

Knowing what's below saves time and money

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With the constantly increasing need for both urban and rural expansion seen across the country, new construction projects of all sizes are being designed and executed. To help keep these projects from running into very time consuming and expensive problems during their construction phases, subsurface utility engineering has been utilized during their designing.

Subsurface utility engineering (SUE) services provide accurate identifying, locating and mapping of existing underground utility systems. The information obtained from this process is utilized to either eliminate or mitigate conflicts with proposed design improvements and existing utility systems.

As a branch of civil engineering, SUE assists designers in managing risks associated with underground utilities through utility mapping at appropriate SUE Quality Levels, utility design and relocation, communication of utility data, and utility accommodation policies.

Proven cost/benefit advantages of SUE make it an essential part of project design. SUE services help project

designers manage risks associated with surprise encounters with buried utilities which can bring construction projects to a complete halt.

Subsurface Utility Engineering technologies include magnetic sensing equipment, sonic equipment, acoustic equipment, ground penetrating radar, nondestructive vacuum excavation equipment and radio frequency detection.

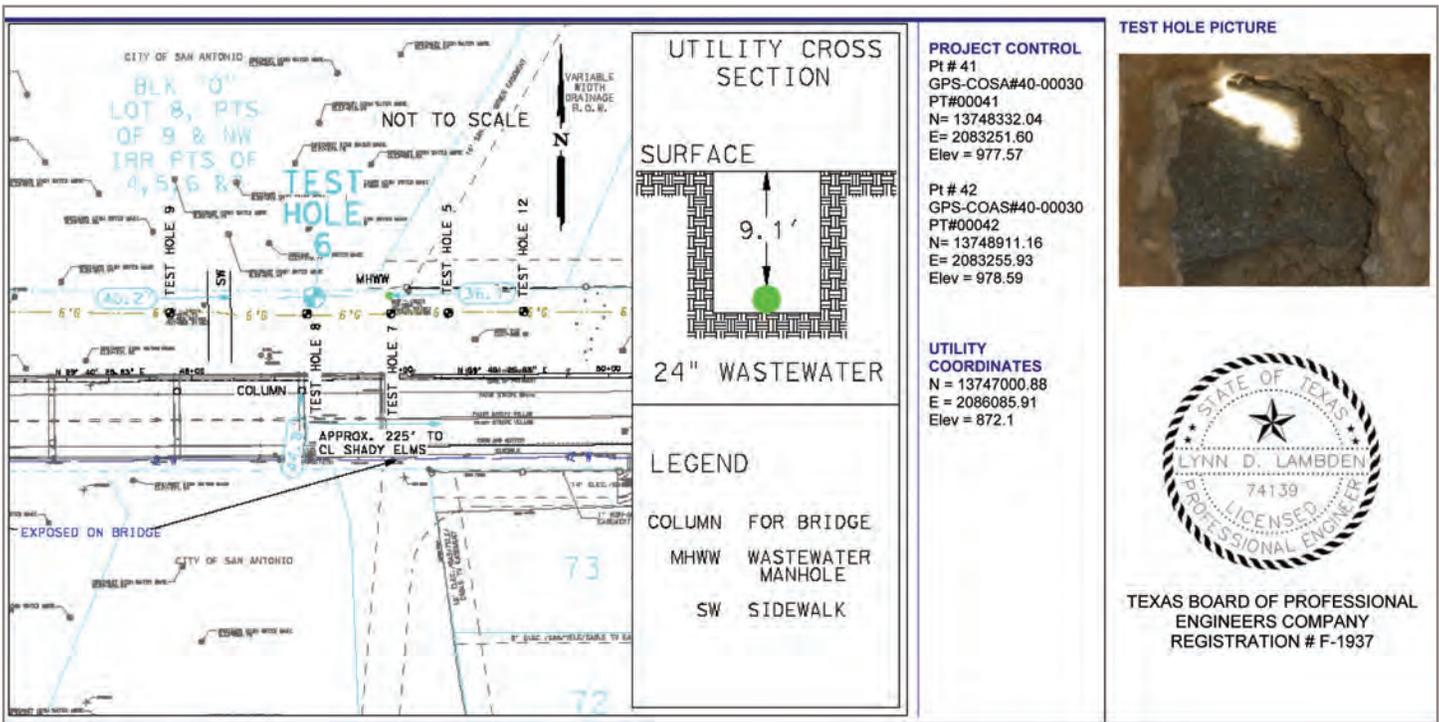
The process was initiated by the Federal Highway Administration in 1981 along the eastern seaboard of the United States in an effort to minimize future utility conflicts during the construction of federally funded highway systems. This process, along with the One-Call system for construction activities could potentially alleviate the problem of hitting existing utility systems and having extensive change orders from contractors for "down time" and utility relocations during the construction process.

SUE services obtained during the design stage would also allow for notification of the utility companies of pending transportation projects early enough to gain their participation in

mitigating conflicts, obtain cheaper prices from the construction contractor by identifying utility systems prior to bidding projects and create a safer environment for construction activities.

Subsurface utility engineering services were adopted by the Texas Department of Transportation (TxDOT) on their projects in 1998. SUE has also been viewed as a best practice service for all types of construction projects for municipality and county public works projects, hospitals, universities/colleges, energy projects and some private development projects throughout the state of Texas. These political entities and agencies have come to realize that knowing where existing utilities are located and mitigating conflicts in the design stage of an improvement project is less costly than finding the conflicts during the construction stage of a project.

The services provided by SUE companies are not to be confused with One-Call services, which are also an essential part of the construction phase of new projects. While the reasons for both are similar, the two are actually completely different services.





(right) Verifying the location of underground lines prior to exposing the line with vacuum excavation (above).

The subsurface utility engineering service is provided so that utility conflicts that may occur during construction can be identified and solved during the planning stage.

Locator services are provided during the construction phase to make sure the designs are able to be constructed as they are drawn, without interference from utility conflicts. Both services play vital roles in the successful and efficient construction of new projects and both are very important tools used to ensure damage prevention.

Depending on how much research and surveying is required for planning and what level of confidence is needed in knowing where the utilities are located, SUE service providers can offer four different levels of quality.

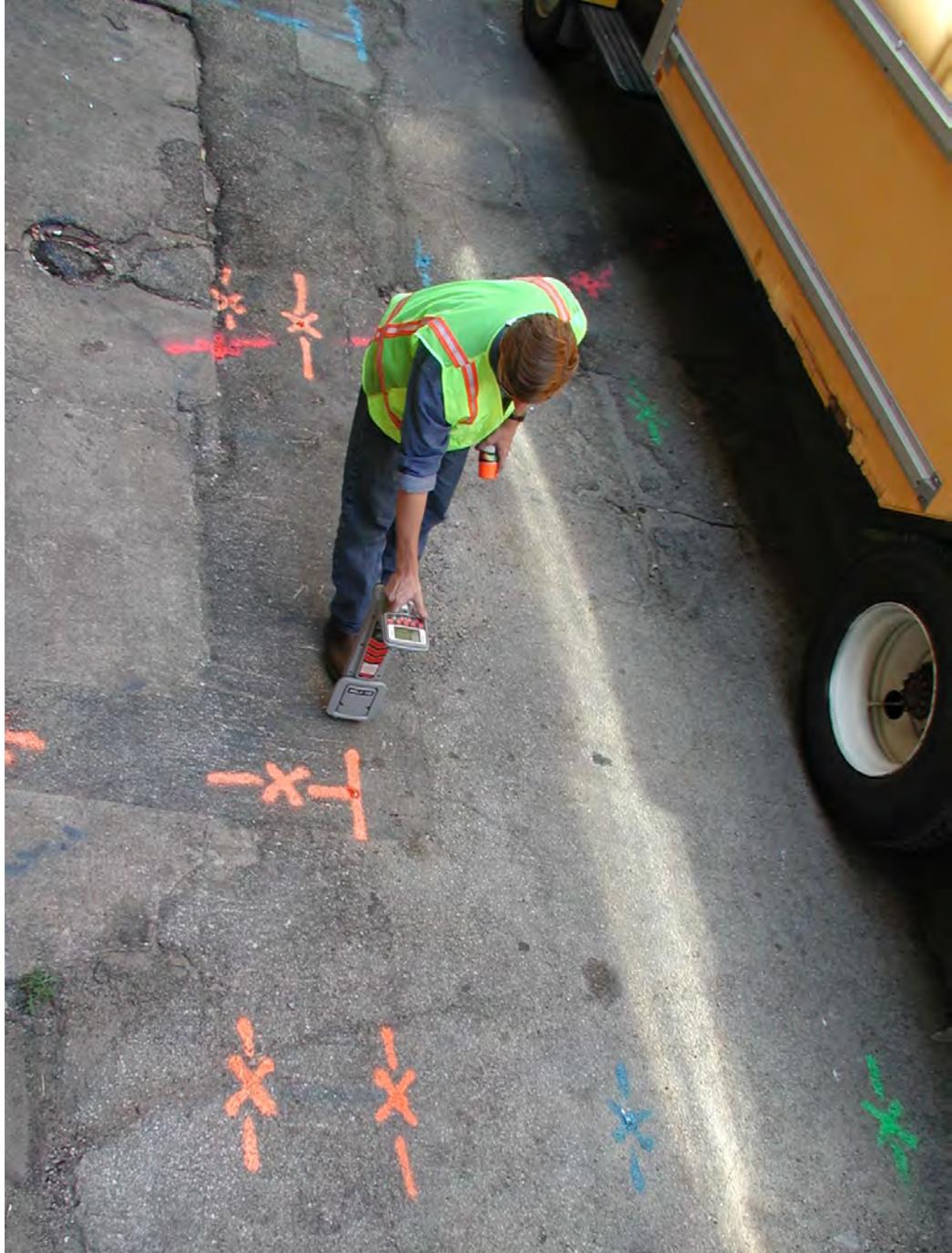
Quality Level D: Record Research/ Data Collection.

Quality Level C: Visible Surface Feature Survey

Quality Level B: Utility Designation

Quality Level A: Utility Locating – Test Hole

Based upon our experience, SAM, Inc. has determined that there are nine



major elements necessary to provide comprehensive SUE services.

The first of these are preliminary meetings, where the SUE company’s project manager and client’s team members establish the limits of the project, review known utilities and discuss which utilities need to be located. They discuss the planned improvements and determine the extent of survey control while identifying any environmentally sensitive areas. A written scope of work is then prepared and submitted to the client. The next step is the Quality Level D stage. It is during this stage that information is derived from records research or oral history and notification of all known utility companies begins. Thorough

research of past projects gives the service provider a better understanding of what utilities they may encounter in the project. It can provide a “feel” for the overall congestion of utilities, but is often limited in terms of comprehensiveness and accuracy.

That is followed by Quality Level C field investigations. Prior to the scope of work being developed, the project manager visits the project site to thoroughly review and confirm above ground indication of utilities. During QL-C, existing surface features are field surveyed and tied to property lines or other features. The condition of the roadway is noted, with particular emphasis on providing safe traffic control



The value of vacuum excavation: now you can safely see it.

during the designating, surveying and locating phases of the project. Level C data supplements Level B data and finds omissions and errors in record information.

The next stage involves obtaining the necessary permits. The service provider will notify and obtain all required permits, including Right-Of-Way rights and letters if access to private property is necessary.

That is followed by a strict Traffic Control Plan. Before any field operations commence, a traffic control plan for each necessary function of SUE services is created. This plan, along with going through the specific ROW processes, is submitted for approval.

Then, the Quality Level B can begin. Under this level, the available crews are chosen and electric utility companies are called for assistance if needed to ensure a safe working environment for all staff members. Designation data is collected by thorough applications of appropriate surface geophysical sensing technology and the located utilities are marked, field-tied to project monumentation, and mapped onto plan documents.

Field Surveying is the next step in the process, as teams will locate the visible utility surface features and the designated utilities using one of their team's survey field crews. All surveys are then tied to the project control.

The highest quality level, Quality Level A, then begins, allowing the provider to begin test hole services using several different methods. SAM, Inc. uses air-vacuum excavation

technology. For this level, precise horizontal and vertical location of utilities is obtained using nondestructive vacuum equipment excavation to safely expose, measure and map utilities. This level includes all other quality level tasks and conflict resolution.

The final steps of the process are Data Management (CAD) and Reporting and Quality Assurance and Quality Control. The entire utility mapping in Micro-Station and/or Auto CADD format compatible may then be provided to the client, along with any other previously agreed upon deliverables. The information is presented with all reference files, resources and an index.

The entire process of locating utilities and providing accurate utility maps is designed to minimize errors. Above all else, the goal of providing SUE services is to help project designers manage and avoid risks they may encounter with buried utilities during construction.

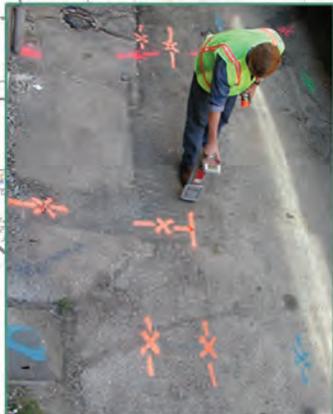
With proper education and information, their projects can stay on schedule and their workers can stay safe, knowing what utilities they are working around.

Planning a construction project?

Avoid potential headaches with SAM, Inc.'s
Subsurface Utility Engineering (SUE) services!

Our dedicated SUE professionals will identify, locate and map all existing underground utilities before you design your project, helping you avoid potential problems during construction.









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