



## CFLHD CADD Standards Manual For MicroStation



February 2004  
*Revised August 2005*



This document has been prepared for:  
Federal Highway Administration  
Central Federal Lands Highway Division  
12300 West Dakota Avenue, Suite 280  
Lakewood, CO 80228-2683

The software products referred to in this publication are furnished under a license and may only be used in accordance with the terms of such license.

The information in this publication is subject to change without notice. Bentley assumes no responsibility for errors that may appear in this software or occur as a result of its use, or the use of these CADD standards.

### **Trademarks**

Bentley, the “B” logo, MicroStation, and GEOPAK are registered trademarks of Bentley Systems, Incorporated.

AutoCAD is a registered trademark of Autodesk, Inc.

### **Software Versions**

MicroStation 2004 Edition

GEOPAK 2004 Edition



# Table of Contents

<b>CHAPTER 1 INTRODUCTION</b>	<b>1</b>
<b>Purpose</b> .....	<b>1</b>
<b>Outline of Manual</b> .....	<b>1</b>
<b>Conventions</b> .....	<b>2</b>
Use of Bold and ( > ) Greater-Than Symbol .....	2
Hyperlinking.....	2
<b>Terms and Abbreviations</b> .....	<b>3</b>
<b>Standard File Extensions</b> .....	<b>3</b>
<b>Support</b> .....	<b>4</b>
<b>CFLHD’s use of MicroStation V8, 2004 Edition</b> .....	<b>4</b>
Models .....	4
Design History .....	4
<b>Macros</b> .....	<b>4</b>
<b>WORKFLOW 1: USING A CFL MICROSTATION BASIC MACRO</b>	<b>5</b>



## 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 cover the use of MicroStation V8, 2004 Edition, including topics such as:

- Directory structures
- File naming conventions and locations
- Seed files
- Annotation
- Line styles
- Color Table
- Cell libraries
- Levels and Symbology
- Batch Printing

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

- User Preferences
- Project Manager
- Survey
- DTM creation
- Design and Computation Manager
- Horizontal and Vertical Design



- Cross-Sections
- Cut Sheets
- Quantities
- Reports
- File exchange procedures

## 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 in blue, 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
.LVL	MicroStation level structure support file
.DDB	GEOPAK D&C Manager database file
.RSC	MicroStation resource file
.X08, .X10	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
.UTL	2D MicroStation design file containing utilities
.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**



## Support

CADD Support help using this manual, 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>

## 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.

### Models

At this time CFLHD will not be using 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 should not use or submit electronic files where multiple models have been used. This includes the use of Sheet models for plotting. CFLHD, for the time being, will be plotting using the same methods as used in MicroStation J.

### Design History

At this time CFLHD will not be using Design History. However, unlike 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.

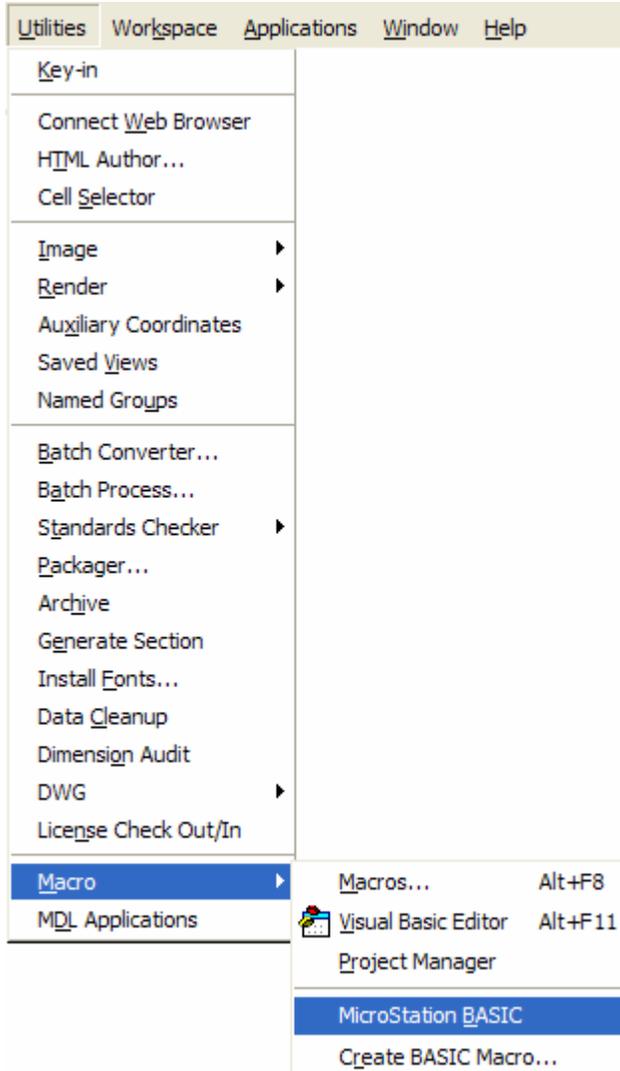
### Macros

CFL has created several MicroStation Basic and Visual Basic for Applications (VBA) macros that will help the user to streamline processes, check geometry, and enhance overall efficiency. These macros can be found at the end of the chapter for which the Macro is the most useful. Accompanying the more complex macros will be a workflow detailing the use and output of each. For simple macros, use the following workflow:



## Workflow 1: Using a CFL MicroStation Basic Macro

### 1. *Select Utilities>Macro>MicroStation BASIC*



**Figure 1-1: CFL MicroStation Basic Macro**

### 2. *Select the desired Macro from the list, or, if it is not in the list, use Browse to find the correct one.*

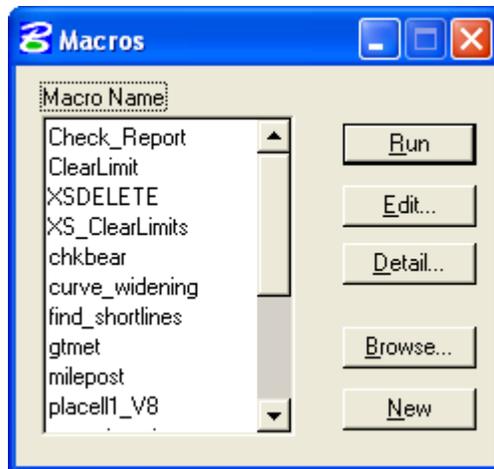


Figure 1-2: Macros List

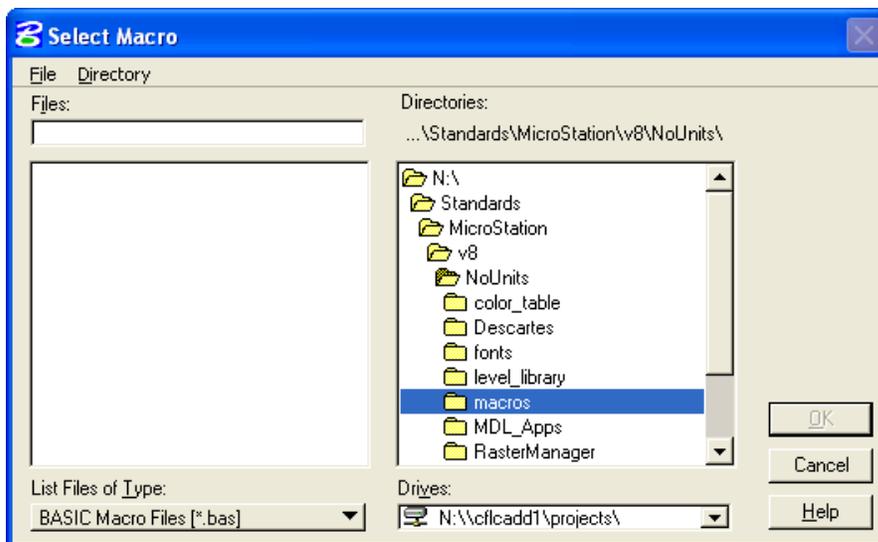


Figure 1-3: Browse to select a Macro

3. *Once the desired macro is selected, click the Run button.*

As stated above, for more complex macros, see the detailed workflows at the end of each chapter.

The dialog above shows the standard CFL CADD support directory structure. For CFL consultants, a list of standard macros and descriptions may be viewed and downloaded from: [click here](#)