

ADOT REGIONAL TRANSPORTATION PLAN FREEWAY PROGRAM

Design Procedure Memorandum

Surveys and Aerial Mapping

Implementation Date: June 25, 2005

A. Introduction:

The purpose of this Design Procedure Memorandum is ensure all parties participating in the development of project surveys, aerial mapping, and right-of-way plans will apply consistent methodologies in the development of their portion of each project in Maricopa County.

B. Horizontal and Vertical Datum's:

Maricopa County has implemented the GDACS system for primary horizontal and vertical survey control that is based on the North American Datum of 1983, 1992 Epoch [NAD83(92),] and North American Vertical Datum of 1988 (NAVD88). The GDACS published control station coordinates meet the accuracy standards of National Geodetic Survey Horizontal B Order and are available on the County's web site.

The coordinate values of GDACS control stations should be used as the survey and aerial mapping primary control for all projects within Maricopa County and within the limits of the published GDACS data. Each control point should be surveyed to verify the accuracy of the information shown on the GDACS survey.

Project horizontal control points should be determined by conducting a Static or Real Time Kinematic GPS Survey by holding the published GDACS control point values from a minimum of two GDACS Control stations. A minimum of three horizontal control stations (National Geodetic Survey, GDACS Recorded/Monumented stations) shall be used in the survey to verify or correct translation, rotation or scaling issues between adjacent projects.

If the survey has field verified any sectional corner monuments shown on a recorded GDACS PLSS Subdivision Survey, the survey will adopt and hold the published GDACS corner position for all corners, assuming that: A) they are found to be within positional tolerance of 0.25', and B) the responsible registrant agrees that the monument/position represented as the section corner on the GDACS survey is true. A note addressing this should also be included on the Results of Survey plan.

Vertical control points should be verified between the GDACS control stations used for the project. Benchmarks published by the NGS or established by the project surveyor may be required on a project-by-project basis. These benchmarks may be used for vertical control provided the project survey is tied into two GDACS control stations by field survey.

The field surveys shall also provide the design consultant with a project specific datum adjustment factor that can be used to adjust the elevations shown on the as-built plans to the datum used for the current vertical control and aerial mapping. The NAVD88 elevations are always greater than the National Geodetic Vertical Datum of 1929 (NGVD29) by approximately two feet. The as-built plans usually reflect elevations that are smaller in value than the elevations determined by new surveys using NAVD88 as the vertical datum.

Unless otherwise directed by ADOT and/or the project scope of work, all survey procedures should be in accordance with ADOT Engineering Survey Section's policies and procedures.

C. Ground Adjustment Factor:

The grid adjustment factor (GAF) of 1.00016 shall be used to convert the GDACS horizontal control point values (grid values) to ground coordinates for use for each project. To convert from grid to ground, multiply each grid coordinate by 1.00016.

D. As-Built Construction Centerline:

An existing construction centerline shall be developed for each project based on the as-built plans and field survey data. Slight modifications to the alignment data may be necessary based upon the information provided on the as-built plans, availability of similar survey control stations used for the original construction projects, and the new aerial mapping.

The existing construction centerline shall be developed by the surveying consultant, reviewed by the registered land surveyor, included on the project Results of Survey Plan and delivered to the design consultant.

If a right-of-way survey has been completed for the project area, the existing right-of-way centerline developed with the right-of-way survey should be used for the project. A new construction centerline should be established by the design engineer if a realignment of the roadway is anticipated with the project.

E. Survey Documentation in Project Plans:

The basis of the project surveys shall be documented with a Results of Survey Plan prepared and sealed by a Professional Land Surveyor registered in the State of Arizona. A copy of the Results of Survey Plan will also be provided to Engineering Survey Section, Photogrammetry and Mapping Services, Right-of-Way Plans Services, the responsible Management Consultant and section design consultants.

The construction plans shall include a Project Control Point Plan, which shall include the location, horizontal coordinates, and elevations of all GDACS and project horizontal and vertical control stations that have been used for the project.