

2018 TRENCHLESS TECHNOLOGY ROAD SHOW

ABSTRACT

Title: Utilizing multi-channel ground penetrating radar technology for creating 3D maps for the Hamilton LRT Project

Title of Sessions: Additional methods for Utility Verification

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ABSTRACT:

Accurate utility mapping is a critical task during design stages of complex urban infrastructure projects. To avoid project delays and minimize cost overruns, fully identifying and locating utilities early in the project planning and design process, by following the ASCE 38-02 Standard, is a highly effective way of managing Utility Risks on the project.

A variety of technologies are used for collecting field data to create composite utility drawings. Electromagnetic cable locate equipment is commonly used for determining the horizontal alignment of conductive utilities. Vacuum excavation is commonly used to determine the horizontal and vertical location of existing utilities. Vacuum excavation is very effective, however can be expensive and requires cutting through the surface of the pavement.

Ground Penetrating Radar (GPR) is an electromagnetic method that has been used since the 1970s for utility detection, with the primary advantages of working for both conductive and non-conductive Utilities, and providing both horizontal location as well as a good estimation of depth. Initially, GPR systems included single antenna devices and required highly trained personnel and extensive expertise. Recent developments in the form of multi-channel GPR array systems and more user friendly analysis software have become a fast and efficient tool that can cover thousands of square meters in a single day.

The study will focus on the results of a Pilot project completed for the Hamilton LRT project. In this study a section of a Right-of-Way for the Hamilton LRT was comprehensively evaluated with a high-density multi-channel GPR array system capable of generating high-resolution three-dimensional subsurface images to identify existing utilities under the pavement surface. The study will show the comparison of the GPR data with the SUE data collected through other techniques. It will identify how the use of the GPR data when combined with the SUE data collectively provided a detailed 3D model of the existing underground infrastructure within the investigation area. The study will identify the results of the investigation and highlight the key findings of the project.

Keywords: Ground Penetrating Radar (GPR), Subsurface Utility Engineering (SUE), mobile subsurface mapping.