Policy: 4465-8- Guidelines for Performing Network Real Time Kinematic Global Positioning System Surveys
Section: Surveys
Office/Department: Office of Design Policy/Suppor
Reports To: Division of Engineering
Contact: 404-631-1000

The Georgia Department of Transportation (GDOT) and its Consultant's Surveyors may use the service of a Global Positioning System (GPS) Real Time Kinematic (RTK) or Virtual Reference Station (VRS) Reference Network for photogrammetric activities as well as topographical surveys.

This data gathering technique does not supersede any current Department guideline with which it may be in conflict. All current guidelines and accuracies in the Department's Phase II Database Contract and/or Scope of Services contracts must be adhered to.

To use the GPS Reference Network technology, the Department and its Consultant's Surveyors must first perform a confinement (this is known by localization, transformation or calibration based on which GPS vendor is used) to known horizontal and vertical project values to ensure generated values from GPS Reference Network match the existing horizontal and data values established for the project.

A. The process for establishing this confinement will be as follows.

1. Control pairs for each end of the project must first be established following current Department guidelines. This is a minimum of four deltas with position and elevation values for each project area.

2. The confinement will consist of holding a position and elevation tie at one end of the project and holding a position only tie at the opposite end of the project.

3. The same geoid file used during control establishment must be utilized in the solutions obtained when using the GPS Reference Network.

4. After the confinement is performed two check shots will be taken on the two control deltas that were not held to establish the confinement to project values. These check shots will not exceed 0.10 survey feet in position and 0.10 survey feet in elevation. More check shots may be taken inside the area of point collection if the Department and/or Consultant Surveyors wish, but the two shots mentioned previously will be the minimum.

5. This confinement will not exceed five miles in length. If the project exceeds five miles in length, another confinement using the same guidelines as listed above shall be performed. A new pair of control points will be needed for the new confinement. The new pair of control points along with a pair of control points from the previous confinement may be used for the new confinement. Four new control points may be used but the previously mentioned method will be the minimum requirement.

6. A minimum of three points with position and elevation values collected from the preceding confinement shall be collected using the new confinement for a data integrity check between the two confinements. These three data integrity check shots between the two confinements will not exceed 0.10 survey feet in position and 0.10 survey feet in elevation.

B. In addition, a check shot is to be taken each time the GPS unit is powered back on after equipment down time and/or the surveyor has acquired a new ambiguity resolution. More check shots may be taken inside the area of point collection if the Department and/or Consultant Surveyors wish but the previously mentioned method will be the minimum. The check shot(s) can be on any point which has position and elevation values and is inside the area of point collection. This check shot(s) will not be in excess of 0.10 survey feet in position and 0.10 survey feet in elevation.

C. A copy of the confinement report(s) as well as a copy of all check shots performed on the project will be supplied to the Department upon request. If these reports are not available at the time requested the data would be considered suspect and the Department and/or Consultant Surveyors would be required at their expense to perform as many field data checks, as the Department deems necessary to ensure data integrity of the project.

D. The GPS Reference Network will not be used if the control pairs are 11.2 miles beyond the established network coverage area. This means the Department will not accept any data established by GPS Reference Network if the control pairs are 11.3 miles or more from the closest GPS base station and outside of the subscribed network area. This distance only pertains to projects that are outside of an established network. This distance does not pertain to shots taken inside the network area. In addition, GPS Reference Network and/or RTK of any kind will not be allowed to establish project control values on Department projects. The Department currently has guidelines in place for establishing project control which must be adhered to.

E. The Department highly recommends that GDOT and/or Consultant Surveyors perform proper GPS mission planning prior to any fieldwork. This includes but is not limited to satellite availability, PDOP, GDOP, known ellipsoid errors in the work area, multi-path influences, cell phone coverage and base station network reliability. All of these error sources can contribute to poor GPS performance, which can result in the rejection of the data by the Department.

F. Consultant Note: It is important to note that the Consultant will ultimately be held responsible for all of their incoming data. Data found to be in error will be recollected and resubmitted at the Consultants' expense. It is responsibility of the Consultant to build in whatever quality control mechanisms that they deem necessary to ensure the integrity of their data. Failure to do so could result in additional cost to the prime and/or survey Consultant. The Department will recollect any surveys performed by Department Surveyors and found to be in error.

References:

None.

History:

annual review: 08/12/25;
added to TOPPS: 02/12/07