SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

SITE NAME: Northwest Plating **Rank: 2**

Cleanup Site ID: 1361

Facility/Site ID: 2231

Completed on 8/14/2019 for inclusion on the August 2019 Hazardous Sites List.

LOCATION OF SITE

825 S Dakota St

Seattle, King County, WA 98108

Township 24N, Range 4E, Section 17

Latitude, Longitude: 47.56695, -122.32174

Tax Parcel ID: 7886101290, 7886101280, 7886101315, South Dakota Street right-of-way

SITE DESCRIPTION

Within Currently Defined Site Boundaries

The source of contamination for the Northwest Plating site (Site) is located on tax parcel 7886101290 (Property). The Property includes 0.31 acres zoned for industrial (IG2) use, and is currently occupied by a vacant industrial building. This parcel is located on the corner of South Dakota Street and 9th Avenue South in the Industrial District of Seattle. The Property historically contained a metal electroplating company called Northwest Plating.

Groundwater and vapor contamination have moved off the Property (see Figures 3, 4, and 6), and the Site is currently defined to include the source parcel, the south-adjacent Perine property (parcel 7886101280), the west adjacent A Better Roofing property (parcel 7886101315), and the South Dakota Street right-of-way. Based on proximity to the defined edges of the groundwater plume prior to beginning interim remedial actions in 2016, 6 additional parcels (listed below; also see Figure 2) may also be impacted by contaminated groundwater and/or vapors.

The Site has been enrolled in Ecology's Voluntary Cleanup Program (VCP) since 2013, with a VCP project number of NW2769. It is located within the Duwamish/Diagonal Way source control area, as determined for Ecology's Lower Duwamish Waterway cleanup.

Historical Owners and Operators

From	To	Owner/Operator	Site Uses
		CONFIRMED TO BE WITHIN SITE	
1957	1989	Northwest Plating Company	Metal electroplating, coating, refinishing (parcel 7886101290)
	2019	Washington Industries Inc.	owner of currently vacant Northwest Plating building; last occupant was AV Pro, who used tenant space in western third of building until moving to Perine property in approximately 2012

SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

1957	2019	Perine Property	Commercial space; tenants included winery, beverage distributor, AV Pro, machine shop, warehouse, and emergency response equipment repair; changed owners in early 2019 (parcel 7886101290)
	2019	A Better Roofing Company	office for residential roofing contractor (parcel 7886101315)
		OTHER PARCELS POSSIBLY IMPACTED	
		BNSF	historical railroad right-of-way (parcel 3958900150)
		Trade Marx	commercial (parcel 7886101215 and 7886101216)
		Title Delivery Services	commercial (parcel 7886101256)
		Touratech	commercial (parcel 7886100540)
		ABC Towing	commercial (parcel 7886100575)
		multi-tenant commercial and warehouse building	current occupants include DSquared Hospitality Services, Skyline Pacific Northwest, and Jon-Don (parcel 7886100495)

Area Surrounding the Site

Buildings within and surrounding the Site are used for commercial and industrial purposes. The closest residential area is located across I-5, approximately 750 feet east of the Site. The closest parks are also located across I-5 to the east of the Site. The closest surface water is the Duwamish River, located approximately 6,800 feet west of the Site. Ten additional Ecology cleanup sites are located within 1/4 mile of this Site. Two have received No Further Action determinations, six are designated Cleanup Started, and two are Awaiting Cleanup.

SITE CHARACTERIZATION AND/OR REMEDIATION

References to "cleanup levels" throughout this assessment indicate Method A or B cleanup levels for unrestricted land use unless otherwise indicated. These values are referenced only as established values that Site data may be compared to. Cleanup levels for this Site have not yet been developed.

SITE DISCOVERY AND LIMITED REMEDIAL ACTIVITIES - NORTHWEST PLATING
Contamination was discovered on the Site in 1989, while Northwest Plating was still an operational business. No documented chemical spills occurred at Northwest Plating, so contamination is likely the result of smaller releases over time during normal electroplating and anodizing activities. Commercial activities involved the use of metals for plating and solvents including trichloroethene (TCE) for cleaning metal parts. Initial sampling by GeoEngineers indicated that soil and groundwater on Site were contaminated with volatile organic compounds (VOCs), hexavalent chromium, and cyanide. The chemical present at the highest concentrations in groundwater was TCE. As the business was closing in 1989 and1990, some equipment and tanks were removed from within the building, and observable and accessible contaminated soil under or adjacent to this equipment was removed. A second round of equipment and hazardous waste removal was done in 1993 by AET, but no subsurface investigation was done at that time.

DEPARTMENT OF ECOLOGY
State of Washington

SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

By 2004, AV Pro was occupying the western portion of the former Northwest Plating building. Three indoor air samples were collected in 2004, and one additional sample was collected in 2007, to determine if subsurface VOC contamination was impacting indoor air. Indoor air had elevated concentrations of TCE, 1,1-dichloroethene, and vinyl chloride. The maximum measured concentration of TCE was 360 µg/m3, above the Method B cleanup level of 0.37 µg/m3.

In 2005, Hart Crowser performed additional equipment removal and decontamination on the portion of the building not occupied by AV Pro. Seven soil areas with elevated concentrations of TCE or chromium were identified for removal as part of the remedial actions within the building. Approximately 150 cubic yards of contaminated soil was excavated and removed from these areas.

Possible indoor air impacts of the Northwest Plating contamination on the adjacent Perine building were identified during sampling in 2011 and 2012. Indoor air samples taken within the Perine contained TCE at concentrations up to 1.7 µg/m3. Groundwater under the Perine building was also sampled, and an area of groundwater with elevated concentrations of TCE was identified under the north-central part of the building.

SITE CHARACTERIZATION FOR REMEDIAL INVESTIGATION

Environmental Partners Inc. (EPI) performed extensive site characterization activities between 2013 and 2016. Characterization began with a passive soil gas survey across the entire Property to help determine where VOCs were located. Results from this survey indicated the highest concentrations of VOCs in the southeast section of the Property and that chemicals were likely migrating to the northwest. Subslab soil gas samples were also collected on the Northwest Plating and Perine properties in 2013. Tetrachloroethene (PCE), TCE, and cis-1,2-dichloroethene (cis-DCE) were the most commonly detected VOCs in the subslab samples. The highest concentration of TCE in these samples was 1,200,000 µg/m3.

Between March 2014 and May 2015, direct push soil borings were advanced at both the Property and the Perine property. A total of 40 borings were located at the Property, 30 at Perine, and 1 boring was located in the Airport Way right-of-way west of the Property. Soil was collected from these borings at multiple depths below ground surface (bgs), and groundwater was sampled using temporary well screens. Twenty of these borings were turned into permanent monitoring wells. In March 2015, 4 additional monitoring wells were installed along South Dakota Street using a combination of air knife and vactor truck. An additional 4 soil borings, located near EPI boring B-56, were done on the Perine property in May 2016 by Sound Earth Strategies.

Investigations on Site to this point had identified two aquifers, separated by a silt-rich layer. The shallow aquifer is located approximately 15 to 20 feet bgs and the intermediate aquifer is located approximately 25 to 45 feet bgs. Historical reports suggested that a deeper aquifer may be present on the Site. Five sonic borings were done in November 2015 to attempt to locate this deep aquifer. The maximum boring depth was 90 feet bgs. No groundwater layers were discovered between the intermediate aquifer and 90 feet bgs. One boring was completely backfilled, and the other 4 were developed into monitoring wells in the intermediate aquifer. Measured hydraulic gradients on Site indicate that groundwater flows upward from the intermediate aquifer to the shallow aquifer, possibly limiting migration of contaminants from the shallow aquifer into the intermediate aquifer.

EPI compiled the 278 soil and 361 groundwater samples collected to this point into a Remedial Investigation report in 2016, and submitted it for review and a written opinion in the VCP. Soil samples were primarily analyzed for VOCs and both total and hexavalent chromium. Total chromium analysis includes both the more common form of chromium (trivalent) and the less common but more toxic form of chromium (hexavalent). Chemicals present in at least one soil sample above cleanup levels were PCE, TCE, vinyl chloride, hexavalent chromium, and total chromium. Groundwater samples were primarily analyzed for VOCs, metals, and cyanide. While selected groundwater samples were analyzed for a suite of metals, in most samples metals analysis included only total and hexavalent chromium. Chemicals present in at least one groundwater sample above cleanup levels were PCE, TCE, cis-DCE, vinyl chloride, cadmium, nickel, zinc, hexavalent chromium, total chromium, and cyanide.

For the Remedial Investigation, the area of contaminated soil and groundwater on Site was defined by the extent

SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

of VOC contamination (see figures), primarily TCE. For soil, the area of contamination with the highest concentrations was located in the south-central portion of the Property. This area has been the target of an interim remedial action, described in more detail below. A plume of contaminated groundwater was defined beginning on the Property near the highly contaminated soil area, extending northwest in the direction of groundwater flow, and then extending to the west along South Dakota Street.

INTERIM REMEDIAL ACTION - SVE AND ERD
An interim remedial action began at the Site in 2016. The goal of this interim action was threefold: one, remove TCE and other VOCs from the vadose zone; two, control vapor migration south to the Perine property; and three, decrease VOC mass in groundwater within or near the source zone to decrease the contributions of groundwater to vapor intrusion. The interim action incorporated both soil vapor extraction (SVE) and enhanced reductive dechlorination (ERD).

The interim action system was installed in two phases. Phase 1, which included 6 ERD injection wells, 7 SVE wells, and associated SVE piping, focused on the area with the highest soil concentrations of TCE (the soil "source" zone, see Figure 5). Installation of Phase 1 occurred between June and August 2016, and SVE system startup occurred in May 2017. Phase 2, which included 9 ERD injection wells, 6 SVE wells, and associated SVE piping, was located to the north and west of Phase 1 to address contamination as it migrated away from the source zone. Installation of Phase 2 occurred between July and November 2017, and SVE system startup occurred in December 2017.

The ERD injection protocol included flushing the well with anaerobic water, inoculating with Dehalococcoides and Dehalobacter species of bacteria, and injecting a commercially available electron donor mixture (Newman Zone from RNAS Remediation Products, an emulsified vegetable oil mixture). This protocol was designed to provide the bacterial species that can dechlorinate PCE, TCE, cis-DCE, and vinyl chloride and to stimulate the anaerobic groundwater conditions under which they thrive. Injections occurred in December 2016 and August 2017.

CURRENT SITE CONDITIONS
The interim remedial action has been successful in decreasing VOC concentrations in soil and groundwater near the "source" zone (see Figures 5 and 6). Interim actions have also decreased hexavalent chromium concentrations in groundwater. Groundwater monitoring occurs in a subset of monitoring wells every 3 months. The SVE system is currently in operation, and effluent is sampled monthly for VOCs. Effluent concentrations are used to confirm that emissions do not need to be permitted by the Puget Sound Clean Air Agency and to determine contaminant mass removal rate. The SVE system removed an estimated 167 pounds of VOCs between May 2017 and February 2019.

ADDITIONAL INFORMATION COLLECTED BY THE SITE HAZARD ASSESSOR

The assessor visited the Site on July 29, 2019. Conditions observed were consistent with those described in site reports.

SPECIAL CONSIDERATIONS

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

☐ **Surface Water**

Not scored due to subsurface contamination.

☑ **Air**

Volatile chemicals are present in soil and groundwater.

SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

☑ **Groundwater**

Contaminants have been quantified in groundwater.

The area of contaminated groundwater was used to estimate remaining substance quantity for both the air and groundwater routes. It is acknowledged that this is likely to overestimate the area of air impacts, since the SVE currently in use is controlling vapors over some of the area of contaminated groundwater. Since decreasing the substance quantity score for the air pathway does not impact the overall site rank, the same surface area was used for the air and groundwater pathway to provide consistency between routes.

Multiple factors were considered when determining how to score the Air Route - Containment question. Groundwater contaminated with VOCs in the downgradient area of the plume, outside of the area covered by the SVE system, is present at depths greater than 2 feet bgs. (for example, groundwater depth at SBW-3 is approximately 8 feet bgs) Soil contamination with VOCs at depths of 2 feet or less has been documented under the former Property, within the area addressed by the SVE system. Currently, emissions from the SVE system are not being filtered to capture VOCs prior to emission to outdoor air. While this mitigates vapor intrusion impacts within buildings on the Site, this does not remove contaminants from the more broadly defined Air Route. Therefore, containment was scored per the WARM scoring manual as Spills, Discharges, and Soil Contamination - Vapors - cover < 2 feet thick and no vapor collection system.

ROUTE SCORES

Surface Water/ Human Health:		Surface Water/ Environment:	
Air/ Human Health:	66.7	Air/ Environment:	6.8
Groundwater/ Human Health:	35.5		

Overall Rank: 2

DEPARTMENT OF ECOLOGY
State of Washington

SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

REFERENCES

1 Environmental Partners Inc. (EPI). May 2013. Vapor Intrusion Assessment, Washington Industries Inc. and Perine Properties, 825 Dakota Street and 812/820 Adams Street, Seattle, Washington.

2 EPI. April 2018. Interim Action System As-Built and Startup Report, Former Northwest Plating Site, 825 South Dakota Street and 812 and 820 South Adams Street, Seattle, Washington.

3 EPI. December 2018. Tables, figures, and 2018 soil analytical data.

4 EPI. July 2019. Annual Groundwater Monitoring Report for 2018-2019, Former Northwest Plating Site, 825 South Dakota Street and 812 and 820 South Adams Street, Seattle, Washington.

5 EPI. June 2013. Work Plan for Vapor Intrusion Mitigation System Installation, Washington Industries Inc. and Perine Properties, 825 Dakota Street and 812/820 Adams Street, Seattle, Washington.

6 EPI. June 2016. Remedial Investigation Report, Former Northwest Plating Site, 825 South Dakota Street and 812 and 820 South Adams Street, Seattle, Washington.

7 EPI. June 2018. Annual Groundwater Monitoring Report for 2017-2018, Former Northwest Plating Site, 825 South Dakota Street and 812 and 820 South Adams Street, Seattle, Washington.

8 EPI. May 2017. Annual Groundwater Monitoring Report for 2016-2017, Former Northwest Plating Site, 825 South Dakota Street and 812 and 820 South Adams Street, Seattle, Washington.

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

10 GeoEngineers. June 1990. Report of Phase 2 Environmental Site Assessment, Northwest Plating Company, Seattle, Washington.

11 GeoEngineers. May 1989. Phase I Environmental Site Assessment, Northwest Plating Company, Seattle, Washington.

12 Hart Crowser. October 2012. Historical Site Cleanup Summary, Northwest Plating Site.

13 Herrera. May 1999. Ground Water Quality Investigation, Northwest Plating, Seattle, Washington.

14 King County. Accessed 2019. iMap. https://8 gismaps.kingcounty.gov/iMap/

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

16 NOAA National Centers for Environmental Information. Accessed 2018. Global Summary of the Year 2000 - 2017 – Seattle Sand Point Weather Forecast Office. Requested from https://www.ncdc.noaa.gov/cdo-web/

17 Sound Earth Strategies. January 2011. Phase I Environmental Site Assessment, John Perine Company Property, 820 South Adams Street, Seattle, Washington.

18 Sound Earth Strategies. January 2012. Results from Indoor Ambient Air and Soil Gas Sampling, Perine Property, 812 and 820 South Adams Street in Seattle, Washington.

19 Sound Earth Strategies. July 2011. Air Quality Evaluation, Perine Property, 820 South Adams Street, Seattle, Washington.

20 Sound Earth Strategies. July 2011. Groundwater Quality Evaluation, Perine Property, 820 South Adams Street, Seattle, Washington.

DEPARTMENT OF ECOLOGY
State of Washington

SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

21 Sound Earth Strategies. June 2011. Phase II Subsurface Investigation, Perine Property, 820 South Adams Street, Seattle, Washington.

22 WA Dept. of Ecology. Accessed 2019. Lower Duwamish Waterway Source Control Area Map. https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Cleanup-sites/Toxic-cleanup-sites/Lower-Duwamish-Waterway/Source-control-area-map

23 WA Dept. of Ecology. Accessed 2019. Well Report Viewer. https://fortress.wa.gov/ecy/waterresources/map/WCLSWebMap/default.aspx

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

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

DEPARTMENT OF ECOLOGY
State of Washington

SITE HAZARD ASSESSMENT
Worksheet 2: Route Documentation

SITE NAME: Northwest Plating

Cleanup Site ID: 1361

Facility/Site ID: 2231

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:

TCE, vinyl chloride

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

Volatile chemicals documented to remain in groundwater at elevated concentrations in 2018-2019 sampling.

List those management units to be considered for scoring:

Air, soil, groundwater

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

Chemicals detected in all matrices; groundwater used to estimate amount of contamination remaining.

3. GROUNDWATER ROUTE

List those substances to be considered for scoring:

TCE, vinyl chloride, hexavalent chromium, cyanide

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

Substances documented to be present in groundwater. This is not a complete list of groundwater contaminants, but the ones for which there is the most data available. Addition of additional contaminants would not change scoring.

List those management units to be considered for scoring:

Groundwater

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

Groundwater is documented to be contaminated on Site.

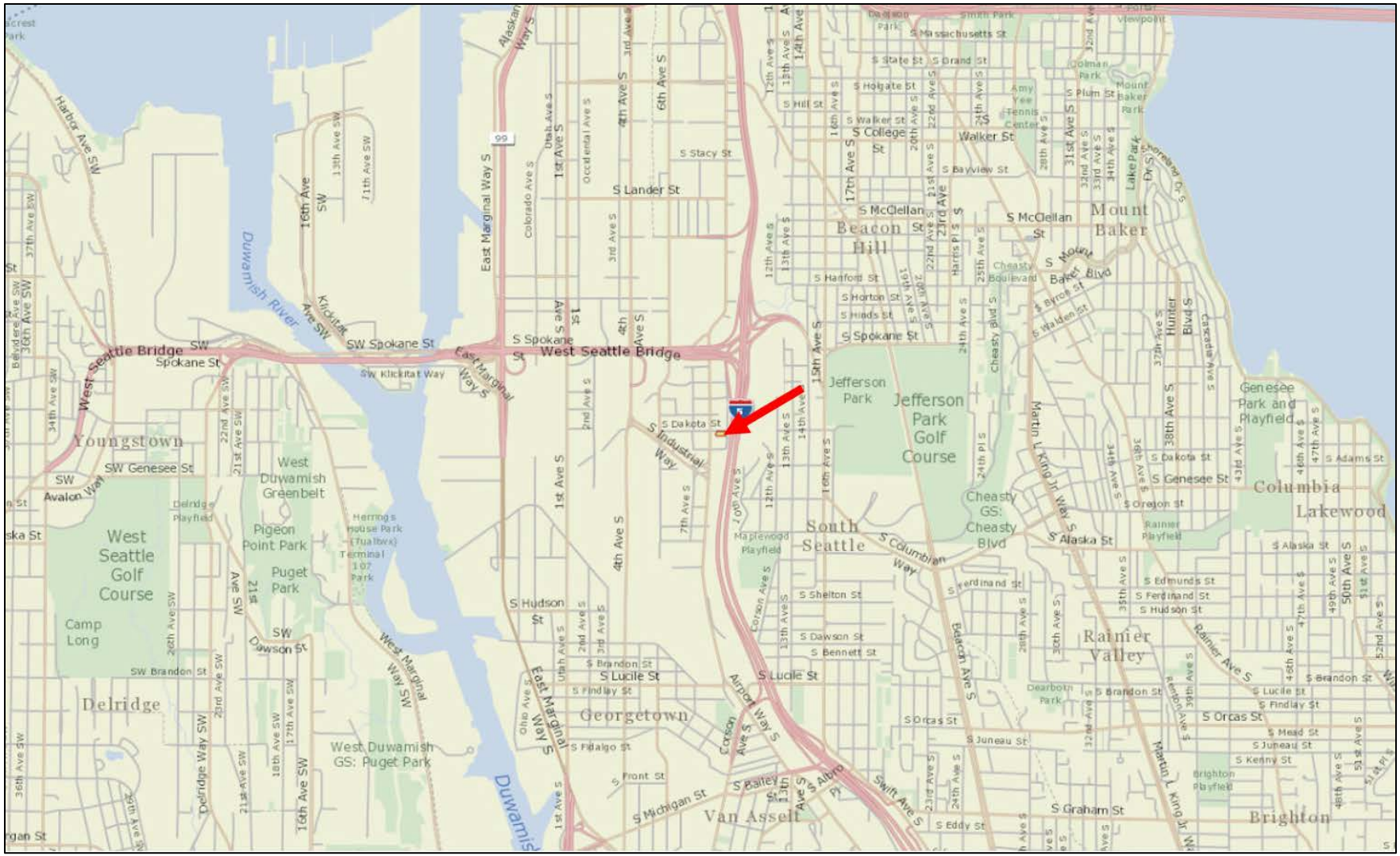


Figure 1. General location of Site. Base figure from King County Parcel Viewer.

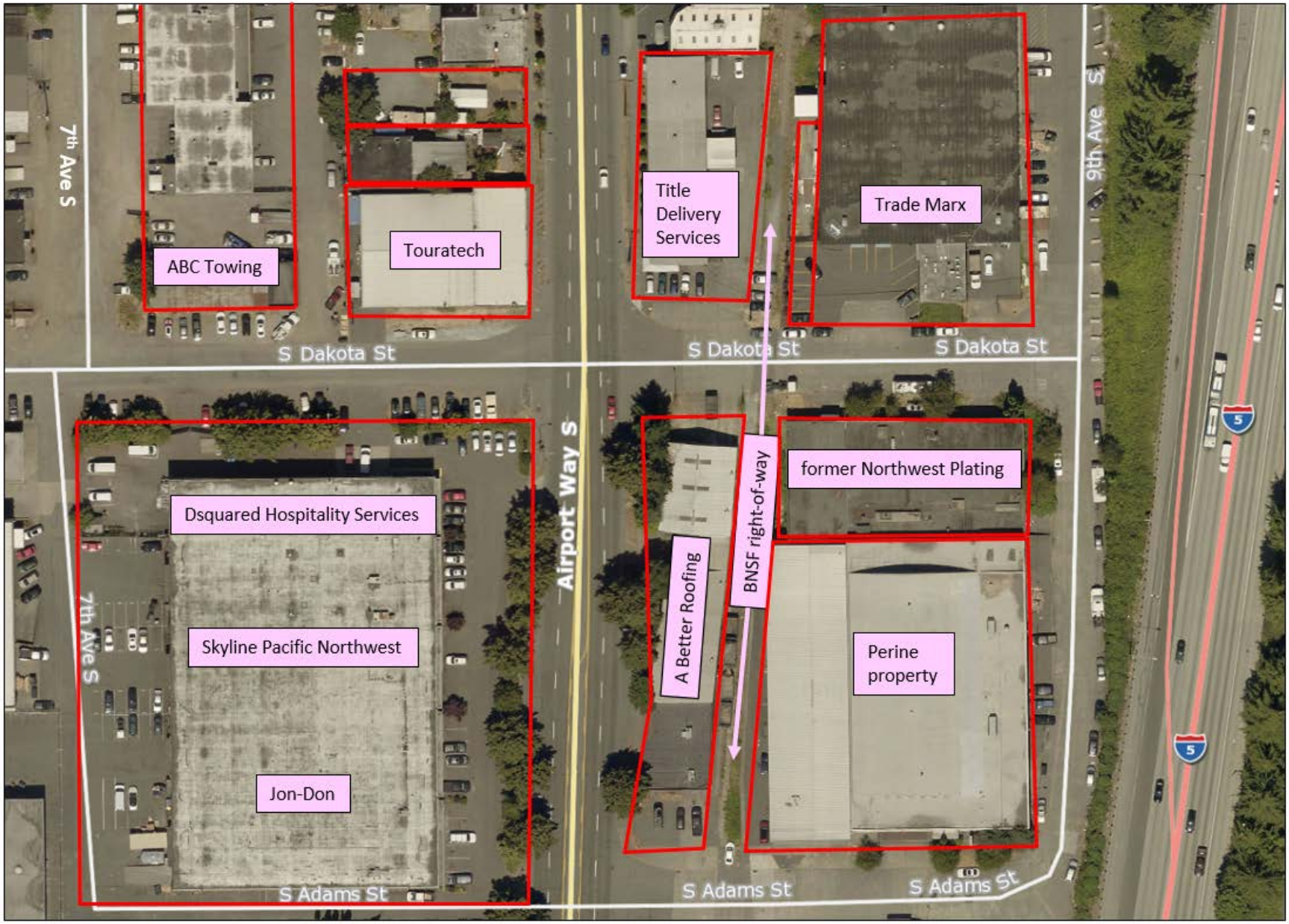


Figure 2. Site area with building occupants. Approximate parcel boundaries are indicated in red. Base figure is 2017 aerial from King County iMap.

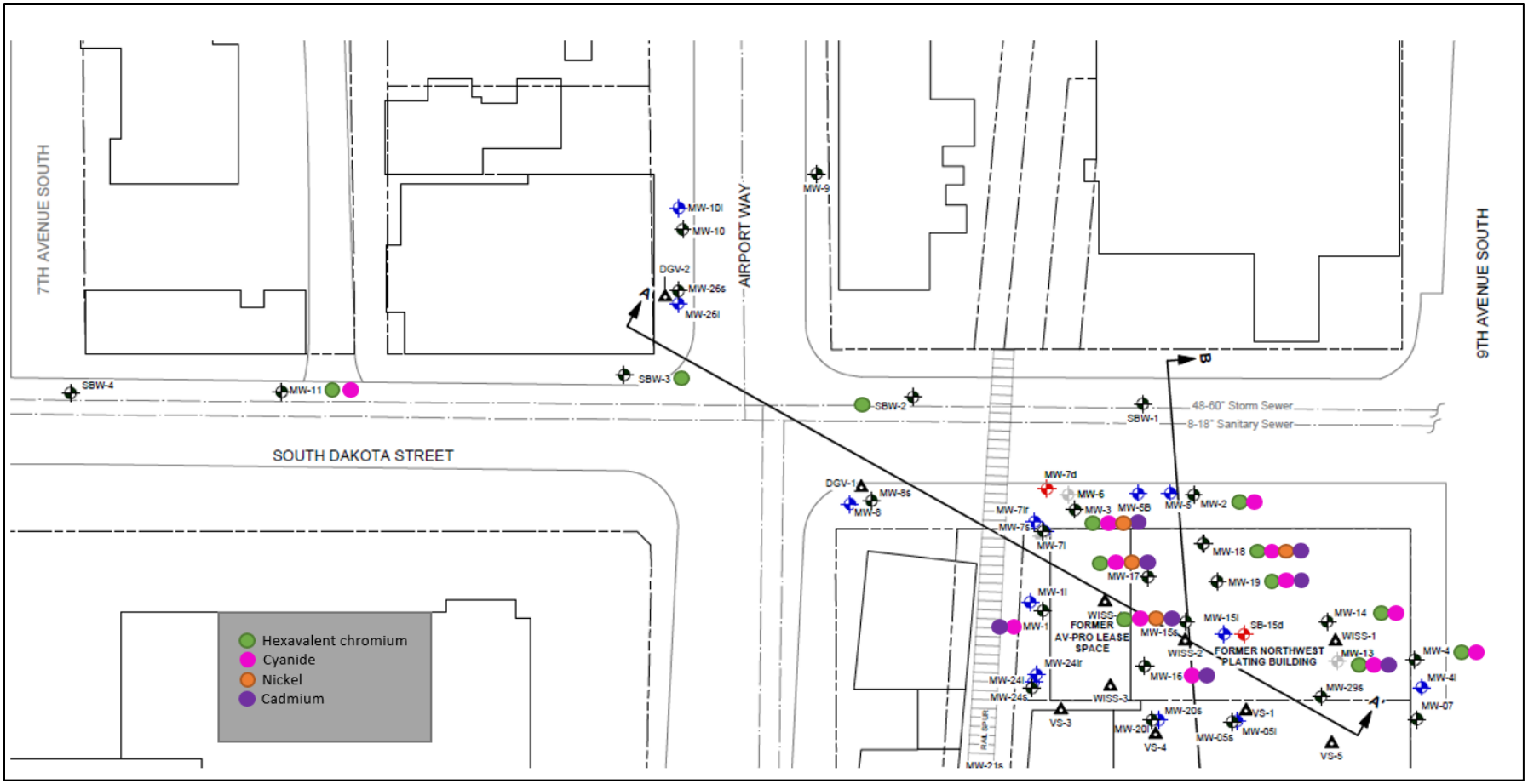


Figure 3. Areas of groundwater contaminated with metals above cleanup levels, in any samples collected prior to the 2016 Remedial Investigation report. While chromium has continued to be monitored regularly in groundwater samples and concentrations of hexavalent chromium have been decreasing, other metals have not been consistently included in analyses since the Remedial Investigation report. Base figure from 2016 EPI Remedial Investigation Report.

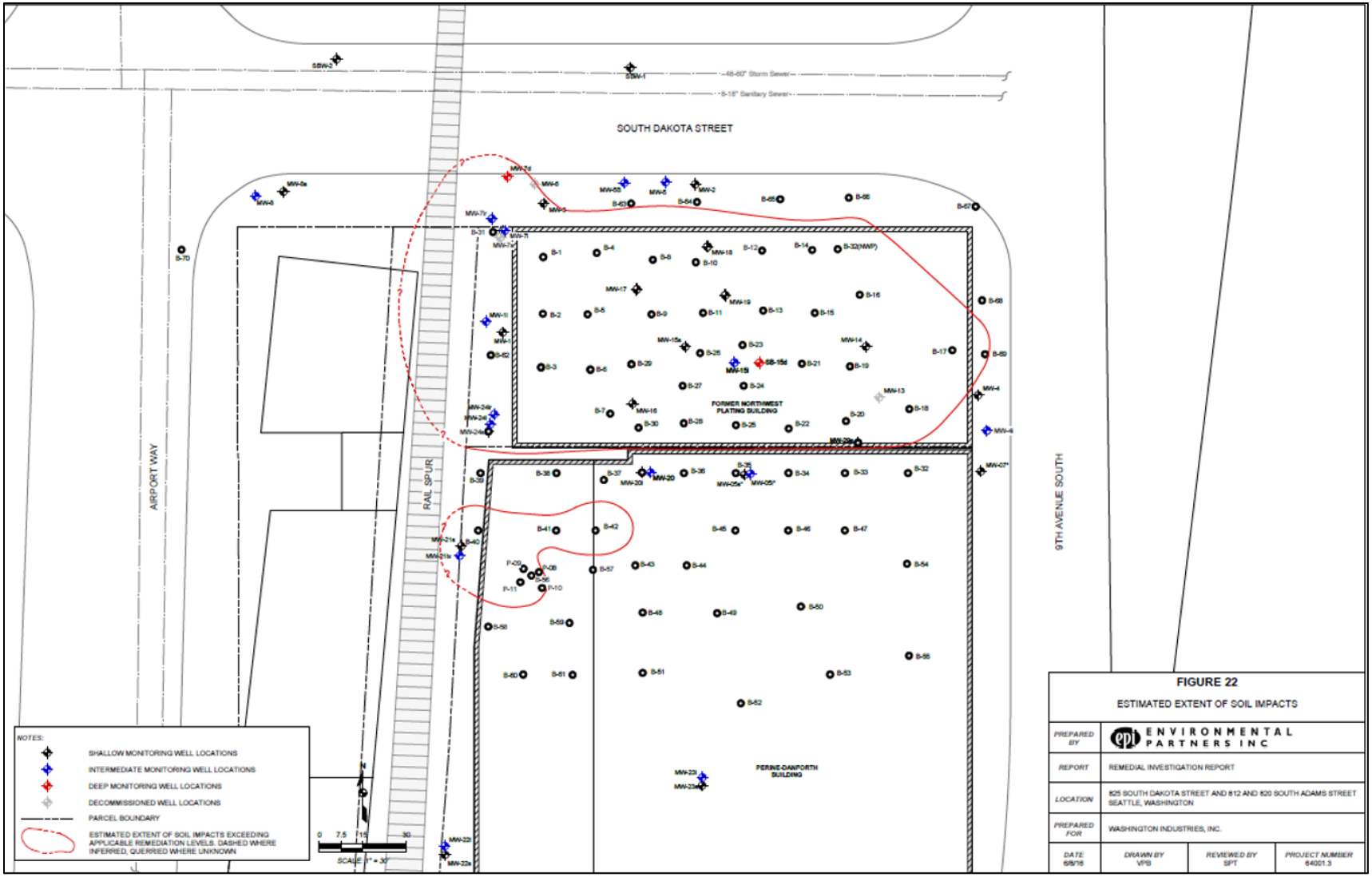
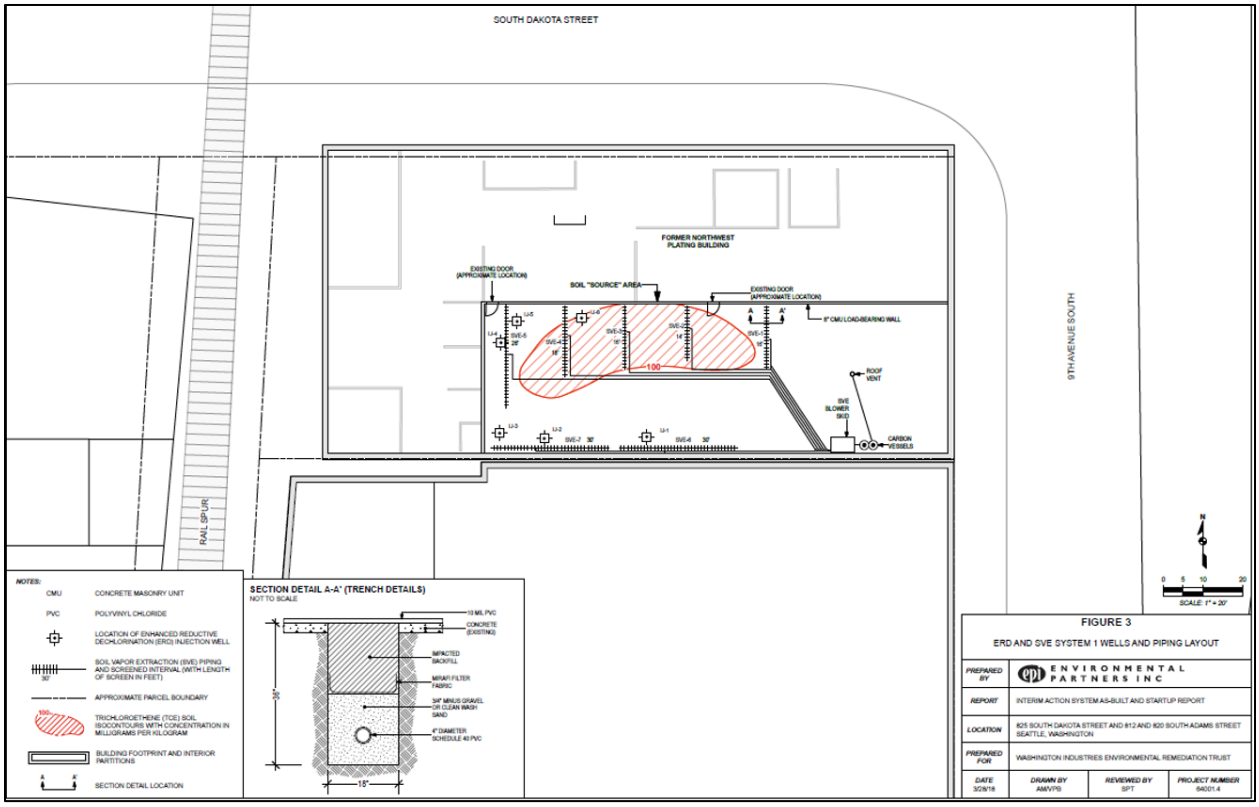


Figure 4. Area of chlorinated solvent contaminated soil at the time of the Remedial Investigation report (2016).



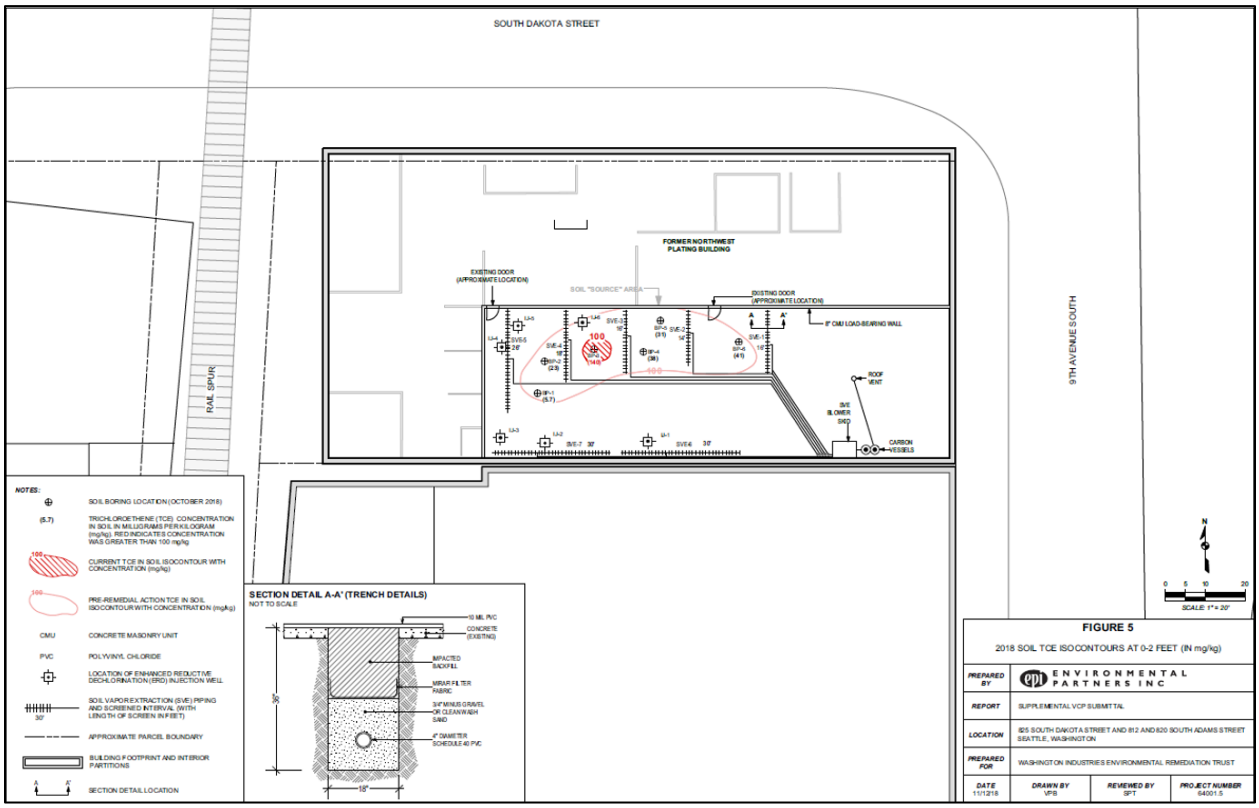


Figure 5. Area of highest soil concentration of chlorinated solvents ("source" zone) before beginning interim remedial actions (top) and in October 2018 (bottom), after the SVE system had been in use for approximately 16 months.

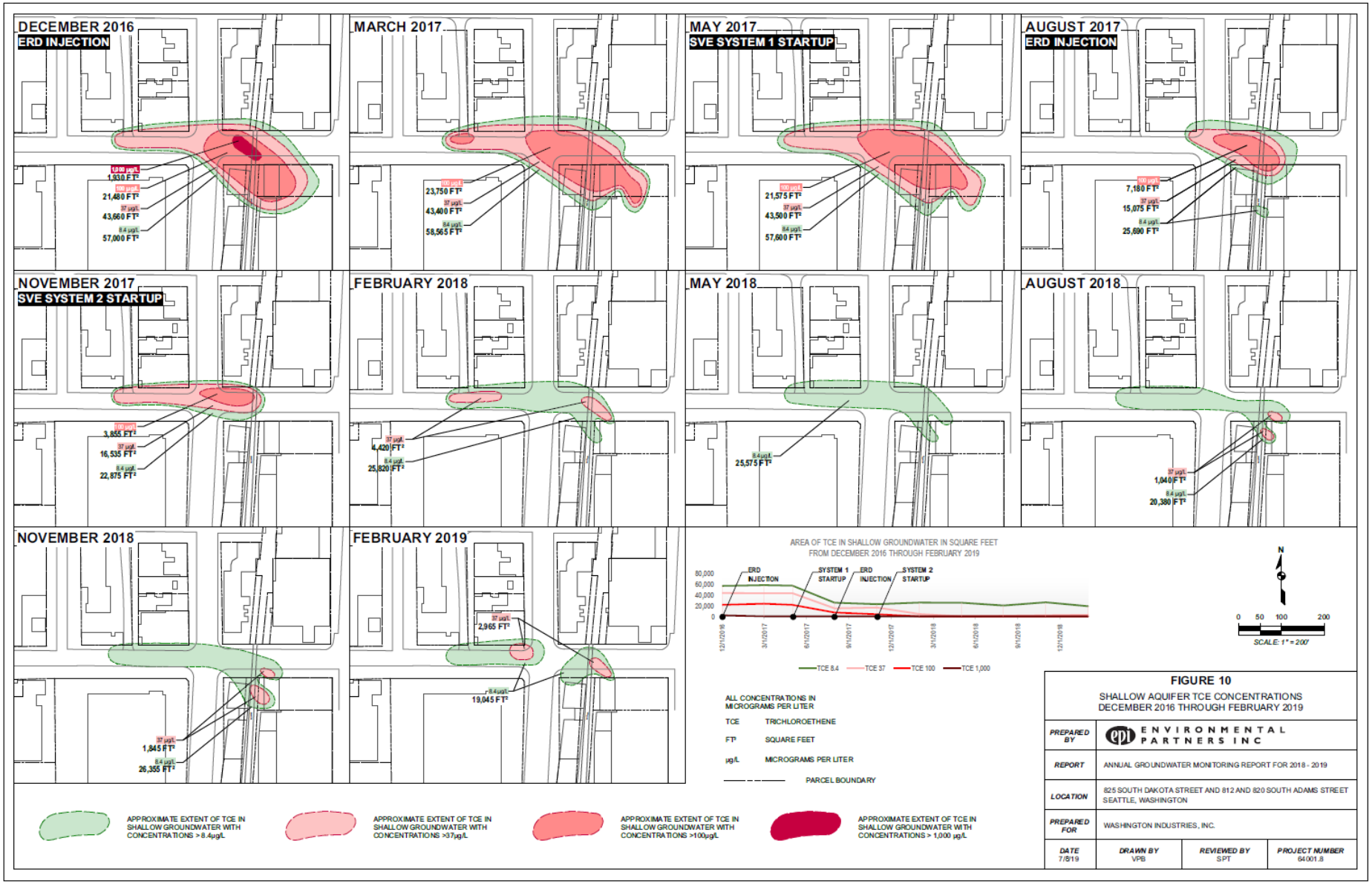


Figure 6. Area of groundwater contamination with chlorinated solvents prior to beginning of interim remedial actions (December 2016) and as determined from results of quarterly monitoring events since that time.

Figure 7. Photo taken during 7/29/19 site visit. East end of the north side of the former Northwest Plating building.

Worksheet 4
Surface Water Route

CSID: 1361

Site: Northwest Plating

Not scored.

Worksheet 5
Air Route

CSID: 1361

Site: Northwest Plating

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
Trichlorothene (TCE)	5.00E-01	10	1.56E+04	3	5.71E-04	10	1.44E-02	5
Vinyl chloride	1.28E-02	10	4.60E+05	1	2.86E-02	5	3.10E-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
Trichlorothene (TCE)	5.80E+01	4		
Vinyl chloride	2.70E+03	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
Trichlorothene (TCE)	1.56E+04	3
Vinyl chloride	4.60E+05	1
Maximum score	3	

Source: WARM Toxicity Database

Environmental Toxicity Score: 3

Range: 1-10

Environmental Tox/Mobil Score: 6

Range: 1-24

1.6 Substance Quantity

Quantity: 19,045 ft^2

Basis: area of contaminated groundwater from January 2019 sampling; see Special Considerations

Source: site reports

Substance Quantity Score: 6

Range: 1-10

2.1 Containment

Description: see Special Considerations

Basis: site reports

Containment Score: 10

Range: 0-10

SUBSTANCE PARAMETER CALCULATIONS

Human Health Pathway

SUBh (Human Tox/Mobil + 5) x (Containment +1) + Substance Quantity: 325.0

Environmental Pathway

SUBe (Environ. Tox/Mobil + 5) x (Containment +1) + Substance Quantity: 127.0

3.0 TARGETS

3.1 Nearest Population

Description: A Better Roofing (business to the west)

Distance (ft): < 100

Source: iMap

Nearest Population Score: 10

Range: 0-10

3.2 Nearest Sensitive Environment

Description:	Jefferson Park		
Distance (ft):	2,200	Nearest Sensitive Environment Score:	5
Source:	iMap	Range:	0-7

3.3 Population within One-Half Mile

Number:	1,892	Population within Half Mile Score:	43.5
Source:	MO CDC	Range:	0-75

TARGET PARAMETER CALCULATIONS

Human Health Pathway

TARh: Nearest Population + Population within Half Mile | 53.5

Environmental Pathway

TARe Nearest Sensitive Environment | 5.0

4.0 RELEASE

Evid. of release?	detected in soil vapor and indoor air samples		
Source:	site reports	Release Score (REL):	5.0
		Range:	0 or 5

AIR ROUTE CALCULATIONS

Human Health Pathway

AIRh = (SUBh x 60/329) x {REL + (TARh x 35/85} / 24 | 66.7

Environmental Pathway

AIRe = (SUBe x 60/329) x {REL + (TARe x 35/85} / 24 | 6.8

Range: 0-100

Worksheet 6
Groundwater Route

CSID: 1361

Site: Northwest Plating

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
Trichlorothene (TCE)	5.00E+00	8	2.40E+03	3	5.00E-04	5	4.64E-02	5
Vinyl chloride	2.00E+00	8	5.00E+02	5	3.00E-03	3	1.50E+00	7
Chromium VI	1.00E+02	6	--	X	3.00E-03	3	--	X
Cyanide	2.00E+02	4	--	X	6.30E-04	5	--	X

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
Trichlorothene (TCE)	1.10E+03	3
Vinyl chloride	2.76E+03	3
Chromium VI	K < 0.1	1
Cyanide	--	X

Maximum value: 3 Mobility Score: 3

Source: WARM Toxicity Database Range: 1-3

1.3 Substance quantity

Quantity: 6348 yd^3

Basis: area of GW contamination from January 2019 sampling x 3 yd depth of shallow aquifer

Source: site reports Substance Quantity Score: 5

Range: 1-10

2.1 Containment

Description: contamination has reached groundwater

Source: site reports Containment Score: 10

Range: 0-10

SUBSTANCE PARAMETER CALCULATION

SUB = (Human Toxicity + Mobility + 3) x (Containment + 1) + Substance Quantity **181.0**

2.0 MIGRATION POTENTIAL

2.2 Net precipitation

Amount (in.):	18.5	Net Precipitation Score:	2
Source:	NOAA NCEI, ESRI	Range:	0-5

2.3 Subsurface Hydraulic Conductivity

Description:	sand and silt		
Source:	site reports	Hydraulic Conductivity Score:	3
		Range:	1-4

2.4 Vertical Depth to Aquifer

Depth (ft):	contamination has reached groundwater	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:	not used, but usable (a demonstration of non-potability has not been completed, though usage is unlikely)		
Source:	iMap, WDOH Water System Database	Aquifer Use Score:	2
		Range:	1-10

3.2 Distance to Nearest Drinking Water Well

Distance (ft):	>2 miles	Well Distance Score:	0
Source:	iMap, WDOH Water System Database	Range:	0-5

3.3 Population Served by Drinking Water Wells within Two Miles — Population Served Score: 0.0

No. of people:	0	Range:	0-100
Source:	WDOH Water System Database, Well Log Viewer		

3.4 Area Irrigated by Wells within Two Miles — Area Irrigated Score: 0.0

Area (acres):	0	Range:	0-50
Source:	Water Resources Explorer		

TARGET PARAMETER CALCULATION

2.0

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

4.0 RELEASE

Evid. of release? contaminants detected in groundwater Release Score (REL): 5.0

Source: site reports Range: 0 or 5

GROUND WATER ROUTE CALCULATION

35.5

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: **1361**

Site: **Northwest Plating**

Human Health Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	66.7	5
Groundwater	35.5	3

Quintile	Value
High (H)	5
Middle (M)	3
Low (L)	

Human Health Pathway Quintiles - based off August 2018 HSL

Quintile	Surface Water		Air		Groundwater	
1	<=	7.9	<=	8.6	<=	24.1
2	8.0	15.1	8.7	16.3	24.2	33.1
3	15.2	21.2	16.4	25.3	33.2	40.4
4	21.3	29.7	25.4	40.1	40.5	49.6
5	>=	29.8	>=	40.2	>=	49.7

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

Human Health Priority Bin Score: 3.9

Environmental Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	6.8	3

Quintile	Value
High (H)	3
Low (L)	

Environmental Pathway Quintiles - based off August 2018 HSL

Quintile	Surface Water		Air	
1	<=	11.3	<=	1.2
2	11.4	24.1	1.3	1.5
3	24.2	31.6	1.6	13.8
4	31.7	49.7	13.9	26.5
5	>=	49.8	>=	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: 2