

Chapter 11 UTILITY SURVEY

11.1 General

In order to minimize the cost and impact upon the **FDOT** and the Utility, established procedures for determining the level of accuracy of a utility survey have been developed. These are termed "level of locates" and are contained in this section.

The **FDOT** designer will attempt to accommodate all existing utilities and new utilities to be constructed concurrently with a project. The selection of typical section features, horizontal alignment, and location of storm drain lines are areas that can sometimes be varied without violating safety standards and design criteria. Design features that reduce or avoid utility conflicts may involve increased cost; however, those costs may be offset by savings in construction time, claims, delays, and supplemental agreements. It is therefore essential to all parties to understand the accuracy required in locating existing utilities in the field and identify who is responsible for gathering the data.

11.2 Responsibility

The Utility is required to and responsible for obtaining a utility permit and developing any associated project work schedule for the installation and maintenance of utility facilities within the R/W of any State Highway System. These documents require the Utility to locate as necessary any of its utilities by exposing and or furnishing survey elevations as necessary to accommodate **FDOT** construction. The **FDOT** regards the determination of the location of existing utilities on **FDOT** R/W as a cooperative effort between the **FDOT** and the Utility. The degree of effort on the part of the **FDOT** and the utility owner will vary with the type of project, the utility, and availability of existing location information. This coordination must begin as soon as the **FDOT** announces its *Five Year Work Program*.

At a minimum, identifying the location and providing properly formatted support documentation of existing major utilities is required on new construction, reconstruction, and add lane projects. Major existing utilities are those principal underground and aerial utilities that potentially conflict with construction activities and scheduling. It is the responsibility of the utility owner to identify and provide locates for major utilities within the **FDOT** right of way. Gravity service connections and laterals are not normally considered major utilities. When required, in special circumstances of identified design conflicts, obtaining locate information for gravity service connections and laterals within the **FDOT** R/W is the responsibility of the Utility.

While it is legally the responsibility of the Utility to physically locate all of its utilities and provide that information to the **FDOT**, for construction projects the **FDOT** design engineer, with the assistance of the DUE and construction personnel, should be consulted to determine the locations and quality levels of locate where utility information is known to be needed. The **FDOT** may at its option initiate an actual survey using its own forces or under a design / surveying contract to accomplish the locates as a matter of expediency. The Utility shall coordinate with the **FDOT** to assure the most up to date utility information is

available to the **FDOT** for actual field verification. Once a project is under construction, additional locates may be necessary. The Utility must coordinate with the **FDOT** to determine if the **FDOT** will assume any responsibility for locates during construction. For locates required by the **FDOT** maintenance (non-construction project related) or "Sunshine State One Call", it is the complete responsibility of the Utility.

Quality Levels of locates are defined in Section 11.3. It is the responsibility of the utility owner to provide up through a Quality Level "B" locate on request. In some instances the utility owner can provide Quality Level "A" locate information. If Quality Level "A" locate information is necessary and cannot be provided by the utility owner, the measurement and documentation for Quality Level "A" locate will be obtained by the **FDOT**, consultants, or others by established agreement.

Existing major underground utilities suspected of being located within three (3) feet of proposed construction operations that would threaten the utility should be considered for Quality Level "A" locate information. The decision to allow utilities to remain within three (3) feet of new construction operations will be made by the District Design Engineer in consultation with the DUE and appropriate construction personnel.

The Utility is required to respond to and furnish information regarding the location of its facilities in a reasonable format determined by the **FDOT** and in a timely manner. Unless otherwise stated, at a minimum this shall be interpreted to mean the Utility will plot the location of its facilities on **FDOT** supplied roadway plans in accordance with the **FDOT** Color Code for location and disposition of facilities and return them to the specified engineer. When the Utility already has and uses compatible software, and when the **FDOT** furnishes the base CADD document to work from, the Utility shall furnish CADD markups in the appropriate color code.

The **FDOT** Color Code to be applied to construction and design plans that shall represent the disposition of utilities is as follows:

- Red – Existing utility facilities to be removed or relocated horizontally to some other location, or existing facilities to be Placed Out Of Service (Deactivated) but left in place.
- Green – Existing utility facilities to remain in place with no adjustment.
- Brown – Existing utility facilities that are to be adjusted vertically but to remain in the same horizontal alignment or completely new facilities to be installed.

NOTE: In addition to the color code, the limits of the facilities to be removed, relocated, adjusted, or placed out of service (deactivated) shall be delineated. If the work is associated with an **FDOT** construction project, utility delineation will be shown by station. For all other permitted work, the limits shall be delineated by distance from a well established point such as the center of an intersection, center of a RR, etc.

When underground utilities are granted access to limited access R/W by the exception process, certified as-builts must be provided as a condition of the permit. All exceptions requesting use of any limited access R/W will require a certified as-built survey and plan signed and sealed by a registered land surveyor in accordance with **Chapter 472, F.S., Land Surveying and Mapping**. When as-built plans are required, they shall be submitted to the DUE no later than thirty (30) days following the completion of the permitted

installation.

Whenever the Utility already has and uses compatible CADD software, and as-built plans are required, they shall be provided in an electronic format. The plans shall describe the facility in detail and in accordance with Chapter 3 of the **UAM**. Underground facilities shall indicate their location in the horizontal and vertical plane in accordance with **The North American Vertical Datum of 1988 (NAVD)**. For aerial facilities, elevation data is not required.

11.3 Locates

The following identifies the key elements within the quality level of utility locates in ascending order about which Subsurface Utility Engineering is applied:

- Quality Level "D" - Existing Records
- Quality Level "C" - Surface Visible Feature Survey
- Quality Level "B" - Designating
- Quality Level "A" - Locating

A detailed description of the scope of work to be included to achieve the various Quality Levels follows:

Quality Level "D" locates are information obtained solely from a review of utility records for facilities that may be affected by the project. The comprehensiveness and accuracy of such information is highly limited. Even when existing information for a utility in a particular area is accurate, there are often other underground systems that are not shown on any records. Quality Level "D" may be appropriate for use early in the development of a project to determine the presence of utilities. Applicable records may include previous construction plans in the area, conduit maps, direct-buried cable records, distribution maps, transmission maps, service record cards, "as-builts" and record drawings, field notes, county, city, UAO or other geographic information system databases, circuit diagrams, or oral histories. The records should be reviewed for indications of additional available records, duplicate information and credibility of such duplicate information, and need for clarification by UAO's. The end product of a Quality Level "D" would be a utility composite drawing or equivalent. The engineer should also make professional judgments regarding the validity and location of topographic features on records versus current topographic features (when available) and conflicting reference of utilities. The engineer should indicate the quality levels, utility type and /or ownership, date of depiction, accuracy of depicted appurtenances, end points of any utility data, active, placed out of service, size, condition, number of jointly buried cables, and encasement.

Quality Level "C" locates are information obtained to augment Quality Level "D" information. This involves topographic surveying of visible, above ground utility features such as poles, hydrants, valve boxes, circuit breakers, etc. If previously surveyed, check survey accuracy and completeness for applicability with the existing project. Correlate applicable utility records to the surveyed features, taking into account the geometries and indications on the records of these surface features. Determine when records and features do not agree and resolve discrepancies. Additional resolution may result from consultation with UAOs.

Quality Level “C” may be appropriately used early in the development of a project and will provide better data than Quality Level “D” information alone. Designers cannot be sure their design is appropriate nor can construction proceed without caution when using information for underground utilities based only on Quality Level “D” and “C” locates.

Quality Level “B” locates are information obtained to augment Quality Level “C” information. Quality Level “B” locates are information obtained through the use of designating technologies (e.g., geophysical prospecting technologies). This is an application using scanning technologies, most of which have very specific capabilities and limitations that vary with site conditions. Applying a variety of techniques is essential to the process of preparing a comprehensive horizontal map of utilities and other underground structures on the site. Designating technologies are capable of providing reasonable horizontal information but provide limited vertical information. Mark the indications of utilities on the ground surface for subsequent survey. Care should be taken to differentiate markings placed on the ground for design purposes from those placed on the ground for damage prevention purposes. Survey all markings that indicate the presence of a subsurface utility. This survey should be to the accuracy and precision dictated by the project’s survey control. Depict all designated utilities. Correlate the designated utilities’ depictions with utility records and/or surveyed appurtenances to identify utilities that may exist but were not able to be designated. Resolve differences between designated utilities and surveyed appurtenances. Recommend to the project owner additional measures to resolve differences if they still exist.

Quality Level “A” locates provide the highest level of accuracy of utility locations in three dimensions. This Quality Level may apply manual, mechanical, or nondestructive (e.g., vacuum excavation) methods to physically expose utilities for measurement and data recording. Quality Levels “B”, “C”, and “D” locates are incorporated in Quality Level “A” locates. The designer should obtain Quality Level “A” locates at highway/utility conflict points where verified information is necessary. Select an appropriate method of gathering data that will achieve the accuracies and precision required by the project. These accuracies are currently typically set to one half (0.5) inch vertical and to applicable horizontal survey and mapping accuracy as defined by the project owner. Excavate test holes exposing the utility to be measured in such a manner that protects the integrity of the utility to be measured. Comply with applicable utility damage prevention laws, permits, and specifications and coordinate with Utility and other inspectors, as required. Determine (a) the horizontal and vertical location of the top and/or bottom of the utility referenced to the project survey datum; (b) the elevation of the existing grade over the utility at a test hole referenced to the project survey datum; (c) the outside diameter of the utility and configuration of non-encased, multi-conduit systems; (d) the utility structure material composition, when reasonably ascertainable; (e) the benchmarks and/or project survey data used to determine elevations; (f) the paving thickness and type, where applicable; (g) the general soil type and site conditions; and (h) such other pertinent information as is reasonably ascertainable from each test hole site. Resolve differences between depicted Quality Level “A” data and other quality levels.

11.4 Subsurface Utility Engineering (SUE)

SUE is more than an established engineering technology that can provide horizontal and

vertical locations of underground utilities to produce an accurate picture of underground infrastructure. Each **FDOT** District has contracts for SUE. The Utility should determine if the location of its facilities will be obtained under the **FDOT** design, construction, and maintenance activities.