City Policy & Procedure

Subject: **Methane Gas Site Policy**

Policy: **1004**

Covers: **Development within, and monitoring of, all former & current landfill sites.**

Revised: **July 20, 2015**

Effective: **October 1, 2015**

Purpose: The Purpose of this policy is to:

1. Establish methane risk zones and develop a procedure to determine the existence of methane gas and the boundaries of current and former landfill sites which are producing or may produce methane gas;

2. Formalize requirements and criteria for development within each zone; and

3. Ensure continuous monitoring of established zones is undertaken to recognize and deal with any generation of migration of methane gas.

With an objective of providing a consistent and reasonable approach to locating suspected landfill sites, establishing zones of decreasing risk on or around current and former landfill sites where the potential for methane gas generation or migration exists, and regulating development within these zones.

**Where there is any conflict between the policies and procedures adopted by the City of Brandon and the policies and procedures set forth in a collective agreement adopted by the City of Brandon, or policies and procedures set forth in a statute of the Provincial or Federal Government, the collective agreement or the Provincial or Federal statute shall supersede such other policies or procedures.*

DEFINITIONS

Building & Safety Manager: means the Building & Safety Manager of the Planning & Building Safety Department, or their designate.

City Engineer: means the City Engineer of the Department of Engineering, Development Services Division, or their designate.

Fire Inspector: means the Fire Inspector of the Brandon Fire and Emergency Services Department, or their designate.

Floor Probe: is a PVC/ABS casing pipe, PVC monitoring pipe, end caps and fittings placed in a floor slab. The probe is intended for monitoring the accumulation of methane gas under a floor slab and constructed as detailed in Drawing No. 2, in the attached Standard Operating Procedure.

Landfill Sites: means all sites identified on the most current edition of the Landfill Sites Atlas showing the approximate location of former landfill sites and the location of existing landfill sites within the City's boundaries. Said landfill sites being used for the disposal of residential, commercial, institutional, and industrial wastes.

Permanent Monitoring Well: is a device for the monitoring of methane gas consisting of a slotted PVC well pipe, fiberglass sock, and connections and outside metal casing as shown in detailed Drawing No. 1 in the attached Standard Operating Procedure.

Professional Engineer: means a Professional Engineer recognized by the Association of Professional Engineers of the Province of Manitoba, or licensed to practice in the Province of Manitoba.

Report: means a Preliminary Methane Soil Vapour Assessment (PMSVA) prepared by a Professional Engineer.

Suspected Landfill Site: means any building site or parcel of land which the City Engineer has determined may contain a former landfill site.

Test Probe: means either a driven or an open bore hole tested for the presence of methane by use of an explosive meter as shown in detailed Drawing No. 3, in the attached Standard Operating Procedure.

POLICY

1. **Establishment of Zones**

   a. Zone 1
   The former or current landfill site.

   b. Zone 2
   From the outer perimeter of Zone 1 to a distance 75 metres from said perimeter.

   c. Zone 3

From the outer perimeter of Zone 2 to a distance 150 metres from the outer perimeter of Zone 1.

d. Zone 4
From the outer perimeter of Zone 3 to a distance 400 metres from the outer perimeter of Zone 1.

2. Development Within Zones

a. Zone 1
No further development of enclosed permanent structures or paved parking lots will be allowed.

b. Zone 2

i. The development of any enclosed structure, paved or sealed parking lot or storage area would require, at the expense of the property owner, a full report and development proposal prepared by a Professional Engineer and acceptable to the Building & Safety Manager in consultation with the City Engineer. The report and development proposal must include preliminary test probe results, proposed locations for floor monitoring probes and permanent monitoring wells which are to be integrated into all structural designs for the proposed sites, and provide for maintenance of structural designs.

The City Engineer will conduct periodic ongoing monitoring of said floor probes, or wells, at the City's expense and should an indication of methane gas be discovered the City Engineer has the right to order inspections by the Building & Safety Manager or the Fire Inspector or both of them.

ii. Notwithstanding the requirement for the installation of a permanent monitoring well, this requirement may be waived by the City Engineer if all of the following conditions are met:

1. Preliminary test probe results do not indicate the presence of methane: and

2. A permanent monitoring well or wells had been located on or adjacent to the site proposed for development with test results indicating the absence of methane.

iii. Depending upon the report and development proposal prepared by the Professional Engineer, construction of any structure on the site may be prohibited by the Building & Safety Manager in consultation with the City Engineer.

iv. Any improvements which are authorized must include into the design thereof a system to deal with any potential generation or migration of methane gas and such design must be approved by the Building & Safety Manager. Prior to the issuance of any occupancy certificate the Developer, at the expense of the property owner, must provide the Building & Safety Manager and the City Engineer with a letter from the Design Engineer stating that the building has

been constructed in accordance with the approved drawings and specifications and requirements of the Manitoba Building Code and applicable City by-laws.

c. Zone 3

i. The development of any structure, paved or sealed parking lot or storage area would require, at the expense of the property owner, boring an open hole and testing by a soil technician with the results to be interpreted by a Professional Engineer or a qualified consultant/civil engineering technologist. Such results and interpretation shall be supplied to the City Engineer, the Fire Inspector and the Building & Safety Manager. The design must be completed by a Professional Engineer.

ii. If methane gas is found in, upon or under the said site, then the Developer must meet the requirements as set out for Zone 2.

iii. If no methane gas is discovered during testing, no permanent well will be required but floor probes, installed at the property owner's expense, will be required. The City Engineer will conduct periodic ongoing monitoring of the floor probes at the City's expense and should an indication of methane gas be discovered, the City Engineer has the right to order inspections by the Building & Safety Manager or the Fire Inspector or both of them.

d. Zone 4

Any development within this area would be at the discretion of the Developer.

e. Redevelopment Within Zones 2 and 3

i. Any improvement to or redevelopment of a structure located within Zone 2 or 3 or a combination thereof, shall require compliance with the Manitoba Building Code and this policy. Where the redevelopment is of a value exceeding 50% of the existing value, then the entire structure must conform to the Manitoba Building Code and this policy.

ii. The required report shall be completed in general accordance with the procedure described in the Ontario Ministry of Environment (MOE) "Draft Guidance: Soil Vapour Intrusion Assessment" dated September 2013 produced by MOE Standards Development Branch (hereafter referred to as the "MOE Guidance Document.

iii. Save Harmless Agreement

Any proposal for development or redevelopment within Zone 2 or 3 or a combination thereof shall require the Developer to execute a Save Harmless Agreement, which shall be prepared by the Property Section, Development Services Division, protecting the City from any and all liability resulting from migration or generation of methane gas and granting the City right of entry for the purpose of monitoring any permanent floor probes and conducting inspections as may be required by the City. The City shall be in receipt of such agreement prior to issuance of any development permit, building permit, or occupancy certificate. Any such agreement shall be binding upon all present and future owners of the lands.

3. Procedure for Determining Location and Stability of Former Landfill Sites

a. Former landfill sites, or suspected landfill sites, shall be identified and mapped in an atlas of former and current landfill sites to be developed by the Department of Engineering. All sites will be eventually monitored through the installation of gas monitoring wells around the approximate perimeter thereof on the nearest adjacent City property. The Department of Engineering will establish a priority list for testing of said sites. One or more sites will be tested each year depending upon the availability of funds thereof.

b. Depending on the results of the initial survey, a further intensified study of that site may be conducted prior to authorization of development or redevelopment in the zone.

c. A procedure will be established by the Department of Engineering relating to eliminating suspected landfill sites from the inventory of such sites due either to an absence of methane generation potential or due to a removal of material capable of such generation.

4. Responsibilities

a. Developer

i. Execute a Save Harmless Agreement, which shall be prepared by the Property Section, prior to any development or redevelopment of lands in Zone 2 or 3 or a combination thereof, and prior to issuance of a development permit or building permit.

ii. Submit to the Building & Safety Manager certified drawings, stamped by a Professional Engineer skilled in the appropriate section of the work concerned, at the property owner's expense, showing the design specifications are in compliance with this policy, the Manitoba Building Code, and the City's Building By-law, as amended.

iii. Assume all costs for the installation of probes and/or wells on the lands to be developed or redeveloped.

iv. Submit to the Building & Safety Manager and the City Engineer a letter from the Design Engineer stating that the building has been constructed in accordance with the approved drawings and specification and requirements of the Manitoba Building Code and applicable City by-laws.

b. The City of Brandon

The Department of Engineering shall be responsible for the following:

i. Establish a priority list for testing of suspected landfill sites.

ii. Establish a procedure for the elimination of suspected landfill sites.

iii. Ascertain the existence, if any, of methane gas either due to generation on or mitigation in, upon, or under such former landfill sites as can be determined in accordance with this policy.

iv. Develop and maintain a Landfill Sites Atlas in which to map identified landfill sites.

v. Establish an inventory of all probes and wells, whether they are within structures or not, and establish a schedule for testing and logging of the results of such testing.

vi. Assume all costs for the monitoring of probes and wells on lands to be developed or redeveloped with a potential for methane gas generation which may be required by the Building & Safety Manager prior to any construction of any additions to dwellings or other structures or any of the suspected landfill sites, identified as Zone 1, 2, or 3.

vii. Review the report, in consultation with the Building & Safety Manager, for any development proposed in Zone 2, or in any area of Zone 3 which due to the existence of methane gas, must meet Zone 2 requirements, to ensure a suitable system is included to deal with any potential generation or migration of methane gas.

c. The Planning & Building Safety Department shall be responsible for the following:

i. Ensure the Developer has completed its responsibilities in accordance with Section 4 a. – i. to iv. prior to the issuance of a development permit, building permit, or occupancy certificate for any development or redevelopment proposed in any of the Zones.

Attachments

- Standard Operating Procedure

Related Items

- Ontario MOE Guidance Document
- Manitoba Building Code
- City By-laws, as deemed applicable.

Revision Date: October 5, 2015 **Authorized By:** *Heather Ewasiuk*

Heather Ewasiuk
City Clerk

Motion #: 342 **Authorized By:** *Patrick Pulak*

Patrick Pulak
Director of Engineering Services & Water Resources

Standard Operating Procedure

Supplementary document to the City of Brandon Methane Gas Site Policy (Policy No. 1004)

1. Sub-Surface Monitoring Probes

Probes driven into the proposed areas of development provide point source monitoring of methane gas concentrations in the local environment around the probe. These probes are only suitable for measuring methane concentrations near the surface, as they can only be driven approximately one to two metres into the soil. It is the responsibility of a qualified professional to determine the type of probe, and its location and depth.

a. Installation of Subsurface Monitoring Probes (see attached Drawing No. 3)

i. If pipe, it shall be constructed such that:

1. The length is not less than 1: 500mm and the inside diameter is not less than 25 mm,
2. An integral hammer cap is installed at the exposed end,
3. A coned tip is installed at the end to be driven into the soil,
4. The pipe is perforated for the bottom 1/3 of the pipe, and
5. A 12mm interior steel pipe with an extraction point is inserted and sealed to the probe body.

ii. If of plastic pipe, it shall be constructed such that:

1. The length is not less than 1: 500mm and the inside diameter is not less than 12mm,
2. 6mm holes are drilled into the bottom 2/3 of the pipe spaced not more than 100mm apart, and
3. When inserted into the ground, is sealed at the perimeter of the pipe at grade by compressing the soil around the tube.

iii. Fitted with a sample extraction point at the test end of the tube with a seal to prevent air dilution.

b. Subsurface monitoring probes shall be inserted into the soil at the proposed construction site to a depth not less than that of the proposed construction or suspected landfill, whichever is deeper.

2. Methane Migration

Methane gas migrates naturally through the soil, geological materials, and through the groundwater and into the building. Man-made structures containing granular fill such as sanitary sewers, utility trenches and storm and foundation drains are important as they may provide preferential pathways for gas migration. Also, additional factors, such as the soil surface cover (snow, ice, pavement), the elevation of the groundwater table, and the existence of barriers or vents along the migration pathways may affect the direction and extent of the gas migration.

a. Protection from Methane Gas Ingress (see attached Drawing No. 2)

i. All floor assemblies in contact with the ground constructed in Zones 2 and 3 shall be protected by an impervious barrier system.

ii. Prior to construction, the design for the impervious barrier system must be submitted to the Building & Safety Manager, which plans shall:

1. Be designed by a Professional Engineer licensed to practice in the Province of Manitoba, and
2. Include the proposed locations of all floor monitoring probes.

b. Responsibilities of the Professional Engineer

i. The Professional Engineer shall perform regular site inspections to confirm that the construction accurately reflects the approved design; and,

ii. Upon completion of construction, the Professional Engineer shall submit a letter of assurance.

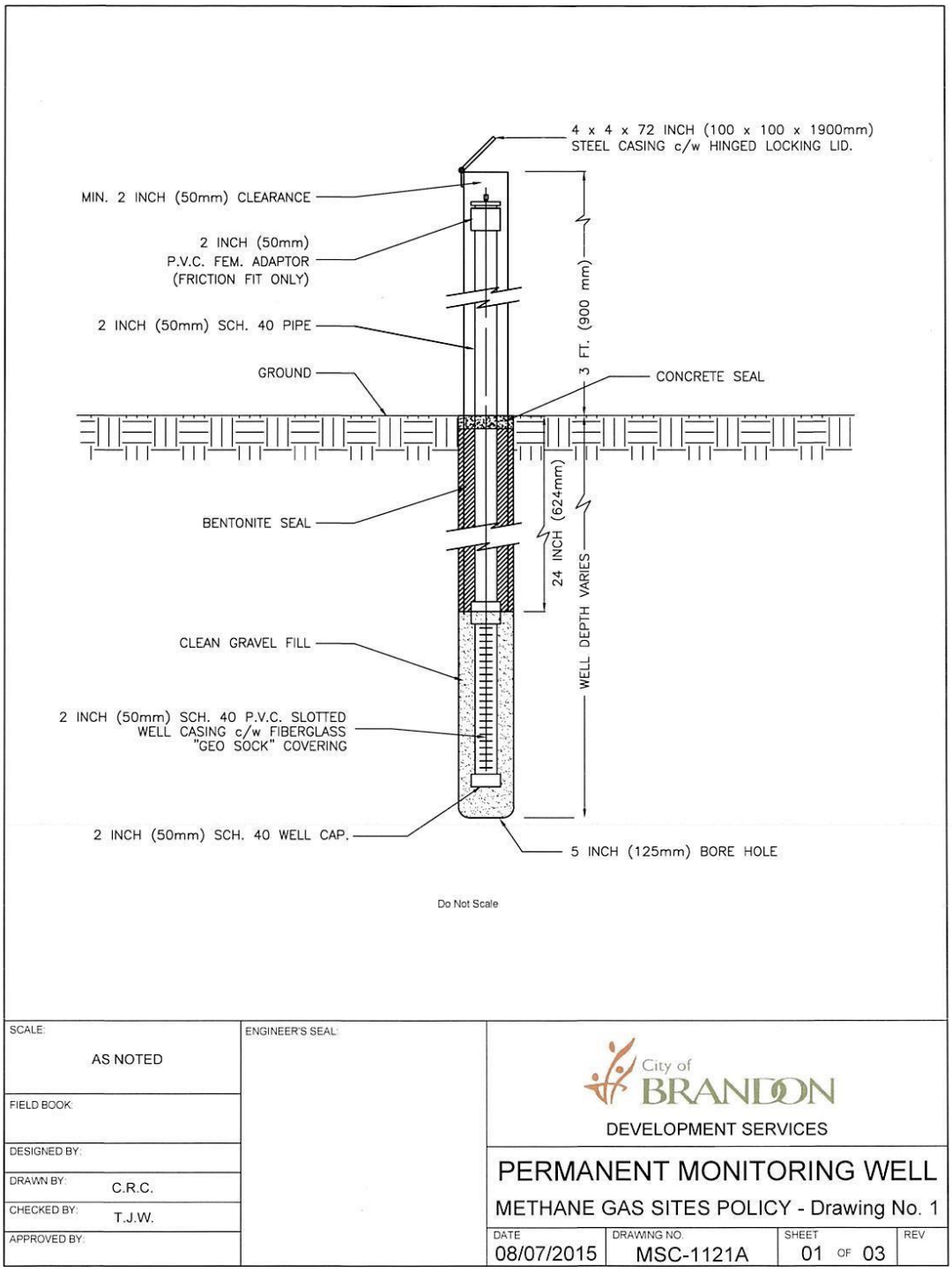
3. Geomembranes

Geomembranes are installed as barriers to prevent gas migration below the floor slab. Typically they consist of 20 to 60 mil thick polyvinyl chloride (PVC), chlorinated polyethylene (CPE), hypalon or high density polyethylene (HDPE). Geomembranes must have a low permeability, high resistence to puncture and tearing, and must be durable, flexible and of an inert nature.

a. Installation of Surface Geomembrane

i. Notwithstanding the requirement for performing a preliminary site evaluation report, where the applicant installs an approved Geomembrane as part of the proposed construction, the provisions for performing preliminary site probe tests as part of the preliminary report may be waived at the discretion of the City Engineer in accordance with Section 2.b.ii. of the Policy.

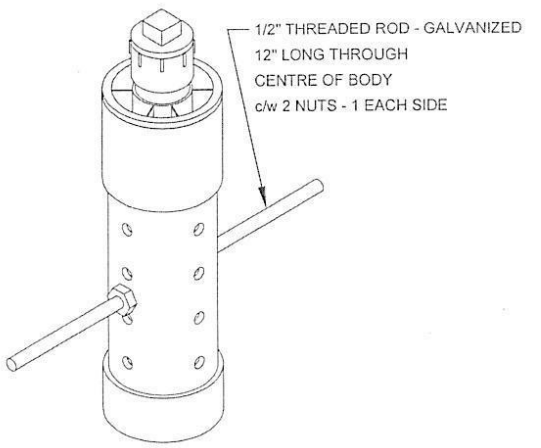
Drawing No. 1



SCALE: AS NOTED	ENGINEER'S SEAL:	City of BRANDON DEVELOPMENT SERVICES
FIELD BOOK:		PERMANENT MONITORING WELL
DESIGNED BY:		METHANE GAS SITES POLICY - Drawing No. 1
DRAWN BY: C.R.C.		
CHECKED BY: T.J.W.		
APPROVED BY:		

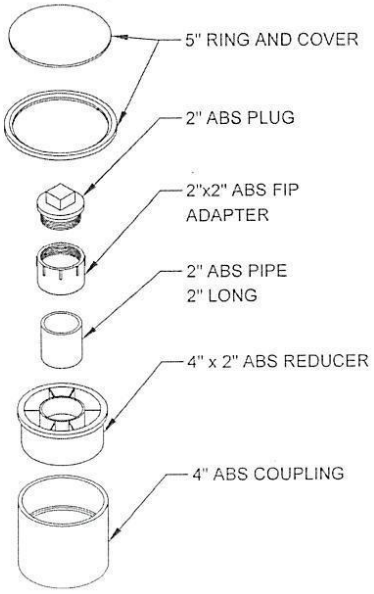
DATE	DRAWING NO.	SHEET	REV
08/07/2015	MSC-1121A	01 OF 03	

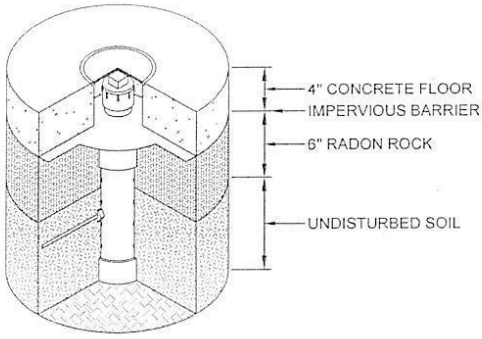
Drawing No. 2



ASSEMBLED FLOOR PROBE

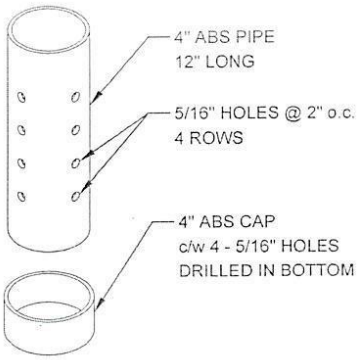
Do Not Scale





INSTALLED FLOOR PROBE

Do Not Scale



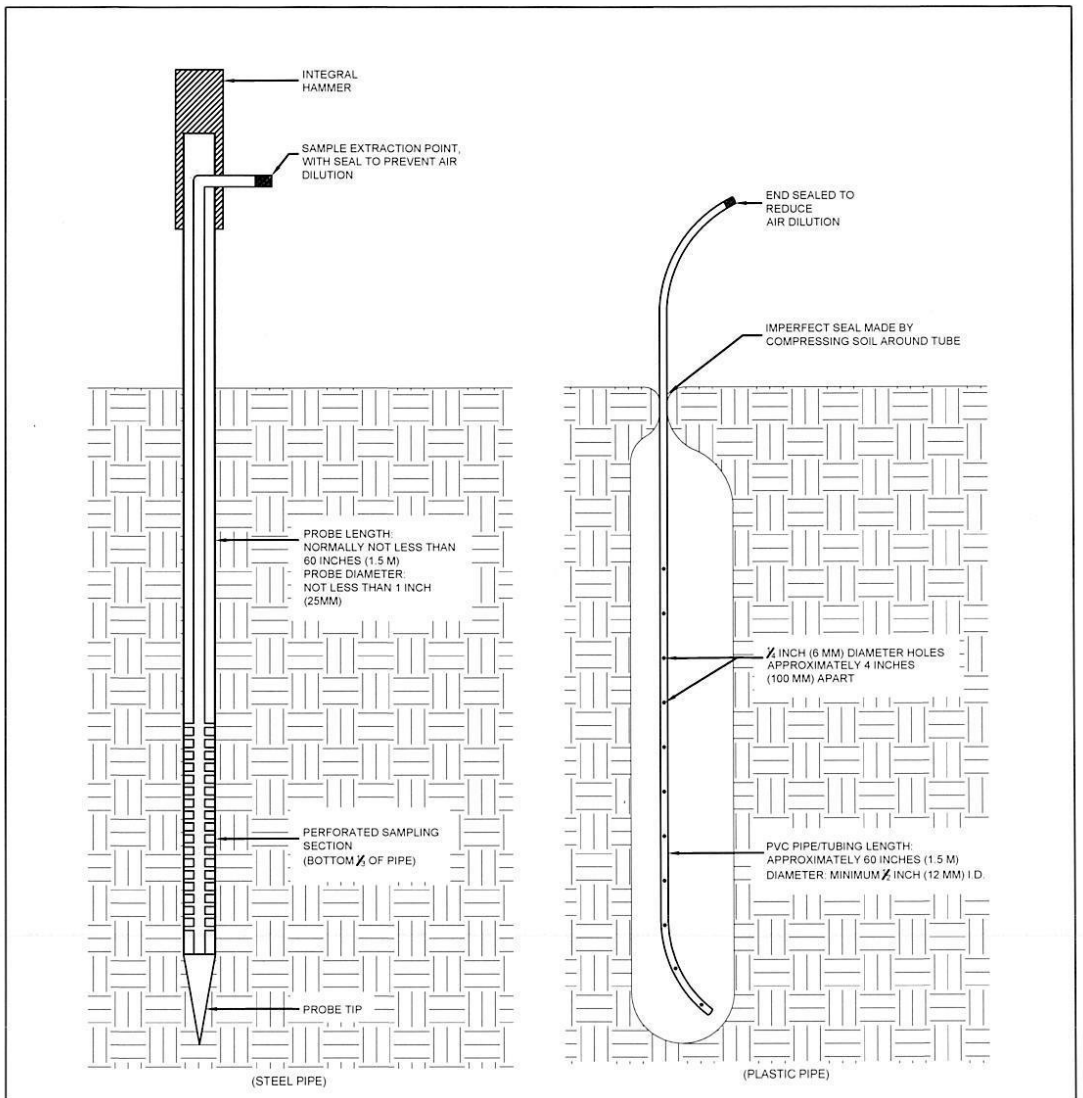
FLOOR PROBE ASSEMBLY DETAIL

Do Not Scale

Note: PVC plastic components may be used in place of ABS plastic.

SCALE: AS NOTED	ENGINEER'S SEAL:	City of BRANDON DEVELOPMENT SERVICES
FIELD BOOK:		FLOOR PROBE METHANE GAS SITES POLICY - Drawing No. 2
DESIGNED BY: G.M.		
DRAWN BY: M.F.		
CHECKED BY: T.J.W.		
APPROVED BY:		DATE 08/07/2015 · DRAWING NO. MSC-1121A · SHEET 01 OF 01 · REV

Drawing No. 3



SUB-SURFACE MONITORING PROBES

Do Not Scale

SCALE: AS NOTED	ENGINEER'S SEAL:
FIELD BOOK:	
DESIGNED BY: G.M.	
DRAWN BY: T.J.W.	
CHECKED BY: T.J.W.	
APPROVED BY:	

City of BRANDON

DEVELOPMENT SERVICES

SUB-SURFACE PROBE

METHANE GAS SITES POLICY - Drawing No. 3

DATE	DRAWING NO.	SHEET	REV
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