

CITY UTILITIES DESIGN STANDARDS MANUAL

**Book 6
CADD Standards (CADD)
CADD3 Submittals**

June 2015

CADD3.01 Purpose

This Chapter provides minimum standards for the submittal and review of Computer Aided Design and Drafting (CADD) work performed by or for City Utilities Engineering (CUE) at any design stage.

Proper submittal and review standards ensure that electronic CADD files prepared for and submitted to CUE consist of all components, properties and formats necessary to create construction drawings as specified and intended. They also ensure that the CADD files reflect what is designed and/or what is constructed in the field.

CADD3.02 CADD File Submittal Requirements

Electronic files shall be submitted once the CADD requirements, as specified by the project Contract, are complete. Submitted files shall conform to all chapters and sections of the CADD Standards, including the project (CADD) folder structure described in [Exhibit CADD2-1](#) and [Exhibit CADD3-1](#) “Minimum Electronic CADD Deliverables”.

Optional: All project electronic files may be submitted at the 30% submittal phase for review of proper project setup and conformity to the CADD Standards.

1. Submittal methods

Submittal of electronic project files is preferred via the City Utilities FTP site (<ftp://acfw-ftp1>). Access instructions and credentials to the FTP site will be provided per request. Other submittal methods may be used as approved.

2. File Format

CADD drawing files shall be submitted in Autodesk Drawing (DWG) format. The required current CUE DWG version shall be verified prior to initiating CADD work.

Unless authorized, electronic plot files shall be submitted in Adobe Acrobat Portable Document File format (PDF) and Autodesk Drawing Web File format (DWF).

3. Model File Drawing Scale and Units

Drawings shall be created at full (1:1 in model space) scale. Distance units shall be set to decimal feet and angle type to decimal degrees. Insertion scale units shall be set to feet.

4. Autodesk/Civil 3D Software

If using Autodesk Civil 3D, the drawings and data objects shall be submitted within the native Civil 3D (DWG) drawing format. Civil 3D data shortcuts shall be submitted within the “_Shortcuts” folder of the project folder structure.

If using Autodesk software, a Sheet Set (DST) file shall be submitted.

5. Drawing File Components and Properties

CADD drawing files shall include all project data and final versions of pertinent objects such as, but not limited to, points, linework, survey databases, data shortcuts, surfaces, 3D faces, alignments, profiles, utilities, benchmarks, images, and sheet layouts required to rebuild and modify the project.

Drawing files shall be submitted as full files, uncompressed, unzipped, and free of any errors. They shall be purged of all unused items (e.g. blocks, layers, line types, nested items, etc.).

A legend shall be included within the drawings submittal which shows and explains all symbols, patterns, blocks, line types, and other pertinent information.

6. Support Files

Support files necessary for initializing, editing, and plotting drawing files shall be submitted for review. The support files shall be a standard component of Autodesk AutoCAD, Microsoft Windows, or an integral and standard component within the drawing file. Support files shall not require additional licensed software to be used. Support files include, but are not limited to, linetypes, hatch patterns, blocks, font styles, plot styles format (*.ctb), layer filters, display configurations, and object styles.

7. External References

Externally referenced files necessary for the project shall be included within the submittal, use relative paths and be attached as overlays. Unnecessary or unused files shall be detached.

8. Photographs and Images

Photographs and images taken or used on the project areas or part of the drawings shall be submitted during the CADD review process. Portable Network Graphic format (PNG) and Joint Photographic Experts Group format (JPG) are the only acceptable formats when using digital photographs and images as part of CUE projects.

9. Datum

Drawings shall be submitted in State Plane coordinates with a minimum of two points of geodetic control for spatial reference, unless otherwise authorized by CUE. All controls and control witnesses used shall be referenced and shown in the CADD drawings.

The North American Datum of 1983 (NAD83) Indiana State Plane, East Zone, US (Survey) Foot (IN83-EF) grid coordinate system shall be used for horizontal control.

The North American Vertical Datum of 1988 (NAVD88) shall be used for vertical control.

Any items or features which are spatially-referenced or referenced on other coordinate systems shall be translated to this same (NAD83/IN83-EF) grid coordinate system.

10. Model Drawings

The following is a list of possible model files that may be required for review:

- Base Drawings
- Survey TOPO Drawings
- Surfaces Drawings
- Alignments Drawings
- Pipe Networks Drawings
- Profiles Drawings
- Cross Sections
- Corridor Drawings
- Border and Title Block Drawings

11. Sheet Drawings

The following is a list of possible sheet files that may be required for review:

- Title Sheet
- General Notes and Legend Sheets
- Plan Sheet Index Sheets
- Survey Control Sheets
- Traffic Control Sheets
- Pavement Marking and Signage
- Demolition Sheets
- Restoration Sheets
- Plan Sheets
- Plan and Profile Sheets
- Cross Section Sheets
- Erosion Control Sheets
- Structure Data Sheets
- Detail Sheets

12. Design Surveys

Refer to design criteria included in [Chapter GR6 – Surveying](#).

CADD3.03 Final Record Drawing Requirements

Final Record Drawings shall follow and conform to [Chapter GR10 - Final Record Drawings](#), as well as, all requirements of the CADD Standards. Final Record Drawing CADD Files shall be created and submitted using all of the project CADD files and folder structure for the (final/conform to contract (CTC)) construction drawings with the following requirements.

1. Drawings without dynamic models
 - A. All constructed Work shall be shown. Original Contract Drawings information shall under no circumstances be erased. Supplemental information collected during construction shall be added to the Final Record Drawings.
 - B. Where constructed Work differs from the Contract Drawings, red lines shall be used to neatly cross out the Contract Drawings information, so that it is still legible, the recorded Work shall appear, in red color, adjacent to the crossed-out Contract Drawings information and a red cloud shall be placed around the recorded Work information.
 - C. Where constructed Work matches Contract Drawings information, a red cloud shall be placed around the Contract Drawings information that has been verified to be correct as constructed.
2. Drawings with Dynamic Models (ex. 3D Pipe Networks)
 - A. All constructed Work shall be shown. Supplemental information collected during construction shall be added to the Final Record Drawings.
 - B. Where constructed work differs from the Contract Drawings and the constructed Work is, or will be, part of a dynamic model within the CADD drawings, the model shall be modified and updated per the marked-up set of Contract Drawings and/or Supplemental Drawings to reflect actual constructed Work. All graphics, labels, and information pertaining to the model shall be shown and updated. A red cloud shall be placed around the recorded Work information to show that it differs from the Contract Drawings information.
 - C. Where constructed Work matches Contract Drawings information, a red cloud should be placed around the Contract Drawings information that has been verified to be correct as constructed.
3. Record Drawing Disclaimer
 - A. Record Drawings shall have a disclaimer note on the Title Sheet with language similar to the following:

FINAL RECORD DRAWINGS NOTE:

THIS RECORD DRAWING HAS BEEN PREPARED FROM FIELD DATA COLLECTED DURING AND AFTER CONSTRUCTION AND/OR, IN PART, BASED UPON INFORMATION FURNISHED BY OTHERS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, CITY UTILITIES ENGINEERING AND CITY UTILITIES ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THIS RECORD DRAWING OR FOR ANY ERRORS OR OMISSIONS THAT MAY HAVE BEEN INCORPORATED INTO IT AS A RESULT OF INCORRECT INFORMATION PROVIDED. THOSE RELYING ON

THIS RECORD DOCUMENT ARE ADVISED TO OBTAIN
INDEPENDENT VERIFICATION OF ITS ACCURACY.

- B. The disclaimer note shall have the *Date* and *Prepared By* fields completed and shall have the Project Engineer's stamp and signature.
- C. The Final Record Drawings shall have the "Final Record Drawings" phase stamp on every sheet within the Title Block Area of the sheet.

CADD3.04 CADD Files Submittal Review

CUE will review all CADD deliverables and other materials submitted. [Exhibit CADD 3-2](#) provides a checklist that can be used to ensure compliance. In addition to the manual review, Autodesk batch standards checker and other tools will be utilized by CUE to audit a drawing file for conformance to the standards. Content not conforming to all pertinent aspects of the CADD standards shall be updated and resubmitted.