State of Oregon
Department of Environmental Quality Memorandum

Date: December 22, 2025

To: FILE

Through: Peter Donahower, Manager, Petroleum Cleanup Section

From: Kenneth Thiessen, Hydrogeologist, Northwest Region Cleanup Section

Subject: **Staff Memorandum in support of a recommended partial No Further Action determination.**
Former Campbell Dry Cleaner building, 817-819 North Russell Street Portland, Oregon.
ECSI #5680

This document presents the basis for the Oregon Department of Environmental Quality's (DEQ) recommended partial No Further Action (NFA) determination for the Former Campbell Dry Cleaner building, in Portland. The multiple cleanup tasks performed in response to site characterization and risk evaluation constitute a protective final remedy acceptable to DEQ and are the basis for this partial NFA recommendation. The multiple cleanup tasks, especially the building crawlspace mechanical ventilation system, have been demonstrated to effectively mitigate vapor intrusion into the building from contaminated site soils exposed in the crawl space. This No Further Action recommendation is partial because it pertains only to the subject property, not the adjacent potentially affected property.

The building crawlspace mechanical ventilation system operated for 10 years (2015 to 2025) as a method to remove solvent vapor from beneath the occupied building. Confirmation indoor air sampling performed in February 2025 demonstrated that the mechanical ventilation system is no longer necessary to maintain acceptable indoor air quality for building occupants.

This proposed partial NFA determination meets the requirements of Oregon Administrative Rules Chapter 340, Division 122, Sections 010 to 0140 and Oregon Revised Statutes 465.200 through 465.455.

This recommended partial NFA proposal is based on information documented in the administrative record for this site. The administrative record is presented at the end of this memorandum.

1. BACKGROUND

Site location
- Address: 817-819 North Russell Street, Portland, Oregon 97227
- Township 1 North, Range 1 East, Section 27BD
- Site Description and Tax lots: Proebstels Add, Block 8, Inc Strip S of & adj W 25' of Lot 9&10

Site setting
- Site size: 0.092 acre
- Structure footprint: 35x63 feet = 2200 square feet
- Total property size 35x114 feet = 3990 square feet

- The site contains a building built in 1905 with ground-floor commercial space and a second floor residence. The property includes a back yard on the north side of the building.

- Land use zoning: Central Employment (EX). This zoning designation allows mixed uses and is intended for areas in the center of the city with predominantly industrial development. Residential uses are allowed but are not intended to predominate or set development standards in the area.

Physical setting
The site elevation is about 95 feet above mean sea level with the ground surface sloping to the west. The nearest surface water body is the Willamette River approximately 1,700 feet to the southwest.

Groundwater was encountered at greater than 50 feet below the ground surface (bgs) during site investigations, which is presumed to represent the water table aquifer. Based on local topography, and investigations at nearby properties (e.g., Tarr Inc., ECSI #1139), groundwater flows to the southwest, toward the Willamette River.

Geology
The site is underlain by sandy silt to a depth of approximately 18 feet bgs. The sandy silt is underlain by fine sand with intermittent silt layers encountered to depths of 55 to 75 feet bgs. Underlying these fine-grained units are alluvial sands and gravels of the Troutdale Formation that are unconsolidated to loosely cemented. The Troutdale Formation is underlain by Columbia River Basalt bedrock at a depth of approximately 200 feet bgs.

Site history
The single building on the subject property was built in 1905 and has a history of commercial and residential uses. A dry-cleaning business operated on the property from 1952 to 1995, when the property was purchased by the current owner. Since 1995, the building has been renovated with a ground floor commercial space and a second-floor residence.

2. BENEFICIAL LAND AND WATER USE DETERMINATIONS

Land use
The site and adjacent properties are primarily used for industrial and commercial purposes, with limited residential use allowed per zoning rules.

Groundwater use
A groundwater utilization survey was not performed for this project. DEQ performed a brief review of well logs from the quarter section including the subject property using the Oregon Department of Water Resources website. The six well logs found indicated that the wells were less than 20 feet deep, typical of monitoring wells. The area of the subject property is supplied with municipal water. DEQ can conclude that use of groundwater for potable use is unlikely in the vicinity of the subject property. Unconfined groundwater in the vicinity of the subject property discharges to the Willamette River west of the site, the river being a regional groundwater discharge boundary.

Surface water use
The Willamette River is located approximately 1,700 feet southwest of the site and is the only surface water body identified in the area. The Willamette supports anadromous and resident fish populations and invertebrate fauna. River uses include transportation, fishing and water sports.

3. INVESTIGATION AND CLEANUP WORK

The primary purpose of investigation and cleanup work on this project was to produce a safe indoor air environment for occupants of the subject property at 817 & 819 North Russell Street. With this focus, off-site data are limited and were collected to support investigation of the subject property. Off-site data were collected prior to DEQ's involvement with the project in 2015. DEQ was denied access to the unoccupied property west of the subject property for further investigation.

The site investigation data set is presented in Tables 1 through 4. Sample collection points and their designations are illustrated in Figure 3. Referenced figures and tables are included as attachments at the end of this memorandum. All site investigation borings were temporary installations to collect soil, soil gas and/or groundwater samples. No monitoring wells are present at the subject property. Project samples were analyzed for chlorinated and other volatile organic compounds (VOCs) by EPA Method 8260B, TO-15 and TO-15 SIM.

Site investigations conducted between 2008 and 2014 identified tetrachloroethene (PCE) and trichloroethene (TCE) in soil, groundwater, soil vapor, and indoor ambient air. Analytical data from the site were compared to DEQ's human health risk-based concentrations (RBC) for potentially complete exposure pathways to site receptors (DEQ 2023). Risk screening identified concentrations of PCE in indoor air exceeding DEQ's inhalation RBC for urban residential and occupational receptors. PCE in soil and soil gas also exceeded the RBC for urban residential receptors via the vapor intrusion pathway.

Cleanup Actions
DEQ oversaw the following cleanup actions at the former Campbell Dry Cleaner site in June 2015:

- Removal sections of flooring in commercial space to access crawl space.
- Removal of 3 cubic yards of source area contaminated soil from the confined space beneath former dry-cleaning machine with disposal at hazardous material landfill.
- Collection of confirmation soil samples from bottom of source area excavation. Sample data indicate that remaining soils meet occupational RBC for PCE. TCE was not detected. One of the four confirmation samples exceeded the urban residential RBC for PCE. Confirmation soil sample data are included at the top of attached Table 1, labeled "Hart Crowser IRAM Implementation" Sampling date: 1 June 2015.
- Backfill source area excavation with controlled density fill to further limit vapor migration and to maintain structural soil consistency to the building foundation.
- Sealing of concrete foundation beneath former dry-cleaning machine to minimize release of solvents to building air.
- Sealing of gaps and weatherization of structure to minimize air transfer between the crawlspace and first and second floors of the building.
- Improved seal on the crawl space access hatch to minimize air transfer between the crawlspace and first and second floors of the building.
- Sealing of crawlspace soils from building using plastic sheeting positioned above ventilation piping. Sealing of plastic at margins and penetrations.
- Installation of a network of ventilation pipes in crawl space above residual contaminated soils.
- Installation of ventilation fan to maintain negative pressure in crawl space using ventilation pipe network, with exhaust discharged above the peak of building.

Nature and extent of contamination
Site Vicinity Map, Figure 2 illustrates the location of the subject property and the nearby Tarr Chemical facility and two additional dry-cleaning facilities. The Tarr Chemical facility is located at 2429 N Borthwick Ave., 200 feet southeast of the subject property.

Releases at the Tarr Chemical facility (ECSI #1139) have resulted in an extensive solvent plume (PCE and TCE) in groundwater that extends 1700 feet to the southwest as far as the Willamette River (Figures 21 and 22). All four facilities illustrated on Figure 2 used dry cleaning solvents and may have contributed contamination to area soil, soil gas, and groundwater.

At the Campbell site, groundwater was encountered at 56 and 52 feet bgs in deep soil borings DP-5 and DP-7, drilled to 60 feet below ground surface (Figure 3). DP-5 was completed cross-gradient of the site in North Russell Street, while DP-7 was completed immediately west of the Campbell Cleaners contaminant source area on the neighboring property. Groundwater samples were collected from each boring with duplicate samples collected from DP-7. PCE at 260 ug/L, TCE at 14 ug/L, chloroform, and various other VOCs were detected in groundwater, although below any applicable RBC for the site (Table 2).

At the Campbell site, the estimated horizontal extent of site-related contamination in soil and soil gas is illustrated in Figure 3 and extends approximately 30 feet downgradient, west of the subject property. The vertical extent of contamination is estimated by DEQ to extend 20 to 25 feet bgs based on analytical data from discrete-depth soil samples. Groundwater is first encountered greater than 50 feet bgs beneath the site. Based on these data (Table 1, GeoDesign data, 2014) Campbell Dry Cleaner releases are not expected to be the source of PCE and TCE contamination in groundwater beneath the subject site.

The Locality of Facility (LOF) for soil and soil gas contamination is also illustrated by Hart Crowser on Figure 3. Available subsurface soil data are limited to the subject property and a portion of the adjoining property to the west and the sidewalk to the south. Attached to this report are municipal utility maps illustrating sewer assets and water pipes in the vicinity of the site (Appendix A). The LOF depicted in Figure 3 is based on detections of PCE and TCE in soil and soil gas which may pose an unacceptable risk to neighboring occupational receptors via the vapor intrusion pathway. Under current policy, DEQ considers the LOF as the extent of contamination that could result in unacceptable risk using relevant exposure pathways. The area of site-related contamination that exceeds relevant screening values does not extend a significant distance off-site, perhaps 30 feet and appears to be the result of diffusion of dry-cleaning solvents in soil.

It should be noted that the entire Campbell site is within the Locality of Facility for the Tarr Inc., LLC site (ECSI #1139).

4. RISK EVALUATION

Conceptual site model
Evaluation of human exposure to residual chemical contamination requires an assessment of the type and extent of that exposure. This evaluation is based on current and reasonably likely future site use. DEQ publishes risk-based concentrations (RBCs) for contaminants encountered in different types of exposure scenarios. These RBCs are conservative estimates of protective levels of contaminants in

soil, groundwater and air. Table 1 below shows potential exposure pathways and receptors for this site. Based on this, applicable RBCs are identified and used for risk screening.

CONCEPTUAL SITE MODEL

Table 1. Identification of applicable RBCs, based on pertinent pathways and receptors

Pathway	Receptor	Applicable RBC?	Basis for selection/exclusion
SOIL			
Ingestion, dermal contact, and inhalation	Residential	No	Exposure pathway is incomplete with active engineering controls. See Note 1.
	Urban residential	Yes	
	Occupational	Yes	
	Construction worker	Yes	
	Excavation worker	Yes	
Volatilization to outdoor air	Residential	No	Exposure pathway is incomplete or below applicable RBC. See Note 1.
	Urban residential	Yes	
	Occupational	Yes	
Vapor intrusion into buildings	Residential	No	Exposure pathway complete. See Note 1.
	Urban residential	Yes	
	Occupational	Yes	
Leaching to groundwater	Residential	No	Exposure pathway is incomplete. See Note 2.
	Urban residential	No	
	Occupational	No	
GROUNDWATER			
Ingestion and inhalation from tap water	Residential	No	See Note 2.
	Urban residential	No	
	Occupational	No	
Volatilization to outdoor air	Residential	No	See Note 2.
	Urban residential	No	
	Occupational	No	
Vapor intrusion into buildings	Residential	No	See Note 2.
	Urban residential	No	
	Occupational	No	
Groundwater in excavation	Construction and excavation worker	No	See Note 2.
SOIL GAS			
Vapor intrusion into buildings	Residential	No	
	Urban residential	Yes	See Note 1.
	Occupational	Yes	See Note 1.
AIR			
Inhalation	Residential	No	
	Urban residential	Yes	See Note 1.
	Occupational	Yes	See Note 1.

Notes:

1. The former dry cleaner site is currently a first floor commercial space with residential housing above. The residential exposure is consistent with DEQ's urban residential exposure scenario. The occupational worker exposure scenario is consistent with a commercial shop worker. Vapor intrusion from soils and soil gas contaminated with dry cleaning solvent was found to be a complete pathway exceeding RBCs to building occupants. Remedial measures, including mechanical crawlspace venting, mitigate risk to building occupants.
2. Local groundwater is not currently used for drinking and is not likely to be used for this purpose in the future. The water ingestion pathway is therefore not considered. The vertical extent of soil contamination is estimated to be 20-25 feet bgs; the depth to groundwater is greater than 50 feet bgs. Soil samples collected outside the Campbell building and exposed to rainfall, do not exceed the leaching to groundwater RBC of 1.9 mg/kg for both urban residential and occupational worker pathways.

A graphic conceptual site model for the project is presented on attached Figure 4. Potentially complete exposure pathways are indicated on Figure 4 include inhalation risk from soil gas, contaminated soils, and groundwater, as well as ingestion and direct contract risk from site soils.

Contaminant concentrations

Comprehensive data tables for the project are attached to this memorandum. As a summary, the indoor ambient air quality data for the first and second floors are presented in Table 2 both prior to (2013, 2014) and following remedial actions (2015).

Table 2. Indoor Ambient Air Quality Data (2013-2015)

Sample location	Sampling date	Tetrachloroethene (PCE) ug/m^3	Trichloroethene (TCE) ug/m^3	Notes
1st floor	Nov. 2, 2015	<1.36	<1.07	Remedial actions complete-confirmation sample.
1st floor	July 6, 2015	2.0 J	46 J	Remedial actions complete-Cans of solvents containing TCE found in first floor shop.
2nd floor	July 6, 2015	<1.4 J	<1.1 J	Remedial actions complete-confirmation sample.
1st floor	Nov 10, 2014	61	1.8	Prior to remedial action
2nd floor	Nov 10, 2014	81	0.26	Prior to remedial action
1st floor	Jan 7, 2013	95	<1.07	Prior to remedial action
2nd floor	Jan 7, 2013	54	<1.07	Prior to remedial action
RBC for air inhalation pathway				
Urban resident		26	1.0	
Occupational worker		47	3.0	

J = estimated
Shaded values indicate exceedance of air inhalation pathway RBC

The source of contamination is a leaking the dry-cleaning machine formerly located near the southwest corner of the building and drained to soil exposed in the building crawl space. The volume of the leak is not known.

As a result of site investigation work, the primary pathway by which contamination has reached building occupants was through vapor intrusion into the building from contaminated soil in the building crawl space. Engineering controls are in-place to mitigate this risk.

Human health risk

The vapor intrusion contaminant pathway was previously found to be complete to building occupants resulting in ambient indoor air exceeding relevant risk-based concentrations for building occupants. The source of the PCE and TCE contamination is crawl space soil beneath the building which necessitated remedial actions to mitigate vapor intrusion into indoor air.

Initial site investigation work (Partner 2011) determined that the maximum PCE concentration as soil vapor was 630,000 ug/m^3 (SV-1, Jan. 21, 2010) at a depth of 5 feet beneath the location of the former dry-cleaning machine (Table 3). This exceeds both the urban residential and occupational vapor intrusion pathway RBC of 5,100 and 47,000 ug/m^3 by factors of 123x and 13x, respectively.

Initially, the maximum PCE concentration in soil beneath the building was 7.8 mg/kg (46 mg/kg duplicate sample) at SB1 from 2 – 4 feet bgs beneath the location of the former dry-cleaning machine (GeoEngineers 2013). Following a three-cubic yard remedial excavation of this area on June 1, 2015, confirmation samples ranged from 0.010 mg/kg at 1.5 feet to 22 mg/kg at 3.5 feet (Hart Crowser 2015). The urban residential and occupational worker vapor intrusion pathways RBC are 6.6 and 36 mg/kg, respectively. The remedial excavation was subsequently filled with controlled-density fill, capping contaminated soil. The 22 mg/kg confirmation sample exceeds only the occupational vapor intrusion pathway RBC.

Following implementation of remedial actions described in Section 3, indoor air quality samples collected in July and November 2015 confirm that indoor ambient air no longer presents unacceptable risk to first floor occupational workers and second floor residents. Confirmation indoor air quality samples were collected twice in the first-floor shop area as small containers of solvents (including TCE) were found in the shop area following sample collection in July 2015. The solvents were removed, and the indoor air quality was resampled in November 2015 which confirmed the efficacy of remediation efforts.

2025 Indoor Air Confirmation Sampling

In February 2025, indoor air quality sampling was performed to determine if continued operation of the crawlspace mechanical ventilation system was necessary beyond its 2015 – 2025 run time. During this sampling event, initial samples were collected on 2/18/2025 with the mechanical ventilation system operating. The mechanical ventilation system was shut off also on 2/18/2025 following initial sample collection. Following a 10-day equilibration period with the mechanical ventilation turned off, indoor air was again sampled on 2/28/2025. This indoor air confirmation sampling work was performed during February 2025 as a conservative case with minimized introduction of outdoor air into the building through open windows and doors. The results of these sampling events are presented in the table below.

These results indicate to DEQ that remediation work is complete, and that the mechanical crawlspace ventilation system can be safely shut off with no unacceptable risk to building occupants.

Summary of VOC Analytical Results in Indoor Air (2014 to 2025)

Table 1 - Summary of VOC Analytical Results in Indoor Air
Former Campbell Drycleaner Site

Sample Location	Sample ID	Date	PCE	TCE	cis-1,2 DCE	trans-1,2 DCE	1,1 DCE	Vinyl Chloride
			Concentrations in µg/cm3					
First Floor	AA-3	10/10/2014	61	**1.8**	<0.79	<0.79	<0.79	<0.51
	AA-3	7/6/2015	**2.0 J**	46 J	<0.79	<0.79	<0.79	<0.51
	CC-1	10/2/2015	<1.36	<1.07	<0.79	<0.79	<0.79	<0.51
	Camp-IA-1	2/18/2025	**8.6**	**0.064**	<0.034	**0.056**	<0.034	<0.034
	Camp-IA-1-post	2/28/2025	**13**	<0.034	<0.034	<0.034	<0.034	<0.034
Second Floor	AA-4	10/10/2014	81	**0.26**	<0.079	<0.079	<0.079	<0.051
	AA-4	7/6/2015	<1.4 J	<1.1 J	<0.79	<0.79	<0.79	<0.51
	Camp-IA-2	2/18/2025	**3.0**	**0.090**	<0.038	**0.085**	<0.038	<0.038
	Camp-IA-2-post	2/28/2025	**6.5**	<0.033	<0.033	<0.033	<0.033	<0.033
Crawlspace	AA-1	10/10/2014	130	<1.1	<0.79	<0.79	<0.79	<0.51
	AA-2 (duplicate)	10/10/2014	120	<1.1	<0.79	<0.79	<0.79	<0.51
	AA-1	7/6/2015	**8.1 J**	4.1 J	<0.79	<0.79	<0.79	<0.51
	AA-2 (duplicate)	7/6/2015	**13 J**	**1.4 J**	<0.79	<0.79	<0.79	<0.51
	Camp-CS	2/18/2025	**0.54**	**0.078**	<0.029	**0.092**	<0.029	<0.029
	Camp-Dup	2/18/2025	**0.55**	**0.076**	<0.036	**0.086**	<0.036	<0.036
	Camp-CS-post	2/28/2025	**4.2 J**	<0.030	<0.030	<0.030	<0.030	<0.030
	Camp-Dup-post	2/28/2025	**6.2 J**	**0.044**	<0.032	<0.032	<0.032	<0.032
Outdoor/Background	AA-5	10/10/2014	<1.4	<1.1	<0.79	<0.79	<0.79	<0.51
	AA-5	7/6/2015	<1.4 J	<1.1 J	<0.79	<0.79	<0.79	<0.51
	Camp-OA	2/18/2025	**0.13**	**0.047**	<0.031	**0.073**	<0.031	<0.031
	Camp-OA-post	2/28/2025	**0.14**	<0.033	<0.033	<0.033	<0.033	<0.033
Oregon RBCs - IA Inhalation	Residential		11	0.47	>PV	>PV	210	0.17
	Urban Residential		26	1.0	>PV	>PV	210	0.2
	Occupational		47	2.9	>PV	>PV	880	2.8

Notes

PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene

µg/cm3 = micrograms per cubic centimeter

< = Analyte not detected at or above the indicated reporting limit

J = Concentration estimated

RBCs = Oregon DEQ Risk Based Concentrations https://www.oregon.gov/deq/FilterDocs/RBDMTable.pdf

>PV = The air concentration reported for the RBC exceeds the vapor pressure of the pure chemical.

Bold indicates concentrations detected above laboratory reporting level.

Red indicates concentrations exceeding applicable RBC.

Ecological risk

The site does not contain ecological habitat. Ecological risk screening was therefore not completed.

5. PUBLIC COMMENT PERIOD

In March 2016, DEQ requested comments on a proposed partial, conditional No Further Action determination for former Campbell Dry Cleaner Site. This request was made when the NFA was conditional and dependent upon continued operation of the building crawlspace mechanical ventilation system. This condition was formalized in an Easement and Equitable Servitudes (EES) to be attached to the property deed by Multnomah County. This EES was not submitted to Multnomah County and DEQ could not complete the 2016 NFA. Public comments were received from neighboring businesses and were addressed by DEQ in 2016. These comments are included in the public administrative record for the project.

The 2025 indoor air sampling work demonstrated that the building crawlspace mechanical ventilation system is no longer needed to maintain safe indoor air quality and ends the requirement (Condition) for the EES. No additional Public Comment Period was requested in 2025.

6. CONCLUSIONS AND RECOMMENDATIONS

Prior to remedial actions, DEQ identified unacceptable risk to building occupants from dry-cleaning solvent releases to soil beneath the building. The solvents entered the building as vapor from the contaminated soil. Numerous site investigation phases and remedial measures (Section 3) were performed to characterize and mitigate this risk.

On behalf of DEQ, Parametrix conducted a final indoor air assessment at the Former Campbell Drycleaner Site during February 2025. Based on the findings of this final assessment, DEQ has reached the following conclusions:

In February 2025, indoor air quality samples were collected from the crawl space, first-floor, second-floor, and outdoor locations at the Site both with the mechanical crawl space ventilation system operating (Feb. 10, 2025) and after the system was shut down for 10 days (Feb. 28, 2025). The February 2025 sampling events demonstrated that long-term air quality conditions inside the building are protective and are less than Risk Based Concentrations without operation of the building crawlspace mechanical ventilation system.

Testing of indoor air previously, following implementation of remedial measures in 2015, demonstrated that indoor air conditions were protective for building occupants, provided that remedial measures, including continued operation of the building crawlspace mechanical ventilation system, remained in operation.

In February 2025, final confirmation indoor air sampling was performed which demonstrated that the building crawlspace mechanical ventilation system is no longer necessary, following ten years of operation, to maintain protective indoor air quality.

Based on the conclusions above, no further indoor air monitoring is necessary, and operation of the building crawlspace mechanical ventilation system is no longer necessary and passive engineering controls already in-place are adequate to maintain indoor air quality.

7. ADMINISTRATIVE RECORD

AGI 2008. Phase Two Environmental Site Assessment, 829 N. Russell Street. March 20.

Partner 2011. Phase II Subsurface Soil Gas Investigation Report. January 20.

DEQ 2011. Brownfields Program Quality Assurance Project Plan. October.

DEQ 2012. Spreadsheet for Risk Based Concentrations for Individual Chemicals. June 7.

DEQ 2016. Request for Comments. Proposed partial conditional no further action determination for former Campbell Dry Cleaner Site. Comments due March 31, 2016.

DEQ 2023. Risk-Based Concentrations for Individual Chemicals (Aug. 2023 revision).

GeoEngineers 2013. Phase II Environmental Site Assessment, Former Campbell Dry Cleaners. March 12.

GeoDesign 2014. Phase III Environmental Site Assessment, Campbell Dry Cleaner Brownfield Project. May 14.

Hart Crowser 2014. Focused Site Investigation Work Plan, Former Campbell Dry Cleaner. September 24.

Hart Crowser 2015. Site Investigation Report, Former Campbell Dry Cleaner Site. February 5.

EPA 2015. Regional Screening Levels. June.

Hart Crowser 2015. IRAM Completion Report, Former Campbell Dry Cleaner Site. July 30.

Parametrix, 2025. Indoor Air Assessment Data Report. Former Campbell Drycleaner Site 817-819 North Russell Street, Portland, Oregon 97227. City of Portland Bureau of Environmental Services Brownfields Program published August 2025.

ATTACHMENTS

TABLES

1 Chemical Analytical Results: Soil (Current and Previous Investigations)
2 Chemical Analytical Results: Groundwater (Previous Investigations)
3 Chemical Analytical Results: Soil Gas (Previous Investigations)
4 Chemical Analytical Results: Indoor Ambient air (Previous Investigations)
5 Chemical Analytical Results: Indoor Ambient Air July 2025

FIGURES

1 Vicinity Map
2 Site Vicinity showing additional facilities which use PCE
3 Site Plan showing site sampling plan, soil gas plume and estimated Locality of Facility
4 Graphic Site Conceptual Model
5 As-Built IRAMs Plan View
6 As-Built Vapor Exhaust Stack
7 As-Built Crawlspace Access Modifications
8 PCE Concentrations in Groundwater, Tarr Inc. Sept 2014
9 TCE Concentrations in Groundwater, Tarr Inc. Sept 2014

APPENDIX A

City of Portland Sewer Assets and Legend, and Water Delivery Piping in Vicinity of Campbell Site.

Table 1 - Chemical Analytical Results: Soil (Previous Investigations)
Former Campbell Dry Cleaner
Portland, Oregon

Sample Location	Sample Date	Sample Depth (feet)	Chlorinated VOCs					
			PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
			Concentration in mg/kg					
Data Extracted from GeoDesign, Phase III Environmental Site Assessment, May 14, 2014. (GeoDesign 2014)								
DP-1 WOOD	20-Jan-14	NA	**0.56**	<0.0070	-	-	-	-
DP-1 (5.5-6.5)	20-Jan-14	5.5-6.5	**0.004**	<0.00028	-	-	-	-
DP-1 (16.5-17.5)	20-Jan-14	16.5-17.5	**0.031**	<0.00029	-	-	-	-
DP-2 (3-4)	20-Jan-14	3-4	**0.068**	<0.00029	-	-	-	-
DP-2 (8-9)	20-Jan-14	8-9	**0.028**	<0.00032	-	-	-	-
DUP-DP-2 (8-9)	20-Jan-14	8-9	**0.032**	<0.00030	-	-	-	-
DP-3 (2-3)	20-Jan-14	2-3	**1.4**	<0.00028	-	-	-	-
DP-3 (8-9)	20-Jan-14	8-9	**0.032**	<0.00028	-	-	-	-
DP-4 (3.5-4.5)	20-Jan-14	3.5-4.5	**2.3**	**0.00063**	-	-	-	-
DP-4 (6.5-7.5)	20-Jan-14	6.5-7.5	**0.15**	<0.00030	-	-	-	-
DP-5 (7-8)	21-Jan-14	7-8	**0.046**	**0.0024**	-	-	-	-
DP-5 (18-19)	21-Jan-14	18-19	**0.006**	<0.00028	-	-	-	-
DP-6 (6-7)	21-Jan-14	6-7	**0.20**	**0.00042**	-	-	-	-
DUP-DP-6 (6-7)	21-Jan-14	6-7	**0.086**	<0.00028	-	-	-	-
DP-6 (18.5-19.5)	21-Jan-14	18.5-19.5	**0.023**	<0.00029	-	-	-	-
DP-7 (7-8)	22-Jan-14	7-8	**0.033**	<0.00029	-	-	-	-
DP-7 (13-14)	22-Jan-14	13-14	**0.023**	<0.00031	-	-	-	-
DP-8 (2-3)	22-Jan-14	2-3	**0.039**	<0.00028	-	-	-	-
DP-8 (8-9)	22-Jan-14	8-9	**0.022**	<0.00032	-	-	-	-
DP-8 (18.5-19.5)	22-Jan-14	18.5-19.5	**0.028**	**0.00048**	-	-	-	-
DP-9 (6-7)	22-Jan-14	6-7	**0.011**	<0.00028	-	-	-	-
DP-9 (12-13)	22-Jan-14	12-13	<0.00028	<0.00028	-	-	-	-
DP-9 (19-20)	22-Jan-14	19-20	**0.014**	<0.00028	-	-	-	-
DP-10 (11-12)	22-Jan-14	11-12	**0.016**	<0.00028	-	-	-	-
DP-10 (17.5-18.5)	22-Jan-14	17.5-18.5	<0.00028	<0.00028	-	-	-	-
Data Extracted from GeoEngineers, Phase II Environmental Site Assessment, March 12, 2013. (GeoEngineers 2013)								
SB1 (2-4')	8-Jan-13	2	**7.8**	<0.19	<0.19	<0.19	<0.19	<0.95
SB1 (2-4')-Dup	8-Jan-13	2	**46**	<0.24	<0.24	<0.24	<0.24	<1.2
SB2 (2-4')	8-Jan-13	2	**1.4**	<0.16	<0.16	<0.16	<0.16	<0.80
SB3 (2-4')	8-Jan-13	2	<0.25	<0.25	<0.25	<0.25	<0.25	<0.81
SB4 (2-4')	8-Jan-13	2	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3
SB5 (3-5')	8-Jan-13	3	<0.22	<0.22	<0.22	<0.22	<0.22	<1.1
SB6 (3-5')	8-Jan-13	3	<0.22	<0.22	<0.22	<0.22	<0.22	<1.1
SB7 (2-4')	8-Jan-13	2	<0.16	<0.16	<0.16	<0.16	<0.16	<0.78
SB8 (2-4')	8-Jan-13	2	<0.14	<0.14	<0.14	<0.14	<0.14	<0.69
Data Extracted from Anderson Geological, Inc., Phase II Environmental Site Assessment for 829 N. Russel Street, March 20, 2008. (AGI 2008)								
SB1-6	6-Mar-08	6	**0.109**	<0.0259	<0.0259	-	-	-
SB1-12	6-Mar-08	12	**0.0883**	<0.0274	<0.0274	-	-	-
SB2-6	7-Mar-08	6	<0.0306	<0.0306	<0.0306	-	-	-
SB2-12	7-Mar-08	12	<0.028	<0.028	<0.028	-	-	-
DEQ RBCs								
Direct Contact - Urban Residential			540	17	310	1,200	3,500	0.76
Direct Contact - Occupational Worker			940	46	2,000	9,200	27,000	3.9
Direct Contact - Construction Worker			1,600	120	620	4,500	12,000	30
Direct Contact - Excavation Worker			44,000	3,400	17,000	130,000	340,000	830
Leaching to Groundwater - Residential			-	0.0093	0.64	0.16	25	-
Leaching to Groundwater - Occupational			-	0.053	>C_{sat}	0.90	100	-
Vapor Intrusion - Urban Residential			6.6	0.32	>Max	16	54	0.053
Vapor Intrusion - Occupational			36	2.8	>Max	200	680	2.2
Volatilization to Outdoor Air - Urban Res.			>C_{sat}	33	>Max	2,000	>C_{sat}	6.5
Volatilization to Outdoor Air - Occupational			>C_{sat}	96	>Max	>C_{sat}	>C_{sat}	89

Please refer to notes on the following page.

Table 1 - Chemical Analytical Results: Soil (Previous Investigations)
Former Campbell Dry Cleaners
Portland, Oregon

Notes:
PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene; VC = vinyl chloride
- = not analyzed or not available
< = Not detected above the indicated laboratory reported detection limit.
Risk-Based Concentrations (RBCs) from Risk-Based Concentrations for Individual Chemicals (DEQ, Rev. June 7, 2012
Detected concentrations are shown in **bold** type
Concentrations exceeding one or more RBCs for the air inhalation pathway are shown in highlighted cells.
>C_{sat} = RBC concentration above the maximum saturation possible in soil.
>Max = The RBC for this constituent and pathway is above 1,000,000 mg/kg.
>S = The RBC exceeds the solubility limit.
Only PCE and degredation products are shown on this table.

Table 2 - Chemical Analytical Results: Groundwater (Previous Investigations)
Former Campbell Dry Cleaner
Portland, Oregon

Sample Location	Sample Date	Sample Depth (feet)	Chlorinated VOCs					
			PCE	TCE	*cis*-1,2-DCE	*trans*-1,2-DCE	1,1-DCE	VC
			Concentration in µg/L					
GeoDesign, Phase III Environmental Site Assessment, May 14, 2014.								
DP-5-W	21-Jan-14	NA	**57**	**4.1**	**0.58**	<1.0	<1.0	< 1.0
DP-7-W	22-Jan-14	NA	**55**	**8.5**	<1.0	<1.0	<1.0	<1.0
DUP-DP-7-W	22-Jan-14	NA	**260**	**14**	<1.0	<1.0	<1.0	<1.0
DEQ RBCs								
Vapor Intrusion - Urban Residential			5,900	380	>S	28,000	27,000	22
Vapor Intrusion - Occupational			32,000	3300	>S	350,000	340,000	910
Volatilization to Outdoor Air - Urban Res.			110,000	6600	>S	430,000	550,000	500
Volatilization to Outdoor Air - Occupational			>S	19000	>S	1,800,000	>S	6800

Notes:
PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene; VC = vinyl chloride.
Only PCE and degradation products are shown on this table.
VOCs = volatile organic compounds.
µg/L = microgram per liter.
< = Not detected above the indicated laboratory reported detection limit.
Risk-Based Concentrations (RBCs) from RBCs for Individual Chemicals (DEQ, Rev. June 7, 2012).
Detected concentrations are shown in **bold** type
>S = The RBC exceeds the solubility limit.

Table 3 - Chemical Analytical Results: Soil Gas (Current and Previous Investigations)
Former Campbell Dry Cleaner
Portland, Oregon

Sample Location	Sample Date	Sample Type	TPH	Chlorinated VOCs						Other detected VOCs																
			Low Fraction	PCE	TCE	*cis*-1,2-DCE	*trans*-1,2-DCE	1,1-DCE	Vinyl Chloride	Acetone	Benzene	Carbon Disulfide	Chloroform	Cyclohexane	Ethanol	Ethylbenzene	Trichloro-fluoromethane	Dichloro-difluoromethane	n-Hexane	Methylene Chloride	2-Propanol	Propene	Toluene	1,1,1-Trichloroethane	1,2,4-Trimethylbenzene	2,2,4-Trimethylpentane	Xylenes
			Concentrations in µg/m^3							Concentrations in µg/m^3																
Hart Crowser 2014 Site Investigation																										
SG-1	1-Dec-14	Grab	**700**	**660**	<2.1	<1.6	<1.6	<1.6	<1.0	**86**	<1.3	<1.2	<1.9	**3.8**	**51**	**3.6**	<2.2	**2.7**	**35**	**2.6**	**8.1**	<1.4	**11**	<2.2	<2.0	<1.9	**15**
SG-2	1-Dec-14	Grab	**1,600**	**1,900**	**27**	<1.6	<1.6	<1.6	<1.0	**40**	<1.3	<1.2	**4.4**	<1.4	**34**	<1.7	<2.2	**2.4**	**2.3**	**1.9**	<6.1	<1.4	**8.7**	**8.7**	**2.4**	<1.9	**9.0**
SG-3	1-Dec-14	Grab	**1,200**	**500**	**15**	<1.6	<1.6	<1.6	<1.0	**31**	<1.3	<1.2	**4.6**	<1.4	**25**	<1.7	<2.2	**2.6**	<1.4	<1.4	<6.1	**7.2**	**9.0**	**11**	**2.9**	<1.9	**8.6**
SG-4	1-Dec-14	Grab	<410	**88**	<2.1	<1.6	<1.6	<1.6	<1.0	**36**	**1.4**	**2.4**	**4.1**	<1.4	**3.6**	**2.0**	**2.6**	**2.4**	**1.8**	<1.4	<6.1	**34**	**9.0**	**9.2**	**3.9**	**3.5**	**11**
SG-5	1-Dec-14	Grab	**740 J**	**18 J**	<2.1	<1.6	<1.6	<1.6	<1.0	**78 J**	<1.3	<1.2	<1.9	**6.5 J**	**150 J**	**2.5**	<2.2	**2.7**	**290 J**	**3.2 J**	**39 J**	<1.4	**11 J**	<2.2	<2.0	<1.9	**11**
SG-6	1-Dec-14	Grab	**1400 J**	**62 J**	<2.1	<1.6	<1.6	<1.6	<1.0	**26 J**	<1.3	<1.2	<1.9	**13 J**	**25 J**	<1.7	<2.2	**2.6**	**850 J**	<1.4	<6.1	<1.4	**7.5 J**	<2.2	**3.1**	<1.9	**8.6**
GeoDesign, Phase III Environmental Site Assessment, May 14, 2014.																										
DP-7-SG	21-Jan-14	-	-	**180,000**	<4,300	<3,200	<3,200	<3,200	<2,000	-	<2,600	-	<3,900	-	-	-	-	-	-	-	-	-	-	-	-	-
DUP-DP-7-SG	21-Jan-14	-	-	**190,000**	<4,300	<3,200	<3,200	<3,200	<2,000	-	<2,600	-	<3,900	-	-	-	-	-	-	-	-	-	-	-	-	-
DP-8-SG	20-Jan-14	-	-	**200,000**	<4,300	<3,200	<3,200	<3,200	<2,000	-	<2,600	-	<3,900	-	-	-	-	-	-	-	-	-	-	-	-	-
DP-9-SG	22-Jan-14	-	-	**81,000**	<4,300	<3,200	<3,200	<3,200	<2,000	-	<2,600	-	<3,900	-	-	-	-	-	-	-	-	-	-	-	-	-
Partner Engineering and Science, Inc., Phase II Subsurface Soil Gas Investigation Report, January 20, 2011.																										
SV-1	30-Dec-10	-	-	**630,000**	<4,800	<4,800	<4,800	<4,800	<4,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SV-2	30-Dec-10	-	-	**360,000**	<1,900	<1,900	<1,900	<1,900	<1,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SV-3	30-Dec-10	-	-	**49,000**	**1,100**	<180	<180	<180	<180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SV-4	30-Dec-10	-	-	**23,000**	**560**	<140	<140	<140	<140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RBCs - Vapor Intrusion Pathway																										
Urban Residential			79,000	5,100	200	>Pv	13,000	42,000	41	-	170	-	58	-	-	530	150,000	-	-	-	-	-	1,000,000	1,000,000	1,500	-	21,000
Occupational			1,700,000	47,000	2,900	>Pv	260,000	880,000	2,800	-	1,600	-	530	-	-	4,900	3,100,000	-	-	-	-	-	22,000,000	22,000,000	31,000	-	440,000

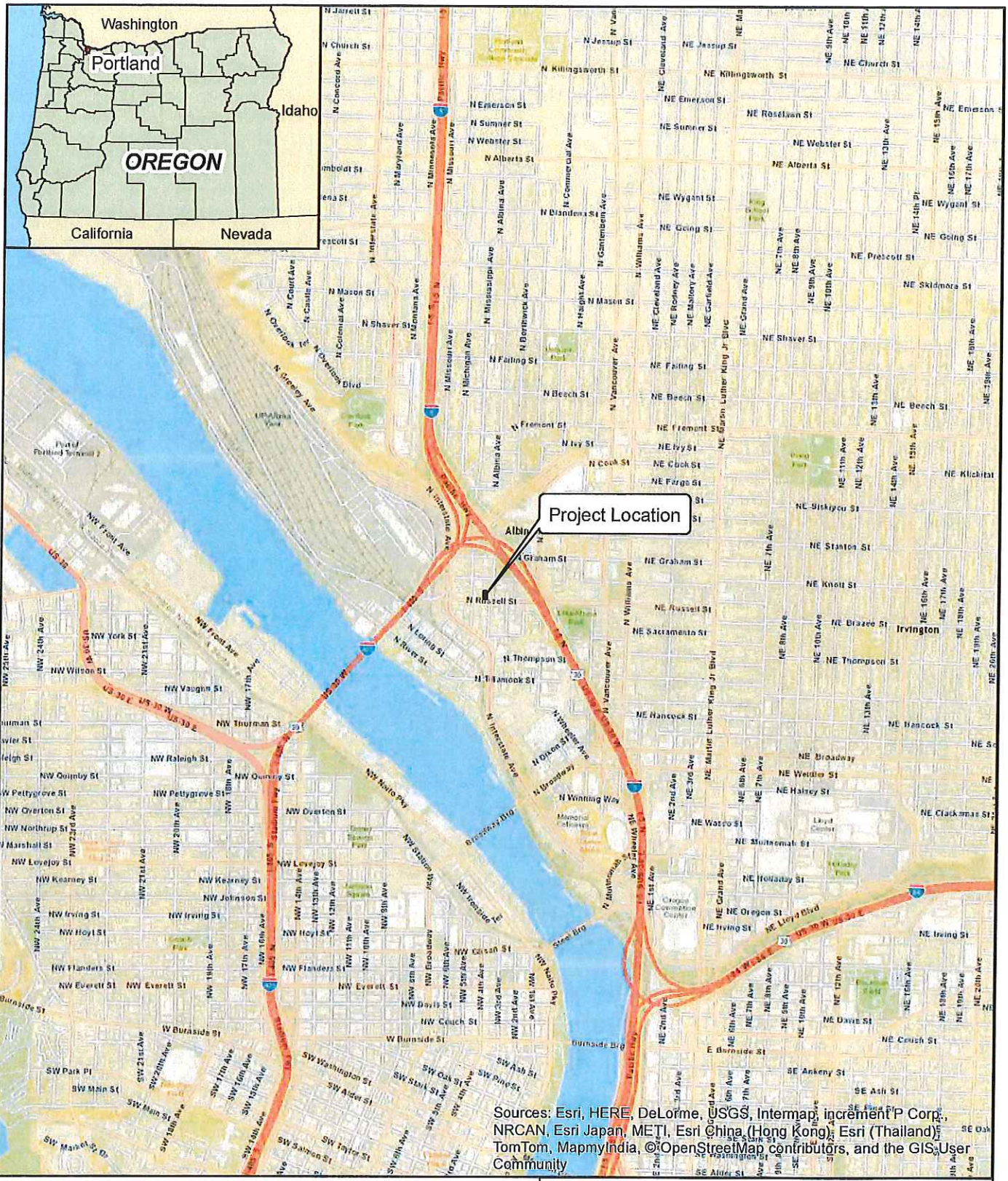
Notes:

PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene.
Grab = samples collected over a 5-minute period.
TPH = total petroleum hydrocarbons.
VOCs = volatile organic compounds.
µg/m^3 = microgram per cubic meter.
< = Analyte not detected at or above the indicated reporting limit.
- = Not analyzed or not available.
J = Concentrations are estimated due to exceedences in Brownfield QAPP RPD limits for field duplicate samples.
Risk-Based Concentrations (RBCs) from RBCs for Individual Chemicals (DEQ, Rev. June 7, 2012).
>Pv = RBC exceeds the vapor pressure of the pure chemical. This constituent cannot create an unacceptable risk for this pathway.
Detected air concentrations are shown in **bold** type.
Ambient air concentrations exceeding the occupational RBCs for the air inhalation pathway are shown in highlighted cells.

Table 4 - Chemical Analytical Results: Indoor Ambient Air (Current and Previous Investigations)
Former Campbell Dry Cleaner
Portland, Oregon

Sample Location	Sample Date	Sample Type	TPH	Chlorinated VOCs						Other detected VOCs																		
			Low fraction	PCE	TCE	*cis*-1,2-DCE	*trans*-1,2-DCE	1,1-DCE	Vinyl Chloride	Acetone	Benzene	Carbon Tetrachloride	Chloroform	Chloromethane	Cyclohexane	Ethanol	Ethylbenzene	Heptane	Trichlorofluoromethane	Dichlorodifluoromethane	n-Hexane	Methylene Chloride	2-Propanol	Styrene	Tetrahydrofuran	Toluene	1,2,4-Trimethylbenzene	2,2,4-Trimethylpentane	Xylenes (m&p + o)
			Concentrations in µg/m^3							Concentrations in µg/m^3																			
DEQ Confirmation Air Sample																													
First Floor																													
CC-1	2-Nov-15	8-hour	<207	<1.36	<1.07	<0.79	<0.79	<0.79	<0.51	**13.5**	**0.94**	<1.26	<0.97	**1.01**	<0.69	**50**	<0.87	**0.98**	<1.12	**1.68**	**0.77**	**0.73 B**	<3.07	<0851	<0.59	**2.26**	<4.66	<0.93	<2.56
Hart Crowser 2015 IRAM Implementation																													
Crawlspace																													
AA-1	6-Jul-15	8-hour	<210	**8.1 J**	**4.1 J**	<0.79	<0.79	<0.79	<0.51	**40 J**	**1.1**	<1.3	<0.97	**1.2**	**1.9**	**74**	**1.3**	**2.1**	**1.3**	**1.3**	**4.2 J**	**2.3**	**86**	<0.85	**0.77**	**26 J**	**1.9**	**1.5**	**6.5**
AA-2 (duplicate)	6-Jul-15	8-hour	<210	**13 J**	**1.4 J**	<0.79	<0.79	<0.79	<0.51	**23 J**	**1.3**	<1.3	<0.97	**1.2**	**1.4**	**75**	**1.4**	**1.7**	**1.5**	**2.7**	**2.5 J**	**1.1**	**100**	<0.85	**0.80**	**11 J**	**0.98**	**1.6**	**8.9**
First Floor																													
AA-3	6-Jul-15	8-hour	<210	**2.0 J**	**46 J**	<0.79	<0.79	<0.79	<0.51	**59 J**	**0.86**	<1.3	<0.97	**1.4**	**1.0**	**100**	**1.2**	**2.3**	**1.4**	**1.7**	**1.9 J**	**11**	**9.8**	**5.1**	**1.1**	**8.7 J**	**3.5**	<0.93	**5.8**
Second Floor																													
AA-4	6-Jul-15	8-hour	<210	<1.4 J	<1.1 J	<0.79	<0.79	<0.79	<0.51	**9.3 J**	<0.64	<1.3	<0.97	**0.76**	**0.83**	**55**	<0.87	**0.90**	<1.1	**1.0**	**1.3 J**	<0.69	**6.1**	<0.85	<0.59	**3.8 J**	<0.98	**1.0**	**2.1**
Background																													
AA-5	6-Jul-15	8-hour	<210	<1.4 J	<1.1 J	<0.79	<0.79	<0.79	<0.51	**11 J**	<0.64	<1.3	<0.97	**1.1**	<0.69	**14**	<0.87	<0.82	**1.3**	**1.6**	**0.95 J**	**0.76**	<3.1	<0.85	<0.59	**2.4 J**	<0.98	<0.93	<1.7
Ventilation Stack																													
Vapor Stack	6-Jul-15	Grab	**500**	**500**	**3.3**	<1.6	<1.6	<1.6	<1.0	**69**	<1.3	<2.5	<1.9	**1.2**	**2.7**	**57**	<1.7	**2.0**	<2.2	**2.8**	**3.2**	**1.9**	**66**	<1.7	**9.1**	**8.3**	<2.0	<1.9	**6.1**
Hart Crowser 2014 Site Investigation																													
Crawlspace																													
AA-1	10-Nov-14	8-hour	<210	**130**	<1.1	<0.79	<0.79	<0.79	<0.51	**8.1**	**0.77**	<1.3	<0.97	**1.2**	-	**6.4**	<0.87	-	**1.3**	**1.8**	**0.78**	<0.69	<3.1	-	-	**2.2**	-	-	<1.7
AA-2 (duplicate)	10-Nov-14	8-hour	<210	**120**	<1.1	<0.79	<0.79	<0.79	<0.51	**8.6**	**0.77**	<1.3	<0.97	**1.3**	-	**7.2**	<0.87	-	**1.5**	**2.0**	**0.74**	**0.94**	<3.1	-	-	**2.0**	-	-	<1.7
First Floor																													
AA-3	10-Nov-14	8-hour	<210	**61**	**1.8**	<0.79	<0.79	<0.79	<0.51	**17**	**0.80**	<1.3	<0.97	**1.5**	-	**28**	<0.87	-	**1.4**	**2.1**	**0.99**	**2.3**	**5.4**	-	-	**2.3**	-	-	**1.8**
Second Floor																													
AA-4	10-Nov-14	8-hour	-	**81**	**0.25**	<0.079	<0.079	<0.079	<0.051	-	**1.5**	**0.55**	**0.88**	**1.1**	-	-	**0.74**	-	-	-	-	-	-	-	-	-	-	-	-
Background																													
AA-5	10-Nov-14	8-hour	<210	<1.4	<1.1	<0.79	<0.79	<0.79	<0.51	**8.8**	**0.86**	<1.3	<0.97	**1.3**	-	**8.3**	<0.87	-	**1.5**	**2.2**	**0.71**	**1.1**	<3.1	-	-	**2.1**	-	-	<1.7
GeoEngineers, Phase II Environmental Site Assessment, March 12, 2013.																													
First Floor																													
IA-1	7-Jan-13	8-hour	<207	**58**	<1.07	<0.793	<0.793	<0.793	<0.511	**31**	**0.83**	<1.26	<0.973	**1.3**	-	**160**	<0.87	-	**1.3**	**2.6**	**1.0**	**3.1**	**34**	-	-	**3.8**	-	-	**2.3**
IA-1 duplicate	7-Jan-13	8-hour	<207	**95**	<1.07	<0.793	<0.793	<0.793	<0.511	**26**	**0.70**	<1.26	<0.973	**1.3**	-	**89**	<0.87	-	**1.2**	**2.6**	<0.705	<0.694	**18**	-	-	**3.8**	-	-	**1.8**
Second Floor																													
IA-2	7-Jan-13	8-hour	<207	**54**	<1.07	<0.793	<0.793	<0.793	<0.511	**38**	**0.89**	<1.26	**2.0**	**1.5**	-	**2,500**	<0.87	-	**1.3**	**2.7**	**0.85**	**2.4**	**61**	-	-	**3.8**	-	-	**3.5**
Background																													
UW-1	7-Jan-13	8-hour	<207	<1.36	<1.07	<0.793	<0.793	<0.793	<0.511	**33**	**0.86**	<1.26	<0.973	**1.3**	-	**32**	**1.0**	-	**1.4**	**2.8**	<0.705	<0.694	**11**	-	-	**4.5**	-	-	**5.0**
RBCs - Air Inhalation Pathway																													
Urban Residential Receptor			390	26	1.0	>Pv	63	210	0.20	-	0.85	1.1	0.29	94	*6,300*	-	2.7	-	730	-	*730*	-	*210*	1,000	-	5,200	7.3	-	100
Occupational Receptor			1,700	47	3.0	>Pv	260	880	2.8	-	1.6	2.0	0.53	390	*26,000*	-	4.9	-	3,100	-	*3,100*	-	*880*	4,400	-	22,000	31	-	440

Notes:
PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene.
8-hour = 8 hour time-weighted average (TWA) sample.
TPH = total petroleum hydrocarbons.
VOCs = volatile organic compounds.
µg/m^3 = microgram per cubic meter.
< = Analyte not detected at or above the indicated reporting limit.
- = Not analyzed or not available.
J = Concentrations are estimated based on exceedances in Brownfield QAPP RPD limits for field duplicate samples.
Risk-Based Concentrations (RBCs) from RBCs for Individual Chemicals (DEQ, Rev. June 7, 2012).
Italicized RBCs are Regional Screening Levels for residential and industrial ambient air (EPA, Rev. June 2015).
>Pv = RBC exceeds the vapor pressure of the pure chemical. This constituent cannot create an unacceptable risk for this pathway.
Detected air concentrations are shown in **bold** type.
Ambient air concentrations exceeding the occupational RBCs for the air inhalation pathway are shown in highlighted cells.
B = Analyte also found in blank.



0 1,000 2,000 4,000 Feet

N

Former Campbell Dry Cleaner
Portland, Oregon

Vicinity Map

15818-00/Task 8 7/15

HARTCROWSER

Figure 1

Document Path: F:\Notebooks\1581800_DEQ Campbell Dry Cleaner\GIS\1581803_V\map.mxd Date: 7/10/2015 User Name: melissaschweitzer

0 50 100 200 Feet

N

Former Campbell Dry Cleaner
Portland, Oregon

Site Vicinity

15818-00/Task 5 2/15

HARTCROWSER

Figure 2

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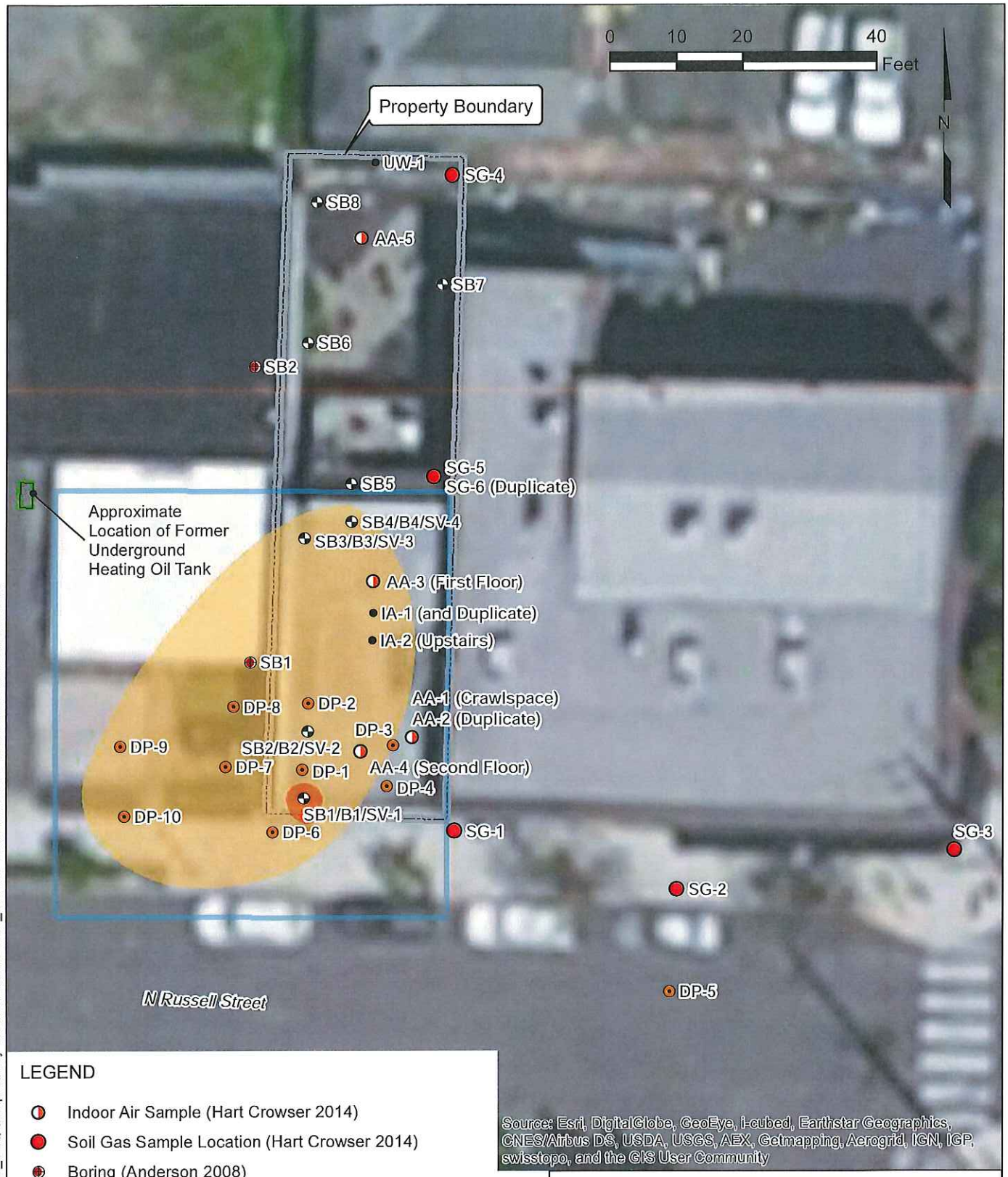

LEGEND

- Indoor Air Sample (Hart Crowser 2014)
- Soil Gas Sample Location (Hart Crowser 2014)
- Boring (Anderson 2008)
- Boring (GeoDesign 2014)
- Boring (GeoEngineers 2013/Partner 2010)
- Indoor Air Sample (GeoEngineers 2013)
- Extent of Soil Posing Unacceptable Risk
- Extent of Soil Gas Posing Unacceptable Vapor Intrusion Risk
- Locality of Facility

Former Campbell Dry Cleaner
Portland, Oregon

Site Plan

15818-00/Task 5 2/15

HARTCROWSER

Figure 3

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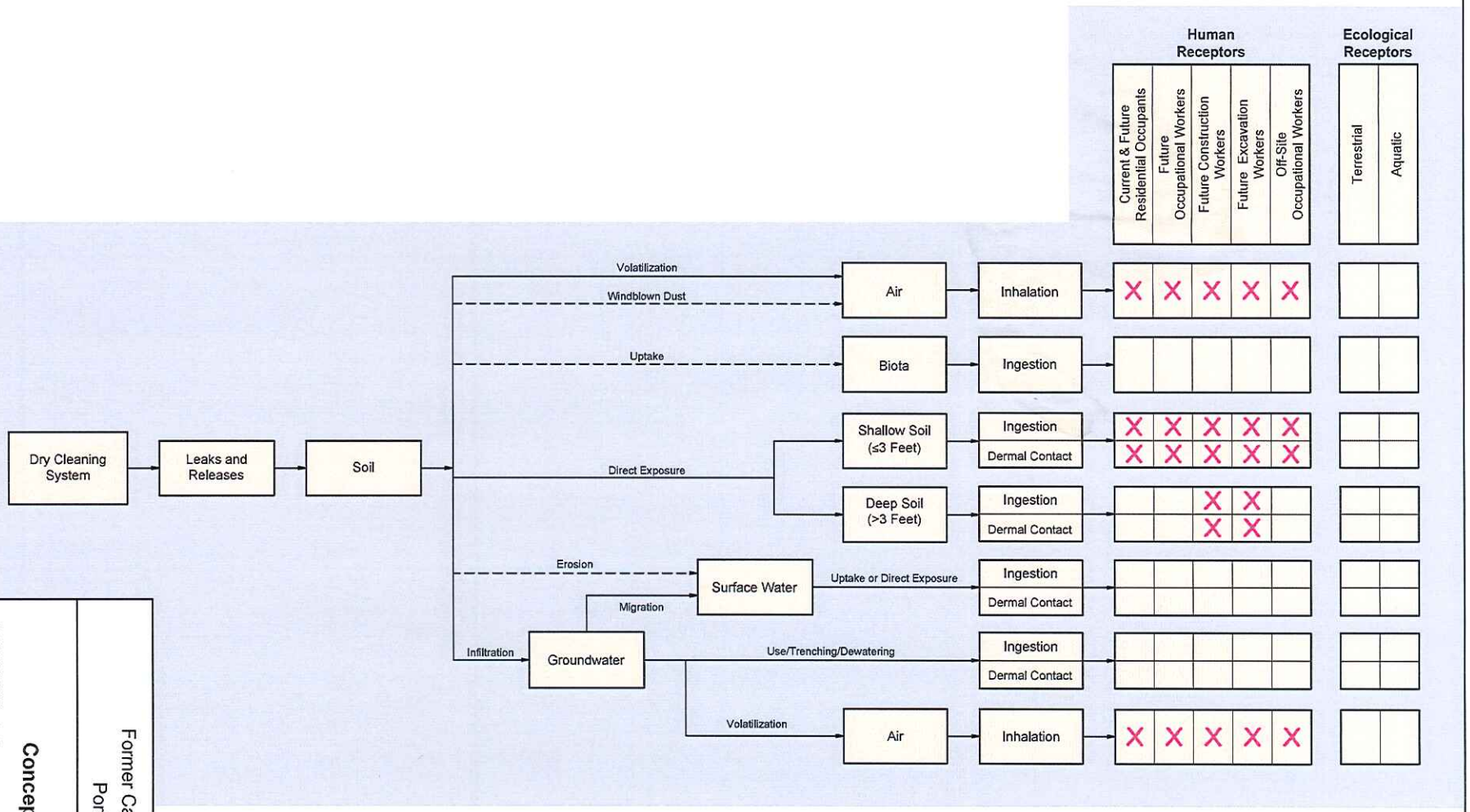


Conceptual Site Model

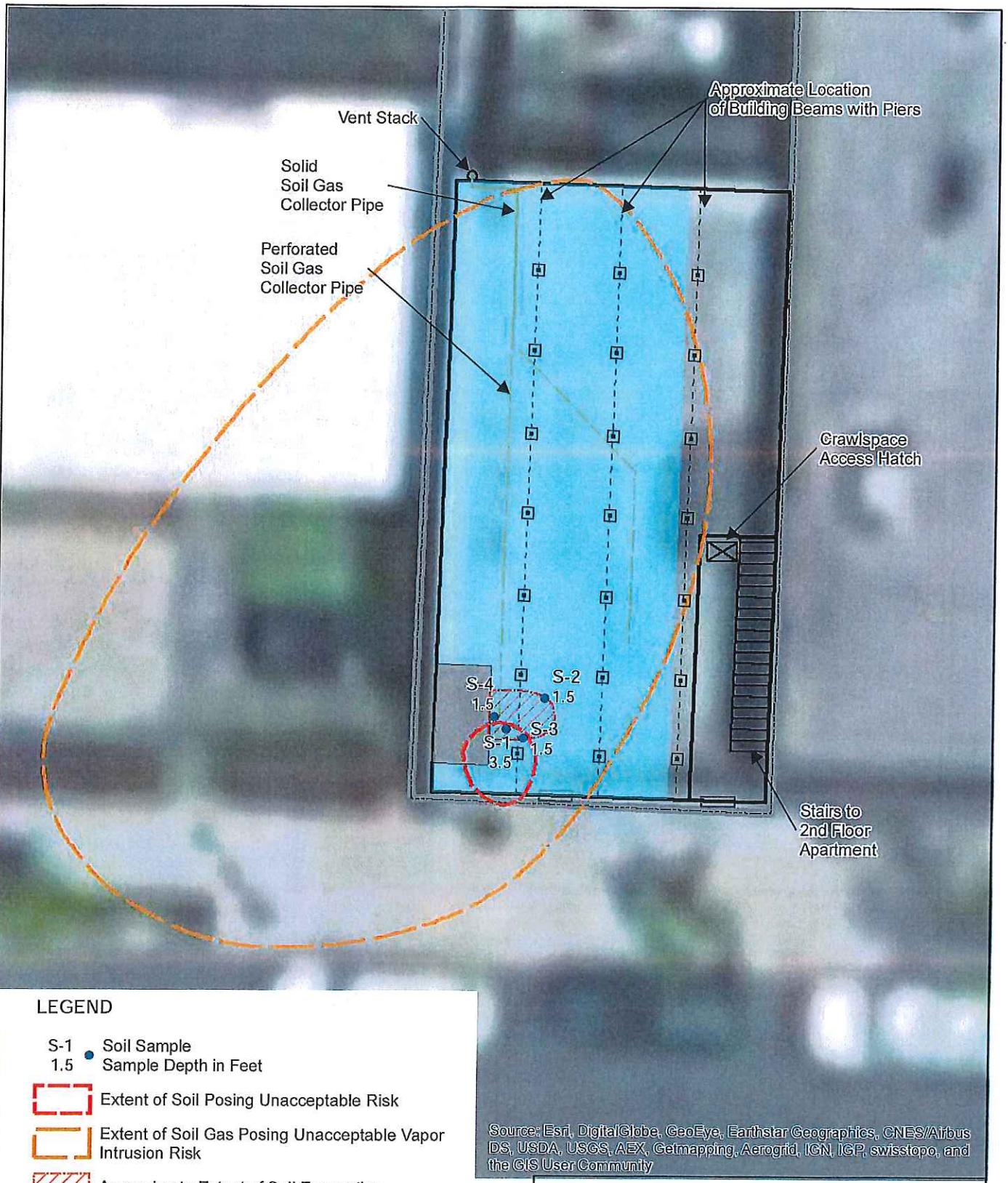
Former Campbell Dry Cleaner
Portland, Oregon

15818-00/Task 5

2/15

HARTCROWSER

Figure 4



LEGEND

- S-1 / 1.5 — Soil Sample; Sample Depth in Feet
- Extent of Soil Posing Unacceptable Risk
- Extent of Soil Gas Posing Unacceptable Vapor Intrusion Risk
- Approximate Extent of Soil Excavation
- Concrete Block
- Area Covered and Sealed with New Moisture Barrier
- Project Boundary

0 5 10 20 Feet

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Former Campbell Dry Cleaner
Portland, Oregon

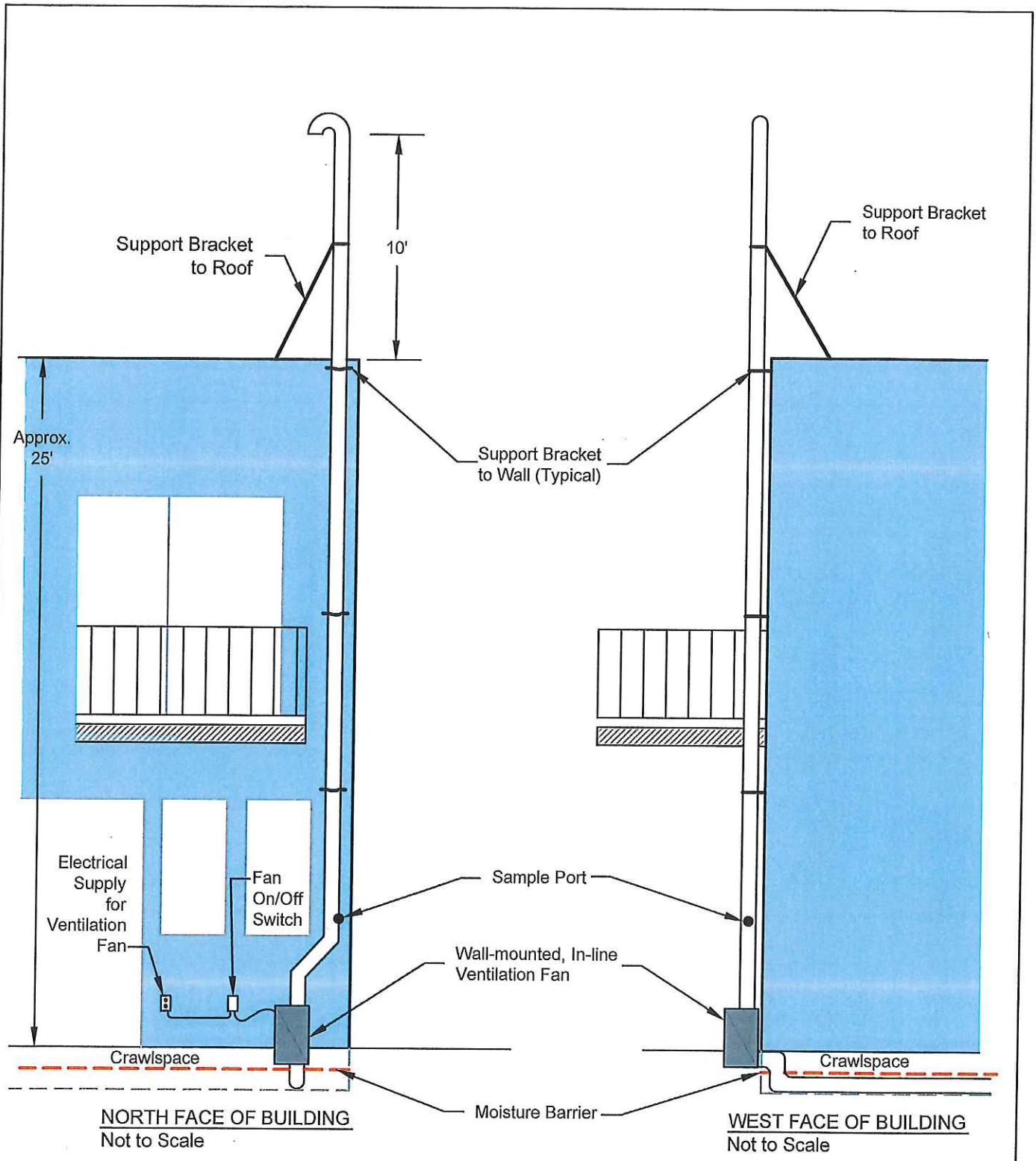
As-Built IRAMs
Plan View

15818-00/Task 8 7/15

HARTCROWSER

Figure 5

Document Path: F:\Notebooks\1581800_DEQ Campbell Dry Cleaner\GIS\1581800_IRAM(2).mxd Date: 7/29/2015 User Name: melissaschweitzer



Former Campbell Dry Cleaner
Portland, Oregon

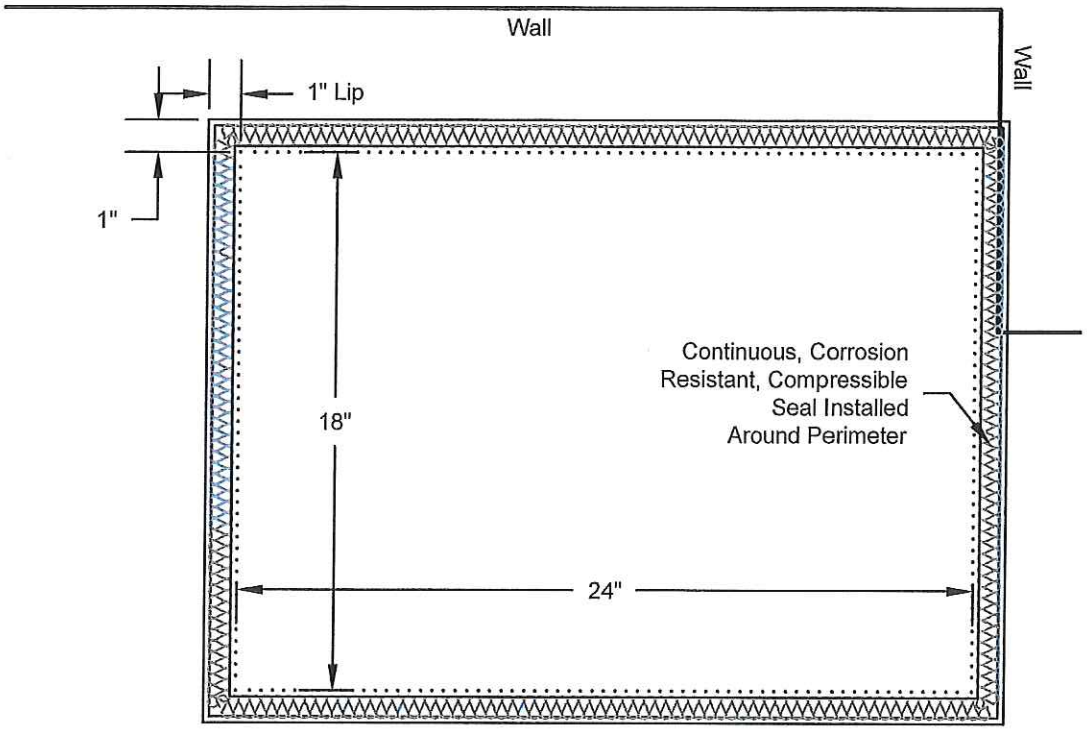
As-Built
Vapor Exhaust Stack

15818-00/Task 8 7/15

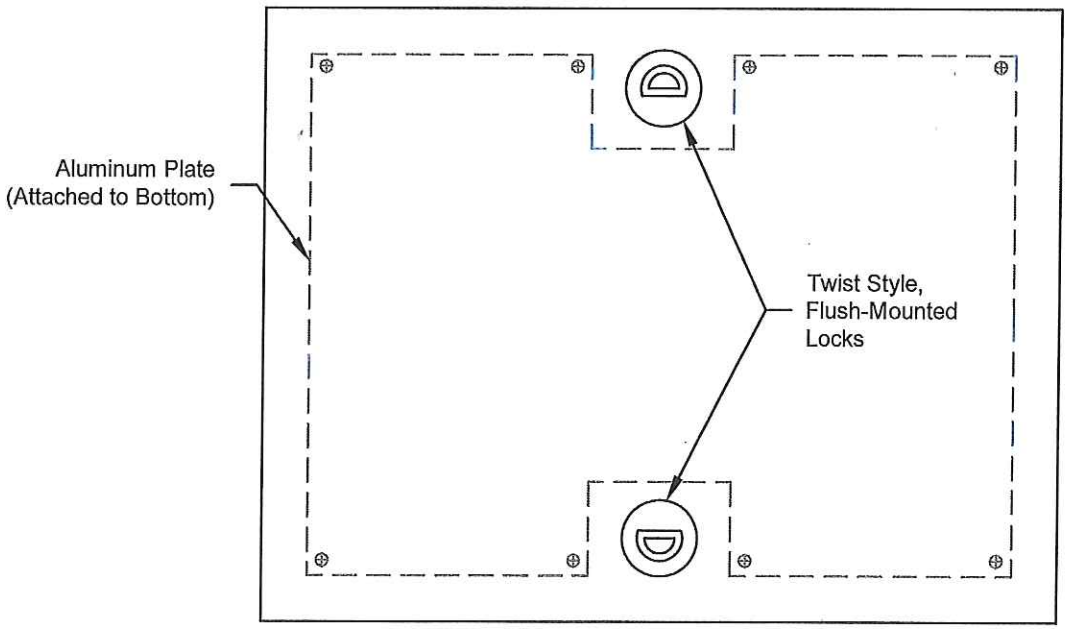
HARTCROWSER

Figure 6

File: F:\Notebooks\1581800_DEQ Campbell Dry Cleaner\CAD\1581800_IRAM.dwg Layout:VaporStack Date: 07-29-2015 Author: melissaschweitzer



CRAWLSPACE ACCESS
Not to Scale

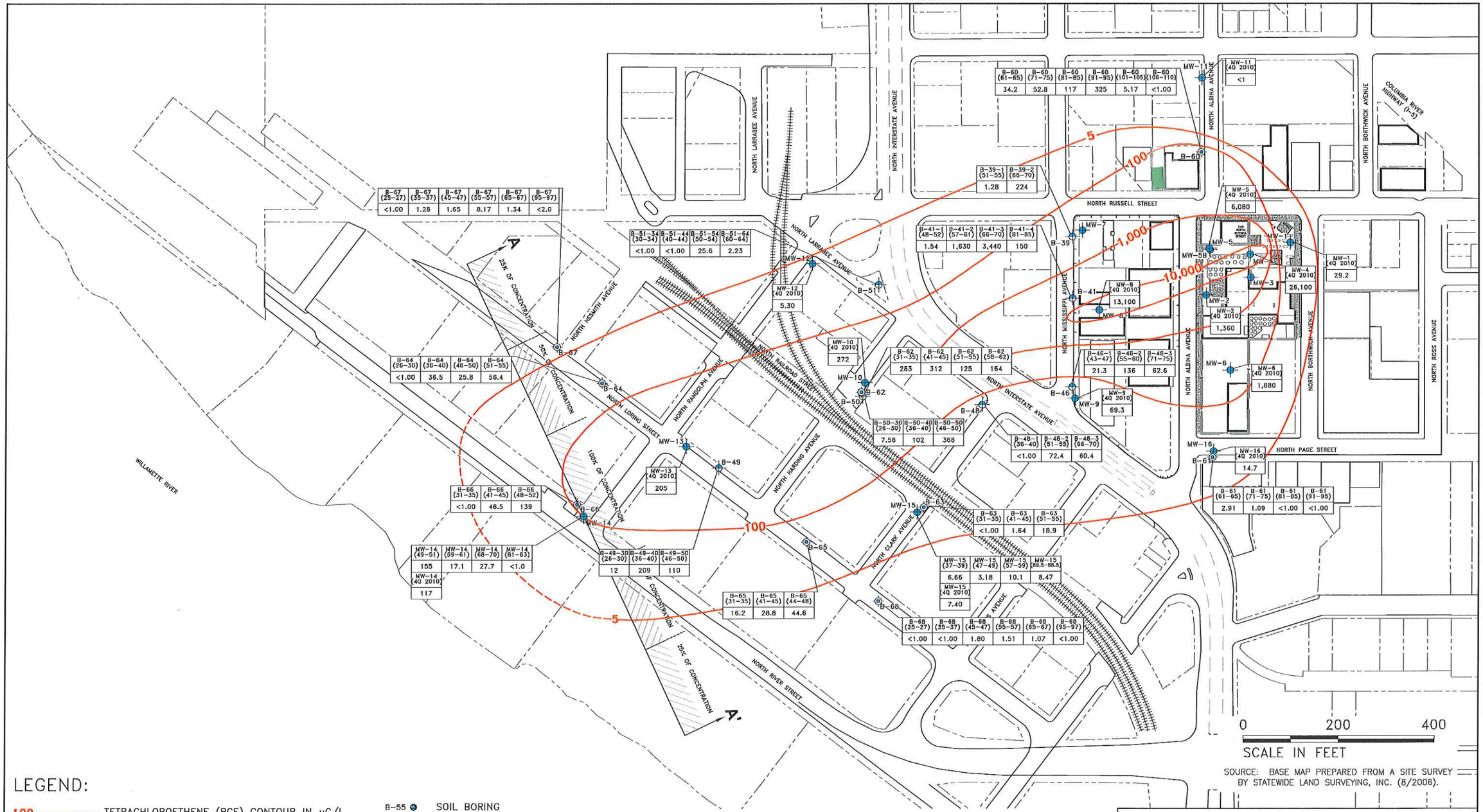


CRAWLSPACE ACCESS HATCH
Not to Scale

N

Former Campbell Dry Cleaner Portland, Oregon	
As-Built **Crawlspace Access Modifications**	
15818-00/Task 8	7/15
HARTCROWSER	Figure 7

File: F:\Notebooks\1581800_DEQ Campbell Dry Cleaner\CAD\1581800_IRAM.dwg Layout:VaporDetails Date: 07-29-2015 Author: melissaschweitzer

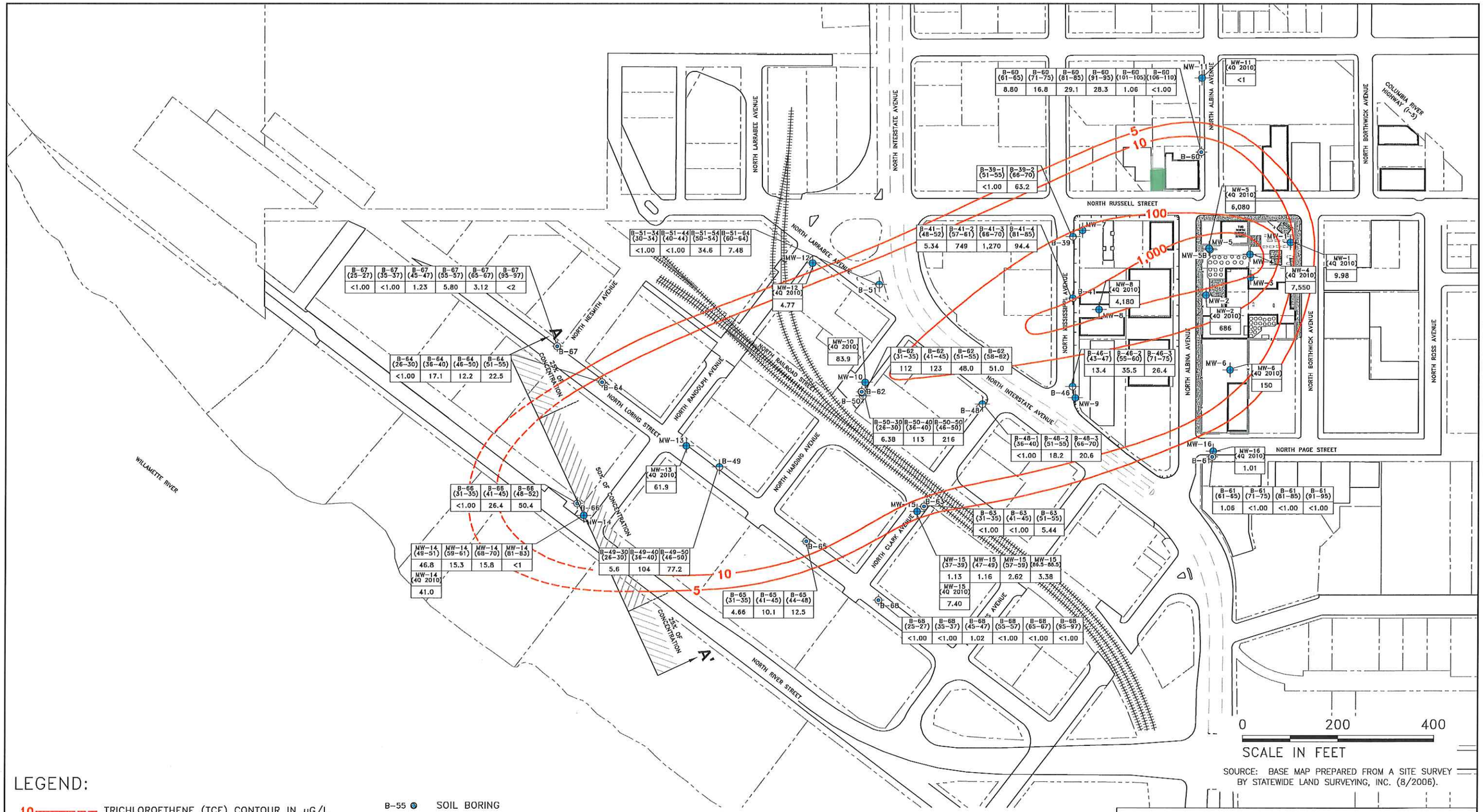


SOURCE: BASE MAP PREPARED FROM A SITE SURVEY BY STATEWIDE LAND SURVEYING, INC. (8/2006).

PCE Concentrations in Groundwater

Remedial Investigation Report
Tarr, Inc.
Portland, Oregon

APEX	Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number 1073-13 September 2014	Figure 8



TCE Concentrations in Groundwater

Remedial Investigation Report
Tarr, Inc.
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1073-13
September 2014
Figure 9

APPENDIX A

City of Portland Sewer Assets and Legend and
Water Delivery Piping in Vicinity of Campbell Site.

Legend

Sewer Easements

Easements

- Public Easements
- QuitClaimed Public Easements
- Private Easements
- Quitclaimed Private Easements

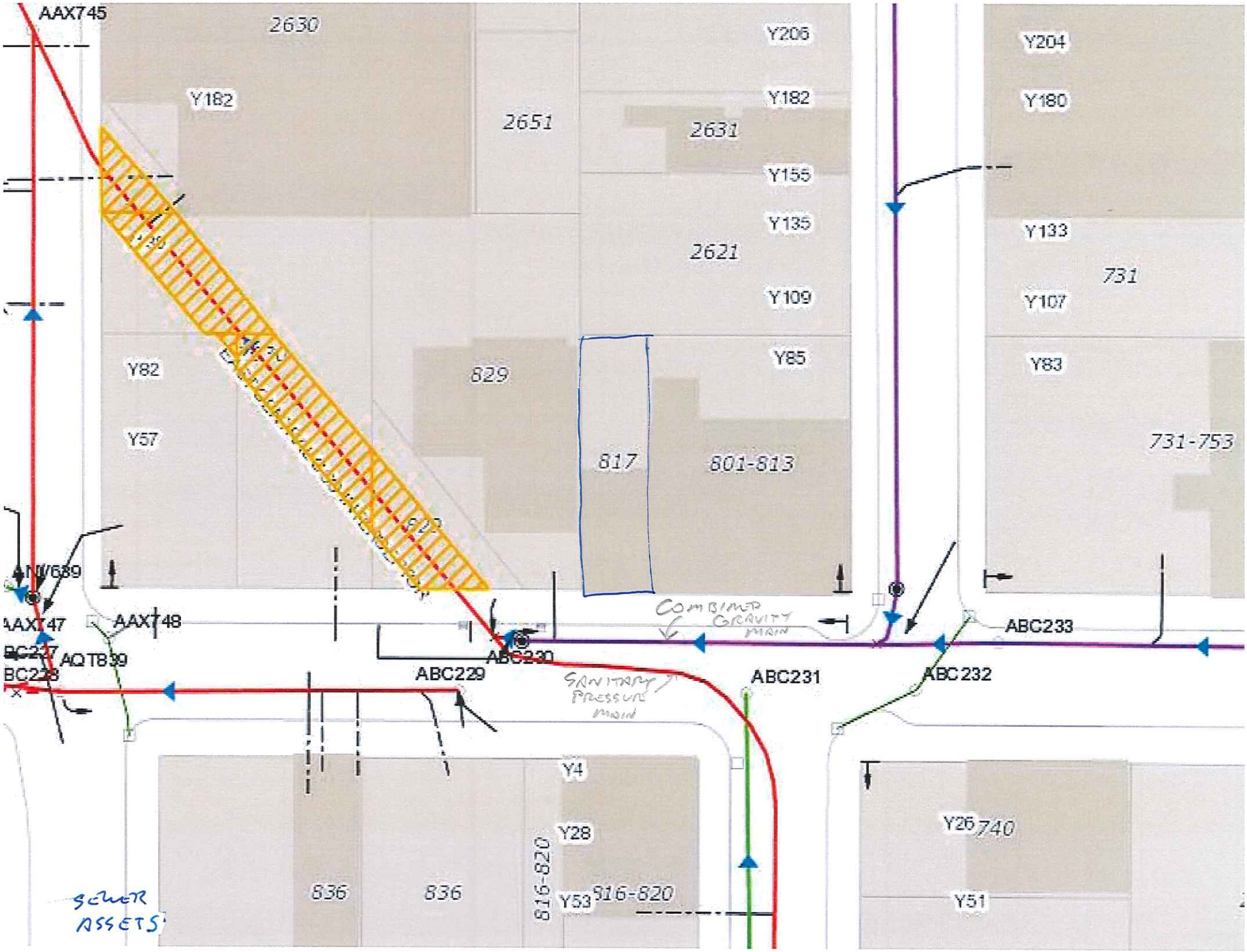
Sewer & Stormwater System

Collection Points

- TREATMENT PLANTS
- PUMP STATIONS
- MANHOLES
- CLEANOUTS
- DIVERSIONS
- OUTFALL
- SEDIMENTATION MANHOLES
- SUMPS
- INLETS
- TRASH RACK
- DISCHARGE POINTS
- FLOW CONTROL
- STORAGE
- WATERWAY FEATURES
- NO ACCESS POINTS

Collection Lines

- SANITARY GRAVITY MAIN
- COMBINED GRAVITY MAIN
- STORM GRAVITY MAIN
- SANITARY PRESSURE MAIN
- COMBINED PRESSURE MAIN
- STORM PRESSURE MAIN
- INLETS
- INLET LEADS
- SEWER LATERALS; STORM LATERALS
- CONNECTION
- CULVERT
- DITCH
- NATURAL CHANNEL
- CONSTRUCTED CHANNEL
- PRF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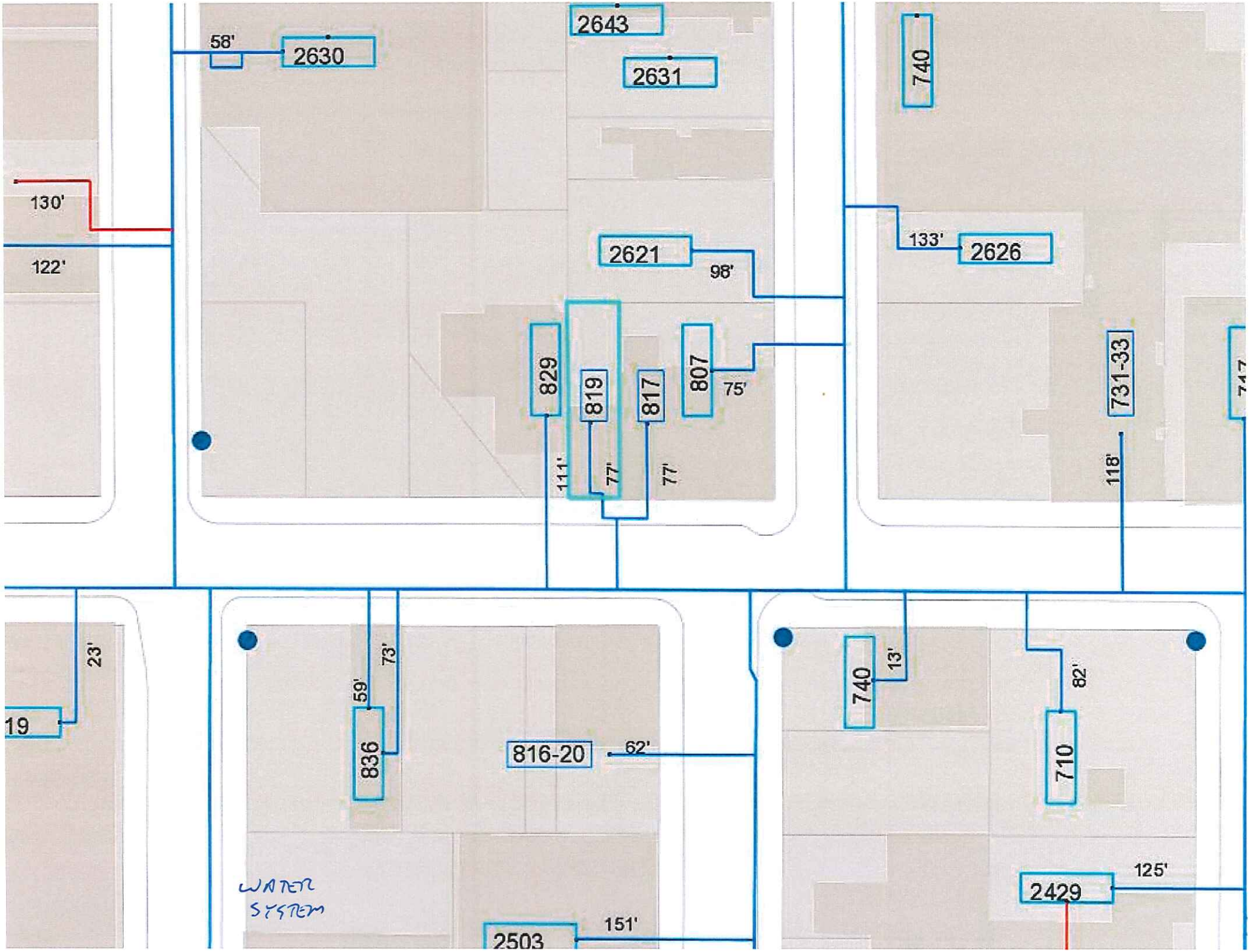
2651
Y206
Y182
2631
Y155
Y135
2621
Y109
Y204
Y180
Y133
731
Y107
Y82
829
Y85
Y83
Y57
817
801-813
731-753
AAX747
AAX748
AQT839
ABC229
ABC230
ABC231
ABC232
ABC233
COMBINED GRAVITY MAIN
SANITARY PRESSURE MAIN
Y4
Y28
836
836
816-820
816-820
Y53
Y26
740
Y51
SEWER ASSETS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2631
740
130'
122'
2621
98'
133'
2626
829
819
817
807
75'
731-33
111'
77'
77'
118'
23'
59'
73'
836
816-20
62'
740
13'
82'
710
19
WATER
SYSTEM
125'
2429
151'
2503