OOWA ONTARIO
Onsite Wastewater Association

OOWA'S Guidance Document Series:
Means of Detection

Produced by the OOWA Onsite Technical Committee

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Table of Contents

1.0 Introduction

The Ontario Building Code (OBC) requires that certain components of a leaching bed are identifiable via non-intrusive investigations. This document details the requirements, importance, and means of detecting subsurface leaching bed components. Reminder, prior to digging, always start by identifying underground utility locates to avoid unintended contact or damage to underground services. Consultation with the local regulatory authority is recommended to confirm their preferred detection method and determine whether they wish to inspect and verify the installed method during a site inspection.

2.0 Ontario Building Code Requirements

Sentence 8.7.2.2(2) of the OBC states the following: The *header line* and *distribution pipes* within a *leaching bed* shall be designed and *constructed* so that they can be detected by

(a) magnetic means,
(b) means of a 14-gauge TW solid copper light coloured plastic coated tracer wire, or
(c) other means of subsurface detection.

Sentence 8.7.2.3(2) of the OBC states the following: The *header line* and *leaching chambers* within a *leaching bed* shall be designed and *constructed* so that they can be detected by

(a) magnetic means,
(b) means of a 14-gauge TW solid copper light coloured plastic-coated tracer wire,
(c) means of a 12 gauge copper clad steel light coloured plastic-coated tracer wire, or
(d) other means of subsurface detection.

3.0 Why Detection is Important

Leaching beds are subsurface systems, and their location may not be known or easily identifiable. Providing means of detection allows for the leaching bed piping to be identified from the ground surface, without needing to probe or dig. The location and size of the leaching bed are important to be identified for reasons such as maintenance or property redevelopment, including the installation of a garage, shed, pool, gazebo, patio or deck. Additional sewage system components, such as forcemains and sanitary sewers are also recommended to be designed and constructed with means of detection.

4.0 Means of Detection to Consider During Design and Installation

4.1 Tracer Wire

Tracer wire methods of detection utilize a plastic-coated copper or steel wire that allows the location of leaching bed piping to be detected from ground surface using specialized equipment. The tracer wire is wrapped around or strapped to, with adhesive tape or zip ties, the leaching bed piping before backfilling. Tracer wire can be used to locate other pipes within the sewage system in the same manner, such as forcemains or sanitary sewers out of buildings. The wire must remain continuous throughout the circuit for successful detection. The system must include a ground-surface access point where the wire can be connected to detection equipment, which sends a signal through the circuit. This can be achieved through a

dedicated tracer wire box or inside the sewage components such as in the distribution box or in the septic/pump tank.

Figure 1- An example of a grey tracer box located on a wooden post.

Figure 2: An example of tracer wire (blue) installed around perimeter of a leaching bed.

Figure 3: An example of tracer wire (white) installed around perimeter of a leaching bed.

Figure 4: An example of tracer wire (white) installed around the forcemain and accessible from within the distribution box at the forcemain inlet and along a leaching bed run.

Tracer wire generally provides a precise and reliable means of locating subsurface components, although it can be more costly than other methods. If the wire is damaged during construction, leading to a break in the circuit, the signal may not pass through the full system when attempting to locate the works.

4.2 Magnetic Means

Magnetic Means refers to using materials that can be detected using a magnetic locator, i.e. a metal detector. Magnetic materials, such as a utility marker or steel rebar, are placed alongside or attached to the leaching bed piping. This method can be inexpensive and easy to install. However, detection accuracy depends on the size and placement of the magnetic material, and the metal may shift during backfilling. If this method is to be used, it is recommended that the metal piece, if not a detected utility marker, be no shorter than 20 cm (8 inches). If rebar is used, the rebar can be bent to create an elbow and placed at the corners, in addition to straight lengths along the distribution pipes and at each T connection. Longer lengths of rebar improve detectability; therefore, longer pieces are preferred whenever possible.

Figure 5: An example of a magnetic means locator, the DEEP-1 magnetic utility marker can go three to four feet deep, depending on soil conditions

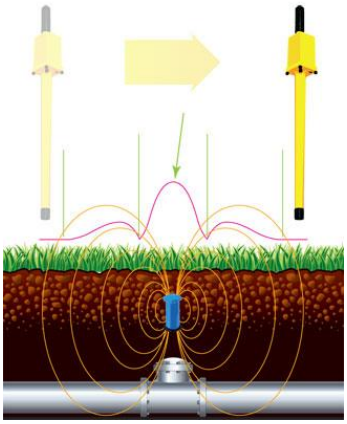
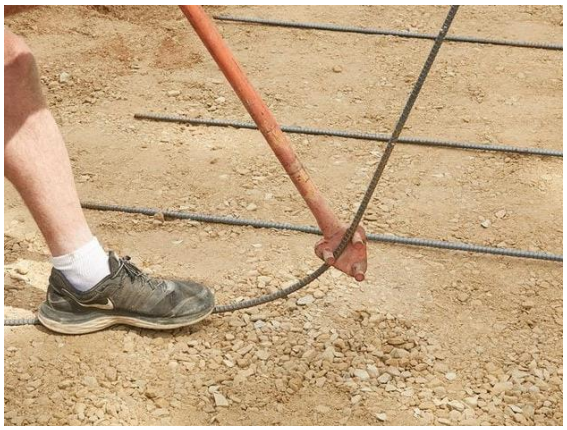


Figure 6: Rebar being bent for a corner elbow; rebar rods placed horizontally in the background.



Scrap metal (excavator bucket teeth, door hinges, nails, etc.) and metal spikes are sometimes considered because they are inexpensive and easy to place during installation. In practice, they do not provide reliable detection. Scrap metal pieces vary significantly in size and shape, which makes detection inconsistent. Small or irregular pieces can be difficult to locate, and may shift as the bed is backfilled, reducing detection reliability. Scrap metal and spikes are therefore not recommended as a method of detection during design or installation.

4.3 Field Drawings, Diagrams and Markers

Other means of detection may include the use of accurate as-built drawings, site plans, diagrams, mapping records, or physical markers that identify the location of onsite sewage system components. To improve their usefulness for future locating activities, drawings should clearly identify system components, dimensions and offsets from permanent site features, key property features (e.g., buildings, driveways, wells, watercourses, and property boundaries), the date the drawing was prepared, and a description of the system installed. Photographs and georeferenced coordinates may further improve accuracy. Examples of markers may include surface rocks, stakes, posts, monuments, or other permanent site features installed to indicate the location of distribution piping, or other system elements.

While drawings, records, and markers can assist in locating system components when physical evidence is limited, they are generally considered less reliable than tracer wire or magnetic detection means. Drawings may become less accurate as site conditions change or where modifications to the system have not been documented. Markers can be moved, removed, buried, obscured, or incorrectly documented over time. As a result, these methods are best used in conjunction with tracer wire or magnetic locators, and are generally not recommended as the sole means of detection.

5.0 Common Experiences in the Field

The most common means of detection involve magnetic markers and tracer wire. For consistent detection and compliance with the OBC, magnetic markers and tracer wire should be placed at each T and Elbow in the piping, rather than solely at the four corners or around the perimeter of the leaching bed. In practice, installation errors such as missing connections or shifted materials can reduce reliability, so careful attention during installation is critical. No method is completely fail-safe; verification and maintenance can help ensure long-term detectability.

6.0 When There are No Installed Means of Detection

In situations where OBC detection means were not installed, locating a leaching bed relies on a combination of observation, system knowledge, and manual techniques. Obtaining the original system permit from the local regulator can provide diagrams or notes that indicate the leaching bed's location and type. Property features such as buildings, wells, and watercourses can help narrow potential bed locations based on OBC required setbacks. Visual clues in the landscape can also help, such as areas of greener or taller grass caused by nitrification, slight depressions, mounded area, sloping terrain, swales or cleared/open spaces. Understanding the system type can help estimate the bed's size, layout, and run spacing. Where accessible, tracing from the septic tank using a plumbing snake or similar tool can follow the effluent line towards the leaching bed, offering additional guidance for locating buried components. These approaches are less precise than tracer wire or magnetic means and may require more time and care to verify the exact system boundaries.

7.0 Conclusion

A practical approach to meeting the OBC detection requirements involve using either tracer wire or magnetic markers placed consistently throughout the system. Tracer wire provides a consistent and dependable means of locating subsurface components, including other system components such as gravity pipes and forcemains. Its primary limitation is the potential for a break in the wire, which can prevent accurate detection of the complete system. Magnetic markers provide a practical means of locating subsurface components. The primary limitation is that magnetic materials may be difficult to detect if they are displaced, buried too deeply, or are of insufficient size. Drawings, diagrams, and markers can provide a reference for means of locating subsurface sewage system components. The primary limitation is that records may become outdated and markers may be moved, removed, buried, or obscured over time, reducing the accuracy of the information available. As a result, drawings, diagrams, and markers are best used to support other detection methods. Applying these practices consistently allows sewage systems to be located with confidence years later, helping support ongoing maintenance, site planning and alignment with OBC requirements.