedial technology.
Model Toxics Control Act (WAC 173-340-750)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for air.	MTCA cleanup levels may be applicable to the Site if remedial activities cause a release to air.

Table 2. Potential Applicable or Relevant and Appropriate Requirements (ARARs)

ARAR	Description	Applicability
Miscellaneous		
Protection of Wetlands, Executive Order 11990 (40 CFR Part 6, Appendix A)	This executive order mandates that response actions taken by federal agencies must be designed to avoid long- and short-term impacts to wetlands. If remediation activities are located near/in wetlands, the activities must be designed to avoid adverse impact to the wetlands wherever possible, including minimizing wetlands destruction and preserving wetland values.	This Act would be potentially applicable to remedial activities at the Site.
Endangered Species Act (50 CFR Parts 17, 402)	Section 7 of the Endangered Species Act (ESA) and 40 CFR Part 402 require that federal agencies consider the effects of their proposed actions on federal listed species. It requires consultation between the agency proposing the action and the U.S. Fish and Wildlife Service (USFWS) or National Oceanic and Atmospheric Administration (NOAA) Fisheries, as appropriate. Preparation of a biological assessment is conducted, addressing the potential effects to listed species in the area and methods to minimize those effects.	The ESA is potentially applicable to remedial actions at the Site because the USFWS has determined that federal threatened species (bald eagle and bull trout) may use the project area. Therefore, they could potentially be affected by these actions.
Native American Graves Protection and Repatriation Act (43 CFR Part 10)	Native American Graves Protection and Repatriation Act regulations protect Native American burials from desecration through the removal and trafficking of human remains and “cultural items,” including funerary and sacred objects.	This Act is potentially applicable to remedial actions at the Site because it is possible that the disturbance of Native American materials could occur as a result of work in the stream bed or subsurface excavations elsewhere at the Site. Such materials are not known to be present at the Site, but could be inadvertently uncovered during soil or sediment removal.
National Historic Preservation Act (36 CFR Parts 60, 63, and 800)	National Historic Preservation Act (NHPA) regulations require federal agencies to consider the possible effects on historic sites or structures of actions proposed for federal funding or approval. Historic sites or structures as defined in the regulations are those on or eligible for the National Register of Historic Places, generally at least 50 years old.	This Act is potentially applicable to stream bed or other subsurface work at the Site. No such sites are known to be present in the area.
Washington Hazardous Waste Management Act (WAC 173-303)	Establishes standards for the generation, transport, treatment, storage, or disposal of designated dangerous waste in the state.	This regulation is potentially applicable to alternatives that would involve handling of contaminated media at the Site. The area of contamination policy allows contaminated media to be consolidated within the same area of a site without triggering Resource Conservation and Recovery Act or Washington dangerous waste regulations.
Department of Transportation of Hazardous Wastes (49 CFR 105 – 180)	Establishes specific U.S. Department of Transportation rules and technical guidelines for the off-site transport of hazardous materials.	Applicable to remedial activities that involve the off-site transportation of hazardous waste.
Washington Solid Waste Handling Standards (WAC 173-350)	Establishes standards for handling and disposal of solid non-hazardous waste in Washington.	These regulations are potentially applicable to solid nonhazardous wastes and are potentially relevant and appropriate to on-site remedial actions governing contaminated media management.
Washington Water Well Construction Act Regulations (WAC 173-160)	Provides requirements for water well construction.	These regulations are potentially applicable to the installation, operation, or closure of monitoring and treatment wells at the Site.



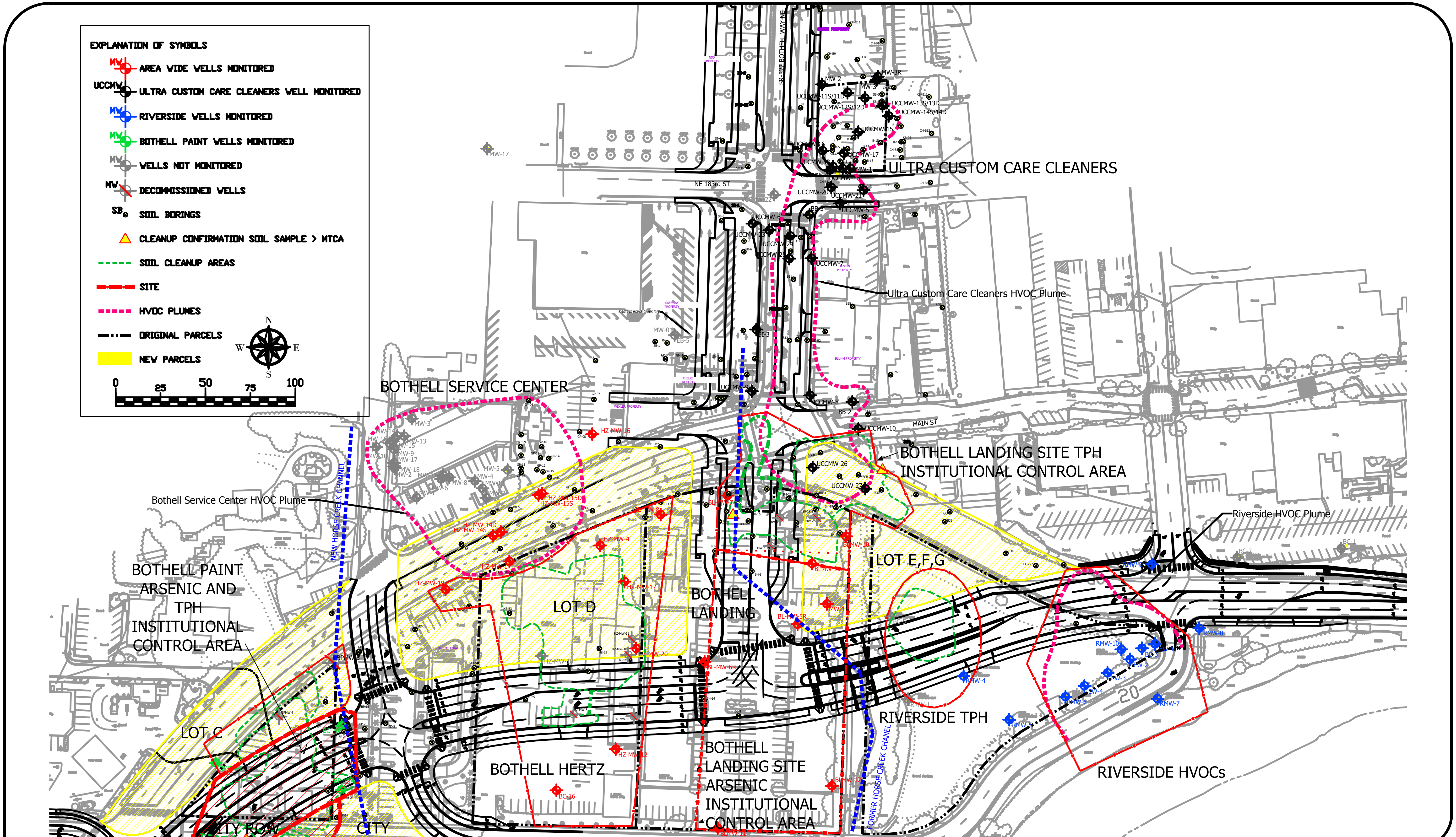
HWA GEOSCIENCES INC.

SITE VICINITY

BOTHELL PAINT RI/FS REPORT
BOTHELL, WASHINGTON

FIGURE NO.
1

PROJECT NO.
2007098-2021



HWA GEOSCIENCES INC.

BOTHELL PAINT RI/FS
BOTHELL WASHINGTON

SITE LOCATION AND
ADJACENT PROPERTIES

DRAWN BY EFK
CHECK BY NN
DATE

FIGURE NO.
2A

PROJECT NO.
2007-098 T2020

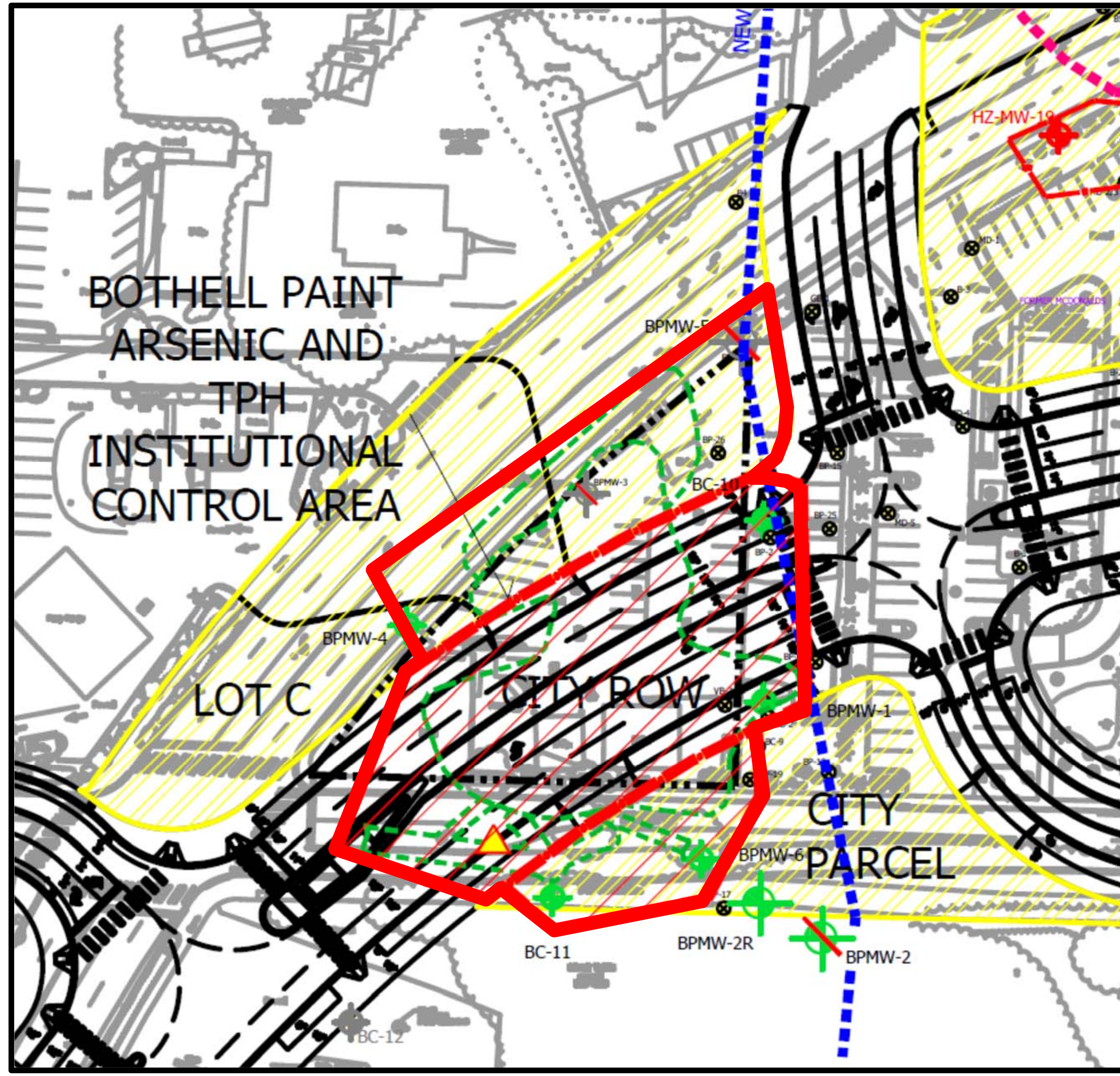
C:\USERS\COMPUTER\GOOGLE DRIVE\COMPANIES\CLIENTS\HWA GEOSCIENCES\05_04_2016\HWA 2007-098-21 T2020 (FIG2).DWG <11x17 all wells (2)> Plotted: 5/22/2015 9:11 AM

EXPLANATION OF SYMBOLS

- MW — AREA WIDE WELLS MONITORED
- UCCMW — ULTRA CUSTOM CARE CLEANERS WELL MONITORED
- MW — RIVERSIDE WELLS MONITORED
- MW — BOTHELL PAINT WELLS MONITORED
- MW — WELLS NOT MONITORED
- MW — DECOMMISSIONED WELLS
- SB — SOIL BORINGS
- CLEANUP CONFIRMATION SOIL SAMPLE > MTCA
- SOIL CLEANUP AREAS
- SITE
- HVOC PLUMES
- ORIGINAL PARCELS
- NEW PARCELS

N W E S

0 25 50 75 100



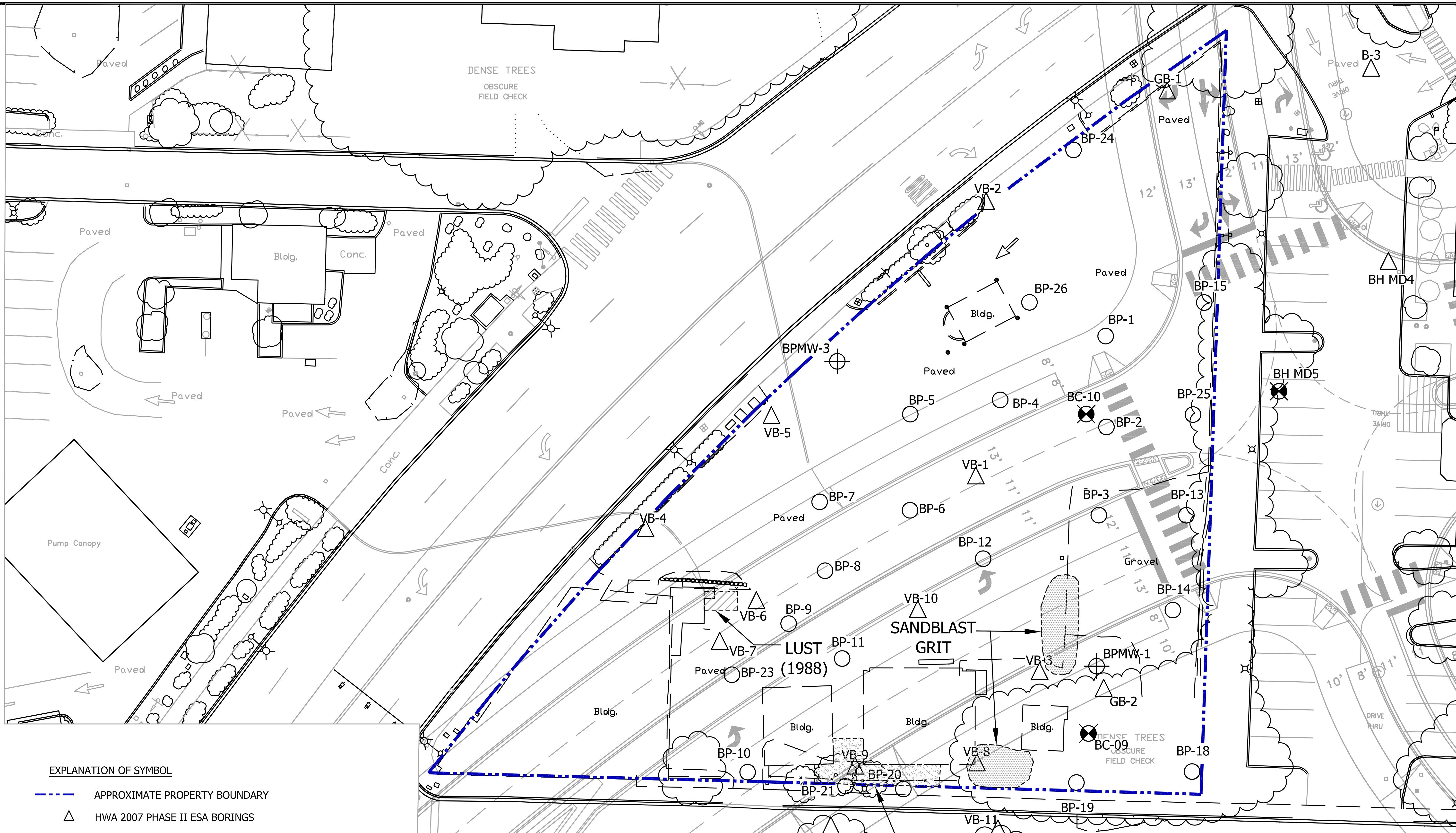
HWA GEOSCIENCES INC.

DETAIL OF SITE LOCATION

BOTHELL PAINT RI/FS
BOTHELL, WASHINGTON

FIGURE NO. 2B

PROJECT NO. 2007-098-T2020



EXPLANATION OF SYMBOL

- APPROXIMATE PROPERTY BOUNDARY
- HWA 2007 PHASE II ESA BORINGS
- HWA 2007 PHASE II ESA WELL LOCATION
- PMX 2009 RI/FS BORING LOCATIONS
- PMX 2009 RI/FS WELL LOCATIONS
- CDM ROW BORING LOCATIONS

BASE MAP PROVIDED BY PARAMETRIX

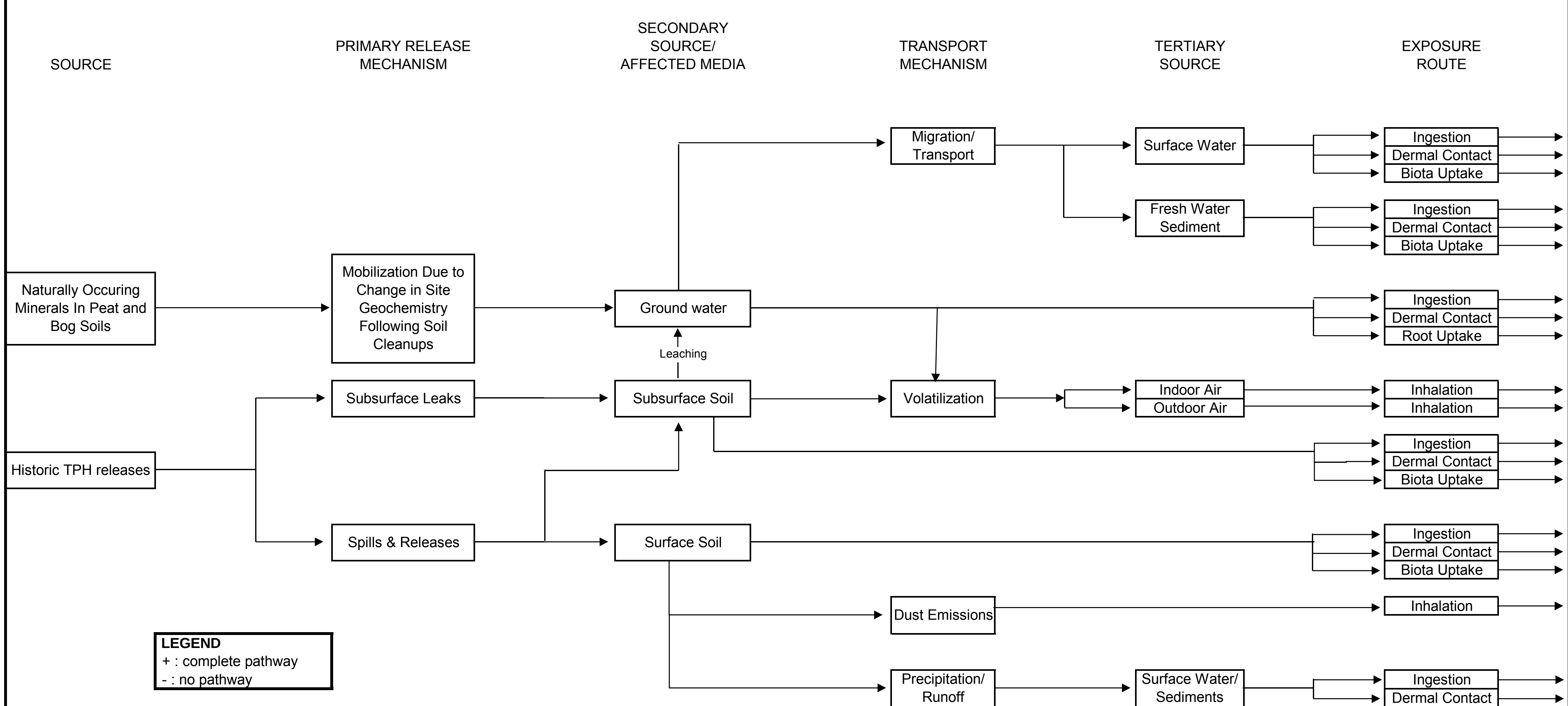
HWA GEOSCIENCES INC.

BOTHELL PAINT AND DECORATING SITE
INTERIM ACTION CLEANUP
BOTHELL, WASHINGTON

SITE PLAN
PRIOR TO CLEANUP

DRAWN BY EFK	FIGURE NO. 3
CHECK BY NN	PROJECT NO.
DATE 11.16.10	2007-098 T922

S:\2007 PROJECTS\2007-098-22 BOTHELL CROSSROADS\CAD\HWA 2007-098-21 T210.DWG <BOTHELL PAINT GPS F3> Plotted: 12/16/2010 9:16 AM



POTENTIAL RECEPTORS

Tertiary Source / Medium	Exposure Route	Non-Intrusive Current Worker/Visitor	Non-Intrusive Future Worker/Visitor	Intrusive Worker	Site Visitors	On-Site Ecological	Off-Site Ecological
Surface Water	Ingestion	-	-	-	-	-	-
Surface Water	Dermal Contact	-	-	-	-	-	-
Surface Water	Biota Uptake	-	-	-	-	-	-
Fresh Water Sediment	Ingestion	-	-	-	-	-	-
Fresh Water Sediment	Dermal Contact	-	-	-	-	-	-
Fresh Water Sediment	Biota Uptake	-	-	-	-	-	-
Ground water	Ingestion	-	-	+	-	-	-
Ground water	Dermal Contact	-	-	+	-	+	-
Ground water	Root Uptake	-	-	-	-	+	-
Indoor Air	Inhalation	+	+	+	+	+	-
Outdoor Air	Inhalation	+	+	+	+	+	-
Subsurface Soil	Ingestion	-	-	+	-	-	-
Subsurface Soil	Dermal Contact	-	-	+	-	-	-
Subsurface Soil	Biota Uptake	-	-	-	-	+	-
Surface Soil	Ingestion	+	+	+	+	+	-
Surface Soil	Dermal Contact	+	+	+	+	+	-
Surface Soil	Biota Uptake	-	-	-	-	+	-
Dust Emissions	Inhalation	-	+	+	+	+	+
Surface Water/ Sediments	Ingestion	-	+	+	+	+	+
Surface Water/ Sediments	Dermal Contact	-	+	+	+	+	+

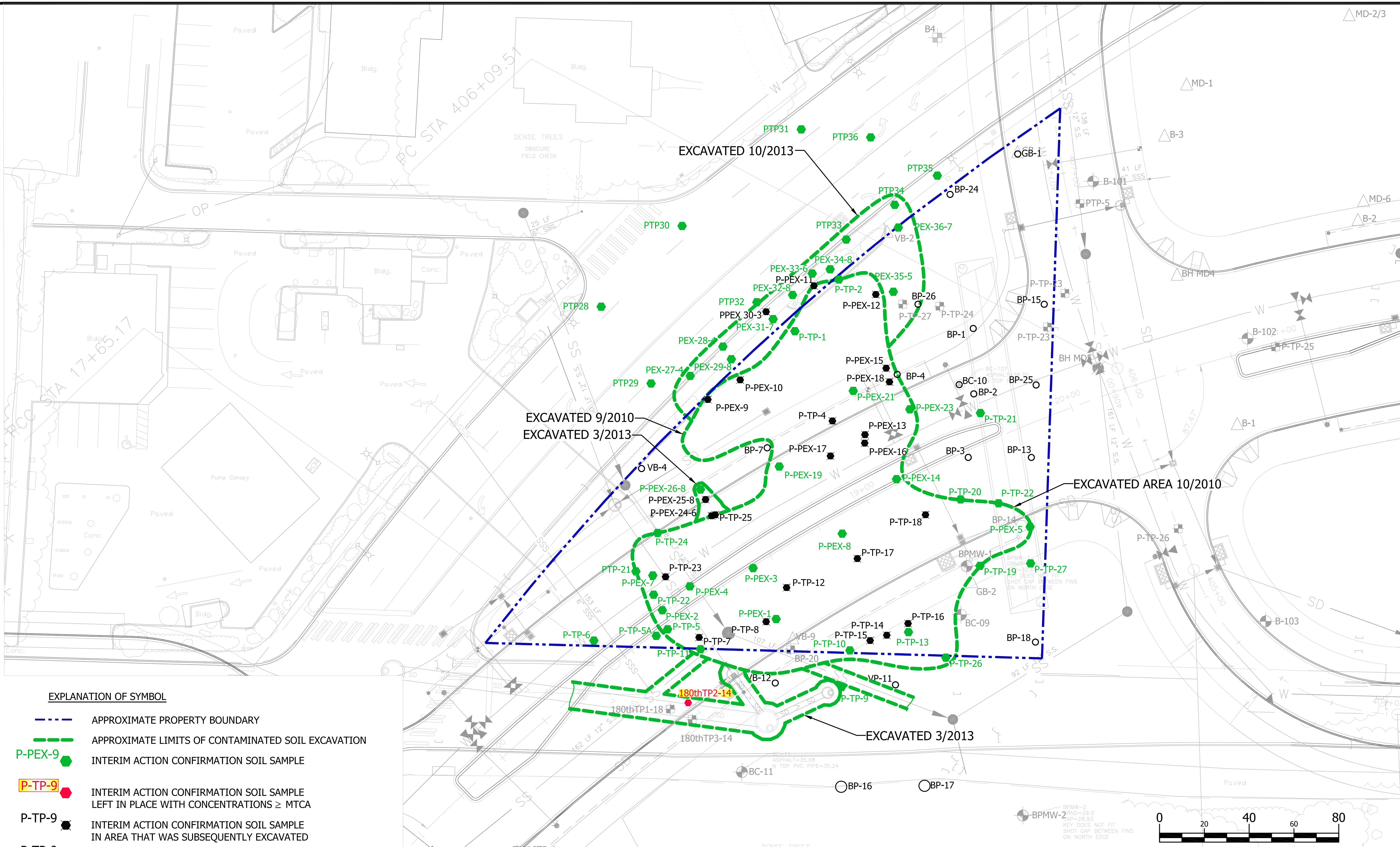
HWA GEOSCIENCES INC.

CONCEPTUAL SITE MODEL

BOTHELL PAINT AND DECORATING SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
BOTHELL, WASHINGTON

FIGURE NO. 4

PROJECT NO. 2007-098-2021



EXPLANATION OF SYMBOL

- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE LIMITS OF CONTAMINATED SOIL EXCAVATION
- P-PEX-9 INTERIM ACTION CONFIRMATION SOIL SAMPLE
- P-TP-9 INTERIM ACTION CONFIRMATION SOIL SAMPLE LEFT IN PLACE WITH CONCENTRATIONS ≥ MTCA
- P-TP-9 INTERIM ACTION CONFIRMATION SOIL SAMPLE IN AREA THAT WAS SUBSEQUENTLY EXCAVATED
- P-TP-9 PRE-INTERIM ACTION SOIL SAMPLE MEETING CLEANUP LEVELS
- PTP-21 UTILITY TEST PIT SOIL SAMPLE MEETING CLEANUP LEVELS

BASE MAP PROVIDED BY PARAMETRIX

HWA GEOSCIENCES INC.

BOTHELL PAINT AND DECORATING SITE
INTERIM ACTION CLEANUP
BOTHELL, WASHINGTON

EXTENT OF INTERIM ACTION SOIL CLEANUP

DRAWN BY EFK
CHECK BY AS
DATE 04.21.15

FIGURE NO. 5

PROJECT NO. 2007-098 T995

S:\2007 PROJECTS\2007-098-22 BOTHELL CROSSROADS\CAD\HWA 2007-098-21 T995A.DWG <BOTHELL PAINT GPS F5> Plotted: 4/21/2015 8:32 AM