



## CFLHD CADD Standards Manual For MicroStation



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This document has been prepared for:  
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### **Software Versions**

MicroStation 2004 Edition

GEOPAK 2004 Edition



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## Chapter 1: Introduction

### Purpose

This document is intended to outline the Federal Highway Administration's Central Federal Lands Highway Division's (CFLHD) use of Bentley's MicroStation V8 2004 Edition and GEOPAK 2004 Edition, as well as internally developed tools and procedures. The CADD (Computer Aided Design and Drafting) Standards Manual will address issues such as: software, tools, techniques, standards, and procedures, which will aid the user in the efficient production of PS&E plans.

The CADD Standards Manual and the associated electronic files are to be used in the generation of electronic plans by both CFLHD internal designers and the A/E firms doing business with CFLHD.

The proper use of CADD Standards can produce many desirable results, including:

- Increased efficiency and productivity
- Re-usability of data
- Increased ability to share resources

The CADD Standards Manual is intended to be as all encompassing as possible. However, there will be circumstances, such as with various scales of drawings, where there is no one correct answer. In these cases the engineer or designer must use his or her judgment to stay as close to the original intent of this manual as possible.

### Outline of Manual

The CADD Standards Manual covers the use of both MicroStation and GEOPAK. The first section of Chapters covers the use of MicroStation V8, 2004 Edition, including topics such as:

- Chapter 1 - Introduction
- Chapter 2 - Directory structures
- Chapter 3 - File naming conventions
- Chapter 4 - Seed files
- Chapter 5 - Annotation
- Chapter 6 - Line styles
- Chapter 7 - Color Table
- Chapter 8 - Cell libraries
- Chapter 9 - Levels and Symbolology
- Chapter 10 - Reference Files
- Chapter 11 – Plans and Packaging
- Chapter 12 – Printing
- Chapter 13 – PDF creation and Plan Delivery



The second section of Chapters covers the use of GEOPAK 2004 Edition, including topics such as:

- Chapter 1 - GEOPAK Introduction
- Chapter 2 - GEOPAK Preferences
- Chapter 3 - Project Manager
- Chapter 4 - Survey
- Chapter 5 - Digital Terrain Models
- Chapter 6 - Design and Computation Manager
- Chapter 7 - Horizontal and Vertical Design
- Chapter 8 - Cross-Sections
- Chapter 9 - Plan & Profile Sheet Clipping
- Chapter 10 - Quantities
- Chapter 11 - GEOPAK Reports
- Chapter 12 – Earthwork Calculations and Grading Summary

## Conventions

The CADD Standards Manual contains special features designed to help the users find information quickly and easily. Below is a description of the conventions used throughout this manual.

### Use of Bold and ( > ) Greater-Than Symbol

Bold letters are used to identify program commands, menus, and file names. The greater-than symbol (>) is used to divide a series of commands.

For example:

Open the file **TTL.dgn** using the **File>Open** command. If it is not in the expected folder, click the **Cancel** button.



Caution is to be shown when the reader should take particular note of the information being discussed.



Information is used to provide helpful information about a particular item when it is being discussed, or to provide general information about the standards as needed.

### Hyperlinking

Throughout the manual there will be references to information found on the CFLHD website, along with the accompanying web link to this information. Links will be as shown below:

<http://www.cflhd.gov/>



## Terms and Abbreviations

Abbreviation	Description
CADD	Computer Aided Drafting and Design
CFLHD/CFL	Central Federal Lands Highway Division
Excel	Spreadsheet software from Microsoft
FHWA	Federal Highway Administration
GEOPAK	Civil Engineering highway design software from Bentley Systems, Inc.
MicroStation	Drafting Software from Bentley Systems, Inc.
MU	Master Units, part of MicroStation's unit system
PS&E	Plans, Specifications, & Estimates
PU	Positional Units, part of MicroStation's unit system
Symbology	Color, weight, and style of graphical elements
SU	Sub-units, part of MicroStation's unit system
UOR	Units of Resolution
WYSIWYG	What You See Is What You Get

**Table 1-1: Terms and Abbreviations**

## Standard File Extensions

Extension	Description
.DGN	MicroStation graphics design file
.DWG	AutoCAD graphics drawing file
.DDB	GEOPAK D&C Manager database file
.RSC	MicroStation resource file
.X30	GEOPAK Criteria files
.CON	2D MicroStation design file containing contours
.MAP	2D MicroStation design file containing mapping planimetrics
.DTM	MicroStation design file containing 3D graphics used to create GEOPAK .TIN file
.TIN	GEOPAK digital terrain model
.RWP	MicroStation design file containing right of way plans
.GPK	GEOPAK coordinate geometry database
.NEZ	Final ASCII survey control file
.DGNLIB	MicroStation library containing levels, text styles and dimension styles

**Table 1-2: File Extensions**



## CFLHD's use of MicroStation V8, 2004 Edition

While there are many new tools in MicroStation V8 2004 edition that CFLHD will take advantage of, there are others that will not be endorsed by CFLHD at this time. If the use of a particular tool is not outlined in this section, or in its appropriate place in the CADD Standards Manual, check with the CFLHD project manager as to the acceptance of its use. The most important of these tools and the CFLHD use of these tools is outlined below. As CFLHD is currently testing some of these tools to determine the best use for CFLHD, comments on potential uses are welcome and should be sent to the above e-mail address.

### New Generation of Standard Files

CFLHD has implemented a new generation of MicroStation/Geopak standard files. This new generation is known as the X30 Generation of standard files. Listed below are links to *MicroStation V8/GEOPAK 2004 – X30 Generation of Standard Files* and *Off-Site Configuration instructions*. Consultants working on CFLHD projects should download the **V8\_Resource.zip** and configure their CADD environment with X30 Generation of Standard Files.

[MicroStation V8 / GEOPAK 2004 - X30 Generation of Standard Files](#)

[Off-Site Configuration Instructions](#)

### Models

Currently it is not the standard practice to use multiple Models within a single DGN file, with the exception of FLH standard drawings or cell libraries. See Chapter 8, Cell Libraries, for more information about models within cell libraries. Both internal users and AE firms may use or submit electronic files where multiple models have been created. It is not recommended for the use of Sheet models for plotting. CFLHD will be plotting using the procedures established for MicroStation V8. If multiple models are creating within a single file, it is imperative that each model is described and documented using a file tracking protocol.

### Design History

At this time CFLHD will not be using Design History. However, similar to models, AE firms may use design history if desired. CFLHD is currently evaluating the best uses for Design History, comments and suggestions may be submitted to the e-mail address listed above.



## Support

Comments and suggestions for these CADD standards should be submitted using the standard change form, which can be downloaded [here](#), and e-mailed to:

<mailto:caddstandard@fhwa.dot.gov>

### Additional Support

Guidance and CADD support on following and understanding these CFL CADD Standards Manuals is also provided by the CFL Engineering Systems Coordinator.

CADD Support Team Contact Information:

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