

## **925 CONSTRUCTION SURVEYING AND LAYOUT**

### **Contractor Survey**

On those projects that are so designated, the Contractor will be responsible for providing construction surveying. This will require competent personnel to perform survey calculations and necessary field documentation such as field books, cross section books, and earthwork quantities. The Resident Engineer should insure that this work is performed under the direction of a Registered Professional Engineer/Surveyor employed by the Contractor.

The Department will provide either traverse or control points for establishing an accurate construction centerline and will establish bench marks adjacent to this line for the proper layout of the work as described herein. Control points will be located on centerline at the beginning and ending of the project, and at all points of curve (P.C.), points of tangent (P.T.), tangents to spiral (T.S.), spirals to tangent (S.T.), and angle points. On long tangents, additional points will be provided for continuity of line.

Traverse points, when provided, will be as follows:

For horizontal control, the Department will run a traverse from which construction centerline can be established. The control points, delineated by iron pins, marks in concrete, or similar devices, will be located to minimize the likelihood of their destruction during construction activities. Coordinates of these points and/or ties to construction centerline will be provided.

For vertical control, the Department will establish bench marks the entire length of the project at horizontal intervals not to exceed 2,500 feet (760 meters).

These control points will be properly referenced and their location documented for future reference. The Contractor should then be provided with this information and physically shown their locations. At this time, the Contractor should be made aware that it is their responsibility to preserve these points for the duration of the project.

Copies of recorded Results of Survey, Record of Survey, Corner Records, documents, maps and plats shall be submitted to the Engineer within ten (10) working days after recordation at the Office of the County Recorder. Copies of all field notes, computation sheets and calculations that relate to the boundary surveys shall also be submitted to the Engineer within this time frame.

Before beginning any construction, the Contractor must submit an outline detailing all survey activities for the project and the sequencing of these events. Section 1150.00, Contractor Construction Surveying, of this Construction Manual should have been used by the Contractor in preparing the outline. The Resident Engineer should thoroughly review this plan to insure that it is realistic, provides the scope of work that is required, and can be monitored by project personnel.

When the survey plan is approved, the Contractor should then check the accuracy of the control work established by the Department, to their satisfaction.

Once construction begins, the Resident Engineer should assign a survey supervisor to monitor the activities and documentation of the Contractor's survey personnel. Conflicts can easily be resolved if there is cooperation between the Contractor and ADOT personnel in this area. The monitor should not actively get too involved with this work, but should be aware of the various survey activities and be available for consultation if the Contractor requests it. The monitor should also be checking for suspected problem areas or deficiencies in the operations. If there are serious survey problems and inconsistencies, the Resident Engineer should be made aware of them, and actions taken to correct them. Serious problems may require restaking at the Contractor's expense.

## Survey Control for Pavement Marking

It is important that pavement markings be accurately laid out prior to their application on the roadway.

At the start of the project, when the contractor submits the schedule of payment for the lump sum Construction Surveying and Layout item, the R.E. should ensure that survey control and layout for final striping is included. If the schedule fails to include a reasonable percentage for this item, the R.E. should *reject* the schedule and require the contractor to resubmit a corrected version for approval. The intent is to ensure that the contractor has planned for the necessary resources to complete the final striping requirements for the project.

A *minimum* of two weeks prior to any paving activities, the contractor, the contractor's survey and pavement marking subcontractors and the R.E. *shall* meet to discuss the survey control for the applications of all temporary and permanent striping. This meeting was previously recommended – it is now *mandatory*. It is strongly suggested that a representative from Regional Signing and Striping be invited. At the meeting the contractor shall provide a written pavement marking layout plan, including provisions for survey control for the *final* pavement markings, that is satisfactory to the R.E. The plan must meet the minimum requirements for survey control and layout of the temporary and permanent striping as defined in Standard Specification 925-3.01.

The plan shall include timeframes that ensure layout is completed in a timely manner. It is the intent that the contractor's survey and pavement marking subcontractors concur with the provisions of the written pavement marking plan. When applicable, the plan shall also include the contractor *requirement* to coordinate the survey layout of projects with no-passing zones with the ADOT No Passing Zone Crew. This contact (phone number provided on the project plans) should be made at least five working days before placement of the applicable pavement marking.

The liability for the proper layout and placement of the striping is clearly the contractor's. If done incorrectly, the R.E. has the authority to require that it be redone correctly at no additional cost to the Department.