SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

SITE NAME: Mill Creek Crossing Prime Cleaners **Rank: 4**

Cleanup Site ID: 11775

Facility/Site ID: 19816

Completed on 1/6/2020 for inclusion on the February 2020 Hazardous Sites List.

LOCATION OF SITE

18001 Bothell Everett Hwy, Suite 125

Bothell, Snohomish County, WA 98012

Tax Parcel ID: 27051800106300

Township 27N, Range 5E, Section 18

Latitude, Longitude: 47.83364, -122.20945

SITE DESCRIPTION

Within Currently Defined Site Boundaries

Based on currently available information, the Mill Creek Crossing Prime Cleaners site (Site) is located in unincorporated Snohomish County, south of Mill Creek (Figure 1). The contamination source is on the tax parcel listed above. This tax parcel, in combination with a second parcel to the east, are occupied by the Mill Creek Crossing shopping center. The parcels are zoned for general commercial use, and total 4.8 acres in size. The shopping center is comprised of two strip retail buildings generally located on the south and east portions of the Site, with a total of 18 tenant spaces. The remainder of the Site houses 3 single occupant retail buildings and associated parking.

Contamination on the Site is linked to dry cleaning operations by tenants in the southwest end of the strip mall buildings. One dry cleaner occupied the end cap space, currently occupied by Money Tree, from approximately 1984-1999. A second dry cleaner, Prime Cleaners, was located in the adjacent tenant space until 2018. Currently, the former Prime Cleaners tenant space is occupied by the Fusion India restaurant. Contaminated groundwater extends off-property to the southwest, and the Site therefore also includes parts of the adjacent commercial property to the south and the Bothell Everett Highway right-of-way.

Historical Owners and Operators

From	To	Owner/Operator	Site Uses
1984		Lakha Properties - Mill Creek LLC (since 2015)	strip mall buildings constructed in 1984; tenants included dry cleaners from approximately 1984 to 2018

Area Surrounding the Site

The Site is located in a commercial area. Nearby businesses include multiple auto service centers to the west across Bothell Everett Highway and self storage facilities to the south and east of the Site. Other tenants within the Mill Creek Crossing plaza are shown on Figure 2. The closest residential area is to the east, past the CubeSmart storage facility. The closest surface water is Silver Creek in the area where it passes through Silver Creek Park, approximately 1200 feet southeast of the Site.

There are nine additional Ecology cleanup sites within one quarter mile of the Site. Seven of these have received a No Further Action determination, and two are designated Cleanup Started. One of the sites designated Cleanup Started is the Plaid Pantry 306 site, located within the Mill Creek Crossing property on the northwest corner. Contamination at the Plaid Pantry site includes gasoline-range petroleum hydrocarbons, benzene, toluene, ethylbenzene, and xylenes in soil and groundwater. Contamination from the Plaid Pantry site is not considered as part of this Site Hazard Assessment.

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SITE CHARACTERIZATION AND/OR REMEDIATION

Site characterization activities have been conducted on the southwest part of the Mill Creek Crossing property, as well as on both sides of the Bothell-Everett Highway right-of-way. Access has not been granted on the south-adjacent Mill Creek Self Storage property, so no sampling has been done on that property in the area of suspected contamination.

SOIL
In 2009, Terracon advanced soil borings within the Prime Cleaner and former cleaner tenant spaces and in the alley south of these tenant spaces to evaluate the extent of soil contamination. Soil samples have also been collected during the installation of monitoring wells, described in the next section. Soil contaminated with tetrachloroethylene (PCE) and its breakdown product trichloroethylene (TCE) above Method A cleanup levels has been found under both former cleaner tenant spaces and south and west of the tenant spaces in paved areas (see Figure 3). The maximum concentrations detected were 240 µg/kg PCE and 38 µg/kg TCE.

GROUNDWATER
Monitoring wells MW-1 through -4 were installed by Terracon in 2009. Terracon also installed MW-5 though -8 between 2009 and 2011. ZipperGeo installed MW-9 and -10 in 2013. Early sampling found groundwater contaminated with PCE above cleanup levels in MW-3, -4, -7, and -8. (see Figure 3)

As part of a 2014 Feasibility Study, ZipperGeo conducted pilot tests of remedial technologies to determine which might effectively treat contaminated groundwater. Dual phase extraction (DPE) showed good results in the pilot study, while injection of treatment solutions for enhanced reductive dechlorination proved difficult at the depths that would be necessary to treat groundwater. Additional details on the selected DPE system are provided in the 2014 Cleanup Action Plan. The DPE system extracts contaminated groundwater and soil vapors simultaneously, and they are treated with granular activated carbon as required by permit conditions to remove PCE before discharge to the sanitary sewer system (groundwater) or the atmosphere (vapors). Based on issues with access for treatment on the Mill Creek Self Storage property and in the right-of-way, the treatment system was designed to address contamination on the Mill Creek Crossing property. Selected locations of DPE wells are indicated on Figure 3.

DPE system startup was in February 2017; following a few months of troubleshooting and addressing mechanical issues, the system has been running continuously since June 2017 other than scheduled maintenance and groundwater sampling events. Groundwater monitoring since system startup has shown decreasing concentrations of PCE in the previously impacted wells. As of the January 2019 sampling, only MW-4 and -8 had PCE above cleanup levels, with a maximum concentration of 12.1 ug/L. (see Figure 4).

VAPOR INTRUSION
The first sampling specifically related to possible vapor intrusion on the Site was conducted in November 2013. This sampling event evaluated conditions in the Money Tree (former cleaners), Prime Cleaners, and Osaka Grill tenant spaces. Two soil vapor samples were collected from beneath each tenant space. There were exceedances of the Method B screening levels for PCE and TCE in these samples. Indoor air samples were also collected in November 2013. One sample was collected in each tenant space, and one ambient outdoor air sample was collected at the same time. At this time, Prime Cleaners was not using a dry cleaning machine that used PCE, but was still using spot cleaners containing PCE and TCE. The spot cleaners were not removed from the building during sampling, and are likely to have contributed to elevated concentrations of PCE and TCE observed in the indoor air sample from the Prime Cleaners tenant space.

An additional indoor and ambient air sampling event was conducted in June 2014. Spot cleaners were removed from the tenant space and the spaces were ventilated before sampling began; spot cleaners were, however, brought back into the building during the sampling event. TCE concentrations were lower than the November sampling event (2.1 ug/m3 vs 280 ug/m3), but still elevated, again possibly due to contributions from the spot cleaners.

Indoor and ambient air have been sampled 3 times since the DPE system began running, in August 2018, January 2019, and April 2019. The Prime Cleaners tenant space was undergoing remodeling during the August

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Worksheet 1: Summary Score Sheet

2018 sampling event, and a new tenant (Fusion India) was functioning in that space by January 2019. No indoor air samples collected in any tenant space during these sampling events has had PCE or TCE above cleanup levels.

ADDITIONAL INFORMATION COLLECTED BY THE SITE HAZARD ASSESSOR

The Assessor visited the Site on December 5, 2019. Conditions generally reflected those described in Site reports. The Plaid Pantry building in the northeast corner of the plaza had been demolished by the time of the visit. Photos from the visit are included below.

Site data was reviewed to evaluate the potential of toxicity following short-term exposures to TCE. Recent sampling events confirm that TCE is not present in indoor air above the action levels specified in Ecology Implementation Memo 22, so further evaluation of short-term TCE risk is not necessary at this time.

SPECIAL CONSIDERATIONS

Checked boxes indicate routes applicable for Washington Ranking Method (WARM) scoring

☐ **Surface Water**

Not scored due to subsurface contamination and distance to nearest surface water.

☑ **Air**

Volatile contaminants present in the subsurface, including soil vapor.

☑ **Groundwater**

Contamination above cleanup levels documented in groundwater.

Although the Site is within the Alderwood Water & Wastewater service area, there are wells within 2 miles of the Site. To conservatively estimate the population still served by wells, Group A or B wells within 2 miles of the Site were identified. All wells were considered for scoring, even those located upgradient of the Site. Only wells that had water sampling data from the last 10 years were included in scoring, as an estimate of the number still in use. This resulted in 3 Group B water systems with a total of 12 connections and 37 people served. Since these wells all serve residential areas, area of irrigation was determined by estimating the yard size in the area around the wells and multiplying that by the maximum 12 connections.

Since soil and soil vapor concentrations have not been measured since the startup of the DPE system, for scoring it was assumed that those media were still contaminated. Groundwater was used to estimate the area of remaining contaminated subsurface media, as it is the only media for which the extent of contamination has been monitored following DPE system startup.

ROUTE SCORES

Surface Water/ Human Health:		Surface Water/ Environment:	
Air/ Human Health:	35.4	Air/ Environment:	1.8
Groundwater/ Human Health:	37.7		

Overall Rank: 4

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REFERENCES

1 Alderwood Water & Wastewater. Accessed 2019. Water service area map. http://awwd.com/Site/Content/Documents/Engineering/AWWDWaterServiceAreaMap.pdf

2 ESRI. Accessed 2019. World Annual Evapotranspiration Map. Accessed through https://www.esri.com/arcgis-blog/products/arcgis-online/mapping/world-average-annual-evapotranspiration-web-map-now-available/

3 Missouri Census Data Center. Accessed 2019. Circular Area Profiles – Version 10C. http://mcdc.missouri.edu/websas/caps10c.html

4 NOAA National Centers for Environmental Information. Accessed 2019. Global Summary of the Year 2000 - 2018 – Everett Snohomish County Airport station. Requested from https://www.ncdc.noaa.gov/cdo-web/

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6 Terracon. August 7, 2009. Limited Site Investigation, Marketplace Retail Center, 18001 Bothell Everett Highway, Bothell, Washington.

7 Terracon. June 29, 2011. Supplemental Limited Site Investigation, Marketplace Retail Center, Bothell, Washington.

8 WA Dept. of Ecology. September 2014. VCP letter Re: Opinion Pursuant to WAC 173-340-515(5) on Remedial Investigation/Feasibility Study and Cleanup Action Plan. Mill Creek Crossing - Prime Cleaners.

9 WA Dept. of Ecology. Accessed 2019. What's in My Neighborhood. https://fortress.wa.gov/ecy/neighborhood/

10 WA Dept. of Health Office of Drinking Water. Accessed 2019. Find Water System. https://fortress.wa.gov/doh/eh/portal/odw/si/FindWaterSystem.aspx

11 ZipperGeo. August 1, 2018. February 2018 Groundwater Monitoring Report - Former Prime Cleaners, 18001 Bothell Everett Highway, Bothell, Snohomish County, Washington.

12 ZipperGeo. February 13, 2019. January 2019 Groundwater Monitoring Report - Former Prime Cleaners, 18001 Bothell Everett Highway, Bothell, Snohomish County, Washington.

13 ZipperGeo. January 28, 2018. Groundwater Monitoring Report - Former Prime Cleaners, 18001 Bothell Everett Highway, Bothell, Snohomish County, Washington.

14 ZipperGeo. June 24, 2014. Cleanup Action Plan, Prime Cleaners.

15 ZipperGeo. June 24, 2014. Remedial Investigation/Feasibility Study and Pilot Study, Prime Cleaners.

16 ZipperGeo. May 9, 2019. April 2019 Groundwater Monitoring Report - Former Prime Cleaners, 18001 Bothell Everett Highway, Bothell, Snohomish County, Washington.

17 ZipperGeo. September 29, 2017. Groundwater Monitoring Report - Former Prime Cleaners, 18001 Bothell Everett Highway, Bothell, Snohomish County, Washington.

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SITE HAZARD ASSESSMENT
Worksheet 2: Route Documentation

SITE NAME: Mill Creek Crossing Prime Cleaners

Cleanup Site ID: 11775

Facility/Site ID: 19816

1. SURFACE WATER ROUTE

List those substances to be considered for scoring:

Not scored.

Explain the basis for choice of substances to be used in scoring:

List those management units to be considered for scoring:

Explain basis for choice of unit to be used in scoring:

2. AIR ROUTE

List those substances to be considered for scoring:

PCE, TCE

Explain the basis for choice of substances to be used in scoring:

Substances have been detected in soil vapor above screening levels.

List those management units to be considered for scoring:

Indoor air, soil vapor, groundwater

Explain basis for choice of unit to be used in scoring:

Indoor air and soil vapor are air media that have been sampled, and groundwater used to estimate area of contamination that may contribute to air contamination.

3. GROUNDWATER ROUTE

List those substances to be considered for scoring:

PCE, TCE

Explain the basis for choice of substances to be used in scoring:

Substances have been detected in soil or groundwater above cleanup levels.

List those management units to be considered for scoring:

Soil, groundwater

Explain basis for choice of unit to be used in scoring:

Groundwater is documented to be contaminated, and contamination in soil overlying groundwater may contribute to observed groundwater conditions.

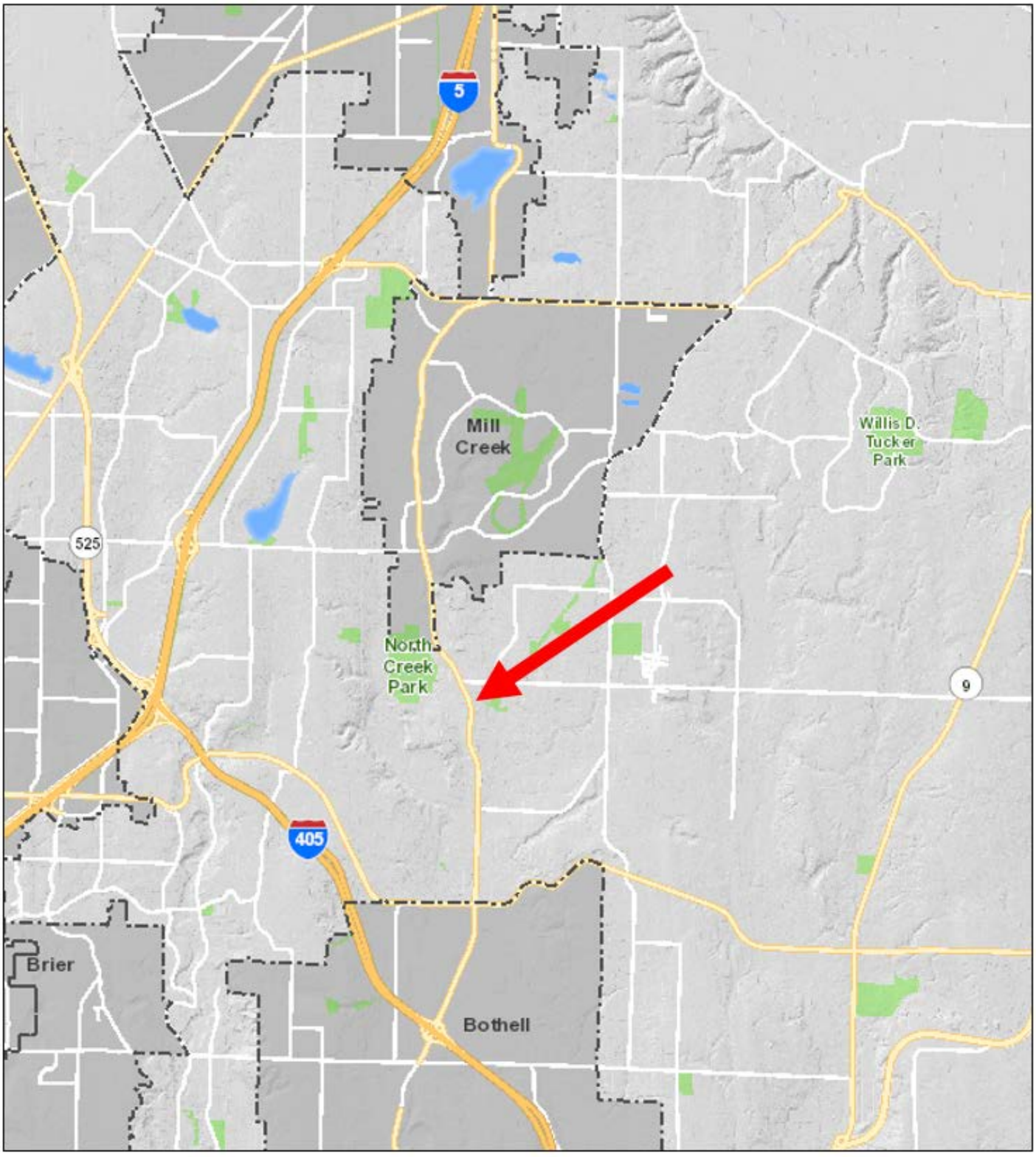

Figure 1. Approximate location of Site. Base map from Snohomish County PDS Map.

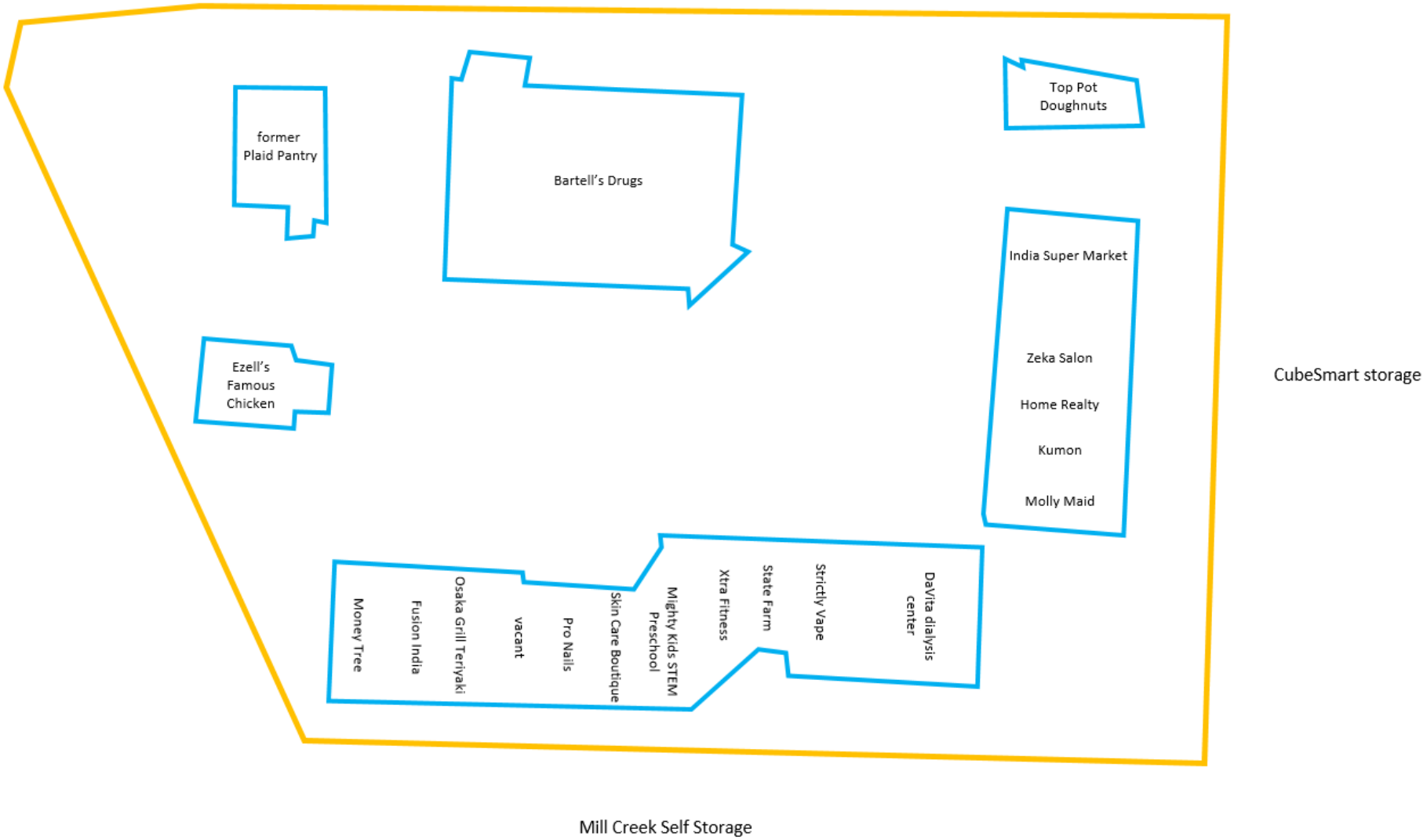

Figure 2. Location of tenants within the Mill Creek Crossing plaza and adjacent retail storage businesses at the time of the Assessor's visit in December 2019. The following figures focus on the southwest corner of the plaza.

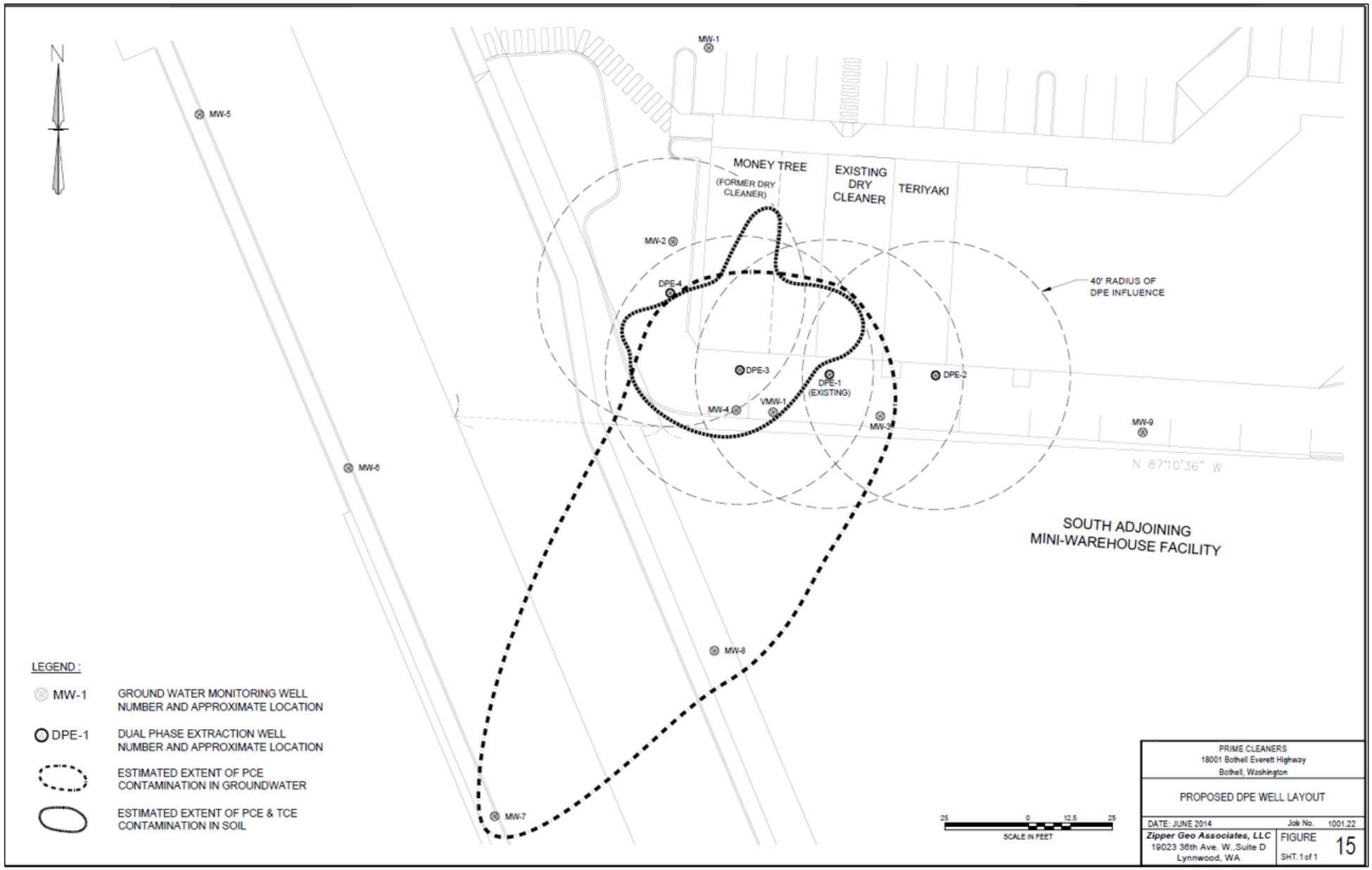

Figure 3. Approximate extent of soil and groundwater contamination with PCE or TCE prior to extraction system startup. Figure from ZipperGeo 2014 RI/FS.

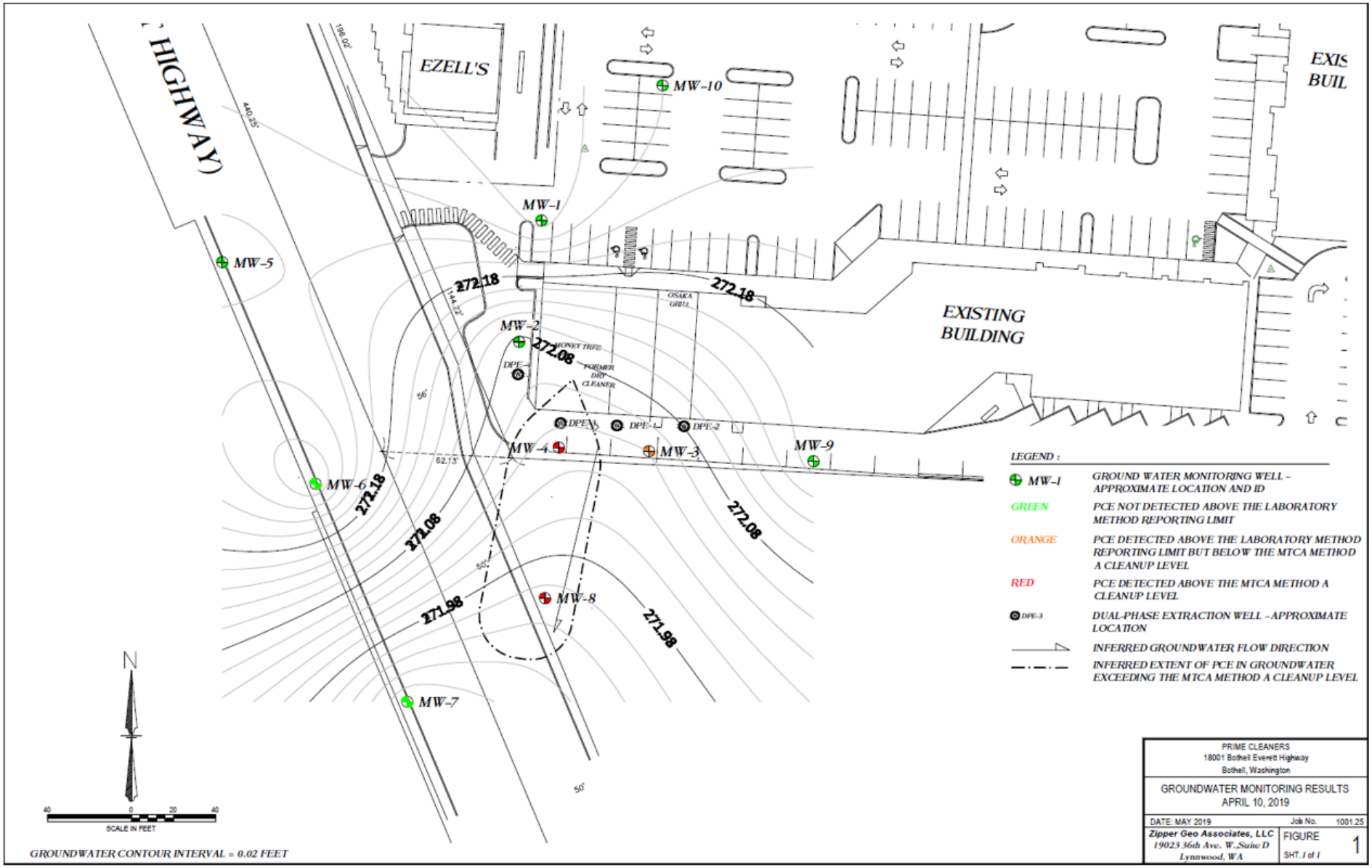

Figure 4. Area of groundwater contamination in the most recent sampling event reported to Ecology, following extraction system startup and operation. Figure from ZipperGeo May 2019 report Re: April 2019 Groundwater Monitoring Report.

Occupants of the end of strip mall where the dry cleaners were historically located. Prime Cleaners was located in the Fusion India space, and another cleaner was located in the Money Tree space. Photo from December 5, 2019 site visit (boxes added later to cover license plates).

Conex box housing DPE system located on the south side of the retail building. MW-4 is visible in the bottom right portion of the photo. Photo from December 5, 2019 site visit.

Former location of Plaid Pantry building in the northwest portion of Mill Creek Crossing plaza. Photo from December 5, 2019 site visit.

Worksheet 4
Surface Water Route

CSID: 11775

Site: Mill Creek Crossing Prime Cleaners

Not scored.

Worksheet 5
Air Route

CSID: 11775

Site: Mill Creek Crossing Prime Cleaners

1.0 SUBSTANCE CHARACTERISTICS

1.1 Introduction

No scoring in Section 1.1.

1.2 Human Toxicity

Substance	Amb. Air Stnd. Value (ug/m^3)	Score	Acute Toxicity Value (mg/m^3)	Score	Chronic Toxicity Value (mg/kg/day)	Score	Carcinogenicity Adj. CPFi (risk/mg/kg-day)	Score
Tetrachloroethylene (PCE)	1.69E-01	10	4.00E+03	5	1.14E-02	5	7.28E-04	3
Trichloroethylene (TCE)	5.00E-01	10	1.56E+04	3	5.71E-04	10	1.44E-02	5

Maximum score: 10

Bonus points: 2

Human Toxicity Score: 12

Source: WARM Toxicity Database

Range: 1-12

1.3 Mobility

Gaseous Mobility

Substance	Vapor Pressure Value (mm Hg)	Score	Henry's Law Value (atm-m3/ mol)	Score
PCE	1.80E+01	4	1.82E-02	4
TCE	5.80E+01	4	1.03E-02	4

Maximum score: 4

Source: WARM Toxicity Database

Particulate Mobility

Soil type:

Erodibility factor:

Climatic factor:

Mobility value:

Mobility Score: 4

Source:

Range: 0-4

1.4 Human Toxicity/Mobility

Source: WARM Scoring Manual

Human Tox/Mobil Score: 24

Range: 1-24

1.5 Environmental Toxicity/Mobility

Substance	Acute Value (mg/m^3)	Score
PCE	4.00E+03	5
TCE	1.56E+04	3
Maximum score	5	

Source: WARM Toxicity Database

Environmental Toxicity Score: 5

Range: 1-10

Environmental Tox/Mobil Score: 10

Range: 1-24

1.6 Substance Quantity

Quantity: 3250 ft^2

Basis: approximate remaining aerial extent of contamination

Source: site reports

Substance Quantity Score: 5

Range: 1-10

2.1 Containment

Description: cover >2' thick; vapor system moves contaminants from subsurface and emits to ambient air without contaminant removal

Basis: site reports

Containment Score: 5

Range: 0-10

SUBSTANCE PARAMETER CALCULATIONS

Human Health Pathway

SUBh (Human Tox/Mobil + 5) x (Containment +1) + Substance Quantity 179.0

Environmental Pathway

SUBe (Environ. Tox/Mobil + 5) x (Containment +1) + Substance Quantity 95.0

3.0 TARGETS

3.1 Nearest Population

Description: commercial buildings on adjacent parcels

Distance (ft): <1000

Source: PDS Map

Nearest Population Score: 10

Range: 0-10

3.2 Nearest Sensitive Environment

Description:	Silver Creek Park		
Distance (ft):	1,200	Nearest Sensitive Environment Score:	6
Source:	PDS Map	Range:	0-7

3.3 Population within One-Half Mile

Number:	2,837	Population within Half Mile Score:	53.3
Source:	MO CDC	Range:	0-75

TARGET PARAMETER CALCULATIONS

Human Health Pathway

TARh: Nearest Population + Population within Half Mile **63.3**

Environmental Pathway

TARe Nearest Sensitive Environment **6.0**

4.0 RELEASE

Evid. of release?	indoor air concentrations below cleanup levels		
Source:	site reports	Release Score (REL):	0.0
		Range:	0 or 5

AIR ROUTE CALCULATIONS

Human Health Pathway

AIRh = (SUBh x 60/329) x {REL + (TARh x 35/85} / 24 **35.4**

Environmental Pathway

AIRe = (SUBe x 60/329) x {REL + (TARe x 35/85} / 24 **1.8**

Range: 0-100

Worksheet 6
Groundwater Route

CSID: 11775

Site: Mill Creek Crossing Prime Cleaners

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human toxicity

	Drink. Wat. Stnd		Acute Toxicity		Chronic Toxicity		Carcinogenicity	
Substance	Value (ug/L)	Score	Value (mg/kg)	Score	Value (mg/kg/day)	Score	Adj. CPFo (risk/mg/kg-day)	Score
PCE	5.00E+00	8	8.00E+02	5	6.00E-03	3	1.68E-03	3
TCE	5.00E+00	8	2.40E+03	3	5.00E-04	5	4.64E-02	5

Maximum score: 8
Bonus points: 2
Human Toxicity Score: 10
Source: WARM Toxicity Database
Range: 1-12

1.2 Mobility

Substance	Solubility Value (mg/L)	Score
PCE	2.00E+02	2
TCE	1.10E+03	3

Maximum value: 3
Mobility Score: 3
Source: WARM Toxicity Database
Range: 1-3

1.3 Substance quantity

Quantity: 2167 yd^3
Basis: aerial extent (see Air Route) x estimated 6 yd depth of aquifer (from RI)
Source: site reports
Substance Quantity Score: 4
Range: 1-10

2.1 Containment

Description: groundwater is contaminated
Source: site reports
Containment Score: 10
Range: 0-10

SUBSTANCE PARAMETER CALCULATION

SUB = (Human Toxicity + Mobility + 3) x (Containment + 1) + Substance Quantity | 180.0

2.0 MIGRATION POTENTIAL

2.2 Net precipitation

Amount (in.):	19	Net Precipitation Score:	2
Source:	NOAA NCEI, ESRI	Range:	0-5

2.3 Subsurface Hydraulic Conductivity

Description:	sand and gravel with varying amounts of silt		
Source:	site reports	Hydraulic Conductivity Score:	3
		Range:	1-4

2.4 Vertical Depth to Aquifer

Depth (ft):	0 - groundwater is contaminated	Depth to Aquifer Score:	8
Source:	site reports	Range:	1-8

MIGRATION PARAMETER CALCULATION

MIG = Depth to Aquifer + Net Precipitation + Hydraulic Conductivity | 13.0

3.0 TARGETS

3.1 Aquifer Usage

Description:	alternate source available with minimum hookup requirements		
Source:	WDOH Find Water System, Alderwood Water service area map	Aquifer Use Score:	4
		Range:	1-10

3.2 Distance to Nearest Drinking Water Well

Distance (ft):	9,240	Well Distance Score:	1
Source:	see Special Considerations above; WDOH Find Water System	Range:	0-5

3.3 Population Served by Drinking Water Wells within Two Miles — Population Served Score: 6.1

No. of people:	37	Range:	0-100
Source:	see Special Considerations above; WDOH Find Water System		

3.4 Area Irrigated by Wells within Two Miles — Area Irrigated Score: 0.1

Area (acres):	0.03	Range:	0-50
Source:	see Special Considerations above; WDOH Find Water System		

TARGET PARAMETER CALCULATION

11.2

TAR = Aquifer Use + Well Distance + Population Served + Area Irrigated

4.0 RELEASE

Evid. of release? contamination documented in groundwater Release Score (REL): 5.0

Source: site reports Range: 0 or 5

GROUND WATER ROUTE CALCULATION

37.7

GW = (SUB x 40/208) x {(MIG x 25/17) + REL + (TAR x 30/165)} / 24

Range: 0-100

Washington Ranking Method
Route Scoring Summary and Ranking Calculation

CSID: **11775**

Site: **Mill Creek Crossing Prime Cleaners**

Human Health Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	35.4	4
Groundwater	37.7	3

Quintile	Value
High (H)	4
Middle (M)	3
Low (L)	

Human Health Pathway Quintiles - based off August 2019 HSL

Quintile	Surface Water		Air		Groundwater	
1	<=	7.8	<=	8.6	<=	24.1
2	7.9	15.1	8.7	16.3	24.2	33.1
3	15.2	21.3	16.4	25.4	33.2	40.3
4	21.4	29.8	25.5	40.1	40.4	49.3
5	>=	29.9	>=	40.2	>=	49.4

$(H^2 + 2M + L) / 8$

Human Health Priority Bin Score: 2.8

Environmental Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	1.8	3

Quintile	Value
High (H)	3
Low (L)	

Environmental Pathway Quintiles - based off August 2019 HSL

Quintile	Surface Water		Air	
1	<=	11.3	<=	1.2
2	11.4	24.1	1.3	1.5
3	24.2	32.0	1.6	13.8
4	32.1	50.0	13.9	26.5
5	>=	50.1	>=	26.6

$(H^2 + 2L) / 7$

Environmental Priority Bin Score: 1.3

FINAL MATRIX RANKING

Human Health Priority	Environmental Priority 5	4	3	2	1	n/a
5	1	1	1	1	1	1
4	1	2	2	2	3	2
3	1	2	3	4	4	3
2	2	3	4	4	5	3
1	2	3	4	5	5	5
n/a	3	4	5	5	5	NFA

n/a - not applicable

NFA - no further action

Site Rank: 4