



APPENDIX A

Proposed Ordinances

PROPOSED AMENDMENT

Chapter 18.78 is added to Title 18 of the Long Beach Municipal Code to read as follows:

CHAPTER 18.78

Construction in the Vicinity of Abandoned Oil Wells

18.78.010 – Applicability.

All construction activities on a vacant parcel or on a tract or parcel map containing abandoned oil/gas wells shall meet the requirements of this Chapter. Construction activities on a vacant parcel or on a tract or parcel map with active and idle wells shall comply with Chapter 18.48. Construction projects for assembly facilities, schools, care giving facilities such as, “A,” “I,” “E,” and “high rises” occupancy classifications shall meet the current CALGEM standards.

18.78.020 - Exemptions

Additions or Modifications. Additions or modifications to existing habitable and non-habitable structures that are less than 50% of the existing floor area and that maintain the separation rule.

18.78.030 – Definitions.

Unless otherwise expressly stated, the following words and terms shall, for the purpose of this Chapter, have the meaning shown in this Section. Where the words or terms are not defined in this Section, Chapter 18.02 shall apply.

- A. “Applicant” means a permit applicant, developer, owner, permittee, operator, or a representative of the owner who is applying for building or grading permit to construct in the vicinity of abandoned oil/gas well/s.
- B. “Close Vicinity” means a well located within the separation rule of an abandoned well.
- C. “Construction Activity” means construction activity including, but not limited to, grading, paving, and/or structure development.
- D. “Geologic Energy Management Division” or “CALGEM” means the state agency responsible for overseeing the drilling, operation, maintenance, plugging and abandonment of oil, natural gas, and geothermal wells.
- E. Development Coordinator means the Building Official, or designated representative(s) with the authority to review construction activity in the vicinity of oil/gas wells.
- F. “Operator” means any person drilling, maintaining, operating, pumping, or in control of any well.
- G. “Peer Review” means consultant/team pre-approved by the City that is charged with the review of oils well abandonment.

- H. "Permittee" means any person or entity seeking to obtain a permit with the City.
- I. "Project Boundary" means the entire proposed site, including the entire area of each and every parcel involved.
- J. "Qualified Professional" means a petroleum engineer currently registered in the State of California and possessing experience in oil/gas well abandonment.
- K. "Separation Rule" means providing 10 ft of separation on two sides of the well, 50 ft of separation on the third side of the well, and the remaining side of the well open with unobstructed vertical clearance for well service rig access.

18.78.040 –Prerequisites

Applicants shall complete the following prerequisite items prior to applying for a grading or building permit for construction within the project boundary.

- A. Entitlements. Obtain all the required land use entitlements of Title 21 (Zoning).
- B. Identify all active, idle, and abandoned wells within the project boundary and within 300-ft of proposed onsite structure(s).
- C. Construction Site Well Review. Complete and submit a Construction Site Well Review (CSWR) Application to CalGEM.
- D. Well Safety Evaluation. Prepare a Well Safety Evaluation per Section 18.78.050.
- E. Leak test Inspection Request. Submit a leak test inspection request to the Development Coordinator per 18.78.110.

18.78.050 – Well Safety Evaluation Submittal requirements.

A well safety evaluation report submitted to Development Coordinator for wells within the project boundary and off-site wells within 300-ft of proposed structure(s). The report shall include the following:

- A. Well Status Report. Well Status Report by CALGEM must be current to within the last 12 months of formal project submittal to plan check and be inclusive of all relevant well work. A duplicate of the entire data package submitted to CALGEM must be submitted to the Development Coordinator.
- B. Well Exhibit. A Well Exhibit shall be submitted to the Development Coordinator for review. The Well Exhibit shall contain of the following elements:
 - 1. Site plan that illustrates all active, idle, and abandoned wells and location and function of all existing and proposed development, including, but not limited to, paved surfaces, auxiliary structures, and occupied structures within the property boundary. Off-site wells within 300-ft of a proposed structure shall be shown on the site plan.

2. For wells within the property boundary:
 - i. Diagram and description of the wells' drill rig accessibility within 24 hours of emergency. Compliance with separation rule shall be clearly shown. If inaccessible within 24 hours, a detailed plan to provide access, including approximate minimum time will be required.
 - ii. Results of leak testing: Applicant will perform leak test in accordance with 18.78.110.

C. Oil Well Assessment: The oil well assessment shall be submitted for wells not abandoned to current CalGEM standards located within the project boundary and/or within 300-ft of a proposed onsite structure. The oil well assessment shall include:

- i. Well bore diagram for each well.
- ii. Well bore diagram shall include:
 1. Well diameter;
 2. Casing and liner specifications and setting depths;
 3. All cementing operations including calculations of cement volumes;
 4. Depths of various hydrocarbon zones and fresh-saltwater interface; and
 5. Any other data required to analyze the current conditions of the well including casing recovery operations and the presence of junk in the hole.

D. Off-site wells within 300-ft of a proposed onsite structure: If information on the well is unavailable, wells shall be considered active in accordance with Long Beach Code 18.48.

E. Wells inaccessible by an emergency rig within 24 hours will require further evaluation in accordance with Section 18.78.080.

18.78.060 – Well Abandonment Request

A. Equivalency Request. An Equivalency Standard Request shall be submitted to the Development Coordinator for wells not abandoned to the current CALGEM standard and which are affected by Construction Activity. The Request shall include the following:

1. Statement. A written statement that states the basis for the request and substantiates the claim of impracticality or hardship for code modification or finding of equivalency to code requirements for proposed alternative materials, design and methods of abandonment and equipment.
2. Any additional relevant information regarding the property, including nearby water injection wells, faults, floodplains, tsunami and/or seiche zones, landslide, and seismic consideration(s).
3. Leak test results in accordance with Section 18.78.120.
4. Long-term Safety Evaluation pursuant to Section 18.78.090 for development proposing to build in close vicinity or over abandoned well(s).
5. The Report shall be stamped, signed, and dated by a Qualified Professional.

B. Review. The Development Coordinator shall have the authority to approve the well(s) "as-is" condition in accordance with Section 18.78.220, or approve the Well Abandonment Equivalency

request and allow the well(s) to be abandoned in accordance with this Section, or deny Well Abandonment Equivalency request if the City is not able to verify the information provided in the report.

- C. Wells within the project boundary and unaffected by Construction Activity, which are not abandoned to any approved current or prior CALGEM standard, may be required to undergo review by the Development Coordinator and/or his designee. The Development Coordinator shall have the authority to approve the well(s) "as-is," or approve alternative abandonment or development conditions.

18.78.070- Equivalency Abandonment Standard

Construction proposed over or within close proximity to abandoned wells, shall not be permitted unless the Development Coordinator has determined that the well(s) has been abandoned in accordance with CALGEM current abandonment standard or to the city's equivalency standard. Equivalency abandonment requests must be reviewed and approved in accordance with Section 18.78.060 prior to abandonment in accordance with the following equivalency standards:

1. A cement plug located at the depth of the last oil/gas zone produced from the well. All perforations shall be plugged with cement, and the plug shall extend at least 100 ft above the top of a landed liner, the uppermost perforations, the casing cementing point, the water shut-off holes, or the oil or gas zone, whichever is higher. If wellbore conditions prevent placement of the plug at the depth of the last zone produced from the well, approximately 100 ft of cement shall be placed inside and outside of the casing above (but as close as possible to) the last zone produced from the well, but no higher than the base of fresh water zone.
2. A cement plug located at the depth of the base of the freshwater zone in the well. If there is cement behind the casing across the fresh-saltwater interface, a 100 ft cement plug shall be placed inside the casing across the interface. If the top of the cement behind the casing is below the top of the highest saltwater sands, squeeze-cementing shall be required through perforations to protect the freshwater deposits. In addition, a 100 ft cement plug shall be placed inside the casing across the fresh-saltwater interface.
3. A cement plug located at the surface. The hole and all annuli shall be plugged at the surface with a cement plug extending at least 50 ft from the top of the cut-off well casing.
4. Leak Test. Perform leak testing per Section 18.78.120.
5. Vent Cones. Install vent cone in accordance with Section 18.78.140.
6. Indemnity Agreement and Declaration of Covenant. Submit Indemnity Agreement per Section 18.78.200 and Declaration of Covenant per Section 18.78.210.
7. Notice of Well Abandonment. Upon receipt of the City's approval per Section 18.78.220, the Applicant may obtain the required permit(s) in accordance with City Building Code requirements.

18.78.080--Wells not accessible

- A. Access. Due to the uncertainty of future conditions, applicants are encouraged to provide rig access when proposing to develop near or over wells.
- B. Methane Mitigation. Wells with limited or no access will be required to provide methane mitigation in accordance with Chapter 18.79 for construction project developing near or over wells with no or limited rig access.
- C. Confirmation. If the City cannot verify the well abandonment to either CALGEM's current standard or the City's equivalency standard, the well shall be abandoned so that the well passes the leak test and the well shall remain assessable for future testing and no building development shall occur in close vicinity or over the well.

18.78.090 – Long-term safety evaluation.

- A. Purpose. Development projects with structures in close vicinity or over an abandoned well shall submit a Long-term safety evaluation.
- B. Submittal. The Long-term safety evaluation shall provide a justification for lack of rig access.

18.78.100 – Above-well head mitigation.

The permittee's Qualified Professional shall submit mitigation plans for Development Coordinator review in compliance with the City Standards for the well cone and vent system. The location of the well(s) and the associated vent piping system shall be noted on the site plan and the foundation plan, in addition to pages dedicated to the well protection system.

18.78.110 – Leak test request.

A leak test request shall be submitted to Development Coordinator stating the following:

1. Well Name;
2. API Number;
3. Location (northing, easting);
4. Equipment to be used in leak testing;
5. Firm name, qualifications, certification and/or license information to perform leak testing; and
6. Signature of permittee.

18.78.120 – Leak testing.

- A. Examination. Abandoned wells shall be tested for gas leakage and visually inspected for oil leakage.

- B. Detector. A leak test shall be completed utilizing a portable gas detector approved in advance by Development Coordinator submitted under the oversight of the Qualified Professional. A portable gas detector calibration form shall be provided to the Development Coordinator representative for inclusion into the leak test observation report.
- C. Leaking Well. A well shall be considered leaking if the meter reading is greater than 50 parts per million (ppm) as observed by the Development Coordinator and/or CALGEM representative. If wells are found to be leaking, there shall be a diligent attempt to abandon the wells to current CALGEM well abandonment standards.
- D. Metal top plate. Following a successful leak test, a metal top plate shall be immediately welded by a licensed welder in the presence of Development Coordinator and/or CALGEM representative (per CALGEM requirements).
- E. Site Restoration. Following all testing and inspection, the test area shall be returned to its previous state and fencing may be required around the area or the entire site, in accordance with Title 14, Division 2, Chapter 4, Subchapter 3, Article 3, Section 1775 of the California Code of Regulations.
- F. Vent Risers and Vent Cones. Vent risers and vent cones shall be installed in accordance with Section 18.78.140 and Section 18.78.160 prior to completing site grading activities.
- G. Inspections.
1. Inspections shall be performed by the Development Coordinator during leak testing, metal plate welding, and vent cone installation and completion.
 2. Inspections must be scheduled at least two (2) business days in advance.
 3. Cone and riser installation shall be observed and inspected by Development Coordinator.
- H. Observation Report. The Development Coordinator will review the leak test observation report documenting the date, time, and summary of the testing certified by the Qualified Professional.

18.78.130 – Site Clean-Up

Any potential site cleanup shall be under the direction of City of Long Beach Health Department or designee, prior to grading and compaction around the well head shall be per grading permit requirements of the City.

18.78.140 – Vent cone.

- A. Purpose. Well vent cones are designed to accumulate potential hazardous and explosive gasses that travel through well casings to the ground surface and vent them to an approved location.
- B. Design. Vent cones shall be of a type and design approved by Development Coordinator. The design and installation shall be in conformance with applicable codes, such as the current adopted edition of the California Building Code, Mechanical Code, Plumbing Code, and City

standards. Any design not in conformance with this specification must be approved, stamped, and signed by a Qualified Professional Engineer licensed in the State of California.

- C. Size. It shall have a minimum 4 ft diameter cone extending 2 ft minimum above the abandoned well cap and backfilled with 3/4 in. gravel.

18.78.150 – Horizontal pipes.

- A. Purpose. Horizontal piping may be necessary to route the vent riser to an appropriate location outside of a building footprint or away from hazardous, aboveground locations.
- B. Standards. Horizontal vent piping shall conform to the following requirements:
1. Horizontal piping connecting the vent cone to the vent riser shall be non-perforated and sloped 1% down towards the vent cone to provide for drainage and clean-out of pipe;
 2. The pipe shall be placed in a sanded trench with a minimum cover of 2 ft. These horizontal runs shall be provided with a 14-gauge solid strand, yellow insulated utility locator wire installed directly above the well-vent pipe; and
 3. Proposed construction material for horizontal pipes shall be submitted to the City in the Mitigation Plan for review.

18.78.160 – Vent risers.

- A. Design. Vent risers can stand alone or be integrated into the proposed design.
- B. Standards. Vent riser pipes shall comply with the following requirements:
1. Vent riser pipe shall have a minimum diameter of 2 in.
 2. The point of gas emission of flag pole vents shall be located at the very top of the pole, which shall be provided with a screened rain guard.
 3. The flag pole vents shall be positioned as below:
 - i. Ten (10) ft above grade;
 - ii. A minimum of 1 ft above a roof line;
 - iii. Ten (10) ft away and 3 ft above any fresh air intake or opening into a building; and
 - iv. Three (3) ft away from the property line.
 4. Flag pole vents shall be clearly and permanently marked/labeled with the words: "Caution methane gas in pipe. No smoking or sparks within 20 ft. "If damaged immediately notify Fire Dept. – Dial 911.
 5. Flag pole vents shall be fitted with a one in. sampling port, located between two (2) to four (4) ft above grade, near the base of the pole. The sampling port must be labeled with a permanent sign with the words: "CAUTION METHANE GAS TEST PORT."
 6. Whenever abandoned well casings must be vented to a structure, such venting shall comply with the most current requirements of methane mitigation ordinance (i.e., electrical classifications, vent spacing, outlet spacing, etc.).
 7. Abandoned well casings that are vented to structures shall not be vented in any way that penetrates the building's "structural envelope."

8. Abandoned well casings that are vented to structures shall have the vent pipes securely attached to the outside of an exterior wall.
9. Whenever abandoned well casings must be vented within a structure, detailed plans of the proposed venting system shall be submitted to the City, with justification, for review and approval prior to any building permits being issued.
10. If necessary, for aesthetic purposes, the vent pipe may be located in an “exterior vent riser chase,” which must be designed by a Qualified Engineer.
11. The vent pipe may also be attached to self-supporting satellite structures such as light standards, signage, or patios.
12. Well vents shall be leak tested in accordance with Section 712 of the California Plumbing Code.

18.78.180 – Methane mitigation.

Building construction projects shall be mitigated in accordance with the Chapter 18.79 requirements

18.78.190 – Exposure Period.

- A. Exposure period. If an oil well is abandoned through the City’s Equivalency Standards, the associated leak testing is valid for the duration of one (1) year.
- B. Significant event. A leak test shall be performed in accordance with Section 18.78.120 if the site experiences a significant event such as earthquake, flooding, fire or other natural or manmade events.
- C. Project Delay. Construction delays of more than a year will require the owner/operator to perform the leak test pursuant Section 18.78.120.
- D. Speculative projects. Proposals to abandon a well in accordance with the City’s equivalency process, but without a proposed development shall be permitted in accordance with this Chapter. The Indemnity Agreement and Declaration of Covenant shall be filed prior to issuance of the Well Abandonment Approval Notice.

18.78.200 – Indemnity Agreement.

Upon project plan approval, the Applicant shall fully execute and record the “Indemnification for Construction in the Vicinity of Abandoned Oil Wells” in the format required by the City for any wells that do not meet the current (at the time of property development) CALGEM standards for abandonment and/or maintenance accessibility and building separations.

18.78.210 – Declaration of covenant.

Prior to final approval of any grading, or building permit for development within the close vicinity or over a former oil/ gas well, the permittee shall record a declaration of a covenant, in a form subject to the review and approval of the City Attorney, putting future owners and occupants on notice of the following: the existence of abandoned oil wells on the site; that the wells within the site have been leak tested and found not to leak based on the date that testing was performed; acknowledgment that CALGEM may order the re-abandonment of any well should it leak in the

future; acknowledgment that CALGEM does not recommend building over wells; and releasing and indemnifying the City for issuing project permits. The covenant shall run with the land, apply to future owners, and may only be released by the City. The Declaration of Covenant shall be filed prior to project final approval.

18.78.220 – Notice of Well Abandonment.

- A. Well Abandonment Request and Equivalency Standard Review. The Development Coordinator or his designee, including, but not limited to, the City's Peer Review consultant shall review the Well Safety Evaluation report and other information provided by the developer for well/s that are submitted for the City Well Abandonment Request and Equivalency Standard consideration to determine if the well abandonment is adequate to prevent hydrocarbons from reaching the surface of the well. The determination shall be based on, at a minimum, a review of a history of all work performed on the well and an independently constructed detailed wellbore diagram showing the current condition of the well.
- B. Safety Assessment Letter. The Development Coordinator or his designee, including, but not limited to, a Peer Review Consultant shall provide a Safety Assessment Letter based on provided relevant project documentation to determine well(s) abandonment complies with the equivalency abandonment standard.
- C. Inspections. Field inspections for the well abandonment will be based on receiving of final CALGEM approval letter for wells that will be abandoned to current CALGEM standards. For the well abandonment that will be submitted through the City's "Equivalency Standards", a certification letter shall be required by the project Qualified Professional Engineer and issuance of Final Abandonment Notice.

18.78.230 – Fees

Well Abandonment Request, Oil Well Assessment Request review, Well Safety Evaluation review, Plan Check, peer review, well head inspection, leak test inspection, and Alternate Materials and Methods of Construction fees for oil well abandonment projects shall be paid in accordance with the latest City Schedule of Fees.

18.78.240 – Post construction protocols.

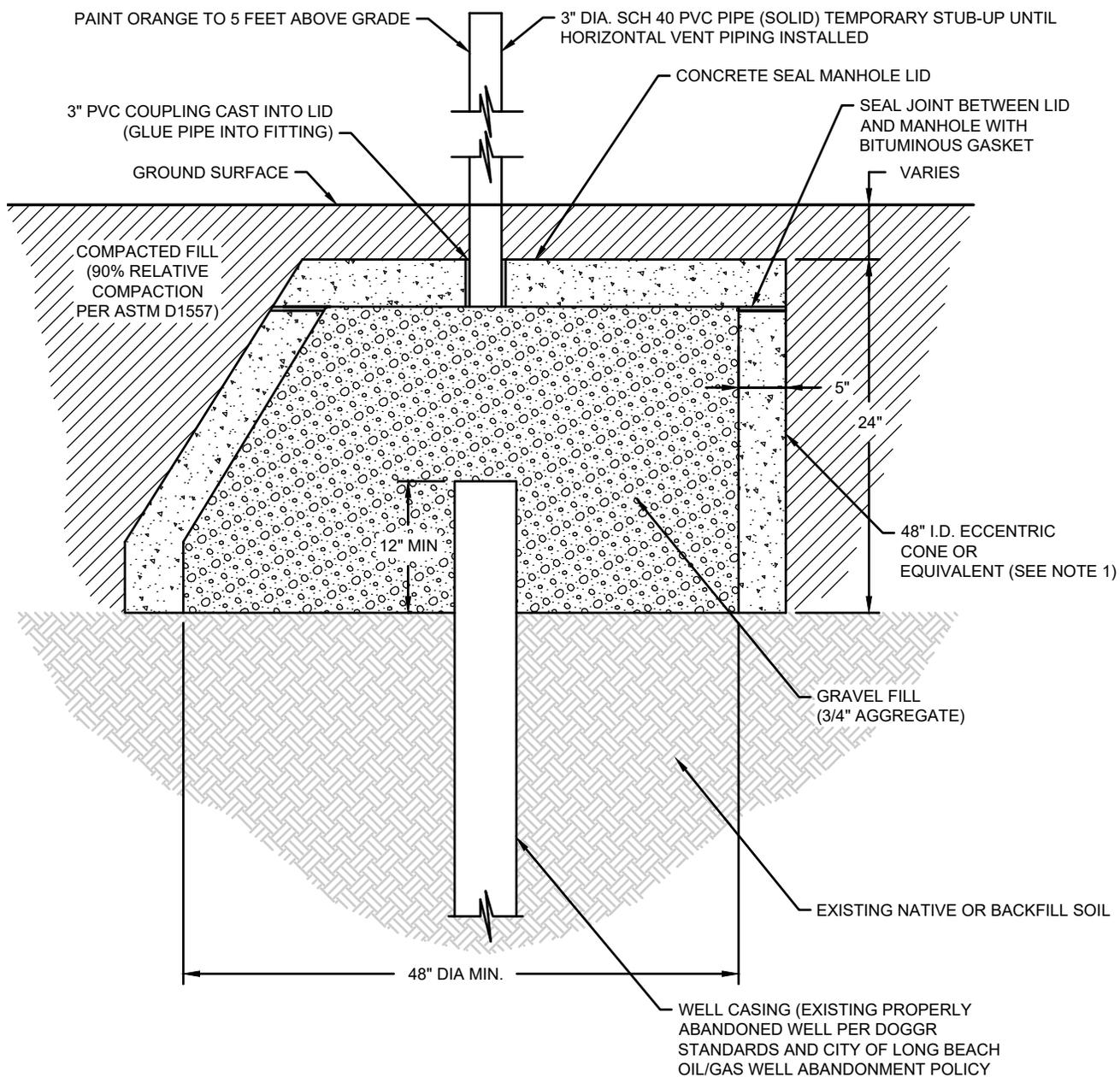
Owner/Applicant will be responsible for monitoring and project maintenance.

18.78.250 – Enforcement and violation.

The Building Official is hereby authorized and directed to enforce the provisions of this Chapter in accordance with Section 18.03.020.

18.78.260 – Site restoration for Vacated Projects.

Should the developer decide not to continue site development, all excavations for well discoveries shall be restored to original condition prior to well discovery disturbance.



NOT TO SCALE

STANDARD - DETAILS
WELL VENT
OIL WELL REDEVELOPMENT
LONG BEACH, CALIFORNIA

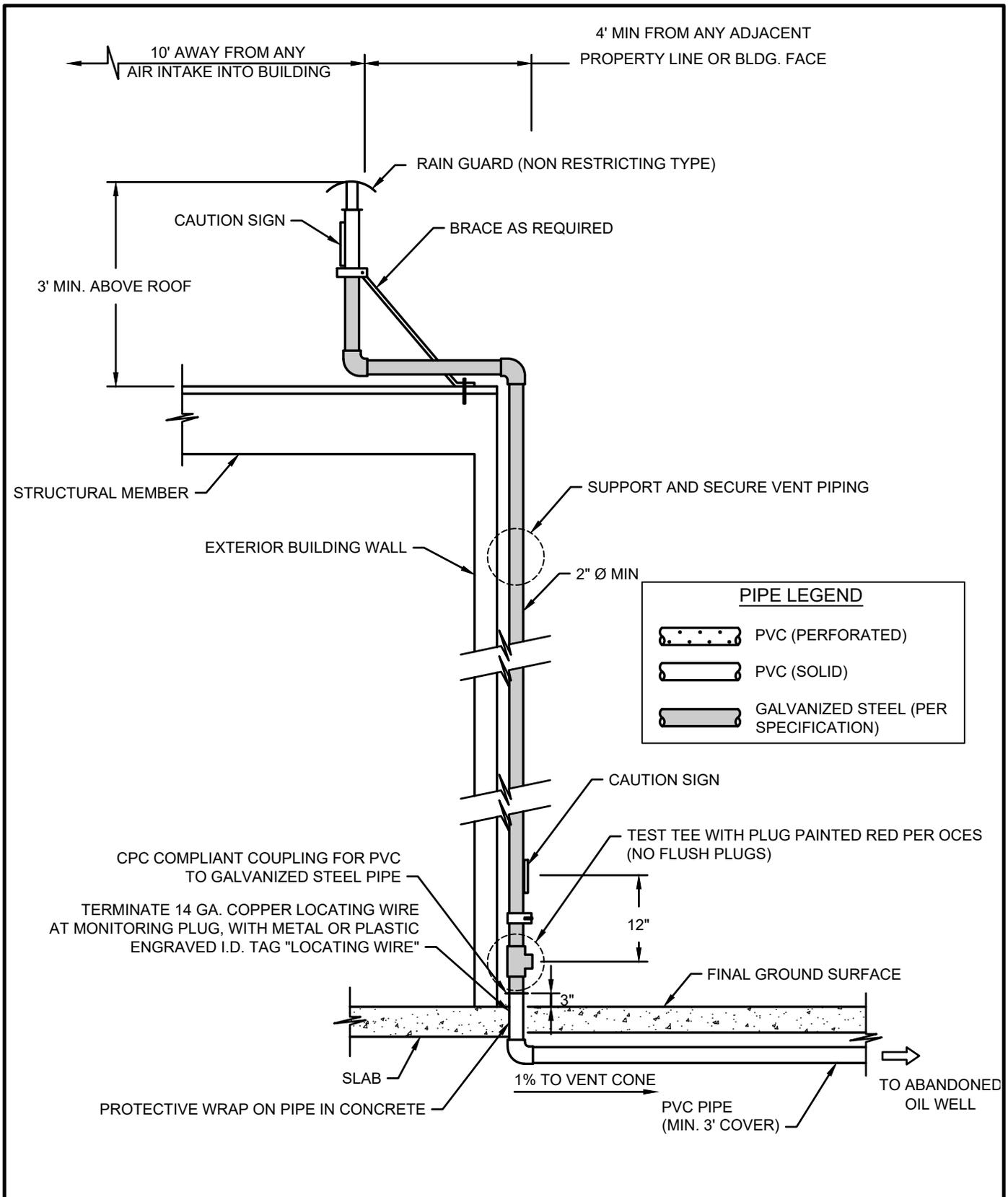
NOTE:

1. CONCRETE AND REINFORCEMENT DETAILS TO BE PROVIDED BY THE DESIGN ENGINEER.

JANUARY 2020

FIGURE

1

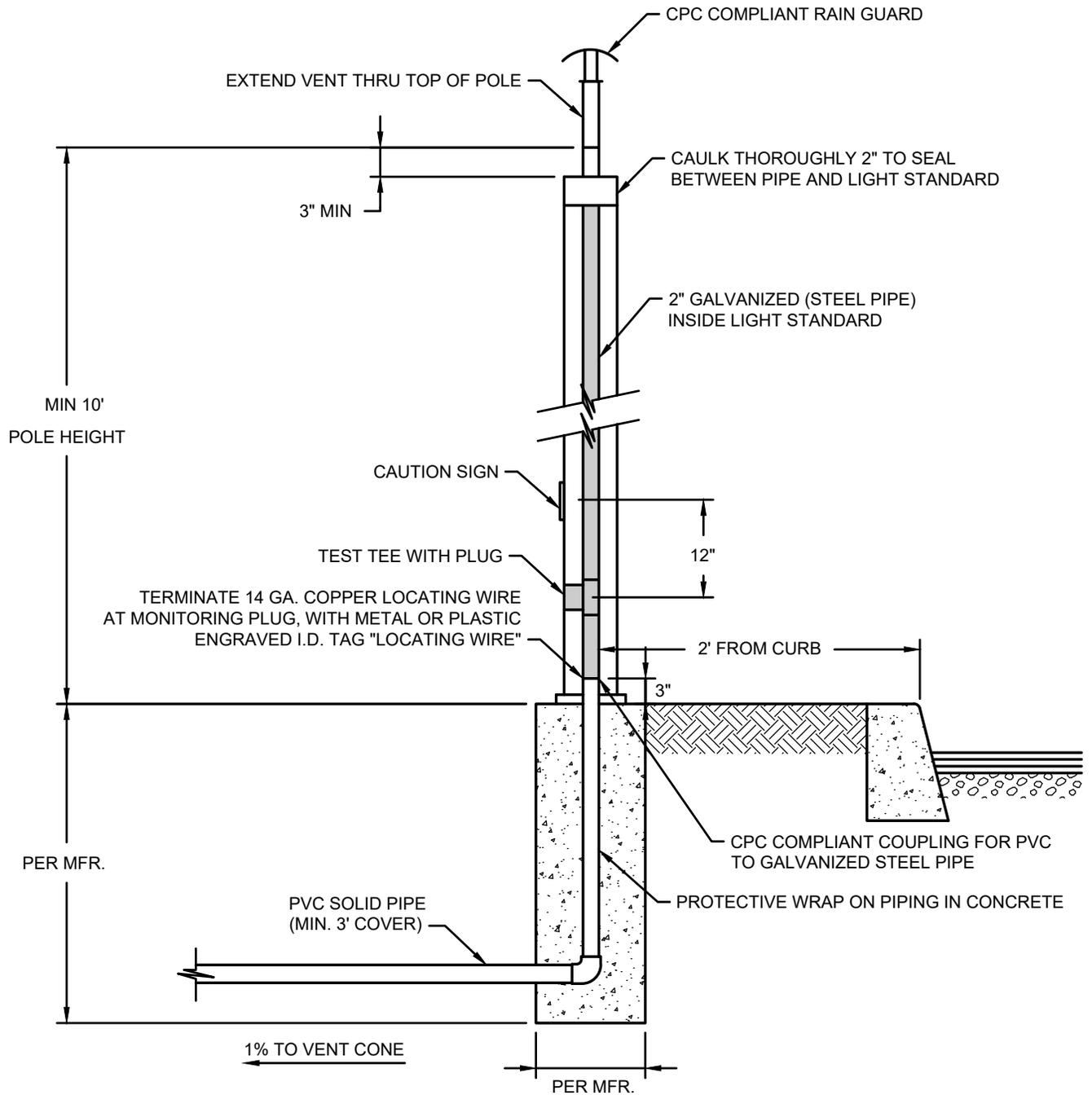


- NOTES:
1. VENT PIPE AND RISER PER CURRENT ADOPTED CPC.
 2. CPC - CALIFORNIA PLUMBING CODE.

NOT TO SCALE

STANDARD - DETAILS
 OIL WELL VENT RISER
 OIL WELL REDEVELOPMENT
 LONG BEACH, CALIFORNIA

JANUARY 2020	FIGURE 2
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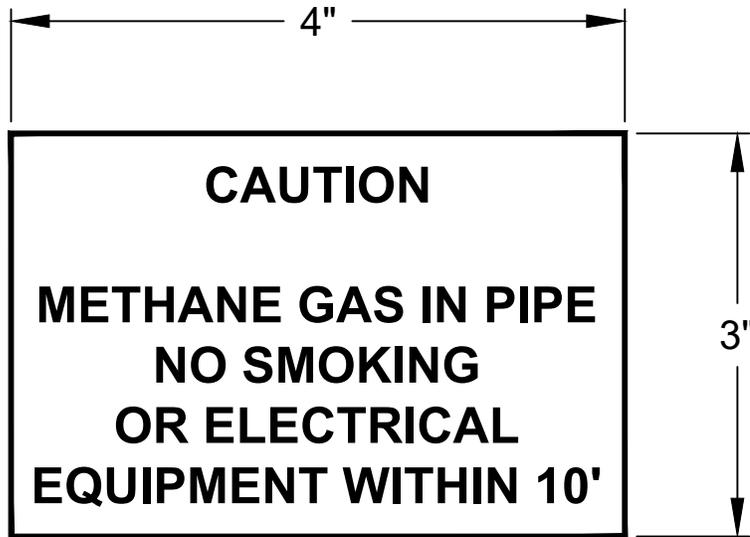
NOT TO SCALE

STANDARD - DETAILS
 OIL WELL VENT RISER TO LIGHT STANDARD
 OIL WELL REDEVELOPMENT
 LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE

3



NOTES:

1. SIGN SHALL BE PLASTIC WITH ADHESIVE BACKING OR APPROVED EQUAL.
2. 1/4" HIGH BLACK LETTERS ON WHITE BACKGROUND AT A MINIMUM.

NOT TO SCALE

STANDARD - DETAILS
OIL VENT SIGN
OIL WELL REDEVELOPMENT
LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
4

PROPOSED AMENDMENT:

Chapter 18.79 is added to Title 18 of the Long Beach Municipal Code to read as follows:

**CHAPTER 18.79
METHANE GAS MITIGATION**

18.79.010 – Applicability

Methane mitigation shall be required for new buildings(structures), additions to buildings (structures), or changes of use that are located in the following areas:

- A. All areas overlying petroleum-bearing formations and within the limits of a reservoir’s boundary, as mapped by the Geologic Energy Management Division (CalGEM). Properties which partially fall into areas described above are fully subject to this Chapter for the entire property.
- B. Structures and impermeable surfaces adjacent to a structure within a distance less than or equal to 300 ft from any active or 100 ft of an abandoned oil/gas well.
- C. If the proposed development is within 1,000 ft from the refuse footprint of any existing or new landfill or disposal site. Projects that fall into this category shall obtain an approval pursuant to Title 27, California Code of Regulations from the Local Enforcement Agency (LEA); i.e., Los Angeles County Public Health. The City of Long Beach Building and Safety Bureau or the City of Long Beach Health Department may require methane mitigation, regardless of the outcome from the LEA review.

The City Building Official may require soil gas investigation for any new development within the City’s jurisdiction. This may include, but is not limited to, properties formally containing storage tanks or surface impoundments containing petroleum products.

18.79.020 - Definitions

The following terms, as used in this chapter, shall have the signification attached to them in this section unless otherwise clearly apparent from this context:

- A. Combustible soil gas – flammable gas within soil pores.
- B. Flammable Gas - gaseous substance capable of sustaining combustion or explosion, as defined in California Fire Code.
- C. Methane Gas Detection and Alarm System - one or more electrical devices capable of continuous monitoring for the presence of methane gas and containing an audible and visual alarm capable of alerting occupants that a hazardous atmosphere exists. All devices shall be approved by the Fire Department.
- D. Gas Membrane Barrier - A tested and approved barrier installed beneath a structure’s slab/foundation for the purpose of limiting the intrusion of combustible soil gas.
- E. Methane Gas - the hydrocarbon substance commonly known as “natural gas,” chemical formula CH₄. For the purposes of definition in this Chapter, natural gas from the distribution system of a utility company is exempted and excluded from the scope of the application of the provisions of this ordinance.
- F. Methane System – Collection of building systems designed to mitigate the accumulation of methane gas to less than hazardous levels within a structure. This includes a designed collection system of piping components located beneath a structure to vent combustible soil gas to the atmosphere; heating, ventilation, and air conditioning (HVAC) systems to introduce outdoor air into a structure to ventilate accumulated methane; and sensors and alarms to detect concentrations of methane gas, activate HVAC and/or active methane mitigation, and alert occupants to the presence of methane gas.

1. Active Methane System: the complete designed piping system originating below a building and terminating above the building with a motorized evacuation device to exhaust accumulated gases.
2. Passive Methane System: a non-powered piping system originating below a building and terminating above the building using natural air flow for venting accumulated gases.
- G. Mitigation Plan - A site-specific plan for the purpose of addressing potential hazards due to the presence of combustible soil gases. The Mitigation Plan must be approved by the City plancheck staff prior to construction.
- H. Qualified Professional - A California Registered Professional Civil Engineer, Petroleum Engineer or Geologist for general mitigation design. A Registered Fire Protection Engineer for the fire alarm and sensor mitigation systems in case of active systems.
- I. Soil Gas Investigation - A scientific investigation reviewed and approved by OCES, conducted under the direction of Qualified Professional for the purpose of determining the locations and concentrations of combustible soil gas.
- J. Standards – a set of prescriptive details referenced and included as a part of this Chapter.

18.79.030 -Methane Soil Gas Investigation

Methane soil gas testing shall be required if a property under development falls under the criteria identified in 18.79.010. The requirement for testing may be waived if the development meets the exemption criteria below:

- A. Single- or two-family homes with first floor areas, including garage space(s), patios, and other impervious surfaces connected to the structure, less than 5,000 sq. ft shall not require site testing and can default to design Level I.
- B. Site testing shall not be required if the methane mitigation system(s) designed for the structure(s) meets design Level III.

Site soil testing shall be performed after site remediation, in accordance with the Long Beach Oil/Gas Well Abandonment Chapter 18.78, CalGEM requirements, and/or local site cleanup requirements. If all sources of combustible soil gas, such as crude oil-impacted soil or oil field sumps, have been removed, isolated, or remediated such that no potential threat to structures due to methane generation or migration remains, then no further mitigation in that area may be required upon review and approval by the City Building Official and/or LA County Public Health.

Coastal Zone Methane Soil Gas Investigation within the Coastal Zone are subject to the local development permit requirements and procedures in Division IX of Chapter 21.25 in Title 21 – Zoning.

18.79.040 - Exemptions

Exemptions to the methane mitigation requirements are as follows:

1. Open parking garage structures with permanent natural ventilation as defined by California Building Code, Title 24 Section 406.5.2; however, On- or below-grade, enclosure building features such as elevator pits, stairwells, storage rooms, and/or elevator lobbies shall be equipped with methane mitigation features described in this policy; or
2. Buildings meeting all of the following as justified in a report signed by a Qualified Professional:
 - a. No previous abandoned oil well history and no active oil wells on site;
 - b. No history of oil field use (e.g., sumps, maintenance, repair, drum storage);
 - c. Site is at least 300 ft from the nearest previously abandoned or active oil well; and

d. Sampling in accordance with City testing standard with fixed laboratory-measured methane at <50 ppmv in soil gas samples.

3. Modifications to existing structures equating to less than 50% of the existing structure area shall not be required to perform site testing and/or methane mitigation with the exception of requirements identified in 18.79.030.

18.79.050 – Methane Mitigation Design Levels

Based upon review of the site soil gas investigation results, the highest methane concentration and pressure shall be utilized to determine the Site Design Level even if not recorded at the same location.

The methane prescriptive standards shall be designed in accordance with the following methane levels as established in Table 1.

Level I: Concentrations of methane less than 5,000 parts per million by volume (ppmv) and measured pressure less than 2 inches of water column (2" WC).

Level II: Concentrations of methane between 5,000 ppmv and 12,500 ppmv regardless of pressure, or concentrations less than 5000 ppmv with measured pressure greater than 2" WC.

Level III: Concentrations of methane greater than 12,500 ppmv at any pressure.

TABLE 1
SITE DESIGN LEVEL AND MITIGATION FEATURES

SITE DESIGN LEVEL	LEVEL I	LEVEL II		LEVEL III
METHANE CONCENTRATION	<5,000 PPMV	<5000 PPMV	≥5,000 PPMV <12,500 PPMV	≥12,500 PPMV
PRESSURE	<2" WC	≥2" WC	ALL PRESSURES	ALL PRESSURES
MITIGATION REQUIREMENTS				
Gas Membrane Barrier (18.79.060A)	X	X	X	X
Perforated Horizontal Pipes (18.79.060B.2)	X	X	X	X
Vent Risers (18.79.060B.4)	X	X	X	X
Signage (18.79.060B.6)	X	X	X	X
Gas Detection System (in-room and vent risers) (18.79.060B.8)		X	X	X
Alarm System (18.79.060B.8)		X	X	X
Control Panel (18.79.060B.8)		X	X	X
Mechanical Sub Slab Extraction (18.79.060B.10)				X
Trench Dam (18.79.060B.7)	X	X	X	X

SITE DESIGN LEVEL	LEVEL I	LEVEL II		LEVEL III
METHANE CONCENTRATION	<5,000 PPMV	<5000 PPMV	≥5,000 PPMV <12,500 PPMV	≥12,500 PPMV
PRESSURE	<2" WC	≥2" WC	ALL PRESSURES	ALL PRESSURES
MITIGATION REQUIREMENTS				
Conduit or Cable Seal Fittings (18.79.060B.7)	X	X	X	X
HVAC Controls (18.79.060B.10)		X	X	X
Pavement Venting (18.79.060B.5)		X	X	X

18.79.060 – Methane Mitigation Components

A. Gas Membrane Barrier

A gas membrane barrier must consist of a manufactured, approved geomembrane designed to prevent the transmission of methane. A gas membrane barrier must be a minimum dry thickness of 15 mils and have a gas transmission rate (GTR) of less than 40 milliliter per square meter day (ml/m²-D) when tested in accordance with American Society for Testing and Materials (ASTM) D1434. Specific geomembranes must be proposed on the mitigation plans by the project proponent for review and approved by City plancheck staff.

Methane Mitigation Plans shall provide, at a minimum, the following membrane-specific details:

1. Typical horizontal and vertical cross-sections;
2. Typical grade beam and footing tie-ins;
3. Pipe boot;
4. Overlaps and repairs;
5. Vertical terminations (if applicable); and
6. Future penetration repairs (post-slab pours).

The Methane Mitigation Plans shall dictate that the membrane installation contractor shall be approved by the membrane manufacturer for installation. A copy of the membrane installation contractor manufacturer approval letter must be submitted with the Methane Mitigation Plans.

A gas membrane barrier shall be installed horizontally beneath the building slab and foundations and vertically along subterranean building elements. The horizontal gas membrane barrier shall be installed per the manufacturer's recommendations and shall be protected above and below the membrane by a 2-in. thick sand layer, a mud slab, a geotextile fabric, or other manufacturer-approved protection course. Manufacturer's approval shall be included with the plancheck submittal. Geotextile fabric shall be tested to confirm weight, density, and puncture resistance per manufacturer's recommendation and/or designed by the Qualified Professional. Puncture calculations shall be submitted with the Methane Mitigation Plans, if applicable.

The vertical gas membrane barrier shall be installed per the manufacturer's recommendations and shall be protected from damage by the manufacturer-approved protection material. Manufacturer's approval shall be included with the submittal.

All Penetrations of the gas membrane barrier shall be sealed with a membrane boot per the manufacturer's recommendations. No rebar or stakes shall be permitted through the membrane. Smoke and soap water testing shall be conducted at all penetrations.

All membrane barriers shall be smoke tested for manufacturing and/or installation defects (e.g., puncture) in accordance with manufacturers recommendation and the Qualified Professional's requirements prior to final inspection and covering. Testing shall follow manufacturer's quality control testing recommendations. All systems shall be final smoke tested under the observation of the project inspector or specialty inspector approved by the building official prior to covering.

B. Sub-Slab Venting

The design for the sub-slab venting system shall be provided by a Qualified Professional. The design and installation shall be in accordance with the California Building Code, Mechanical Code, and Plumbing Code, and meet the following criteria:

B.1 - Materials

Vent piping shall be a minimum 3-in. diameter polyvinyl chloride (PVC), high-density polyethylene (HDPE), acrylonitrile butadiene styrene (ABS), or strip composite perforated pipe or equivalent. Equivalency must be demonstrated by the design Qualified Professional in the submittal. Strip composite shall be connected to horizontal pipe and riser pipes with manufactured connections. Vent piping details shall be provided on the Methane Mitigation Plans, including product specifications and connection details.

B.2 - Horizontal Vent Pipe

Unless otherwise approved by City, sub-slab vent piping shall be placed such that no portion of the foundation is more than 25 ft from a horizontal, perforated vent pipe. Vent piping with a diameter of 3 inch shall not be spaced greater than 50 ft apart horizontally on center (OC) and vent piping with a diameter of 4 inch shall not be spaced greater than 100 ft apart horizontally OC. Mani folding of vent piping is prohibited without prior approval from the City inspector. The total length of solid horizontal piping shall not exceed 100 ft for Design Levels I and II. Solid horizontal vent piping shall maintain a minimum 1% positive slope towards the vent riser.

Where piping transitions through building foundations, the penetration shall be accomplished in compliance with the California Building Code and with the approval of the Building Official as approved by the project structural engineer.

Groundwater reported with site testing; engineer shall account for groundwater in design, e.g.: dewatering system or no ventilation and mat slab with 1% sloping toward perimeter landscaping. Water discharge from dewatering system be permitted through Public Works as industrial waste or stormwater based on characterization and permit requirements.

B.3 - Gas Collection Layer

Trenches: Vent piping shall be embedded in a pipe trench and backfilled with aggregate meeting the requirements of Gas Collection Aggregate. Aggregate shall surround the pipe a minimum of 4 in. in all directions.

Gravel Blanket: A minimum thickness of 2 in. of gravel or a thickness equal to 2 times the largest particle size, whichever is greater, shall be placed above the subgrade and pipe trench. Gravel shall meet the criteria for Gas Collection Aggregate. Designer shall consider maximum particle size and puncture protection of membrane. Puncture calculations shall be provided in accordance with LBMC 18.79.050. Alternatively, a 200-mil (minimum) thickness geocomposite may be used in lieu of aggregate blanket. Geocomposite details including, but not limited to, manufacturer name, product name, and overlap/seaming requirements shall be included on the Methane Mitigation Plans.

Gas Collection Aggregate: Aggregate shall not contain more than 5% fines passing the No. 200 sieve.

Within trenches, the minimum particle size shall not be smaller than pipe perforations. The gradation of aggregate shall be provided on the Methane Mitigation Plans.

B.4 -Vent Riser Pipes

Vent risers shall be connected to horizontal ventilation piping and be provided at a frequency in accordance with Table 2.

Transitions: Perforated pipe shall be connected to vertical vent riser pipe with a California Plumbing Code approved transition/adaptor and contain no more than 5 ft of solid pipe from outside edge of footing to the perforated pipe transition under the building. Exceptions may be made for specific structural conditions of a building. Transition to vertical riser pipe material shall occur no less than 6 in. above grade. Solid, horizontal vent piping in trenches shall maintain a minimum 1% positive slope towards the vent riser.

Locations: Vent riser pipes shall be located on the exterior of a structure except in Level I and II designs where structures are wider than 200 ft. Vent risers may be located within a structure for Level III designs if fans/blowers are located at the termination of the vent riser, exterior to the structure. If within a structure, vent risers shall be within a sealed chase that does not communicate with other parts of the structure. Vent riser pipe shall not be installed within 5 ft of electrical panels, water heaters, fireplaces or other sources of heat or ignition.

Materials: Vertical vent riser pipe shall be not less than 2 in. in diameter. For single family dwellings up to two stories, vertical vent riser pipe shall be constructed of polyvinyl chloride (PVC), ABS, cast iron, galvanized steel, black iron, or PVDF pipes. All other vertical riser pipes shall be constructed of galvanized steel or cast-iron material. All joints shall be tightly sealed with approved materials. Riser pipe shall be similarly protected from physical damage, including UV damage by painting all exposed PVC or ABS.

Manifolding of vent piping is prohibited without prior approval from the City inspector.

Terminations: Riser pipes shall terminate at a minimum of 10 ft above surrounding grade or not less than 6 in. above the adjacent roof level. Riser pipe terminations shall be located at least 1 ft from a parapet wall. Riser pipe shall terminate at a distance of a minimum of 10 ft from and 3 ft above any building opening or air intake and within the property line. The termination of all vent riser pipes shall be provided with a “T” connection or other approved rain cap to prevent the intrusion of rainwater. The rain cap shall be non-restricting to air flow.

TABLE 2

MIN. VENT RISER PIPE DIAMETER (inches)	NUMBER OF VENT RISERS PER BUILDING FOOTPRINT AREA (square feet)
2	1/2,500 (min of 2 risers)
2 1/2	1/5,000 (min of 3 risers)
3	1/7,500 (min of 4 risers)
4	1/10,000 (min of 4 risers)

NOTES:

1. Riser length shall be a maximum of 100' measured along solid pipe (including bends) for design levels I and II.
2. Vent Risers max spacing shall be 100' measured between vent risers for design levels I and II.
3. When the application of the spacing and location requirement of this table results in the requirement of a fractional number of Vent Risers, any fraction shall be construed as one Vent Riser.
4. Horizontal pipes shall always be equal or larger in diameter than the vertical risers.
5. Building Footprint shall be defined as the area in square feet contained within the exterior walls at or below the grade level.
6. Number of required vent risers shall be determined by the selected riser pipe diameter and the rate of vent riser per building footprint area.

Shut-off Valve: A shut-off valve shall be provided within the first three ft of the vent riser to isolate the vent riser from the horizontal vent piping. The valve type and location shall be shown on the Methane Mitigation Plans. Valves shall be chained or otherwise locked open unless vent risers are being tested or replaced.

Sampling Port: A sampling port shall be designed and installed in the vent riser pipe. The sampling port shall be accessible and in the exterior wall surface near ground level for the purpose of testing the vent system. The port shall be provided with a threaded plug or cap. No flush plugs are allowed. A square metal brass tag or rigid plastic engraved sign identifying the tee as a methane collection system vent shall be installed adjacent to the test tee. The vertical riser shall be pressure tested in accordance with Section 712.0 of the California Plumbing Code (CPC) using the sampling port. A sampling port detail shall be shown on the Methane Mitigation Plans.

B.5 - Hardscape Ventilation

Hardscapes covering 5,000 sq. ft or more and located within 15 ft of any structures requiring methane mitigation shall also be vented with pavement vents or by installing landscaping areas immediately adjacent to the building exterior walls at least two ft wide covering at least 80% of building perimeter.

B.6 - Signage

Vent pipe shall be clearly marked with signage to indicate that the pipe may contain combustible gas. A Warning Sign should be placed at the main building entrance or in a location approved by the City inspection staff.

B.7 - Utilities and Trench Dams

All underground electrical conduit penetrating the slab or foundation of the building shall be provided with a seal-off device, as normally found on classified electrical installations. This device is intended to prevent the travel of gas into the occupied portion of the structure through conduit runs. Any device installed shall meet the applicable requirements of the California Electrical Code. Manholes, tanks, or other intermediately occupied structures shall be mitigated. Trench Dam: Utilities entering a structure shall have a trench dam constructed. For the purpose of determining the appropriate electrical wiring method and equipment, boundaries of the hazardous area classification are specified in Table 3, 4, and 5:

**TABLE 3
OUTDOOR HAZARDOUS AREA CLASSIFICATIONS**

LOCATION	MEASURED SOIL GAS CONCENTRATIONS (PPMV)	HAZARDOUS AREA CLASSIFICATION
Below finished grade	<12,500 >12,500	Unclassified Class I, Div 1
Sumps	Total submerged Partially submerged	Unclassified Class I, Div 1
Above grade	NA	Unclassified

TABLE 4
BUILDING HAZARDOUS AREA CLASSIFICATIONS

LOCATION	MEASURED SOIL GAS CONCENTRATIONS (PPMV)	HAZARDOUS AREA CLASSIFICATION
Below Membrane	<1,000 >1,000	Unclassified Class I, Div 1
Below grade within the raised floor foundation or lowest building slab without gas barrier membrane	NA	Class I, Div 1
Above grade within the raised floor foundation footing without gas barrier membrane but with adequate ventilation	<12,500 >12,500	Unclassified Class I, Div 2
Above membrane but below lowest building slab or raised floor foundation	<12,500 >12,500	Unclassified Class I, Div 2
Within building	NA	Unclassified
Sumps	Totally Submerged Partially Submerged	Unclassified Class I, Div 1

TABLE 5
VENT RISER HAZARDOUS AREA CLASSIFICATIONS

LOCATION	DISTANCE	HAZARDOUS AREA CLASSIFICATION
Passive System Vent Outlet	0 to 3 feet 3 to 5 feet >5 feet	Class I, Div 1 Class I, Div 2 Unclassified
Active System Vent Outlet	0 to 5 feet 5 to 10 feet >10 feet	Class I, Div 1 Class I, Div 2 Unclassified
Joints and fittings not enclosed within wall spaces*	0 to 3 feet >3 feet	Class I, Div 2 Unclassified
Joints and fittings in framed walls*	Any distance within the frame stud bay	Class I, Div 1
In the vent system	NA	Class I, Div 1
Gas sampling port	0 to 3 feet >3 feet	Class I, Div 2 Unclassified

* The hazardous area designation for these areas is considered as unclassified under the following conditions:

1. All joints and fittings are welded in approved manner,
2. Approved double walled vent risers are provided, or
3. Approved four inch or smaller threaded steel pipe venting system or equivalent approved piping system is installed.

B.8 - Alarm and Sensor Mitigation System

Alarm and sensor mitigation system plans shall be designed by a Qualified Professional and submitted to the City for review and approval.

Location: Sensors shall be installed within the enclosed areas of the building to detect the possible presence of methane in the air as well, as within vent risers. Sensors shall be placed at the ceiling line of the lowest building level. A minimum of one sensor shall be required per room of the lowest level. Sensors shall be provided at the following frequency:

**TABLE 6
FREQUENCY OF AUTOMATIC SENSORS**

ROOM FLOOR AREA OR CONCEALED SPACE AREA (SF)	NUMBER OF SENSORS
10,000 and More	Minimum of 3 Sensors plus one for every 20,000 and fraction thereof in excess of 10,000
More than 5,000 and less than 10,000	3 Sensors
More than 1,000 and Up to 5,000	2 Sensors
0 and Up to 1,000	1 Sensor
Elevator Shafts and Enclosed Stairwells	1 Sensor
Vent Risers	1 Sensor per Vent Riser

Features: The sensors shall be able to detect explosive gas at concentrations between 0 and 100% of the lower explosive limit (LEL) for methane (5% methane by volume) with a sensitivity of 1% of the LEL and a detection limit of 5% of the LEL. Detectors and wiring shall be immune to radio frequency and infrared remote-transmitter frequency interface.

Backup Power: Backup power for control panel shall be provided for a minimum of 24 hours for standby mode plus 5 minutes of alarm under full load condition; backup should be available within 60 seconds of power loss.

Control Panel: The sensors shall be connected to a compatible control panel. The control panel shall issue an alarm, HVAC response, and/or autodial response following detection of methane. An auto dialer shall be required to allow message alerting to building maintenance of the alarm conditions, including gas alarms and fault conditions.

Detection and Response: The in-room sensors shall be set for the following gas alarm conditions:

1. The low-level alarm shall be for methane concentrations at or greater than 10% of the LEL. The low-level alarm shall trigger HVAC system activation to flush accumulated methane in the lowest level of the building. A warning annunciator shall illuminate on the control panel, and a notification shall be sent to building owner or engineering consultant to investigate the source of the alarm and implement an engineering solution to resolve the condition.
2. The high-level alarm should be for methane concentrations at or greater than 25% of the LEL. The high-level alarm shall sound an audible/visible alarm, trigger an evacuation of the affected building, and alert a central station monitoring company. Building HVAC ventilation shall continue operation.

Visual and audible alarms shall be required to be provided at a minimum frequency of one per 10,000 sq. ft of building space and one per business unit in multi-unit commercial structures.

Audible alarm shall be a minimum of 15 decibels (db) above ambient noise; visual alarm shall be 15 candelas.

B.9 - Single-Station Gas Detection Sensor(s)

Existing structures exempt from site testing and/or methane mitigation or change of occupancy projects shall install single-station methane gas detection sensors with battery backup in the lowest occupied space of the structure. The battery should be sized to operate the single-station gas detector at least 20 hours in standby mode and 5 minutes in alarm mode. The location of the detector should be provided on the plans. Hard-wired sensors with a central control panel may be installed in lieu of single-station gas sensors.

B.10 - Mechanical Ventilation System

In the event of an in-room sensor gas alarm activation, automated mechanical ventilation system for the building shall be set to activate using 100% outdoor air makeup. The system may be designed to one of the following levels:

1. 10% LEL detection of in-room sensor triggers ventilation that can achieve a minimum of 4 air exchanges per hour (ACH). No battery backup is required for this system. Parts of fans in this option shall be of nonferrous or non-sparking materials or their casing shall be lined or constructed of such material.
2. Continuous operation of the mechanical ventilation system without connection to in-room sensor that is able to provide a minimum of 1 ACH.
3. Mechanical ventilation system that starts up at least once every 6 hours to provide a minimum of 24 air exchange per day.

In the event of concurrent fire alarm system, fire alarm will override methane alarm HVAC response. HVAC system is not required for buildings with natural ventilation in accordance with 18.79.040.

B.11 - Active Sub-Slab Ventilation System

An active mitigation system shall be designed by a Qualified Professional. Automatic gas sensors shall be installed to measure gas in the vent riser. Upon detection of 75% of the LEL in the vent risers, the forced sub-slab air venting system shall provide a minimum of three air changes per hour of the vent piping and the gravel trench continuously. The vent riser sensor shall not activate interior alarms. Unless the porosity of the gravel is established by a test prepared by a Qualified Professional, the porosity of the gravel shall be taken as 25%.

Air change and head loss calculations should be provided on the Methane Mitigation Plans with blower and motor specified, including fan curves.

18.79.070 - Operations and Maintenance

An Emergency/Contingency Plan shall be prepared by the Qualified Professional dictating emergency response procedures, location of control panel, and automatic sensors. Specifications for repair of the membrane shall be included as well as as-built information for the sub slab system. The Emergency/Contingency Plan will be included in the building's final Commissioning Report.

An Operation, Monitoring, and Maintenance (OMM) Plan is required. The monitoring and maintenance of all methane mitigation systems shall remain the responsibility of the property owner. City of Long Beach does not conduct such services.

Testing shall be performed annually and maintained by the owner for a period of 5 years and shall be made available to the City Building and Safety and Fire Department upon request. Additional testing may be required by Long Beach Fire Department.

18.79.080 - Plan Review and Inspection Fees

Methane plan check, and inspection fees shall be applicable to a project with methane mitigation in accordance with Long Beach Master Schedule of Fees and Charges.

A separate alarm system plan review and inspection shall be applied for the methane Levels II and III systems per the Long Beach Fire Code requirements.

City inspection will be conducted to cover project grading issues related to methane mitigation. Special inspection for the methane mitigation measures will be conducted by the project Methane Mitigation System Qualified Professional in order to certify the project before grading/building final inspection.

18.79.090 Inspections

All methane mitigation components shall be inspected by the City inspection staff. The Contractor shall provide a minimum of 24 hours advance notice and provide access for inspections, including the following construction activities:

- A. Foundation - Before placement of the methane barrier, an integrity check of the vent collector and inspection of the sub-slab vent pipe routing shall be conducted. The elbow connecting perforated pipe to solid pipe beneath the riser pipe shall be left unconnected for this check and connected after the inspection prior to backfill.
- B. Methane Barrier - Smoke testing of the methane barrier shall be performed before placement of the concrete slab or protection layer above the methane barrier. The installer shall provide certification of installation and where applicable mil. thickness proof.
- C. Exterior Wall Vent Riser (Prior to Screening) - A visual inspection of vent pipe joint integrity and routing shall be conducted.
- D. Final Inspections before building occupancy shall be conducted to verify the following:
 1. Caution Sign - Caution signs shall be located on the vent riser at each floor level and above the roofline.
 2. Warning Sign - A warning sign shall be located at the main building entry.
 3. Rain Caps - shall be fitted to the top of the vent risers.
 4. Test Tee - A 2-in. diameter test tee with plug (no flush plugs) shall be installed and painted red.
 5. Test Tee Signage - Install a permanent metal or rigid plastic placard adhered to the wall immediately above or adjacent to the test tee plug or cap. Sign to be red with white letters and read "Methane Vent Test Location."
 6. Testing of sensors/alarms/auto dialer/HVAC, and venting relay. Certification that the system is installed per plan and operates as designed will be acceptable.

18.79.100 - Qualified Professional Project Certification

The methane mitigation system must be designed by a Qualified Professional who is knowledgeable in this field. The system must be designed, constructed, and installed under direct supervision of the Qualified Professional. Prior to the construction and installation of the system, the Methane Mitigation Plans must be approved by the City. However, the City does not provide quality control and provides continuous inspection of the construction and installation of the methane system; this responsibility is vested in the Qualified Professional. The Qualified Professional is required to submit a certification to the City inspector prior to final approval of the grading/building certificate of occupancy stating the following:

- A. I am a Qualified [Engineer/Geologist] in the State of California and that I am knowledgeable in the field of methane mitigation systems.
- B. The methane mitigation system has been constructed and installed under my direct supervision and in accordance with the approved plans (a copy of the As-Built plans must be enclosed).
- C. The structure is free from methane gas and can be safely occupied (a copy of the test results must be enclosed).

18.79.110 Covenant and Agreement

Upon the building final inspection, a recorded Covenant and Agreement shall be submitted to the City inspector as defined below:

A. Design Levels I and II

The Owner of the property acknowledges for himself, his heirs, successors in interest or assigns the following:

- 1. The building is constructed within the City of Long Beach Methane Zone and/or within 300 ft of an active, 100-ft abandoned oil well, or 1,000 ft of a landfill and is subject to methane gas intrusion from the underlying soil.
- 2. The methane mitigation system approved and on file with the Building Official of the City of Long Beach has been installed on the property.

B. Design Level III

The Owner of the property acknowledges for himself, his heirs, successors in interest or assigns the following:

- 1. The building is constructed within the City of Long Beach Methane Zone and/or within 300 ft of an active, 100-ft abandoned oil well, or 1,000 ft of a landfill and is subject to methane gas intrusion from the underlying soil.
- 2. That a methane mitigation system, approved and on file with the Building Official of the City of Long Beach, has been installed on the property.
- 3. The property owner will maintain and operate the system in accordance with the requirements specified in the plans, all as approved under jurisdiction of the Building Official and Fire Marshal of the City of Long Beach.
- 4. An irrevocable consent to the City of Long Beach to permit its authorized representatives to enter onto the said premises during regular business hours for the purpose of inspecting and testing for methane intrusion.

18.79.120 - Post Construction Protocols

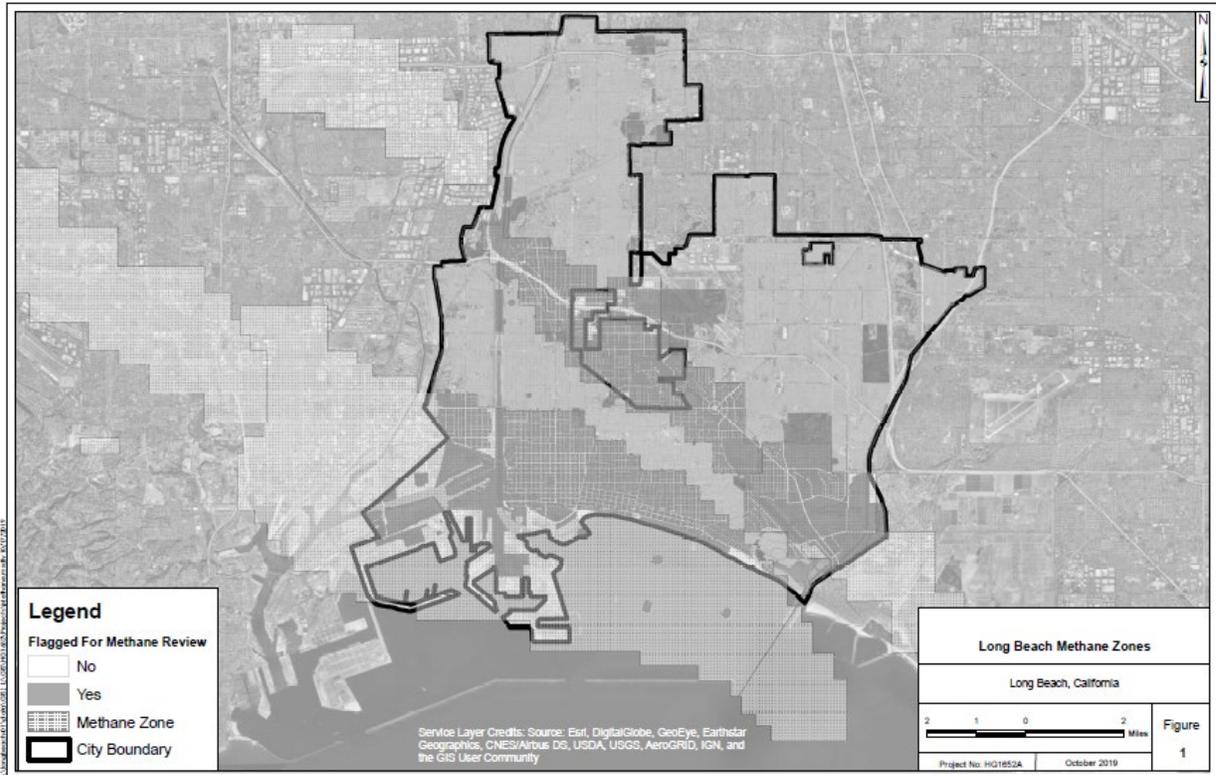
Owner/Applicant will be responsible for all monitoring and project maintenance requirements. The City does not conduct such services.

Any building modification that impact methane mitigation shall be conducted in conformance with the original project approval.

18.78.130 - Enforcement/Violation

- A. It shall be the duty of the Building Official to enforce the provisions of this Chapter.
- B. Stop Orders. If at any time the provisions of this Chapter are violated, the Building Official may order immediate cessation of construction. The project applicant/owner shall immediately comply with the order of the Building Official to cease and shall not resume such operations until written consent therefor by the Building Official has been obtained.

LONG BEACH METHANE ZONES – MAP



RATIONALE:

Unlike other major cities in LA and Orange County, City of Long Beach has not had methane gas mitigation standards in past. Large part of the City is built around the oil/gas wells, landfills, and other methane producing sources such as cemeteries. It became imperative for the City to adapt site methane gas mitigation standards due to developers wanting to develop properties that test positive for methane gas. The proposed chapter consists of a set of prescriptive details and standards that will assist project owners and developers in developing such properties.

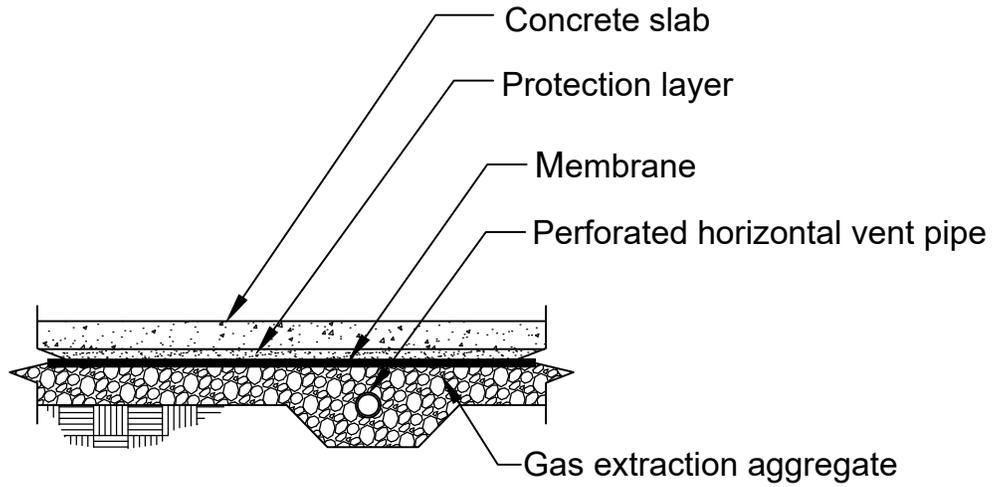
FINDINGS:

Local Geologic Condition – Amendment is necessary on the basis of a local geologic condition. The City of Long Beach is a densely populated city and historically has been an oil producing area. The City has a vast array of active, idle, abandoned, or dormant oil/gas producing wells as well as several landfills that potentially all can be methane gas producing sources.

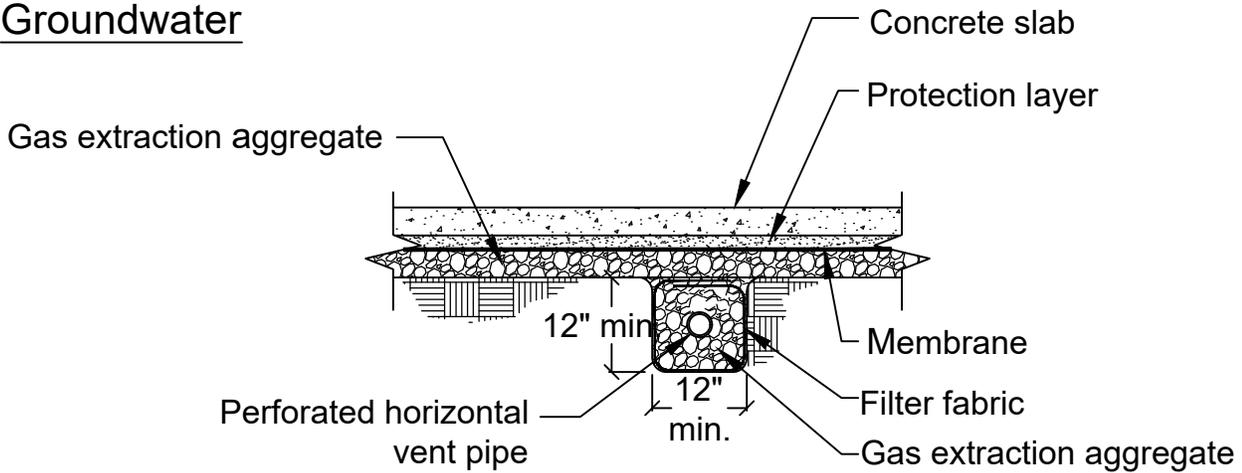
The proposed amendment goal is to establish a set of prescriptive standards for soil methane gas mitigation throughout the City. The proposed Ordinance also sets requirements to reduce liability for the City and general tax payer. This process shall be incorporated into the code to assure that new buildings and structures and additions or alterations to existing buildings or structures are designed and constructed in accordance with the scope and objectives of the California Building and Residential Code.

Local Geologic Condition – The City of Long Beach has an extensive overlaying petroleum-bearing formation and for years oil and gas drillings have occurred throughout the City. This new Chapter is necessary on the basis of local geologic conditions. During last 100 years oil/gas wells were driven throughout the city and landfills have contributed to accumulation of methane gas in the soil in some parts of Long Beach. This combined with and many properties show various levels of soil methane gas. This ordinance facilitates development of sites that show methane gas and provides prescriptive standards for the contractors to mitigate methane and city staff who either review or inspect such projects.

Alternative A:
No Groundwater



Alternative B:
Groundwater

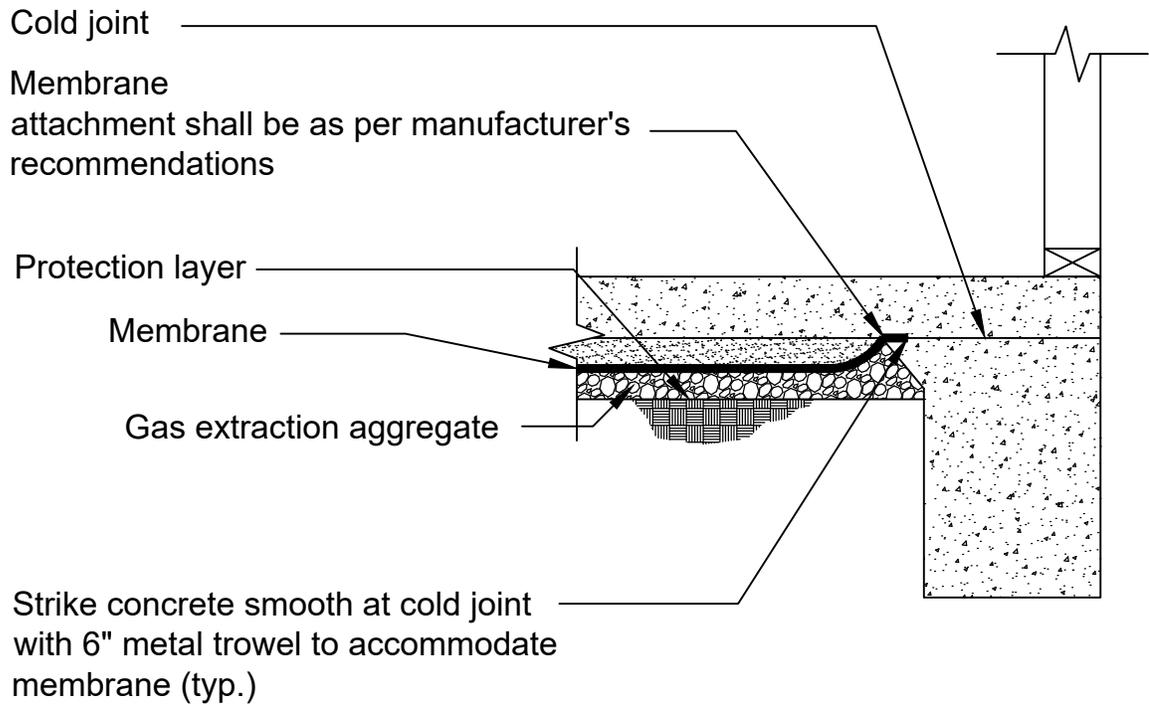


NOTE:

1. THE STANDARD DETAILS SHOWN ON THIS FIGURE ARE TYPICAL MINIMUM DETAILS. ACTUAL MATERIAL DIMENSIONS TYPES AND SPECIFICATIONS ARE TO BE PREPARED BY THE DESIGN ENGINEER IN GENERAL ACCORDANCE WITH THE CITY OF LONG BEACH METHANE MITIGATION STANDARDS.

NOT TO SCALE

STANDARD - DETAILS SUB-SLAB VENT SYSTEM METHANE MITIGATION LONG BEACH, CALIFORNIA	
JANUARY 2020	FIGURE 2

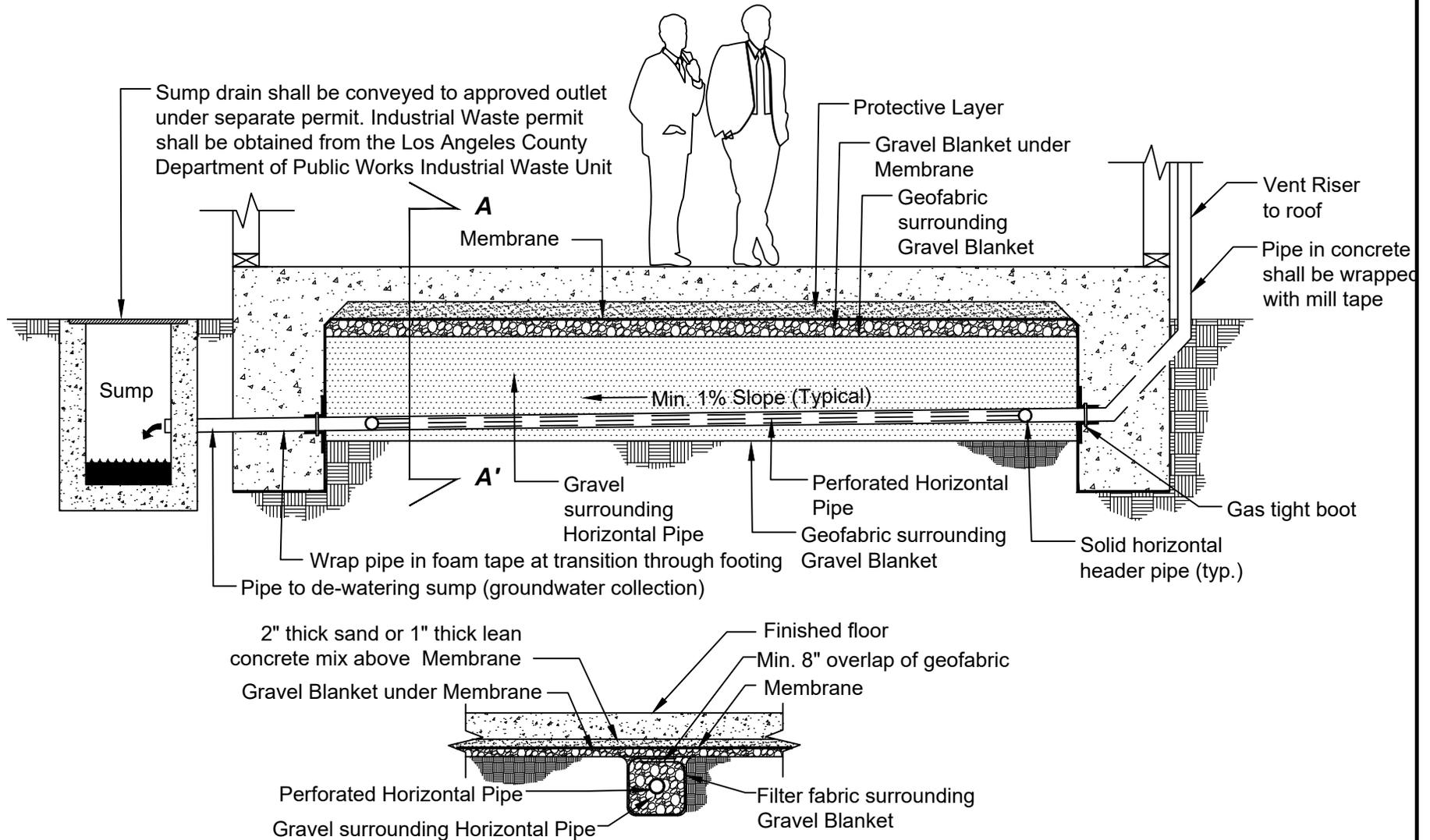


NOT TO SCALE

STANDARD - DETAILS
 MEMBRANE TERMINATION AT EXTERIOR
 FOOTING - TWO POUR
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
 3

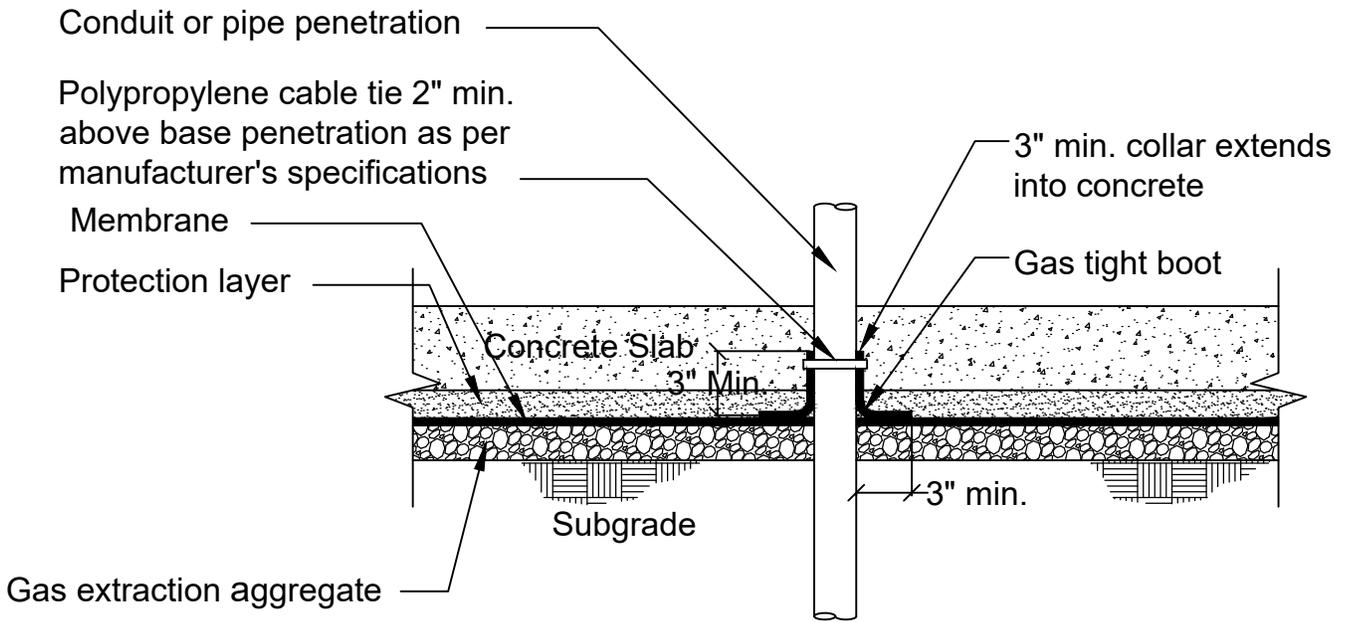


Section A - A'

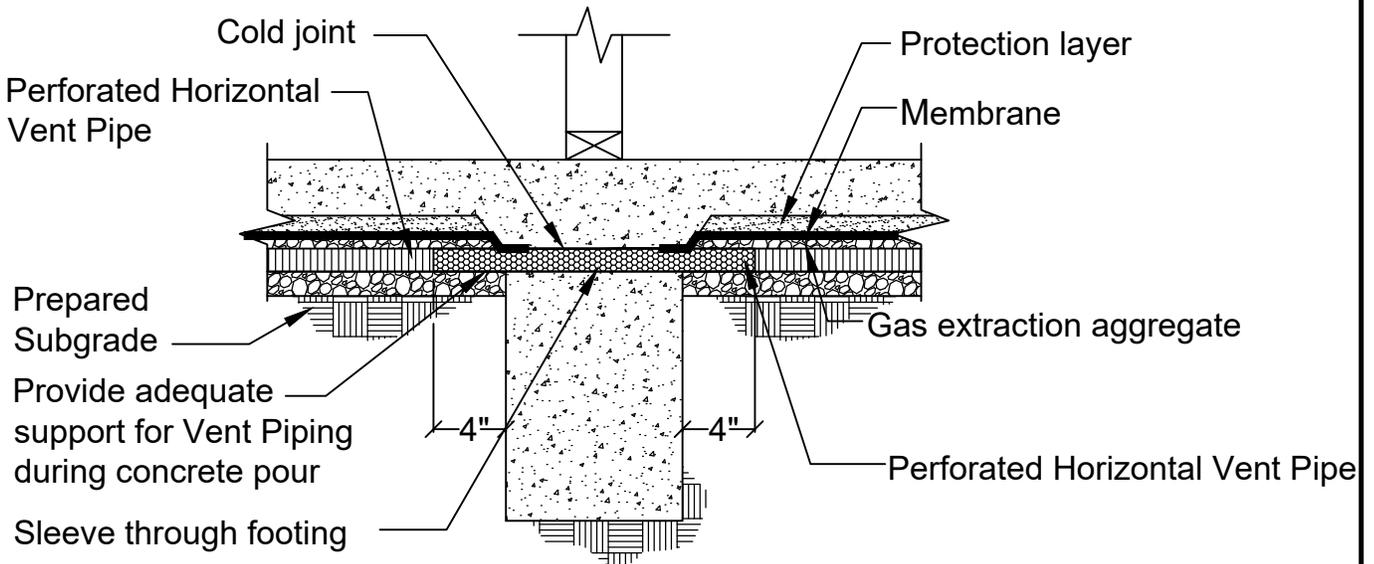
Notes:

1. Perforated Horizontal Pipe used as combination De-Watering and Vent Pipe shall be sized one full plumbing pipe size larger than required by spacing.
2. Piping and conduit shall be protected from corrosion and structural settlement as follows:
 - a. Tape shall be applied on conduit and piping encased in cement slurry or concrete.
 - b. Tape shall be PS-37-90, Black Plastic PVC or PE Pressure-Sensitive Corrosion Preventive Tape.
3. The standard details shown on this figure are typical minimum details. actual material dimensions types and specifications are to be prepared by the design engineer in general accordance with the City of Long Beach Methane Mitigation Standards.

NOT TO SCALE	
STANDARD - DETAILS COMBINATION DE-WATERING AND VENT PIPE METHANE MITIGATION LONG BEACH, CALIFORNIA	
JANUARY 2020	FIGURE 4



Membrane Boot

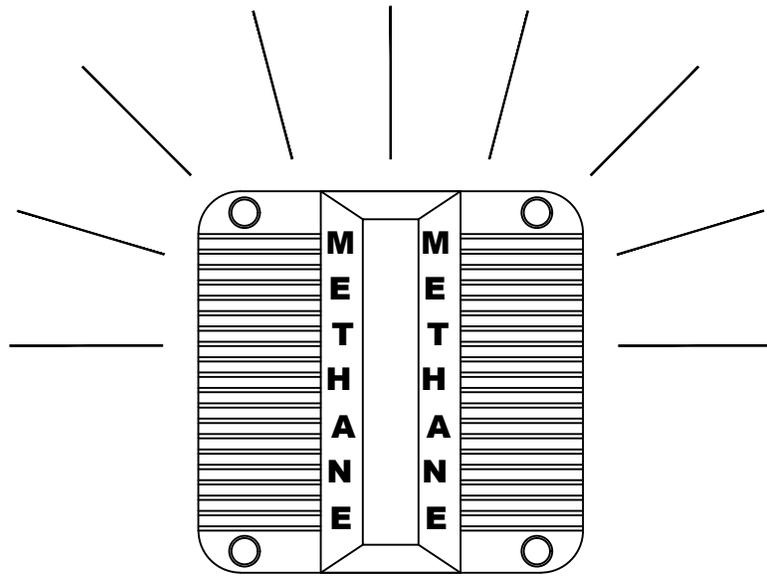


NOT TO SCALE

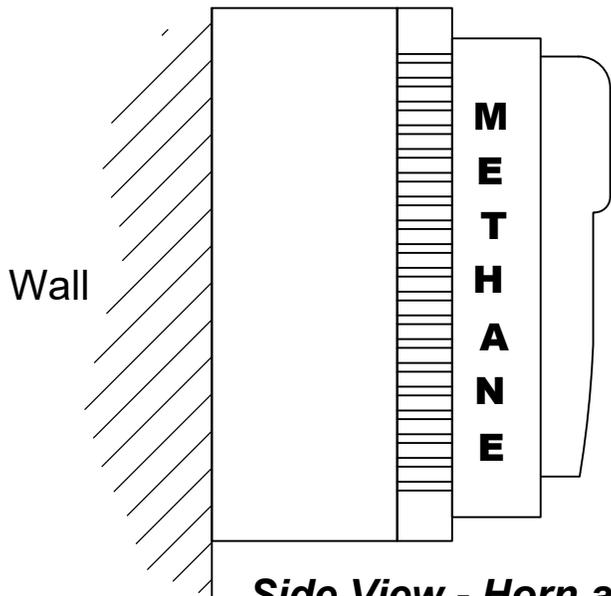
STANDARD - DETAILS
 VENT PIPE AT INTERIOR FOOTING
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
 5



Strobe



Side View - Horn and Strobe Device

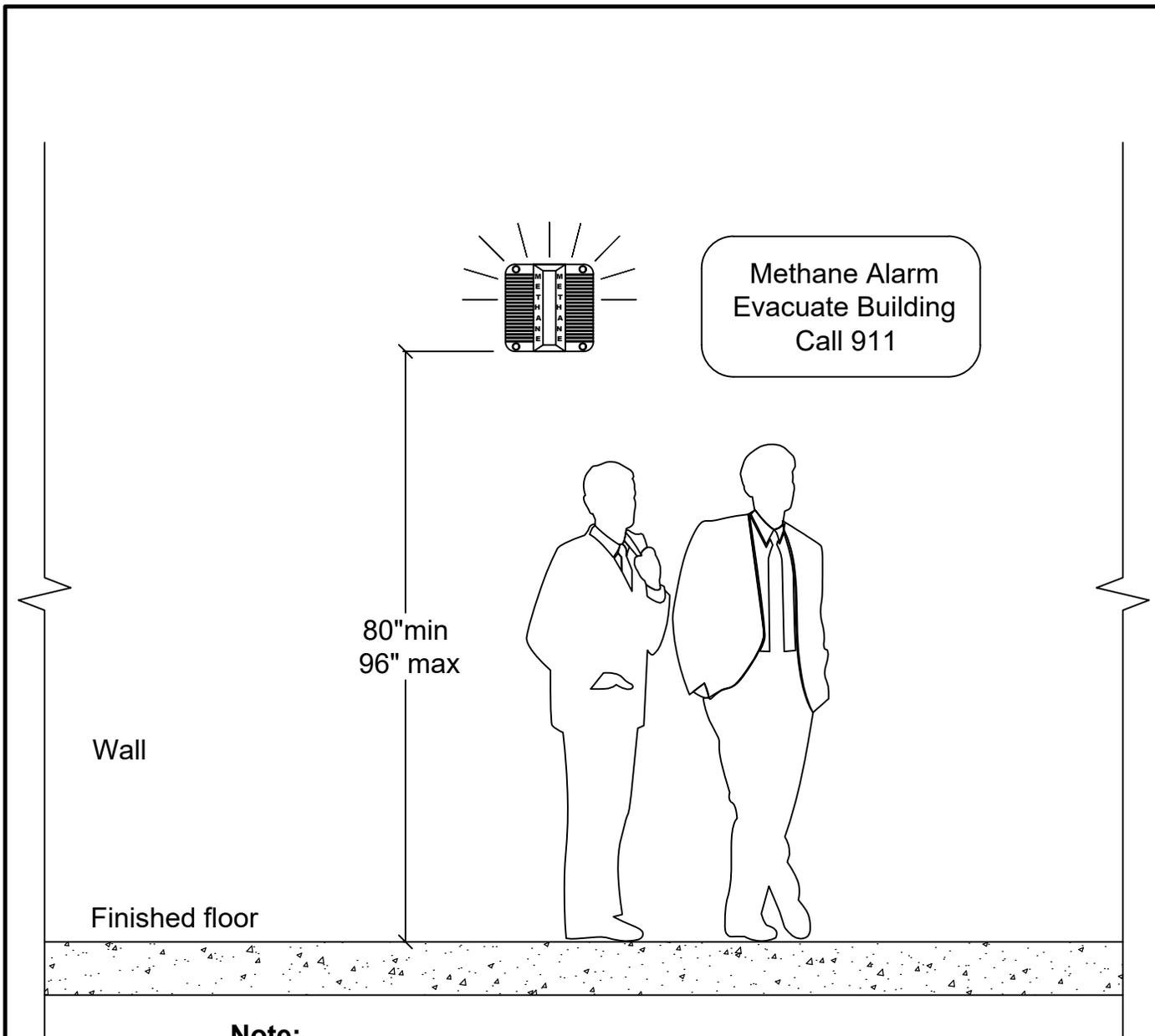
Surface mount horn/strobe

NOT TO SCALE

STANDARD - DETAILS
METHANE ALARM DEVICE - HORN AND
STROBE COMBINATION
METHANE MITIGATION
LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
6



Note:

All methane Audio/Visual Alarms shall be installed above the floor at a standard height between 80 and 96 inches with a blue light and adjacent signage (as shown) unless otherwise noted.

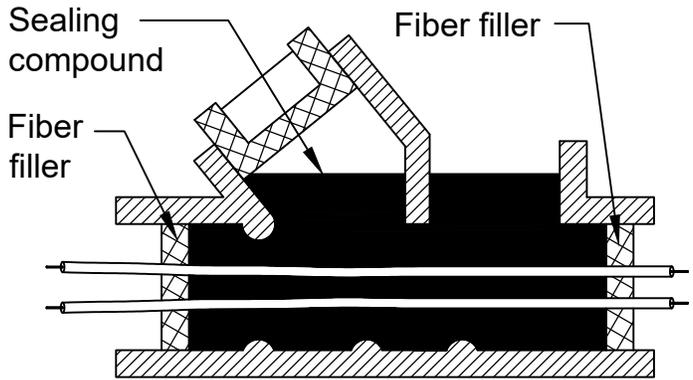
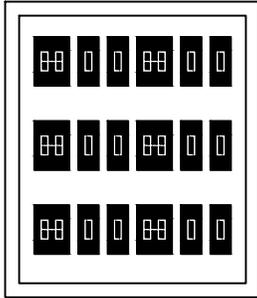
NOT TO SCALE

STANDARD - DETAILS
 METHANE ALARM DEVICE MOUNT
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA

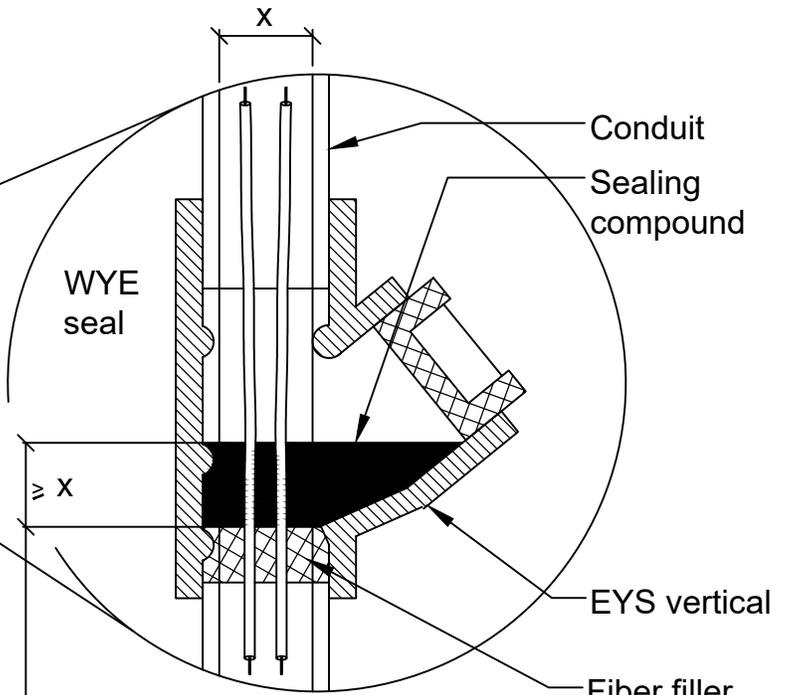
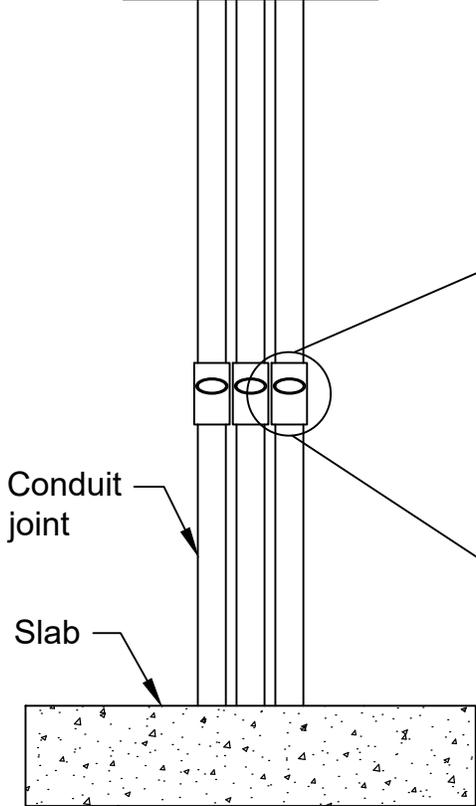
JANUARY 2020

FIGURE
 7

Circuit Breaker Panel



Horizontal Conduit Seal



Fill thickness equal to conduit diameter not less than 5/8")

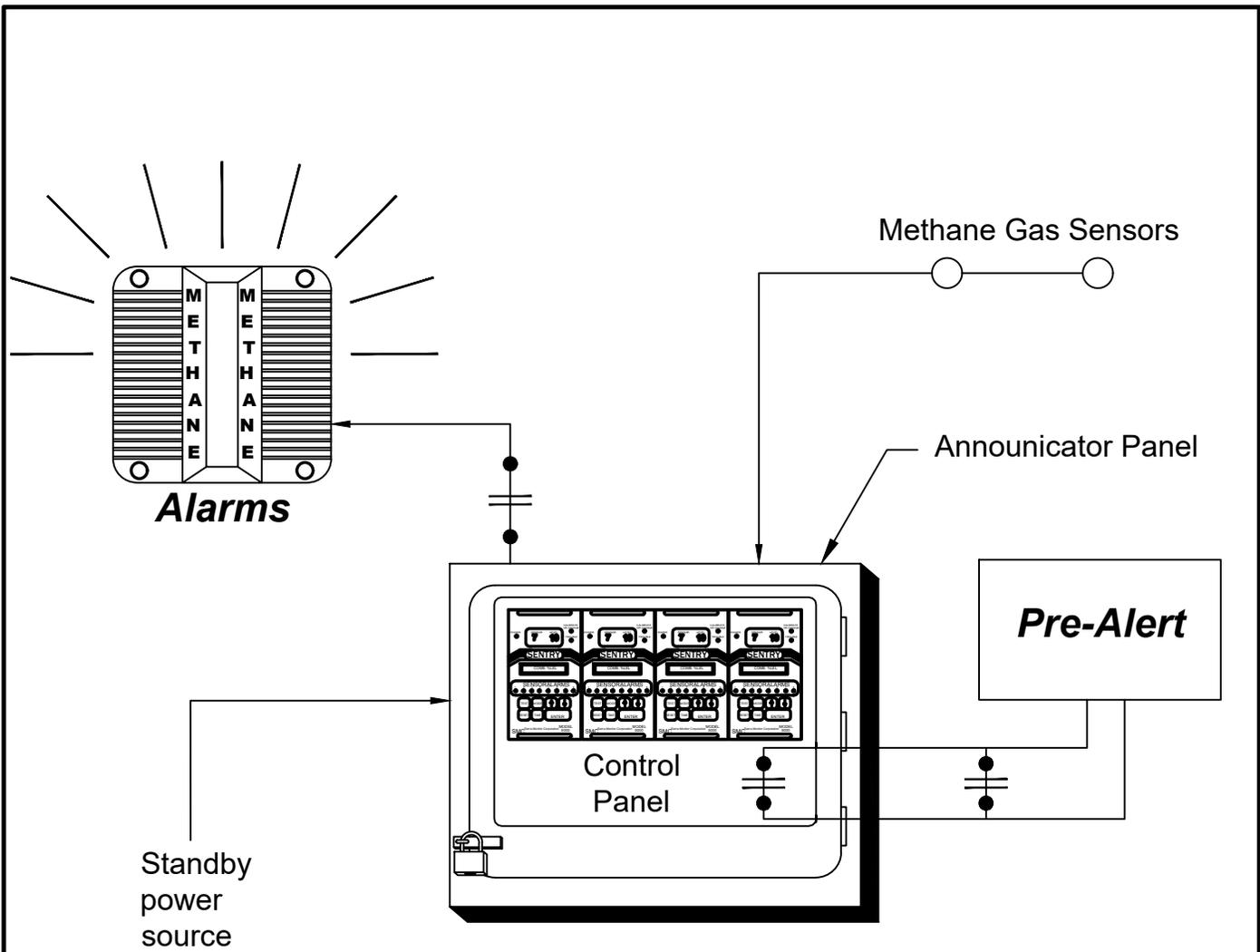
Veritcal Conduit Seal

NOTE:

1. THE STANDARD DETAILS SHOWN ON THIS FIGURE ARE TYPICAL MINIMUM DETAILS. ACTUAL MATERIAL DIMENSIONS TYPES AND SPECIFICATIONS ARE TO BE PREPARED BY THE DESIGN ENGINEER IN GENERAL ACCORDANCE WITH THE CITY OF LONG BEACH METHANE MITIGATION STANDARDS.

NOT TO SCALE

STANDARD - DETAILS CONDUIT SEAL METHANE MITIGATION LONG BEACH, CALIFORNIA	
JANUARY 2020	FIGURE 8



Notes:

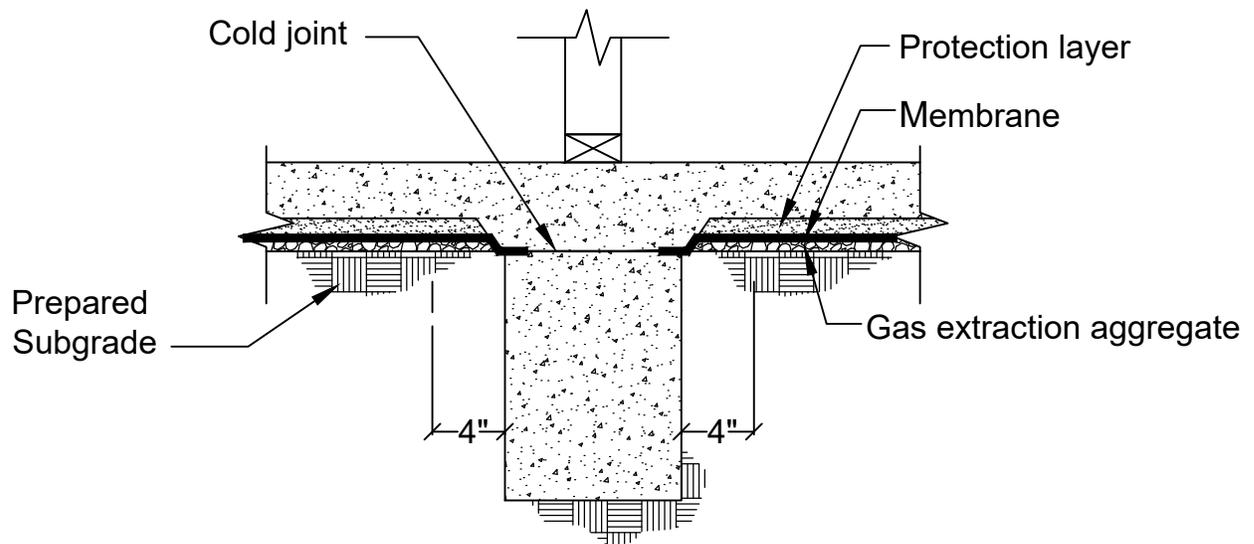
1. The Methane Gas Detection System shall operate 24 hr./day continuously.
2. All building strobe/alarms to sound simultaneously upon any high Gas Detection in building.
3. Auto dialer shall not be required for single family dwellings.
4. Standby power shall provide sufficient power to the Methane Gas Sensors for 24 hours.

NOT TO SCALE

STANDARD - DETAILS
 METHANE DETECTION SYSTEM
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
 9



NOTE:

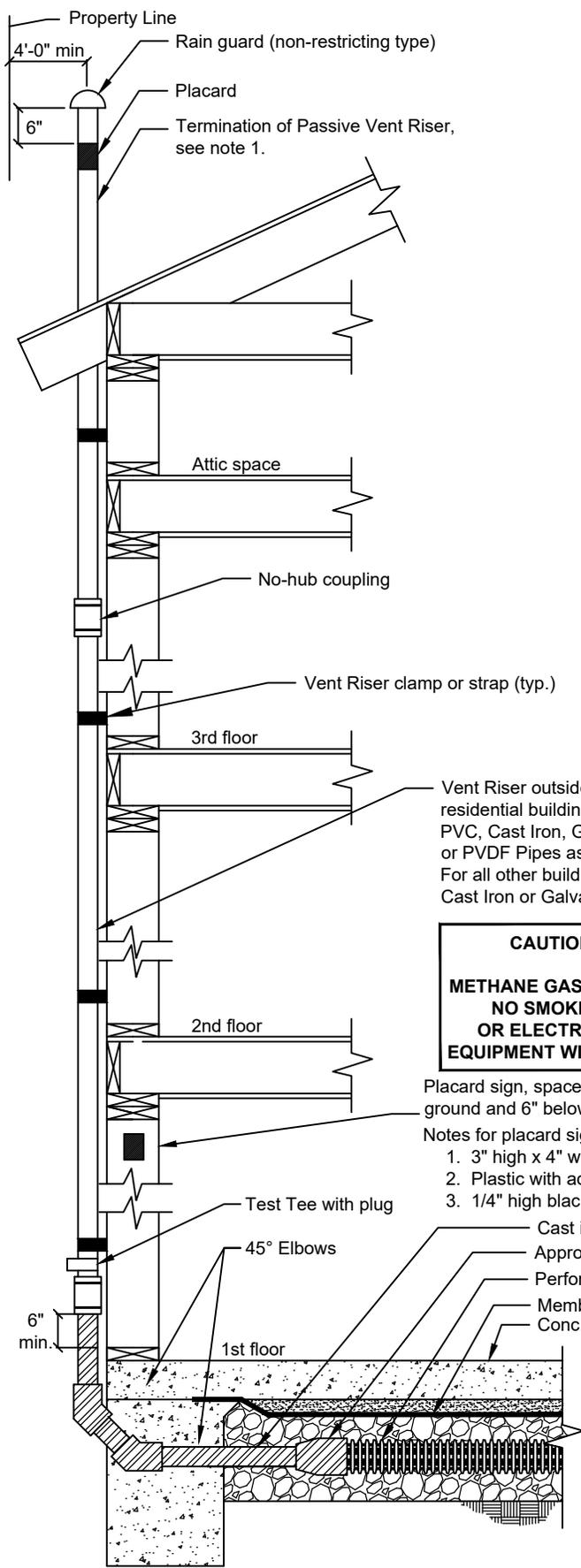
1. THE STANDARD DETAILS SHOWN ON THIS FIGURE ARE TYPICAL MINIMUM DETAILS. ACTUAL MATERIAL DIMENSIONS TYPES AND SPECIFICATIONS ARE TO BE PREPARED BY THE DESIGN ENGINEER IN GENERAL ACCORDANCE WITH THE CITY OF LONG BEACH METHANE MITIGATION STANDARDS.

NOT TO SCALE

STANDARD - DETAILS
 MEMBRANE TERMINATION AT INTERIOR
 FOOTING
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
 10



- Notes:**
1. Termination of Passive Vent Riser shall be as follows:
 - a. 10' min. away from, or at least 3' above any openable window, door, opening or air intake, or vent shaft.
 - b. 3' min. in every direction from any lot line, alley, and street.
 - c. Extend through the vent flashing, 6" min. above the roof, and 1' min. from any parapet or building wall.
 - d. 10' above grade
 - e. 3' above roof line
 2. Wrap all piping with approved material through concrete slab or floor.
 3. Support all piping in accordance with City of Long Beach Plumbing Code.
 4. The piping of the venting system shall be tested with air.
 5. Vent riser penetrations through fire rated walls, ceilings, floors, and roof assemblies shall be protected.
 6. All exposed PVC shall be protected from UV light.

Vent Riser outside wall, residential buildings up to 2 stories may use PVC, Cast Iron, Galvanized Steel, Black Iron or PVDF Pipes as Vent Riser. For all other buildings, Vent Riser shall be of Cast Iron or Galvanized Steel Pipe.

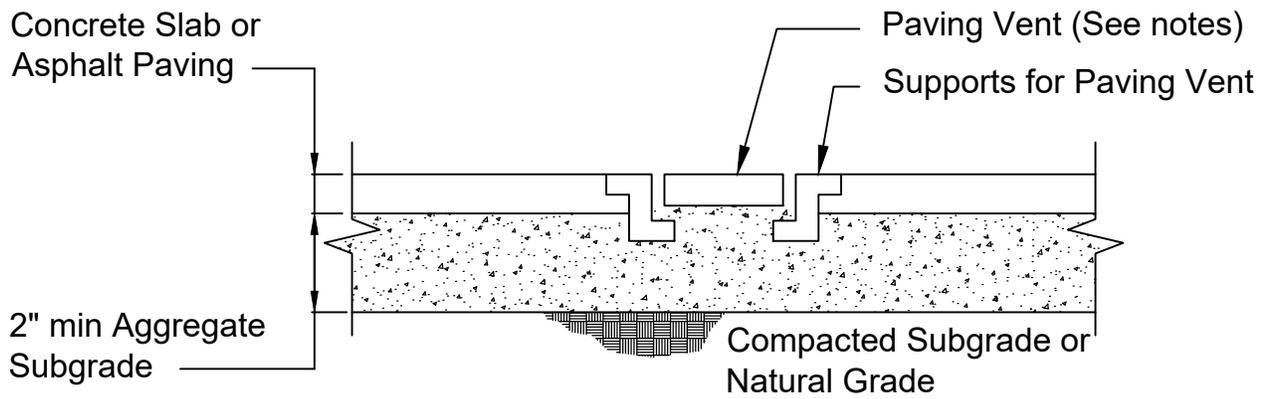
CAUTION
METHANE GAS IN PIPE
NO SMOKING
OR ELECTRICAL
EQUIPMENT WITHIN 10'

Placard sign, spaced at 5' above ground and 6" below termination

Notes for placard sign:

1. 3" high x 4" wide,
2. Plastic with adhesive backing, and
3. 1/4" high black letters on white background

NOT TO SCALE
 STANDARD - DETAILS
 VENT RISER
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA



Notes:

1. 12 square inches Paving Vent shall be constructed on cast iron.
2. 12 square inches Paving Vent shall be installed at the same rate as the vent risers.
3. 12 square inches Paving Vent shall be spaced a maximum of 100' apart.
4. Net area of openings in each Paving Vent shall be 12 square inches.

NOT TO SCALE

STANDARD - DETAILS
 PAVED AREAS VENTING
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
 12

WARNING

**THIS BUILDING IS PROTECTED WITH A
METHANE GAS CONTROL BARRIER.
ANY PROPOSED PENETRATION OR
ALTERATION OF FLOOR SLAB
REQUIRES NOTIFICATION OF CITY OF
LONG BEACH OIL CODE
ENFORCEMENT SECTION (OCES) AND
INSPECTION BY AN ENGINEER**

Notes:

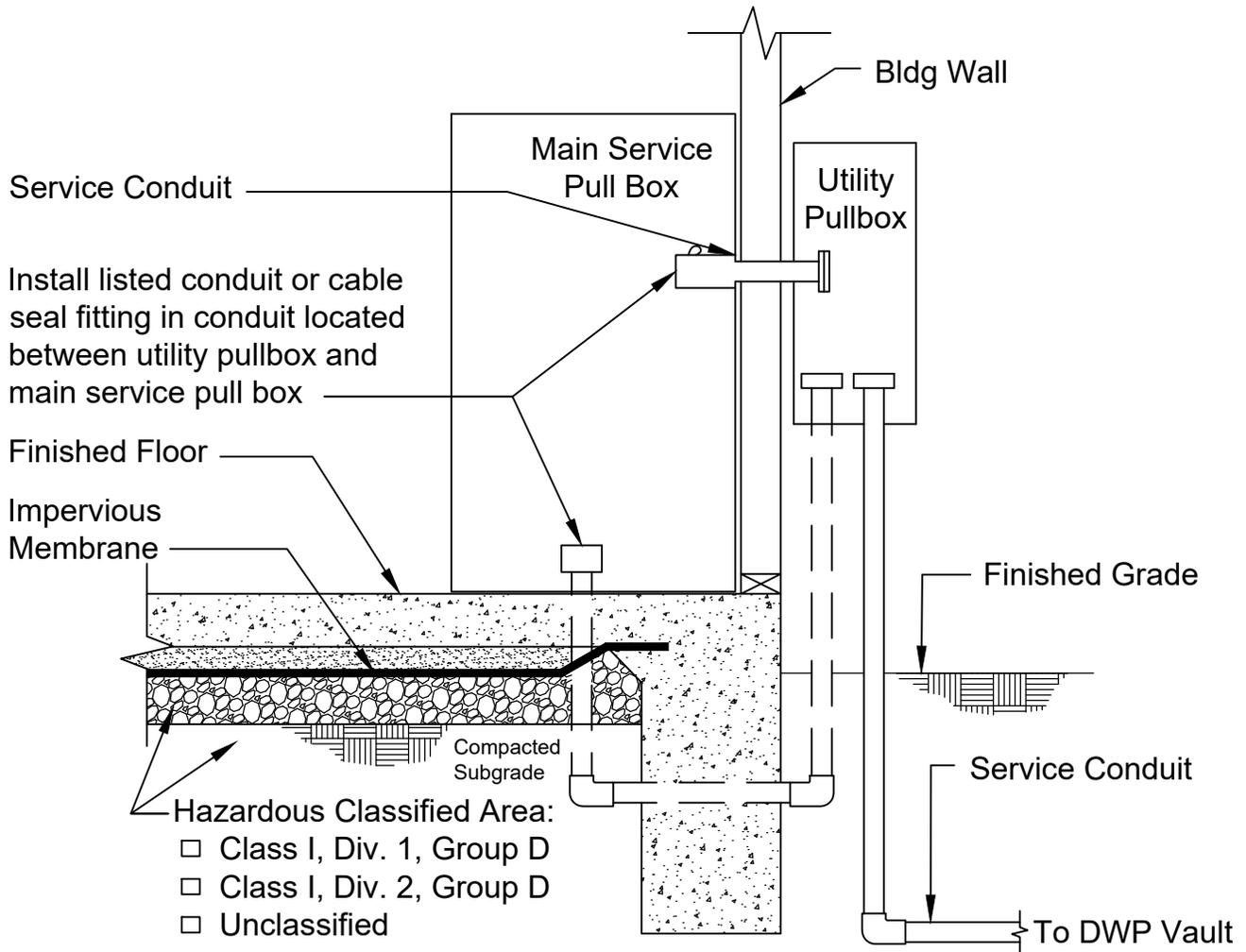
1. This notification is to be permanently stamped or etched in the surface of the garage slab, near main building entrance, or other location approved by the OCES at the time of construction.
2. All letters 1/2" (min.) in height.
3. At least one required per building.
4. This notification shall be posted and maintained at the front entrance of the building, except residential buildings.

NOT TO SCALE

STANDARD - DETAILS
GAS MEMBRANE NOTIFICATION PLACARD
METHANE MITIGATION
LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
13



Note:

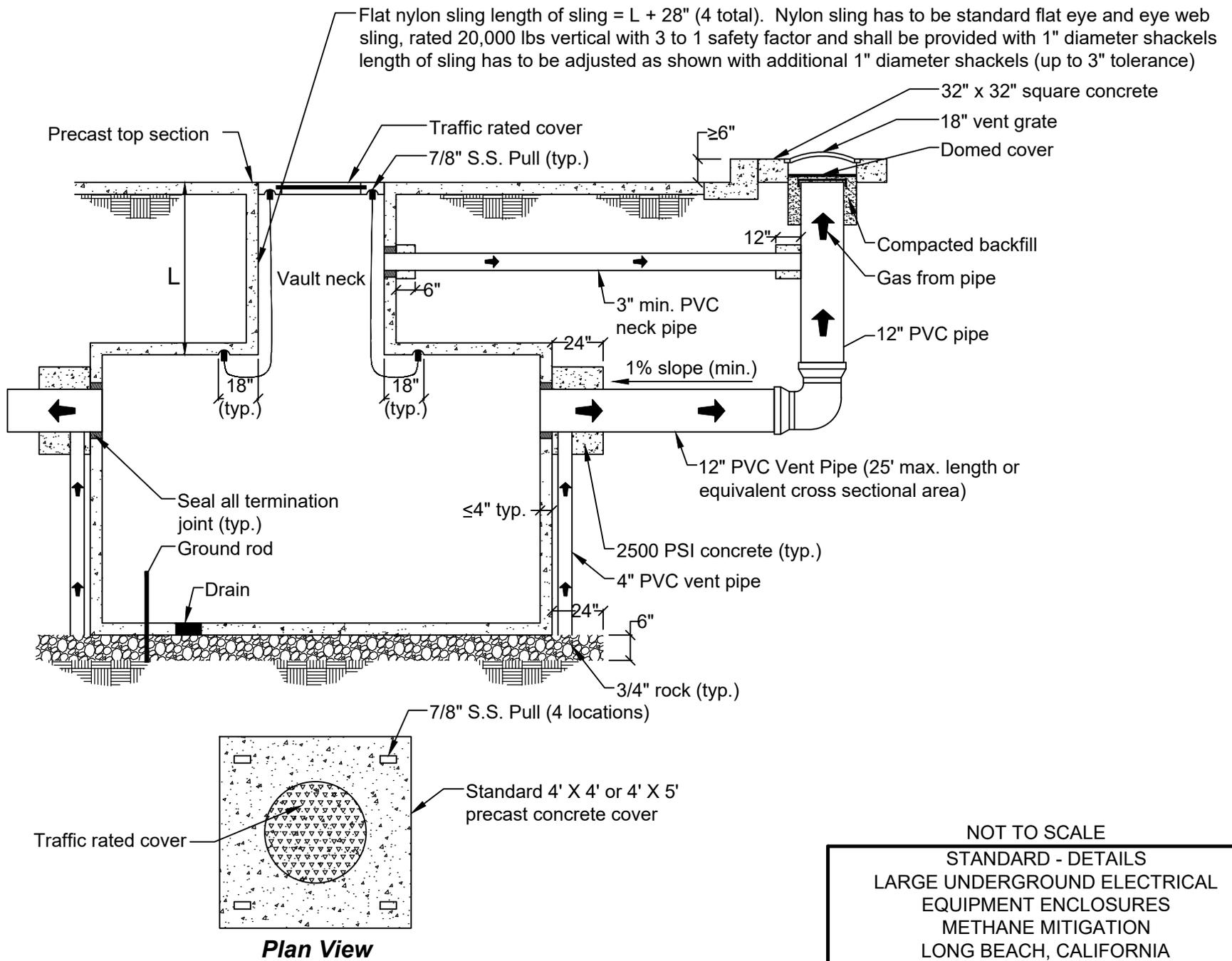
1. Piping and conduit shall be protected from corrosion and structural settlement as follows:
 - a. Tape shall be applied on conduit and piping encased in cement slurry or concrete.
 - b. Tape shall be PS-37-90, Black Plastic PVC or PE Pressure - Sensitive Corrosion Preventive Tape.

NOT TO SCALE

STANDARD - DETAILS
 CONDUIT OR CABLE SEAL FITTINGS FOR
 BUILDING SERVICE AND DWP PULL BOXES
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA

JANUARY 2020

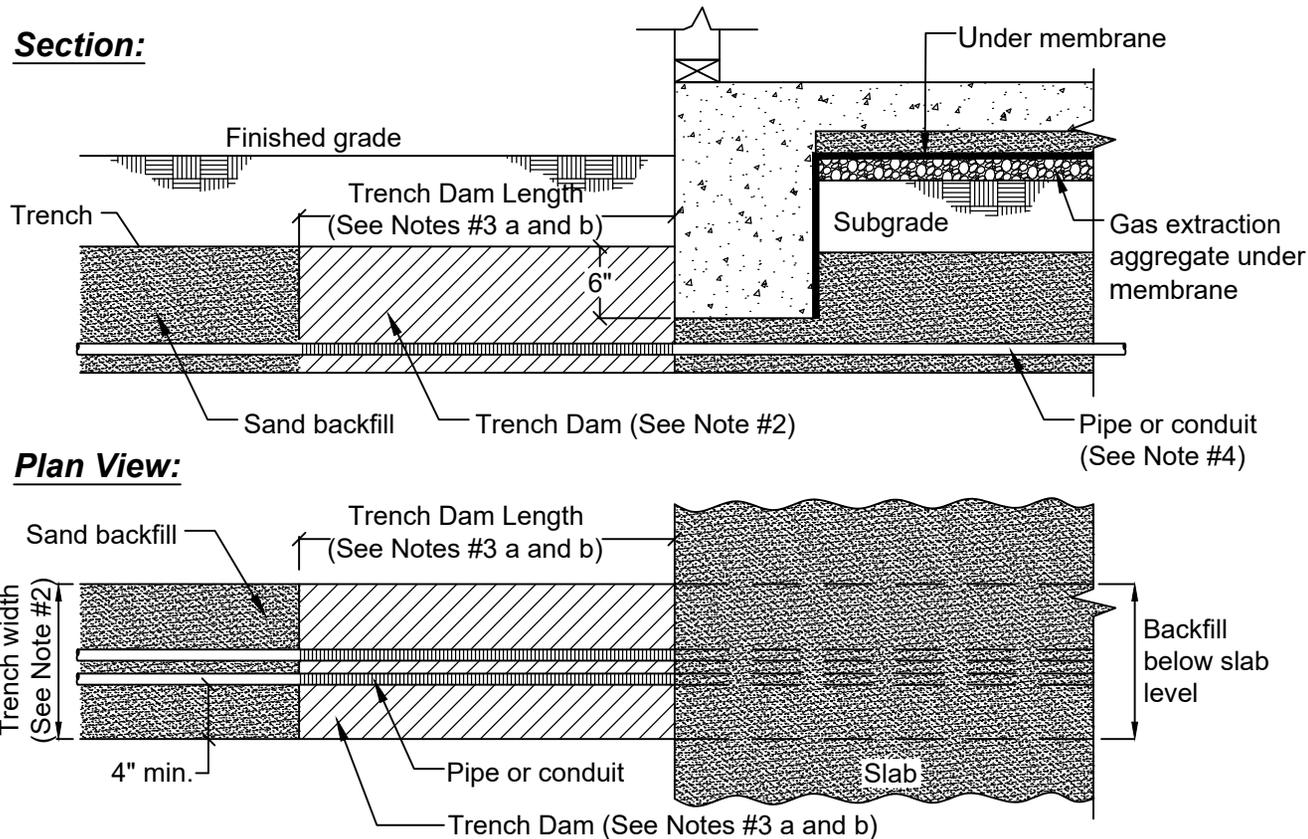
FIGURE
 14



NOT TO SCALE

STANDARD - DETAILS
 LARGE UNDERGROUND ELECTRICAL
 EQUIPMENT ENCLOSURES
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA

JANUARY 2020	FIGURE 15
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Notes: Trench Dams

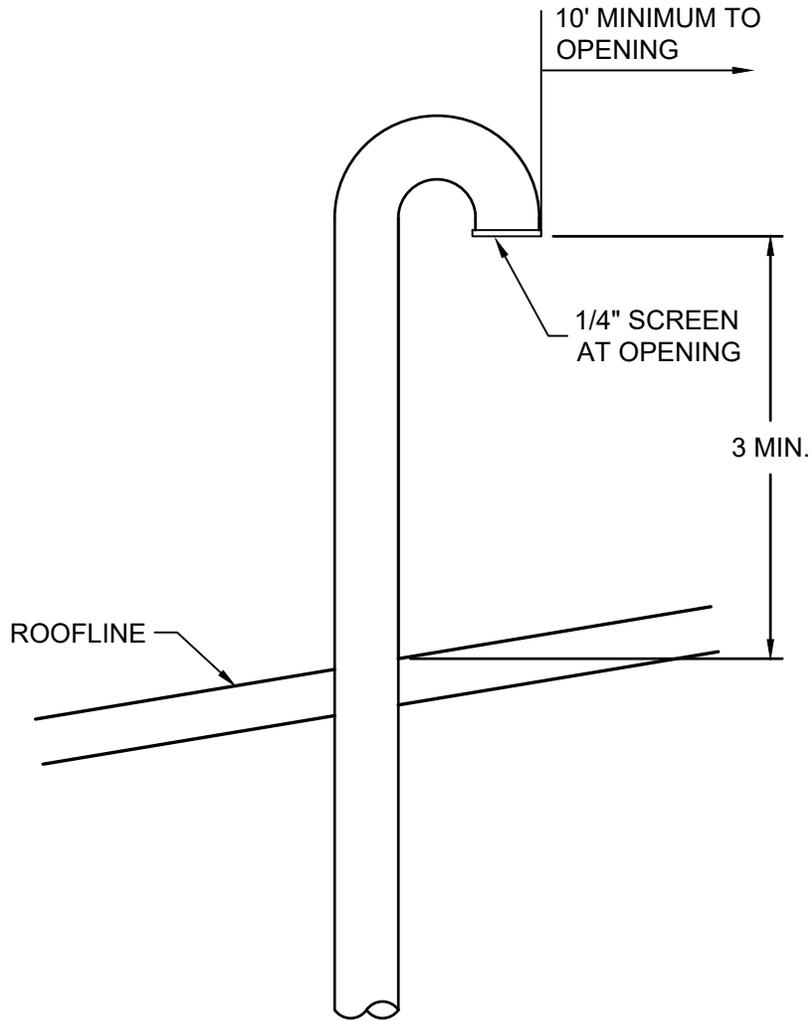
1. All Trench Dams shall be installed in trenches containing piping and conduit that connects directly from the utility lines in the street.
2. The width of a Trench Dam shall be one half the length.
3. Trench Dams shall be constructed of one of the following:
 - a. Bentonite Cement Slurry three feet long: A mixture of 4% Type II Cement, and 2% Powdered Bentonite.
 - b. Compacted Native Soils Backfill five feet long: Native soils shall be compacted at least 90% relative compaction in accordance with ASTM D-1557 Testing Procedures.
 - c. Concrete mixes other than Bentonite Cement Slurry may be used provided conduit or piping is wrapped with High Density PVC Foam Tape, Closed Cells, Adhesive Backed, 1/4" thick by 1/2" wide shall be applied to clear surface with ends butted together at most visible locations in Trench Dam.
4. Piping and conduit shall be protected from corrosion and structural settlement as follows:
 - a. Tape shall be applied on conduit and piping encased in cement slurry or concrete.
 - b. Tape shall be PS-37-90, Black Plastic PVC or PE Pressure-Sensitive Corrosion Preventive Tape.

NOT TO SCALE

STANDARD - DETAILS
TRENCH DAM
METHANE MITIGATION
LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
16

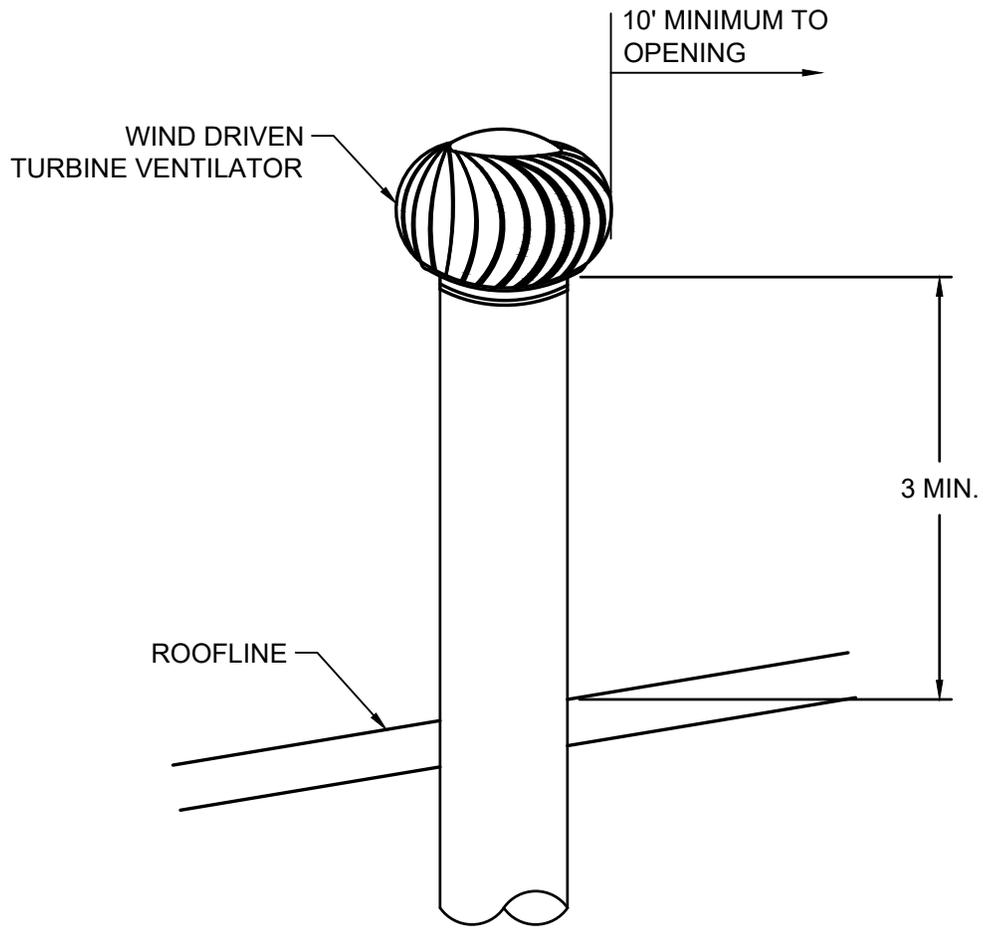


NOT TO SCALE

STANDARD - DETAILS
OPTIONAL PASSIVE PIPE TERMINATION
METHANE MITIGATION
LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
17

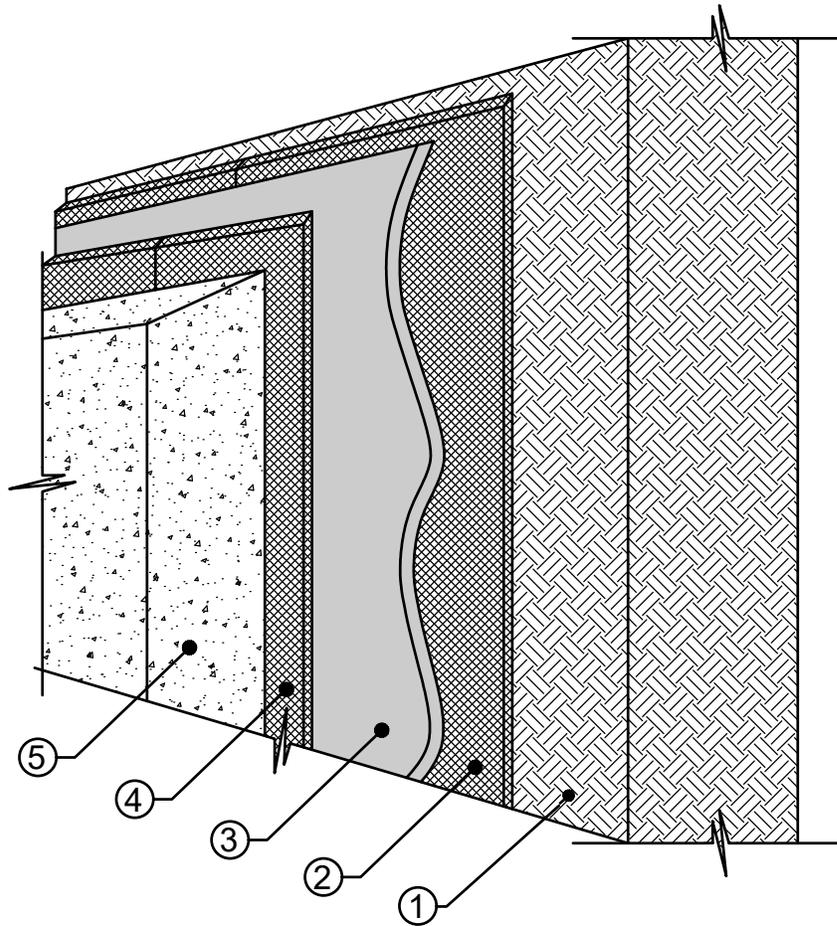


NOT TO SCALE

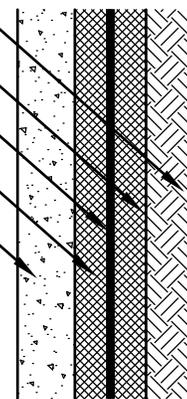
STANDARD - DETAILS
OPTIONAL PASSIVE RISER PIPE TERMINATION
METHANE MITIGATION
LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
18



- ① PREPARED EARTH SUBGRADE
- ② APPROVED GEOSYNTHETIC IF NEEDED
- ③ GEOMEMBRANE PER SPEC
- ④ APPROVED GEOSYNTHETIC IF NEEDED
- ⑤ CONCRETE

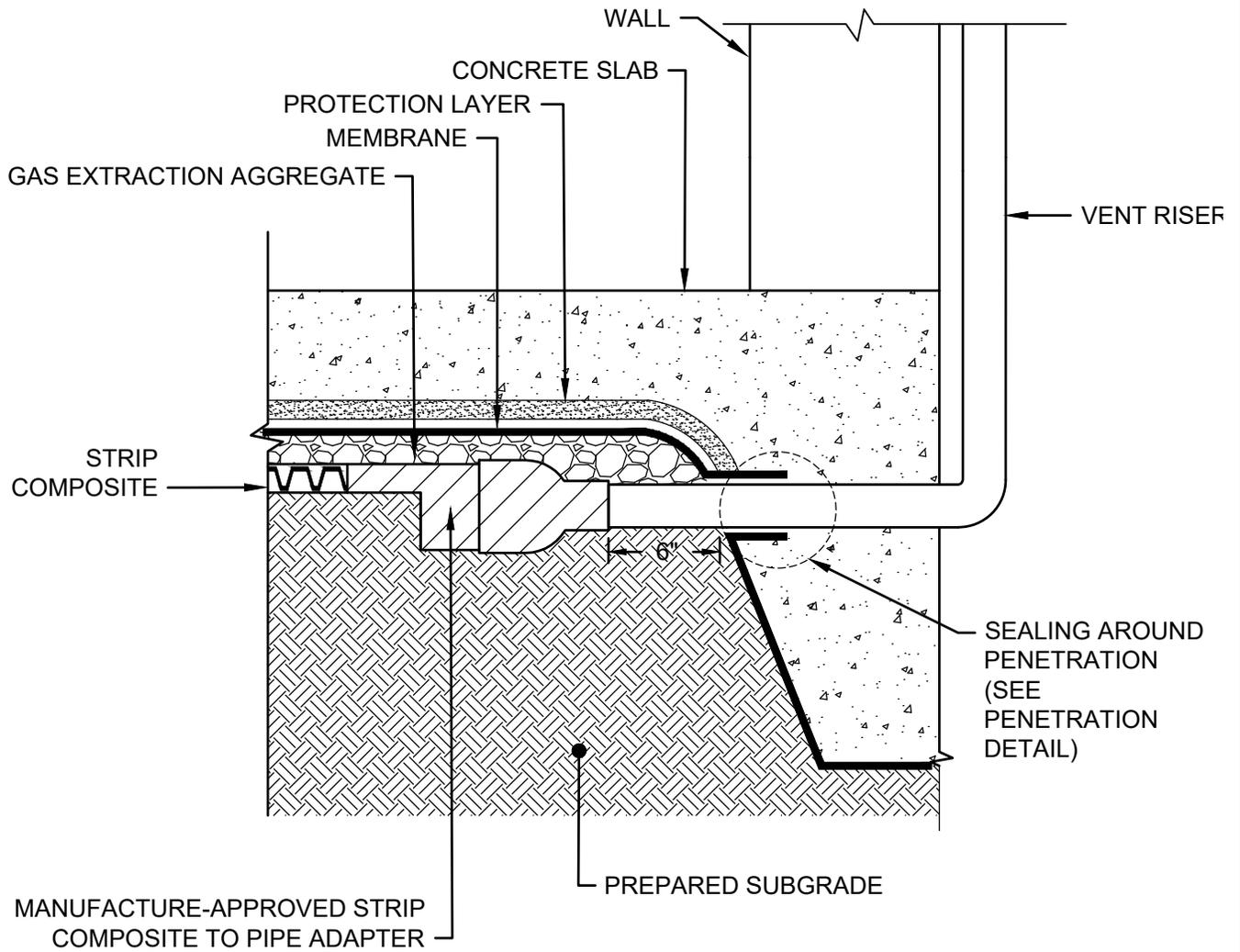


NOT TO SCALE

STANDARD - DETAILS
 VERTICAL MEMBRANE
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
 19



NOTE:

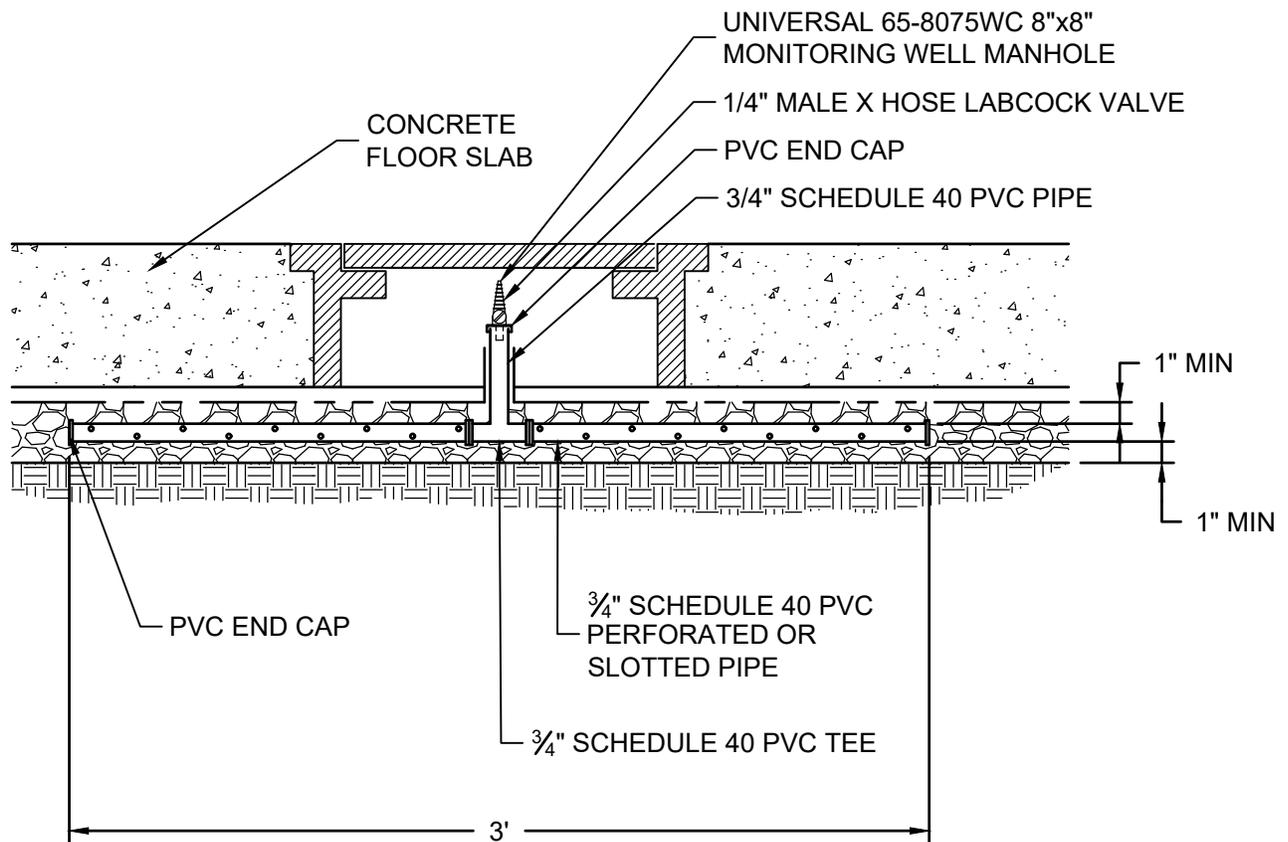
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NOT TO SCALE

STANDARD - DETAILS
 STRIP COMPOSITE TO VENT RISER
 TRANSITION
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
 20



NOT TO SCALE

STANDARD - DETAILS
 MANUAL MONITORING PROBE VAULT
 METHANE MITIGATION
 LONG BEACH, CALIFORNIA

JANUARY 2020

FIGURE
 21