

## Pat Hoban

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**From:** Niles, Dan@Waterboards <Dan.Niles@waterboards.ca.gov>  
**Sent:** Tuesday, September 29, 2020 9:45 PM  
**To:** Glenn Tofani; Pat Hoban  
**Cc:** (SCC-PW) Kimberly Finley  
**Subject:** RE: Santa Cruz/ Capitola -- Soil vapor issue

Hi Glenn and Pat,

As requested, I reviewed the revised plans and preliminarily concur with the scope of work with the condition that a land use covenant will be established for ensuring performance of the systems as detailed prior to occupancies. I also referenced in our forthcoming responsible party disposition letter (a.k.a. "comfort letter") our intent to formally concur with the comprehensive set of plans for the systems with the above noted condition.

Some questions that may or may not necessitate updates:

- Intake filtering: Is intake filtering advised to prevent any relevant "clogging" of the gravel layer? Is this a factor to consider? Are the "Filter Socks" shown in the drawings piping perforations, or literally filtering socks? I am thinking along the lines of ash debris from fires, dust generation during grading for the various phases of development, or from possible future developments on surrounding properties; etc.
- Gravel layer specifications: What is the typical texture of gravel used; e.g., coarse/angular, subangular, sub-rounded, rounded? I was looking for a gravel texture specification to inform how placement technique(s) and static building load may affect probability for maintaining liner surfaces free of punctures.

Thank you,

Dan

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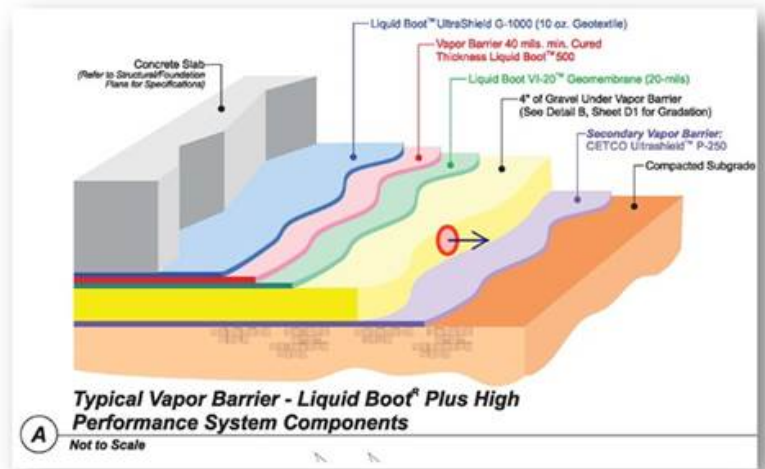
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**Sub-Slab Depressurization (SSD) System Monitoring <sup>(1)</sup>**  
 1412- 1514 Capitola Road, Santa Cruz

**1.0 SUB-SLAB DEPRESSURIZATION (SSD) SYSTEM**

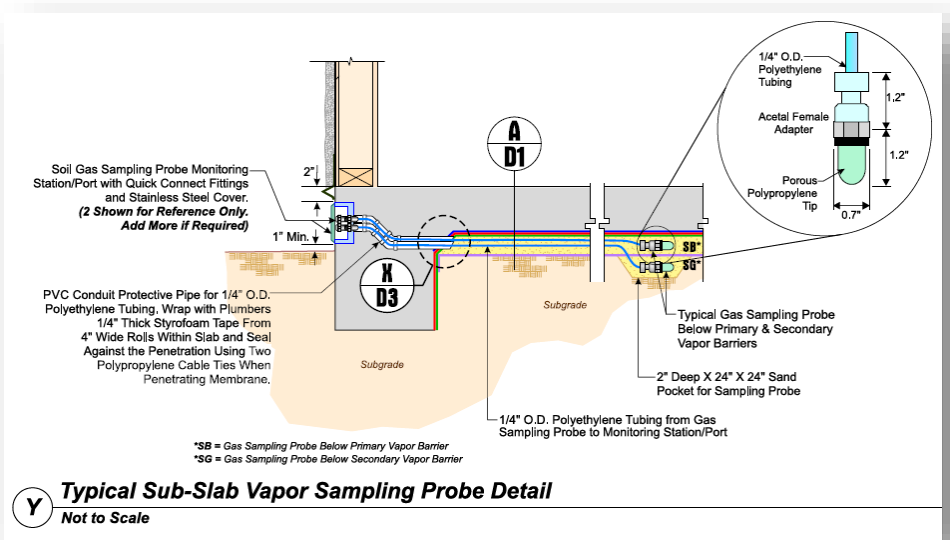
**1.1 Normal Operation Design**

For operation of the SSD system, a blower would be installed on the vent riser for the central piping run at the roof level (medical buildings) or in a crawl space (apartment buildings). Fresh outside air would be actively drawn into the outer passive vent piping loops and flow through the gravel blanket to the active inner piping loops in response to the operation of the blowers. The flow resistance of the passive vent piping components will ensure that a pressure of negative 0.05-inches of water (-0.05), or lower, will be maintained in the gravel blanket relative to atmospheric. The secondary barrier improves the efficiency of the SSD system and allows smaller, more energy efficient blowers to be used. It also minimizes the extraction of soil gas in response to the induced negative pressure in the gravel ventilation blanket and reduce any associated VOC emissions. See conceptual drawing of double barrier barrier design, right)



Each building contains an Individual monitoring system that includes a vacuum level monitoring switch at the blower inlet and an automated cellular notification system that provides notification if the vacuum level fall below the established depressurization level. The automated monitoring systems can also be used remotely at any time to confirm the proper operation of the SSD system.

Soil gas monitoring probes are installed beneath the floor slabs of the buildings to provide a means of monitoring post-construction soil gas pressures (see detail to the right).



<sup>1</sup>: The descriptions provided are generated from Vapor Intrusion Mitigation System plans designed by GeoKinetics:  
 - [https://geotracker.waterboards.ca.gov/view\\_documents?global\\_id=T10000014098&document\\_id=6029539](https://geotracker.waterboards.ca.gov/view_documents?global_id=T10000014098&document_id=6029539)

## 1.2 Construction Certification Testing (prior to installation of the foundation)

The vapor barrier system will be inspected and tested at the time of construction as part of the VIMS certification process to confirm it is functioning as intended and is fully protective of the building occupants. Initial testing of that system will be performed *at the time of construction*. Specifically:

### 1.2.1 Temporary Blower for Initial Testing

A temporary blower will be installed on each active vent riser will be to confirm the required level of depressurization is achieved in the gravel blanket. The target level of depressurization in the gravel blanket is -0.05-inches of water relative to the air pressure on the interior of the building.

### 1.2.2 Smoke Testing

A specific smoke testing procedure will be completed to identify any potential pinholes, perforations, or leaking seams. The slab concrete will not be installed until the membrane has been approved and certified by the VIMS Engineer.

## 1.3 Construction Certification Testing (following building construction)

Following construction and prior to occupancy the following integrity testing will be completed:

### 1.3.1 Radon Testing

Post-construction measurement of the concentrations of radon gas beneath the barrier and on the interior of a building provides a reliable means of establishing the soil-gas-to-indoor-air attenuation factor that is associated with a barrier system.

- The concentrations of radon gas in the soil gas beneath the building, in the interior air, and in the outside air will be measured using Durrige RAD7 Electronic Radon Detectors.
- The sub-membrane soil gas and interior air samples will be collected through the detector for a period of approximately 24-hours in order to obtain representative average concentrations with a high confidence level.

The measured building attenuation rate will be evaluated confirm that the vapor barriers are functioning as intended.

### 1.3.2 Confirmation of Depressurization:

Blowers installed at each active vent riser will be used to confirm the required level of depressurization is achieved in the gravel blanket. The target level of depressurization in the gravel blanket is of negative 0.05-inches of water (-0.05) relative to the air pressure on the interior of the building.

### 1.3.3 Indoor & Outdoor Air, and Sub-Barrier Soil Gas Samples

For project documentation, at the completion of construction and prior to occupancy, the following samples will be collected and analyzed for volatile chemicals of concern by EPA T0-15 for project documentation:

- *Indoor and Outdoor Air Samples* will be collected into six liter Summa canisters over 24-hour period and run by the SIM (lower detection limit) method. The outdoor air samples will also be collected concurrently with the indoor air samples from the upwind side of each building.
- *Subbarrier, Soil Gas Samples* will be collected into one liter Summa canisters over a 10-minute period.

The results of the construction observation /testing I certification and the post-construction sampling activities described in this submittal will be presented in a *VIMS Certification Report* that will be submitted to the Owner at the completion of construction.

#### 1.4 On-going Maintenance Requirements and Annual Testing & Reporting

The following maintenance and monitoring tasks will be completed annually and documented in a brief *Annual Maintenance and Monitoring Report* that will be uploaded electronically to the State Water Resources Control Board document archive for this site <sup>(2)</sup>

##### 1.4.1 Blower Flow Rates/Inlet Pressures and Sub-Slab Pressures

The blower flow rates and inlet pressures, and the pressures in the sub-slab probe pairs will be monitored on an annual basis to ensure the SSD system is operating properly.

- A minimum pressure reduction of negative 0.02-inches of water (-0.02) will be confirmed for all gravel blanket gas probes.

If inadequate depressurization levels are identified, mitigative measures will be taken that may include:

- The restriction of fresh air recharge into one or more of the passive vent risers, and/or
- The installation of a larger blower.

The minimum required vacuum levels at the blower inlets that are necessary to achieve the required level of depressurization in the gravel blanket will be confirmed for each monitoring event.

##### 1.4.2 Physical Inspection

Accessible components of the system will be inspected on at least an annual basis to ensure they are undamaged and operational. These activities will include visual inspection of the vent pipe riser outlets in order to ensure they are open and unobstructed – as well as to identify any apparent deterioration that could potentially hinder the operation of the system. The proper operation of the automated notification system will also be confirmed. Any problems will be documented and repaired as soon as possible.

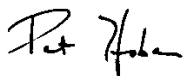
##### 1.4.3 Documentation/Annual Reporting

A letter report will be completed annually that documents the prescribed pressure measurements, and inspection conditions, and any modifications to the mitigation system inspection. The annual report will be prepared and submitted to the California Regional Water Quality Control Board Central Coast Region and will include a certification stating the SSD system is operating properly, functioning as intended and is fully protective of the building occupants.

Please contact me at our office if you have any questions regarding this summary (722-3580).

*Sincerely,*

WEBER, HAYES AND ASSOCIATES

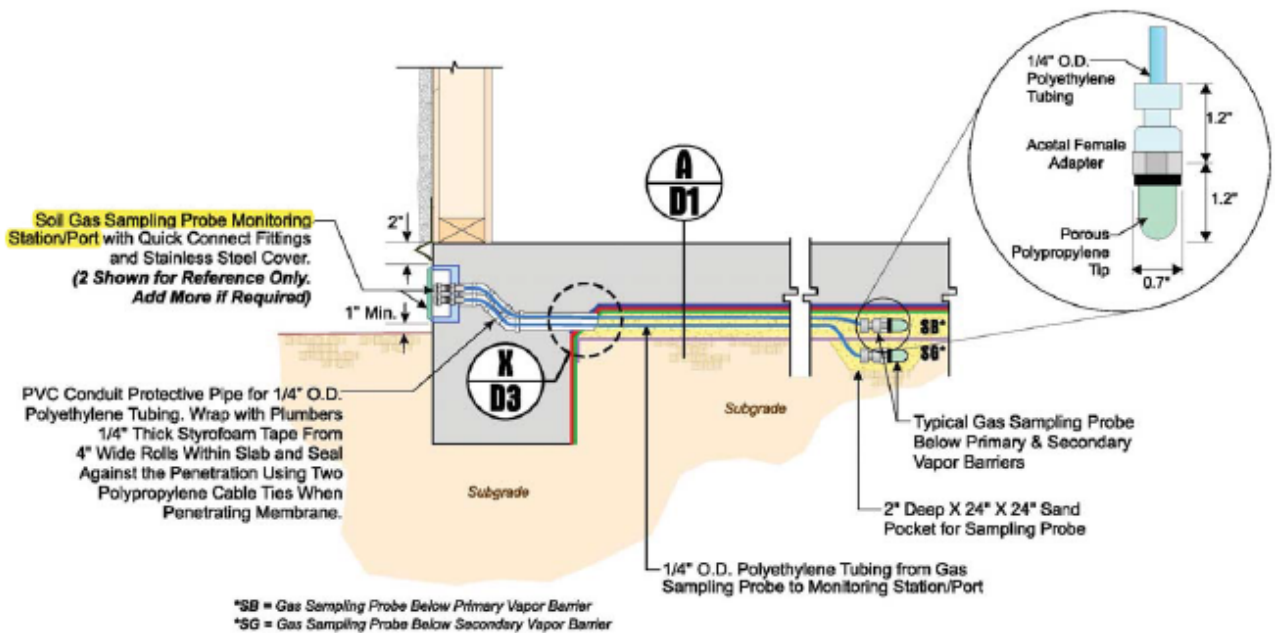
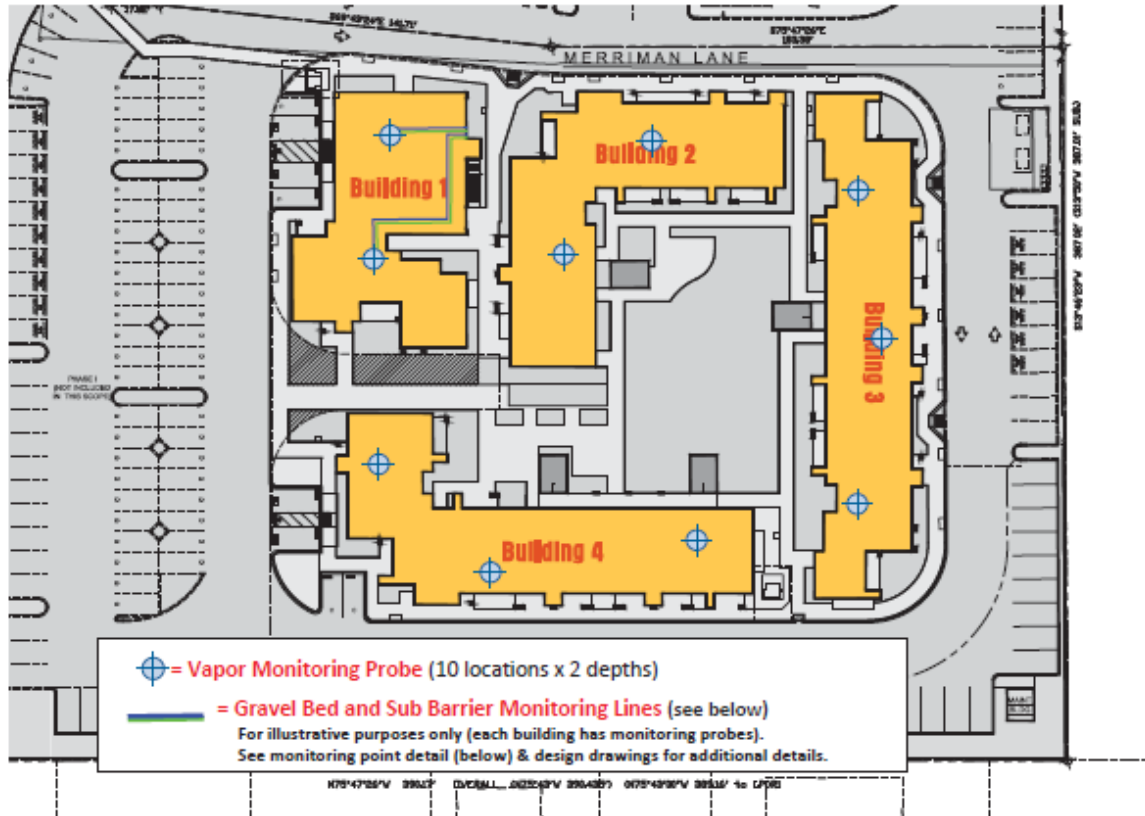


Patrick Hoban, PG  
Principal Geologist

<sup>2</sup>: GeoTracker archive link for T100000 14098)

- [https://geotracker.waterboards.ca.gov/profile\\_report.asp?global\\_id=T10000014098](https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000014098)

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**Y Typical Sub-Slab Vapor Sampling Probe Detail**  
 Not to Scale