LANDAU ASSOCIATES

TECHNICAL MEMORANDUM

TO: Erin Hobbs, Washington State Department of Ecology

CC: Ron Taylor, Capital Industries
Don Verfurth, Gordon Rees Scully Mansukhani

FROM: Jennifer Wynkoop

DATE: March 18, 2025

RE: **Vapor Intrusion Mitigation System Shut Down Investigation Results**
Pacific Food Systems, Inc. North Building
Seattle, Washington
Project No. 1933001.030.033

INTRODUCTION AND BACKGROUND

Landau Associates, Inc. (Landau) has prepared this technical memorandum on behalf of Capital Industries, Inc. (Capital) presenting the results of an investigation evaluating conditions following the shutdown of the vapor intrusion mitigation system at the Pacific Food Systems, Inc. North Building (PFS-N) located at 5815 4th Avenue South property in Seattle, Washington (site). The general site location and location of PFS-N relative to the Capital property are shown on Figure 1 and Figure 2.

The Washington State Department of Ecology (Ecology) required mitigation of vapor intrusion (VI) from volatile constituents of concern at the PFS-N property in accordance with Agreed Order Number DE 5348, entered into by Ecology and Capital on January 24, 2008. Mitigation measures were implemented in 2015, which consisted of a sub-slab depressurization system (SSDS) and ongoing sampling activities to evaluate the effectiveness of the mitigation.

In July 2023, Landau submitted a draft Work Plan (Work Plan; Landau 2023a) to Ecology that presented sampling data showing that vapor intrusion was not causing unacceptable indoor air concentrations and that the SSDS could be shut down without impacting risk. The Work Plan detailed a proposed shutdown of the system and confirmation sampling to verify that conditions were protective. This report presents the results of the confirmation sampling following system shutdown.

PFS-N Vapor Mitigation System Background

In April 2011, volatile organic compounds, tetrachloroethene (PCE), and trichloroethene (TCE) were detected in soil gas at concentrations exceeding the screening levels used to evaluate VI risk (75 micrograms per cubic meter [µg/m^3] and 3.9 µg/m^3, respectively) in two sub-slab soil gas samples collected at the PFS-N Building. The initial sub-slab sample results indicated the potential for VI into the PFS-N Building and resulted in collection of indoor air samples to further evaluate whether a VI risk was present (Farallon 2017). Testing of indoor and outdoor ambient air was conducted by Farallon between

2012 and 2014. Indoor air results showed that TCE was present in indoor air at concentrations exceeding the indoor air screening criteria (Inhalation Pathway Interim Measure Action Levels calculated by Farallon). At the time, no evaluation was conducted to determine if there was a background source of the TCE for indoor air and the concentrations of TCE in indoor air were attributed to vapor intrusion from sub-slab soil gas.

Tier 4 mitigation measures were implemented in 2015, which consisted of a the SSDS. Initial sampling showed no reduction of concentrations of TCE in indoor air. Adjustments were made to optimize the system (extending the discharge stack to eliminate possible re-entrainment) and to confirm that the negative pressure field exerted by the mitigation system extended across the building (by installing additional differential pressure monitoring points) in 2017 and 2018. Pressure measurements continued to indicate the SSDS was maintaining a negative pressure field across the entire building slab. Despite these efforts, TCE concentrations remained elevated in indoor air.

In September 2021, Landau conducted a review of the existing site data and completed a chemical inventory and building survey. The chemical inventory revealed a background source of TCE inside the building; the tenant was using a spray-can product (Zep 45 penetrating lubricant) containing 30 to 50 percent TCE. The tenant was subsequently instructed to remove the product from the building during sampling events. Varying levels of compliance with these instructions have been observed but in general, the tenant appears to still be using the product but has agreed to have the product removed during sampling. Since removal of the Zep 45 product during sampling, all indoor sample results for TCE have been below the indoor air screening criteria (current Model Toxics Control Act [MTCA] Method B screening level for commercial workers of 2.85 µg/m^3). Indoor air TCE concentrations over time are shown on Figure 3.

At the same time as indoor air concentrations of TCE were declining due to the identification and mitigation of the presence of the background source of TCE in indoor air, concentrations of TCE in sub-slab soil gas concentrations have also been steadily declining, as evidenced by declining concentrations of TCE observed in air samples collected from the SSDS influent. SSDS influent concentrations, which are a measure of the average concentrations of TCE in sub-slab soil gas beneath the slab, have dropped below the sub-slab soil gas screening level (current MTCA Method B Screening Level for Commercial Workers of 95 µg/m^3). This is an indication that overall vapor intrusion risk has decreased significantly over time. SSDS influent TCE concentrations over time are shown on Figure 3.

The monitoring described above, conducted in 2022 and 2023, indicates that operation of the mitigation system is no longer warranted. As described above, in July 2023, Capital submitted the Work Plan to Ecology providing soil vapor data and describing a proposed shutdown and confirmation sampling program. . The system was shut down in August 2023, and confirmation sampling was conducted in August, September, and December 2023 to capture a range of potential vapor intrusion conditions.

SHUTDOWN AND CONFIRMATION SAMPLING

The Work Plan proposed to shut down the SSDS and collect two rounds of confirmation sampling; a first sampling event at least 24-hours post-shutdown, and a second sampling event at least one month

following the first, to determine if the system could be shut down permanently and decommissioned. The scope of the investigation and description of the procedures used to complete the investigation and evaluate the results were presented in the Work Plan (work plan; Landau 2023b).

The investigation was conducted in accordance with the work plan, with the addition of a third confirmation sampling event in December 2023 to ensure winter conditions were evaluated (when air-pressure differentials between sub-slab and indoor air conditions are likely to be highest and therefore provide an understanding of a worst-case scenario). Prior to each sampling event, Landau requested that the tenant cease use of and remove all open and unopened containers of the TCE-containing Zep 45 at least 48 hours in advance of the sampling event, as well as

avoid the use of Zep 45 indoors at any point during the sample collection. The tenant complied with the request and no containers were observed in use during any of the confirmation sampling events. However, the tenant is continuing to use the product outside of the sampling events.

Confirmation Monitoring Activities

Three rounds of confirmation monitoring were conducted during August, September, and December 2023, on the following schedule:

Date	Activity
August 9	Landau requests that tenant remove potential TCE sources (Zep 45) 48-hrs prior to sampling
August 16	Vapor pin installation, and SSDS shutdown
August 17	First round: indoor air sampling
August 18	First round: sub-slab vapor sampling
September 12	Landau requests that tenant remove potential TCE sources (Zep 45) 48-hrs prior to sampling
September 19	Second round: sub-slab vapor sampling
September 20	Second round: indoor air sampling
November 21	Landau requests that tenant remove potential TCE sources (Zep 45) 48-hrs prior to sampling
December 27	Third round: indoor air sampling
December 28	Third round: sub-slab vapor sampling

In accordance with the work plan, confirmation indoor air samples were collected at the three indoor air locations (5815N-IA1, 5815N-IA8, and 5815N-IA9) where previous operation, maintenance, and monitoring samples were collected (Figure 4). One outdoor air sample was collected to evaluate background ambient air conditions during indoor air sampling (5815N-OA1). Confirmation samples for sub-slab soil gas were collected at three new sub-slab sampling ports (5815N-VP1, 5815N-VP2, and 5815N-VP3) installed adjacent to the indoor air sampling locations.

Analytical Results

All indoor air, outdoor air, and sub-slab soil vapor samples were analyzed for PCE, TCE, cis-1,2-dichloroethene (cis-DCE), trans-1,2-dichloroethene (trans-DCE), 1,1-dichloroethene (1,1-DCE), and vinyl

chloride (VC) by the US Environmental Protection Agency Method TO-15. Analytical results are presented in Table 1. Laboratory analytical reports are included in Attachment 1. Results from the three confirmation sampling events were compared to the current Method B Commercial Worker screening levels and are summarized below.

Trans-DCE and 1,1-DCE were not detected above the laboratory reporting limit in any sample, and the reporting limits were well below the screening levels relevant to the site. Cis-1,2-DCE was detected in two samples, and VC in one sample above the laboratory reporting limit, but results were well below the screening levels.

PCE and TCE were detected above the reporting limit in all nine 8-hour indoor air samples, and PCE in two of the three outdoor air samples. The maximum detected concentrations of PCE (an estimated[1] 0.464 µg/m3) and TCE (0.627 µg/m^3) are lower than the screening levels for Commercial Workers by more than an order of magnitude (44.9 µg/m^3 for PCE and 2.85 µg/m^3 for TCE).

PCE was detected in the outdoor air samples in a similar range of detection levels as the indoor air samples, indicating that at least some proportion of the PCE detected in the indoor air samples is likely from an outdoor background source.

PCE and TCE were also detected above the laboratory reporting limit in all nine sub-slab soil gas samples. PCE was detected at concentrations ranging from 0.914 µg/m^3 to 1,080 µg/m^3, below the soil gas screening level of 1,200 µg/m^3 for commercial workers. TCE was detected at concentrations ranging from 33 µg/m^3 to 6,120[2] µg/m^3. At two locations, 5815N-VP1 and 5815N-VP9, concentrations were above the calculated soil gas screening level of 95 µg/m^3 for commercial workers during all three confirmation events, and at location 5815N-VP8, concentrations were above the calculated soil gas screening level during only the December confirmation sampling event.

DISCUSSION AND RECOMMENDATIONS

No compounds were detected in indoor or outdoor air at concentrations above the commercial screening levels. TCE was detected above the MTCA Method B screening level for commercial sub-slab soil gas in samples from all three sub-slab locations in at least one of the three confirmation sampling events, However, the indoor air confirmation samples collected with the SSDS shut down indicate that vapor intrusion from sub-slab conditions is not creating an inhalation risk in indoor air at the PSF-N property even during worst-case atmospheric conditions, and that the SSDS is not required to maintain these conditions. Additionally, soil vapor extraction at Plant 4, adjacent to PFS is expected to begin in 2025, which will significantly reduce sub-slab soil gas concentrations.

Therefore, Capital proposes to permanently discontinue system operation and decommission the SSDS at PFS-N.

[1] The lab results for PCE and TCE collected on 8/17/24 at 5815N-IA9 were qualified as “estimated” due to laboratory internal standards out of control limits. The results are given a “J” qualifier noting that they are estimates in Table 1.
[2] The laboratory result for TCE collected on 12/18/23 at 5815N-VP1 was noted by the laboratory as having exceeded the quantitation range for the analysis.

USE OF THIS TECHNICAL MEMORANDUM

This Technical Memorandum has been prepared for the exclusive use of Capital Industries and Department of Ecology for specific application to the Pacific Food Systems, Inc. North Building property. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. Landau makes no other warranty, either express or implied.

This document has been prepared under the supervision and direction of the following key staff.

LANDAU ASSOCIATES, INC.

Alyssa Johnson
Associate Scientist

Jennifer Wynkoop
Principal Scientist

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ATTACHMENTS

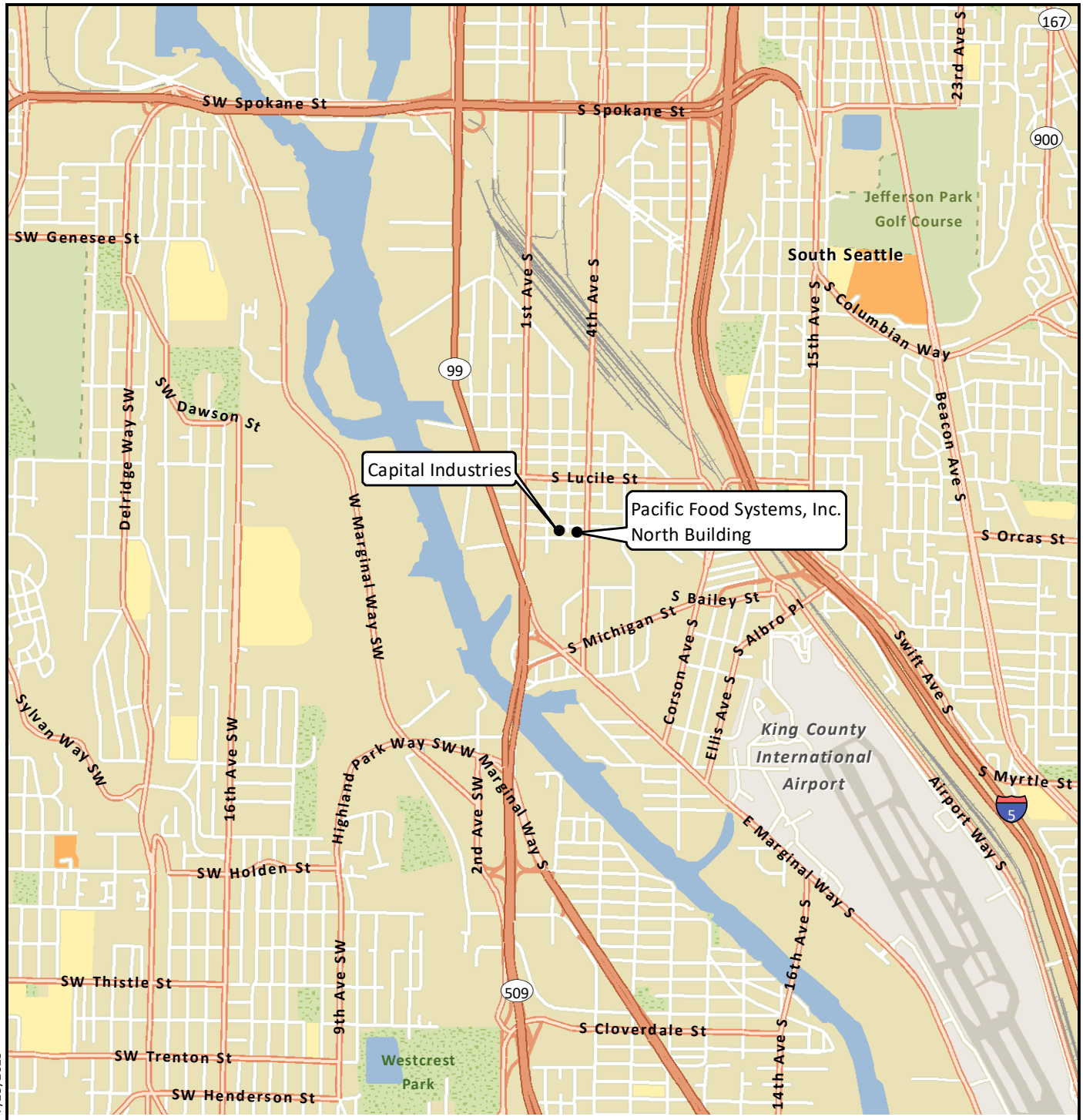
Figure 1	Vicinity Map
Figure 2	Site Map
Figure 3	TCE Time Series Plot Monitoring Locations
Figure 4	Monitoring Locations
Table 1	Indoor Air and Sub-slab Sampling Results

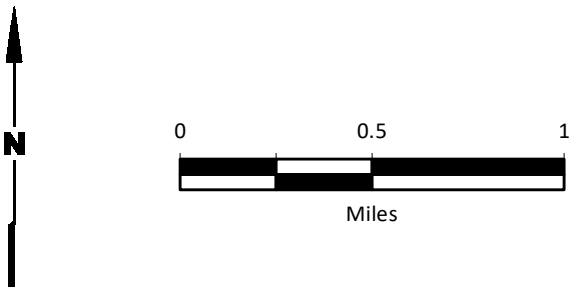
REFERENCES

Farallon. 2017. *Vapor Intrusion Mitigation Measures Status Report*; Pacific Food Systems, Inc. North Building, 5815 Fourth Avenue South; Seattle, Washington. Agreed Order No. DE 10402. Prepared for Ron Taylor, Capital Industries, Inc. by Farallon Consulting LLC, Issaquah, Washington. August.

Landau. 2023a. *Agency Review Draft Technical Memorandum – Work Plan for Vapor Intrusion Mitigation System Shut Down*; Pacific Food Systems, Inc. North Building, Seattle, Washington. Landau Project No. 1933001.030.033. Landau Associates, Inc. July 25.

Landau. 2023b. Agency Review Draft Technical Memorandum RE: Work Plan for Vapor Intrusion Mitigation System Shut Down. Pacific Food Systems, Inc. North Building. Seattle, Washington Landau Project No. 1933001.030.033. Landau Associates, Inc. July 25.





Data Source: Esri 2012

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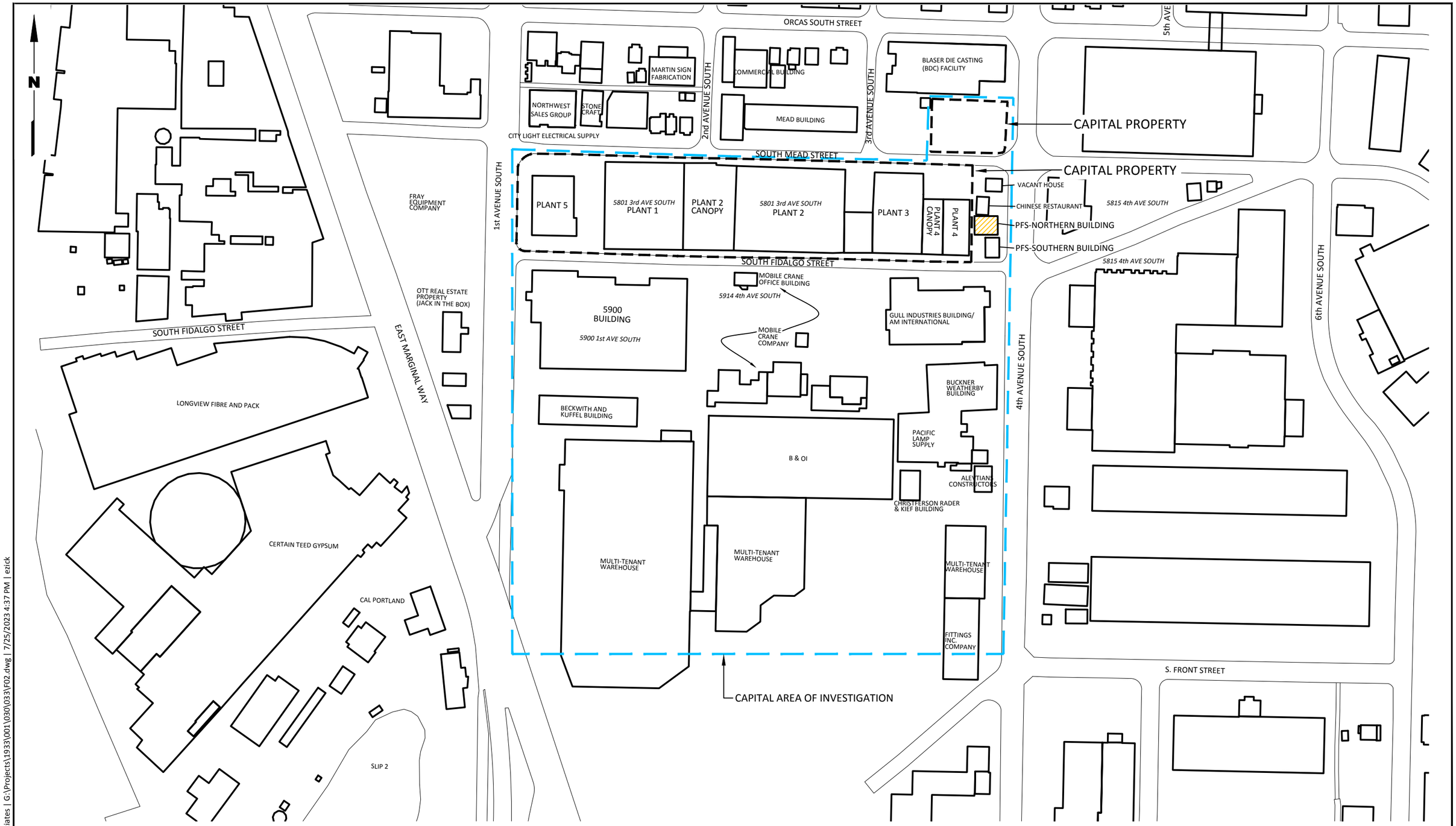
Capital Industries, Inc. Seattle, Washington	**Vicinity Map**	Figure 1



Legend

Pacific Food Systems - North Building

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 200 400

Scale in Feet

Source: Farallon Consulting, August 2017

Capital Industries, Inc.
Seattle, Washington

Site Map

Figure 2

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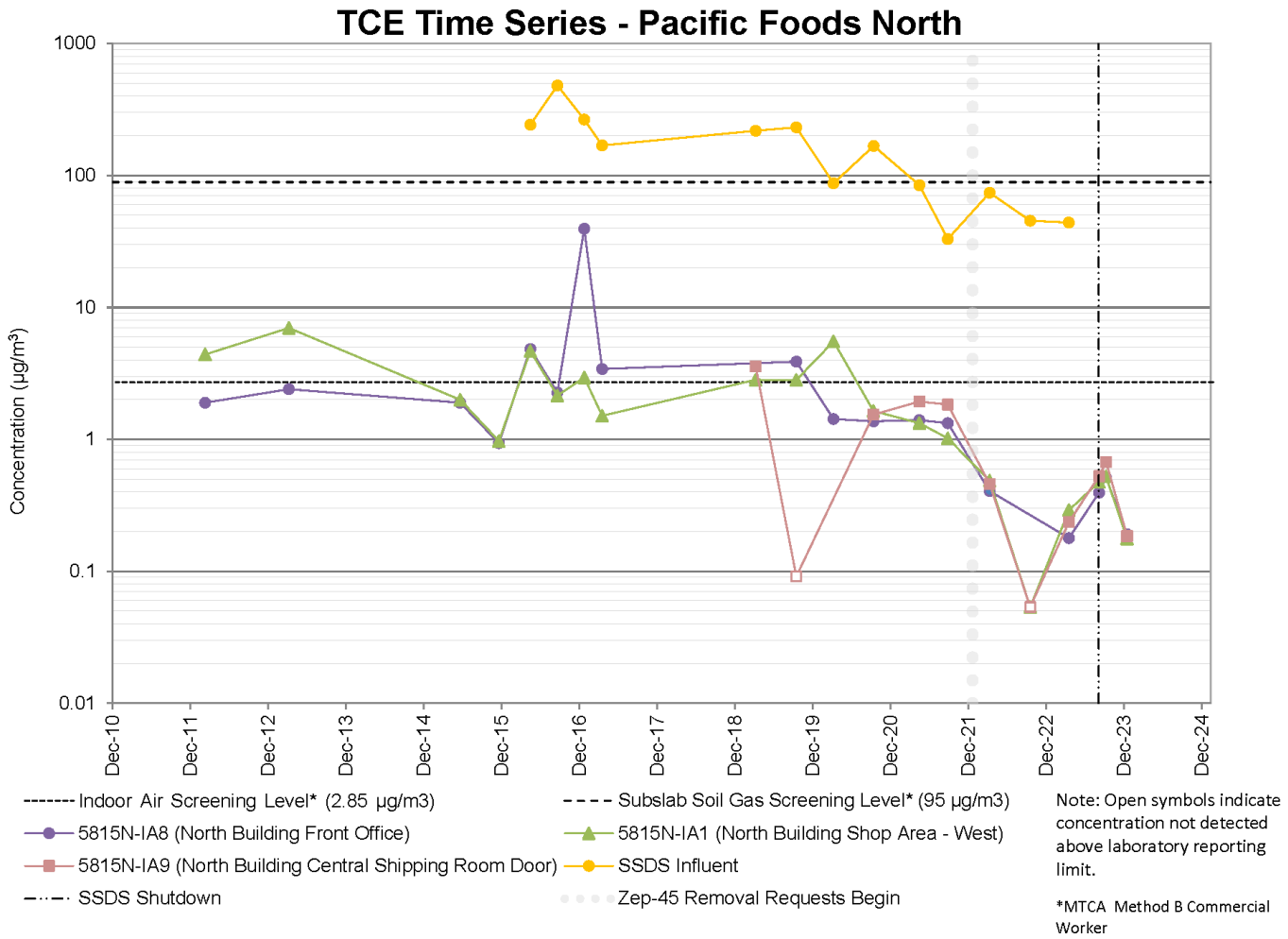

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Landau Associates

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Capital Industries, Inc. Seattle, Washington	**TCE Time Series Plot Monitoring Locations**	Figure 3

N

STORAGE YARD

CAPITAL INDUSTRIES, INC. PROPERTY
5801 3rd AVENUE SOUTH

4th AVENUE SOUTH

CHINESE RESTAURANT

FLOOR DRAIN
SUMP
STOVE HOODS
DINNING AREA
KITCHEN
AQUARIUM
OIL/WATER SEPARATOR
STORAGE
MENS RESTROOM
WOMENS RESTROOM

PACIFIC FOOD SYSTEMS - NORTH BUILDING

5815N-IA1
5815N-VP1
MACHINE WORK AREA
POWER TOOL WORK AREA
ROLLUP DOOR
PARTS ROOM 2 LEVELS
TOOL BOX
SUMP 1
SUMP 2
5815N-IA9
5815N-VP9
WORK BENCHES
OFFICE
OFFICE
5815N-IA8
5815N-VP8
PARTS CLEANER
RESTROOM

CAPITAL INDUSTRIES PLANT 4

AIR INLET 2" GATE VALVE AND FILTER

4" DIAMETER VENT STACK EXTENDED 6' ABOVE ROOF

OFFICE
PACIFIC FOOD SYSTEMS - SOUTH BUILDING
HALLWAY
OFFICE
OFFICE
OFFICE
OFFICE

SSDS BLOWER MOUNTED TO OUTSIDE WALL IN COVERED AREA

STORAGE YARD

5815N-OA1

SOUTH FIDALGO STREET

Legend

- I Indoor Air Monitoring Location
- S Subslab Soil Gas Monitoring Location
- O Outdoor Air Sample Location

Note

1. SSDS = Subslab Depressurization System.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 20 40
Scale in Feet

Source: Farallon Consulting, August 2017

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Capital Industries, Inc.
Seattle, Washington

Pacific Food Systems, Inc.
North Building
Monitoring Locations

Figure
4

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Table 1
Indoor Air and Sub-slab Analytical Results
Vapor Mitigation Shutdown
Pacific Food Systems, Inc. North Building
5815 4th Avenue South
Seattle, Washington

Sample Type	Location	Sample Identification	Sample Date	Ratio PCE/TCE	Volatile Organic Compounds (µg/m³; TO-15)					
					PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride
Lowest Commerical Worker Indoor Air MTCA Method B Screening Level (a)					44.9	2.85	156	156	779	1.33
Indoor Air (c)	5815N-IA1	5815N-IA1-20230817	8/17/2023	0.67	**0.321**	**0.476**	0.198 U	0.595 U	0.0397 U	**0.0600**
		5815N-IA1-20230919	9/19/2023	0.44	**0.229**	**0.524**	0.198 U	0.595 U	0.0397 U	0.0256 U
		5815N-IA1-20231227	12/27/2023	1.20	**0.212**	**0.177**	0.198 U	0.595 U	0.0397 U	0.0256 U
	5815N-IA8	5815N-IA8-20230817	8/17/2023	0.69	**0.271**	**0.395**	0.317 U	0.952 U	0.0634 U	0.0409 U
		5815N-IA8-20230919	9/19/2023	0.41	**0.214**	**0.517**	0.198 U	0.595 U	0.0397 U	0.0256 U
		5815N-IA8-20231227	12/27/2023	1.35	**0.258**	**0.191**	0.198 U	0.595 U	0.0397 U	0.0256 U
	5815N-IA9	5815N-IA9-20230817	8/17/2023	0.88	**0.464 J**	**0.526 J**	0.476 U	1.43 U	0.0952 U	0.0613 U
		5815N-IA9-20230919	9/19/2023	0.32	**0.218**	**0.672**	0.198 U	0.595 U	0.0397 U	0.0256 U
		5815N-IA9-20231227	12/27/2023	1.32	**0.245**	**0.185**	0.198 U	0.595 U	0.0397 U	0.0256 U
Outdoor Air	5815N-OA1	5815N-OA1-20230817	8/17/2023	5.33	**0.344**	0.0645 U	0.238 U	0.714 U	0.0476 U	**0.0762**
		5815N-OA1-20230919	9/19/2023	1.29	**0.0692**	0.0537 U	0.198 U	0.595 U	0.0397 U	0.0256 U
		5815N-OA1-20231227	12/27/2023	N/A	0.0678 U	0.0537 U	0.198 U	0.595 U	0.0397 U	0.0256 U
Lowest Commerical Worker Sub-slab Soil Gas MTCA Method B Screening Level (b)					1,200	95	5,200	5,200	26,000	44
Subslab	5815N-VP1	5815N-VP1-20230818	8/18/2023	0.02	**5.76**	**316**	0.793 U	2.38 U	0.159 U	0.102 U
		5815N-VP1-20230920	9/20/2023	0.05	**97.5**	**1,960**	**2.40**	2.38 U	0.159 U	0.102 U
		5815N-VP1-20231228	12/28/2023	0.18	**1,080**	**6,120 E**	**3.00**	2.38 U	0.159 U	0.102 U
	5815N-VP8	5815N-VP8-20230818	8/18/2023	0.06	**1.82**	**33.0**	0.793 U	2.38 U	0.159 U	0.102 U
		5815N-VP8-20230920	9/20/2023	0.01	**0.914**	**61.9**	0.793 U	2.38 U	0.159 U	0.102 U
		5815N-VP8-20231228	12/28/2023	0.15	**50.4**	**338**	0.793 U	2.38 U	0.159 U	0.102 U
	5815N-VP9	5815N-VP9-20230818	8/18/2023	0.02	**3.75**	**180**	0.793 U	2.38 U	0.159 U	0.102 U
		5815N-VP9-20230920	9/20/2023	0.02	**2.77**	**149**	0.793 U	2.38 U	0.159 U	0.102 U
		5815N-VP9-20231228	12/28/2023	0.13	**52.9**	**403**	0.793 U	2.38 U	0.159 U	0.102 U

Notes:

Bold text indicates detected analyte

Blue shading indicates detected analyte exceeds Modified Method B.

(a) Indoor air screening levels are compared to indoor air results only and are the lowest of Cancer or Noncancer levels.

(b) Sub-slab screening levels are compared to subslab vapor results only and are the lowest of Cancer or Noncancer

(c) Indoor air concentrations are not normalized to outdoor air concentrations.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

E = Value above quantitation range

Acronyms/Abbreviations:

µg/m³ = micrograms per cubic meter

MTCA = Model Toxics Control Act

N/A = not applicable

PCE = tetrachloroethene

TCE = trichloroethene