

**DRAFT ENGINEERING EVALUATION
VILLA STREET LP
990 VILLA STREET
MOUNTIAN VIEW, CA 94041
PLANT NO. 24328; APPLICATION NO. 29732**

BACKGROUND

Trinity Source Group, Inc., on behalf of Villa Street LP, has applied for an Authority to Construct/Permit to Operate the following soil remediation project:

S-1: Sub-Slab Depressurization (SSD) System Equipped with one (1) blower; Make: Fantech; Model: Rn1; Maximum flow rate: 140 scfm;

S-2: Sub-Slab Depressurization (SSD) System Equipped with one (1) blower; Make: Fantech; Model: Rn1; Maximum flow rate: 140 scfm

S-3: Sub-Slab Depressurization (SSD) System Equipped with one (1) blower; Make: Fantech; Model: Rn1; Maximum flow rate: 140 scfm

All Abated by

A-1: (2) – 200 lbs Granular Activated Carbon (GAC) Adsorbers arranged in series, Make: EnviroSupply & Service, Inc, Model: V200

The above equipment will be located at 990 Villa Street, Mountain View, CA 94041. The subject property was formerly Austin's Fremont Laundry, a dry cleaning facility. Historical soil and sub-slab vapor sampling at the Subject Property has confirmed the presence of the halogenated volatile organic compound (HVOC) tetrachloroethene (PCE) below the building foundation slab, which poses a vapor intrusion inhalation risk to future building occupants. To mitigate this risk, Villa Street LLP, while performing building renovations has taken a pre-emptive mitigation action and installed a SSDS, as recommended by the United States Environmental Protection Agency (USEPA) in the "OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Sources to Indoor Air" (USEPA, 2015). Trinity Source Group, Inc has performed pilot test during the period from April 8 to 12, 2019 to determine the extent and magnitude of soil gas impacts.

The SSD systems will consist of five horizontal extraction trenches plumbed to three vertical riser pipes. Extraction Trenches, EXT-1 and Ext-2 are each fitted with an inline fan designated Source-1 (S-1) and S-2, respectively. Ext-3 through Ext-5 are plumbed together under the slab and are drawn upon by an inline fan designated S-3. All three sources will be treated with a pair of 55-gallon drums containing minimum of 200-pounds of vapor phase granulated activated carbon (A-1), before venting through the same discharge point P-1.

S-1, S-2 and S-3 will be located within 1,000 feet of the outer boundary of Khan Lab School at 1200 Villa Street, Mountain View, CA 94041. Therefore, this application requires Public Notification per District Regulation 2-1-412. Also, the following two schools are within one-quarter mile of the sources and will be included in public notification.

- Mountain View Academy, located at 360 South Shoreline Blvd., Mountain View, CA 94041
- View High School, located at 655 West Evelyn Ave., Mountain View, CA 94041

A public notice was prepared and will be sent to the parents or guardians of children enrolled in the above referenced schools and to each address within a radius of 1,000 feet of the sources.

EMISSIONS CALCULATION

POC and NPOC Emissions from S-1, S-2, and S-3 Sub-Slab Depressurization Systems:

For a conservative estimate of annual emissions, the District staff assumed that the systems are operated for the entire year with inlet concentrations corresponding to the initial soil concentration levels. Generalized assumptions follow:

- Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21 °C; 1 mole occupies 24.15 L
- Influent values based on operational parameters of equipment and applicant supplied soil vapor test results:
 - Influent volumetric flowrate limit of 140 scfm for S-1; maximum influent concentration = Tetrachloroethylene (PCE) 81,000 µg/m³, Trichloroethylene (TCE) 3,900 µg/m³, cis-1,2-Dichloroethene 1,100 µg/m³
 - Influent volumetric flowrate limit of 140 scfm for S-2; maximum influent concentration = Tetrachloroethylene (PCE) 8,500 µg/m³, Toluene 98 µg/m³, m,p-Xylenes 210 µg/m³
 - Influent volumetric flowrate limit of 140 scfm for S-3; maximum influent concentration = Tetrachloroethylene (PCE) 34,000 µg/m³, Trichloroethylene (TCE) 1,400 µg/m³, Tetrahydrofuran 900 µg/m³, tert-Butanol 490 µg/m³
- Abatement efficiency of 98.5% was assumed for A-1, (2) – GAC 200-pound capacity Adsorbers.

Emissions of Toxic Air Contaminants [PCE]:

$$\frac{81000 \mu\text{g}}{\text{m}^3} * \frac{140 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{1 \text{ m}^3}{35.31 \text{ ft}^3} * \frac{1 \text{ lb}}{4.54\text{E}+08 \mu\text{g}} * (1 - 0.985) = \mathbf{0.015 \text{ lb/day}} \text{ (abated)}$$

$$0.015 \text{ lb/day} * 365 \text{ days/yr} = \mathbf{5.58 \text{ lb/year}} \text{ (abated)} = \mathbf{0.0028 \text{ tons/year}} \text{ (abated)}$$

Table 1 – Estimated Emissions from S-1

Pollutant	Influent Vapor Concentration (µg/m ³)	Unabated Daily Emissions (lb/day)	Abated Hourly Emissions (lb/hr)	Abated Daily Emissions (lb/day)	Abated Annual Emissions (lb/yr)
PCE	81000	1.019	6.37E-04	1.53E-02	5.58
TCE	3900	0.049	3.07E-05	7.36E-04	0.27
cis-1,2-Dichloroethene	1100	0.014	8.65E-06	2.08E-04	0.08

Table 2 – Estimated Emissions from S-2

Pollutant	Influent Vapor Concentration (µg/m ³)	Unabated Daily Emissions (lb/day)	Abated Hourly Emissions (lb/hr)	Abated Daily Emissions (lb/day)	Abated Annual Emissions (lb/yr)
PCE	8500	0.1069	6.69E-05	1.60E-03	0.59
TCE	98	0.0012	7.71E-07	1.85E-05	0.01
m,p-Xylene	210	0.0026	1.65E-06	3.96E-05	0.01

Table 3 – Estimated Emissions from S-3

Pollutant	Influent Vapor Concentration ($\mu\text{g}/\text{m}^3$)	Unabated Daily Emissions (lb/day)	Abated Hourly Emissions (lb/h)	Abated Daily Emissions (lb/day)	Abated Annual Emissions (lb/yr)
PCE	34000	0.428	2.67E-04	6.42E-03	2.34
TCE	1400	0.018	1.10E-05	2.64E-04	0.10
Tetrahydrofuran	900	0.011	7.08E-06	1.70E-04	0.06
Tert-Butanol	490	0.006	3.85E-06	9.25E-05	0.03

Total Emissions from S-1, S-2 and S-3:

Per Regulation 1-234, any organic compounds designated to have negligible photochemical reactivity by the USEPA are considered NPOCs. Since PCE has been determined to have negligible photochemical reactivity per 40 CFR 51.100(s)(1), PCE was considered to be NPOC.

Tables 4-6 summarize the cumulative increases in criteria pollutant emissions that will result from the operation of S-1, S-2, and S-3.

Table 4 – Total Criteria Pollutant Emissions from S-1

Pollutant	Emissions		
	(lb/day)	(lb/yr)	(TPY)
POC	9.44E-04	0.34	0.000
NPOC	1.53E-02	5.58	0.003

Table 5 – Total Criteria Pollutant Emissions from S-2

Pollutant	Emissions		
	(lb/day)	(lb/yr)	(TPY)
POC	5.81E-05	0.02	0.000
NPOC	1.60E-03	0.59	0.000

Table 6 – Total Criteria Pollutant Emissions from S-3

Pollutant	Emissions		
	(lb/day)	(lb/yr)	(TPY)
POC	5.27E-04	0.19	0.000
NPOC	6.42E-03	2.34	0.001

PLANT CUMULATIVE INCREASE

Table 7 summarizes the cumulative increase in criteria pollutant emissions that will result at Plant No. 24328 from operation of S-1, S-2, and S-3.

Table 7 - Plant Cumulative Emissions Increase, Post 4/5/91

Pollutant	Existing Emissions, Post 4/5/91 (TPY)	New Increase with This Application (TPY)	Cumulative Emissions (TPY)
POC	0.000	0.0003	0.0003
NPOC	0.000	0.0043	0.0043

HEALTH RISK ANALYSIS**Table 8 - Toxic Air Contaminant Emissions Calculations from S-1**

Pollutant	Abated Hourly Emissions (lb/h)	Acute Trigger Level (lb/h)	Abated Annual Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	HRA Required? (Y/N)
PCE	6.37E-04	4.40E+01	5.58	1.40E+01	N
TCE	3.07E-05	-	0.27	4.10E+01	N
cis-1,2-Dichloroethene	8.65E-06	-	0.08	-	N

Table 9 - Toxic Air Contaminant Emissions Calculations from S-2

Pollutant	Unabated Hourly Emissions (lb/h)	Acute Trigger Level (lb/h)	Unabated Annual Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	HRA Required? (Y/N)
PCE	6.69E-05	4.40E+01	0.59	1.40E+01	N
Toluene	7.71E-07	8.20E+01	0.01	1.20E+04	N
m,p-Xylene	1.65E-06	4.90E+01	0.01	2.70E+04	N

Table 10 - Toxic Air Contaminant Emissions Calculations from S-3

Pollutant	Unabated Hourly Emissions (lb/h)	Acute Trigger Level (lb/h)	Unabated Annual Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	HRA Required? (Y/N)
PCE	2.67E-04	4.40E+01	2.34	1.40E+01	N
TCE	1.10E-05	NA	0.10	4.10E+01	N
Tetrahydrofuran	7.08E-06	-	0.06	-	N
tert-Butanol	3.85E-06	-	0.03	-	N

Based on calculations presented in Tables 8-10, emissions of TACs for S-1, S-2, and S-3 do not exceed acute or chronic trigger levels set forth in Table 1 of Regulation 2-5; therefore, a toxic risk screen is not required.

STATEMENT OF COMPLIANCE

The owner/operator of S-1, S-2, and S-3 is expected to comply with Regulation 8-47-301, "Emission Control Requirements, Specific compounds", and Regulation 8-47-302, "Organic compounds", since S-1, S-2, and S-3 will be abated by A-1. The emissions from S-1, S-2, and S-3 will be required to be vented to A-1 at all times of operation.

BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

In accordance with Regulation 2-2-301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxides (SO₂), particulate matter less than 10 micrometer (PM₁₀) and particulate matter less than 2.5 micrometer (PM_{2.5}).

Based on the emission calculations presented in POC emissions calculation section, S-1, S-2, and S-3 are not subject to BACT, since the potential to emit for all criteria pollutants is less than 10 pounds per day for S-1, S-2, and S-3.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

This project is considered to be ministerial under the District's CEQA Regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors as described in the District's Permit Handbook Chapter 9.2 (Soil Vapor Extraction) and therefore is not discretionary as defined by CEQA.

PERMIT CONDITION**Permit Condition #27002**

1. The owner/operator shall vent Sources S-1, S-2, and S-3 at all times to Abatement device A-1, two (200 lb minimum capacity) Activated Carbon Vessels arranged in series. Influent vapor flow shall not exceed 140 scfm for each source. In no event shall the Toxic Air Contaminants (TACs) emissions to the atmosphere exceed the respective chronic trigger levels in District's Regulation 2-5, Table 2-5-1. [Basis: Cumulative Increase, Regulation 2-5]
2. The owner/operator of S-1, S-2, and S-3 shall monitor with a photo-ionization detector (PID), flame-ionization detector (FID), or other method approved in writing by the District's Source Test Manager at the following locations:
 - a. At the inlet to the second to last carbon vessel in series.
 - b. At the inlet to the last carbon vessel in series.
 - c. At the outlet of the carbon vessel that is last in series prior to venting to the atmosphere.

When using an FID to monitor breakthrough, readings may be taken with and without a carbon filter tip fitted on the FID probe. Concentrations measured with the carbon filter tip in place shall be considered methane for the purposes of these permit conditions. [Basis: Cumulative Increase, Regulation 2-5, TBACT]

3. The owner/operator of S-1, S-2, and S-3 shall record these monitor readings in a monitoring log at the time they are taken. The owner/operator shall use the monitoring results to estimate the frequency of carbon change-out necessary to maintain compliance with conditions number 4 and 5. Monitoring shall be conducted on a daily basis for the first week of operation. After demonstrating continuous compliance for the first week, the owner/operator may switch monitoring to a weekly schedule. The owner/operator of S-1, S-2, and S-3 may also propose for District review, based on actual measurements taken at the site during operation of the source, that the monitoring schedule be changed based on the decline in organic emissions and/or the demonstrated breakthrough rates of the carbon vessels. Written approval by the District's Engineering Division must be received by the owner/operator prior to a change to the monitoring schedule. [Basis: Cumulative Increase, Regulation 2-5, TBACT]

4. The owner/operator of S-1, S-2, and S-3 shall immediately change out the second to last carbon vessel with unspent carbon upon breakthrough, defined as the detection at its outlet of the higher of the following:
 - a. 10 % of the inlet stream concentration to the Carbon vessel.
 - b. 1 ppmv or greater (measured as hexane).
 [Basis: Cumulative Increase, Regulation 2-5, TBACT]
5. The owner/operator of S-1, S-2, and S-3 shall immediately change out the last carbon vessel with unspent carbon upon detection at its outlet of 0.3 ppmv (measured as hexane). [Basis: Cumulative Increase, Regulation 2-5, TBACT]
6. The owner/operator of S-1, S-2, and S-3 shall maintain the following records for each month of operation of the source:
 - a. The hours and times of operation.
 - b. Each monitor reading or analysis result for the day of operation they are taken.
 - c. The number of carbon beds removed from service.
 - d. Total throughput of soil vapor from source S-1, S-2, and S-3 in Standard Cubic Feet
 Such records shall be retained and made available for inspection by the District for two years following the date the data is recorded. [Basis: Regulation 1-523]
7. The owner/operate of S-1, S-2, and S-3 shall report any non-compliance with these conditions to the Compliance & Enforcement Division at the time that it is first discovered. The owner/operator of S-1, S-2, and S-3 shall detail the corrective action taken and include the data showing the exceedance as well as the time of occurrence in the submittal. [Basis: Cumulative Increase, Regulation 2-5, TBACT]
8. The owner/operator of S-1, S-2, and S-3 shall maintain a file containing all measurements, records and other data that are required to be collected pursuant to the various provisions of this conditional Authority to Construct/Permit to Operate. All measurements, records and data required to be maintained by the owner/operator shall be retained for at least two years following the date the data is recorded. [Basis: Regulation 1-523]
9. Upon final completion of the remediation project, the owner/operator of S-1, S-2, and S-3 shall notify the Engineering Division within two weeks of decommissioning the operation. [Basis: Cumulative Increase, Regulation 2-5, TBACT]

RECOMMENDATION

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all applicable requirements of District, state, and federal air quality-related regulations. The preliminary recommendation is to issue an Authority to Construct for the equipment listed below. However, the proposed source is located within 1,000 feet of a school, which triggers the public notification requirements of District Regulation 2-1-412.6. After the comments are received from the public and reviewed, the District will make a final determination on the permit.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on issuance of a Permit to Operate for the following source:

- S-1: Sub-Slab Depressurization (SSD) System Equipped with one (1) blower; Make: Fantech; Model: Rn1; Maximum flow rate: 140 scfm;**
S-2: Sub-Slab Depressurization (SSD) System Equipped with one (1) blower; Make: Fantech; Model: Rn1; Maximum flow rate: 140 scfm
S-3: Sub-Slab Depressurization (SSD) System Equipped with one (1) blower; Make: Fantech; Model: Rn1; Maximum flow rate: 140 scfm

All Abated by

A-1: (2) – 200 lbs Granular Activated Carbon (GAC) Adsorbers arranged in series, Make: EnviroSupply & Service, Inc, Model: V200

Prepared by:

Date: 8/5/19

Huiting Gao,
Air Quality Engineer

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