July 22, 2014

CEDAR RAPIDS METRO DESIGN STANDARDS CHAPTER 5 – ROADWAY DESIGN

Supplemental to SUDAS Chapter 5

Chapter 5L – Design Surveys

Add this section chapter.

CHAPTER 5L-1 DESIGN SURVEY STANDARDS

A. Scope and Purpose

1. Purpose: To ensure correct and sufficient information is provided to designers and to standardize basic information presented on construction drawings for the Jurisdiction Capital Improvement Project (CIP) projects and for private developments with facilities that will be accepted by the Jurisdiction
2. Scope: These specifications shall be a guide to Surveyors working on Jurisdiction projects. These specifications are considered minimum standards for design survey information provided to all engineering designers for designing construction projects. Additional information may be included with design surveys and shown on construction drawings.

B. Horizontal and Vertical Control

1. All horizontal and vertical control shall be based on the Metropolitan Area Aerial Mapping Ground Control information as available from the Jurisdictional Engineer. Include a list of all horizontal and vertical control points used for project design in the construction drawings.

C. Horizontal Control Monuments

1. Permanent Horizontal Control Monuments (Traverse Points) shall be, but are not limited to, landscape spikes, rebar or pipe of substantial length and diameter securely embedded in undisturbed ground. Crosses cut into concrete pavement or structures, or nails set in asphalt pavement may be used for horizontal and control monuments. Hubs, nails in ground, inked marks on concrete or similar are not considered permanent, but may be used as temporary control points during data collection.

2. All permanent horizontal control monuments shall be referenced to local physical features by horizontal measurements or description to allow for future recovery. Such references shall be included in the construction drawings.

3. A network of horizontal control monuments encompassing the entire project limits shall be provided. A minimum of two permanent horizontal control monuments, within sight of each other and no greater than 600 feet apart, shall be provided for each construction site.

4. Each horizontal control point shall be described with a north and east coordinate and may include an elevation. However, some horizontal control monuments may not be acceptable as bench marks, as described below.

D. Vertical Control Monuments

1. Permanent Vertical Control Monuments (Bench Marks) shall be local physical features that are permanent and not at risk of changes in elevation due to frost, normal wear and tear, or any vertical movement.

2. Permanent vertical control monuments may include, but are not limited to, braced nails or double nails in bases of power poles and trees; fire hydrants; abutment walls, concrete structures that extend below normal frost line; etc. Hubs, nails, rebar and pipes that do not extend below the frost line; markings on concrete structures, such as sidewalks, curbs, concrete pads, or other fixtures that do not extend below the frost line are not considered permanent, but may be used as temporary control points during data collection.

3. A network of vertical control monuments encompassing the entire project limits shall be provided. A minimum of two permanent vertical control monuments (bench marks), no greater than 600 feet apart, shall be provided for each construction site. More may be required according to lay of the land.

4. All permanent vertical control monuments (bench marks) shall be referenced and described using local physical features to all for future recovery. Such references shall be included in the construction drawings.

E. Accuracy

1. Accuracy of horizontal and vertical control monuments shall meet standards set by the Federal Geodetic control Committee (FGCC) for Third Order Surveys (1:10,000).

2. Acceptable methods for establishing coordinates and elevations of horizontal and vertical control monuments include, but are not limited to, traditional traversing, differential leveling, and adjustment of these measurements utilizing a minimum of two Metropolitan Area Aerial Mapping Control Monuments. Real Time Kinetic (RTK) GPS survey methods utilizing one or more of the Metropolitan Area Aerial Mapping Control Monuments as a Base Station, may be used provided an independent check of the resulting information using traditional methods between all vertical and horizontal control points set in this manner is made. All records of these procedures shall become Jurisdiction property.

F. Data Collection for Design Surveys

1. Sufficient topographic and underground data shall be collected to make standard design practices possible. All data collected must meet requirements of the specific job. Jurisdiction designers shall determine limits of the areas to be surveyed. Special care shall be taken to obtain horizontal and vertical information at project design limits to ensure a clean and smooth transition from new to existing.

2. Most data collected will be in the form of coordinates, including a Northing, Easting and a Vertical Elevation. It may be necessary to reference existing coordinate systems, such as stationing or another coordinate system. Care must be taken to collect enough data from these existing systems to utilize them during the design.

G. Underground Utility Locations

All surveys shall include written and electronic record information provided by local utility companies for underground features, along with collecting information on utility markings located at the site by means of the Iowa One Call service (1-800-292-8989).

H. Ownership of Data

All information collected by the designer and/or surveyor for Jurisdiction improvements projects shall become Jurisdiction property.

I. Certification

Construction drawings require a signature block and seal for the land surveyor certifying sufficiency of design survey.