

AS-Built and Spatial Data Standard for Facilities, Infrastructure and Environment (SDSFIE) Guide for GIS Deliverables Created as Part of DPW Environmental Projects

Fort Leonard Wood, Missouri

Introduction

This Appendix provides guidance for implementing Engineering and Construction Bulletin (ECB) No. 2006-15, “Standardizing Computer Aided Design (CAD/CADD) and Geographic Information Systems (GIS) Deliverables for all Military Design and Construction Projects” (http://www.wbdg.org/ccb/ARMYCOE/COEECB/ecb_2006_15.pdf). This guidance establishes the requirements for geospatial data deliverables produced as part of design, design-build, or design-bid-build contracts for Fort Leonard Wood, Missouri. It includes description of the:

- Coordinate System and Datum;
- Data Quality Standard;
- Deliverables;
- SDFSIE-Compliant GIS Deliverable Specification; and
- Metadata.

Coordinate System and Datum

All geospatial deliverables (CADD or GIS format), whether obtained via survey or any other data collection process, shall be measured in meters. The coordinate system for all geospatial data will be UTM Zone 15. The vertical datum, if applicable, will be North American Vertical Datum 1988 (NAVD 88). The horizontal datum will be WGS84.

Precise specifications of the UTM Coordinate System, are as follows:

Grid Coordinate System Name: Universal Transverse Mercator

UTM Zone Number: 15

Transverse Mercator Projection

Scale Factor at Central Meridian: 0.999600

Longitude of Central Meridian: -93.000000

Latitude of Projection Origin: 0.000000

False Easting: 500000.000000

False Northing: 0.000000

Planar Coordinate Information

Planar Distance Units: meters

Coordinate Encoding Method: coordinate pair

Coordinate Representation

Abscissa Resolution: 0.000032

Ordinate Resolution: 0.000032

Geodetic Model

Horizontal Datum Name: D_WGS_1984

Ellipsoid Name: WGS_1984

Semi-major Axis: 6378137.000000

Denominator of Flattening Ratio: 298.257224

Data Quality Standard

As Built Survey

An as-built condition survey should be performed to capture the information listed in this Appendix. All relevant features shall be identified on as-built drawings and shall be GPS or conventional surveyed to the level of accuracy specified below.

Coordinate Accuracy

The Contractor shall use conventional surveying and other methods, such as a total station or GPS for field data collection at an accuracy level in accordance with “Geospatial Positioning Accuracy Standards, Part 4: Architecture, Engineering Construction, and Facilities Management. Published by the FGDC and available at

http://www.fgdc.gov/standards/standards_publications/index.html.

Horizontal and vertical accuracy of features, where vertical coordinates are collected, shall be +/- 2cm.

Surveyor Certification Requirement

The surveyor shall verify the survey for accuracy and a statement will be provided to the government stating the level of accuracy for the data being reported (in metric units). In addition to the accuracy statement, the following information should be provided in a survey report:

- Coordinate system & datum used;
- Projection;

- Units of measure (vertical and horizontal);
- Attribute description (GPS data dictionary—features, attributes and attribute values);
- Source - Receiver type, antenna type, receiver settings, number of positions per point feature, correction method and any field other relevant field procedures utilized;
- Survey method;
- Equipment list;
- Calibration documentation;
- Description of control points and control diagrams;
- Field notes; and
- Field-collected data (in addition to the post-processed final data used to prepare the geospatial data deliverable).

Utilities

Underground and aboveground utility lines shall be surveyed at a minimum of two points along every straight run, at every change of direction, at every tie in point, and at any change in line size.

Deliverables

The intent of the deliverable set is to provide the Installation with comprehensive geospatial information about the facility footprint and site features that exist outside the building(s). The electronic deliverables must be in the file format and data standard used by the Installation's Operations and Maintenance System (as noted in "Coordinate System and Datums", above).

The Installation requires deliverables in the following software formats:

- GIS Files
 - ESRI geodatabase file.
 - The coordinate system, projection, datum(s) and units will be defined for the layer and will be documented in the metadata.
 - Where captured, vertical coordinate information will be stored as a feature attribute as meters above mean sea level. Polygon-z, polyline-z, and point-z formatted files are not requested.
- CADD Files
 - MicroStation DGN files in A/E/C CADD format, using the coordinate system, projection, datum, and units specified in the RFP.

100% Design (Design Complete)

Final design deliverables for each design package should consist of (A) the drawings and specifications, and (B) the GIS file(s):

- 100% complete drawings, specifications, calculations/design analysis, and a list of all comments and their resolution for that work package. All final design drawings will be in the A/E/C CADD Standard format, current version as agreed upon by the government and the contractor. The A/E/C CADD Standard is available at <https://tsc.wes.army.mil/products/standards/aec/aecstdweb.asp>. Metadata shall be delivered with each CADD file, and will meet the standard specified in this Appendix.
- A corresponding SDSFIE-compliant GIS deliverable for the feature layers listed in Table 1 of this Appendix. For each listed layer the contractor should provide either a GIS deliverable or a statement that no features in that layer will be constructed, be modified, or pose a design constraint for the project. The SDSFIE standard is available at <http://www.sdsfie.org>. Metadata shall be delivered with each GIS data layer and will meet the standard specified in this Appendix.

As-Built (Construction Complete)

Final construction deliverables shall consist of (A) the as built drawings and specifications, and (B) the GIS file(s). The contractor will provide a submittal of the CADD and GIS files that depict the as-built condition of the site. The data layers to be delivered, the coordinate accuracy of the features, the required attribution, and the metadata will meet the standards specified in this Appendix.

For each layer listed in Table 1, the contractor will provide either a GIS deliverable or a statement that no features in that layer were constructed or modified. The tie in to a utility main line is considered a modification of the utility main line, and the portions of main lines that were exposed should therefore be included in the deliverable.

SDSFIE-Compliant Deliverable Specification

Geodatabase Template

Upon request the government will provide the contractor with an SDSFIE-compliant GIS layer template to be used for populating the GIS deliverables required under the contract. The contractor shall populate the layers without modifying the template. The contractor shall ensure that layers to be delivered but not included in the template, should the template not be complete, are fully compliant with the current SDSFIE standard.

There may be circumstances in which SDSFIE compliance cannot be maintained. In such circumstances, proposed deviations with the standard must be communicated by the contractor and reviewed by the government. Approval for the deviation shall be documented.

Data Integrity Check

The contractor shall utilize a topology build and clean routine and assure the following:

- No erroneous overshoots, undershoots, dangles or intersections in the line work;
- Lines should all be continuous, i.e. do not create dashed lines with many small line segments;
- Point features should be digitized as points, not graticules, cells, symbols or icons;
- No sliver polygons;
- All polygons completely close and have a single unique centroid; and
- Digital representation of the common boundaries for all graphic features must be coincident, regardless of feature layer.

Required GIS Data Layers and Required Attributes

Table 1 lists the SDSFIE-compliant GIS data layers that are to be delivered as part of this contract. The list is based on a review of the type(s) of facility(s) being constructed. However, it is possible that some layers in the list will not be used.

Metadata

The contractor shall prepare metadata conforming to the most current version of the Federal Geospatial Data Committee's (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM) at http://www.fgdc.gov/standards/standards_publications. Appendix A of the ECB, http://www.wbdg.org/ccb/ARMYCOE/COEECB/ecb_2006_15.pdf, is the FGDC metadata profile for Army Installations and should be followed as closely as possible. An ESRI Metadata Stylesheet for Army Geospatial Data is posted at <https://gis.hqda.pentagon.mil>. Metadata content will accompany all electronic geospatial data submissions. This includes both CADD and GIS formats. A metadata file shall accompany, at minimum, each CADD data set and/or each GIS data set. Metadata should be prepared to FGDC standards and delivered in XML format readable by software applications that use the FGDC XML format standard (such as ESRI ArcMap 10.x).

Table 1. SDSFIE Layer Names and Required Attributes.

Any feature that is created as part of a construction project shall be provided in its appropriate feature_class as defined by the SDSFIE standard. Required attributes are defined in the Quality Assurance Plans for ACSIM/IMCOM. SDSFIE standard and the associated QAP's are located at Army IGI&S Portal Page <https://www.us.army.mil/suite/grouppage/147316>
AKO/CAC access required.
