

Subsurface Utility Engineering and Utility Locating – What’s the Difference?

Subsurface Utility Engineering (SUE) and Utility Locating may appear to be similar but each serve a different purpose. In reality, both may utilize electro magnetic (EM) locate equipment to identify the location of underground utilities, but the similarities generally end there.

The practice of Subsurface Utility Engineering was formalized with the creation of ASCE 38-02 - The Standard Guideline for Collection and Depiction of Existing Subsurface Utility Data, in 2002. The Standard promotes the use of field investigations and records research to determine the accurate location of underground infrastructure. Most importantly, the ASCE 38-02 provides a process to identify the quality of the results, and allow users to determine the degree of uncertainty of the information depicted. The Standard was created to provide reliable information to engineers to aid in the design process, plan for utility relocations, reduce overall projects costs and can also aid in improving project safety during construction.

The EM locator is a go to tool in both industries, but its application and end results are very different. When used in the damage prevention industry it is called locating, but when used in the SUE industry it is referred to as designating (as defined in ASCE 38-02). The EM locator determines the location of magnetic fields either naturally present on conductors or through induction with the use of transmitters. The location of the buried conductive plant is marked on the surface of the ground. The Utility Locator will place marks on the ground using color coded paint specific to each utility. The marks for a SUE investigation are placed using pink paint (temporary markings) to avoid confusion with locating markings. The interpretation of the signals and an understanding of the geophysical properties of the earth and conductive elements is key to producing reliable data in both industries.

The SUE investigation will use EM locators, as well as a variety of other geophysical technologies, to determine the location of known utilities and unknown conductive signals during the designation phase. For a SUE investigation the information collected in the field is surveyed, and integrated using CAD software onto a utility mapping drawing. Other site investigations and field observations related to the utility infrastructure that may be present are collected from the site. The SUE investigation includes a review of the record information (i.e. construction drawings) and resolves discrepancies that may be found. The SUE utility mapping drawing includes all utilities that were either identified in the field or identified on records even if they could not be designated in the field. In many projects the construction methods and sequencing may be reviewed to better understand the presence of abandoned or removed utilities. The Engineer responsible for the investigation reviews all information and makes a professional judgement as to the quality of the information and how to depict it on the drawing. The distinction between how utilities are identified is made using quality levels according to ASCE 38-02. To make this distinction the Engineer confirms the validity of the designating marks and the methods used, the survey data, compares record drawings and checks the probability of the alignment based on known installation practices. The Engineer will also provide a SUE report which outlines the methodology used for the investigation (including geophysical equipment used), the findings of the investigation, and how they may impact the project. Often times there will also be recommendations for any additional

investigations suggested to further identify the location of utilities in critical locations. The focus of additional investigations is specific to the project. Once construction begins the results of the SUE investigation may help the contractors understand the risks associated with the buried utilities prior to excavation. Private Locates would still be required prior to any physical excavation.

Utility Locating (One-Call or Private Locating) is primarily focused on public safety and damage prevention during construction. Utility Locating allows excavators to understand the location of the known underground utilities in the field, which is a necessity for safe excavation. In the One Call or Private Locating, the EM locator is used to verify alignments of known utilities shown on the Utility Company records. In many jurisdictions they are performed by 3rd party contract locate companies. The Utility Locator places marks on the ground using color coded paint to indicate the horizontal alignment of the known utility and creates a NO DIG zone stating that a utility lies beneath the marked area. In the damage prevention industry, the information is most commonly conveyed on a locate sheet with a sketch showing the specific utility in the target area. If a locator is responsible for multiple utilities, multiple utilities may be shown on the same sketch. Sketches are commonly provided onsite or can be transmitted via email. Typically, once a locate is completed, there is no independent technical or practical review of the sketch produced, prior to providing to the end user, which is the contractor.

Although their purpose and execution are different, both Subsurface Utility Engineering (SUE) and One Call or Private Utility Locating provide important valuable information for their end users. One Call and/or Private Locate are commonly mandatory and even legislated in some jurisdictions. They are required and necessary even when a SUE investigation is completed. SUE is recognized as a best practice in the Canadian Common Ground Alliance Best Practices Manual, the Transportation Association of Canada's – Guideline for the Coordination of Utility Relocations and other key documents. SUE is a valuable tool for any engineer to manage utility risks on their project.

Together Subsurface Utility Engineering (SUE) and One Call or Private Utility Locating are an effective 1, 2 punch that can be used to ensure your project's overall success!

Ophir Wainer is responsible for developing new business and leading the strategic direction for T2 Utility Engineers in major markets across Canada. Ophir has more than 20 years of experience in utilities and subsurface utility engineering. He is a member of the CSCE, a board member of the NASTT BC chapter, a member of CATT committees and involved in CERIU. He is an experienced speaker on both subsurface utility engineering and damage prevention, and has presented and moderated at various conferences and training seminars.

Blaine Hunt is an engineer with more than 20 years of project management experience in the consulting engineering and industrial manufacturing sectors. He has successfully led both large and small-scale multi-faceted projects from initial planning, design, construction and installation phases through to launch and steady-state operations in complex, time-sensitive environments. He is a licensed engineer in the provinces of British Columbia, Alberta and Ontario.