Indoor Air and Soil Gas Sampling Work Plan

Bothell Lot D

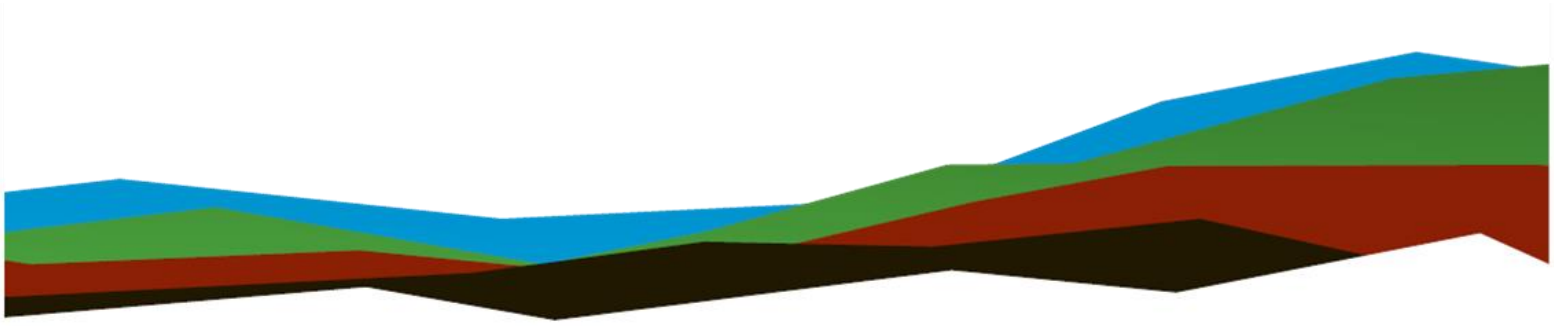
9911 Main Street

Bothell, King County, Washington

August 26, 2024 | Terracon Project No. 81207336

Prepared for:

Maple Multi-Family Land TX L.P
C/O Weil, Gotshal & Manges, LLP
2001 M Street NW, Ste 600
Washington DC



Prepared by:

Terracon Consultants, Inc.
Mountlake Terrace, Washington

Terracon

Nationwide
Terracon.com

- Facilities
- Environmental
- Geotechnical
- Materials

21905 64th Ave W, Ste 100
Mountlake Terrace, WA 98043-2251
P 425-771-3304
F 425-771-3549
Terracon.com

August 26, 2024

Maple Multi-Family Land TX L.P.
C/O Ms. Annemargaret Connolly
Weil, Gotshal & Manges, LLP
2001 M Street NW, Ste 600
Washington DC, 20036

CC: Mark Hoyt and Scott Bevan

and

Public Works Department
City of Bothell
18415 101st Avenue NE
Bothell, Washington 98011

Attn: Mr. Scott Adamek

Re: Indoor Air and Soil Gas Sampling Work Plan
Bothell Lot D
9911 Main Street
Bothell, King County, Washington
Terracon Project No. 81207336

Dear Ms. Connolly and Mr. Adamek:

Terracon Consultants, Inc. (Terracon) is pleased to present you with this Indoor Air and Soil Gas Sampling Work Plan (Work Plan) for review, comment, and approval for the Bothell Lot D (Site), on behalf of Maple Multi-Family Land TX L.P. c/o Weil, Gotshal & Manges, LLP (our Client).

The Site is currently being managed under a Consent Decree (CD) between the Washington State Department of Ecology (Ecology) and the City of Bothell (City). It is Terracon's understanding that this Work Plan will be provided by the City to Ecology for their formal opinion and approval.

1.0 SITE INFORMATION AND BACKGROUND

The Site is located at 9911 Main Street, formerly identified as 18107 Bothell Way Northeast, in Bothell, Washington. The Site is an amalgamation of three separate King County tax parcels (described below) totaling approximately 2.6 acres comprised of King County Tax Parcel No. 945720-0050. The Site is developed with an approximate 105,000-square foot mixed-use, six-story multi-family apartment building. The ground floor consists of an open-air parking garage, residential apartments to the north and west, and commercial tenant spaces to the east (along Bothell Way Northeast). The second floor consists of an open-air parking garage and residential apartments, and the third through sixth floors consist of residential apartments. The Site building is currently unoccupied.

The Site was formerly occupied by a dry cleaner known as Bothell Service Center Simon & Sons (BSCSS) in the northwestern portion of the Site, a former gasoline station and automotive repair known as Al's Auto Bothell Wexler (Wexler) in the northeastern portion of the Site, and a former automotive repair on the southern portion of the Site known as Bothell Former Hertz/AARenco/AA Rentals of Bothel Inc (Hertz). The BSCSS and Wexler properties have been combined and are collectively referred to as the BSCSS. All three former facilities have been merged to form the current Site, referred to as the Bothell Lot D.

From the 1990s to present, numerous subsurface investigations and remedial actions have been performed on-Site. As a part of these remedial actions, all historical documented underground storage tanks and associated piping have been removed from the Site. Furthermore, soil above the groundwater table previously impacted with total petroleum hydrocarbons (TPH), metals, and volatile organic compounds (VOCs) at concentrations exceeding cleanup levels have been remediated via excavation and/or by soil vapor extraction. Although soil above the water table has been remediated, chlorinated VOCs (cVOCs), TPH, and arsenic remain in groundwater at concentrations exceeding cleanup levels. Impacted groundwater has been documented at numerous locations across the Site.

An environmental covenant (EC) was executed on April 26, 2020, for all three sites: BSCSS, Wexler, and Hertz. In accordance with the restrictions and requirements outlined in the EC implemented for the property, and as a part of the redevelopment of the Site, Terracon oversaw the installation of a Vapor Intrusion Mitigation System (VIMS) that consists of subgrade vent piping and a vapor membrane rated to impede cVOCs and other contaminants of concern (COCs) associated with the Site (i.e. TPH). The Plans & Specifications for VIMS Block D are attached.

At the request of the City, Terracon has prepared this Work Plan to perform indoor air and sub slab soil gas sampling via existing sampling ports prior to occupancy of the Site building in general accordance with the CD.

2.0 WORK PLAN

The objective of this Work Plan is to outline the scope of services to evaluate the indoor air quality of the first floor of the Site building and to monitor the sub slab soil gas conditions at existing soil vapor points prior to building occupancy.

2.1 Indoor Air Sampling

Terracon will conduct indoor air sampling within the ground floor tenant and retail spaces. Prior to administering the air canisters, Terracon will assess preferential pathways for precluding factors and preferential routes, where sub-slab soil vapors could potentially migrate from the subsurface into occupied areas, impacting indoor air. Terracon will also assess the indoor air locations for other potential indoor sources of the COCs (e.g., chemicals, paints, and janitorial supplies). Refer to the attached Indoor Air Building Survey and Sample Form for the site assessment questionnaire. If any potential indoor sources of the COCs are identified, those sources should be removed from the sample location areas by the building owner at least one week prior to sampling. If possible, the business owner will provide adequate airflow and ventilation to those areas following the removal of the potential indoor sources. After the items are removed and the allotted period of time has passed, a Terracon representative will return to the Site to collect the indoor air samples. The buildings heating, ventilation, and air conditioning (HVAC) should be operating under normal conditions as anticipated during occupancy at least 48 hours prior to sampling.

For the purposes of this Work Plan, Terracon has selected the approximate sample locations based on our review of the plan set, which may be adjusted based on the observations and findings of Terracon's assessment. The indoor air sample locations will be selected in areas most representative of indoor occupied spaces with the highest probability of potential vapor intrusion issues. Six indoor air (IA) quality samples will be collected from the on-Site building and five background air (BA) samples at exterior locations.

Specifically, indoor air (IA) sample IA1 will be placed in the elevator lobby on the northeast portion of the Site building, IA2 will be sampled in the elevator lobby on the southeast portion of the Site building, IA3 will be sampled in the stairwell on the southwest portion of the Site building, and IA4 through IA6 will be sampled in stairwells, near elevators, and in accessible mechanical rooms along the western and northern portions of the Site building. Background air (BA) samples BA1 through BA4 will be sampled on the roof, in the vicinity of the HVAC intake system, and BA5 will be sampled on the exterior ground floor level in the upwind direction, in a location to be determined at the time of sampling. Terracon will research atmospheric pressure, recent rainfall, and prevailing wind patterns in the vicinity of the Site, and check the wind direction immediately prior to sampling.

The number of indoor air samples to be collected were based on the buildings first-floor square-footage area using the New Jersey Department of Environmental Protection *Vapor Intrusion Technical Guidance,* Recommended Minimum Number of Indoor Air Samples Table 3.3, dated January 2018, and Ecology's *Guidance for Evaluating Soil Vapor Intrusion in Washington: Investigation and Remedial Action*, dated March 2022.

Given the mixed commercial and residential use of the building, all indoor air quality samples will be 24-hour, Time Weighted Average (TWA) air quality samples collected with 6-liter Summa™ canisters. The indoor air quality sample intakes will be set at breathing height, approximately 3 to 5 feet above ground surface. After sampling is completed, Terracon will return to the Site to remove the Summa canisters.

The Summa canisters and flow regulators will be provided by an analytical laboratory. The Summa canister gauge will be monitored closely to ensure that a minimum negative pressure of 6 inches of mercury is remaining on the dedicated gauge at the time the Summa canister is closed. Field vacuum data will be recorded for each of the canisters, both prior to and following sample collection.

Refer to the attached Exhibit 1 for the proposed indoor air sample locations and Exhibit 2 for the proposed background air BA1 through BA4 sample locations. The proposed sampling locations may be modified in the field to account for access limitations or other Site conditions. Ecology and the City of Bothell will be notified of any significant modifications to the sampling locations.

Sample collection procedures will be conducted in accordance with local industry standard practices. The sampling and analytical program, including the number and types of samples and laboratory analyses, is detailed in the table provided below:

Sample Location ID	Analysis	Sample Type	Maximum No. of Samples	Method
IA1 through IA6	Site Contaminants of Concern	Indoor Air	6	TO-15 SIM & MA-APH
BA1 through BA5		Background Air	5	

Contaminants of Concern: Total Petroleum Hydrocarbons (TPH), benzene, toluene, ethylbenzene, xylenes, and naphthalene (BTEXN), and chlorinated volatile organic compounds (cVOCs).

Reported indoor air concentrations will be compared with Ecology's guidance document *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action,* dated March 2022 and the February 2024 updated *CLARC MTCA Method B Indoor Air Cleanup Levels*.

In addition, the indoor air concentrations will be compared to Ecology's *Vapor Intrusion Investigations and Short-term TCE Toxicity: Implementation Memorandum No. 22*'s Short-term TCE Exposure Indoor Air Action Levels. When trichloroethene (TCE) is

present in soils, groundwater, or soil gas, vapor intrusion assessments should determine if indoor air concentrations exceed cleanup levels based on chronic exposure, such as MTCA Method B Indoor Air Cleanup Levels. Assessments should also, however, be designed to determine if indoor air concentrations are higher than action levels protective of toxic, non-cancer effects caused by short-term exposures to the chemical as defined in Washington Administrative Code (WAC) 173-240-200.

2.2 Sub-Slab Soil Gas Sampling

Within 24 hours of completing the indoor air sampling, Terracon will conduct sub-slab soil gas sampling from the permanent soil vapor port installed as part of the VIMS. Seven soil gas samples will be collected from vapor ports VMP2, VMP3, VMP5, VMP7, VMP8, VMP10, and VMP11. The vapor port sample locations are depicted on Exhibit 1.

Prior to collecting the soil gas samples, approximately three air volumes will be purged from the sampling tubing connected to the vapor sampling port. Once three volumes are purged, the inline quick-connect valve will be closed to begin the equilibration process. The completely assembled sampling train will be tested for potential leakage by using a low flow purge pump (~200 milliliters per minute [mL/min]) to generate a vacuum on the system, and then allowing the sealed sampling train to sit with an approximate 10 inches of mercury (in Hg) negative pressure vacuum during a 10-minute shut-in test.

One the sampling train is confirmed to be leak-free and the equilibration time has passed, a soil gas sample will be collected from the soil vapor port. The soil gas samples will be collected with 1-liter Summa canisters. The Summa canisters used for this assessment will be pre-tested and individually certified as free of COCs by the analytical laboratory. The canisters will be equipped with laboratory-supplied flow regulators allowing for sample collection at a low-flow rate (i.e., <200 mL/min). The flow regulator valve will be opened to begin gas collection, which typically occurs over approximately five minutes. In addition, as a leak check to the valve connected to the tubing connection at the sampling point, a rag soaked in isopropyl alcohol (tracer gas) will be placed near the valve and sampling port at the time of sample collection. If the connections leaked, elevated concentrations greater than 100,000 micrograms per meter cubed ($\mu g/m^3$) of isopropyl alcohol would be detected.

The Summa canister gauge will be monitored closely to ensure that a minimum negative pressure of 6 inches of mercury is remaining on the dedicated gauge at the time the Summa canister is closed. Field vacuum data will be recorded for each of the Summa canisters, both prior to and following sample collection.

Sample collection procedures will be conducted in accordance with local industry standard practices. The sampling and analytical program, including the number and types of samples and laboratory analyses, is detailed in the table provided below:

Sample Location ID	Analysis	Sample Type	Maximum No. of Samples	Method
VMP2, VMP3, VMP5, VMP7, VMP8, VMP10, and VMP11	Site Contaminants of Concern and isopropyl alcohol	Sub-Slab Soil Gas	7	TO-15 SIM & MA-APH

Contaminants of Concern: Total Petroleum Hydrocarbons (TPH), benzene, toluene, ethylbenzene, xylenes, and naphthalene (BTEXN), and chlorinated volatile organic compounds (cVOCs).

Reported sub slab soil gas concentrations will be compared to the February 2024 updated *CLARC MTCA Method B Soil Gas Screening Levels*.

3.0 REPORTING

The results of the indoor air quality sampling and sub-slab soil gas sampling will be summarized in a report, which includes the following:

- Documentation of field activities;
- Site plan showing pertinent Site features;
- Analytical laboratory results; and
- Data evaluation and presentation of findings.

The analysis, comments, and recommendations presented in the final written report will be based on the information collected as discussed in this Work Plan. Terracon will provide a final report detailing the sampling activities to the client and the City. It is Terracon's understanding that the final report will be submitted to Ecology by the City.

4.0 CLOSING

Terracon appreciates the opportunity to submit this Work Plan and we look forward to your favorable consideration and approval. If you have any questions or comments pertaining to the material presented herein, please contact the undersigned.

Sincerely,

Terracon Consultants, Inc.

Sydney K. Pazera, E.I.T.
Staff Environmental Engineer

Kyle Bennet, L.G.
Project Manager

Matt Wheaton, L.G., P.E.
Senior Principal

Attachment: Exhibit 1 – Indoor Air and Soil Gas Sampling Locations
Exhibit 2 – Background Air Sampling Locations
Indoor Air Building Survey and Sample Form
Plans & Specifications for Vapor Intrusion Mitigation System Block D

N

IA5

VMP7

IA6

VMP8

VMP5

IA1

VMP3

IA4

VMP10

IA2

VMP2

VMP11

IA3

VR1 VR2 VR3 VR4 VR5 VR6 VR7 VR8 VR9 VR10 VR11 VR12 VR13 VR14

40 0 10 20 40

APPROXIMATE SCALE IN FEET

LEGEND

IA1 APPROXIMATE LOCATION AND NUMBER OF PROPOSED INDOOR AIR SAMPLE LOCATION

VMP2 APPROXIMATE LOCATION AND NUMBER OF PROPOSED SUB SLAB SOIL GAS SAMPLE LOCATION

Project Mngr:	KSB
Drawn By:	SKP
Checked By:	KSB
Approved By:	MYW
Project No.	81207336
Scale:	AS SHOWN
File No.	Exhibit 1
Date:	July 2024

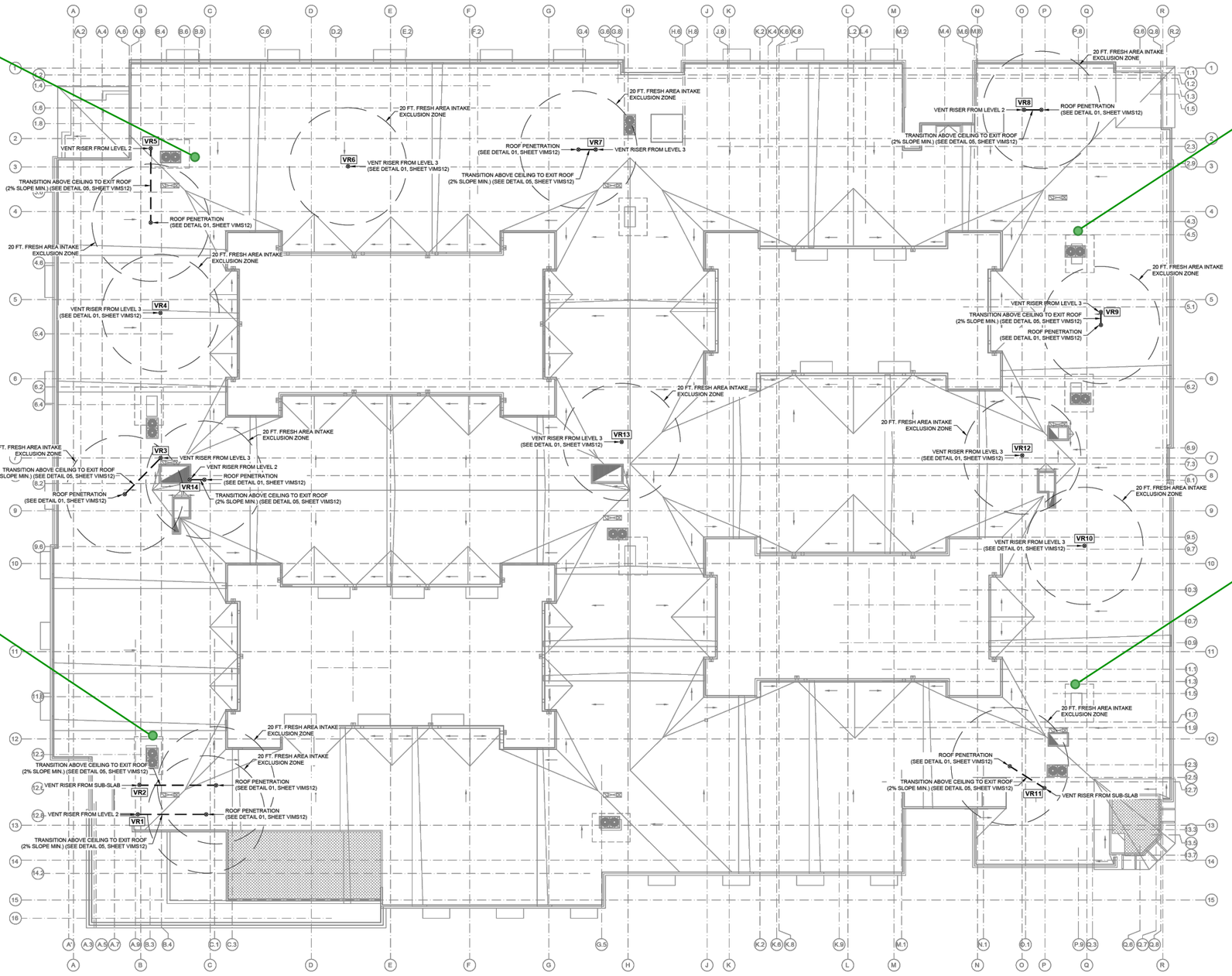
Terracon
Explore with us
21905 64TH AVENUE W, STE 100 MOUNTLAKE TERRACE, WA 98043
PH. (425) 771-3304 FAX. (425) 771-3549

Indoor Air and Soil Gas Sampling Locations

Alexan Bothell
9911 Main Street
Bothell, Washington

EXHIBIT 1

N



40 0 10 20 40

APPROXIMATE SCALE IN FEET

LEGEND

BA1 APPROXIMATE LOCATION AND NUMBER OF PROPOSED BACKGROUND AIR SAMPLE LOCATION

Project Mngr: KSB	Project No. 81207336	Terracon Explore with us	**Background Air Sampling Locations**
Drawn By: SKP	Scale: AS SHOWN	21905 64TH AVENUE W, STE 100 MOUNTLAKE TERRACE, WA 98043	Alexan Bothell 9911 Main Street Bothell, Washington
Checked By: KSB	File No. Exhibit 2	PH. (425) 771-3304 FAX. (425) 771-3549	EXHIBIT 2
Approved By: MYW	Date: July 2024		

Indoor Air Building Survey and Sample Form

Preparers Name:_____ Date:_____

Preparer's affiliation:_____ Phone #:_____

Site Name:_____ Project No.:_____

1.0 Occupants

Building Address:_____

Property Contact:_____ Owner/Renter/other:_____

Contact Phone:_____

2.0 Building Characteristics

Building type:_____

Describe building:_____

Sensitive population: day care/nursing home/hospital/other (specify)_____

Number of floors below grade:_____(full basement / crawlspace / slab-on-grade)

Approx. depth of basement below grade surface: _____ ft.

Basement floor construction and thickness: _____

Foundation Walls: _____

Basement sump present: (yes / no) Sump pump: (yes / no) Water in sump: (yes / no)

Are the basement walls or floor sealed with waterproof paint or epoxy? (yes / no)

Type of ground cover outside of building: grass / concrete / asphalt / other:_____

Existing subsurface depressurization system in place? (yes / no) active / passive

Sub-slab vapor/moisture barrier in place? (yes / no)

Type of barrier:_____

Type of heating system for the building: _____

_____

3.0 Indoor Contaminant Sources

Identify all potential indoor sources found in the building (including attached garages), the location of the source (floor and room), and whether the item was removed from the building 48 hours prior to indoor air sampling event. Any ventilation implemented after removal of the items should be completed at least 24 hours prior to the commencement of the indoor air sampling event.

Potential Sources	Location(s)	Removed (yes/no/NA)
Gasoline storage cans		
Gas-powered equipment		
Kerosene storage cans		
Moth balls		
Air fresheners		
Fuel tank (inside building)		
Wood stove or fireplace		
New furniture/upholstery		
New carpeting/flooring		
Hobbies – glues, paints, etc.		
LIST OTHER IMPORTANT SOURCES IDENTIFIED		

4.0 Miscellaneous Items

Do any occupants of the building smoke? (yes / no) How often? _____

Does the building have an attached garage directly connected to living space? (yes / no)

If so, is a car usually parked in the garage? (yes / no)

Are gas-powered equipment or cans of fuel stored in the garage? (yes / no)

Do the occupants of the building have their clothes dry cleaned? (yes / no)

If yes, how often? Weekly / monthly / 3-4 times a year

Do any of the occupants use solvents in work? (yes / no)

If yes, what types of solvents are used: _____

If yes, are their clothes washed at work? (yes / no)

Has painting or staining been done in the building in the last 6 months? (yes / no)

If yes, when _____ and where _____

Provide any information that may be pertinent to the sampling event and may assist in the data interpretation process:_____

_____

5.0 Sampling Information

Sampling Personnel: _____ Phone: _____

Company: _____

Sample Source: Indoor Air / Sub-Slab / Exterior Soil Gas

Were "Instructions for Occupants" followed? (yes / no)

If not, describe modifications: _____

6.0 Meteorological Conditions

Was there significant precipitation within 12 hours prior to (or during) the sampling event? (yes / no) _____

Describe the general weather conditions: _____

_____

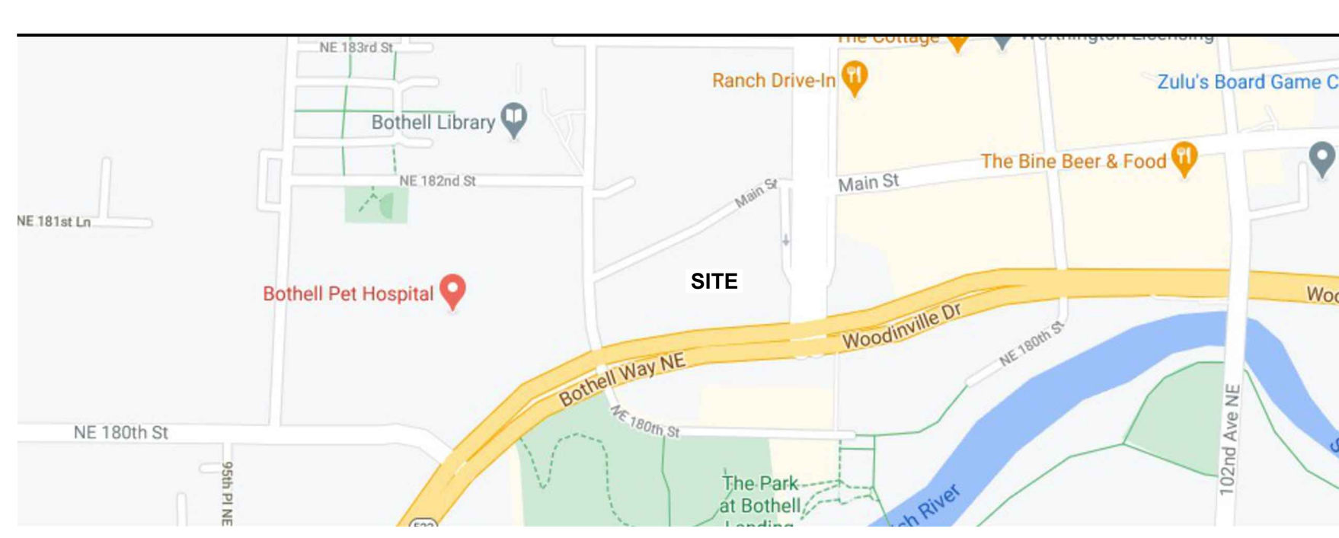
PLANS & SPECIFICATIONS FOR

VAPOR INTRUSION MITIGATION SYSTEM

BLOCK D

MAIN STREET
BOTHELL, WASHINGTON

PROJECT SITE LOCATION



INDEX OF SHEETS

NOTICE FOR CONTRACTOR

ALL CONTRACTORS AND SUBCONTRACTORS PERFORMING WORK SHOWN ON OR RELATED TO THESE PLANS SHALL CONDUCT THEIR OPERATIONS SO THAT ALL EMPLOYEES ARE PROVIDED A SAFE PLACE TO WORK AND THE PUBLIC IS PROTECTED. ALL CONTRACTORS AND SUBCONTRACTORS SHALL COMPLY WITH THE "OCCUPATIONAL SAFETY AND HEALTH REGULATIONS" OF THE U.S. DEPARTMENT OF LABOR AND ALL LOCAL AND STATE REGULATIONS.

THE OWNER AND THE VIMS DESIGNER SHALL NOT BE RESPONSIBLE IN ANY WAY FOR CONTRACTORS AND SUBCONTRACTORS COMPLIANCE WITH THE "OCCUPATIONAL SAFETY AND HEALTH REGULATIONS" OF THE U.S. DEPARTMENT OF LABOR AND ALL LOCAL AND STATE REGULATIONS.

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER AND THE VIMS DESIGNER HARMLESS FROM ANY AND ALL LIABILITY REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPT FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE VIMS DESIGNER.

IN CASE OF CONFLICT BETWEEN THESE PLANS AND OTHER SITE DESIGN DOCUMENTS AND/OR MANUFACTURER SPECIFICATIONS / REQUIREMENTS THE APPROPRIATE PARTIES / COMPANIES WITH CONFLICTING DOCUMENTATION SHALL CONFER TO DETERMINE A MUTUALLY AGREED UPON SOLUTION.

NOTES

I. APPLICABILITY

A. GENERAL

1. A PASSIVE VAPOR INTRUSION MITIGATION SYSTEM (VIMS) SHALL BE INSTALLED AND WILL INCLUDE A 60-MIL DRY THICKNESS APPLICATION OF SPRAY-APPLIED ASPHALTIC MEMBRANE AND A 20-MIL SHEET MEMBRANE WITH SPRAY-APPLIED SEAMS UNDERLAIN BY A GAS VENT SYSTEM VENTED AT THE ROOF. THE VIMS IS DESIGNED TO BE CONVERTED TO AN ACTIVE SYSTEM.

2. VIMS DETAILS PRESENTED IN THESE PLANS AND SPECIFICATIONS SHALL BE UTILIZED IN THE CONSTRUCTION OF THE BUILDING DESIGNATED ON SHEETS VIMS1 THROUGH VIMS12. THE BASIS OF DESIGN IS A SPRAY-APPLIED MEMBRANE (OCCUPIED ENCLOSED AREAS), A VOLATILE ORGANIC COMPOUND (VOC) RESISTANT SHEET MEMBRANE (PARKING GARAGE AREAS), AND ANY ASSOCIATED VENTING MATERIALS AS DESCRIBED IN THESE PLANS. MANUFACTURER REFERENCE TO THESE PRODUCTS ARE PROVIDED BELOW AS APPROVED PROVIDERS OF THE MEMBRANE AND MATERIALS ONLY AND MAY BE SUBSTITUTED FOR EQUIVALENT PRODUCTS IF APPROVED BY THE VIMS DESIGNER. NOTE: LIQUID BOOT 500 IS NOT AN APPROVED EQUIVALENT.

   - CETCO REMEDIATION TECHNOLOGIES, HOFFMAN ESTATES, IL (714) 384-0111
   - EPRO SERVICES, INC. (EPRO); TEL: (800) 882-1896; WWW.EPROINC.COM
   - LAND SCIENCE TECHNOLOGIES, SAN CLEMENTE, CA (949) 366-8000

3. THE VIMS DESIGN WILL GENERALLY CONFORM TO THE LOS ANGELES BUILDING CODE (LABC) METHANE HAZARD MITIGATION STANDARD PLAN AND TO ANSI/AARST CC-1000 2018 (SOIL GAS CONTROL SYSTEM IN NEW CONSTRUCTION OF BUILDINGS).

4. THE VIMS MEMBRANE WILL ALSO SERVE AS A MOISTURE MEMBRANE AND WILL REPLACE ANY VAPOR OR MOISTURE BARRIER SPECIFIED IN THE STRUCTURAL DETAILS. INSTALLATION OF A MOISTURE OR VAPOR BARRIER BETWEEN THE VIMS MEMBRANE AND BUILDING FLOOR SLAB MAY VOID THE WARRANTY PROVIDED BY THE VIMS MEMBRANE MANUFACTURER.

5. WATERPROOFING WILL BE INSTALLED BY THE GENERAL CONTRACTOR AS SPECIFIED IN THE ARCHITECTURAL DRAWINGS AND SHALL BE INSTALLED TO MITIGATE AGAINST VAPOR INTRUSION INTO INDOOR AIR. WATERPROOFING MATERIALS FOR VAPOR INTRUSION MITIGATION SHALL BE COMPATIBLE WITH THE VIMS MEMBRANE TO FORM A GAS-TIGHT SEAL. ALL WATERPROOFING MATERIALS SHALL BE REVIEWED BY THE VIMS DESIGNER AND VIMS MEMBRANE MANUFACTURER FOR COMPATIBILITY WITH THE VIMS MEMBRANE AND THE VAPOR CONTAMINANTS PRESENT IN THE SUBSURFACE. MANUFACTURER'S PRODUCT INFORMATION AND INSTALLATION PROCEDURES SHALL BE SUBMITTED TO AND APPROVED A MINIMUM OF FOUR WEEKS PRIOR TO INSTALLATION.

B. SYSTEM COMPONENTS

1. THE VIMS CONSTRUCTION SHALL CONSIST OF, BUT NOT BE LIMITED TO, THE FOLLOWING:

   a. SUPPLY AND INSTALL 4-INCH AGGREGATE LAYER BENEATH FOUNDATION SLAB
   b. SUPPLY AND INSTALL VAPOR COLLECTION PIPING AND ASSOCIATED FITTINGS
   c. SUPPLY AND INSTALL 4-INCH PVC CONVEYANCE PIPING
   d. SUPPLY AND INSTALL SUB-SLAB VACUUM MONITORING PROBES AND ACCESS PANELS
   e. SUPPLY AND INSTALL 60-MIL ASPHALTIC LAYER BENEATH OCCUPIED ENCLOSED AREAS
   f. SUPPLY AND INSTALL PROTECTIVE AND BASE GEOTEXTILE LAYERS ABOVE AND BELOW THE 60-MIL ASPHALTIC LAYER, RESPECTIVELY
   g. SUPPLY AND INSTALL 20-MIL SHEET MEMBRANE LAYER BENEATH PARKING GARAGE AREAS
   h. SEAL 20-MIL MEMBRANE TO SEAMS, FOOTINGS, AND PENETRATIONS USING ASPHALTIC EMULSION
   i. PERFORM SMOKE AND COUPON TESTING OF THE 60-MIL AND 20-MIL VIMS MEMBRANES
   j. SUPPLY AND INSTALL SCH. 40 PVC VERTICAL VENT RISER PIPING, SHUTOFF VALVES, SAMPLE PORTS, AND GAS FITTINGS
   k. COMPLETE CONNECTION OF VERTICAL VENT RISER PIPING TO ROOF AS APPROPRIATE
   l. INSTALL ROOF-MOUNTED PASSIVE VENTILATORS
   m. PROVIDE ELECTRICAL CONDUIT WITHIN 5 FEET OF EACH VENT RISER IN CASE ACTIVE FANS ARE NEEDED

2. ALL MATERIALS ARE TO BE DELIVERED TO THE PROJECT SITE IN THEIR ORIGINAL UNBROKEN PACKAGES BEARING THE MANUFACTURER'S LABEL SHOWING BRAND, WEIGHT, VOLUME, BATCH NUMBER AND DATE. MATERIALS ARE TO BE STORED AT THE PROJECT SITE IN STRICT COMPLIANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

II. VAPOR INTRUSION MITIGATION SYSTEM

A. VAPOR COLLECTION AND VENT SYSTEM

A.1 AGGREGATE LAYER

1. A MINIMUM 4-INCH LAYER OF GRAVEL AGGREGATE SHALL BE PROVIDED BENEATH THE FOUNDATION SLAB. THE AGGREGATE LAYER SHALL MEET ASTM C33 REQUIREMENTS FOR SIZE 5, 6, 56, OR 57 AND CONTAIN NO MORE THAN 5% FINES (I.E. ≤5% PASSING #200 SIEVE).

2. THE AGGREGATE WILL BE PLACED IMMEDIATELY BELOW THE VIMS MEMBRANE AND WITHIN THE LINE OF THE TRENCHES FOR THE SUB-SLAB VAPOR COLLECTION PIPING AS SHOWN IN DETAILS 01 & 02, SHEET VIMS6 AND DETAILS 01 & 02, SHEET VIMS8.

3. ANY AGGREGATE REMOVED DURING PLACEMENT OF UTILITIES MUST BE PLACED BACK TO LEVEL GRADE AND COMPACTED AS SPECIFIED IN THE PROJECT PLANS AND SPECIFICATIONS. UTILITIES PLACED IN THE AGGREGATE LAYER MAY NOT BE LARGER THAN 1-INCH IN DIAMETER. UTILITIES LARGER THAN 1-INCH IN DIAMETER MUST BE BURIED INTO THE SUBGRADE SUCH THAT NO MORE THAN 1 INCH OF THE AGGREGATE LAYER IS AFFECTED.

4. THE SUBGRADE UNDER THE AGGREGATE SHALL BE ROLLED SMOOTH AND MOISTURE CONDITIONED AS NECESSARY TO ACHIEVE THE COMPACTION SPECIFIED IN THE GEOTECHNICAL ENGINEER'S SPECIFICATION.

A.2 SUB-SLAB VAPOR COLLECTION PIPING

1. SUB-SLAB VAPOR COLLECTION PIPING SHALL BE COMPRISED OF SCH. 40 4-INCH DIAMETER POLY VINYL CHLORIDE (PVC) SLOTTED PIPE (0.020-INCH WIDTH; 6 ROWS; 0.25-INCH SPACING) AS APPROVED BY THE VIMS DESIGNER (SEE DETAILS 01 & 02, SHEET VIMS6 AND DETAILS 01 & 02, SHEET VIMS8).

2. VAPOR COLLECTION PIPING SHALL BE INSTALLED AT LOCATIONS SHOWN ON VIMS2 AND PLACED IN TRENCHES ACCORDING TO DETAILS 01 & 02, SHEET VIMS6 AND DETAILS 01 & 02, SHEET VIMS8. THE GRAVEL TRENCHES IN THE PARKING GARAGE SHALL BE LINED WITH A NON-WOVEN GEOTEXTILE (MIRAFI 140N OR EQUIVALENT) FROM THE BOTTOM OF THE TRENCH TO THE BOTTOM OF THE 4-INCH AGGREGATE LAYER (SEE DETAILS 01 & 02, SHEET VIMS8). THE GRAVEL TRENCHES IN THE OCCUPIED ENCLOSED AREAS SHALL BE LINED WITH A 10-MIL THERMOPLASTIC LAYER. FROM THE BOTTOM OF THE TRENCH AND CONTINUING ALONG THE BOTTOM OF THE 4-INCH AGGREGATE LAYER (SEE DETAILS 01 & 02, SHEET VIMS6).

3. VAPOR COLLECTION PIPING SHALL BE CONNECTED TO 4-INCH SOLID SCHEDULE 40 PVC CONVEYANCE PIPING TO THE VENT RISERS, CONNECTING TO SCH. 40 PVC ELBOWS TURNING UP THROUGH THE FLOOR SLAB ADJACENT TO FOUNDATION FOOTINGS AND STRUCTURAL COLUMNS. ALL CONVEYANCE PIPING SHALL BE IN PLACE PRIOR TO POURING THE FOUNDATION GRADE BEAMS OR FOOTINGS WHEN POURED SEPARATELY FROM THE FLOOR SLAB. THE PIPING TRANSITIONS SHALL BE ACCOMPLISHED IN COMPLIANCE WITH ALL APPLICABLE BUILDING CODES AND WITH THE APPROVAL OF THE PROJECT STRUCTURAL ENGINEER AND/OR BUILDING OFFICIAL.

4. ANY PVC GLUES USED TO CONNECT SUB-SLAB PIPING SHALL BE LOW-VOC.

A.3 ABOVE SLAB GAS VENT RISER

1. VENT RISER TO THE ROOF SHALL BE COMPRISED OF 4-INCH DIAMETER SCH. 40 PVC RISER PIPING AND SHALL BE LOCATED WITHIN THE WALLS/CHASES OR INSTALLED ADJACENT TO INTERIOR SUPPORT COLUMNS.

2. THE RISER PIPE TO THE ROOF SHALL BE FULLY SUPPORTED THROUGH THE ENTIRE HEIGHT OF THE BUILDING WITH PIPE CLAMPS OR SIMILAR, SUCH THAT NO DOWNWARD FORCE (DUE TO THE WEIGHT OF THE RISER PIPE) IS EXERTED ON THE SUB-SLAB VENTING SYSTEM.

3. IF INSTALLED IN AN INTERIOR WALL, A 12"x12" MEDIUM SECURITY ACCESS PANEL SHALL BE INSTALLED BETWEEN 2 AND 5 FEET ABOVE THE FLOOR SLAB IN ORDER TO ACCESS THE VENT SYSTEM FOR VACUUM MONITORING, AIR FLOW RATE MONITORING, AND/OR SAMPLING (SEE DETAILS 01, 02, 03, AND 10, SHEET VIMS10, AND 02 & 07, SHEET VIMS11).

4. THE VENT RISER PIPE SHALL BE EQUIPPED WITH A 4-INCH SHUT-OFF VALVE ABOVE THE ROOF BENEATH THE PASSIVE VENTILATOR (SEE DETAIL 01, SHEET VIMS12). THE VENT RISER PIPE SHALL ALSO INCLUDE A 4"x4"x2" TEE TO BE ACCESSIBLE BETWEEN 2 AND 5 FEET ABOVE THE LEVEL 1 FLOOR SLAB AND THROUGH THE ACCESS PANEL WHERE APPROPRIATE. A 2"x1/4" BUSHING SHALL BE INSTALLED INTO THE TEE WITH A MINI BALL VALVE (1/4" MPT x 1/4" HOSE BARB) AS SHOWN IN DETAILS 01, 02, 03, 04, 05, AND 10, SHEET VIMS10 AND 01, 02, AND 07, SHEET VIMS11.

5. PLACARDS SHALL BE INSTALLED ON EACH VENT RISER APPROXIMATELY EVERY 5 FEET AND AT ANY EXPOSED RISER PIPING (SEE DETAIL 04, SHEET VIMS12).

6. A VIMS MEMBRANE IDENTIFICATION SIGN SHALL BE INSTALLED IN UTILITY AND MECHANICAL ROOMS (SEE DETAIL 03, SHEET VIMS12). THIS SIGN IS TO BE PLACED ON THE WALLS AT EYE LEVEL AND SHALL NOT BE COVERED OVER. THE LOCATION OF THIS NOTIFICATION WILL BE DETERMINED BY THE CONTRACTOR, OWNER, OR BUILDING OFFICIAL.

A.4 PASSIVE VENTILATOR

1. A PASSIVE VENTILATOR CAPABLE OF 26 CFM WITH A 4 MPH WIND SHALL BE INSTALLED ON AT THE TOP OF EACH VENT RISER PIPE ABOVE THE ROOF LINE. THE VENTILATORS SHALL INCLUDE BASES, REDUCING COUPLINGS, AND ALL OTHER REQUIRED ACCESSORIES FOR A SECURE CONNECTION TO THE VENT RISER PIPING.

2. THE AURA AV-04 ROOF VENT IS AN ACCEPTABLE PASSIVE VENTILATOR (SEE DETAIL 02, SHEET VIMS12). THESE PRODUCTS ARE MANUFACTURED BY ACTIVE VENTILATION PRODUCTS, INC.; 1-800-247-3463; WWW.ROOFVENTS.COM.

3. THE PASSIVE VENTILATORS SHALL BE INSTALLED IN ACCORDANCE WITH INDUSTRY STANDARDS AS RECOMMENDED BY THE MANUFACTURER.

4. RISER PIPES SHALL TERMINATE A MINIMUM OF 24 INCHES ABOVE THE ROOF-LINE, EQUIPPED AND BRACED APPROPRIATELY IN ACCORDANCE WITH APPLICABLE BUILDING CODES (SEE DETAIL 01, SHEET VIMS12).

5. ROOF-MOUNTED VENTILATORS SHALL BE LOCATED AT A DISTANCE OF NOT LESS THAN 20 FEET FROM ANY BUILDING AIR INTAKE (REFER MECHANICAL PLANS FOR AIR INTAKES) AND AT A DISTANCE OF AT LEAST 4 FEET FROM ANY PROPERTY LINE.

B. VIMS 60-MIL MEMBRANE (OCCUPIED ENCLOSED AREA)

B.1 MATERIALS

1. THE VIMS MEMBRANE SHALL CONSIST OF A SPRAYED-ON OR LOCALLY TROWEL APPLIED, ASPHALTIC EMULSION LAYER BETWEEN TWO LAYERS OF PROTECTIVE GEOTEXTILE MATERIAL.

2. INSTALLATION OF THE BASE LAYER AND PROTECTIVE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS UNLESS OTHERWISE SPECIFIED AND APPROVED BY THE VIMS DESIGNER.

B.2 BASE AND PROTECTIVE LAYERS

1. THE BASE LAYER SHALL CONSIST OF A CHEMICALLY RESISTANT POLYPROPYLENE GEOTEXTILE MATERIAL SUPPLIED BY THE MANUFACTURER AND APPROVED BY THE VIMS DESIGNER. THE BOTTOM BASE LAYER IS INSTALLED AS A CARRIER FABRIC FOR THE VIMS MEMBRANE.

2. THE UPPER SURFACE OF THE VIMS MEMBRANE SHALL BE PROTECTED BY A MANUFACTURER APPROVED PROTECTIVE GEOTEXTILE LAYER, PLACED BETWEEN THE FLOOR SLAB AND THE MEMBRANE AS SPECIFIED ON THESE PLANS. THE PROTECTIVE LAYER IS INSTALLED AFTER THE APPLICATION, CURING, AND TESTING OF THE ASPHALTIC MEMBRANE.

B.3 SPRAY-APPLIED ASPHALTIC MEMBRANE

1. THE VIMS MEMBRANE SHALL CONSIST OF A SPRAY-APPLIED, SINGLE COURSE, HIGH BUILD, POLYMER MODIFIED ASPHALT EMULSION OR EQUIVALENT AS APPROVED BY THE VIMS DESIGNER. THE MEMBRANE SHALL HAVE A MINIMUM CURED (DRY) THICKNESS OF 60-MILS AND SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS UNLESS OTHERWISE SPECIFIED AND APPROVED BY THE VIMS DESIGNER.

B.4 VIMS MEMBRANE INSTALLATION

1. THE VIMS MEMBRANE SHALL BE PLACED BENEATH THE FLOOR SLAB, FOOTINGS, AND TRENCHES IN ACCORDANCE WITH THESE PLANS AND DETAILS. THE VIMS MEMBRANE SHALL NOT BE PLACED ON TOP OF ANY CONCRETE PIERS OR EXTENDED REBAR.

2. SEAMS SHALL BE OVERLAPPED A MINIMUM OF 6 INCHES AND SEALED IN ACCORDANCE WITH THE SPECIFICATIONS SET FORTH IN THESE PLANS (SEE DETAIL 05, SHEET VIMS6).

B.5 PENETRATION SEALS

1. WHERE UTILITIES, VENT LINES, PIPING, ELECTRICAL CONDUITS, ETC. PENETRATE THE VIMS MEMBRANE, A 3-INCH COLLAR OF REINFORCEMENT FABRIC AND ASPHALTIC MEMBRANE SHALL BE PROVIDED TO CREATE A GAS-TIGHT SEAL AROUND THE PENETRATION IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS AS SHOWN ON DETAIL 03, SHEET VIMS6.

2. WHERE PENETRATIONS SUCH AS ELECTRICAL UTILITY CONDUITS, PLUMBING PIPING, ETC. ARE CONCENTRATED, A CONCRETE PENETRATION BANK WILL BE CONSTRUCTED TO SECURE THE PENETRATIONS IN-PLACE (SEE DETAIL 4, SHEET VIMS6). THE PENETRATION BANK SHALL BE CONSTRUCTED USING A MINIMUM THICKNESS OF 12 INCHES OF NON-SHRINK GROUT EXTENDING A MINIMUM OF 8 INCHES FROM ANY PENETRATION, ALLOWING FOR A MINIMUM 6-INCH ATTACHMENT OF THE VIMS MEMBRANE, SIMILAR TO AN ATTACHMENT TO AN INTERIOR FOOTING. THE TOP OF THE PENETRATION BANK SHALL BE BELOW THE BOTTOM OF THE SLAB. PENETRATIONS SHALL NOT BE IN CONTACT WITH ADJACENT PENETRATIONS OR OTHER OBJECTS TO ALLOW PROPER SEALING AROUND THE ENTIRE PENETRATION CIRCUMFERENCE.

C. VIMS 20-MIL MEMBRANE

C.1 MATERIALS

1. THE VIMS MEMBRANE SHALL CONSIST OF A 20-MIL VOC RESISTANT SHEET MEMBRANE SUPPLIED BY CETCO REMEDIATION TECHNOLOGIES, EPRO SERVICES, INC., OR LAND SCIENCE TECHNOLOGIES, OR APPROVED EQUAL.

2. THE VIMS MEMBRANE SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS UNLESS OTHERWISE SPECIFIED AND APPROVED BY THE VIMS DESIGNER.

C.2 PENETRATION SEALS

1. WHERE UTILITIES, VENT LINES, PIPING, ELECTRICAL CONDUITS, ETC. PENETRATE THE VIMS MEMBRANE, A GAS-TIGHT SEAL SHALL BE CREATED AROUND THE PENETRATION IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS AS SHOWN ON DETAIL 03, SHEET VIMS8.

2. WHERE PENETRATIONS SUCH AS ELECTRICAL UTILITY CONDUITS, PLUMBING PIPING, ETC. ARE CONCENTRATED, A CONCRETE PENETRATION BANK WILL BE CONSTRUCTED TO SECURE THE PENETRATIONS IN-PLACE (SEE DETAIL 04, SHEET VIMS8). THE PENETRATION BANK SHALL BE CONSTRUCTED USING A MINIMUM THICKNESS OF 12 INCHES OF NON-SHRINK GROUT EXTENDING A MINIMUM OF 8 INCHES FROM ANY PENETRATION, ALLOWING FOR A MINIMUM 6-INCH ATTACHMENT OF THE VIMS MEMBRANE, SIMILAR TO AN ATTACHMENT TO AN INTERIOR FOOTING. THE TOP OF THE PENETRATION BANK SHALL BE BELOW THE BOTTOM OF THE SLAB. PENETRATIONS SHALL NOT BE IN CONTACT WITH ADJACENT PENETRATIONS OR OTHER OBJECTS TO ALLOW PROPER SEALING AROUND THE ENTIRE PENETRATION CIRCUMFERENCE.

3. WHERE MONITORING, EXTRACTION, OR INJECTION WELLS PENETRATE THE VIMS MEMBRANE, A GAS-TIGHT SEAL SHALL BE CREATED AROUND THE PENETRATION AS SHOWN IN DETAIL 09, SHEET VIMS9.

D. VACUUM MONITORING PROBES

1. SUB-SLAB VACUUM MONITORING PROBES SHALL BE INSTALLED WITHIN THE 4-INCH AGGREGATE LAYER IMMEDIATELY BELOW THE VIMS MEMBRANE (SEE DETAIL 11, SHEET VIMS10). THE PROBE WILL CONSIST OF A 1-INCH SCH 40 PVC PIPE WITH 12 INCHES OF 0.02-INCH SLOTTED PIPE WRAPPED IN A FILTER SOCK AND BURIED IN THE AGGREGATE LAYER (SEE DETAIL 14, SHEET VIMS10). 1/4-INCH TUBING EQUIPPED WITH A STAINLESS STEEL PROBE TIP WILL BE INSTALLED FROM THE END OF THE PROBE CONTINUOUSLY TO THE MONITORING END OF THE TUBING, TERMINATED IN THE ACCESS PANEL (SEE DETAILS 12 AND 14, SHEET VIMS10).

2. A 12"x12" MEDIUM SECURITY ACCESS PANEL SHALL BE INSTALLED IN AN INTERIOR WALL BETWEEN 2 AND 5 FEET ABOVE THE FLOOR SLAB IN ORDER TO ACCESS THE VACUUM MONITORING PROBES FOR VACUUM MONITORING AND/OR SAMPLING (SEE DETAILS 11 AND 12, SHEET VIMS10). THE VACUUM MONITORING PROBES AND SAMPLING PORT SHALL BE COMBINED INTO A SHARED ACCESS PANEL (SEE DETAILS 01, 02, 03, 10, 11, AND 12, SHEET VIMS10).

3. VACUUM MONITORING PROBES SHALL BE SEALED AT THE SAMPLING END WITH A VAPOR TIGHT CONNECTION (SEE DETAILS 12 AND 13, SHEET VIMS10).

E. QUALITY ASSURANCE

1. THE VIMS SUBCONTRACTOR SHALL BE TRAINED AND APPROVED BY THE VIMS MATERIAL MANUFACTURER. THE VIMS SUBCONTRACTOR SHALL PROVIDE CERTIFICATION FROM THE MANUFACTURER (A) CONFIRMING THAT THE VIMS SUBCONTRACTOR RETAINED BY THE OWNER FOR THE PERFORMANCE OF THIS SCOPE OF WORK IS CERTIFIED BY THE MANUFACTURER FOR INSTALLATION OF THE MATERIAL; AND (B) WARRANTING ITS MATERIAL TO BE FREE OF DEFECTS WHEN THAT MATERIAL IS INSTALLED BY THE VIMS SUBCONTRACTOR.

2. A PRE-INSTALLATION CONFERENCE SHALL BE HELD PRIOR TO THE APPLICATION OF THE VIMS MEMBRANE TO COORDINATE PROPER SUBSTRATE AND INSTALLATION CONDITIONS AND PROCEDURES. THE VIMS SUBCONTRACTOR, SITE SUPERINTENDENT, THE FOUNDATION SUBCONTRACTOR, SUB-SLAB UTILITY CONTRACTORS, AND THE VIMS DESIGNER SHALL BE PRESENT AT THIS MEETING.

3. THE INSTALLATION OF THE VIMS MEMBRANE SHALL BE CLOSELY MONITORED BY THE VIMS DESIGNER OR HIS DESIGNATED REPRESENTATIVE. INSPECTIONS SHALL TYPICALLY BE PERFORMED PRIOR TO, DURING, AND SUBSEQUENT TO THE INSTALLATION OF THE VAPOR COLLECTION PIPING AND APPLICATION OF THE VIMS MEMBRANE. IT IS THE RESPONSIBILITY OF THE VIMS SUBCONTRACTOR TO NOTIFY THE OWNER AND VIMS DESIGNER WITHIN 72 HOURS OF BEGINNING ANY PORTION OF THIS WORK.

4. ALL SURFACES TO RECEIVE THE VIMS MEMBRANE TERMINATIONS SHALL BE INSPECTED AND APPROVED BY THE VIMS SUBCONTRACTOR FOR THE PERFORMANCE OF THIS SCOPE OF WORK AND BY THE VIMS DESIGNER PRIOR TO COMMENCING WORK.

5. PRIOR TO PLACING THE FLOOR SLAB OVER THE MEMBRANE, THE VIMS DESIGNER SHALL INSPECT AND APPROVE THE MEMBRANE IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS. CONSTRUCTION OF THE FLOOR SLAB SHALL NOT PROCEED WITHOUT CERTIFICATION OF THE SUCCESSFUL INSTALLATION BY THE VIMS SUBCONTRACTOR.

F. SUBMITTALS

1. THE VIMS SUBCONTRACTOR SHALL SUBMIT ANY UPDATES OR REVISIONS TO THE MANUFACTURER'S MATERIAL DATA AND RECOMMENDED INSTALLATION PROCEDURES TO THE VIMS DESIGNER FOR REVIEW AND APPROVAL AT LEAST ONE WEEK PRIOR TO THE CONSTRUCTION OF THE VIMS MEMBRANE.

2. THE VIMS SUBCONTRACTOR SHALL SUBMIT REPRESENTATIVE SAMPLES OR MANUFACTURER'S PRODUCT SPECIFICATIONS OF THE FOLLOWING TO THE VIMS DESIGNER FOR APPROVAL:

   a. VIMS 60-MIL MEMBRANE
      - BASE GEOTEXTILE AND UPPER PROTECTIVE MATERIALS
      - ASPHALTIC MEMBRANE
      - 10-MIL THERMOPLASTIC LINER
      - AGGREGATE MATERIAL
      - VAPOR COLLECTION PIPING
      - VACUUM MONITORING PROBE MATERIALS AND COMPONENTS

   b. VIMS 20-MIL MEMBRANE
      - 20-MIL SHEET MEMBRANE MATERIAL
      - TRENCH REINFORCEMENT FABRIC
      - AGGREGATE MATERIAL
      - ASPHALTIC EMULSION
      - VAPOR COLLECTION PIPING

3. AT THE COMPLETION OF INSTALLATION, THE VIMS SUBCONTRACTOR SHALL CERTIFY THAT VIMS INSTALLATION WAS COMPLETED IN ACCORDANCE WITH THE PROJECT PLANS AND SPECIFICATIONS AS WELL AS MANUFACTURER SPECIFICATIONS.

4. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO COLLECT AND MAINTAIN A DATABASE OF SAFETY DATA SHEETS FROM ALL RELEVANT SUBCONTRACTORS AND THE COMPLETION LETTER FROM THE VIMS SUBCONTRACTOR(S).

G. WARRANTY

1. TERRACON RECOMMENDS THE OWNER OBTAIN A WARRANTY FOR THE VIMS MEMBRANE. THE MANUFACTURER PROVIDES PRODUCT AND/OR SYSTEM WARRANTIES FOR THE VIMS MEMBRANE RANGING FROM ONE YEAR T0 5 YEARS IN DURATION. EXTENDED WARRANTIES MAY RANGE FROM 5 TO 30 YEARS IN DURATION.

2. THE VIMS MANUFACTURER MAY REQUIRE SUBMITTAL OF DESIGN DOCUMENTS, ENVIRONMENTAL REPORTS, GEOTECHNICAL REPORTS, OR OTHER DOCUMENTATION FOR REVIEW PRIOR TO ISSUING A WARRANTY, AND ADDITIONAL COSTS MAY APPLY. PLEASE CONTACT THE SELECTED MANUFACTURER FOR WARRANTY TERMS AND CONDITIONS AND ADDITIONAL INFORMATION.

3. MANUFACTURERS EXTENDED WARRANTIES MUST BE REQUESTED BY THE OWNER PRIOR TO VIMS INSTALLATION BID REQUESTS.

H. JOB CONDITIONS

1. THE AREAS ADJACENT TO THE VIMS MEMBRANE ARE TO BE PROTECTED BY THE VIMS SUBCONTRACTOR FOR THE PERFORMANCE OF THIS SCOPE OF WORK DURING THE INSTALLATION PROCESS. WHERE NECESSARY, MASKING OR OTHER PROTECTIVE MEASURES SHALL BE UTILIZED TO PREVENT STAINING OF SURFACES BEYOND THE LIMITS OF THE APPLICATION.

2. WORK IS TO BE PERFORMED ONLY WHEN EXISTING AND FORECASTED WEATHER CONDITIONS ARE WITHIN THE MANUFACTURER RECOMMENDATIONS FOR THE MATERIAL AND PRODUCT USED. THE APPLICATION OF THE VIMS MEMBRANE COMPOUNDS SHALL BE SUSPENDED IF THE AMBIENT TEMPERATURE FALLS BELOW 45° F, OR DURING PERIODS OF PRECIPITATION. APPLICATION OF THE VIMS MEMBRANE MAY BE PERFORMED BELOW 45° F, BUT ONLY WITH WRITTEN PERMISSION FROM THE VIMS DESIGNER AND MATERIAL MANUFACTURER.

3. A MINIMUM CLEARANCE OF 24 INCHES IS REQUIRED FOR A TYPICAL SPRAY APPLICATION OF THE ASPHALTIC LAYER. FOR AREAS WITH LESS THAN 24-INCH CLEARANCE, THE ASPHALTIC LAYER MAY BE APPLIED BY HAND.

4. ALL PLUMBING, ELECTRICAL, MECHANICAL AND STRUCTURAL ITEMS THAT ARE LOCATED BENEATH OR THAT PASS THROUGH THE VIMS MEMBRANE SHALL BE POSITIVELY SECURED IN THEIR PROPER POSITIONS AND APPROPRIATELY PROTECTED PRIOR TO APPLICATION OF THE ASPHALTIC LAYER.

5. THE VIMS MEMBRANE SHALL BE INSTALLED BEFORE PLACEMENT OF REINFORCING STEEL. IF REINFORCING STEEL IS PRESENT AT THE TIME OF APPLICATION, ALL EXPOSED REINFORCEMENT SHALL BE MASKED BY THE FOUNDATION SUBCONTRACTOR PRIOR TO APPLICATION OF THE ASPHALTIC LAYER.

6. REINFORCING STEEL, PIPING, FORMS, ETC. SHALL NOT BEAR DIRECTLY ON THE MEMBRANE OR PROTECTIVE LAYER AND EQUIPMENT SHALL NOT BE DRIVEN OVER THE MEMBRANE OR ITS PROTECTIVE LAYER WITHOUT PRIOR APPROVAL FROM THE VIMS DESIGNER AND MANUFACTURER.

7. STAKES USED TO SECURE THE CONCRETE FORMS SHALL NOT PENETRATE THE VIMS MEMBRANE AFTER IT HAS BEEN INSTALLED. IF STAKES NEED TO PUNCTURE THE MEMBRANE AFTER IT HAS BEEN INSTALLED, THE VIMS DESIGNER AND INSTALLER SHOULD BE NOTIFIED, AND NECESSARY REPAIRS NEED TO BE MADE BY THE VIMS SUBCONTRACTOR.

8. FIELD SITUATIONS NOT SPECIALLY DETAILED SHALL BE HANDLED PER THE INTENT OF THESE PLANS AND SPECIFICATIONS WITH THE APPROVAL OF THE VIMS DESIGNER. THE APPLICATOR / CONTRACTOR MAY SUBMIT SHOP DRAWINGS FOR ALTERNATIVE METHODS. SEE STRUCTURAL FOUNDATION PLANS FOR COMPLETE DEPTHS AND DETAILS OF FOOTING. DEPTHS OF FOOTINGS SHOWN IN THESE PLANS ARE GENERALIZED, ACTUAL FOOTING DEPTHS MAY VARY.

9. APPROPRIATE CARE SHALL BE EXERCISED TO PROTECT THE VIMS MEMBRANE AND PREVENT PENETRATIONS SUBSEQUENT TO ITS APPLICATION. THE VIMS MEMBRANE SHALL BE PROTECTED FROM PEDESTRIAN TRAFFIC WITH THE PROTECTIVE GEOTEXTILE LAYER. THE PROTECTIVE GEOTEXTILE SHALL BE KEPT FREE OF DIRT AND DEBRIS, TO THE EXTENT POSSIBLE, UNTIL THE FLOOR SLAB IS POURED. IT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO ENSURE THAT THE VIMS MEMBRANE AND THE PROTECTION SYSTEM ARE NOT PENETRATED AFTER THE COMPLETION OF THE INSTALLATION.

I. INSTALLATION

I.1 VAPOR COLLECTION PIPING INSTALLATION

1. VAPOR COLLECTION PIPING SHALL BE CONNECTED TO PROVIDE A GAS-TIGHT SEAL AT ALL CONNECTIONS AND FITTINGS AND SHALL BE CONSTRUCTED OF MATERIALS THAT COMPLY WITH THE UNIFORM PLUMBING AND MECHANICAL CODES. ALL JOINTS SHALL BE TIGHTLY SEALED WITH APPROVED MATERIALS. ANY GLUE OR SOLVENT USED TO SEAL THE PIPING MUST BE LOW-VOC.

2. PLACEMENT OF AGGREGATE ABOVE THE PIPING SHALL NOT BEGIN BEFORE THE VIMS DESIGNER HAS INSPECTED THE GRADE AND ALIGNMENT OF THE PIPING, THE BEDDING OF THE PIPING AND THE JOINTS BETWEEN THE PIPING. ALL PIPING LOCATED WITHIN THE AGGREGATE LAYER SHALL BE PROTECTED FROM PHYSICAL DAMAGE.

3. CONVEYANCE PIPING GREATER THAN 10 FEET IN LENGTH SHALL HAVE 1/4-INCH DIAMETER WEEP HOLES DRILLED ON THE BOTTOM OF THE PIPE APPROXIMATELY EVERY 5 FEET.

4. SOLID RISER PIPE SHALL BE LOCATED WITHIN THE WALLS/CHASES OR SHALL BE SIMILARLY PROTECTED FROM PHYSICAL DAMAGE. DAMAGE INCURRED DURING CONSTRUCTION OR OCCUPANCY COULD AFFECT SYSTEM PERFORMANCE.

I.2 VIMS MEMBRANE AND PROTECTIVE LAYER INSTALLATIONS

1. THE SUBGRADE SHALL BE MOISTURE CONDITIONED AND COMPACTED BY THE GRADING CONTRACTOR AS SPECIFIED IN THE PROJECT PLANS AND SPECIFICATIONS. THE FINISHED SURFACE SHALL BE SMOOTH, UNIFORM, AND FREE OF DEBRIS AND STANDING WATER. FINAL SUBGRADE INSPECTION/PREPARATION SHALL NOT PRECEDE THE VIMS INSTALLATION BY MORE THAN 72 HOURS.

2. THE AGGREGATE LAYER SHALL BE MOISTURE CONDITIONED AND COMPACTED AS SPECIFIED IN THE PROJECT PLANS AND SPECIFICATIONS.

3. IF THE VIMS MEMBRANE IS TO BE PLACED ON A CONCRETE SURFACE, CONCRETE SURFACES SHALL BE LIGHT BROOM FINISHED OR SMOOTHED, FREE OF ANY DIRT, DEBRIS, LOOSE MATERIAL, RELEASE AGENTS OR CURING COMPOUNDS. ALL VOIDS MORE THAN 1/4-INCH IN WIDTH SHALL BE PROPERLY FILLED WITH NON-SHRINK GROUT OR AS SPECIFIED IN THE PROJECT PLANS AND SPECIFICATIONS. MASONRY JOINTS SHALL BE STRUCK SMOOTH WITH A METAL TROWEL. ALL PENETRATIONS SHALL BE PREPARED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS.

4. ALL VIMS MEMBRANE PENETRATIONS SHALL BE PREPARED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS. WHERE POSSIBLE, ANY FORM STAKES THAT PENETRATE THE VIMS MEMBRANE SHALL BE REBAR WHICH SHALL BE BENT OVER AND LEFT IN THE SLAB. HOLLOW CONDUIT STAKES SHALL NOT BE USED.

5. TRENCHES SHALL BE CUT OVERSIZE AS NECESSARY TO ACCOMMODATE INSTALLATION OF THE VIMS MEMBRANE.

6. THE WALLS OF FOOTING OR UTILITY TRENCHES SHALL BE SMOOTH AND FREE OF ROOTS OR PROTRUDING ROCKS.

7. IF ORGANIC MATERIALS WITH POTENTIAL FOR GROWTH (E.G. SEEDS OR GRASSES) ARE PRESENT WITHIN THE SUBGRADE, THE GENERAL CONTRACTOR SHALL APPLY A SOIL STERILANT AT THE MANUFACTURER'S RECOMMENDED RATE PRIOR TO THE INSTALLATION OF THE VIMS MEMBRANE.

8. THE BASE LAYER SHALL FIRST BE LAID ON THE AGGREGATE LAYER IN ACCORDANCE WITH THE MATERIAL MANUFACTURER'S SPECIFICATIONS. ALL SEAMS SHALL BE OVERLAPPED A MINIMUM OF 6 INCHES. ANY OPEN UTILITY OR OTHER TRENCH PRESENT AT THE TIME OF APPLICATION SHALL BE LINED WITH PROTECTIVE BASE LAYER EXTENDING AT LEAST 6 INCHES ONTO THE ADJOINING SUBGRADE. THE BASE LAYER SHALL BE IN INTEGRAL CONTACT WITH ALL INTERIOR FOUNDATION CORNERS. ASPHALTIC MEMBRANE SHALL BE SPRAY APPLIED TO A THICKNESS OF 30 MILS MINIMUM AT OVERLAPPED SEAMS AND A THICKNESS OF 60-MILS MINIMUM FOR SEAMS WHERE THE 60-MIL MEMBRANE (OCCUPIED ENCLOSED AREAS) TRANSITIONS TO THE 20-MIL MEMBRANE (PARKING GARAGE AREAS).

9. INSTALL THE PROTECTIVE BOND LAYER OVER THE NOMINALLY CURED ASPHALTIC LAYER NO LATER THAN RECOMMENDED BY MANUFACTURER AND BEFORE STARTING SUBSEQUENT CONSTRUCTION OPERATIONS. VISUAL INSPECTION AND SMOKE TESTING MUST BE PERFORMED PRIOR TO PLACING THE PROTECTIVE LAYER OVER THE ASPHALTIC LAYER.

I.3 SEALING 60-MIL MEMBRANE PENETRATIONS

1. ALL PENETRATIONS SHALL BE CLEANED AND PREPARED TO PROVIDE PROPER ADHESION OF THE ASPHALTIC LAYER FOR A VAPOR TIGHT SEAL. METAL PENETRATIONS SHALL BE SANDED CLEAN AND PREPARED USING EMERY CLOTH FOR PROPER ADHESION OF THE ASPHALTIC LAYER.

2. ALL PENETRATIONS SHOULD BE SECURED PRIOR TO INSTALLATION OF THE VIMS MEMBRANE SYSTEM. PENETRATIONS SHALL NOT BE IN CONTACT WITH ADJACENT PENETRATIONS OR OTHER OBJECTS TO ALLOW PROPER SEALING AROUND THE ENTIRE PENETRATION CIRCUMFERENCE. WHERE PENETRATIONS SUCH AS ELECTRICAL CONDUITS, PLUMBING PIPING, ETC ARE CONCENTRATED, A CONCRETE PENETRATION BANK WILL BE CONSTRUCTED PRIOR TO VIMS MEMBRANE PLACEMENT. THE CONCRETE PENETRATION BANK WILL CONSIST OF A MINIMUM THICKNESS OF 12 INCHES OF CONCRETE, EXTENDING A MINIMUM OF 8 INCHES BEYOND THE EDGE OF EACH PENETRATION TO ALLOW FOR ATTACHMENT OF THE VIMS MEMBRANE (SEE DETAIL 04, SHEET VIMS6).

3. THE BASE LAYER SHALL BE CUT AROUND PENETRATIONS SO THAT IT LAYS FLAT ON THE SUBGRADE. THERE SHOULD NOT BE A GAP LARGER THAN 1/8-INCH BETWEEN THE BASE LAYER AND THE PENETRATION (SEE DETAIL 03, SHEET VIMS6 AND DETAIL 03, SHEET VIMS8).

4. APPLY ONE COAT OF ASPHALTIC MEMBRANE TROWEL GRADE OR ASPHALTIC MEMBRANE SPRAY TO THE BASE GEOTEXTILE LAYER AND AROUND THE PENETRATIONS AT A THICKNESS OF 60-MILS. PENETRATIONS SHOULD BE TREATED IN A 6-INCH RADIUS AROUND THE PENETRATION AND 3 INCHES ONTO THE PENETRATION OBJECT.

5. BASE GEOTEXTILE LAYER BOND MATERIAL OR REINFORCEMENT FABRIC SHALL BE USED AS AN EMBEDDED GEOTEXTILE LAYER COLLAR PLACED AFTER THE FIRST APPLICATION OF THE ASPHALTIC MEMBRANE SPRAY OR ASPHALTIC MEMBRANE TROWEL GRADE. THEN SPRAY A SECOND 60-MIL COAT OVER THE EMBEDDED REINFORCING LAYER ENSURING THE COMPLETE SATURATION OF THE EMBEDDED LAYER AND TIGHT SEAL AROUND THE PENETRATION.

6. THE PENETRATION SHALL BE WRAPPED WITH A POLYPROPYLENE CABLE TIE AT A POINT 2 INCHES ABOVE THE BASE OF THE PENETRATION. THE CABLE TIE SHALL BE TIGHTENED FIRMLY SO AS TO SQUEEZE THE CURED MEMBRANE COLLAR, BUT NOT TOO TIGHT TO SLICE INTO THE FINISHED SEAL. (SEE DETAIL 03, SHEET VIMS6 AND DETAIL 03, SHEET VIMS8). THE CABLE TIE MAY BE INSTALLED IMMEDIATELY AFTER THE GEOTEXTILE LAYER COLLAR HAS BEEN INSTALLED.

I.4 SEALING 20-MIL MEMBRANE PENETRATIONS

1. ALL PENETRATIONS SHALL BE CLEANED AND PREPARED TO PROVIDE PROPER ADHESION OF THE ASPHALTIC EMULSION. METAL PENETRATIONS SHALL BE SANDED CLEAN AND PREPARED USING EMERY CLOTH FOR PROPER ADHESION OF THE ASPHALTIC EMULSION.

2. ALL PENETRATIONS SHOULD BE SECURED PRIOR TO INSTALLATION OF THE VIMS MEMBRANE SYSTEM. PENETRATIONS SHALL NOT BE IN CONTACT WITH ADJACENT PENETRATIONS OR OTHER OBJECTS TO ALLOW PROPER SEALING AROUND THE ENTIRE PENETRATION CIRCUMFERENCE. WHERE PENETRATIONS SUCH AS ELECTRICAL CONDUITS, PLUMBING PIPING, ETC ARE CONCENTRATED, A CONCRETE PENETRATION BANK WILL BE CONSTRUCTED PRIOR TO VIMS MEMBRANE PLACEMENT. THE CONCRETE PENETRATION BANK WILL CONSIST OF A MINIMUM THICKNESS OF 12 INCHES OF NON-SHRINK GROUT, EXTENDING A MINIMUM OF 8 INCHES BEYOND THE EDGE OF EACH PENETRATION TO ALLOW FOR ATTACHMENT OF THE VIMS MEMBRANE (SEE DETAIL 04, SHEET VIMS8).

3. THE MEMBRANE SHALL BE CUT AROUND PENETRATIONS SO THAT IT LAYS FLAT ON THE SUBGRADE. THERE SHOULD NOT BE A GAP LARGER THAN 1/8-INCH BETWEEN THE BASE LAYER AND THE PENETRATION (SEE DETAIL 03, SHEET VIMS8).

J. INSPECTIONS

1. THE INSPECTION OF ALL VAPOR CONTROL MEASURES SHALL BE PERFORMED BY THE VIMS DESIGNER. AT A MINIMUM, INSPECTION SHALL TAKE PLACE AT THE FOLLOWING STAGES OF THE INSTALLATION, AS DEEMED NECESSARY BY THE VIMS DESIGNER:

   a. VIMS 60-MIL MEMBRANE
      - AFTER THE INSTALLATION OF THE VAPOR COLLECTION PIPING AND PRIOR TO INSTALLATION OF THE AGGREGATE LAYER ABOVE THE VAPOR COLLECTION PIPING;
      - DURING THE COMPLETION OF VACUUM MONITORING PROBE INSTALLATION;
      - PERIODICALLY DURING THE INSTALLATION OF THE BASE LAYER;
      - DURING THE SPRAY APPLICATION OF THE ASPHALTIC LAYER;
      - DURING SMOKE TESTING;
      - AFTER THE INSTALLATION OF THE PROTECTIVE GEOTEXTILE LAYER, REINFORCING STEEL, AND ALL FOUNDATION FORM WORK, BUT PRIOR TO AND THROUGHOUT THE PLACEMENT OF CONCRETE FOR THE FLOOR SLAB;
      - DURING AND AT THE COMPLETION OF THE VERTICAL VENT RISER PIPING AND PASSIVE VENTILATOR INSTALLATION.

   b. VIMS 20-MIL MEMBRANE
      - AFTER THE INSTALLATION OF THE VAPOR COLLECTION PIPING AND PRIOR TO INSTALLATION OF THE AGGREGATE LAYER ABOVE THE VAPOR COLLECTION PIPING;
      - PERIODICALLY DURING THE INSTALLATION OF THE 20-MIL MEMBRANE;
      - DURING SEALING OF SEAMS AND PENETRATIONS;
      - DURING SMOKE TESTING;
      - AFTER THE INSTALLATION OF THE 20-MIL, REINFORCING STEEL, AND ALL FOUNDATION FORM WORK, BUT PRIOR TO AND THROUGHOUT THE PLACEMENT OF CONCRETE FOR THE FLOOR SLAB;
      - DURING AND AT THE COMPLETION OF THE VERTICAL VENT RISER PIPING AND PASSIVE VENTILATOR INSTALLATION.

2. FINAL SUBGRADE INSPECTION / PREPARATION SHALL NOT PRECEDE THE VIMS INSTALLATION BY MORE THAN 72 HOURS.

3. FIELD QUALITY CONTROL IS A VERY IMPORTANT PART OF ALL APPLICATIONS. THE VIMS SUBCONTRACTOR SHALL CHECK HIS OWN WORK FOR COVERAGE, THICKNESS, AND ALL-AROUND GOOD WORKMANSHIP.

4. COUPON SAMPLES SHALL BE CUT FROM THE VIMS MEMBRANE IN 2 SQUARE INCHES TO REPRESENT A MAXIMUM AREA OF 500 SQUARE FEET OF APPLICATION AND PROVIDED TO THE VIMS INSPECTOR. THE THICKNESS OF THE COMPOSITE LAYER SHALL BE MEASURED WITH A DIGITAL CALIPER HAVING A RESOLUTION OF 1 MIL OR BETTER. THE THICKNESS OF THE BASE GEOTEXTILE SHALL BE DEDUCTED FROM THE COMPOSITE THICKNESS IN ORDER TO DETERMINE THE THICKNESS OF THE ASPHALTIC LAYER. WHEN WARRANTED, THE TEST AREA SHALL BE MARKED BY THE VIMS DESIGNER FOR REPAIR.

5. VOIDS LEFT BY SAMPLING SHALL BE PATCHED BY THE VIMS SUBCONTRACTOR BY OVERLAPPING THE VOID BY A MINIMUM OF 6 INCHES. A THIN TACK COAT OF ASPHALTIC EMULSION SHALL BE APPLIED TO ADHERE TO THE GEOTEXTILE BASE PATCH. SPRAY OR TROWEL APPLIED ASPHALTIC EMULSION SHALL THEN BE APPLIED TO A 100 MIL MINIMUM DRY THICKNESS, EXTENDING AT LEAST 3 INCHES BEYOND THE GEOTEXTILE PATCH.

6. ON CONCRETE SURFACES, THE VIMS MEMBRANE SHALL BE CHECKED FOR COVERAGE WITH A LIGHTLY OILED, NEEDLE NOSE DEPTH GAUGE. THE MINIMUM READING SHALL BE RECORDED AND THE TEST AREA SHALL BE MARKED FOR REPAIR BY THE VIMS DESIGNER.

7. CONCRETE TEST AREAS SHALL BE PATCHED WITH ASPHALTIC MEMBRANE TO A 100 MIL MINIMUM DRY THICKNESS, EXTENDING A MINIMUM OF 1 INCH BEYOND THE TEST PERIMETER.

8. EACH COMPLETED AREA OF VIMS MEMBRANE SHALL BE SMOKE TESTED AT THE COMPLETION OF THE INSTALLATION IN ACCORDANCE WITH MANUFACTURER'S PROTOCOL TO CONFIRM THE INTEGRITY OF THE VIMS MEMBRANE. ONE SMOKE TEST SHALL BE CONDUCTED FOR A MAXIMUM OF EVERY 2,500 SQUARE FOOT AREA. ANY LEAKS WHICH ARE IDENTIFIED SHALL BE REPAIRED AND RE-TESTED UNTIL ALL LEAKS/PERFORATIONS ARE ELIMINATED.

9. PRIOR TO PLACING THE CONCRETE SLAB OVER THE VIMS MEMBRANE, THE VIMS SUBCONTRACTOR SHALL CERTIFY THAT THE VIMS MEMBRANE HAS BEEN INSTALLED AND TESTED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND IS FREE OF LEAKS, AND IS INSTALLED TO THE MINIMUM THICKNESS SPECIFIED IN THESE PLANS.

10. SERVICE LISTED IN THIS SPECIFICATION AS BEING REQUIRED BY THE VIMS DESIGNER ARE DEPENDENT UPON OWNER AUTHORIZATION OF SAID SERVICES TO VIMS DESIGNER, AND NOTIFICATIONS TO THE VIMS DESIGNER OF THE PROJECT STATUS BY THE VIMS SUBCONTRACTOR. IF THESE SERVICES ARE NOT PERFORMED BY THE VIMS DESIGNER, THE MANUFACTURER'S WARRANTY MAY BE VOIDED.

RECOMMENDED VAPOR INTRUSION MITIGATION SYSTEM TASKS SUMMARY

TASKS TO BE COMPLETED	RECOMMENDED CONTRACTOR / TRADE RESPONSIBLE FOR TASK	
	GC	VIMS SUB CONTRACTOR
SUBGRADE PREPARATION		
PLACEMENT OF 4-INCH MIN. COMPACTED AGGREGATE LAYER ABOVE SUBGRADE.	X	
PREPARATION OF AGGREGATE TO ALLOW FOR MEMBRANE ATTACHMENT TO VERTICAL AND HORIZONTAL SURFACES	X	
CONSTRUCTION OF 12-INCH THICK CONCRETE PENETRATION BANKS WHERE UTILITY CONDUITS ARE CONCENTRATED.	X	
INSTALLATION OF 10-MIL THERMOPLASTIC LINER ABOVE SUBGRADE IN OCCUPIED ENCLOSED AREAS WHERE THE VIMS 60-MIL MEMBRANE IS INSTALLED.	X	
INSTALLATION OF VENT SYSTEM		
EXCAVATION OF TRENCHES FOR CONVEYANCE PIPING AND VAPOR COLLECTION PIPING.	X	X
INSTALLATION OF NON-WOVEN GEOTEXTILE IN TRENCHES OF PARKING GARAGE AREAS WHERE THE VIMS 20-MIL MEMBRANE IS INSTALLED.	X	X
INSTALLATION OF 10-MIL THERMOPLASTIC LINER IN TRENCHES OF OCCUPIED ENCLOSED AREAS	X	X
INSTALLATION OF PIPE TRANSITIONS THROUGH GRADE BEAMS OR THICKENED SLABS.	X	
INSTALLATION OF VAPOR COLLECTION PIPING AND CONVEYANCE PIPING	X	X
CONNECTION OF THE VAPOR COLLECTION PIPE TO PIPE COUPLINGS.		X
INSTALLATION OF SUB-SLAB VACUUM MONITORING PROBES IN AGGREGATE LAYER OF OCCUPIED ENCLOSED AREAS	X	X
BACKFILL OF AGGREGATE OVER THE CONVEYANCE PIPE AND VAPOR COLLECTION PIPE AFTER INSTALLATION IS COMPLETED.	X	X
CONNECTION OF THE EXHAUST PIPE TO A ROOF MOUNTED PASSIVE VENTILATOR.	X	
INSTALLATION OF VENT RISER PIPE SAMPLE PORTS AND ACCESS PANEL ON INTERIOR WALL.	X	
INSTALLATION OF 4-INCH VERTICAL VENT RISER PIPE, ENDING A MINIMUM OF 24" ABOVE FINISHED ROOF.	X	
VIMS 60-MIL MEMBRANE INSTALLATION		
REMOVAL OF EXCESS SOILS FROM BUILDING PAD AND SITE, IF NECESSARY.	X	
PLACEMENT OF BASE GEOTEXTILE LAYER AND VIMS MEMBRANE.		X
SEALING OF ALL FLOOR SLAB PENETRATIONS		X
PLACEMENT OF PROTECTIVE GEOTEXTILE LAYER OVER VIMS MEMBRANE.		X
PERFORMANCE OF SMOKE TEST AND FINAL QC OF VIMS MEMBRANE.		X
INSPECTION OF SYSTEM BY CERTIFIED VIMS MEMBRANE TECHNICIAN DURING INSTALLATION.		X
VIMS 20-MIL MEMBRANE INSTALLATION		
REMOVAL OF EXCESS SOILS FROM BUILDING PAD AND SITE, IF NECESSARY.	X	
PLACEMENT OF VIMS MEMBRANE.		X
SEALING OF ALL FLOOR SLAB PENETRATIONS.		X
PERFORMANCE OF SMOKE TEST AND FINAL QC OF VIMS MEMBRANE		X
INSPECTION OF SYSTEM BY CERTIFIED VIMS MEMBRANE TECHNICIAN DURING INSTALLATION.		X

K. REPAIRS

1. TERRACON UNDERSTANDS THAT IMPROVEMENTS MAY BE REQUIRED DURING FUTURE BUILDING ADDITIONS OR RENOVATIONS. IF FUTURE IMPROVEMENTS REQUIRE CUTTING THROUGH THE SLAB AND MEMBRANE, THE VIMS DESIGNER SHALL BE NOTIFIED.

2. REPAIRS OF THE VIMS BARRIER SHALL BE CONDUCTED BY A MANUFACTURER CERTIFIED INSTALLER. A GENERAL REPAIR DETAIL IS SHOWN IN DETAIL 08, SHEET VIMS6.

3. VIMS DESIGNER SHALL BE NOTIFIED TO PROVIDE CONSTRUCTION OBSERVATION SERVICES TO DOCUMENT THE REPAIR OF THE VIMS MEMBRANE.

STANDARD OF CARE AND LIMITATIONS

TERRACON'S SERVICES WILL BE PERFORMED IN A MANNER CONSISTENT WITH GENERALLY ACCEPTED PRACTICES OF THE PROFESSION UNDERTAKEN IN SIMILAR DESIGNS IN THE SAME GEOGRAPHICAL AREA DURING THE SAME TIME PERIOD. PLEASE NOTE THAT TERRACON DOES NOT WARRANT THE WORK OF THIRD PARTIES SUPPLYING INFORMATION USED IN THE PREPARATION OF THE VAPOR INTRUSION MITIGATION SYSTEM. THESE SERVICES WERE PERFORMED IN ACCORDANCE WITH THE SCOPE OF WORK AGREED WITH YOU, OUR CLIENT, AS REFLECTED IN OUR PROPOSAL.

REV.	DATE	BY	DESCRIPTION

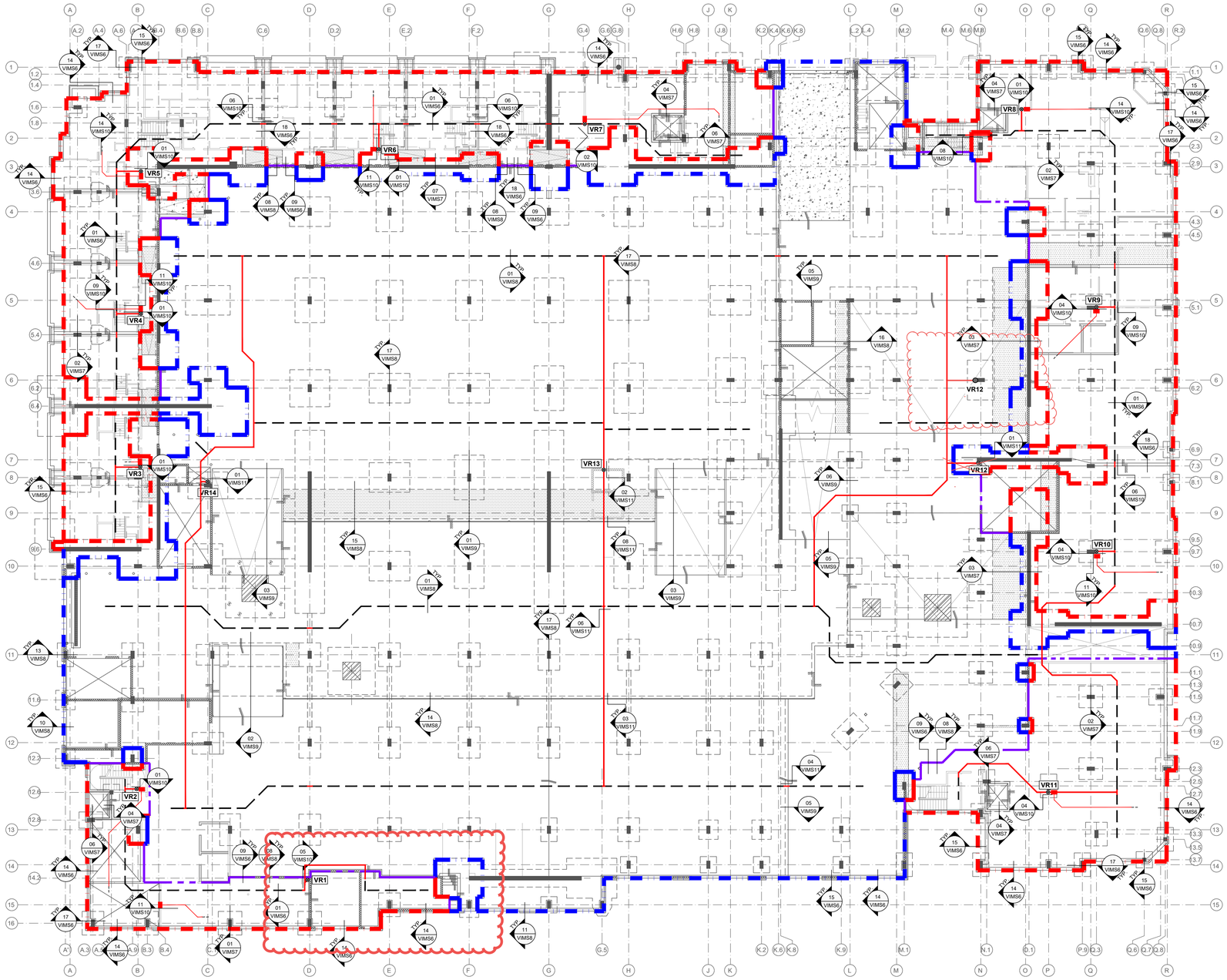
TITLE SHEET AND GENERAL NOTES

BLOCK D
MAIN STREET
BOTHELL, WASHINGTON

Terracon
Consulting Engineers and Scientists
1421 EDINGER AVENUE, SUITE C TUSTIN, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

VIMS1

DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	NOT TO SCALE
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	1 OF 12



LEGEND

- 4-INCH I.D. 0.020-INCH SLOTTED SCH 40 PVC VAPOR COLLECTION PIPING
- 4-INCH I.D. SOLID SCH 40 PVC BELOW SLAB CONVEYANCE PIPE
- SUB-SLAB VACUUM MONITORING PROBE WITH ACCESS PANEL
- EXTENT OF 60-MIL MIN. SPRAY-APPLIED VAPOR INTRUSION MITIGATION SYSTEM MEMBRANE
- EXTENT OF 20-MIL MIN. SHEET VAPOR INTRUSION MITIGATION SYSTEM MEMBRANE
- LOCATION WHERE 60-MIL MIN. MEMBRANE AND 20-MIL MIN. MEMBRANE JOIN
- VR1 VENT RISER TO LEVEL 1 LOCATION

N

SCALE IN FEET: 16 0 4 8 16

VIMS MEMBRANE AND VAPOR COLLECTION VENT PIPE LAYOUT

SCALE: 1/16" = 1'-0"

01

REV	DATE	BY	DESCRIPTION

VAPOR INTRUSION MITIGATION SYSTEM PLAN - LEVEL 1

BLOCK D

MAIN STREET

BOTHELL, WASHINGTON

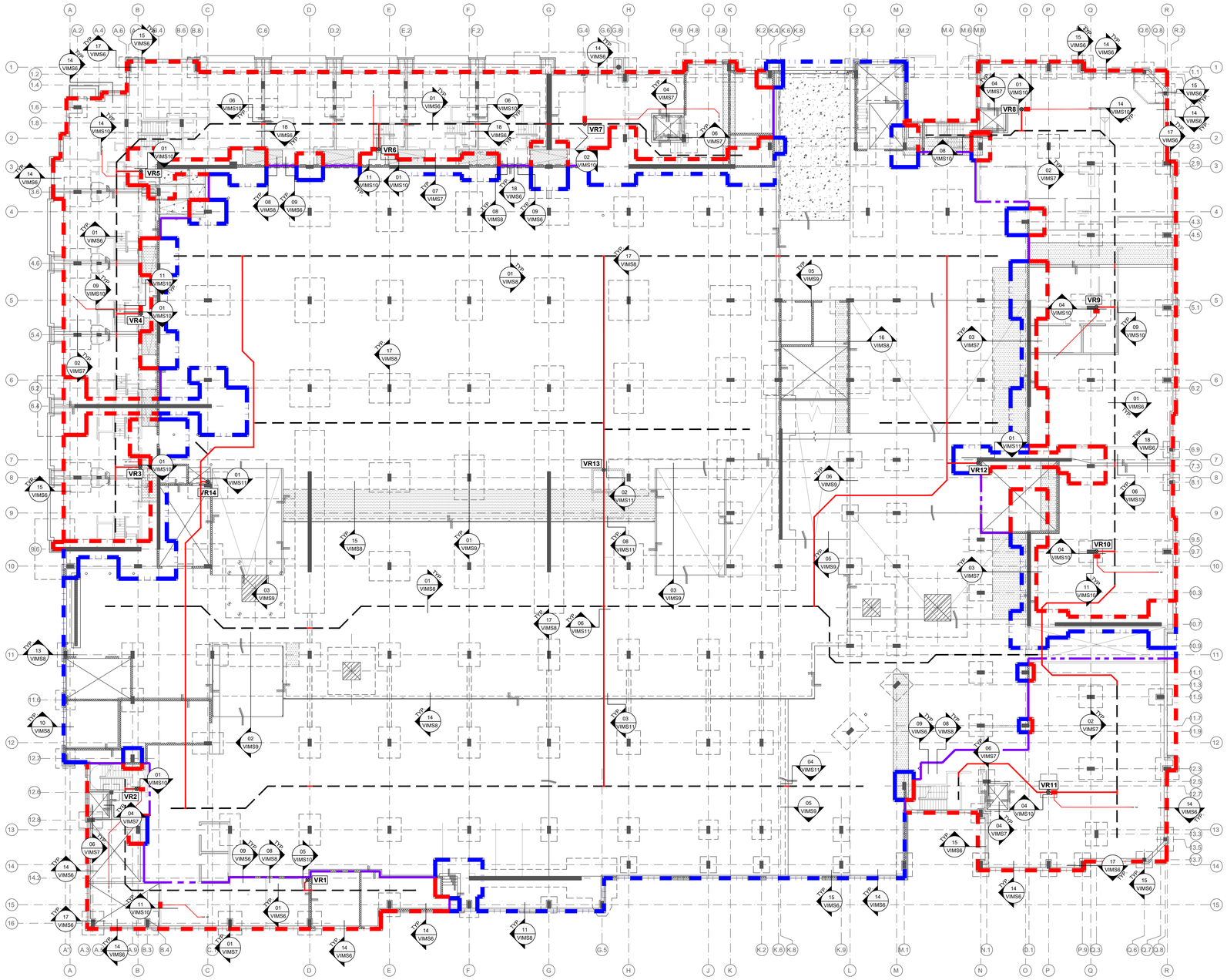
Terracon

Consulting Engineers and Scientists

1421 EDINGER AVENUE, SUITE C TUSTIN, CA 92780

PH: (949) 261-0051 FAX: (949) 261-6110

VIMS2	
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	1/16" = 1'-0"
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	2 OF 12



LEGEND

- 4-INCH I.D. 0.020-INCH SLOTTED SCH 40 PVC VAPOR COLLECTION PIPING
- 4-INCH I.D. SOLID SCH 40 PVC BELOW SLAB CONVEYANCE PIPE
- SUB-SLAB VACUUM MONITORING PROBE WITH ACCESS PANEL
- EXTENT OF 60-MIL MIN. SPRAY-APPLIED VAPOR INTRUSION MITIGATION SYSTEM MEMBRANE
- EXTENT OF 20-MIL MIN. SHEET VAPOR INTRUSION MITIGATION SYSTEM MEMBRANE
- LOCATION WHERE 60-MIL MIN. MEMBRANE AND 20-MIL MIN. MEMBRANE JOIN
- VR1 VENT RISER TO LEVEL 1 LOCATION

N

16 0 4 8 16
SCALE IN FEET

VIMS MEMBRANE AND VAPOR COLLECTION VENT PIPE LAYOUT
SCALE: 1/16" = 1'-0"

01

REV	DATE	BY	DESCRIPTION

VAPOR INTRUSION MITIGATION SYSTEM PLAN - LEVEL 1

BLOCK D
MAIN STREET
BOTHELL, WASHINGTON

Terracon
Consulting Engineers and Scientists
1421 EDINGER AVENUE, SUITE C
TUSTIN, CA 92780
PH: (949) 261-0051
FAX: (949) 261-6110

VIMS2	
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	1/16" = 1'-0"
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	2 OF 12

REV.	DATE	BY	DESCRIPTION

VAPOR INTRUSION MITIGATION SYSTEM PLAN - LEVEL 2

BLOCK D

MAIN STREET

BOTHELL, WASHINGTON

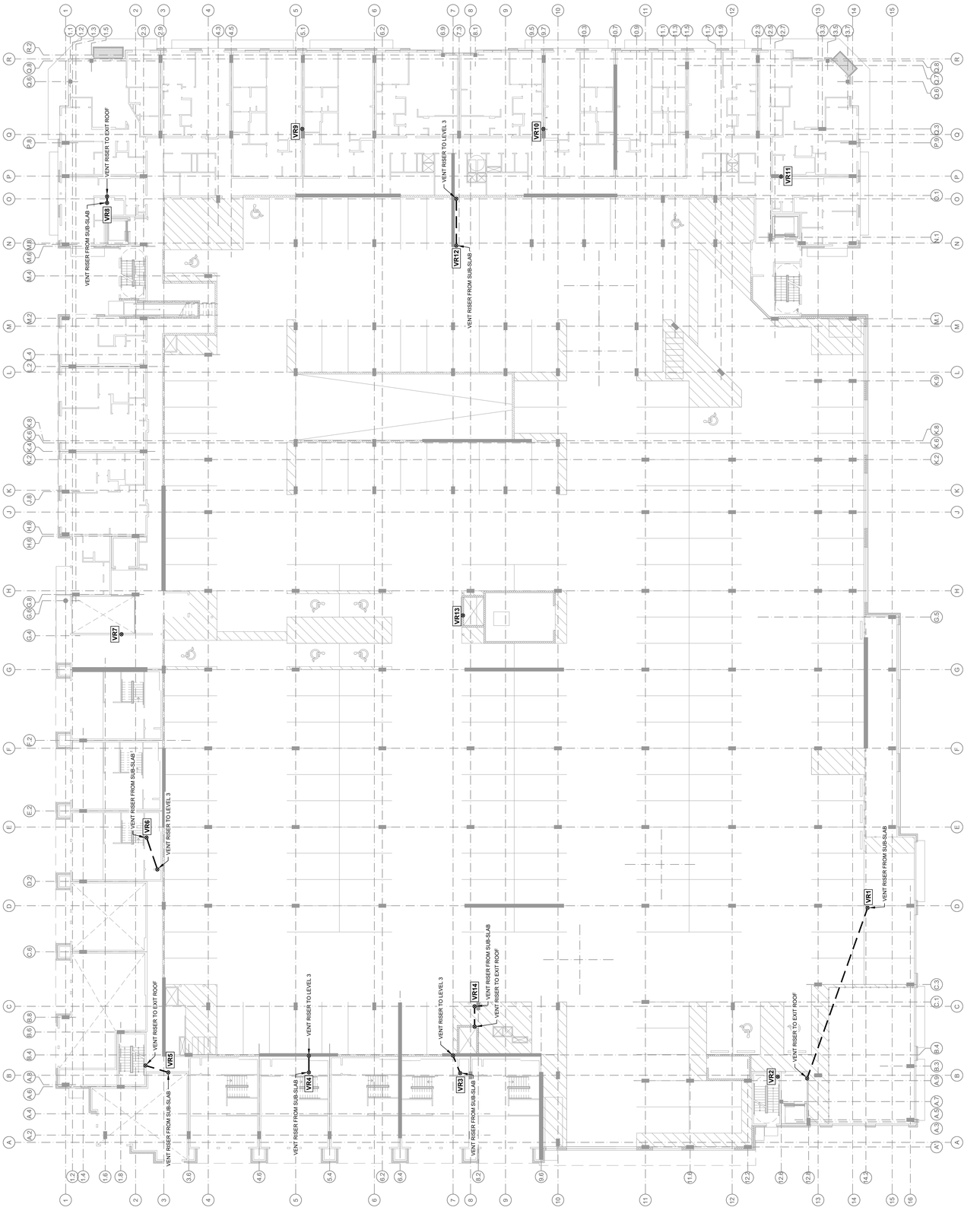
Terracon

Consulting Engineers and Scientists

1421 EDINGER AVENUE, SUITE C TUSTIN, CA 92780

PH. (949) 261-0051 FAX. (949) 261-6110

VIMS3	
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	RMF
SCALE:	1/16" = 1'-0"
DATE:	12/20/21
JOB NO.	69271063
ACAD NO.	69271063 VIMS
SHEET NO.	3 OF 12



LEGEND

VR1 ● VENT RISER FROM LEVEL 1 TO LEVEL 2 LOCATION

— — — VENT RISER TRANSITION BETWEEN LEVELS

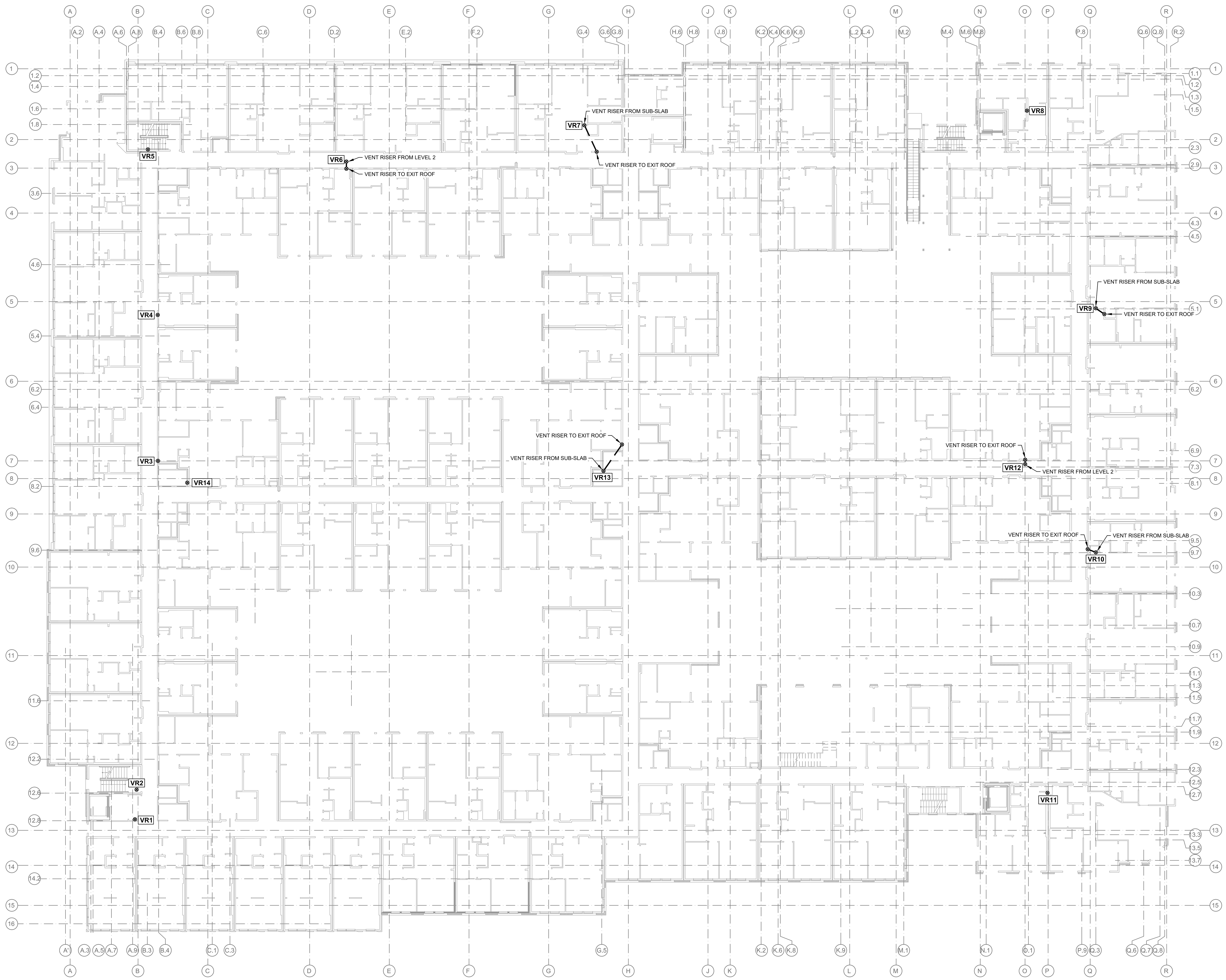
N

SCALE IN FEET

0 4 8 16

VENT RISER TRANSITION BETWEEN LEVEL 1 AND LEVEL 2 01

SCALE: 1/16" = 1'-0"



LEGEND

VR1 ⊗ VENT RISER FROM LEVEL 2 TO LEVEL 3 LOCATION

— — VENT RISER TRANSITION BETWEEN LEVELS

16 0 4 8 16
SCALE IN FEET

N

VENT RISER TRANSITION BETWEEN LEVEL 2 AND LEVEL 3

SCALE: 1/16" = 1'-0"

01

REV.	DATE	BY	DESCRIPTION

VAPOR INTRUSION MITIGATION SYSTEM PLAN - LEVEL 3

BLOCK D
MAIN STREET
BOTHELL, WASHINGTON

Terracon
Consulting Engineers and Scientists
1421 EDINGER AVENUE, SUITE C TUSTIN, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

VIMS4

DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	1/16" = 1'-0"
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	4 OF 12

REV.	DATE	BY	DESCRIPTION

VAPOR INTRUSION MITIGATION SYSTEM PLAN - ROOF

BLOCK D

MAIN STREET

BOTHELL, WASHINGTON

Terracon

Consulting Engineers and Scientists

1421 EDINGER AVENUE, SUITE C TUSTIN, CA 92780

PH. (949) 261-0051 FAX. (949) 261-6110

VIMS5	
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	RMF
SCALE:	1" = 1'-0"
DATE:	12/20/21
JOB NO.	69271083
ACAD NO.	69271083 VIMS
SHEET NO.	5 OF 12

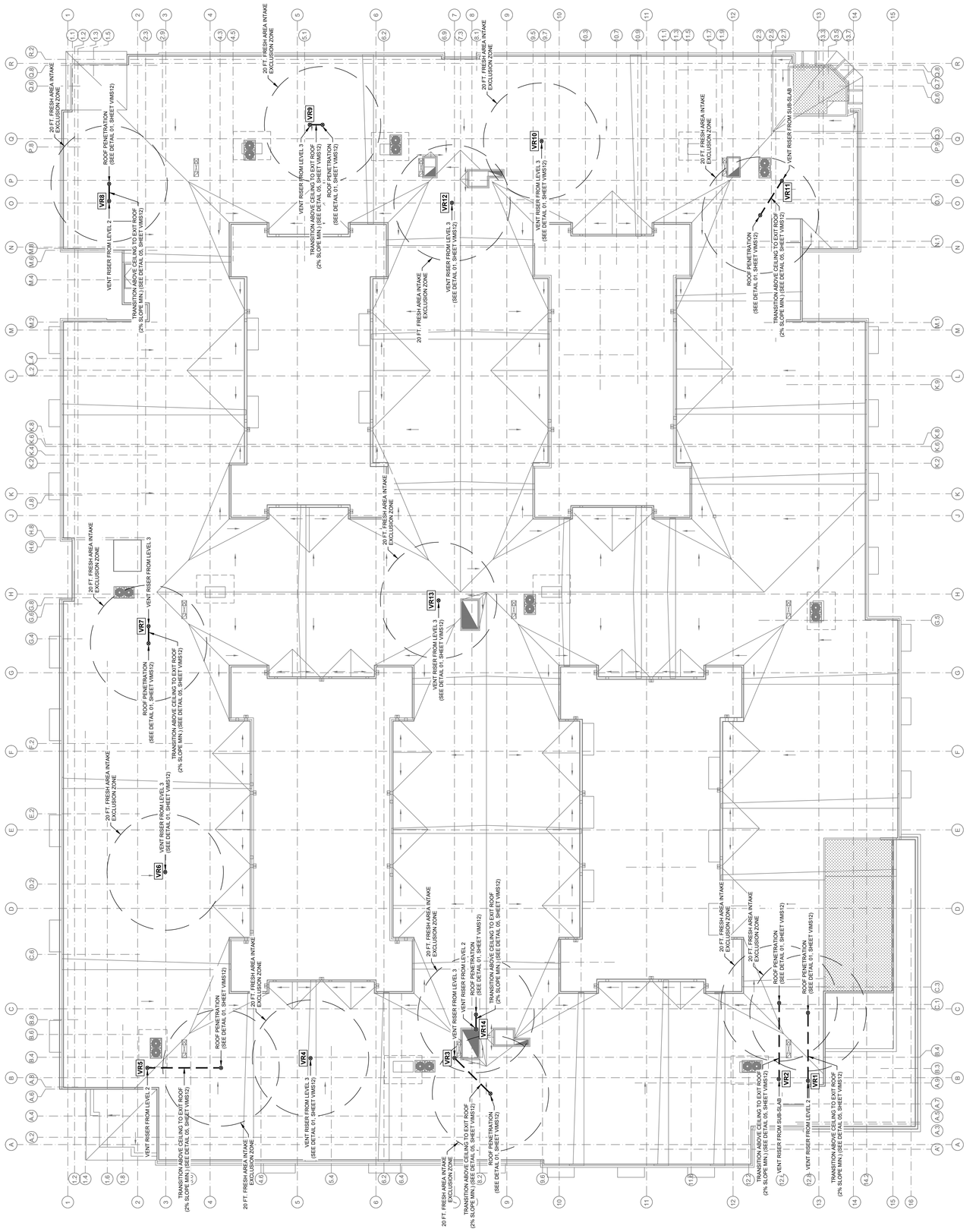
N

SCALE IN FEET

0 4 8 16

ROOF VENT LAYOUT 01

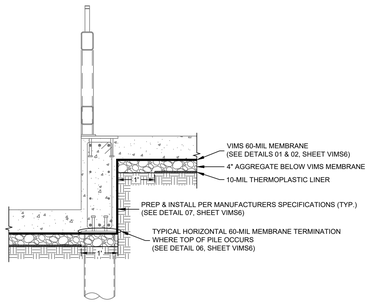
SCALE: 1/16" = 1'-0"



LEGEND

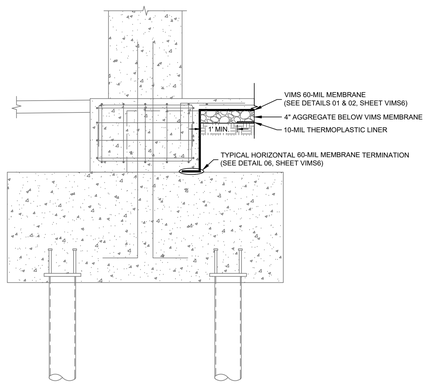
VR1 ● VENT RISER FROM LEVEL 3 TO EXIT ROOF LOCATION

— — — VENT RISER TRANSITION BELOW THE ROOF DECK



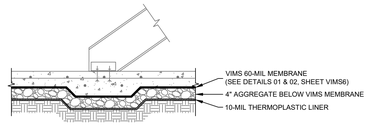
VIMS MEMBRANE AT SLAB ELEVATION CHANGE 19

NOT TO SCALE; REF: STRUCTURAL DETAILS 10 & 12, SHEET S302



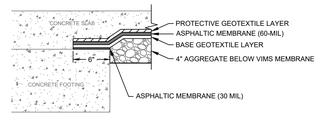
VIMS MEMBRANE AT TYPICAL PILASTER REINFOREMENT 16

NOT TO SCALE; REF: STRUCTURAL DETAIL 19, SHEET S301



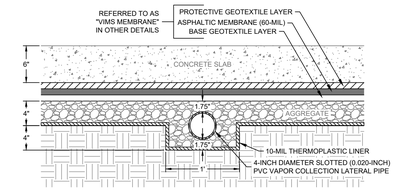
VIMS MEMBRANE AT TYPICAL THICKENED SLAB AT STAIR LANDING 11

NOT TO SCALE; REF: STRUCTURAL DETAIL 07, SHEET S301



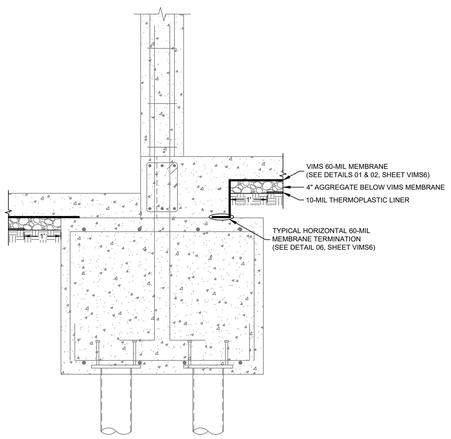
TYPICAL HORIZONTAL 60-MIL MEMBRANE TERMINATION 06

NOT TO SCALE



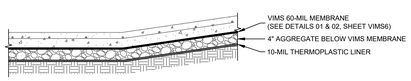
60-MIL MEMBRANE SUB-SLAB VENT SYSTEM 01

NOT TO SCALE



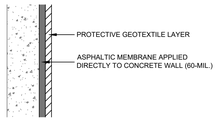
VIMS MEMBRANE AT INTERIOR PILE CAP WITH ELEVATION CHANGE 20

NOT TO SCALE; REF: STRUCTURAL DETAIL 05, SHEET S302



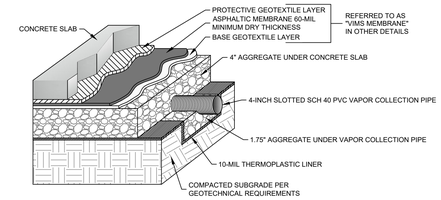
VIMS MEMBRANE AT BOTTOM OF RAMP 12

NOT TO SCALE; REF: STRUCTURAL DETAIL 09, SHEET S301



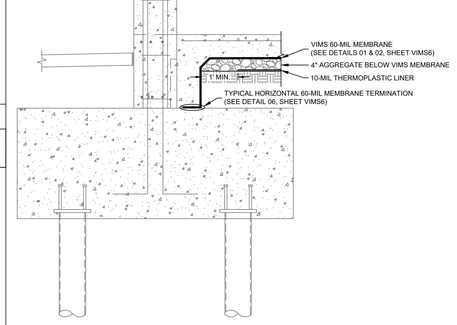
TYPICAL VIMS 60-MIL MEMBRANE INSTALLATION ON VERTICAL WALL 07

NOT TO SCALE



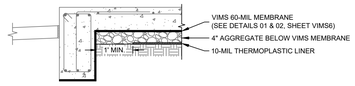
VIMS 60-MIL MEMBRANE CONFIGURATION 02

NOT TO SCALE



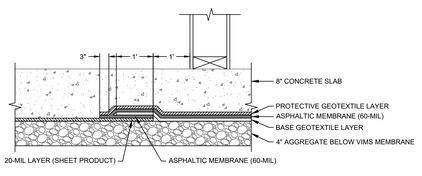
VIMS MEMBRANE AT TYPICAL EXTERIOR PILE CAP 17

NOT TO SCALE; REF: STRUCTURAL DETAILS 02, 03 & 04, SHEET S302



VIMS MEMBRANE AT TYPICAL EXTERIOR GRADE BEAM 14

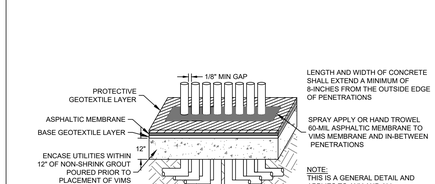
NOT TO SCALE; REF: STRUCTURAL DETAIL 14, SHEET S301



NOTES:
1. EXISTING DAMAGE TO BE INSPECTED AND ASSESSED BY VIMS DESIGNER OR CERTIFIED VIMS INSTALLER.
2. STEPS 1 & 2 TO BE PERFORMED BY GENERAL CONTRACTOR.
3. ALL DUE CARE MUST BE USED TO ENSURE HAND-CHIPPED CONCRETE OPERATION DOES NOT PENETRATE OR DAMAGE EXISTING MEMBRANE.
4. STEPS 3 & 4 TO BE PERFORMED BY A CERTIFIED VIMS INSTALLER.
5. STEP 3, APPLY 1" MIN. OF TROWEL GRADE ABOVE NEWLY EXPOSED MEMBRANE AND COVER WITH NEW PIECE OF PROTECTIVE GEOTEXTILE LAYER.
6. STEP 4, CONCRETE TO BE INSTALLED BY OTHERS ACCORDING TO FINISH FLOOR PROJECT SPECIFICATIONS.

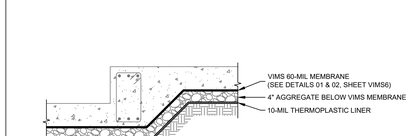
VIMS 60-MIL MEMBRANE REPAIR DETAIL 08

NOT TO SCALE



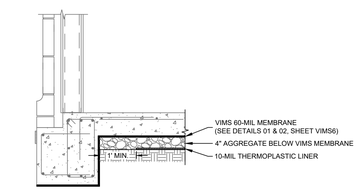
VIMS 60-MIL MEMBRANE PENETRATION 03

NOT TO SCALE



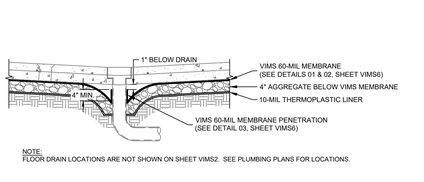
VIMS MEMBRANE AT SLAB ELEVATION CHANGE GREATER THAN 12 INCHES 18

NOT TO SCALE; REF: STRUCTURAL DETAIL 06, SHEET S302



VIMS MEMBRANE AT TYPICAL EXTERIOR GRADE BEAM WITH BRICK LEDGE 15

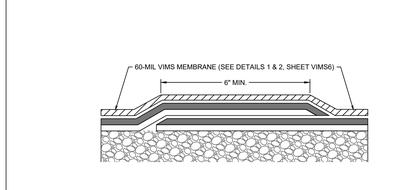
NOT TO SCALE; REF: STRUCTURAL DETAILS 15 & 16, SHEET S301



NOTE:
FLOOR DRAIN LOCATIONS ARE NOT SHOWN ON SHEET VIMS2. SEE PLUMBING PLANS FOR LOCATIONS.

VIMS MEMBRANE AT TYPICAL AREA DRAIN 10

NOT TO SCALE; REF: STRUCTURAL DETAIL 08, SHEET S301



TYPICAL 60-MIL MEMBRANE TERMINATION OVERLAP 05

NOT TO SCALE

NOTE:
THIS IS A GENERAL DETAIL AND APPLIES TO ANY AND ALL UTILITIES WHERE THEY ARE LESS THAN 3-INCHES APART. THE SPECIFIC LOCATIONS ARE NOT SHOWN ON VIMS2.

60-MIL MEMBRANE PENETRATION BANK 04

NOT TO SCALE

VIMS 60-MIL SPRAY-APPLIED MEMBRANE AND 20-MIL SHEET MEMBRANE OVERLAP 09

NOT TO SCALE

REV	DATE	BY	DESCRIPTION

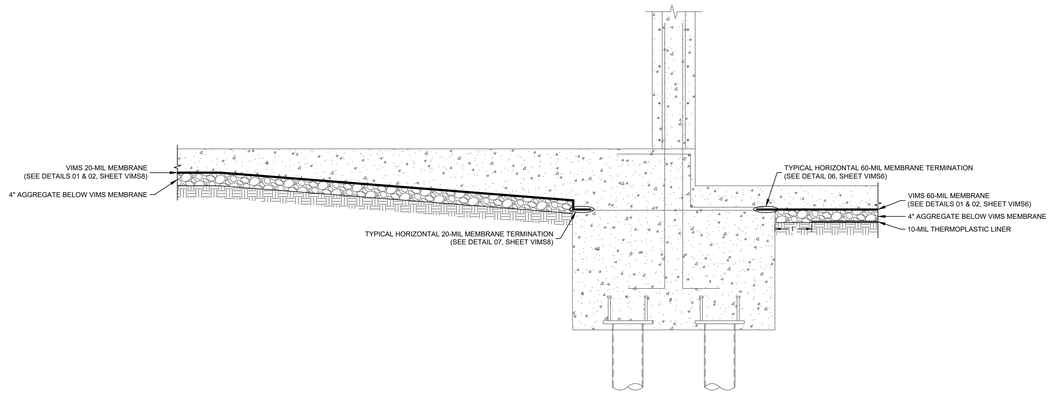
VAPOR INTRUSION MITIGATION SYSTEM DETAILS - MEMBRANE (60-MIL)

BLOCK D

MAIN STREET
BOTHELL, WASHINGTON

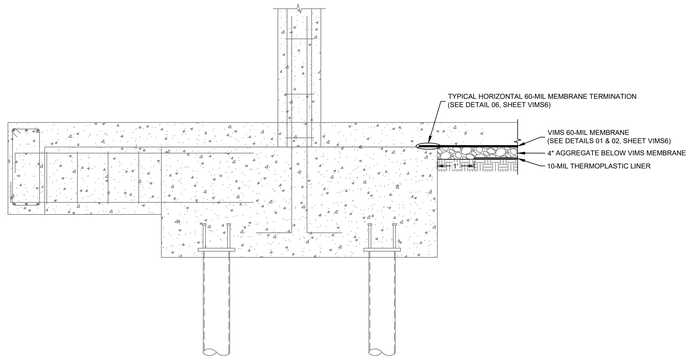
Terracon
Consulting Engineers and Scientists
1421 EDINGER AVENUE, SUITE C
TUSTIN, CA 92780
PH. (949) 261-0051
FAX: (949) 261-6110

VIMS6	
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	NOT TO SCALE
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	6 OF 12



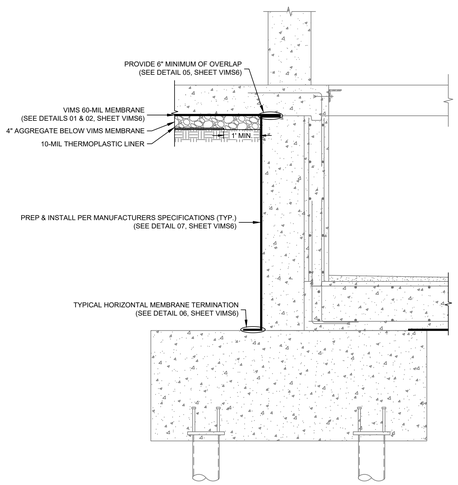
VIMS MEMBRANE AT INTERIOR PILE CAP WITH ELEVATION CHANGE 03

NOT TO SCALE; REF: STRUCTURAL DETAIL 08, SHEET S302



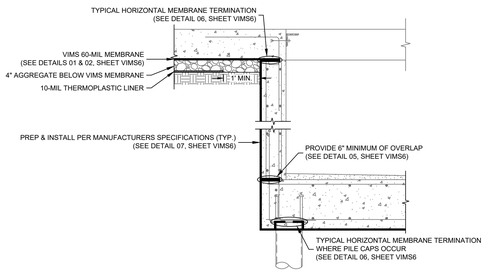
VIMS MEMBRANE AT INTERIOR COLUMN SUPPORT CONNECTED TO EXTERIOR GRADE BEAM 01

NOT TO SCALE; REF: STRUCTURAL DETAIL 20, SHEET S301 AND DETAIL 06, SHEET S303



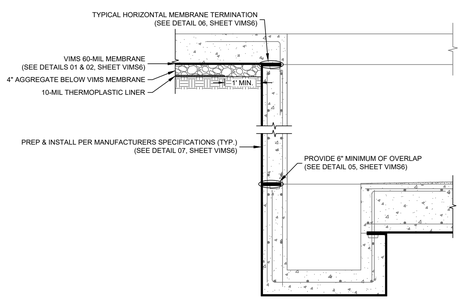
VIMS MEMBRANE AT ELEVATOR PIT - PILE CAP SUPPORTED WITH COLUMN FOOTING 06

NOT TO SCALE; REF: STRUCTURAL DETAIL 03, SHEET S303A



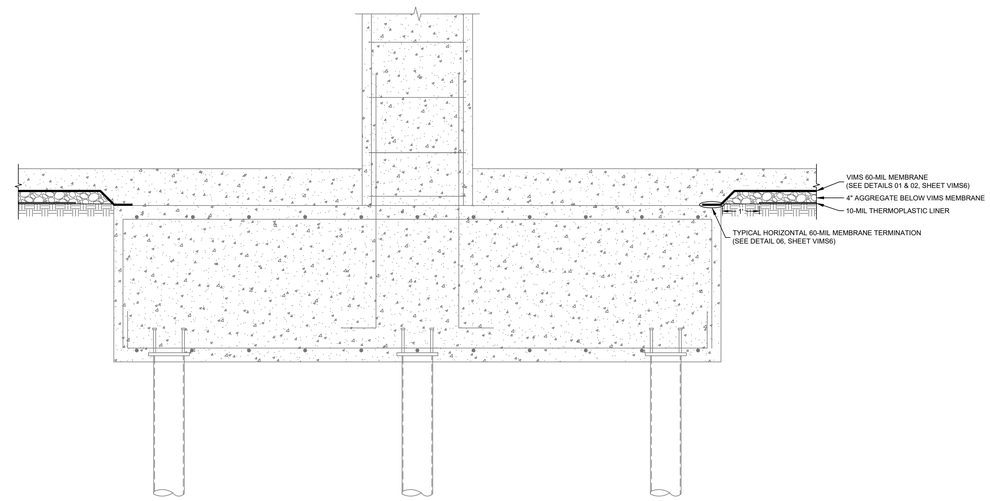
VIMS MEMBRANE AT ELEVATOR PIT - PILE CAP SUPPORTED 04

NOT TO SCALE; REF: STRUCTURAL DETAIL 02, SHEET S303A



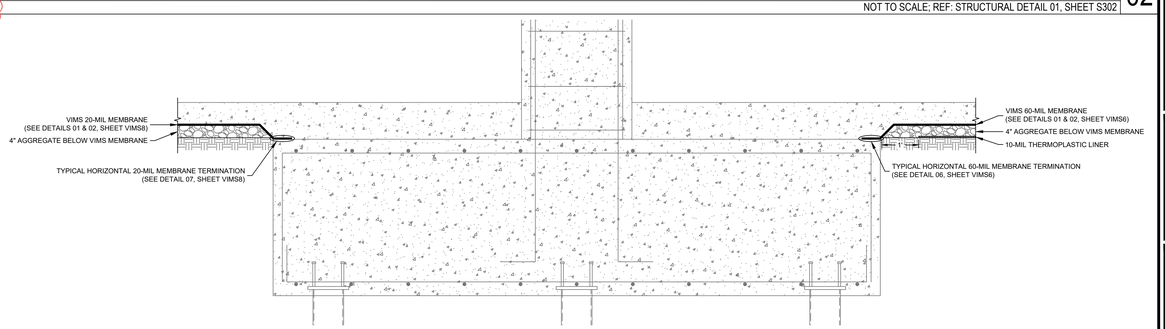
VIMS MEMBRANE AT ELEVATOR SUMP PIT 05

NOT TO SCALE; REF: STRUCTURAL DETAIL 01, SHEET S303A



VIMS MEMBRANE AT TYPICAL PILE CAP 02

NOT TO SCALE; REF: STRUCTURAL DETAIL 01, SHEET S302



VIMS 60-MIL AND 20-MIL MEMBRANES AT TYPICAL PILE CAP 07

NOT TO SCALE; REF: STRUCTURAL DETAIL 01, SHEET S302

REV	DATE	BY	DESCRIPTION

VAPOR INTRUSION MITIGATION SYSTEM DETAILS - MEMBRANE (60-MIL)

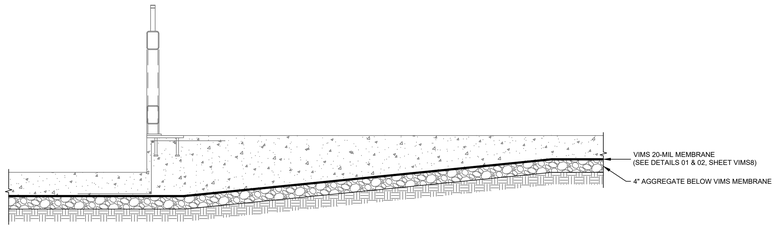
BLOCK D

MAIN STREET

BOTHELL, WASHINGTON

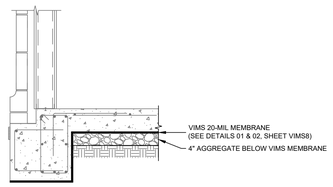
Terracon
Consulting Engineers and Scientists
1421 EDINGER AVENUE, SUITE C
TUSTIN, CA 92780
PH: (949) 261-0051
FAX: (949) 261-6110

VIMS7	
DESIGNED BY:	JTY
DRAWN BY:	PTK
APP'VD. BY:	PMH
SCALE:	NOT TO SCALE
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	7 OF 12



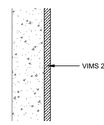
VIMS 20-MIL MEMBRANE AT GARAGE SLAB ELEVATION CHANGE | 15

NOT TO SCALE; REF: STRUCTURAL DETAIL 09, SHEET S302 AND DETAIL 04, SHEET S303



VIMS 20-MIL MEMBRANE AT TYPICAL EXTERIOR GRADE BEAM WITH BRICK LEDGE | 11

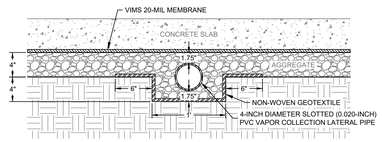
NOT TO SCALE; REF: STRUCTURAL DETAILS 15 & 16, SHEET S301



THIS IS A TYPICAL DETAIL. MEMBRANE SHOULD BE INSTALLED PER MANUFACTURER'S INSTALLATION GUIDELINES.

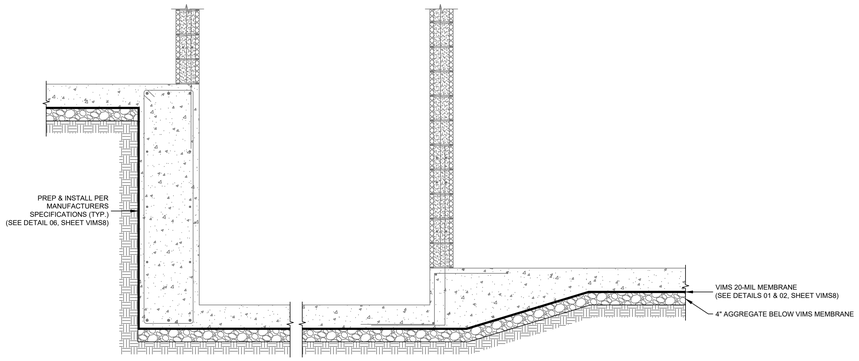
TYPICAL VIMS 20-MIL MEMBRANE INSTALLATION ON VERTICAL WALL | 06

NOT TO SCALE



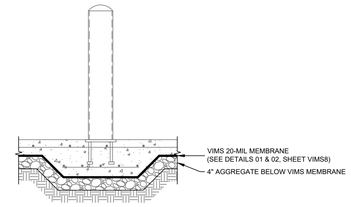
20-MIL MEMBRANE SUB-SLAB VENT SYSTEM | 01

NOT TO SCALE



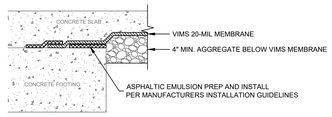
VIMS 20-MIL MEMBRANE AT GARAGE RAMP WITH SLAB ELEVATION CHANGE | 16

NOT TO SCALE; REF: STRUCTURAL DETAIL 01, SHEET S303



VIMS 20-MIL MEMBRANE AT TYPICAL THICKENED SLAB AT BOLLARD | 12

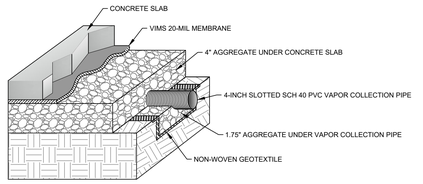
NOT TO SCALE; REF: STRUCTURAL DETAIL 10, SHEET S301



PREP AND INSTALL PER MANUFACTURER'S INSTALLATION GUIDELINES

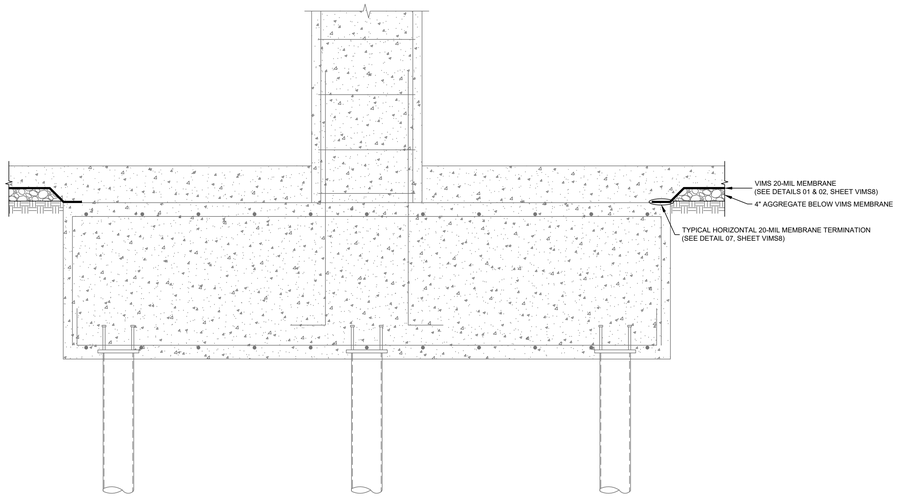
TYPICAL HORIZONTAL 20-MIL MEMBRANE TERMINATION | 07

NOT TO SCALE



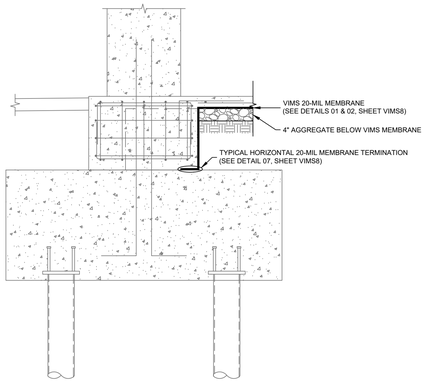
VIMS 20-MIL MEMBRANE CONFIGURATION | 02

NOT TO SCALE



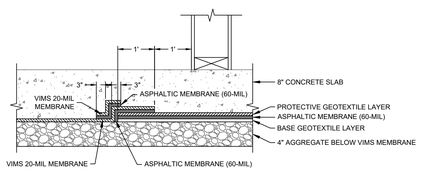
VIMS MEMBRANE AT TYPICAL PILE CAP | 17

NOT TO SCALE; REF: STRUCTURAL DETAIL 01, SHEET S302



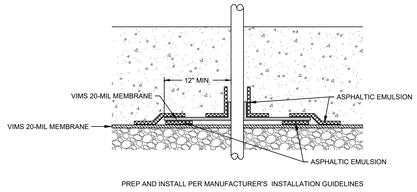
VIMS MEMBRANE AT TYPICAL PILASTER REINFOREMENT | 13

NOT TO SCALE; REF: STRUCTURAL DETAIL 19, SHEET S301



VIMS 20-MIL SHEET MEMBRANE AND 60-MIL SPRAY-APPLIED MEMBRANE OVERLAP | 08

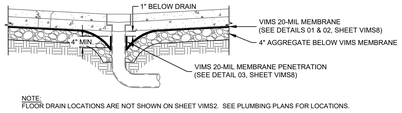
NOT TO SCALE



PREP AND INSTALL PER MANUFACTURER'S INSTALLATION GUIDELINES

VIMS 20-MIL MEMBRANE PENETRATION | 03

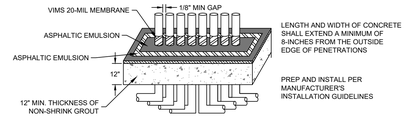
NOT TO SCALE



NOTE:
FLOOR DRAIN LOCATIONS ARE NOT SHOWN ON SHEET VIMS2. SEE PLUMBING PLANS FOR LOCATIONS.

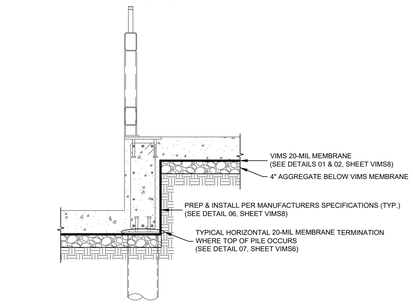
VIMS 20-MIL MEMBRANE AT TYPICAL AREA DRAIN | 09

NOT TO SCALE; REF: STRUCTURAL DETAIL 08, SHEET S301



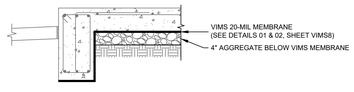
20-MIL MEMBRANE PENETRATION BANK | 04

NOT TO SCALE



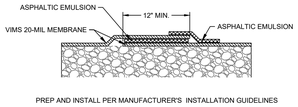
VIMS MEMBRANE AT SLAB ELEVATION CHANGE | 14

NOT TO SCALE; REF: STRUCTURAL DETAILS 10 & 12, SHEET S302



VIMS 20-MIL MEMBRANE AT TYPICAL EXTERIOR GRADE BEAM | 10

NOT TO SCALE; REF: STRUCTURAL DETAIL 13, SHEET S301



PREP AND INSTALL PER MANUFACTURER'S INSTALLATION GUIDELINES

TYPICAL 20-MIL MEMBRANE TERMINATION OVERLAP | 05

NOT TO SCALE

REV	DATE	BY	DESCRIPTION

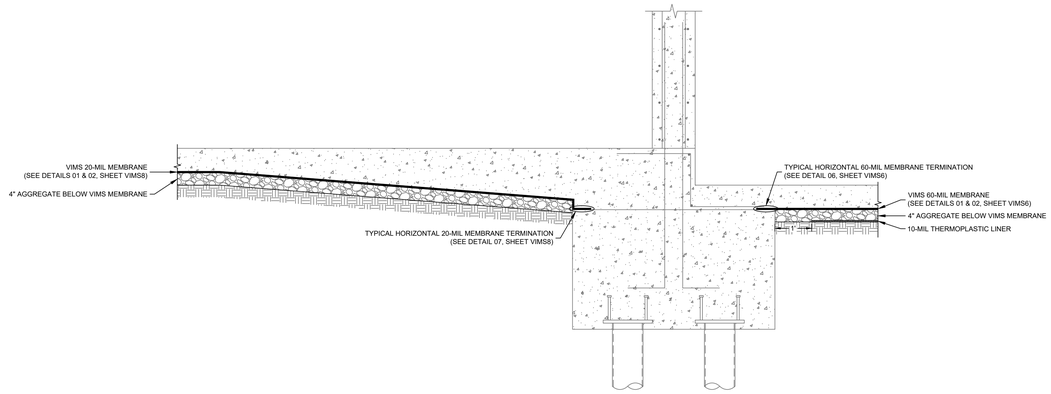
VAPOR INTRUSION MITIGATION SYSTEM DETAILS - MEMBRANE (20-MIL)

BLOCK D

MAIN STREET
BOTHELL, WASHINGTON

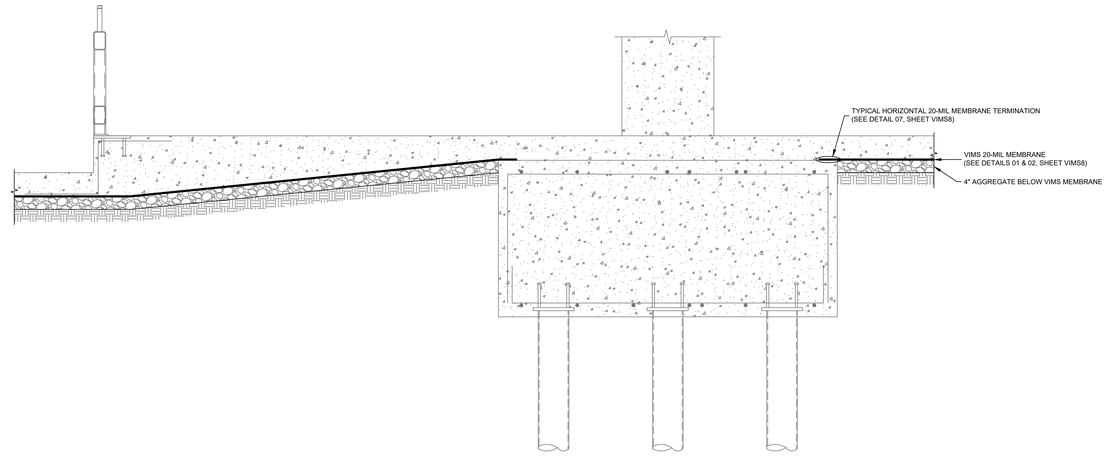
Terracon
Consulting Engineers and Scientists
1421 EDINGER AVENUE, SUITE C
TUSTIN, CA 92780
PH. (949) 261-0051
FAX. (949) 261-6110

VIMS8	
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	NOT TO SCALE
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	8 OF 12



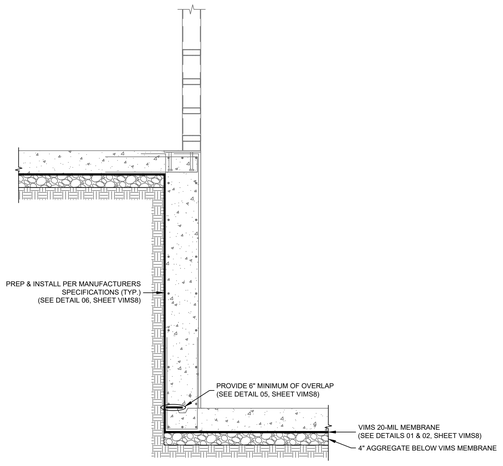
VIMS MEMBRANE AT INTERIOR PILE CAP WITH ELEVATION CHANGE 04

NOT TO SCALE; REF: STRUCTURAL DETAIL 08, SHEET S302



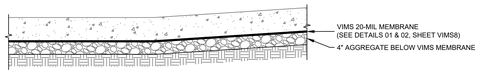
VIMS MEMBRANE AT PILE CAP ADJACENT TO GARAGE RAMP WITH SLAB ELEVATION CHANGE 01

NOT TO SCALE; REF: STRUCTURAL DETAIL 02, SHEET S303



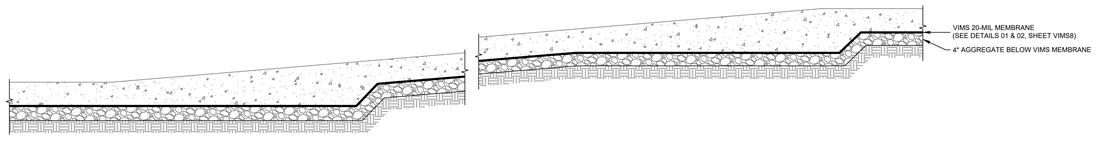
VIMS MEMBRANE AT GARAGE SLAB ELEVATION CHANGE 06

NOT TO SCALE; REF: STRUCTURAL DETAIL 11, SHEET S302



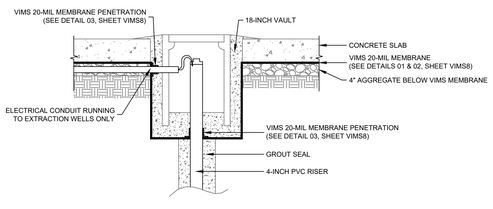
VIMS MEMBRANE AT GARAGE RAMP 05

NOT TO SCALE; REF: STRUCTURAL DETAIL 07, SHEET S302



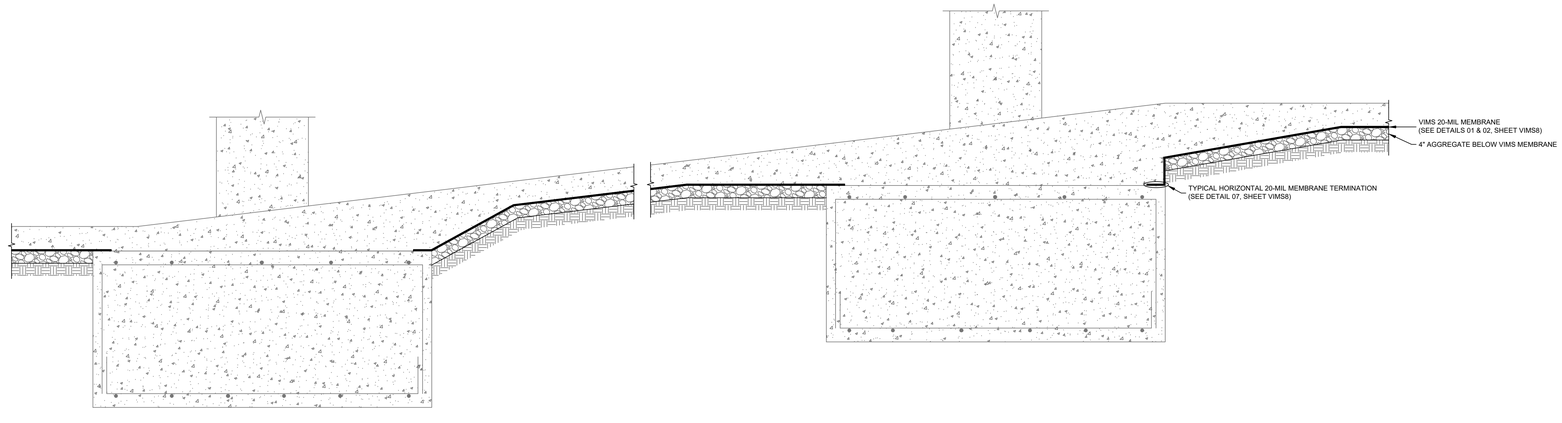
VIMS MEMBRANE AT GARAGE RAMP 02

NOT TO SCALE; REF: STRUCTURAL DETAIL 03, SHEET S303



VIMS MEMBRANE AT TYPICAL 4-INCH
INJECTION/EXTRACTION WELL DETAIL 09

NOT TO SCALE; REF: TYPICAL 4-INCH INJECTION/EXTRACTION WELL DETAIL FROM ETEC



VIMS MEMBRANE AT GARAGE RAMP WITH COLUMN 03

NOT TO SCALE; REF: STRUCTURAL DETAIL 05, SHEET S303

REV	DATE	BY	DESCRIPTION

VAPOR INTRUSION MITIGATION SYSTEM DETAILS - MEMBRANE (20-MIL)

BLOCK D

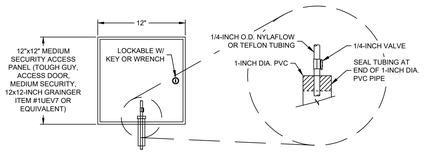
MAIN STREET

BOTHELL, WASHINGTON

Terracon
Consulting Engineers and Scientists
1421 EDINGER AVENUE, SUITE C
TUSTIN, CA 92780
PH. (949) 261-0051
FAX: (949) 261-6110

VIMS9

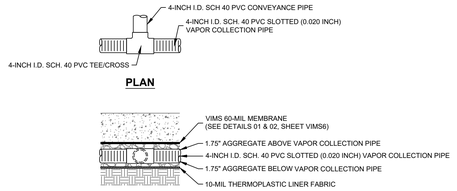
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	NOT TO SCALE
DATE:	12/2021
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	9 OF 12



NOTE:
VENT RISER SAMPLE PORT AND SUB-SLAB VACUUM MONITORING PROBE TO SHARE ACCESS PANEL.

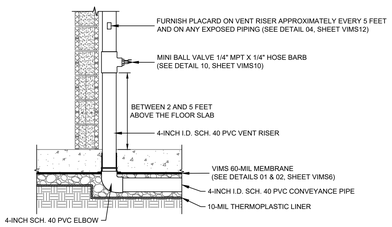
VACUUM MONITORING PROBE ACCESS PANEL 12

NOT TO SCALE



VAPOR COLLECTION PIPE TRANSITION TO CONVEYANCE PIPE 09

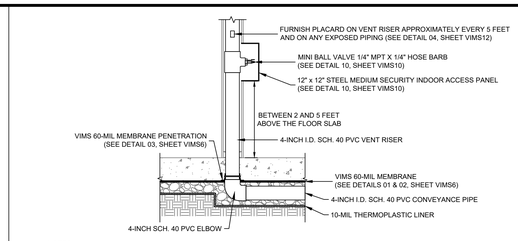
NOT TO SCALE



NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO IT IS POSITIONED SIDEWAYS (NOT INWARDS OR OUTWARDS) WHEN FACING THE WALL.

VENT RISER ADJACENT TO CMU WALL (VR1) 05

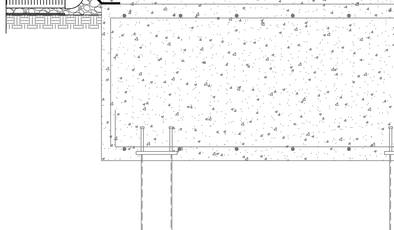
NOT TO SCALE



NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO IT IS POSITIONED SIDEWAYS (NOT INWARDS OR OUTWARDS) WHEN FACING THE WALL.

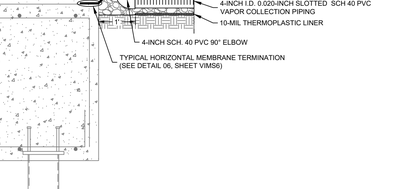
VENT RISER AT INTERIOR WALL (VR2, VR3, VR4, VR5, VR6, AND VR8) 01

NOT TO SCALE



SMALL DIAMETER SEAL 13

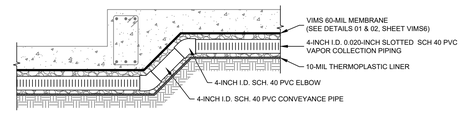
NOT TO SCALE



NOTES:
1. THIS IS A GENERAL DETAIL. LOCATIONS OF ACCESS DOORS TO BE DETERMINED BY OWNER AND VIMS DESIGNER.
2. VENT PIPING SAMPLE PORT AND SUB-SLAB VACUUM MONITORING PROBE TO SHARE ACCESS PANEL.
3. BOTTOM OF ACCESS PANEL SHALL BE BETWEEN 2 AND 5 FEET ABOVE THE FLOOR SLAB.

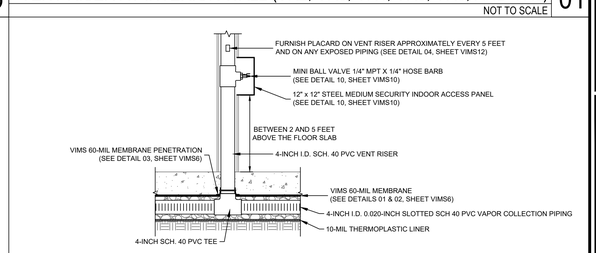
VENT PIPING SAMPLE PORT 10

NOT TO SCALE



VIMS MEMBRANE AT SLAB ELEVATION CHANGE GREATER THAN 12 INCHES 06

NOT TO SCALE; REF: STRUCTURAL DETAIL 06, SHEET S302



NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO IT IS POSITIONED SIDEWAYS (NOT INWARDS OR OUTWARDS) WHEN FACING THE WALL.

VENT RISER AT INTERIOR WALL (VR7) 02

NOT TO SCALE

VACUUM MONITORING PROBE END 14

NOT TO SCALE

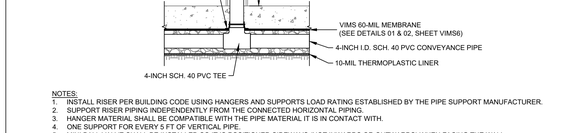
NOTE:
VENT PIPING SAMPLE PORT AND SUB-SLAB VACUUM MONITORING PROBE TO SHARE ACCESS PANEL.

SUB-SLAB VACUUM MONITORING PROBE AND ACCESS PANEL 11

NOT TO SCALE

CONVEYANCE PIPE OR VAPOR COLLECTION PIPE AT SLAB ELEVATION CHANGE 07

NOT TO SCALE; REF: STRUCTURAL DETAILS 10 & 12, SHEET S302



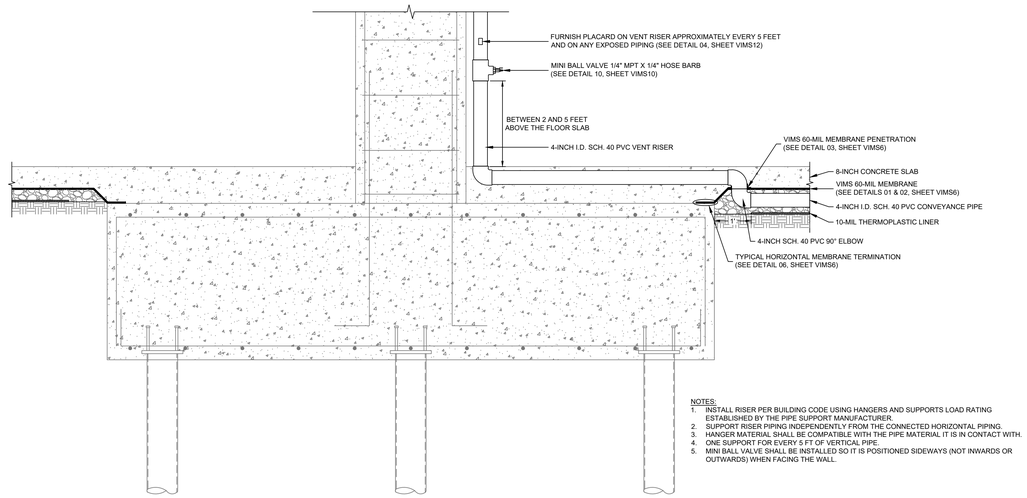
NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO IT IS POSITIONED SIDEWAYS (NOT INWARDS OR OUTWARDS) WHEN FACING THE WALL.

VENT RISER AT INTERIOR WALL (VR11) 03

NOT TO SCALE

TRANSITION PIPE AT INTERIOR COLUMN SUPPORT 08

NOT TO SCALE; REF: STRUCTURAL DETAIL 01, SHEET S302



NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO IT IS POSITIONED SIDEWAYS (NOT INWARDS OR OUTWARDS) WHEN FACING THE WALL.

VENT RISER AT INTERIOR COLUMN SUPPORT (VR9, VR10, AND VR11) 04

NOT TO SCALE; REF: STRUCTURAL DETAIL 01, SHEET S302

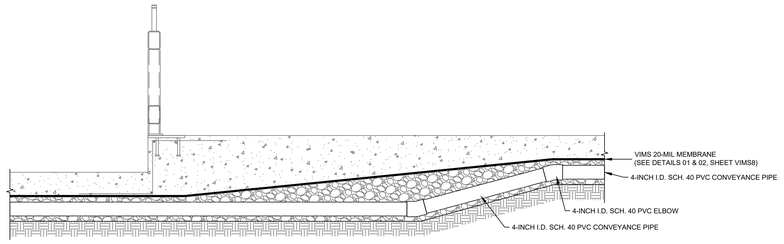
REV	DATE	BY	DESCRIPTION

VAPOR INTRUSION MITIGATION SYSTEM DETAILS - PIPING (60-MIL MEMBRANE)

BLOCK D
MAIN STREET
BOTHELL, WASHINGTON

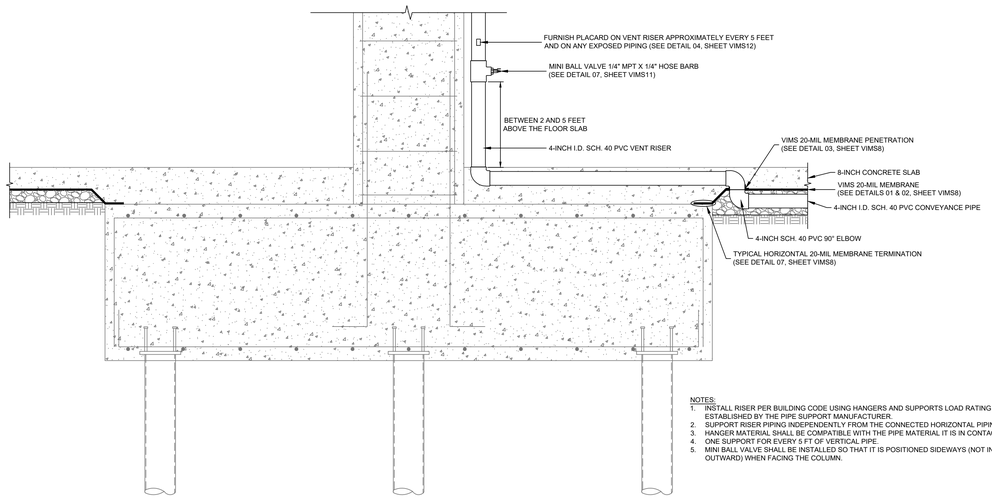
Terracon
Consulting Engineers and Scientists
14211 EDINGER AVENUE, SUITE C
TUSTIN, CA 92780
PH: (949) 261-0051
FAX: (949) 261-6110

VIMS10	
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	NOT TO SCALE
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	10 OF 12



CONVEYANCE PIPE AT GARAGE SLAB ELEVATION CHANGE 08

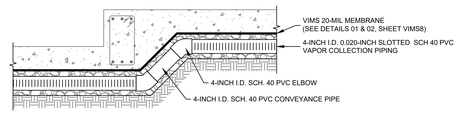
NOT TO SCALE; REF: STRUCTURAL DETAIL 09, SHEET S302 AND DETAIL 04, SHEET S303



NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO THAT IT IS POSITIONED SIDEWAYS (NOT INWARD OR OUTWARD) WHEN FACING THE COLUMN.

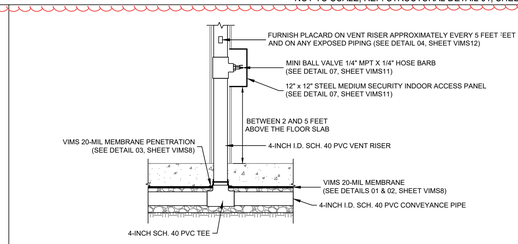
VENT RISER AT INTERIOR COLUMN SUPPORT (VR12 AND VR14) 01

NOT TO SCALE; REF: STRUCTURAL DETAIL 01, SHEET S302



VIMS MEMBRANE AT SLAB ELEVATION CHANGE GREATER THAN 12 INCHES 05

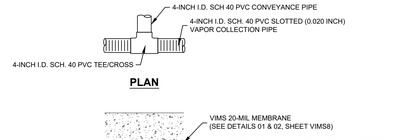
NOT TO SCALE; REF: STRUCTURAL DETAIL 06, SHEET S302



NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO THAT IT IS POSITIONED SIDEWAYS (NOT INWARD OR OUTWARD) WHEN FACING THE WALL.

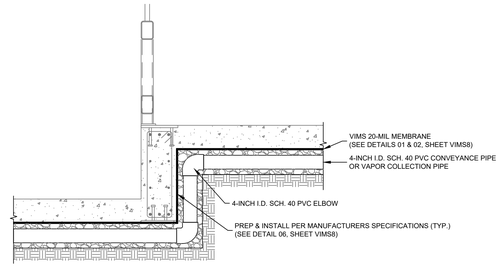
VENT RISER AT INTERIOR WALL (VR13) 02

NOT TO SCALE



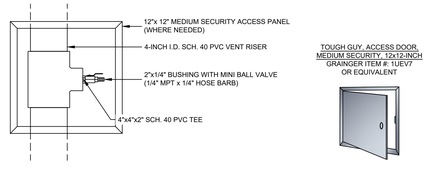
VAPOR COLLECTION PIPE TRANSITION TO CONVEYANCE PIPE 06

NOT TO SCALE



CONVEYANCE PIPE OR VAPOR COLLECTION PIPE AT SLAB ELEVATION CHANGE 03

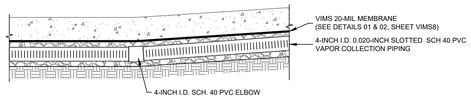
NOT TO SCALE; REF: STRUCTURAL DETAILS 10 & 12, SHEET S302



NOTES:
1. THIS IS A GENERAL DETAIL. LOCATIONS OF ACCESS DOORS TO BE DETERMINED BY OWNER AND VIMS DESIGNER.
2. VENT PIPING SAMPLE PORT AND SUB-SLAB VACUUM MONITORING PROBE TO SHARE ACCESS PANEL.
3. BOTTOM OF ACCESS PANEL SHALL BE BETWEEN 2 AND 5 FEET ABOVE THE FLOOR SLAB.

VENT PIPING SAMPLE PORT 07

NOT TO SCALE



VAPOR COLLECTION PIPE AT BOTTOM OF GARAGE RAMP 04

NOT TO SCALE; REF: STRUCTURAL DETAIL 07, SHEET S302

REV	DATE	BY	DESCRIPTION

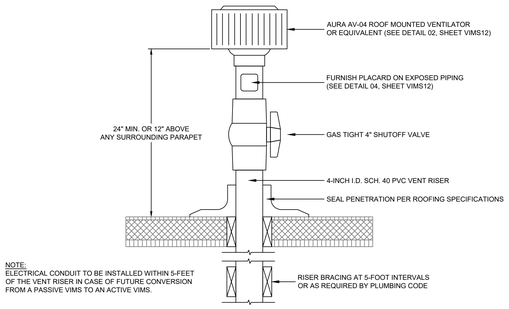
VAPOR INTRUSION MITIGATION SYSTEM DETAILS - PIPING (20-MIL MEMBRANE)

BLOCK D

MAIN STREET
BOTHELL, WASHINGTON

Terracon
Consulting Engineers and Scientists
1421 EDINGER AVENUE, SUITE C
TUSTIN, CA 92780
PH. (949) 261-0051
FAX: (949) 261-6110

VIMS11	
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	NOT TO SCALE
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	11 OF 12



NOTE:
ELECTRICAL CONDUIT TO BE INSTALLED WITHIN 5-FEET OF THE VENT RISER IN CASE OF FUTURE CONVERSION FROM A PASSIVE VIMS TO AN ACTIVE VIMS.

ROOF PENETRATION DETAIL 01
NOT TO SCALE

ROOF-MOUNTED VENTILATOR 02
NOT TO SCALE

THIS NOTIFICATION IS TO BE INSTALLED IN UTILITY AND MECHANICAL ROOMS AND PLACED ON THE WALLS AT EYE LEVEL AND SHALL NOT BE COVERED OVER.

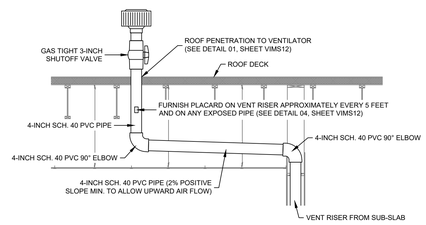
LOCATION OF NOTIFICATION TO BE DETERMINED BY PROJECT CONTRACTOR, OWNER OR BUILDING OFFICIAL.

SIGN CAN BE PURCHASED AT
http://www.complianesigns.com/terracon.shtml

VIMS MEMBRANE IDENTIFICATION SIGN 03
NOT TO SCALE

PLASTIC STICKER WITH ADHESIVE BACKING.
LARGE LETTERS MIN 1/2" HIGH
RED LETTERS ON WHITE BACKGROUND
3" MIN. REQUIRED
THIS SIGN SHALL BE POSTED ON EACH VENT RISER APPROXIMATELY EVERY FIVE FEET, AND ALSO ON ANY EXPOSED RISER PIPING.
PLACARD CAN BE PURCHASED AT
http://www.complianesigns.com/terracon.shtml

PLACARD AT VENT RISER OUTLET 04
NOT TO SCALE



VENT RISER VERTICAL TO HORIZONTAL TRANSITION BELOW ROOF DECK 05
NOT TO SCALE

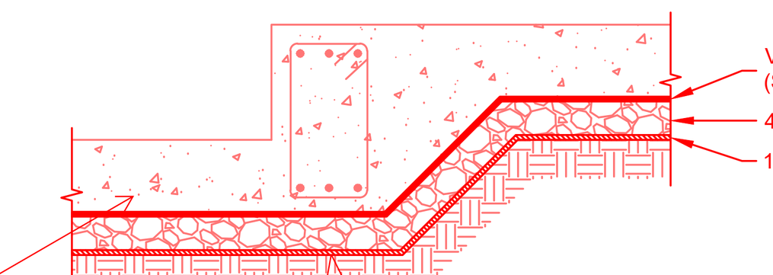
REV	DATE	BY	DESCRIPTION

VAPOR INTRUSION MITIGATION SYSTEM DETAILS - PIPING (60 & 20-MIL MEMBRANE)

BLOCK D
MAIN STREET
BOTHELL, WASHINGTON

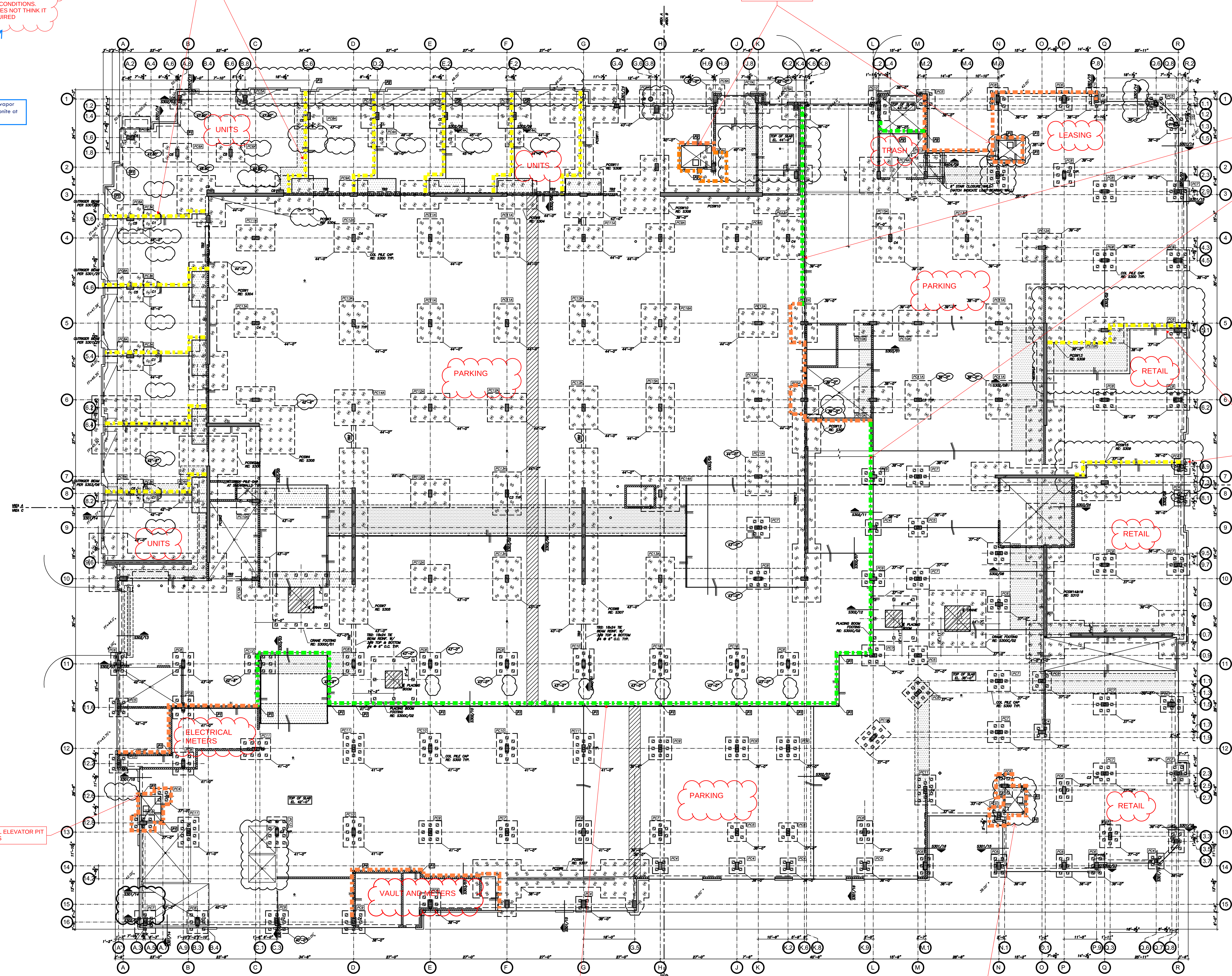
Terracon
Consulting Engineers and Scientists
1421 EDINGER AVENUE, SUITE C
TUSTIN, CA 92780
PH. (949) 261-0051
FAX: (949) 261-6110

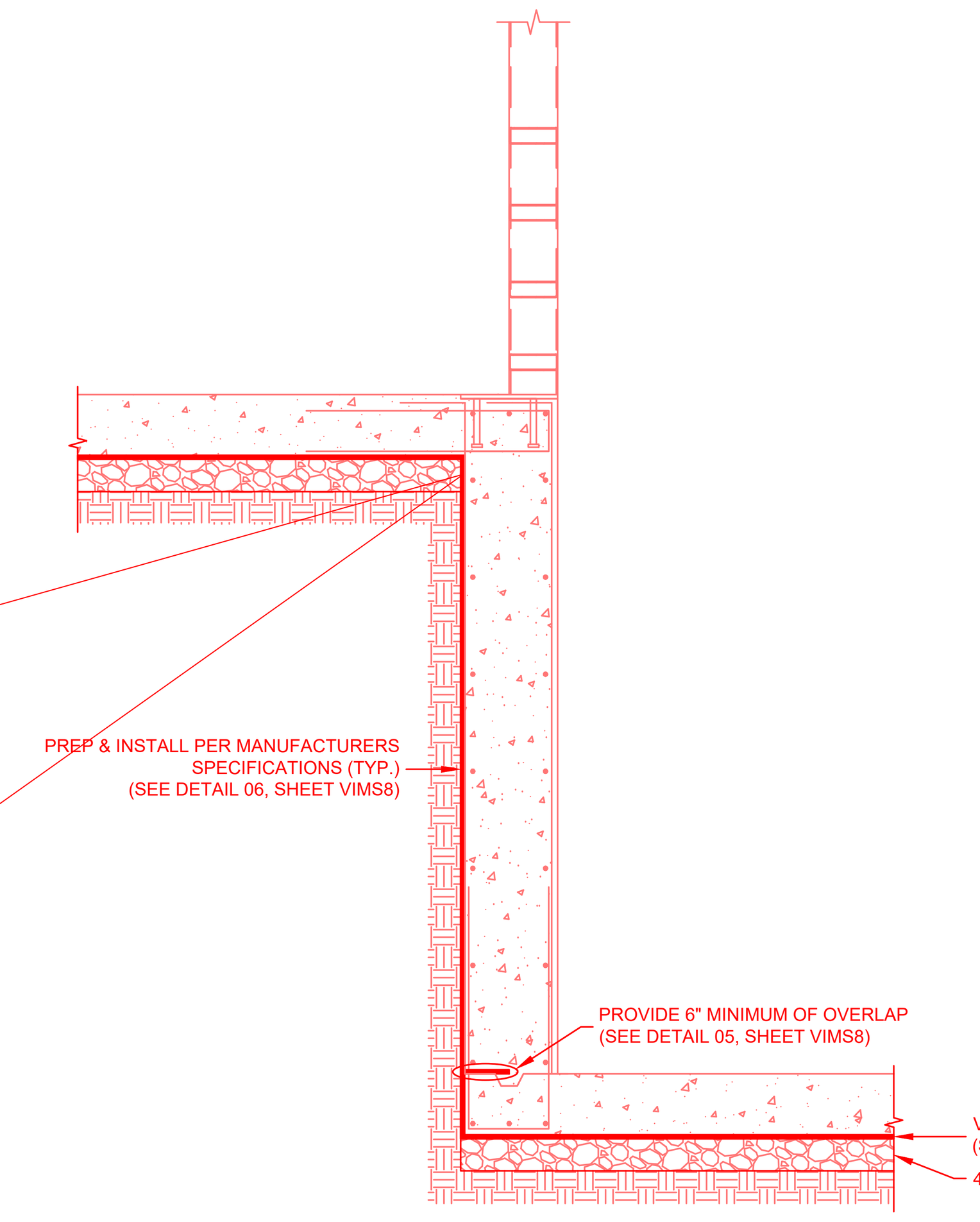
VIMS12	
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	NOT TO SCALE
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	12 OF 12



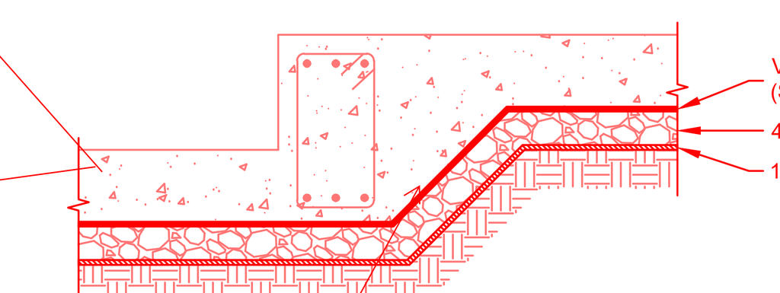
4EA. PLEASE CONFIRM WATERPROOFING REQUIREMENT IN THESE CONDITIONS. HLR DOES NOT THINK IT IS REQUIRED

4EA: 4EA takes no exception to just the vapor mitigation system as shown without bentonite at yellow highlighted conditions.





DETAIL 06/VIMS9 AS CALLED OUT ON VIMS2



DETAIL 18/VIMS6 AS CALLED OUT ON VIMS2

4EA. PLEASE CONFIRM WATERPROOFING REQUIREMENT IN THESE CONDITIONS. HLR DOES NOT THINK IT IS REQUIRED

4EA: 4EA takes no exception to just the vapor mitigation system as shown without bentonite at yellow highlighted conditions.

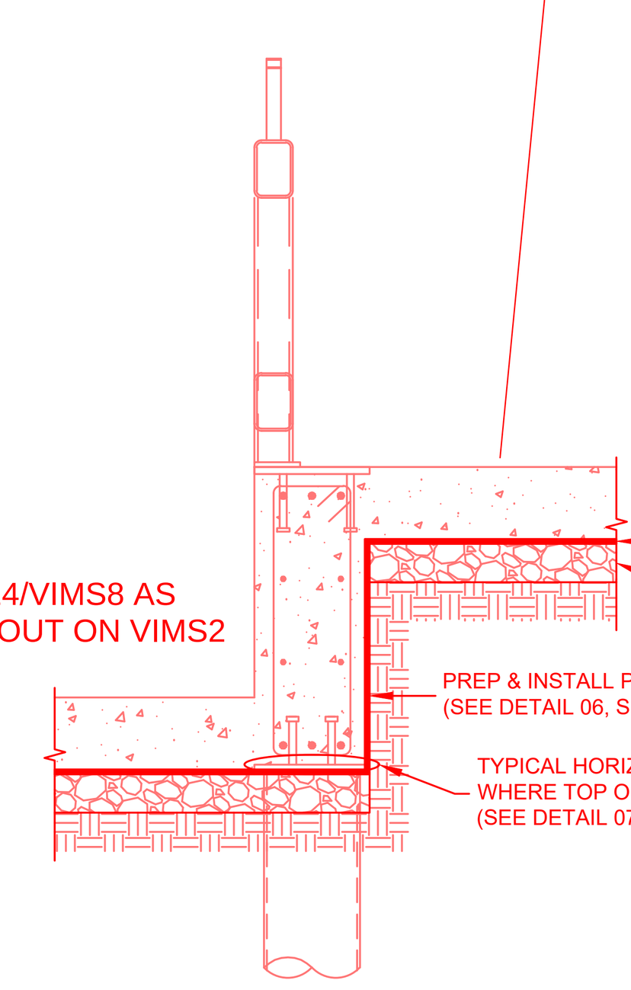
🟧 BENTONITE REQUIRED. GEO-SEAL BOND B-80 MIL SYSTEM. SEE NEW EPRO DETAILS RFI 44

🟩 BENTONITE RECOMMENDED. POSSIBLE VE, TO BE REVIEWED WITH OWNER

*NOTES:
1. THIS IS A GRAPHICAL REPRESENTATION OF LOCATIONS OF VERTICAL WALLS BENEATH THE SLAB. PROVIDE BENTONITE WATERPROOFING PER SPEC 07100 2.03 L.3 AND T - AT BELOW GRADE FOUNDATION WALLS AND ELEVATOR PITS.

2. NOT ALL VIMS DETAILS THAT REQUIRE WATERPROOFING ARE REFERENCED HERE. SEE ALSO 19/VIMS6, 06,04,&05/VIMS7, 16/VIMS8, 06/VIMS9, & 07/VIMS10.

DETAIL 14/VIMS8 AS CALLED OUT ON VIMS2



APPROVAL STAMPS

HLR ARCHITECTS

HENSLEY LAMKIN RACHEL, INC.
DALLAS • HOUSTON • SEATTLE
WWW.HLRINC.NET
PH: 972.726.9400

PROJECT MGR:
DRAWN BY:
CHECKED BY:

REVISIONS

VIEWTECH, INC.
4205 BELTWAY DR. ADDISON, TEXAS 75001
PH: (972) 661-8187 FAX: (972) 661-8172

MATTHEW HENRY RITCHIE STATE OF WASHINGTON 50743 STRUCTURAL ENGINEER PROFESSIONAL ENGINEER
[illegible]
01-26-22

Project Title:
BLOCK D MAIN STREET
BOTHELL, WASHINGTON

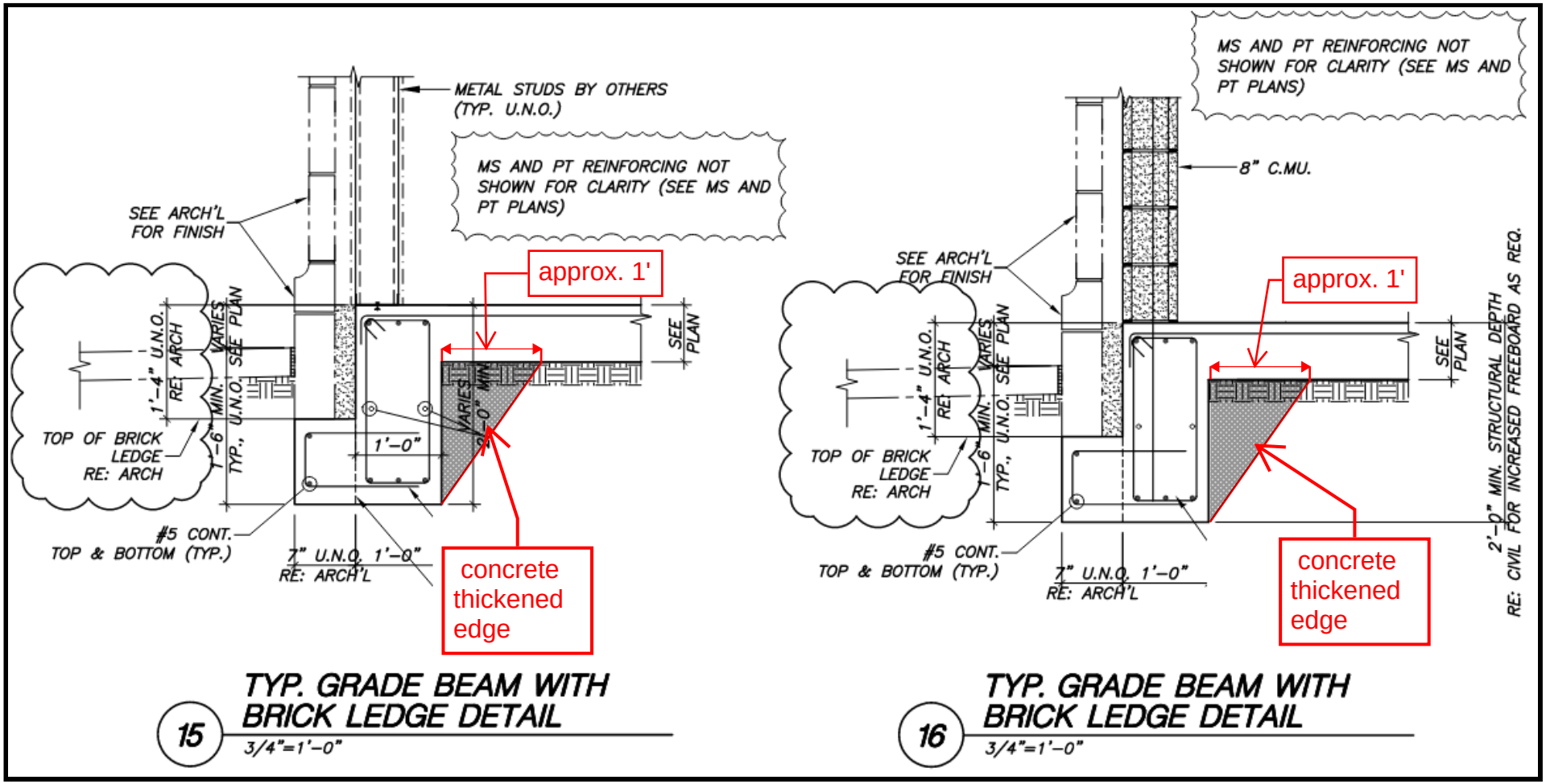
TCR TRAMMELL CROW RESIDENTIAL

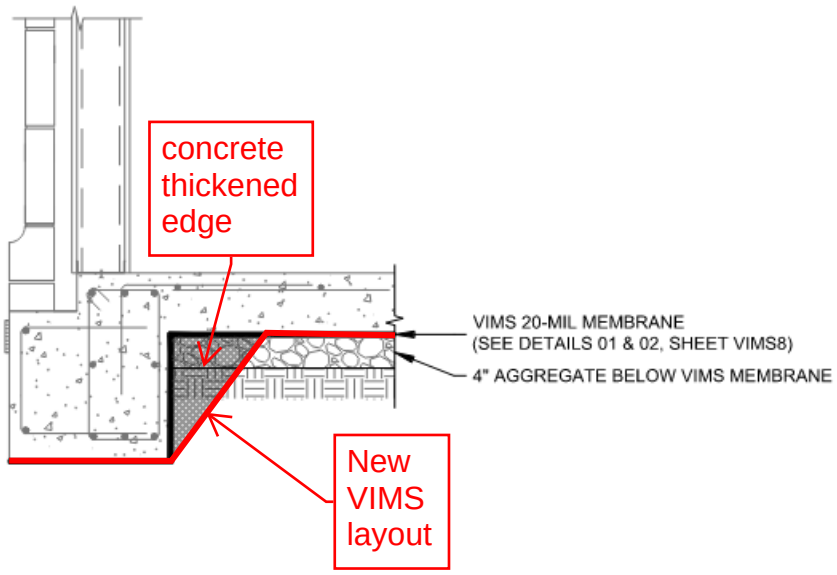
Permit Set Issue:	08.06.2021
GMP Issue:	07.28.2021
ASI 1 (Struct. Conc.):	12.03.2021
ASI 2 (IFC):	01.26.2022

Project ID 20245

Drawing No.
S200A-D

FOUNDATION PLAN AREA A

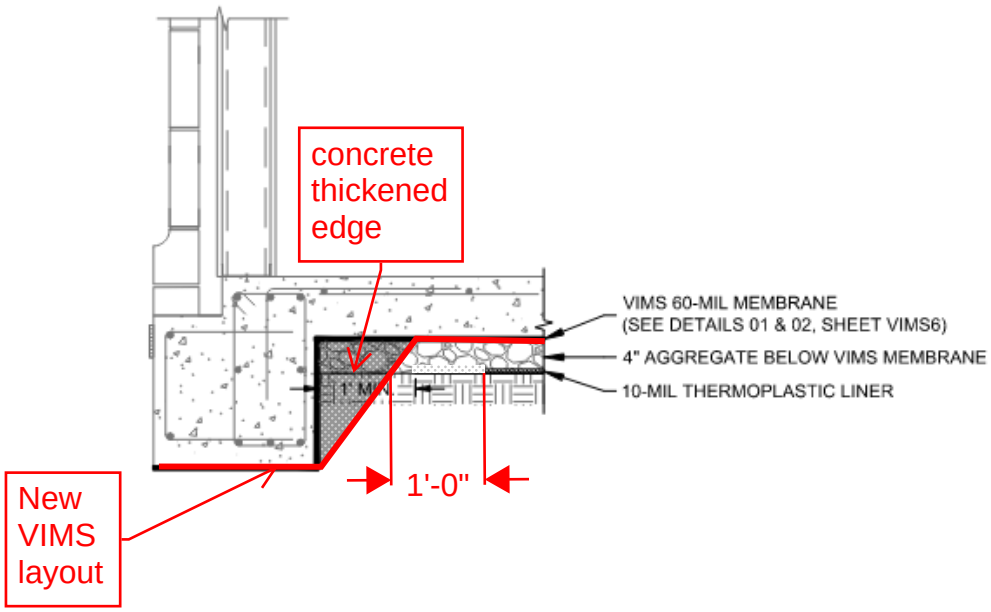

METAL STUDS BY OTHERS (TYP. U.N.O.)
MS AND PT REINFORCING NOT SHOWN FOR CLARITY (SEE MS AND PT PLANS)
SEE ARCH'L FOR FINISH
approx. 1'
SEE PLAN
VARIES
1'-4" U.N.O. RE: ARCH
1'-6" MIN. TYP., U.N.O.
VARIES SEE PLAN
TOP OF BRICK LEDGE RE: ARCH
1'-0"
VARIES 2'-0" MIN.
#5 CONT. TOP & BOTTOM (TYP.)
7" U.N.O. 1'-0" RE: ARCH'L
concrete thickened edge
15
TYP. GRADE BEAM WITH BRICK LEDGE DETAIL
3/4"=1'-0"
MS AND PT REINFORCING NOT SHOWN FOR CLARITY (SEE MS AND PT PLANS)
8" C.M.U.
SEE ARCH'L FOR FINISH
approx. 1'
SEE PLAN
1'-4" U.N.O. RE: ARCH
1'-6" MIN. TYP., U.N.O.
VARIES SEE PLAN
TOP OF BRICK LEDGE RE: ARCH
#5 CONT. TOP & BOTTOM (TYP.)
7" U.N.O. 1'-0" RE: ARCH'L
concrete thickened edge
2'-0" MIN. STRUCTURAL DEPTH RE: CIVIL FOR INCREASED FREEBOARD AS REQ.
16
TYP. GRADE BEAM WITH BRICK LEDGE DETAIL
3/4"=1'-0"



VIMS 20-MIL MEMBRANE AT TYPICAL EXTERIOR GRADE BEAM WITH BRICK LEDGE

11

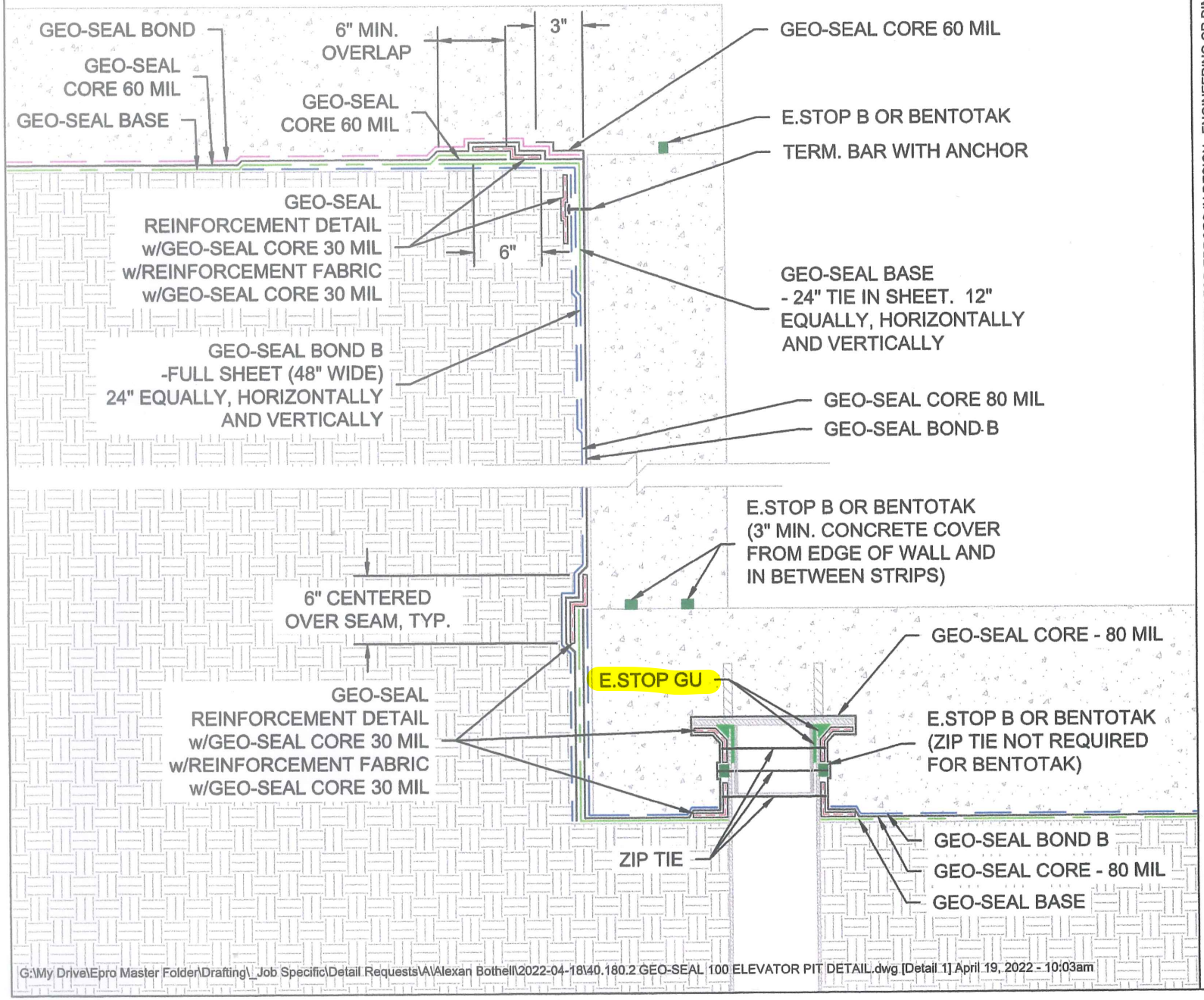
NOT TO SCALE; REF: STRUCTURAL DETAILS 15 & 16, SHEET S301



VIMS MEMBRANE AT TYPICAL EXTERIOR GRADE BEAM WITH BRICK LEDGE

15

NOT TO SCALE; REF: STRUCTURAL DETAILS 15 & 16, SHEET S301



G:\My Drive\Epro Master Folder\Drafting_Job Specific\Detail Requests\A\Alexan Bothell\2022-04-18\40.180.2 GEO-SEAL 100 ELEVATOR PIT DETAIL.dwg [Detail 1] April 19, 2022 - 10:03am

epro
1328 E. KELLOGG DRIVE
WICHITA, KS 67211
1-800-882-1896
EPROINC.COM

Geo-Seal® Vapor Intrusion Barrier

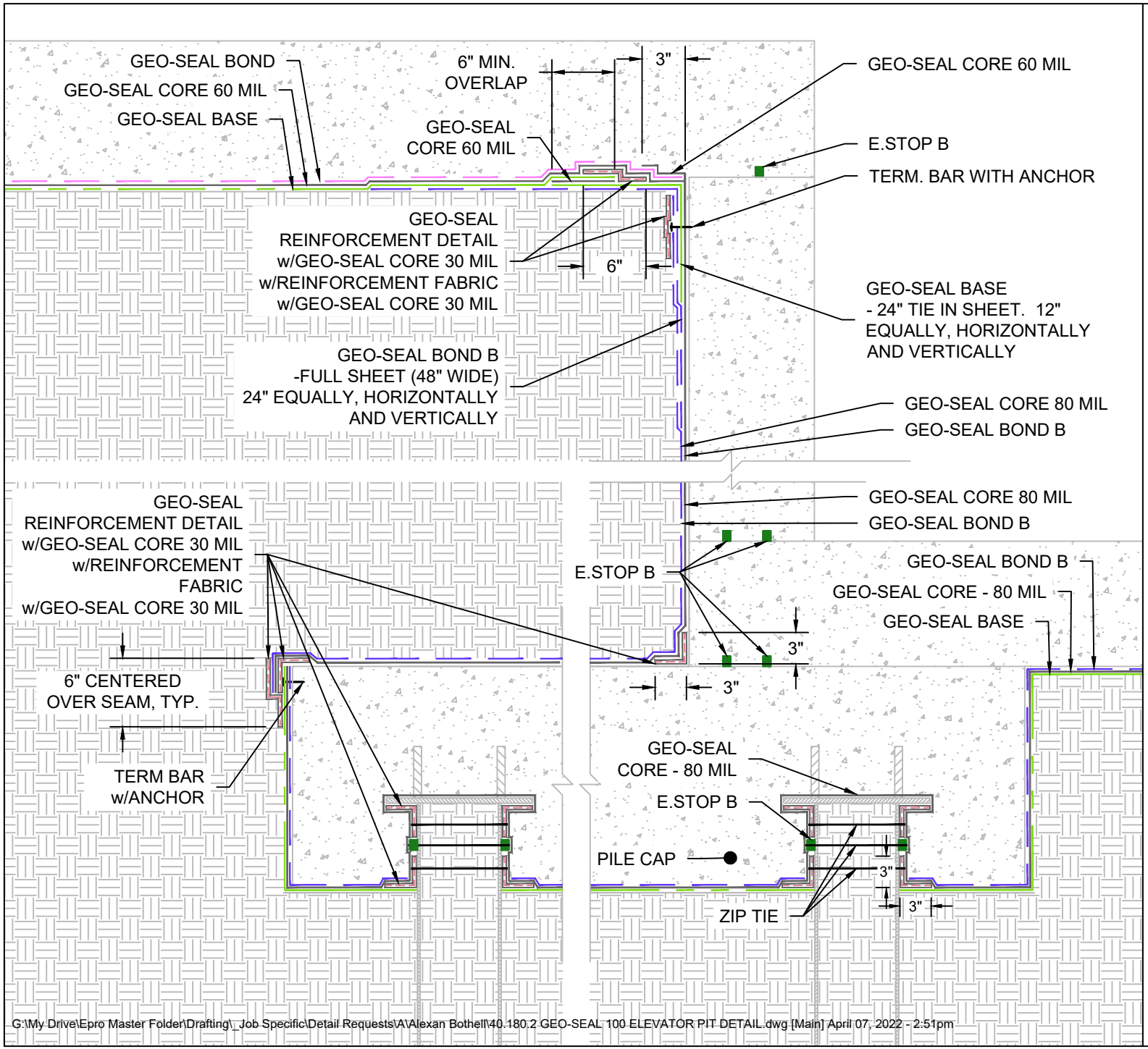
DRAWIMG NUMBER
40.180.2.2-MOD

SYSTEM NAME
GEO-SEAL 100

SYSTEM DESCRIPTION
ELEVATOR PIT SECTION AT PILE

DATE
4/19/2022

DRAWN BY	SCALE
RJT	NTS



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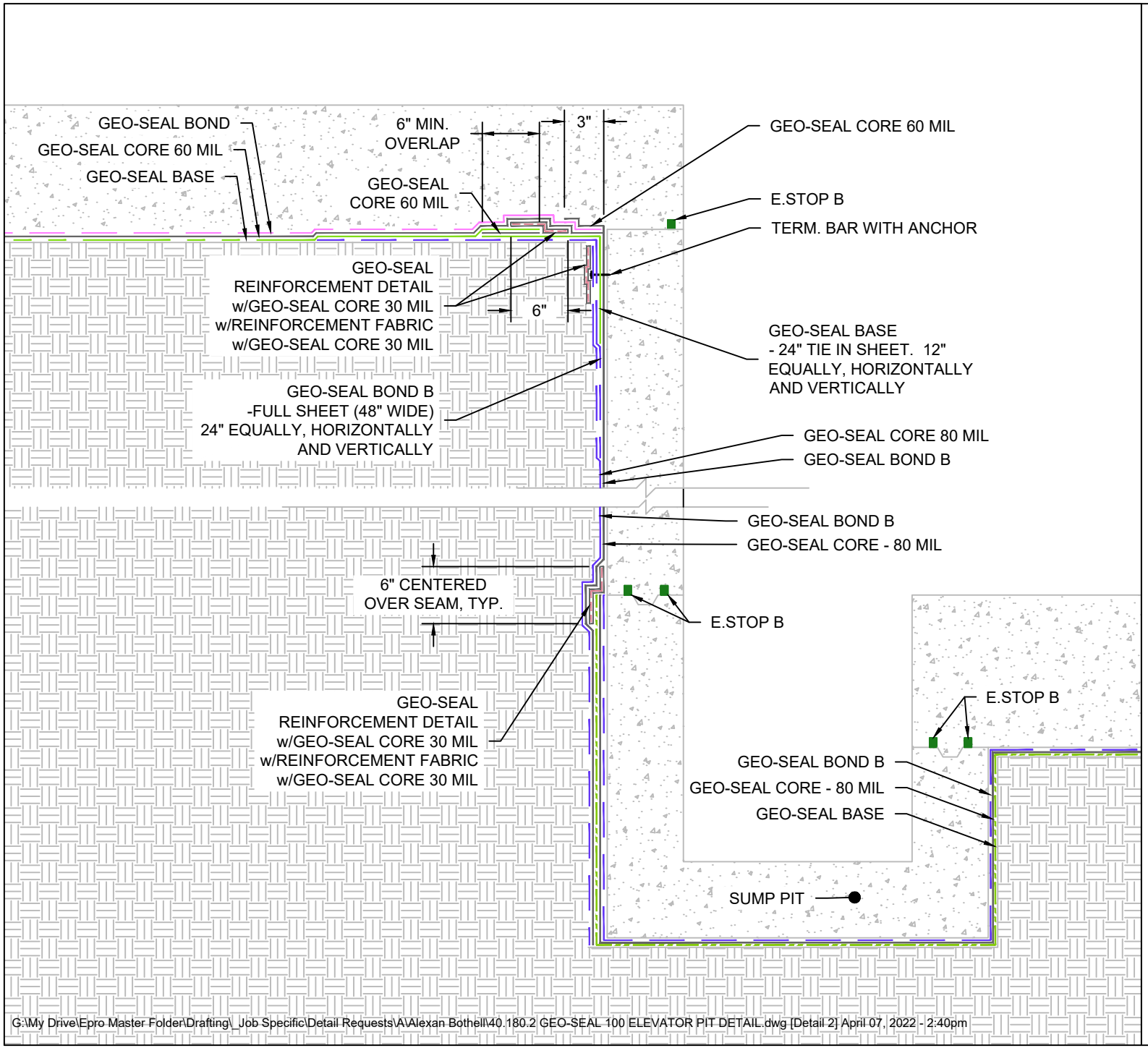
epro
1328 E. KELLOGG DRIVE
WICHITA, KS 67211
1-800-882-1896
EPROINC.COM

Geo-Seal® Vapor Intrusion Barrier

DRAWIMG NUMBER	
40.180.2.3-MOD	
SYSTEM NAME	
GEO-SEAL 100	
SYSTEM DESCRIPTION	
ELEVATOR PIT SECTION AT PILE CAP	
DATE	
4/07/2022	
DRAWN BY	SCALE
RJT	NTS
PAGE 1 OF 1	



G:\My Drive\Epro Master Folder\Drafting_Job Specific\Detail Requests\A\Alexan Bothell\40.180.2 GEO-SEAL 100 ELEVATOR PIT DETAIL.dwg [Detail 2] April 07, 2022 - 2:40pm

epro
1328 E. KELLOGG DRIVE
WICHITA, KS 67211
1-800-882-1896
EPROINC.COM

Geo-Seal® Vapor Intrusion Barrier

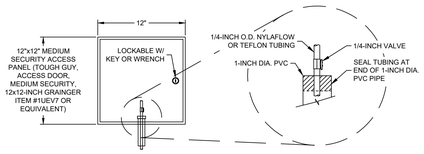
DRAWIMG NUMBER
40.180.2.1-MOD

SYSTEM NAME
GEO-SEAL 100

SYSTEM DESCRIPTION
ELEVATOR PIT
SECTION
AT SUMP PIT

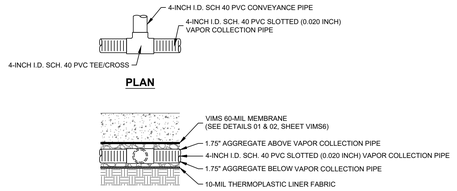
DATE
4/07/2022

DRAWN BY	SCALE
RJT	NTS

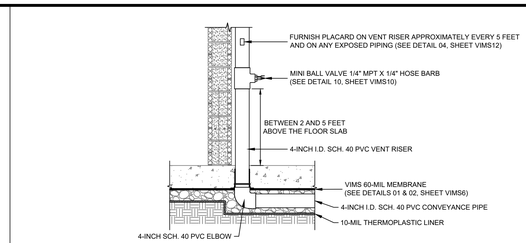


NOTE:
VENT RISER SAMPLE PORT AND SUB-SLAB VACUUM MONITORING PROBE TO SHARE ACCESS PANEL.

VACUUM MONITORING PROBE ACCESS PANEL 12
NOT TO SCALE

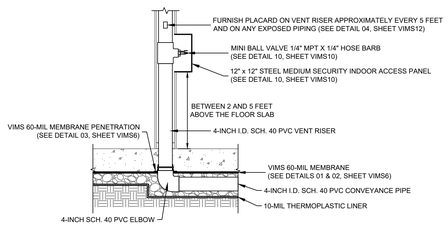


VAPOR COLLECTION PIPE TRANSITION TO CONVEYANCE PIPE 09
NOT TO SCALE



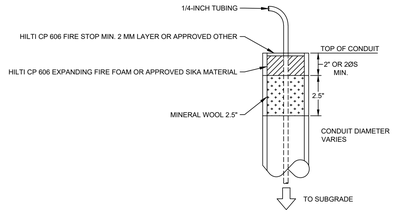
NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO IT IS POSITIONED SIDEWAYS (NOT INWARDS OR OUTWARDS) WHEN FACING THE WALL.

VENT RISER ADJACENT TO CMU WALL (VR1) 05
NOT TO SCALE

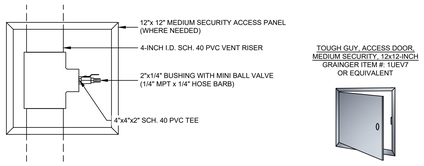


NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO IT IS POSITIONED SIDEWAYS (NOT INWARDS OR OUTWARDS) WHEN FACING THE WALL.

VENT RISER AT INTERIOR WALL (VR2, VR3, VR4, VR5, VR6, AND VR8) 01
NOT TO SCALE

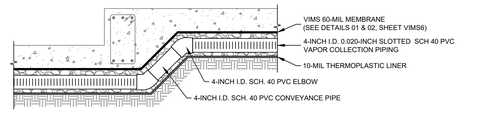


SMALL DIAMETER SEAL 13
NOT TO SCALE

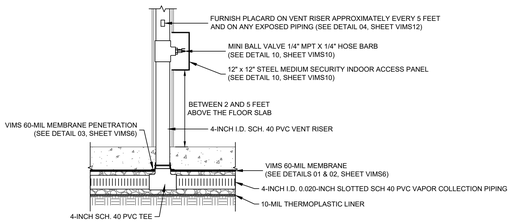


NOTES:
1. THIS IS A GENERAL DETAIL. LOCATIONS OF ACCESS DOORS TO BE DETERMINED BY OWNER AND VIMS DESIGNER.
2. VENT PIPING SAMPLE PORT AND SUB-SLAB VACUUM MONITORING PROBE TO SHARE ACCESS PANEL.
3. BOTTOM OF ACCESS PANEL SHALL BE BETWEEN 2 AND 5 FEET ABOVE THE FLOOR SLAB.

VENT PIPING SAMPLE PORT 10
NOT TO SCALE

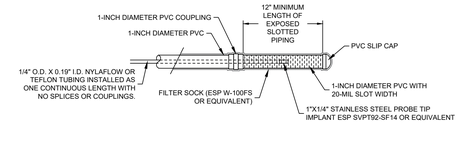


VIMS MEMBRANE AT SLAB ELEVATION CHANGE GREATER THAN 12 INCHES 06
NOT TO SCALE; REF: STRUCTURAL DETAIL 06, SHEET S302

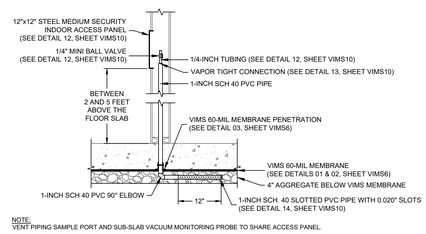


NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO IT IS POSITIONED SIDEWAYS (NOT INWARDS OR OUTWARDS) WHEN FACING THE WALL.

VENT RISER AT INTERIOR WALL (VR7) 02
NOT TO SCALE

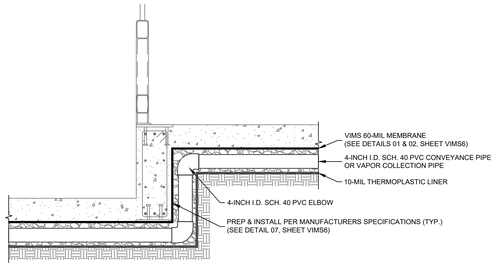


VACUUM MONITORING PROBE END 14
NOT TO SCALE

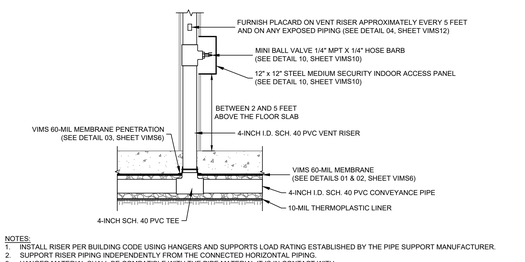


NOTE:
VENT PIPING SAMPLE PORT AND SUB-SLAB VACUUM MONITORING PROBE TO SHARE ACCESS PANEL.

SUB-SLAB VACUUM MONITORING PROBE AND ACCESS PANEL 11
NOT TO SCALE



CONVEYANCE PIPE OR VAPOR COLLECTION PIPE AT SLAB ELEVATION CHANGE 07
NOT TO SCALE; REF: STRUCTURAL DETAILS 10 & 12, SHEET S302



NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
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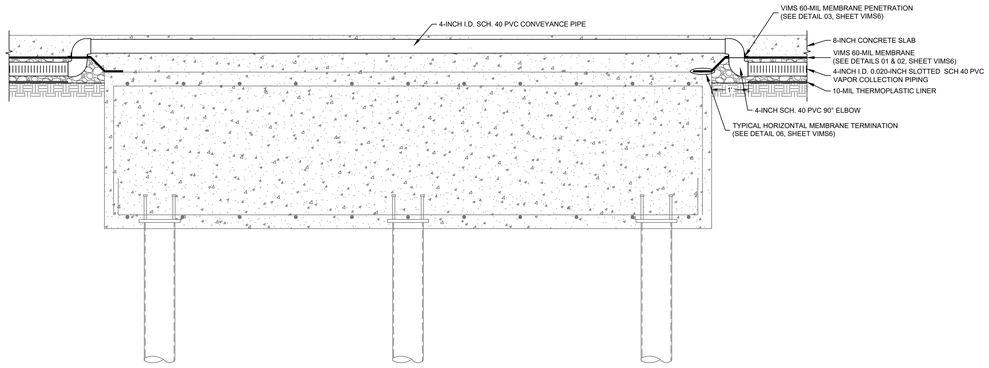
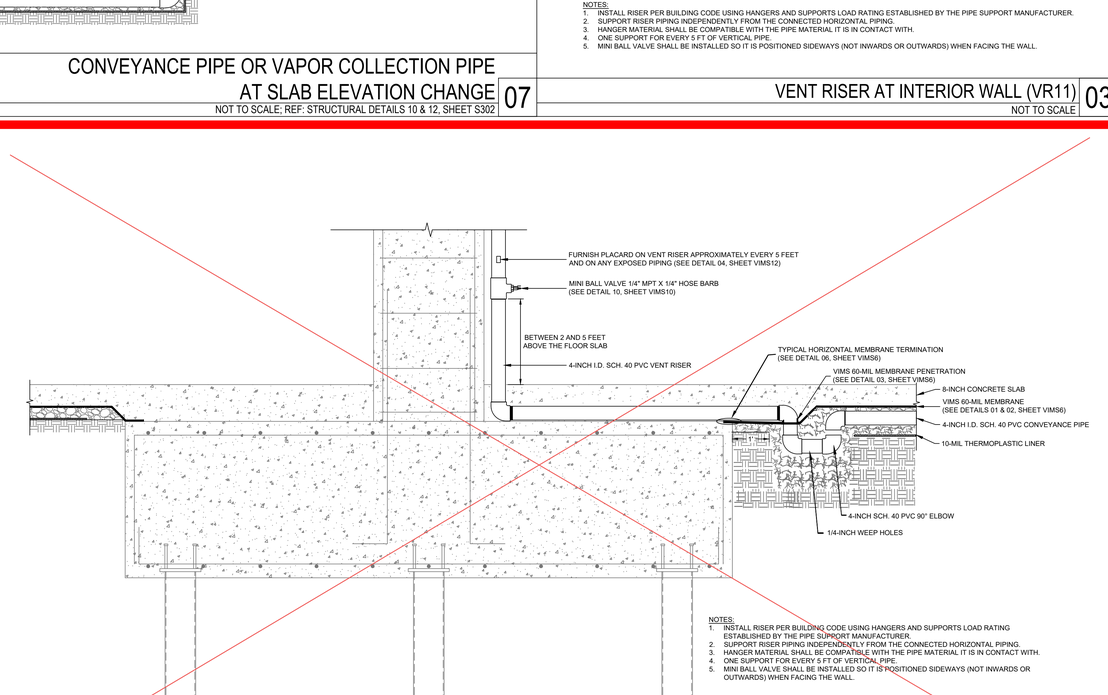
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO IT IS POSITIONED SIDEWAYS (NOT INWARDS OR OUTWARDS) WHEN FACING THE WALL.

VENT RISER AT INTERIOR WALL (VR11) 03
NOT TO SCALE



TRANSITION PIPE AT INTERIOR COLUMN SUPPORT 08
NOT TO SCALE; REF: STRUCTURAL DETAIL 01, SHEET S302



NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO IT IS POSITIONED SIDEWAYS (NOT INWARDS OR OUTWARDS) WHEN FACING THE WALL.

VENT RISER AT INTERIOR COLUMN SUPPORT (VR9, VR10, AND VR11) 04
NOT TO SCALE; REF: STRUCTURAL DETAIL 01, SHEET S302

REV	DATE	BY	DESCRIPTION

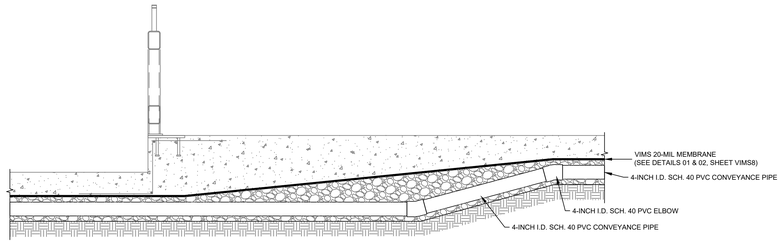
VAPOR INTRUSION MITIGATION SYSTEM DETAILS - PIPING (60-MIL MEMBRANE)

BLOCK D
MAIN STREET
BOTHELL, WASHINGTON

Terracon
Consulting Engineers and Scientists
14121 EDINGER AVENUE, SUITE C
TUSTIN, CA 92780
PH: (949) 261-0051
FAX: (949) 261-8110

VIMS10

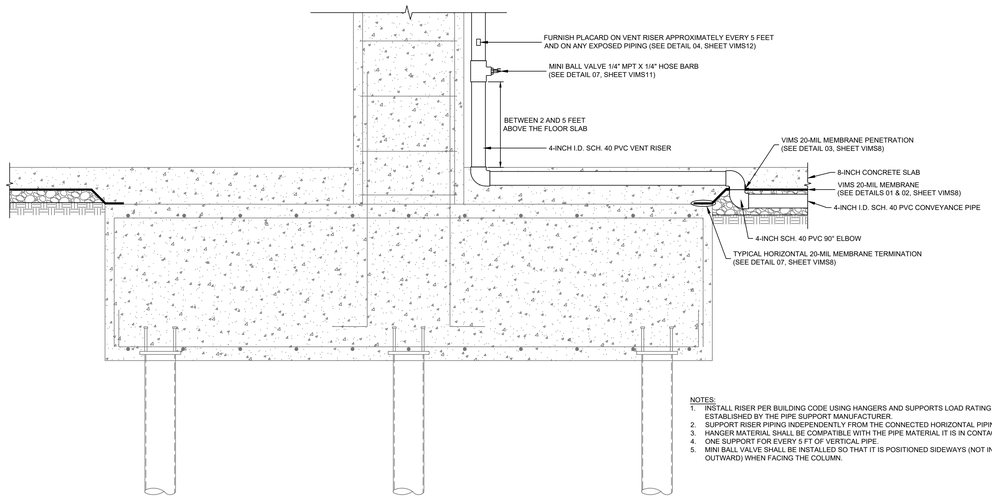
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	NOT TO SCALE
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	10 OF 12



CONVEYANCE PIPE AT GARAGE SLAB ELEVATION CHANGE 08

NOT TO SCALE; REF: STRUCTURAL DETAIL 09, SHEET S302 AND DETAIL 04, SHEET S303

SAME AS DETAIL 04 SHEET VIMS10 BUT WITH 20-MIL SYSTEM



NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
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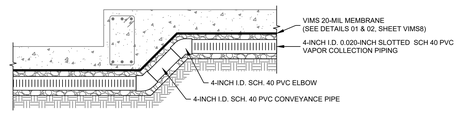
3. HANGER MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL IT IS IN CONTACT WITH.
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO THAT IT IS POSITIONED SIDEWAYS (NOT INWARD OR OUTWARD) WHEN FACING THE COLUMN.

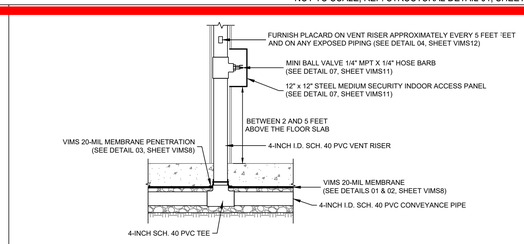
VENT RISER AT INTERIOR COLUMN SUPPORT (VR12 AND VR14) 01

NOT TO SCALE; REF: STRUCTURAL DETAIL 01, SHEET S302



VIMS MEMBRANE AT SLAB ELEVATION CHANGE GREATER THAN 12 INCHES 05

NOT TO SCALE; REF: STRUCTURAL DETAIL 06, SHEET S302



NOTES:
1. INSTALL RISER PER BUILDING CODE USING HANGERS AND SUPPORTS LOAD RATING ESTABLISHED BY THE PIPE SUPPORT MANUFACTURER.
2. SUPPORT RISER PIPING INDEPENDENTLY FROM THE CONNECTED HORIZONTAL PIPING.
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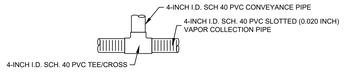
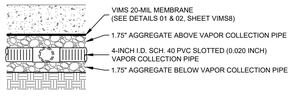
4. ONE SUPPORT FOR EVERY 5 FT OF VERTICAL PIPE.
5. MINI BALL VALVE SHALL BE INSTALLED SO THAT IT IS POSITIONED SIDEWAYS (NOT INWARD OR OUTWARD) WHEN FACING THE WALL.

VENT RISER AT INTERIOR WALL (VR13) 02

NOT TO SCALE



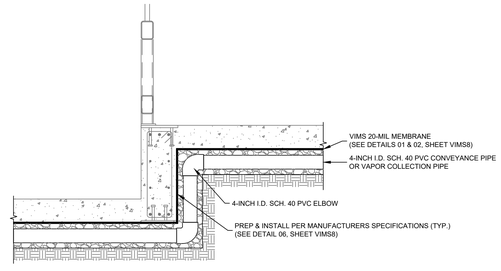
PLAN



PROFILE

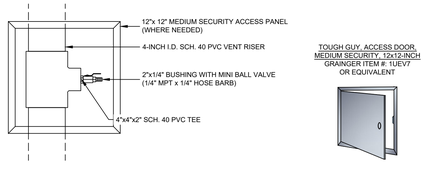
VAPOR COLLECTION PIPE TRANSITION TO CONVEYANCE PIPE 06

NOT TO SCALE



CONVEYANCE PIPE OR VAPOR COLLECTION PIPE AT SLAB ELEVATION CHANGE 03

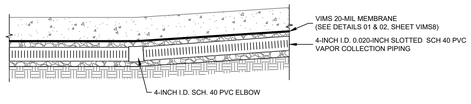
NOT TO SCALE; REF: STRUCTURAL DETAILS 10 & 12, SHEET S302



NOTES:
1. THIS IS A GENERAL DETAIL. LOCATIONS OF ACCESS DOORS TO BE DETERMINED BY OWNER AND VIMS DESIGNER.
2. VENT PIPING SAMPLE PORT AND SUB-SLAB VACUUM MONITORING PROBE TO SHARE ACCESS PANEL.
3. BOTTOM OF ACCESS PANEL SHALL BE BETWEEN 2 AND 5 FEET ABOVE THE FLOOR SLAB.

VENT PIPING SAMPLE PORT 07

NOT TO SCALE



VAPOR COLLECTION PIPE AT BOTTOM OF GARAGE RAMP 04

NOT TO SCALE; REF: STRUCTURAL DETAIL 07, SHEET S302

REV	DATE	BY	DESCRIPTION

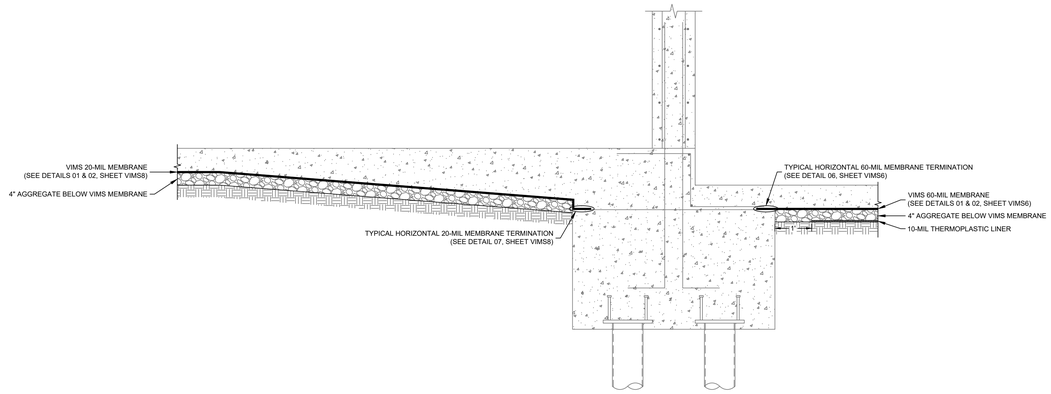
VAPOR INTRUSION MITIGATION SYSTEM DETAILS - PIPING (20-MIL MEMBRANE)

BLOCK D

MAIN STREET
BOTHELL, WASHINGTON

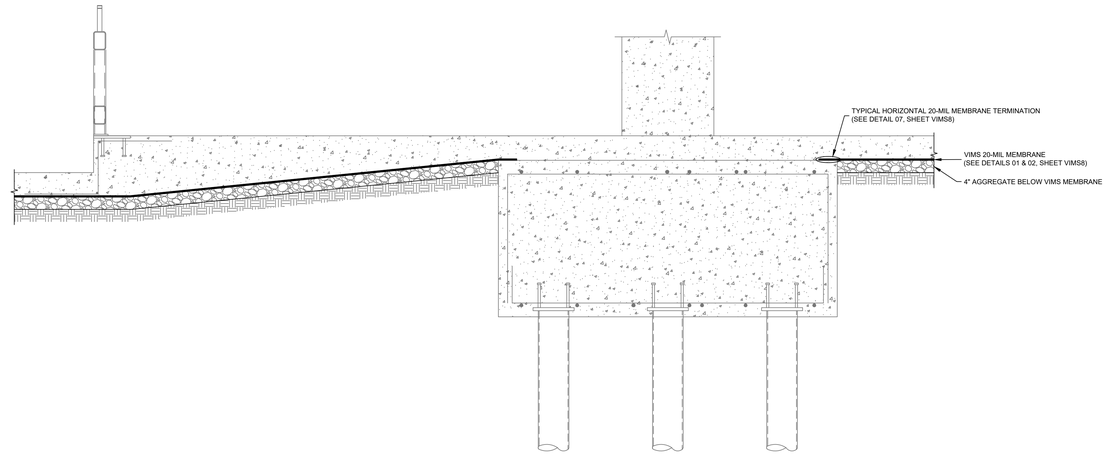
Terracon
Consulting Engineers and Scientists
1421 EDINGER AVENUE, SUITE C
TUSTIN, CA 92780
PH. (949) 261-0051
FAX: (949) 261-6110

VIMS11	
DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	NOT TO SCALE
DATE:	12/20/21
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	11 OF 12



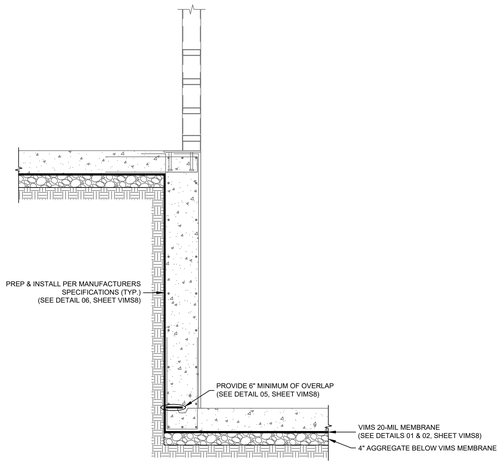
VIMS MEMBRANE AT INTERIOR PILE CAP WITH ELEVATION CHANGE 04

NOT TO SCALE; REF: STRUCTURAL DETAIL 08, SHEET S302



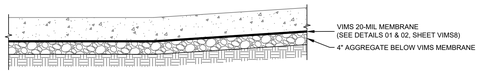
VIMS MEMBRANE AT PILE CAP ADJACENT TO GARAGE RAMP WITH SLAB ELEVATION CHANGE 01

NOT TO SCALE; REF: STRUCTURAL DETAIL 02, SHEET S303



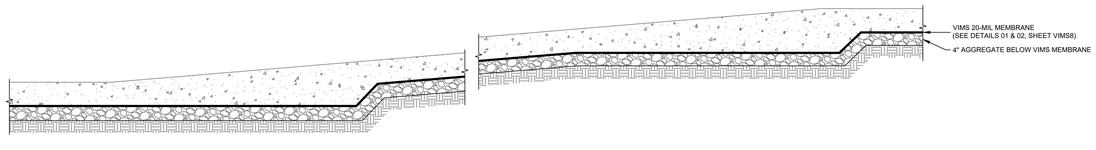
VIMS MEMBRANE AT GARAGE SLAB ELEVATION CHANGE 06

NOT TO SCALE; REF: STRUCTURAL DETAIL 11, SHEET S302



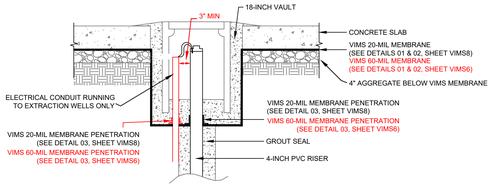
VIMS MEMBRANE AT GARAGE RAMP 05

NOT TO SCALE; REF: STRUCTURAL DETAIL 07, SHEET S302



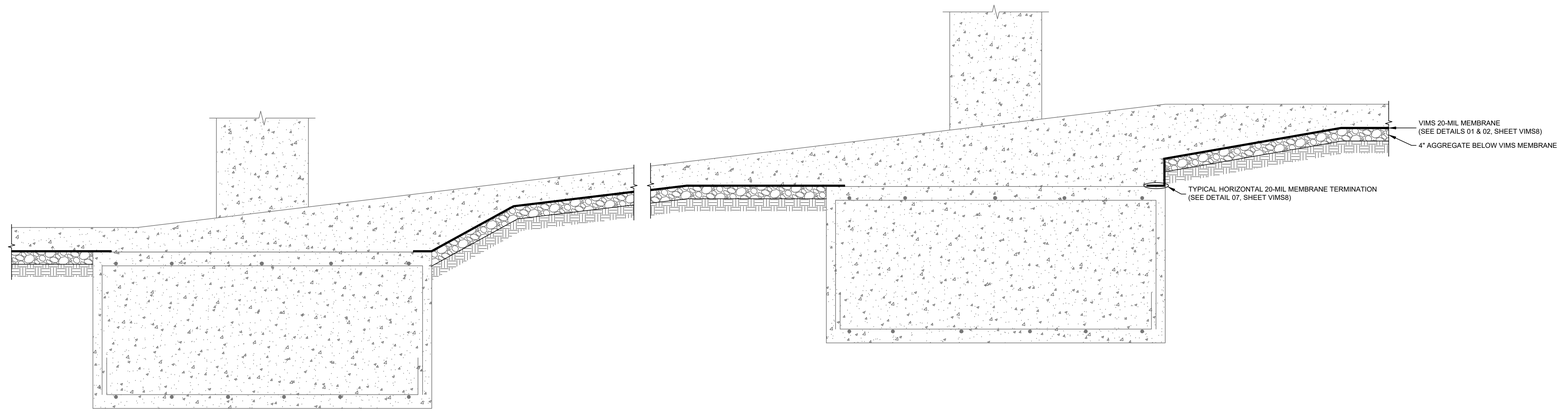
VIMS MEMBRANE AT GARAGE RAMP 02

NOT TO SCALE; REF: STRUCTURAL DETAIL 03, SHEET S303



VIMS MEMBRANE AT TYPICAL 4-INCH
INJECTION/EXTRACTION WELL DETAIL 09

NOT TO SCALE; REF: TYPICAL 4-INCH INJECTION/EXTRACTION WELL DETAIL FROM ETEC



VIMS MEMBRANE AT GARAGE RAMP WITH COLUMN 03

NOT TO SCALE; REF: STRUCTURAL DETAIL 05, SHEET S303

REV	DATE	BY	DESCRIPTION

VAPOR INTRUSION MITIGATION SYSTEM DETAILS - MEMBRANE (20-MIL)

BLOCK D

MAIN STREET

BOTHELL, WASHINGTON

Terracon
Consulting Engineers and Scientists
1421 EDINGER AVENUE, SUITE C
TUSTIN, CA 92780
PH. (949) 261-0051
FAX: (949) 261-6110

VIMS9

DESIGNED BY:	JTY
DRAWN BY:	PTK
APPVD. BY:	PMH
SCALE:	NOT TO SCALE
DATE:	12/2021
JOB NO.	60217063
ACAD NO.	60217063 VIMS
SHEET NO.:	9 OF 12