Subsurface Utility Engineering

(SUE)

ODOT Surveyors Conference

Presented by: Heather Howe and Gary Holeman

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What is SUE?

Today SUE is an engineering practice that enables state and local transportation agencies, design consultants, utility companies, and other stakeholders to:

- Apply appropriate surface geophysical methods, such as pipe and cable locators or ground penetrating radar, to determine the existence and horizontal position of subsurface utilities, and
- Depict existing subsurface utilities on their plans and other documents in a standardized manner that informs users of the reliability of both the locational presence and the absence of utilities, and then uses data depictions for risk-based engineering purposes during the planning, design, and construction phases of projects.

When should SUE be used?

- SUE can, and should be used at almost any point in a project's development, depending upon the project and its specific needs.
- Looking at just the mapping component of SUE, look at a highway project where any, but not limited to, of the following conditions exist:
  - Utilities are expected to be present
  - The existing ground will be disturbed enough during construction to potentially impact existing utilities
  - New right-of-way will need to be acquired
  - Paving widths may be extended

Types of Projects

- Projects having subgrade work
  - Signal projects
  - Urban
  - ITS
  - Intersections
  - Large Interchanges

What are Quality Levels

There are 4 Quality Levels per *ASCE 38-02, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data*.

- QL – D
- QL – C
- QL – B
- QL - A

Quality Level D

- Quality Level D (QLD) information is obtained from the review and documentation of existing utility records, verbal accounts, and/or one-call markings.
- Its purpose is to determine the existence of major active utilities and their approximate locations referenced to the existing and current plan documents.

Quality Level C

- Quality Level C (QLC) builds upon the QLD information by adding an independent detailed topographical site survey for surface-visible appurtenances of subsurface utilities, including but not limited to fire hydrants, junction boxes, valves, risers, and manholes.
- It is important to note that QLC does not refer to the structure or portion of the utility segment that is visible; it refers to the hidden underground portions of the utility line or cable segment.

Quality Level B

- Quality Level B (QLB) information is obtained through the application of appropriate surface geophysical methods, surveying, depicting, and using professional judgment to determine the existence and approximate horizontal location of utilities (a utility's "designation").

A QLB attribute means that:

The location of depicted utilities found through geophysics within a search area has been addressed with as much precision and certainty as possible with the geophysical and survey methods used without actual follow-up excavation.

Quality Level A

- Quality Level A (QLA) information is obtained by the actual exposure (or verification of previously exposed and surveyed utilities) and subsequent measurement of subsurface utilities, usually at a specific point. Highly accurate horizontal and vertical data are subsequently surveyed and recorded. QLA (sometimes referred to as "locating,") provides the highest level of certainty.

Quality Level A (cont.)

- QLA information is highly accurate. Survey accuracies to obtain it are typically set at 15mm (1/2-inch) vertically, and to project survey standards horizontally (typically the same as for topographical features), although these accuracies and precisions are generally left to the owner to specify in a scope of work.
- QLA data are typically portrayed as a 3-D point location; whereas, QLB, QLC, or QLD horizontal data are line segments.

Deliverables

- A report
- A model, in 3D

Now What?

- The SUE consultant has delivered a model of subsurface utilities
- Who uses this for what?

Design Use

- Conflict detection
- Design

Construction use

- The construction crew will have a model of all existing and new elements
- Potential conflict zones can be highlighted

Thank you.

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