Subsurface Utility Engineering

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Following GDOT's SUE Subconsultant Process

Since 1999, the Georgia Department of Transportation (GDOT) has been incorporating Subsurface Utility Engineering (SUE) during the design phase of its highway construction projects. By providing the project's roadway designer with **accurate** underground utility information early in the design stage, GDOT is able to take advantage of SUE's valuable engineering technology to reduce costly utility conflicts/relocations and construction delays.

"By properly integrating SUE into the preconstruction phase of our projects, we are better able to manage the risks involved with utilities during the construction phase," said Brent D'Angelo, GDOT's State Subsurface Utilities Engineer.

When providing SUE services on GDOT projects, all SUE subconsultants, including TBE Group, are expected to follow established GDOT procedures, which can serve as helpful guidelines on any construction project incorporating SUE.

"In order to maximize the benefits of SUE, it is essential that the **right information** be provided to the roadway designer **at the right phase** in a project's development," D'Angelo said. "In order to ensure we are getting the 'most bang for our buck,' we have developed SUE workflow processes that outline what activities should be done and when they should occur."

GDOT SUE PROJECT WORKFLOW

Once GDOT awards the SUE contract, a kick-off meeting is held with all appropriate parties – the SUE subconsultant (such as TBE), the prime design consultant, GDOT's State Subsurface Utilities Engineer (SSUE), District Utilities Engineer (DUE), and the project manager. The main purpose of the meeting is to identify the scope of SUE services, including the SUE study limits, and the SUE quality levels (QL) appropriate for the particular project.

There are four recognized quality levels of subsurface utility information:

- Quality Level D – researching existing utility records. This quality level applies when making broad decisions about route selection, purchasing right-of-way, or producing a higher level of data. QL-D information is typically recommended to be requested during a project's concept development.

- Quality Level C – surveying visible above-ground utility features and correlating the data with QL-D information. This quality level of information is used to determine general utility conflict areas. QL-C information is typically recommended to be requested on rural projects or on projects where the utility impacts are considered minor. Typically, this level is requested when preliminary design begins and project mapping and survey control have been established.

- Quality Level B – using surface geophysical techniques to determine the existence and horizontal position of underground utilities. This quality level of information is used by the designer to make educated decisions on where to place storm drainage systems, footings and foundations, etc., to avoid conflicts with existing utility facilities. Because of the increased integrity of this level of information, it is recommended for request on urban-type projects or on projects where the utility impacts are substantial. Typically, QL-B is requested when preliminary design begins and project mapping and survey control have been established.

- Quality Level A (also known as "test holes") – using nondestructive digging equipment, such as vacuum excavation, at critical points along the utility's path to determine the precise horizontal and vertical position of underground utilities, as well as the type, size, condition, material and other characteristics. It is recommended that this level of information be requested when specific conflict areas are identified and it is determined that by making adjustments in various design elements, drastic cost savings will be incurred for the project. QL-A is recommended for request after the Preliminary Field Plan Review (PFPR) to ensure that all potential conflicts are identified.

Once the scope of services is determined during the kick-off meeting, the SUE subconsultant coordinates any necessary maintenance of traffic (MOT) issues, permitting requirements, and information regarding future utility installations. The subconsultant then begins the SUE process, researching existing utility records (QL-D). As indicated above, QL-D is generally performed and reported during the conceptual design phase, in accordance with GDOT's Plan Development Process (PDP). This allows the designer to identify any "show stoppers" – major utilities that could drastically affect the layout of the project.

As the design progresses, and typically as soon as the survey control is available, the SUE subconsultant designates the existence and horizontal position of the subsurface utilities (QL-B). On some projects, the SUE consultant will also perform a preliminary utility conflict analysis or utility conflict "matrix." This "matrix" is used by the roadway designer as just one more tool in identifying and minimizing utility-related impacts to the project. This phase of SUE must be completed and the resulting data must be submitted to the State Subsurface Utilities Engineer prior to being incorporated into the project's design. This review and approval are necessary to ensure that the SUE investigation addresses all of the project's specific requirements. By incorporating the SUE subconsultant's QL-B information and preliminary conflict analysis early into the plans, the roadway designer is able to make intelligent decisions on what adjustments are necessary in order to avoid utility conflicts/relocations. Identifying the horizontal location of existing utilities prior to any major design work results in fewer design changes later on in the design process.

After QL-B deliverables have been reviewed and approved by the GDOT Utilities office, the utility plans are now ready for the Preliminary Field Plan Review (PFPR) meeting, a visual on-site assessment of the design plans. After the PFPR meeting, the SUE subconsultant confers with the roadway designer, the District Utility Engineer and the State Subsurface Utilities Engineer to address any PFPR comments and to determine the need for QL-A services. QL-A services should be completed and the resulting data should be approved prior to the Final Field Plan Review (FFPR) meeting. QL-A provides the opportunity to confirm or update QL-B findings, which is especially important when the precise horizontal and vertical locations of any of the underground utilities are critical to the design.

The last step in the workflow process is final conflict analysis and resolution. QL-A data is studied to determine the most cost-effective approach to the utility conflict. Costs are researched and recommendations are made as to which option makes the most sense – plan redesign or utility relocation. Once GDOT makes the final decision, the findings and recommendations are turned over to the designer for the project's final design.

"Although our SUE program is still in its relative infancy stage of development, we are already receiving positive feedback from our roadway designers on many of its benefits," D'Angelo said. "As our program develops further, we foresee SUE as becoming an integral part of all GDOT projects. The success of our SUE program is due in large part to the high level of expertise and commitment displayed by our SUE subconsultants, such as TBE Group."

TBE Group, a national SUE leader with offices in Georgia and 30 other states, has been providing SUE services to GDOT since their introduction in 1999. For more information on TBE's SUE services, contact Randy Sanborn at 678-421-0080, or rsanborn@tbegroup.com. For more details on GDOT's SUE program, visit the SUE Consultant Workflow Chart on GDOT's web site at www.dot.state.ga.us/dot/operations/utilities/sue/index.shtml.

Credits

Author(s)
Randy Sanborn

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http://www.sueunitedkingdom.com/

Beijing, China
10.65308343
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