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June 24, 2021

Sonja Max
914 12th Street
Bellingham, WA 98225
(sonjamx@gmail.com)

Re: Opinion pursuant to WAC 173-340-515(5) on Remedial Action for the following Hazardous Waste Site:

- **Site Name:** Cascade Laundry
- **Site Address:** 205 Prospect St., Bellingham WA 98225
- **Facility/Site No.:** 21786898
- **Cleanup Site ID No.:** 11853
- **VCP Project No.:** NW3076

Dear Sonja Max:

The Washington State Department of Ecology (Ecology) received your request for an opinion on contaminant characterization work completed at the Cascade Laundry facility (Site) in 2019. This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70A.305 RCW.

Description of the Site

This opinion applies only to the Site described below. The Site is defined by the nature and extent of contamination associated with the following releases:

- Total petroleum hydrocarbons in the gasoline, diesel, and oil ranges (TPH-G, TPH-D, and TPH-O; benzene, toluene, ethylbenzene, and xylenes (BTEX); tetrachloroethene (PCE); trichloroethene (TCE); and vinyl chloride to Soil.

- TPH-G, TPH-D, BTEX, cis 1,2-dichloroethene (DCE), vinyl chloride, and 1,2-dichloropropane (DCP) to Groundwater.

- Benzene, PCE, TCE, chloroform, and carbon tetrachloride to Air.

Enclosure A includes a detailed description and diagram of the Site, as currently known to Ecology.

Please note a parcel of real property can be affected by multiple sites. At this time, we have no information that the parcel associated with this Site is affected by other sites.

Basis for the Opinion

This opinion is based on the information contained in the documents listed in **Enclosure B**. A number of these documents are accessible in electronic form from the Site web page[1]. The complete records are kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. Visit our Public Records Request page[2] to submit a public records request or get more information about the process. If you require assistance with this process, you may contact the Public Records Officer at publicrecordsofficer@ecy.wa.gov or 360-407-6040.

This opinion is void if any of the information contained in those documents is materially false or misleading.

Analysis and Opinion

Based on a review of the *Remedial Investigation/Site Characterization* dated December 11, 2019 (*RI Report*), and the *Vapor Intrusion Investigation* dated December 17, 2019 (*VI Report*), Ecology has determined:

- Ecology appreciates the additional Site investigations completed by your project team pursuant to the prior VCP opinion letter issued by Ecology.

- The horizontal and vertical extent of chemicals of concern (COCs) above MTCA cleanup levels in Site soil and groundwater has not been delineated. At a minimum, additional soil and groundwater data are needed at the following locations:

    - Directly west of monitoring well MW-1, at the edge of the slope near the location of borings SB4 and DP2.

    - South of monitoring well boring SB3, on adjacent City of Bellingham education center/museum property.

    - Additional soil and groundwater characterization and sampling locations may be needed to fully delineate contamination on the Site.

[1] https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=11853
[2] https://ecology.wa.gov/About-us/Accountability-transparency/Public-records-requests

- Consider a drilling method that allows full penetration of the top of weathered sandstone bedrock (such as sonic drilling), to provide screened intervals that fully access groundwater perched at the glaciomarine drift/Chuckanut Sandstone interface. A number of monitoring wells at the adjacent Holly Street Landfill (Cleanup Site ID 253) were drilled slightly beyond the weathered top of the sandstone in order to set well screens across the water-bearing zone.

- Recheck monitoring wells MW-2 and MW-3 for the presence of seasonal groundwater, especially during the wet season. If measurable groundwater is present, calculate groundwater elevations in all three monitoring wells and prepare a groundwater elevation contour map. At the adjacent 401 Central Ave LUST Site[3], monitoring well borings were initially dry, but groundwater was later present in completed monitoring wells. After the wells were bailed to dryness, sufficient groundwater recharged to allow collection of groundwater samples.

- Ecology recommends incorporating summary data from the 2003 Holly St Landfill[4] *Remedial Investigation Feasibility Study* in an update of the conceptual model of the Cascade Laundry Site, with respect to assessing potential off-Property impacts. Site monitoring wells L-MW-2 and A-MW-6 provide important data in this regard (see **Enclosure C** for well locations). This information was generally described in the Phase I Environmental Site Assessment included in the *Baseline Environmental Summary* report dated March 15, 2015; however, the presence or absence of Cascade Laundry Site COCs in specific Holly St Landfill monitoring wells need to be presented as part of the RI report.

- In consideration of past leather tanning and dyeing activities on the Site, Ecology requests testing of the following additional chemicals in future soil and groundwater samples collected at the Site (see **Enclosure B, Additional Documents Cited**; USEPA 1982):

  - Metals: copper, hexavalent chromium, trivalent chromium, nickel, lead, and zinc

  - Cyanide

- Ecology recommends testing of groundwater from monitoring well MW-1 for VPH and EPH, to support calculation of Method B TPH groundwater cleanup levels.

- Include historical and current subsurface piping on a Site base map, as requested in the October 30, 2017 VCP opinion letter. Include stormwater piping, including the catch basin near monitoring well MW-3.

- Ecology concurs with the site-specific Terrestrial Ecological Evaluation (TEE) presented in the *RI Report*, with the addition of total chromium from MTCA Table 749-3 (67 micrograms per kilogram [mg/kg]).

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[3] https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=12378
[4] https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=253

- Ecology requests preparation of updated preliminary Site cleanup level tables. Preliminary Site cleanup levels used for assessing the extent of Site contamination must be the most stringent of the following:

    - Soil: Method A unrestricted land use, Method B (if a Method A cleanup level is not available), or an applicable cleanup level from MTCA TEE Table 749-3.

    - Groundwater: Method A, Method B (if a Method A cleanup level is not available), or Method B Vapor Intrusion Screening Levels.

    - Sub-Slab Soil Vapor: Sub-Slab Soil Gas Vapor Intrusion Screening Levels.

    - Indoor Air: Method B or Ecology *Vapor Intrusion (VI) Investigations and Short-Term Trichloroethene (TCE) Toxicity, Implementation Memorandum No. 22, Ecology Publication No. 18-09-047, October 2019*[5] (for short-term TCE exposure).

- Please note that the Site-specific, direct-contact Method B soil cleanup level for TPH presented in the *RI Report* (along with the appended Soil Cleanup Level Worksheets) cannot be used at this Site, because detection of TPH and BTEX in groundwater samples has confirmed that the soil-to-groundwater leaching pathway is complete.

- It is possible that a demonstration of groundwater non-potability could result in lower soil and groundwater Site cleanup levels for certain COCs. However, Ecology cannot consider a non-potability demonstration until Site characterization has been completed, as stated in the October 30, 2017 VCP opinion letter. The following steps are required to apply non-potable groundwater cleanup levels at a site:

    - Meet the non-potable classification criteria, per WAC 173-340-720(2).

    - Complete a site-specific risk assessment to develop non-potable groundwater cleanup levels, per WAC 173-340-720(6).

    - Notify in writing all potentially affected property owners, local governments, tribes, and water purveyors with jurisdiction in the area potential affected by Site groundwater contamination of the proposed non-potable groundwater cleanup levels and provide an opportunity to comment.

    - Include an institutional control complying with WAC 173-340-440 as an element of the proposed Site cleanup action, to restrict use of, or contact with, the contaminated groundwater.

[5] Implementation Memorandum No. 22: Vapor Intrusion (VI) Investigations and Short-Term Trichloroethene (TCE) Toxicity (wa.gov)

- Ecology requests the following changes and additions to the *RI Report*:

    - Prepare an updated Site base map showing locations of all former USTs, the former sump, all subsurface explorations completed at the Site (test pits, borings, monitoring wells, UST excavation samples, and sub-slab soil vapor samples), and Holly St Landfill monitoring wells L-MW-2 and A-MW-6. Consider using 11 x 17 format to facilitate inclusion of this data at a scale that provides sufficient resolution.

    - Prepare an updated Site building base map showing locations of all indoor air samples and sub-slab soil samples from 2015, 2018, and 2019.

    - Using the updated base maps, prepare separate maps by media (soil, groundwater, indoor air / sub-slab soil vapor) showing numerical chemical concentrations for all samples that exceed preliminary Site cleanup levels.

    - Prepare a west-east hydrogeologic cross section through Holly St Landfill wells L-MW-2 and A-MW-6, the western property boundary, boring SB-4 and the proposed adjacent monitoring well, monitoring well MW-1 and adjacent borings and test pits, boring B-6, and boring DP1. Include a vertical scale in feet relative to mean sea level. Show groundwater levels in monitoring wells included in the section and concentrations of COCs in soil and groundwater that exceed preliminary Site cleanup levels. Such a cross section is critical in understanding the relationship of the glacial drift/bedrock interface and perched groundwater that occurs at this contact (see the example Holly St Landfill cross section in **Enclosure D**).

    - Please provide a complete list of references in the *RI Report*.

- Ecology appreciates completion of the most recent VI sampling in 2018 and 2019, and the evaluation of sub-slab and indoor air sampling data in the *VI Report*. Based on our review of the *VI Report*, Ecology has the following concerns regarding potential VI exposure to Site workers and visitors:

    - Contaminated groundwater is a continuing source of chemical transport via VI to sub-slab vapor and indoor air for PCE and TCE, based on exceedances of the VI groundwater screening levels for these COCs. Although vinyl chloride was detected in groundwater at three orders of magnitude above the VI groundwater screening level, this chemical was not detected in samples of sub-slab soil gas or indoor air. Future sub-slab and indoor air samples should include analysis of vinyl chloride to determine if this chemical is or is not a VI concern.

    - Based on the absence of benzene and chloroform in sub-slab soil vapor samples, Ecology concurs with the VI Report conclusion that detections of these chemical in indoor air samples are likely due to indoor sources and not VI.

- Concentrations of COCs in sub-slab vapor and indoor air in the basement of the Site building create a potential hazard to occupants of the basement, especially TCE concentrations in indoor air that were within 9% of the short-term worker exposure concentration of 7.5 micrograms per cubic meter ($\mu g/m^3$); see Ecology *Implementation Memorandum No. 22*.

- Ecology Draft Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action, Ecology Publication No. 09-09-047, Revised April 2018[6] (*Draft VI Guidance*) provides decision matrices regarding assessment and mitigation of COCs in soil gas and indoor air. Applying these matrices to observed Site concentrations of benzene, chloroform, PCE, and TCE yields the following recommendations (see **Enclosure E**):

    - Benzene and chloroform: repeat sampling; investigate potential indoor sources.

    - PCE (basement and main floor above basement): repeat sampling; mitigate if multiple consecutive indoor air samples exceed the screening level.

    - TCE (basement): mitigate. This is especially important regarding the short-term TCE screening level discussed in the previous paragraph.

    - Please note that mitigation of short-term TCE impacts to indoor air can be achieved by limiting access to the affected building spaces (such as the Site building basement), as discussed in *Implementation Memorandum No. 22*:

      "Therefore, while this memorandum advocates comparing our Action Levels to measurements (or estimates) of average 21-day concentrations, Ecology also recommends that, if any 24-hour or 8-hour measurements of average indoor air TCE concentrations exceed Table 1's Action Levels (for residents or workers, respectively), prompt action should be taken to either reduce those concentrations, or reduce the degree to which women of childbearing age are exposed."

    - Chapter 5 – Mitigation, of the *Draft VI Guidance*, discusses VI mitigation for Sites where cleanup of the subsurface VI contamination source is not imminent:

      "Ecology also recommends that non-residential buildings be mitigated when assessments conclude that vapor intrusion may be unacceptably contaminating indoor air and a cleanup action capable of quickly remediating the subsurface source is not ready for implementation."

- Ecology recommends submittal of a work plan to guide collection of supplemental Site

[6] https://apps.ecology.wa.gov/publications/SummaryPages/0909047.html

characterization data (including additional sampling of indoor air) and preparation of a supplemental RI report. Once RI has been completed, work on the Feasibility Study (FS) can be initiated, to confirm Site cleanup levels for affected media and evaluate cleanup options.

- Please continue to upload Site data to the Ecology Environmental Information Management (EIM) database, which is a requirement prior to issuance of a No Further Action opinion.

Limitations of the Opinion

1. Opinion does not settle liability with the state.

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70A.305.040(4).

2. Opinion does not constitute a determination of substantial equivalence.

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination. *See* RCW 70A.305.080 and WAC 173-340-545.

3. State is immune from liability.

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70A.305.170(6).

Contact Information

Thank you for choosing to clean up the Site under the Voluntary Cleanup Program (VCP). After you have addressed our concerns, you may request another review of your cleanup. Please do not hesitate to request additional services as your cleanup progresses. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our web site: www.ecy.wa.gov/vcp. If you have any questions about this opinion, please contact me by phone at (206) 594-0121 or by email at michael.warfel@ecy.wa.gov.

Sincerely,

Michael R. Warfel
VCP Site Manager
Toxics Cleanup Program, NWRO

Enclosures (5): A – Description and Diagrams of the Site
B – Basis for the Opinion: List of Documents
C – Monitoring Well Location Map from the Holly St. Landfill Site
D – Cross Section from the Holly St Landfill Site
E – Vapor Intrusion Decision Matrices

cc: Kim Ninnemann, Stratum Group (kim@stratumgroup.net)

Enclosure A

Description and Diagrams of the Site

Site Description

This section provides Ecology's understanding and interpretation of Site conditions, and is the basis for the opinions expressed in the body of the letter.

Site: The Site is defined by the release of TPH-G, TPH-D, TPH-O), BTEX, PCE, TCE, and vinyl chloride to soil; TPH-G, TPH-D, BTEX, cis-1,2-DCE, vinyl chloride, and 1,2-DCP to groundwater; and benzene, PCE, TCE, chloroform, and carbon tetrachloride to air. The Site is located at 205 Prospect Street in Bellingham, Washington (the Property), as shown on **Figure 1**.

Area and Property Description: The Property corresponds to Whatcom County parcel number 380330111249 which is 0.54 acres in size. The Property is occupied by a two-story building constructed in 1922 which has a daylight basement. The Property is bounded by Prospect Street to the east, a paved parking area and commercial offices to the north (including the 401 Central Ave LUST cleanup Site, Cleanup Site ID 12378), a museum to the south, and Maritime Heritage Park to the west (Holly St Landfill Site, Cleanup Site ID 253); see **Figure 2**). Land use surrounding the Site is commercial with the exception of the adjacent park. A former gas station was located across Prospect Street to the southeast.

Property History and Current Use: The Property was first developed with a residence, as seen in aerial photos from 1892. The large building (205 and 207 Prospect Street) was constructed on the Property in 1922 and consists of two stories with a daylight basement. The southern portion of the Property was used as a car sales lot until approximately 1935. The Property was developed as a dry cleaning and laundry facility by 1932, which included fabric dying and leather tanning.

A one-storing addition (203 Prospect Street) was added on the south wall of the large building in 1966. Dry cleaning and fabric dying activities continued until 1971. A commercial laundry operation continued at the Property until the early 2000s. The two buildings on the Property are currently occupied by a cider company, restaurant, art gallery, and performing arts theater.

Contaminant Sources and History: Three underground storage tanks (USTs) were previously located on the Property, for storage of Bunker C fuel oil (3,200 gallons) used to power the boilers, gasoline (500 gallons), and dry cleaning solvent (300 gallons); see **Figure 3**. The gasoline UST was installed in 1978 and closed-in-place in 1992. The installation dates of the other two USTs are unknown but they were both removed in 2010.

TPH-G, PCE and xylenes were detected at concentrations that exceed MTCA Method A cleanup levels in bottom and sidewall soil samples collected during removal of the dry cleaning solvent UST. TPH-G detected in all samples was likely mineral spirits, which was the most common dry cleaning solvent in use in the United States from the late 1920s through the late 1950s.

Sludge contaminated with TPH-D, TPH-O, 1,3,5-trimethylbenzene (TMB) and 1,2,4-TMB was

present in the sump within the southwestern room of the building. The source of petroleum in the sump sludge is suspected to be from machinery leaks, such as hydraulic fluid, that were captured in the sump. 1,3,5-TMB, 1,2,4-TMB, and n-propylbenzene, which are contaminants associated with dyes, were detected in soil at test pit 2 (TP-2) at 5 feet bgs and boring DP-3 on the southwest side of the main building at 2 feet bgs, at concentrations below MTCA cleanup levels. The sump was cleaned out and filled with concrete in 2014.

Volatile organic compounds were identified within the indoor air of the building including carbon tetrachloride, PCE and chloroform. Carbon tetrachloride was commonly used in dry cleaning (either mixed with other solvents for dry cleaning or as a spot cleaner) by the 1930s but due to high toxicity and the tendency to corrode machinery, it was phased out by the early 1950s. By 1962, PCE became the leading dry cleaning solvent used in the United States. Chloroform was likely used as a dry cleaning spot remover and for cleaning leather.

Physiographic Setting: Western Whatcom County and the Bellingham area are part of the Fraser-Whatcom Lowlands, broadly characterized as a north-south trending structural and topographic depression bounded to the west by the complex tectonics of the San Juan, Canadian Gulf, and Vancouver Islands, and to the east by the Cascade uplift. The Lowlands typically feature extensive sequences of consolidated and unconsolidated sediments, typically dominated near the surface by geologically recent glacial deposition.

The Property slopes to the west, steepening at the western boundary. The slope at the west side of the building is vegetated and drops approximately 25 feet to the flat portion of the adjacent Maritime Heritage Park. The Property elevation is approximately 65 feet above mean sea level and includes the upper portion of the original shoreline bluff above the Whatcom Creek estuary.

Surface/Storm Water System: The Whatcom Creek estuary is located approximately 320 feet to the northwest and Whatcom Waterway is located approximately 500 feet west of the Property. The entire length of Whatcom Creek has been listed by Ecology as a Category 5 "Polluted Water" for concentrations of dissolved oxygen and fecal coliform and temperature variations. Documented fish using Whatcom Creek include bull trout and sea-run cutthroat, Chinook, Coho, chum, pink, and steelhead salmon. Restoration of Whatcom Creek's riparian habitat has been ongoing since the early 1990's. Estuary habitat exists in the tidal zone.

Ecological Setting: The Property is located adjacent to Maritime Heritage Park, which includes a native plant trail, fish hatchery, athletic fields, a trail along Whatcom Creek, and landscaped areas (primarily grass with shrubs and trees).

Geology: The Property is underlain by the Bellingham drift, which was deposited by melting glacial ice near the end of the last glacial period and generally consists of silty clay. Silty clay, clayey silt, sandy clay, and sandy silt were encountered in Site borings to depths of up to 30 feet below ground surface (bgs). Zones of sand approximately 2 to 14 feet thick were encountered at various locations. Fill material up to 15 feet in thickness, with brick, woody debris, glass, and charcoal, was encountered on the west side of the Property and the southwestern corner of the

building east of the retaining wall. Sandstone bedrock (Chuckanut Formation) was encountered at depths of 26 to 32 feet bgs.

Groundwater: Groundwater at depths ranging from 12 to 17 feet below ground surface (bgs) was encountered during winter and spring months. Groundwater is present year round below 17 feet bgs within slightly coarser sandy lenses within a predominantly saturated silty clay. Groundwater at the adjacent Maritime Heritage Park (Holly St Landfill site) was encountered at 12 to 13 feet bgs, which corresponds with a depth of approximately 43 feet bgs at the Property. Groundwater flow is likely to the northwest, toward Whatcom Creek. The three monitoring wells installed at the Site are shown on **Figure 4**. Only MW-1 produced sufficient yield to collect a groundwater sample.

Water Supply: The Property is served by the City of Bellingham public drinking water utility, which obtains its water from Lake Whatcom. According to Ecology's well log database, no drinking water wells are located within ½ mile of the Property.

Release and Extent of Soil, Groundwater and Air Contamination:

Soil

Soil contamination was identified in shallow fill soils along the southwestern corner of the building and between 14 to 24 feet bgs throughout the southern and western portions of the Property (**Figures 5 and 6**). TPH-G, TPH-D, TPH-O, benzene, and PCE exceeded MTCA Method A cleanup levels. Vinyl chloride was greater than the Method B soil cleanup level in one sample (DP3). Total chromium (Cr) was detected in soil at concentrations of 20 to 54 milligrams per kilogram (mg/kg), which is above the Method A soil cleanup level for Cr+6 (19 mg/kg). Without speciation of Cr+3 and Cr+6, it is not possible to determine if Cr exceeds a Method A cleanup level or a TEE cleanup level.

PCE and benzene concentrations above MTCA Method A cleanup levels have been detected as deep as 30 feet bgs (boring B-5). The horizontal and vertical extent of this contamination has not been delineated.

Groundwater

TPH-G, benzene, PCE, and vinyl chloride have been detected in groundwater at concentrations exceeding their MTCA Method A cleanup levels (**Figures 7 and 8**). Groundwater contamination was identified beneath the building footprint and adjacent to the southwest and west sides of the building. The horizontal and vertical extent of groundwater contamination has not been delineated.

Soil Vapor and Indoor Air

The following summarizes detections of chemicals that present the potential for exposure to building occupants via the vapor intrusion (VI) pathway:

- Concentrations of benzene, PCE, and vinyl chloride exceeded the Method B cancer VI screening level in groundwater from monitoring well MW-1.

- Concentrations of TCE and PCE exceeded the VI sub-slab screening levels in soil gas samples from basement sample SS2 (**Figure 9**).

- Concentrations of the following chemicals exceeded their respective Method B indoor air cleanup levels in air samples collected inside the Site building (**Figure 10**): benzene, TCE, PCE, and chloroform.

- The concentration of TCE in 2018 indoor air sample from the basement (#8) was 6.8 micrograms per cubic meter ($\mu g/m^3$), near the short-term TCE "worker" exposure limit of 7.5 $\mu g/m^3$; see Implementation Memorandum No. 22, Vapor Intrusion (VI) Investigations and Short-Term Trichloroethene (TCE) Toxicity, Publication Number 18-09-07, Revised October 2019[1].

[1] https://apps.ecology.wa.gov/publications/SummaryPages/1809047.html

Site Diagrams

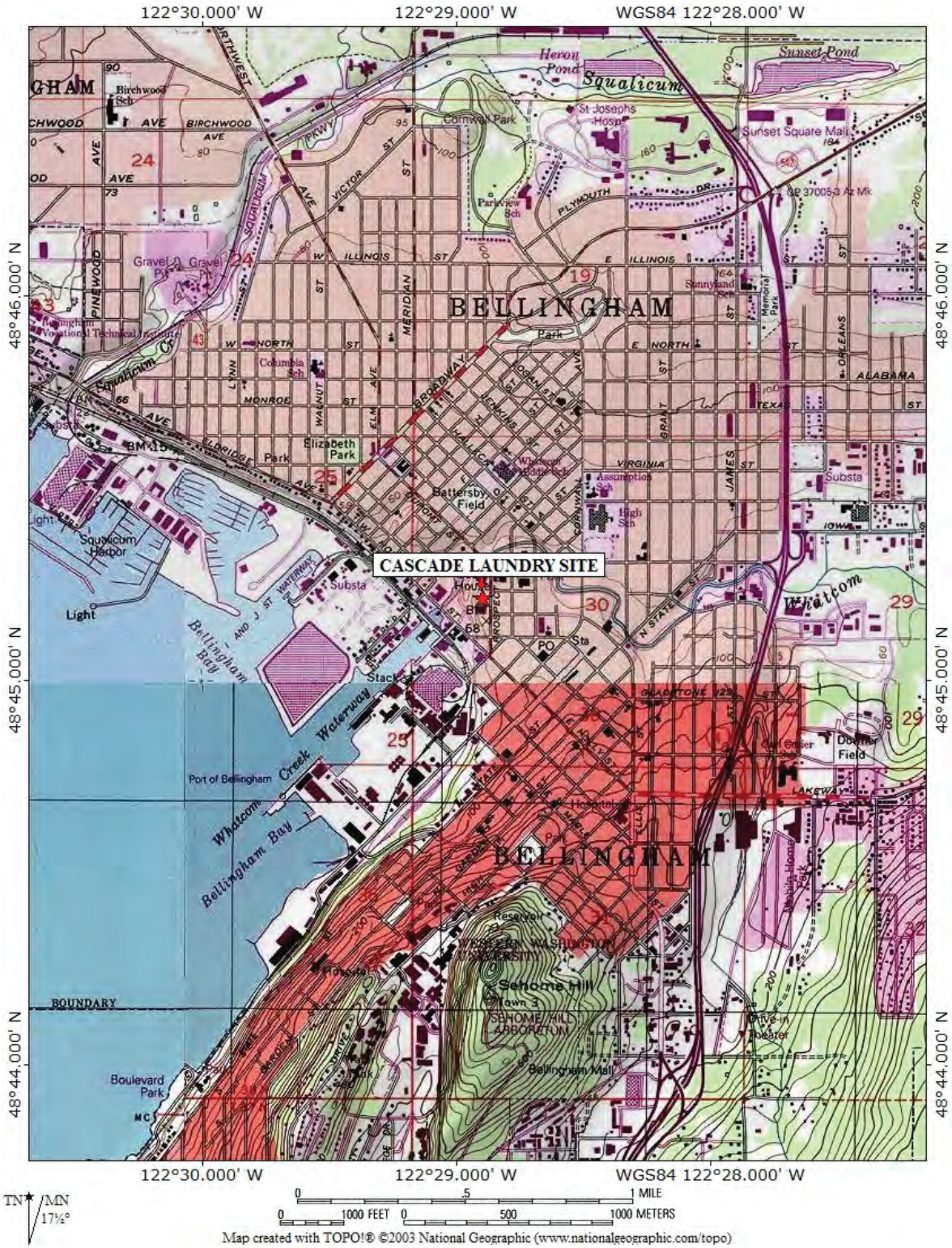


Figure 1. Site Vicinity Map

Enclosure A, Figure 1

Figure 2. Aerial photograph of site and vicinity (GoogleEarth, 2018)

Enclosure A, Figure 2

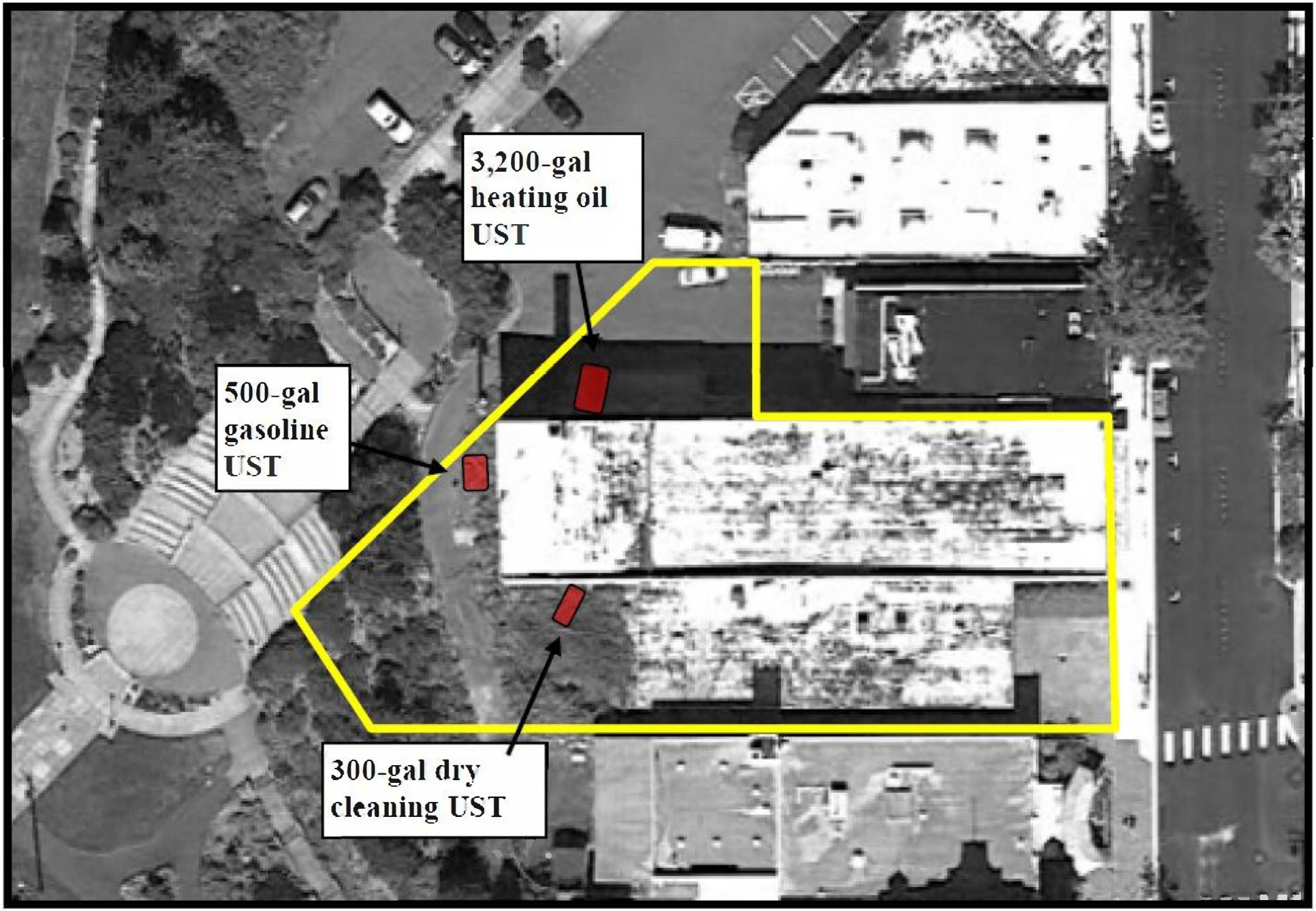


Figure 4. Onsite tank locations

Enclosure A, Figure 3

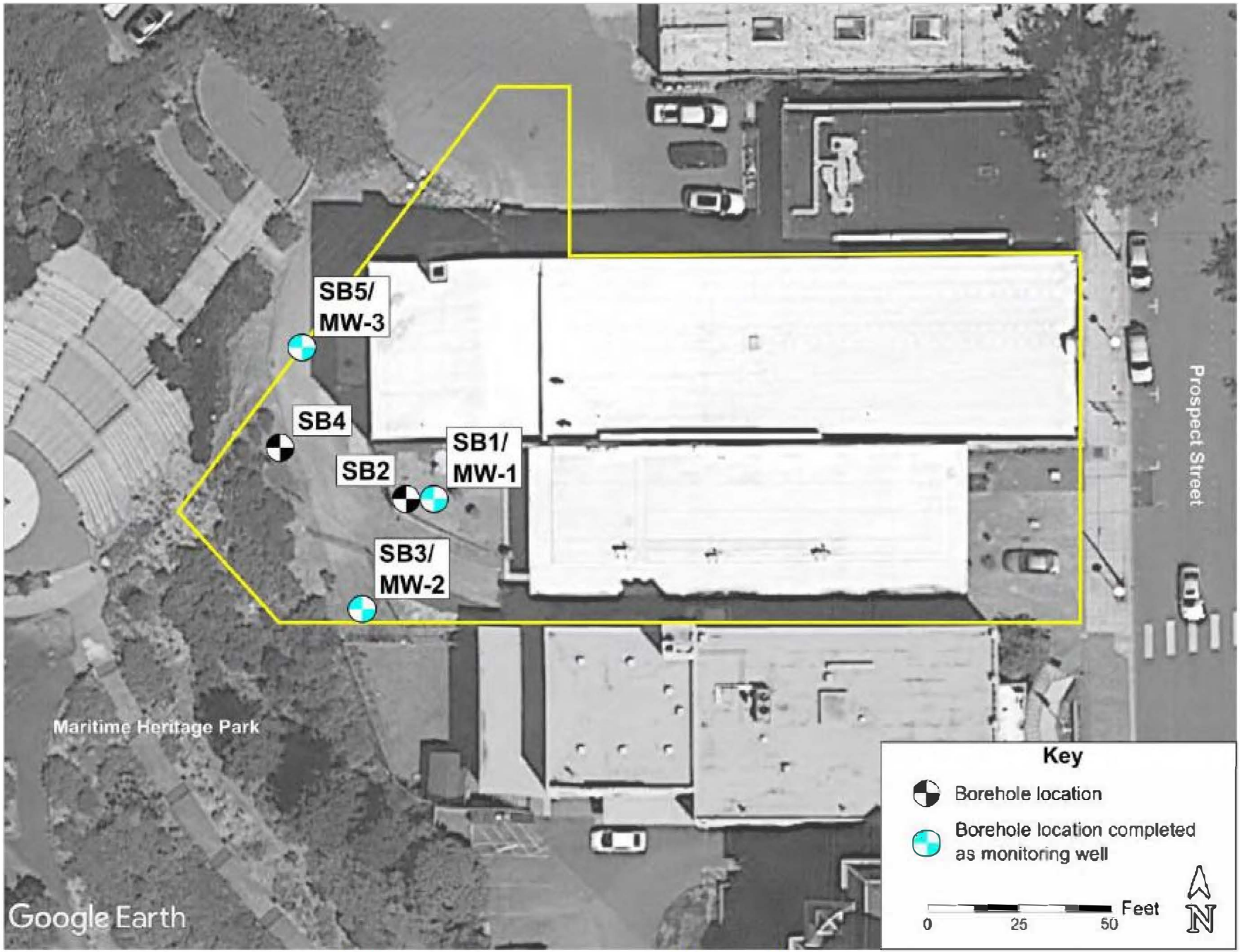


Figure 3. Environmental boring locations

Enclosure A, Figure 4

March 12, 2015
Cascade Laundry, 205 Prospect Street, Bellingham, WA
Environmental Baseline

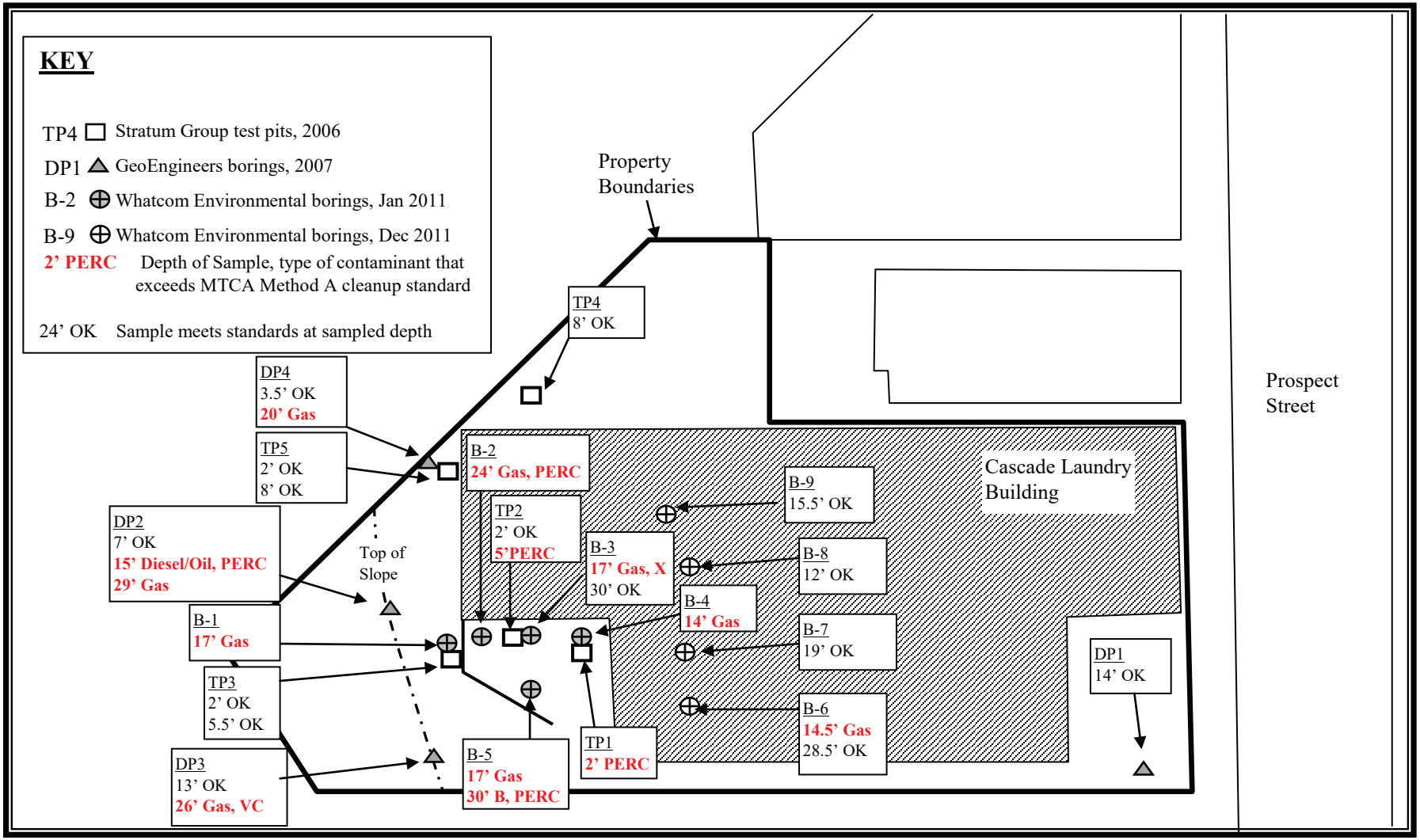


Figure 8. Soil Sample Exceedences (above MTCA Method A)

Enclosure A, Figure 5

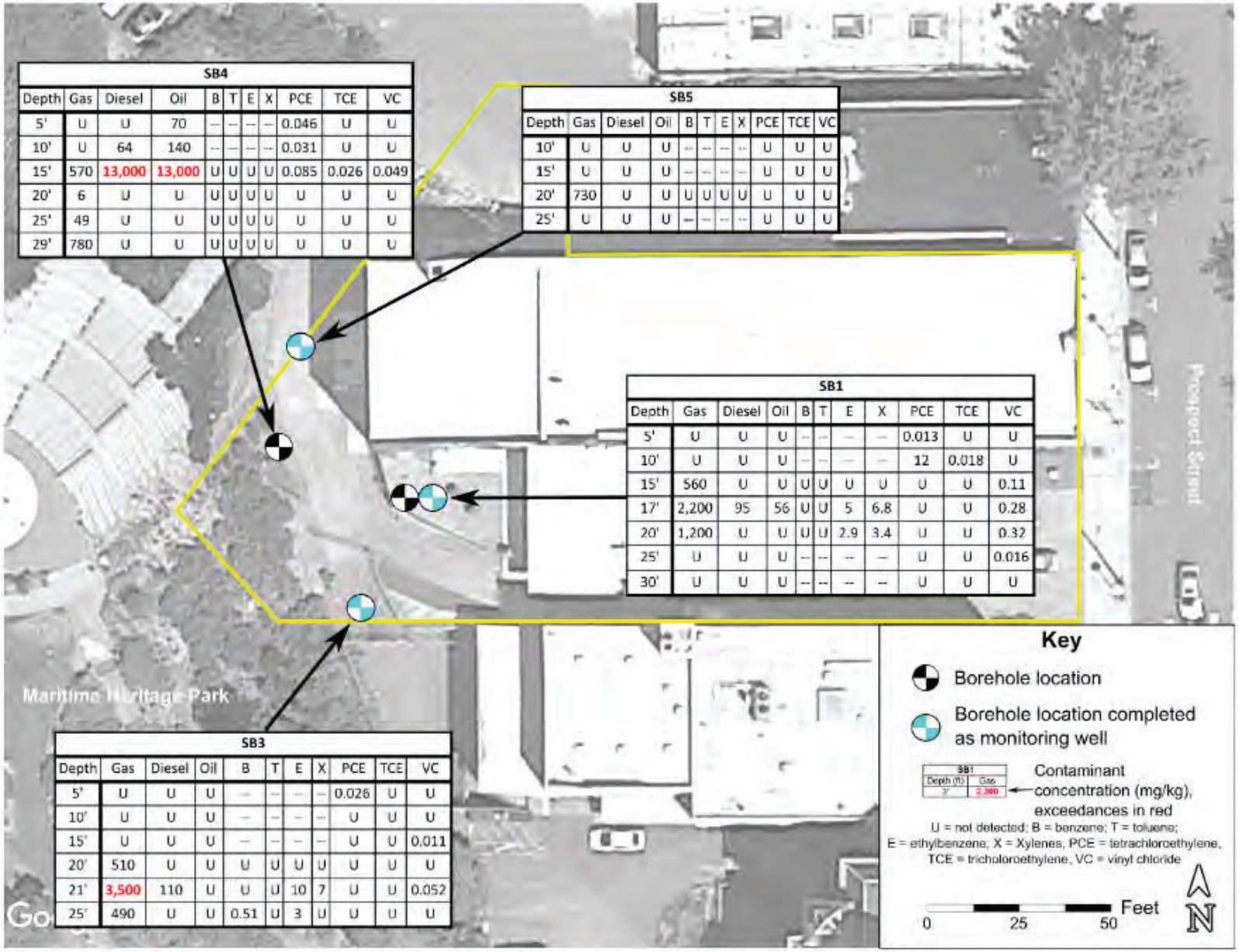


Figure 4. Map of soil sample results for contaminants of concern

Enclosure A, Figure 6

March 12, 2015
Cascade Laundry, 205 Prospect Street, Bellingham, WA
Environmental Baseline

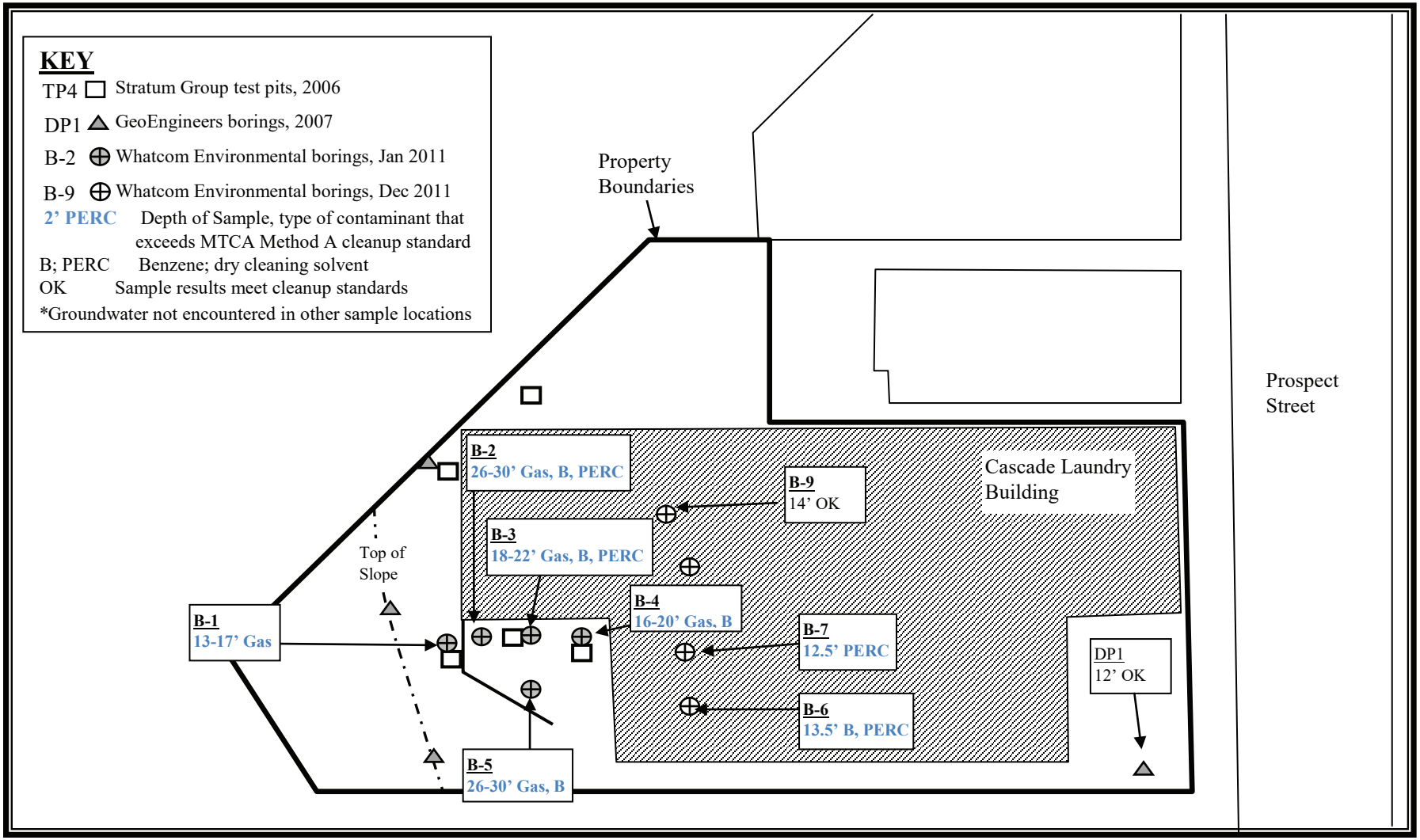


Figure 9. Groundwater Sample Locations with exceedences above MTCA Method A

Enclosure A, Figure 7

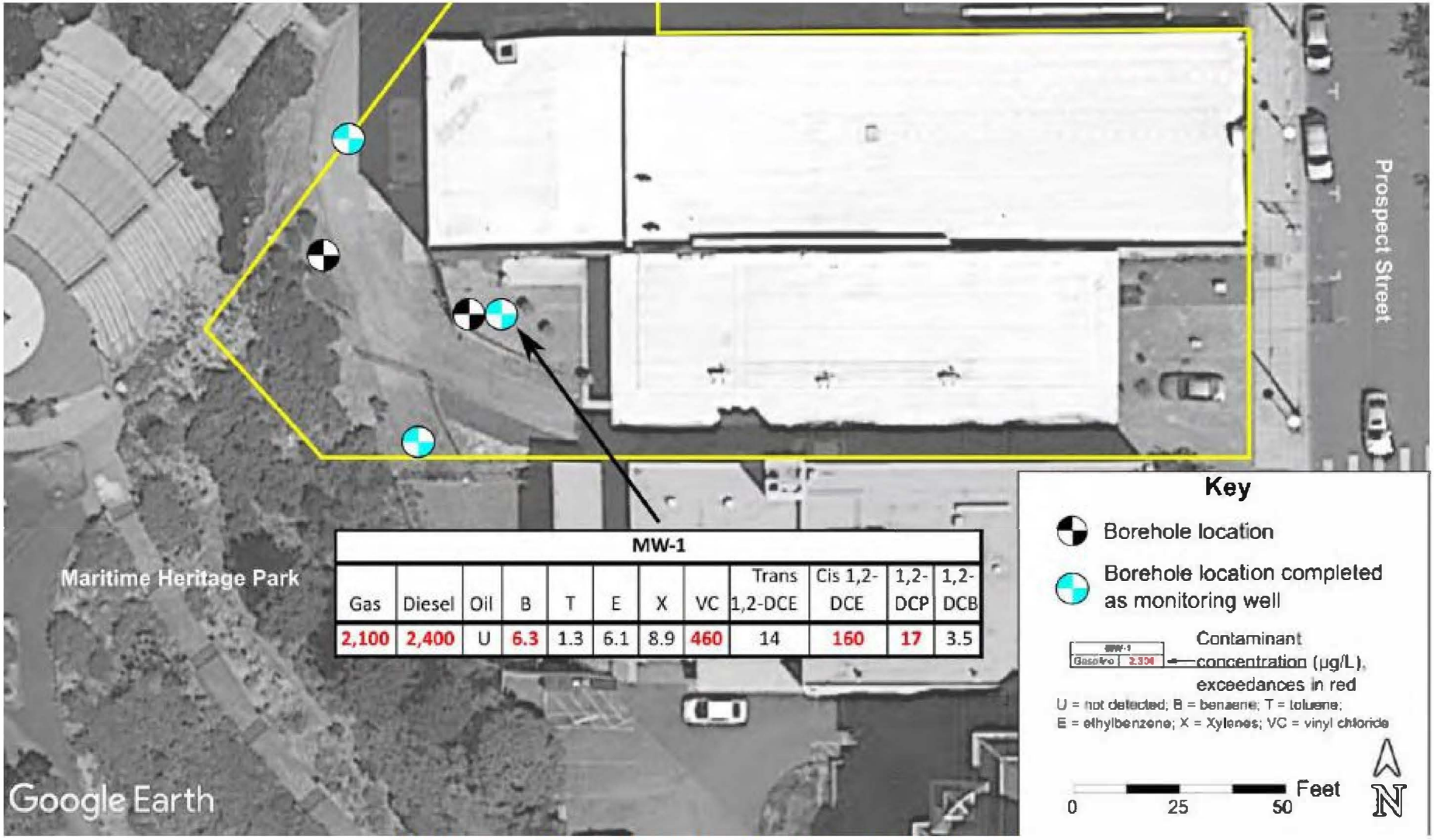


Figure 5. Map of groundwater sample results.

Enclosure A, Figure 8

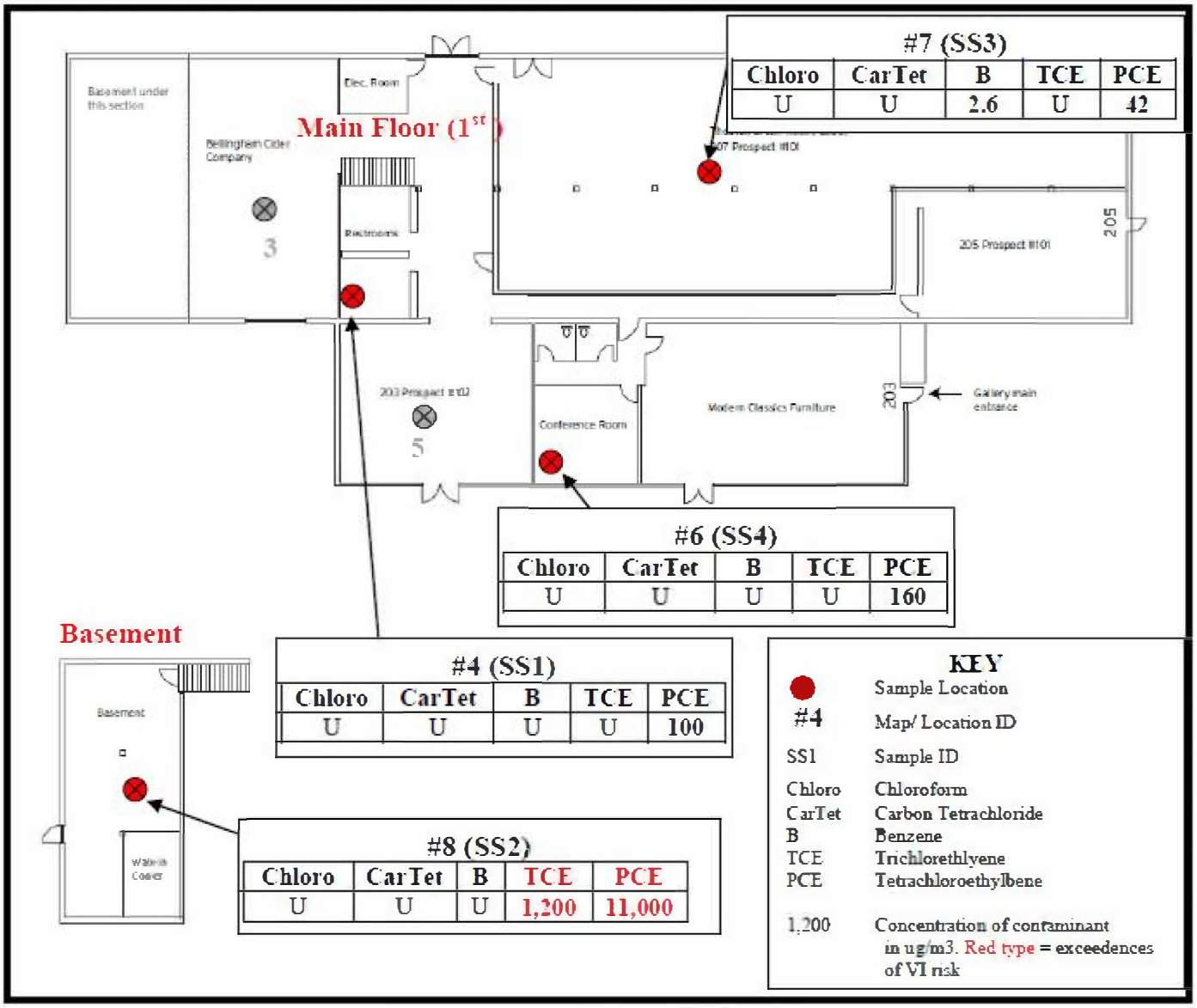


Figure 2. Sub-slab sample results

Enclosure A, Figure 9

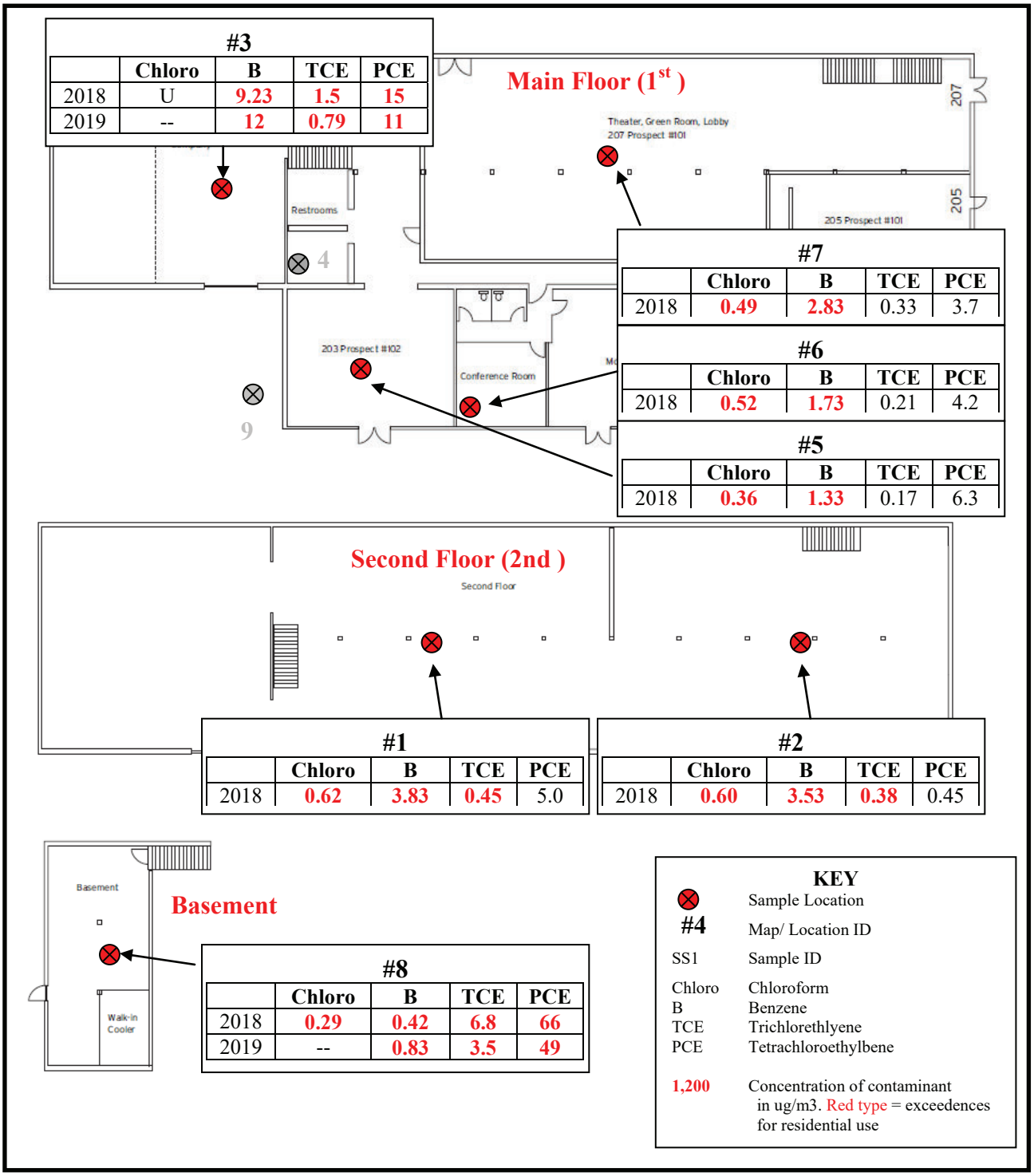


Figure 3. Indoor air sample results from January 2018 and April 2019 (only contaminants detected are presented in Figure 4).

Enclosure A, Figure 10

Enclosure B

Basis for the Opinion:
List of Documents

1. Stratum Group (Stratum), *Vapor Intrusion Investigation*, December 17, 2019.

2. Stratum, *Remedial Investigation/Site Characterization*, December 11, 2019.

3. Stratum, *Groundwater Well Installation Update*, June 15, 2018.

4. Stratum, *Underground Storage Tank Removal and Hazardous Waste Generator Identification*, May 9, 2018.

5. Department of Ecology (Ecology), *VCP NW3076 Opinion Letter*, October 30, 2017.

6. Whatcom Environmental, *Remedial Investigation Work Plan*, May 24, 2016.

7. Whatcom Environmental, *Baseline Environmental Summary*, March 12, 2015.

8. Ecology, *Initial Investigation Field Report, ERTS 626428, Cascade Laundry*, February 2, 2012.

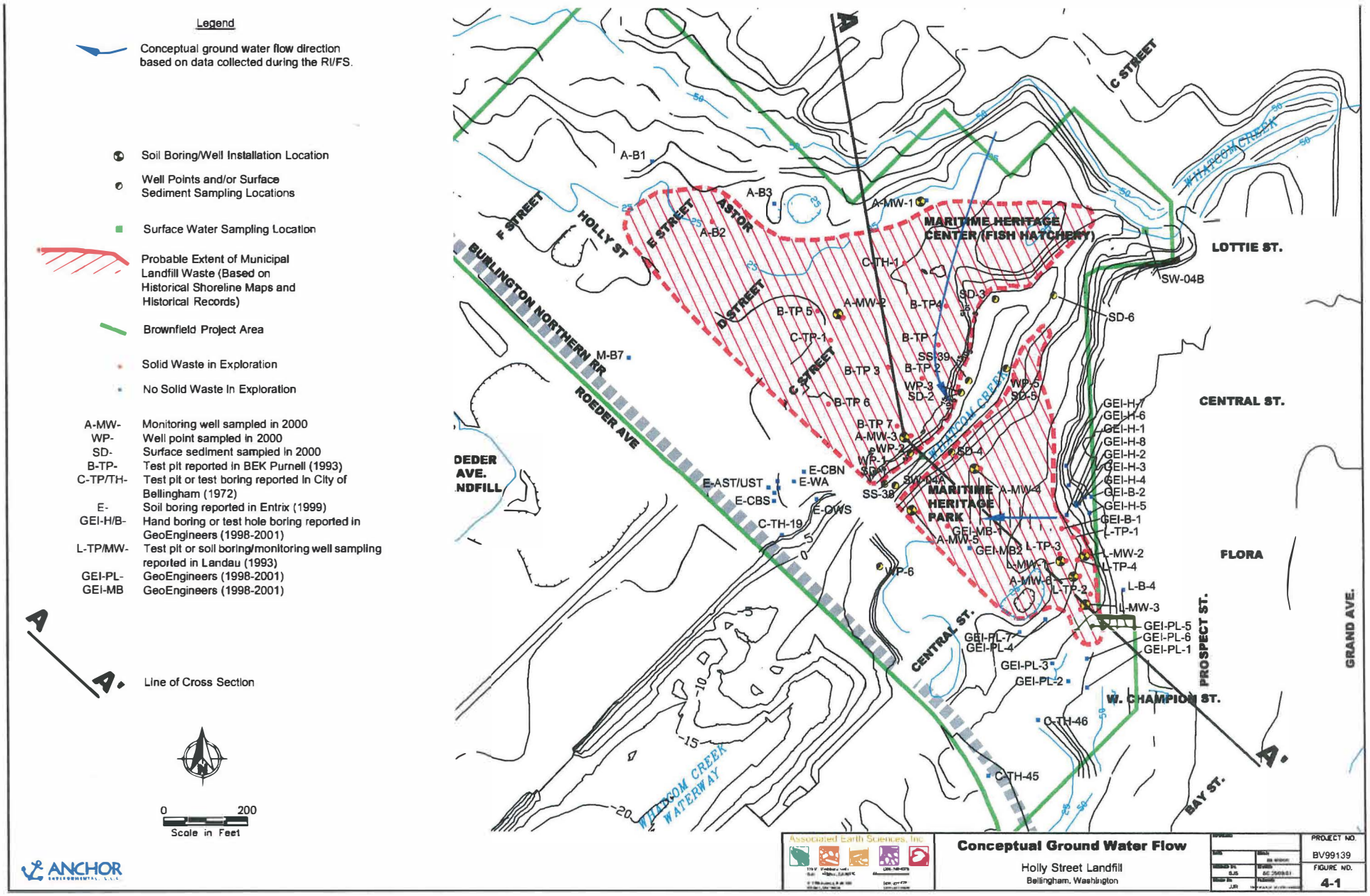
Additional Document Cited

U.S. Environmental Protection Agency, *Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Leather Tanning and Finishing Point Source Category*, November 1982.

Enclosure C

Monitoring Well Location Map from the Holly St Landfill Site

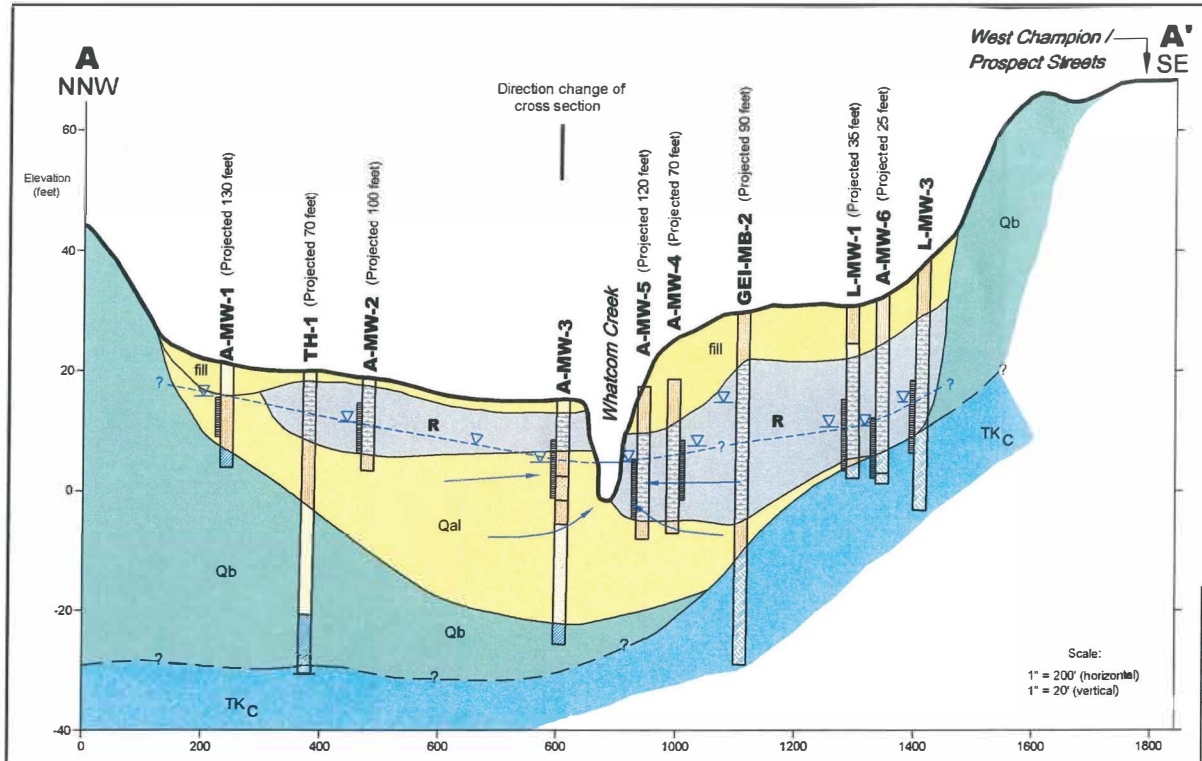
Enclosure C - Holly St Landfill Well Location Map



Enclosure D

Example Cross Section from the Holly St Landfill Site

Enclosure D - Holly St Landfill Cross Section



Symbols

- Measured water level
- Inferred water table
- Well: Screened casing with filter pack
- Conceptual ground water flow path

Water level data for A-MW-1, A-MW-2, and A-MW-3 obtained 10/08/00 *(corrected for tidal fluctuation)*

Water level data for L-MW-1 and L-MW-3 obtained 11/18/92

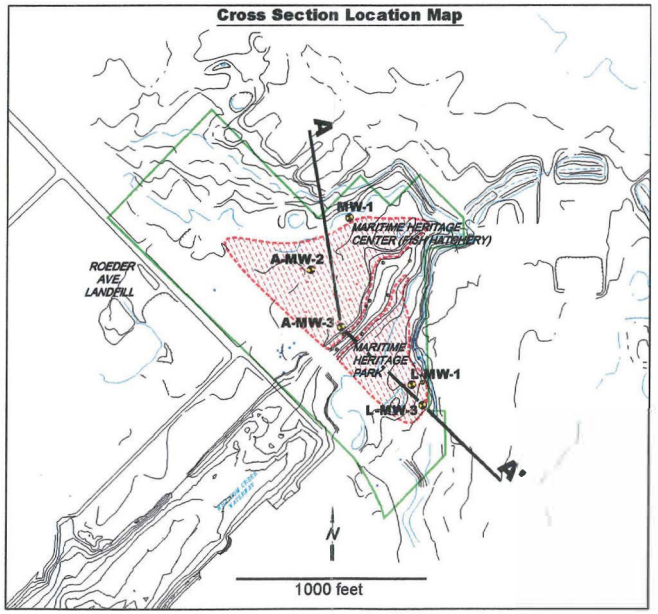
TH series borings advanced in 1969 (CH 2M Hill, 1972).

A-MW-1, A-MW-2 & A-MW-3 wells installed April, 2000.

L-MW series wells installed November, 1992.

A-MW-4, A-MW-5 & A-MW-6 wells installed December 2000.
GEI-MB-2 boring drilled April 2001.

Cross Section Location Map



Geologic Reference

fill	Sand, silt and gravel with occasional debris of anthropogenic origin, but not associated with landfill refuse.
R	Refuse: Landfill debris emplaced specifically in the Holly Street Landfill.
Qal	Quaternary Alluvium: Includes recent mudflat sediment, reworked deposits derived from the Nooksack River, and recent alluvial deposits from Whatcom Creek.
Qso	Sumas Outwash: Sandy outwash of Sumas glacial stade. Inferred to be present northwest of site based on Easterbrook (1976).
Qb	Bellingham Drift: Glacio-marine sandy silt and clay.
TK_C	Chuckanut Formation: Sandstone and carbonaceous shale. Outcrops south-southeast of end of cross section.

Coarse-Grained Soils - More than 50% Retained on No. 200 Sieve	Sands - 50% or More of Coarse Fraction Passes No. 4 Sieve	≤ 5% Fines	Well-graded sand and sand with gravel, little to no fines
			Poorly-graded sand and sand with gravel, little to no fines
		≥ 15% Fines	Silty sand and silty sand with gravel
Fine-Grained Soils - 50% [1] or More Passes No. 200 Sieve	Silts and Clays Liquid Limit Less than 50	≥ 15% Fines	Silt, sandy silt, gravelly silt, silt with sand or gravel
			Clay of low to medium plasticity; silty, sandy, or gravelly clay, lean clay
			R Refuse

[1] Percentage by dry weight

Associated Earth Sciences, Inc.

Geologic Cross Section A-A'

Holly Street Landfill
Bellingham, Washington

PROJECT NO
BV99139
FIGURE NO
4-2

Enclosure E

Vapor Intrusion Decision Matrices

indoor samples were collected, but the sub-surface source may be capable of contaminating indoor air in the future.

(3) Mitigate: the combination of indoor and sub-slab data suggests that VI may be unacceptably contaminating indoor air. Methods to mitigate exposures related to VI are described in Chapter 5 of this Guidance. Mitigation is considered a temporary measure implemented to address exposures related to VI until contaminated environmental media are remediated. In some cases, instead of mitigation, the responsible party may choose to implement an interim action that remediates the VI source. These types of actions are also discussed in Chapter 5.

Two matrices have been provided below, one for carcinogens (E-1) and one for non-carcinogens (E-2). They are very similar. Both are intended for buildings where the applicable "acceptable" indoor air concentration is the Method B air cleanup level. However, since non-carcinogens may produce harmful effects once threshold exposures are reached, the middle column of Table E-2 has reduced the concentration range associated with "marginally" unacceptable indoor air quality. This is consistent with Ecology's policy of requiring action when the Hazard Index (HI) clearly exceeds a value of 1.0.

Table E-1. Decision matrix for carcinogenic contaminants of concern.

Indoor air measurement[111]**/ Sub-slab soil gas measurement**	**Indoor air** concentration < indoor air SL	**Indoor air** concentration > indoor air SL, but < 10 times the SL	**Indoor air** concentration > 10 times the SL
Sub-slab soil gas concentration < applicable SL	no need for mitigation	Repeat sampling; investigate potential indoor sources	Repeat sampling; investigate potential indoor sources
Sub-slab soil gas concentration > applicable SL, but < 10 times the SL	no need for mitigation	repeat sampling; mitigate if multiple consecutive indoor air samples exceed the SL.	investigate potential indoor sources; mitigate if unable to locate/isolate indoor sources
Sub-slab soil gas concentration > 10 times the applicable SL	Repeat sampling	Repeat sampling; mitigate if multiple consecutive indoor air samples exceed the SL.	mitigate
No **Sub-slab** soil gas data	Repeat sampling if sub-slab soil gas concentration is likely to be > 10 times the SL; collect sub-slab data, if possible, during repeat sampling	Repeat sampling; collect sub-slab data if possible	mitigate

[111] This refers to the indoor measurement due to VI. Commonly this will be estimated to be the [max measured indoor concentration] – [representative measured, same-day, ambient air concentration]

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Sub-slab soil gas concentration > 10 times the applicable SL	Repeat sampling	Repeat sampling; mitigate if multiple consecutive indoor air samples exceed the SL. **PCE**	mitigate **TCE**
No **Sub-slab** soil gas data	Repeat sampling if sub-slab soil gas concentration is likely to be > 10 times the SL; collect sub-slab data, if possible, during repeat sampling	Repeat sampling; collect sub-slab data if possible	mitigate

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