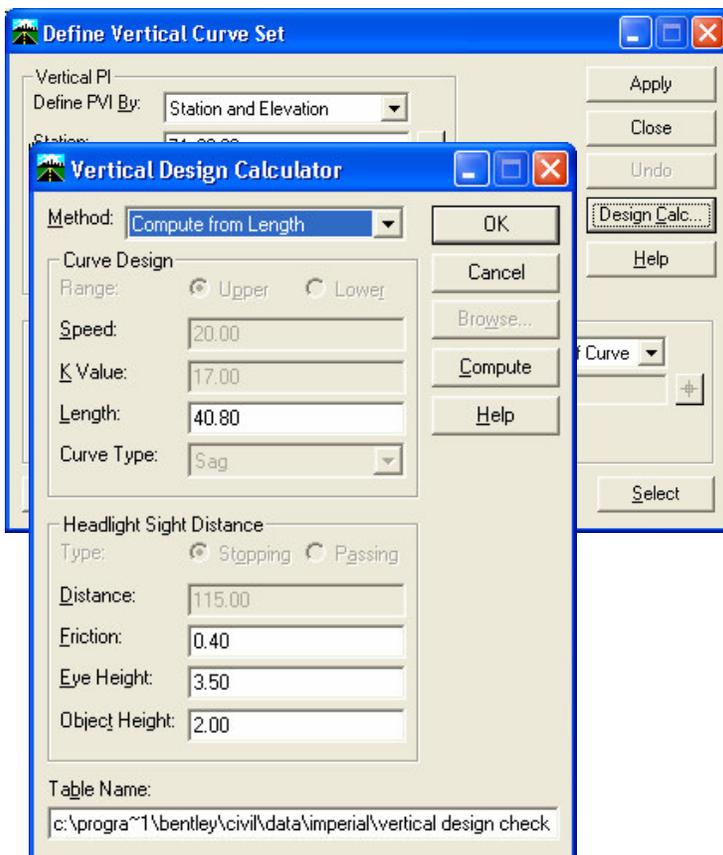


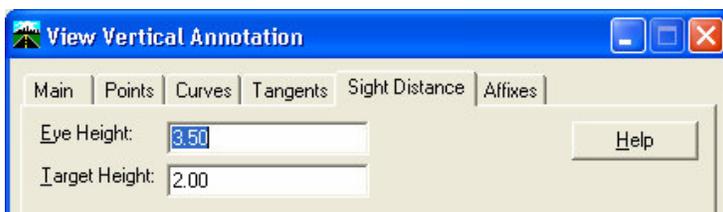
## ATTENTION DESIGNERS

**Superelevation Notice: The Policy on Geometric Design of Highways and Streets (AASHTO) 2004** has revised the guidelines for Superelevation Design. The present CDOT-Workspace does not contain the revised criteria. Therefore, until further notice, all Superelevation calculations must be performed by hand based on the latest design guidelines. **DO NOT** rely on the InRoads Superelevation calculations. The Superelevation tables are presently being updated to reflect the **AASHTO 2004** changes and will be rolled out to all CDOT InRoads users as soon as this change is complete.

**Sight Distance Notice:** The default Headlight Site Distance Object Height is hard coded into the InRoads Software "Vertical Design Calculator". The Object Height default is being set to 0.5 ft, however **The Policy on Geometric Design of Highways and Streets (AASHTO) 2004** design guidelines updates this value to 2.0 ft.



In the "View Vertical Annotation" dialog box, the target height always displays at 2.00 even if the value in the above procedure has not been changed. Make sure to follow the above Sight Distance procedure.



# Specialty Group Details

## ***CADD Website - Library Details***

**Did you know that** the CADD Website includes Specialty Group MicroStation Details that can be downloaded and used on your projects? These Details are being drawn on appropriate levels utilizing CDOT Workspace Standards. Designers can submit details to your Team Region Representative for review and approval and then details will be included on CDOT Website for use by others.

[Click Here](#) to review your Team Member.

## **MicroStation**

### *CADD Library Details*

**Did you know** that CADD Library Details are being collected? The Details need to be drawn on appropriate levels, utilizing CDOT Standards. Designers can submit details to Region Representative for review and approval and then details will be included on CDOT Web site for use by others. Submit the drawings to the CADD Manager upon completion.

## General

### CDOT Design Guide

**Just a reminder, did you know** that the **CDOT *Design Guide* 2005** is available at the following link: [CDOT Design Guide 2005](#) under the Manuals section (CDOT Design Guide 2005). This design guide supersedes the 1995 guide. You will find this guide to be extremely well written and a very useful tool.

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# 1. INTRODUCTION

Cell libraries contain cells which represent symbols, patterns, details and terminators that are available to all users. Cells eliminate the need for each user to redraw frequently used information over and over.

MicroStation has two different kinds of cells, point cells and graphic cells. The major differences between the two types of cells are as follows: the symbology (level, color, style and weight), the behavior of the cell when the view is rotated, snap points on the cells and flexibility of external system resource files.

## ***Graphic Cells***

- When the cell is placed it retains its symbology. In other words, if the elements in the cell were drawn in color=3, style=1 and weight =2, the same symbology will be used when the cell is placed in the file.
- Graphic cells rotate with respect to the view.
- All elements of the cell are snappable.
- They are not 'tied' to system resource files. Attribute and database linkages can be attached to them.
- Graphic cells can be very complex and include data fields.

## ***Shared Cells***

A cell can be placed as a "Shared Cell". A shared cell is stored in the DGN file. To place the same cell in the future, the cell library does not need to be attached.

## ***Point Cells***

- Point cells take on the current symbology settings when placed into a DGN file.
- Point cells do not rotate when the view is rotated.
- Point cells are only snappable at their origin point.

## ***Pros and Cons***

### ***Graphic Cell***

- A cell has to be created for every situation. For example, if there are levels for Storm Drains and Electric Lines and you need a manhole. A manhole cell must be created using the symbology of that level. If a point cell is used, the user can use one cell taking on the active symbology of the needed level.
- All elements of a graphic cell are snappable. Graphic cells should not be used in situations where the cell is placed and the coordinates of that cell

---

are need in the future. Mistakes are bound to happen due to the whole cell being snappable.

- Each time a graphic cell is placed in the dgn file, the library definition is stored in the design file resulting in an increase in file size.

### ***Point Cell***

- Only one cell needs to be created for many situations.
- Point cells are only snappable at their origin. Control points, elevation spots, etc should be created using point cells.
- Point cells do not rotate when the MicroStation view is rotated.
  - BHI created a MDL called Pcell2Gcell.ma that can be used to change Point cells to graphic cells if the cell needs to be rotated in the view.

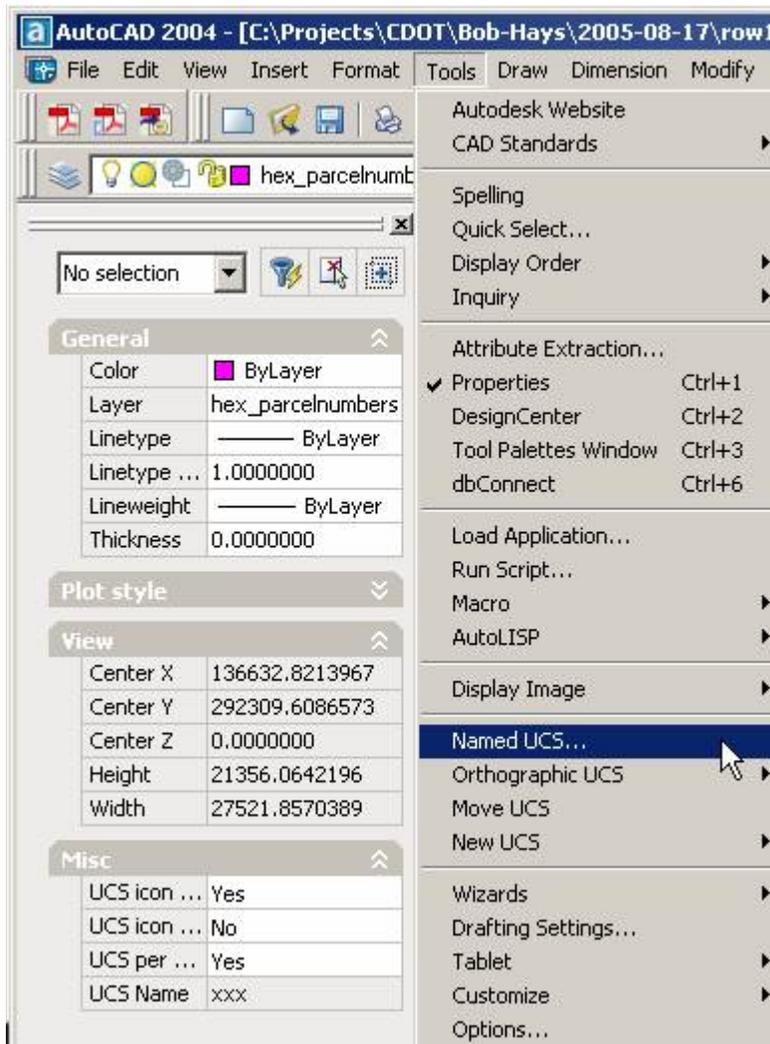
### ***Summary***

CDOT's cell libraries should have both graphic and point cells available. The key is to determine when the cell is going to be used and how that cell will be viewed in the plan set drawings.

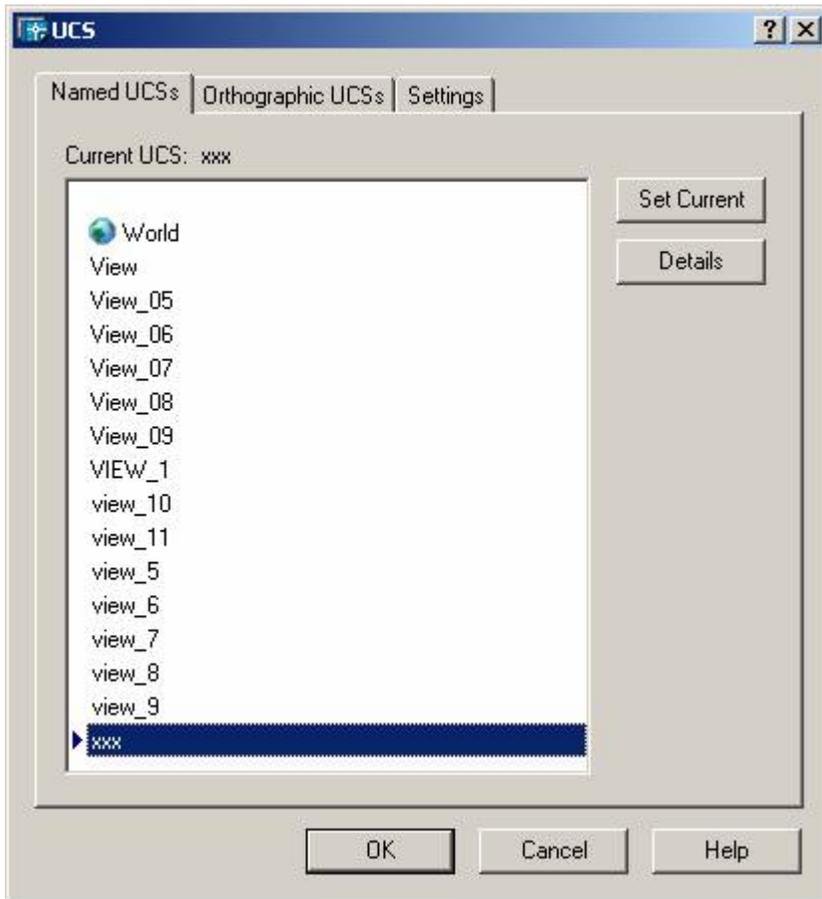
## Changing From UCS to WCS in AutoCAD

This workflow could be useful for Corridor projects or mapping that was received by outside Agencies (Cities, Counties, other consultants) where other phases of the project are in AutoCAD and need to be referenced into a MicroStation project, but continually come into the wrong coordinate system when referenced. It may be due to a User Defined Coordinated System (UCS) within AutoCAD which may need to be updated to a World Coordinate System (WCS).

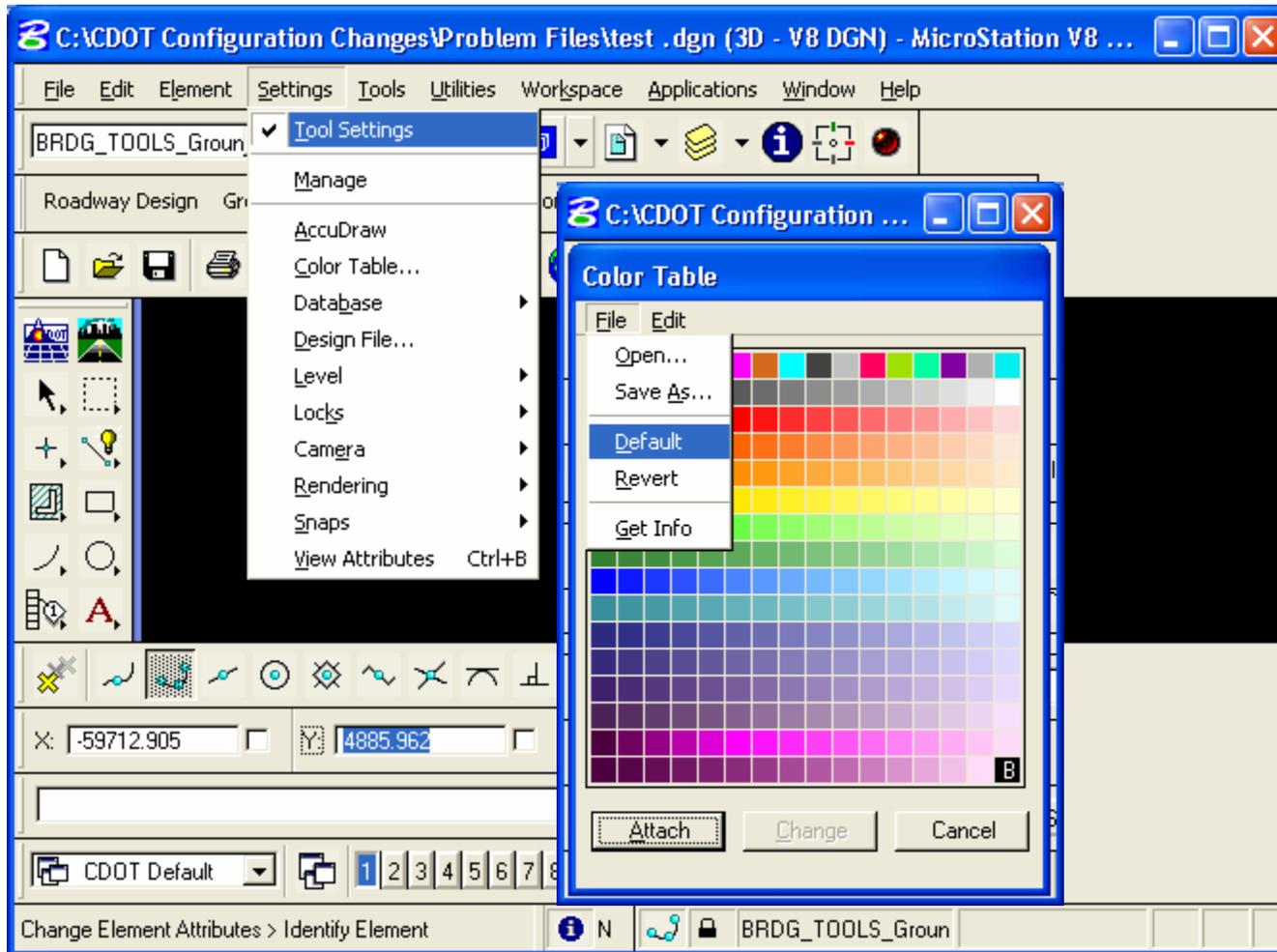
Here is the workflow to change the UCS back to the WCS. Go to the item below in AutoCAD.



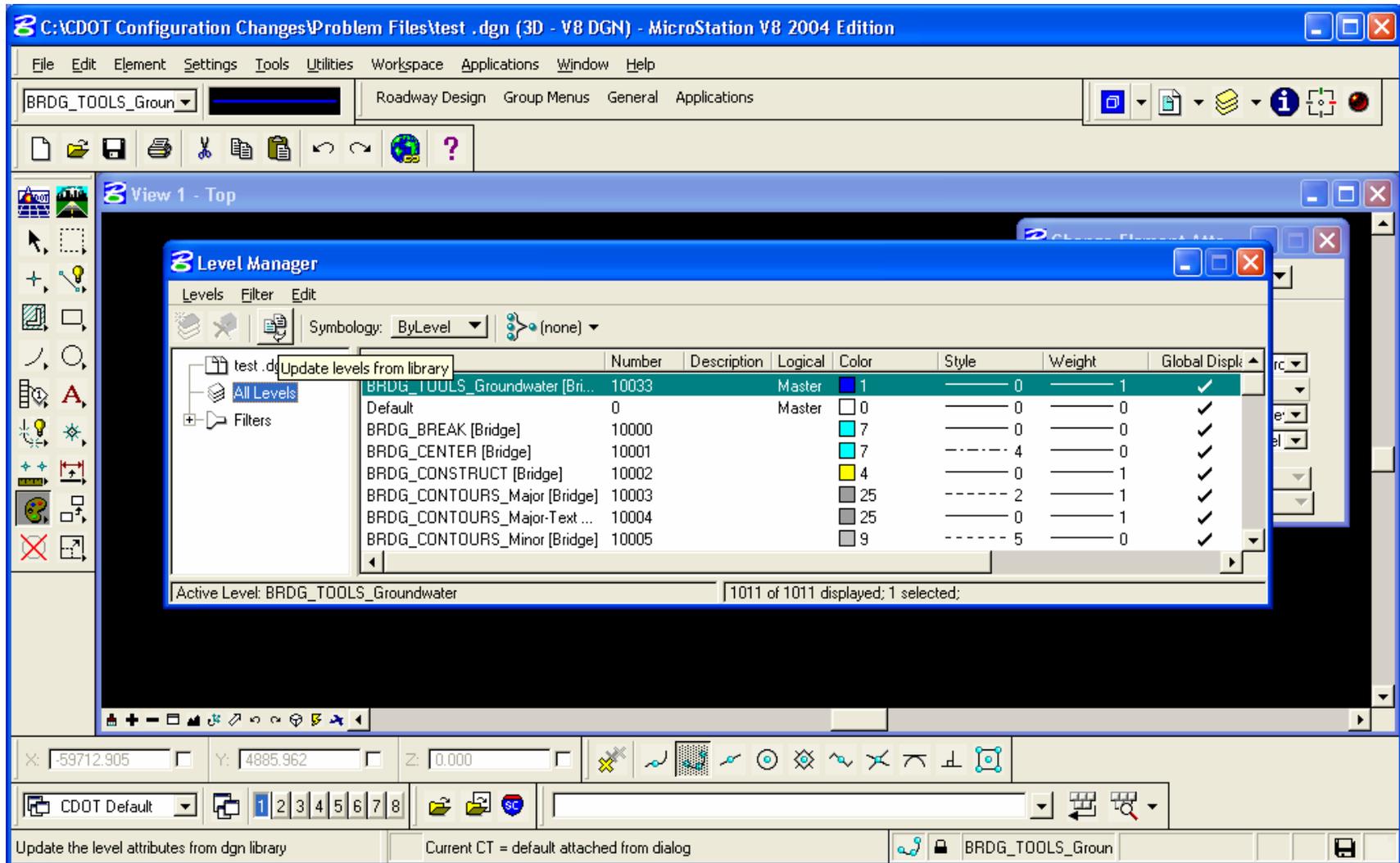
That brings up the dialog box:



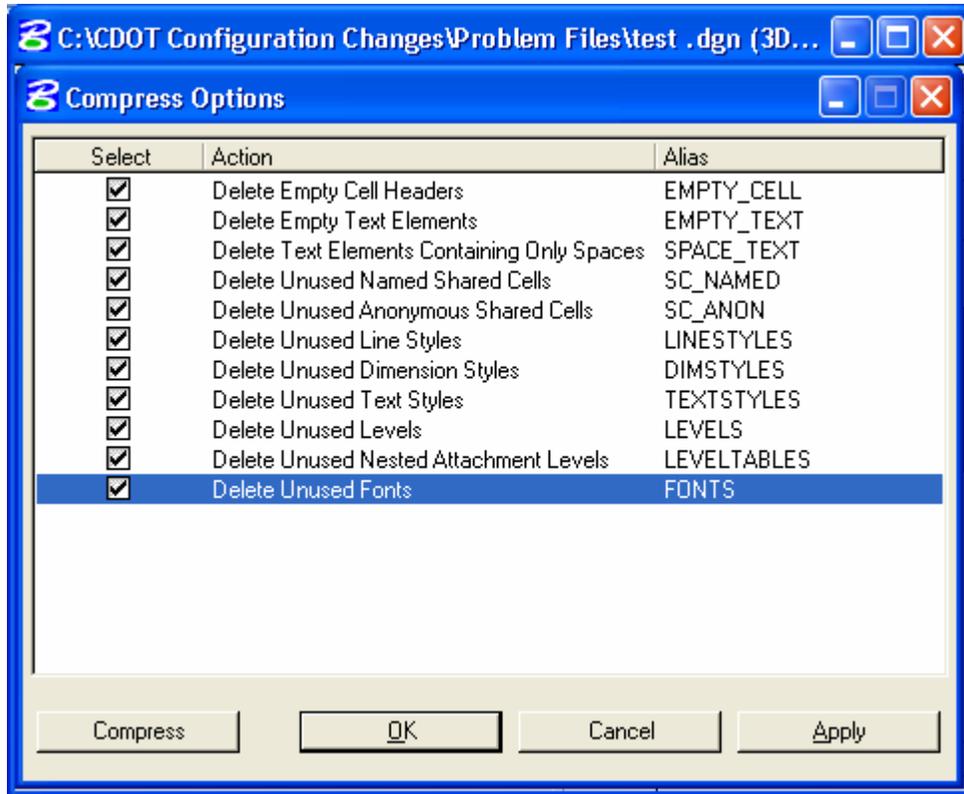
Highlight World and Set Current. That brings you back to the default WCS and Save the file when you exit AutoCAD. Then reference as required into MicroStation.



Check Color Table, reset if need be. Color 1 is blue in MicroStation not Red.



Update levels from Library if there is an Asterick next to the level.



Compress the design file with the compress options all turned on.

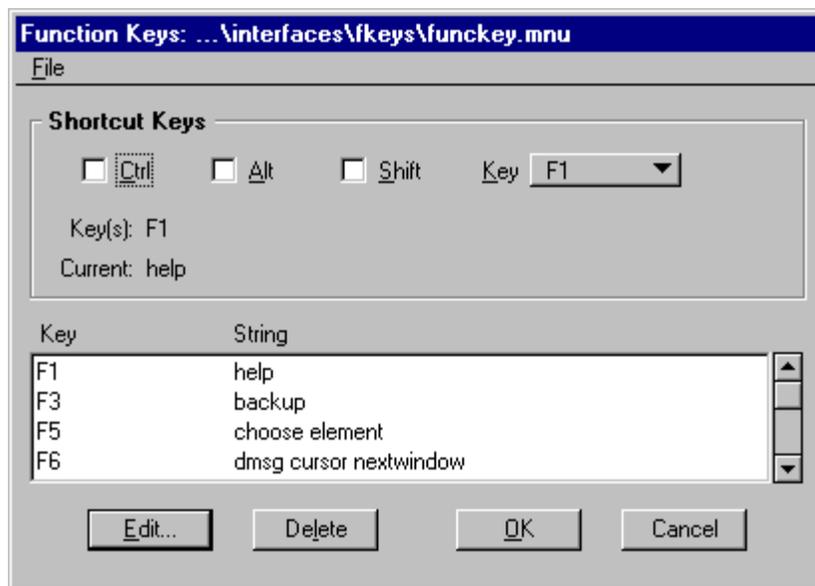
Make sure to do a file save settings before exiting the file. This will save the Color Table changes.

## Function Keys — How to Control and Benefit from them

MicroStation provides a number of tools that can aid any designer to increase the speed and accuracy of design work. One of these is function keys. They offer a quick way to accomplish many tasks and are very easy to configure and change.

The basic concept of function keys in MicroStation is to associate a key-in command or a series of key-in commands to a function key on the keyboard or a combination of a function key and the “Shift”, “Alt” and “Ctrl” keys. This gives you 96 unique combinations. Since almost anything can be done with key-in commands in MicroStation, the possibilities for their use are only limited by your imagination.

After a default installation of MicroStation, a standard function key menu is loaded when MicroStation is started. To find out which function keys are mapped and the commands they are mapped to, click on the “Workspace” pulldown menu on the main MicroStation menu bar and select “Function keys...”. This opens the “Function Keys” dialog box as shown below.



Notice that the name of the file which defines the values in this dialog box is displayed in the title bar at the top. Funckey.mnu is the default menu file name. The file is located in the: C:\Program Files\Workspace-CDOT\Standards-Local\Users\”individual user’s name” in the CDOT Configuration.

Any function key combination that is currently being used is listed in the display area at the bottom of the dialog box. To see all the values you can simply scroll down the list. If you notice a missing function key or combination it just means that it has not been defined yet. In the image above you can see that function key “F1” is assigned to the key-in command “help”. That’s why when you hit the F1 key the MicroStation help file opens up. The “F2” key in the image above is assigned to a series of two key-in commands. If you look closely you can see they are separated by a semicolon (;). The semicolon is the character you use to separate multiple key-in commands entered on a single line. The MicroStation key-in “dialog reference” opens the reference file dialog box. The second key-in “reference display design” makes sure the reference file dialog displays the vector reference file attachments. As a note I have the “Shift-F2” combination mapped to “dialog reference;REFERENCE DISPLAY RASTER”. This allows me to quickly change between raster and vector reference display, which is something I frequently do.

The area at the top of the dialog box labeled “Shortcut Keys” is used to designate the function key you want to view, change or define. The check boxes next to “Ctrl”, “Alt” and “Shift” can be clicked on or off independently in any combination. The “Key” drop-down button to the right of these check boxes and labels has the choices “F1” through “F12” representing each of the function keys on your keyboard. By clicking on the appropriate check boxes and selecting a function key in the “Shortcut Key” section, you can view that

combinations current value, click the delete button at the bottom of the dialog to remove it's current assignment or use the "Edit" button to change its existing value or create a new value if it is currently undefined.

As a simple example of how function keys can save a lot of time in doing repetitive tasks, let's set up the function key combination "Shift-F11" so that when pressed, it will close all view windows, then open view one maximized and fit the view. This could be used as part of setting up deliverables to meet a client's standard. To start you would want to work out the key-in commands required to accomplish the above and test them manually to make sure they worked. The string that we will use to do the above is.

"view off all; view on 1;window tile;fit all;selview 1"

Now open the "Function Key" dialog as described above and click on the "Shift" checkbox and select "F11" from the drop-down button. If this combination is being used it will highlight in the display box in the bottom section of the dialog box. If it is not defined you will see (undefined) next to the label "Current". In either case click the "Edit" button. This opens the "Edit Key Definition" dialog box. Now type the key-in string from above into the "New" field. Keep in mind that there is a 56 character limit in entering key-in commands in this dialog. In another tip I will show you how to overcome this limitation, but for now, when the string is entered click the "OK" button to close the dialog. When you are done making changes to the function key list click the "OK" button on the main "Function Key" dialog box.

Clicking the "OK" button will bring up an "Alert" dialog box asking the question, "Save changes?", with three choices: "Yes", "No" and "Cancel". "Yes" saves the changes to the file listed at the top of the "Function Keys" dialog box. "No" closes the dialog box with your changes active for the current session but does not save the changes you made to the file. "Cancel" returns you to the "Function Keys" dialog box.

As a final note the main "Function Keys" dialog box has a "File" pulldown menu that allows you to "Open", "Save As" or "Save" function key menu files. If you create a new menu file and open it remember that it will only remain active in the current session unless you update the value of the MS\_FKEYMNU environment variable to point to this new file and in the CDOT Configuration this is not an option.

## **MicroStation**

### *CADD Library Details*

**Did you know** that CADD Library Details are being collected? The Details need to be drawn on appropriate levels, utilizing CDOT Standards. Designers can submit details to Region Representative for review and approval and then details will be included on CDOT Web site for use by others. Submit the drawings to the CADD Manager upon completion.

## CADD Manual

### MicroStation and InRoads Key-Ins

**Did you know** that the new CADD Manual contains two reference documents that may be of particular use to those that use Key-Ins? These documents attached below are called [MicroStation Key-in Reference](#) and [InRoads Key-in Reference](#). They can also be found in the [CDOT CADD Design Manual](#) under Chapter Six, Drafting Guidelines, 6.6 Key-Ins.



## MICROSTATION KEYIN REFERENCE

This document provides a MicroStation alternate keyins.  
These keyins can be typed into the Key-in Browser individually or strung together by a semicolon.



### Angle

**AA**= Sets the active angle

### Auxiliary Coordinate Systems

**AD**= Places relative data points  
**AX**= Places absolute data points  
**PX**= Deletes an ACS  
**RX**= Attaches an ACS  
**SX**= Saves the current ACS

### Cells

**AC**= Sets the Active Cell and activates the Place Cell tool  
**AP**= Sets the active pattern cell  
**AR**= Sets the Active Cell, and activates Place Cell Relative  
**CC**= Create Cell from fence or selection set  
**CD**= Delete Cell from attached cell library  
**CM**= Creates an array of cells  
**CR**= Rename a cell in the attached cell library  
**LT**= Sets the active line terminator cell  
**PT**= Sets the active point used with the Place Point command.  
**RC**= Attaches a cell library

### Color

**CT**= Attaches a color table

### Dimensioning

**LD**= Sets the level for dimension data  
**TV**= Sets the dimensioning tolerance limits

### Element Symbology

**CO**= Sets the active color  
**LC**= Sets the active line style  
**WT**= Sets the active line weight

### Files

**EL**= Creates an element list file  
**FF**= Copy the contents of a fence to a new or existing file  
**RD**= Open another design file  
**RF**= Attach a reference file  
**SF**= Move the contents of a fence to a new or existing file  
**XD**= Exchanges the active file with a reference file

### Grid

**GR**= Sets the active grid reference spacing  
**GU**= Sets the distance of the grid dots in working units  
**UR**= Sets the unit round off

### Line Terminators

**LT**= Sets the active line terminator cell  
**TS**= Sets the scale factor for the active terminator

### Levels

**LV**= Sets the active level  
**OF**= Turns levels off  
**ON**= Turns levels on

### Patterns

**AP**= Sets the active pattern cell  
**PA**= Sets the pattern angle for pattern cells  
**PD**= Sets the spacing between patterns  
**PS**= Sets the active pattern scale

### Precision Input

**DI**= Places a data point at a given distance and direction  
**DL**= Places a data point at a given X, Y and Z distance along the design axes  
**DX**= Places a data point at a given X, Y and Z distances along the view axes  
**XY**= Places a data point using absolute coordinates

**Scale**

**AS=** Sets the active scale  
**XS=** Sets the active X Scale  
**YS=** Sets the active Y Scale  
**ZS=** Sets the active Z Scale

**Stream digitizing**

**SD=** Sets the stream delta  
**ST=** Sets the stream tolerance

**Text**

**DF=** Opens the Fonts dialog box  
**DR=** Displays a text file  
**FT=** Sets the active font  
**LL=** Sets the maximum line length for text  
**LS=** Sets the lines spacing for multiple lines of text  
**NN=** Sets the active text node number  
**TB=** Sets the tab spacing when importing text  
**TH=** Sets the text height  
**TI=** Sets the copy and increment value  
**TW=** Sets the Text Width  
**TX=** Sets both the height and width of the text

**View Control**

**DV=** Deletes a named or saved view  
**RV=** Rotates a view  
**SV=** Save a view  
**VI=** Attaches a saved view  
**WO=** Sets the window origin

**View Control – 3D**

**AZ=** Sets the active depth - absolute  
**DD=** Changes the display depth - relative  
**DP=** Sets the display depth - absolute  
**DZ=** Sets a new active depth - relative

**Miscellaneous**

**KY=** Sets the keypoint snap divisor

## INROADS KEY-IN REFERENCE

This document provides the InRoads key-ins that can be used with the MicroStation key-in browser.



### Station key-in formats

When using alignment station values conventionally there is a plus sign “+” between the second and third digits. InRoads will allow you to input the station with or without the plus sign in the MicroStation Key-in Browser and InRoads dialogs.

- 15+15.25
- 1515.25

### Slope key-in formats

When entering slope or grade information in InRoads dialogs and the MicroStation Key-in Browser you can use the below formats.

To key-in a grade of 10 percent:

- 10%
- 1:10
- .10

### Angle key-in formats

When entering angles in InRoads dialogs and the MicroStation Key-in Browser you can use the below formats.

To key-in a bearing of N12°34'56"E:

- N12^34'56"E
- N12.5822E

### Plan View key-ins

#### **Northing Easting Elevation (NE=)**

NE=northing,easting,[elevation]

NE= 2842525.75,1558050.78,11530.47

#### **Station Offset Elevation (SO=)**

SO=station,offset,[elevation],[alignment name],[project name]

SO=1500,-25,0,siderd01,geometry01

#### **Distance Direction (DI=)**

DI=distance,direction

DI=100,n45e

**Cross Section and Profile key-ins**

Delta Offset (DO=)  
DO=delta,offset  
DO=50,-10

Distance Grade (DG=)  
DG=distance,grade  
DG=200,50%

**Cross Section key-ins**

Offset Elevation (OE=)  
OE=offset,elevation  
OE=50,11430

**Profile key-ins**

Station Elevation (SE=)  
SE=station,elevation  
SE=19+50,11430



### **Directions:**

**I-25 to 6<sup>th</sup> Avenue///6<sup>th</sup> Avenue west to W. Colfax  
Left onto W. Colfax///W. Colfax to Corporate Drive  
Left onto Corporate Drive/// Corporate Drive to stop sign  
Left onto Corporate Circle///CDOT building on left side of the street.**

# InRoads

## **MicroStation File Open and InRoads**

**Did you know** that the File Open command within MicroStation, closes the last MicroStation drawing file but does not Exit the InRoads program? Unlike AutoCAD, MicroStation only opens one file at a time, thereby closing the previous file while opening the next file. The File Close option will close InRoads completely, so try the file open command instead.

# MULTIPLE ACCUDRAW SHORTCUT FILES

**By Seth M. Cohen, ProSoft NET**

Is your MicroStation desktop cluttered with toolframes & toolbars? Are you sacrificing precious desktop real estate because “YOU GOTTA HAVE THAT ICON”? If so, then creating multiple AccuDraw key-in shortcuts will let you reclaim your desktop!

What is AccuDraw? According to the MicroStation/J help, “AccuDraw is a drafting aid that evaluates such parameters as your current pointer location, the previously entered data point, the last coordinate directive, the current tool's needs, and any directive you have entered via either keyboard shortcuts or AccuDraw options. AccuDraw then generates the appropriate precision coordinates and applies them to the active tool”. The topic that we will be discussing is AccuDraw shortcuts.

## ACCUDRAW SHORTCUTS

The functionality of AccuDraw shortcuts is to run MicroStation key-in commands. This is accomplished by the user creating a shortcut to a desired key-in by associating two alphanumeric characters to that key-in.

Here is an example of how to create an AccuDraw shortcut, and how they can make drafting more efficient, and increase your MicroStation desktop.

Wouldn't it be nice if.....you could turn off the display of, let's say, 150 reference files without having to:

- 1) Open the Reference File Dialog box
- 2) Select all the reference files
- 3) Click the display toggle on the Reference File Dialog to off
- 4) Click the Update All icon to refresh the view

Well with AccuDraw, you could set two shortcuts to toggle all the reference files on and off. Here's how:

First, we will define two shortcuts that will act like switches. The shortcuts are, **R0** and **R1**. R0 would turn all reference files off, and R1 would turn all reference files on.

To accomplish this, open AccuDraw by keying in ACCUDRAW DIALOG MAIN, or click the AccuDraw icon on the primary toolbar. When the AccuDraw window appears, press the question mark (Shift + /), which will open the AccuDraw shortcuts window (see *Figure 1*). Click on the New button. When the Edit Shortcut Dialog appears, type in the following data (see *Figure 2*):

Shortcut – **R0**

Description – **all ref's (display) off**

Command – **REFERENCE DISPLAY OFF ALL;UPDATE ALL**

Choose **OK**.



*Figure 1*



*Figure 2*

For the shortcut that turns on all reference files, click the New button again but replace the Shortcut field with R1, and replace “OFF” (in the Command field) to “ON”.

That’s it! Now, when you want all 150 reference files turned OFF or ON, type R0 or R1.

Here are a couple of tips on using AccuDraw shortcuts:

- 1) For AccuDraw shortcuts to work correctly, the AccuDraw Window will need the “focus”. To move the focus to the AccuDraw Window, the following can be done:
  - a. Press the ESC key
  - b. Assign the following key-in to a function key: ACCUDRAW DIALOG MAIN.  
Whenever you need focus in AccuDraw, press the Function Key.
  - c. To assure that the focus stays in the AccuDraw Window as much as possible, choose Workspace > Preferences > Category-Tools, and toggle the Auto-Focus Tool Settings Window OFF.
- 2) MStoys.ma\* is an MDL that adds the key-in commands ACCUDRAW ROTATE ELEMENT and ACCUDRAW SUSPEND. These key-in commands rotate the AccuDraw compass to the angle of any element and temporarily suspend AccuDraw, respectively.
- 3) You can string commands together by using a semi-colon(;). Doing this reduces the amount of “clicks” or movement that you will have to do with the mouse. An example of this would be:  
Shortcut - CB, Command - REFERENCE CLIP BOUNDARY;ALL;CHOOSE ELEMENT. This shortcut will clip the boundary of all reference files, after a fence is defined (and you don’t even have to open the Reference File dialog or Reference tool box).

\*To obtain a copy of this MDL go to the following web address:

<http://www.mindspring.com/~rob.brown/microstation/mstoys/mstoys.html>

### **“HEY SETH, WHAT ABOUT FUNCTION KEYS?”**

Now you might be saying “Why should I use AccuDraw? I could use function keys.” Well one major advantage of AccuDraw shortcuts is that you can make shortcuts that make sense. Unlike using Function Keys (F1, F2, ALT+CTRL+F1, etc.) AccuDraw shortcuts can “sound” like the key-ins they are created for. For example the Copy command could be CO, the Rotate command could be RO, etc. Plus, you won’t get carpotunnel syndrome from trying to activate the ALT+CTRL+Shift+F8 function key.

### **LIMITATIONS OF ACCUDRAW SHORTCUTS**

This is not to say that using AccuDraw shortcuts does not have its limitations as well. One limitation is that there is no way to have single letter and two letter shortcuts that begin with the same letter. In other words, you can’t have a shortcut Z and ZW. Another one of AccuDraw’s limitations is that you can only have up to two-character shortcuts. This limitation can be very frustrating when developing a list of shortcuts meant to improve your productivity. For instance, let’s say you wanted to create a shortcut for the Copy command (key-in COPY EXTENDED). The obvious two-letter shortcut would be CO. What if CO were already taken? And CP? And CY? There is no way to get by this limitation of AccuDraw’s functionality.....Until now.

### **MULTIPLE ACCUDRAW SHORTCUT FILES**

This brings us to the main subject of this article. How can we allow MicroStation to use more than two characters for shortcuts? The answer is simple. We can create a MicroStation BASIC macro that acts

like a switch, and loads another AccuDraw shortcut file for you. With help from a former fellow employee of mine, David Munro, P.E., a Project Engineer at CLD Consulting Engineers Inc. in Manchester NH, we created such a macro.

Here is the Macro:

'Shortcut.bas - Used to Load AccuDraw Shortcut files

---

'Assumes custom shortcut files are in location:

'c:\bentley\workspace\standards\data\

'Command syntax: "MACRO SHORTCUT SHORTCUTS"

'where "shortcuts" is the shortcut file to be called.

1. Sub main
  2. Dim status as Integer
  3. Dim fileName as String
  4. Dim strTemp as string
  - 5.
  6. MbeSendCommand "NoEcho"
  - 7.
  8. fileName = Command\$
  - 9.
  10. strTemp = "c:\bentley\workspace\system\data\" & fileName & ".txt"
  11. status = MbeDefineConfigVar("MS\_ACCUDRAWKEYS",strTemp)
  12. MbeSendCommand "ACCUDRAW SHORTCUTS READFILE"
  - 13.
  14. MbeSendCommand "Echo"
  15. End Sub
- 

You don't have to be a programmer to understand how the BASIC program is working. Here is a breakdown of the code. If you don't care to know, please feel free to skip to the section titled "*Getting The Files In The Right Place*".

- 1) The first three lines (after Sub main) define variables.
- 2) Line 6 is very important for certain shortcuts. "No Echo" tells MicroStation not to display messages like "MACRO <macro file> LOADED " etc. in the message area (any messages in the lower right corner). By disabling the messages from appearing, the user has full sight of the current snap mode, selection set count, etc.
- 3) "Command\$" is a MicroStation BASIC command that returns a string representing the argument from the command line used to start the macro. In other words, any text entered after the key-in " MACRO <macro file>" will get sent to the Command\$ string variable, which I have equated to fileName.

Here is an example.

Shortcut = **C1**

Key-in = MACRO SHORTCUT COLORS

This key-in runs the macro *shortcut.ba* and passes “COLORS” to Command\$. The macro then takes COLORS and stores it in the variable cmd.

- 4) Then, we define the variable strTemp to equal the path (default) of the shortcut files, and we append (&) the contents of the cmd variable with a TXT extension. The TXT extension is added so we don't have to type .txt in every AccuDraw shortcut that we use to call another file.
- 5) Next we redefine the value of the MS\_ACCUDRAWKEYS variable to equal strTemp.
- 6) Then we Send a Command to MicroStation with the key-in ECHO, which re-initializes the messages display.

## **GETTING THE FILES IN THE RIGHT PLACE**

Now we need to look at where to put our AccuDraw shortcut file. A few questions need to be answered first.

- 1) Are you running a network setup (i.e. your workspace is located on a server) and users have roaming profiles?
- 2) Are you running a localized setup (MicroStation “out of the box”)?
- 3) Will users be responsible for creating their own shortcut files or will one user maintain the files?
- 4) Do you wish to stay in the shortcut file that you call, or do you want to revert back to a “master shortcut file” once the shortcut loaded is executed (will expand on this later).

Here are some suggestions for implementing multiple AccuDraw shortcut files defined by each setup.

### Network Setup using Roaming Profiles and The Master Shortcut File (preferred setup)

This setup requires that you create and store the AccuDraw shortcut files in the user's roaming profile. This is a great way to allow each user at your site to maintain/create their own shortcut files. This way, each user will create/assign shortcuts that make sense to them. Additionally, the user can log onto any machine in the network (with MicroStation loaded on the machine) and use their shortcut files.

The following is a list of items that will need to be changed/edited:

#### **1. Initial definition of MS\_ACCUDRAWKEYS in a site configuration file.**

An example of this is: MS\_ACCUDRAWKEYS = \$(PROFILE)shortcuts/shortcut.txt

The \$(PROFILE) variable, uses the WinNT environment variable \$(USERPROFILE) to expand the variable definition to c:\winnt\profiles\\bentley\shortcuts\shortcut.txt. Be careful if you change over to Windows 2000 Professional, as the \$(USERPROFILE) variable is defined as c:\documents and settings\.

#### **2. Define the folder location of the Multiple AccuDraw Shortcut files.**

This is up to you where you wish the shortcut files to be located, but I recommend using the location that is already defined in step number one. The folder location defined in step 1 is c:\winnt\profiles\\bentley\shortcuts\.

#### **3. Place the macro in a path defined by MS\_MACRO**

Usually, a folder(s) exists on the network where macros are placed for all users to have access to. This folder is defined by the MicroStation variable MS\_MACRO. An example definition of MS\_MACRO is: MS\_MACRO > \$(\_USTN\_SITE)macros/. \_USTN\_SITE expands to

\$\_(USTN\_WORKSPACEROOT)standards/. If you're not sure of what I am talking about, please call me (really, I mean it).

#### 4. The strTemp variable in the macro.

In the macro shown above, strTemp is defined as "c:\bentley\workspace\system\data\" & fileName & ".txt". For the macro to find the shortcut files in the user's roaming profile, we must change strTemp to:

```
strTemp = "$(\PROFILE)\shortcuts\" & fileName & ".txt".
```

You also have the option to place the shortcut files in one location that only a certain group of individuals have access to. Then you can then set network permissions to allow which users will maintain and create the shortcut files. You still have to complete the steps above, except the definition of the location folder and the Master Shortcut file (Steps 1 and 2) are set to a folder that all users can share on the network.

#### Local Setup and The Master Shortcut File (using MicroStation "out of the box")

The local setup is the easiest of all. The only requirement is to create/edit the AccuDraw shortcut files and place them in the default location defined by MS\_ACCUDRAWKEYS (c:\bentley\workspace\system\data). The only other requirement is that you place the macro in a location where MS\_MACRO is defined (c:\bentley\workspace\system\macros).

#### **What do I mean by "The Master Shortcut File"?**

AccuDraw shortcuts and files can be setup in two ways:

- Method 1. Use a master shortcut file, and when the macro is used to switch to another file, each shortcut in that "switched file" will be created so that they switch back to the master shortcut file.
- Method 2. When the macro is called to switch to another file, the shortcuts in *that* file will be defined so that they *don't* switch back to the master shortcut file, rather the user stays in the file called and can create a commonly named shortcut in each file that switches back to the master shortcut file .

I know, this sounds a little confusing, but it's REALLY easy to setup. The table below helps better describe this:

#### Method 1:

##### Example shortcuts in The Master Shortcut File (shortcut.txt)

Shortcut	"Description"	Command key-in
"AR"	"Rotate to element"	"ACCUDRAW ROTATE ELEMENT"
"AZ"	"Sets az=0 and dp -5k,5k"	"AZ=0;SELVIEW 1;RESET;DP=-5000,5000;SELVIEW 1;RESET"
"AT"	"Rotate top"	"ACCUDRAW ROTATE TOP"
"BF"	"Wset add"	"WSET ADD;WSET DROP;UPDATE ALL"
"C1"	"Color table shortcuts"	"MACRO SHORTCUT COLORTABLES"
"CA"	"Change attributes"	"MDL L CHANGEBY;CHANGE ELEMENT EXTENDED"
"DI"	"Dialogs"	"MACRO SHORTCUT DIALOGBOXES"

**“MM”**      **“Macro and mdl shortcuts”**      **“MACRO SHORTCUT MACROSANDMDLS”**

*Note the shortcuts bolded. These shortcuts call other shortcut files via the macro.*

Example shortcuts in the dialogboxes.txt shortcut file

<b>Shortcut</b>	<b>Description</b>	<b>Command key-in</b>
“CL”	"Config variables"	"MACRO SHORTCUT SHORTCUT; MDL L CFGVARS"
“FK”	"Function key menu"	"MACRO SHORTCUT SHORTCUT; DIALOG FUNCCKEYS"
“FN”	"Font settings"	"MACRO SHORTCUT SHORTCUT; DIALOG FONT"
“WU”	Working units	“MACRO SHORTCUT SHORTCUT; DIALOG UNITS”
<b>“ZZ”</b>	<b>"Shortcut"</b>	<b>"MACRO SHORTCUT SHORTCUT"</b>

*Note that all the shortcuts contain the key-in MACRO SHORTCUT SHORTCUT along with the desired shortcut. Additionally, the **ZZ shortcut** serves as an, "oops, I pressed the wrong buttons" shortcut, that restores you to the master shortcut file*

Method 2:

Example shortcuts in The Master Shortcut File (shortcut.txt)

<b>Shortcut</b>	<b>Description</b>	<b>Command key-in</b>
AR	ROTATE TO ELEMENT	ACCUDRAW ROTATE ELEMENT
AZ	SETS AZ=0 AND DP -5K,5K	AZ=0;SELVIEW 1;RESET;DP=-5000,5000;SELVIEW 1;RESET
BF	WSET ADD	WSET ADD;WSET DROP;UPDATE ALL
<b>C1</b>	<b>COLOR TABLE SHORTCUTS</b>	<b>MACRO SHORTCUT COLORTABLES</b>
CA	CHANGE ATTRIBUTES	MDL L CHANGEBY;CHANGE ELEMENT EXTENDED
<b>DI</b>	<b>DIALOGS</b>	<b>MACRO SHORTCUT DIALOGBOXES</b>
<b>MM</b>	<b>MACRO AND MDL SHORTCUTS</b>	<b>MACRO SHORTCUT MACROSANDMDLS</b>

*Note the shortcuts bolded. These shortcuts call other shortcut files via the macro.*

Example shortcuts in the dialogboxes.txt shortcut file

<b>Shortcut</b>	<b>Description</b>	<b>Command key-in</b>
CL	"CELL LIBRARY"	"DIALOG CELLMMAINTENANCE"
CV	"CONFIG VARIABLES"	"MDL L CFGVARS"
CZ	"CUSTOMIZE"	"MDL L CUSTOMIZ; CUSTOMIZ DIALOG"
DF	"DESIGN FILE SETTINGS"	"MDL L DGNSET"
DS	"DIMENSION SETTINGS"	"DIALOG DIMSETTINGS OPEN"
FK	"FUNCTION KEY MENU"	"DIALOG FUNCCKEYS"
FN	"FONT SETTINGS"	"DIALOG FONT"
<b>ZZ</b>	<b>"SHORTCUT"</b>	<b>"MACRO SHORTCUT SHORTCUT"</b>

*Note that all the shortcuts contain the key-in MACRO SHORTCUT SHORTCUT along with the desired shortcut. Additionally, the **ZZ shortcut** serves as an, "oops, I pressed the wrong buttons" shortcut, that restores you to the master shortcut file*

**How do I find those key-ins?**

So, how do you find out all those key-ins? There are many ways to find out key-ins, but I am going to cover two, for brevity's sake:

1. An MDL utility called ALTKEYIN
2. Run the Macro Recorder tool

The first tool is an “Alternative key-in” to the MicroStation Key-In window. ALTKEYIN extracts any MicroStation key-in that you invoke by clicking on an item from the pull-down menus or from clicking an icon on a toolbox. ALTKEYIN “grabs” the key-in and populates the AltKey-In window (see figure 3).

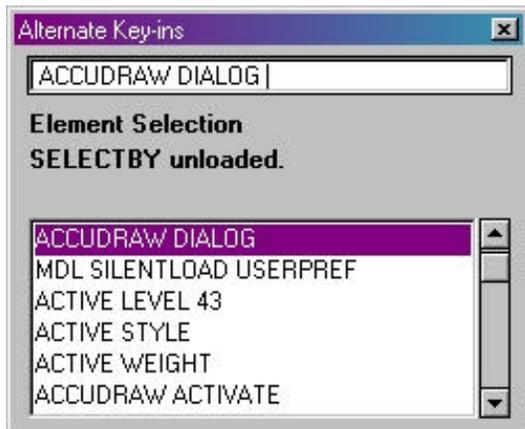


Figure 3

To copy the key-in from the AltKey-In window:

- 1) Put the focus in the AltKey-In field
- 2) Press the Up and Down keys on the keyboard to cycle to the desired key-in(s)
- 3) Select the text
- 4) Press CTRL+C to copy the text to the clipboard.

Now you can create your shortcut by pasting the command syntax into the command field of the Edit Shortcut dialog box. So, you ask, how do I get a copy of this awesome utility? E-mail [info@prosoftnet.com](mailto:info@prosoftnet.com), and we will e-mail you the free ALTKEYIN utility.

The second way to find your desired key-ins is to run the Macro Record tool. Here are the steps:

1. Choose **Utilities > Create Macro...** from the MicroStation pull-down menu
2. Give the macro a name. Notice the Record Macro dialog appears (see figure 4)
3. Choose/pick the commands that you wish to extract
4. Click the Stop button on the Record Macro dialog to stop the macro from recording
5. Choose **Utilities > Macros** and notice the Macros dialog points to the newly created macro
6. Open the macro to see the key-ins that were invoked
7. Copy the desired key-ins to the command field of the Edit Shortcut dialog box or create a shortcut that runs your newly created macro



Figure 4

## **Reasons to try AccuDraw**

Implementing AccuDraw shortcuts at your site can increase your productivity two-fold. I will explain this statement with a real life example.

Prior to working with ProSoft, I was a Highway Design Technician / MicroStation & InRoads Coordinator, supporting Engineers and Technicians with drafting and minor engineering tasks. My primary work involved Design for the Vermont Agency of Transportation (VTrans), New Hampshire Department of Transportation (NHDOT) and Maine Department of Transportation (MDOT). One of the tasks involved with Highway design is making revisions to a set of Roadway Plans that an Engineer would mark up (lot's of red ink). Although user might find this task tedious and boring, I loved performing this task as it involved (for me) the use of AccuDraw shortcuts. I would challenge myself to create as many shortcuts that I needed without using any pull-downs or icons. This is of course why my Master Shortcut file contains approximately 150 shortcuts.

One day, I decided to see if spending all this time creating these shortcuts was truly making me more productive, and wasn't wasting company time. My test was to take a part of a set of plan sheets, time myself and perform all the edits without using any AccuDraw shortcuts (i.e. using pull-downs and icons only). Then, do the same edits using my AccuDraw shortcuts. I performed these edits on the "Typical Sections Sheets". Typical sections are a set of plan sheets that show the cross sectional view of the designed roadway at major changes. Here are the results of this test:

- 1) Typical Sections with pull-downs and icons only – 1 ½ hours
- 2) Typical Sections using AccuDraw shortcuts only – 45 minutes

As you can see from this test, using AccuDraw shortcuts increased my productivity by two!

## **Conclusion**

Am I saying that you too can increase your productivity two-fold? Maybe not. What I am saying is to give AccuDraw shortcuts a try and you too will reap the benefits from one of MicroStation's best tools.

Also, I am providing (free of charge) all my AccuDraw shortcut files and the macro used to switch between shortcut files in a convenient ZIP file. These shortcuts are over 7 years in the making, in 13 different shortcut files, and total more than 350 shortcuts in all! Simply e-mail [info@prosoftnet.com](mailto:info@prosoftnet.com), and we will send you the ZIP file.

Take back your MicroStation desktop and increase your drafting productivity today, with the use of multiple AccuDraw shortcuts!

*Seth M. Cohen is a technical writer for ProSoft NET and has been using MicroStation since 1995. He is a certified instructor for the MicroStation CAD Manager class, InRoads, InRoads Site and InRoads Survey. Seth can be reached at [scohen@prosoftnet.com](mailto:scohen@prosoftnet.com) and by phone at 207-781-7000 or 888-781-7000 (toll-free).*

# Redline

## ***Opening an Editable Redline File***

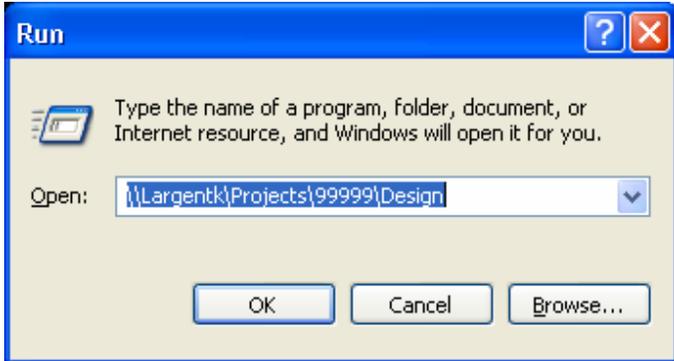
**Did you know** that if a file is opened in a read only mode, then there are only a few commands that are allowed in Redline. It will be very obvious to you as the icons will not look anything like the training. You will be in a "View" only mode. Also check in the lower right hand corner of the screen, to see if there is a Red "X". If so the file is being opened as read only. In order to open the file for Redline use, try using Start > all programs > Bentley Redline > and select the Bentley Redline executable. You can right click on the executable and send to desktop for a shortcut to the command in the future.

**Method for connecting to Project Manager's machine. Including: creating a Shortcut, updating Project Configuration File (PCF) and setting up Project Defaults within InRoads**

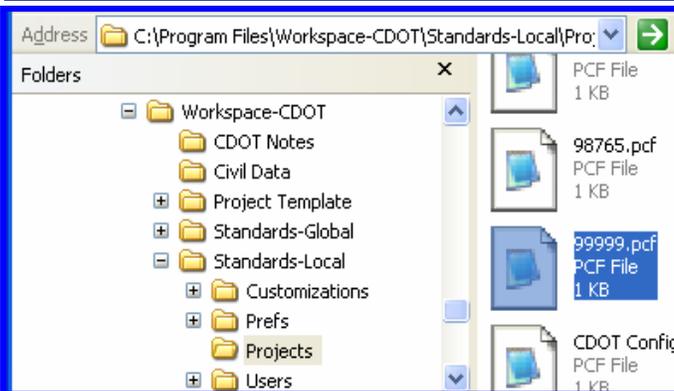
Submitted by Elizabeth Hawkins

**TIPS AND TRICKS**

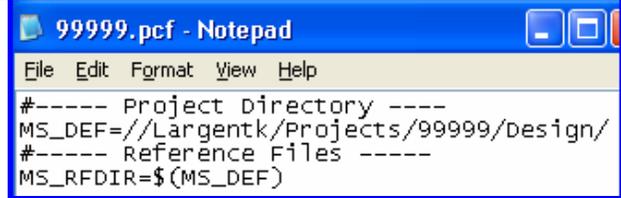
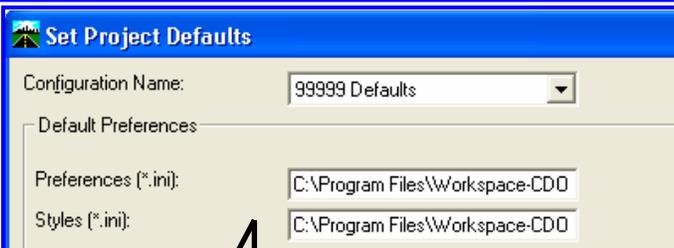
Additional Tips and Tricks can be found on the CDOT CADD Tips and Tricks webpage.



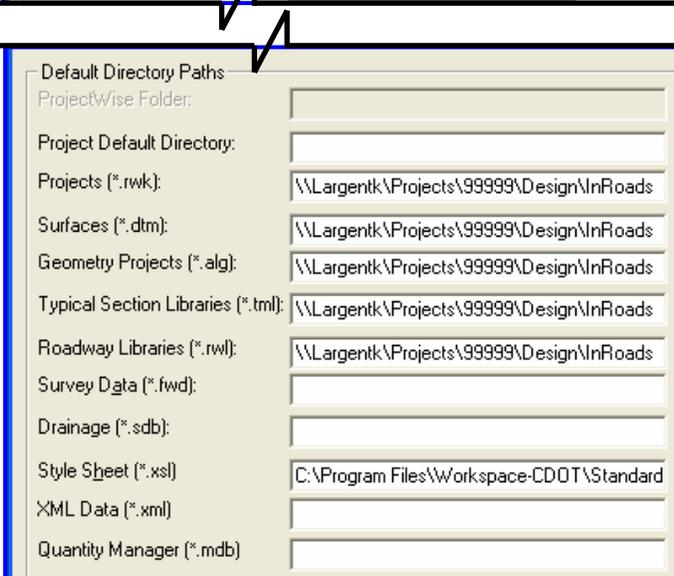
**Step 1** - To open a folder on the Project Manager's machine, go to the *Windows Start Menu*, select *Run...* a dialog will open, Key-in the appropriate path desired. Do not use *Browse*. Select *OK* when complete. (Example: \\Largentk\Projects\99999\Design shown at left) After the folder has opened, Right click on the Folder icon in the Address Bar of the Explorer Window and drag to the Desk Top, a dialog box will open. Select **Create Shortcuts Here** (Note: Each person desiring to work on the project must be given appropriate access to the folders they will be working with). The Project Manager should determine the level of Access. The V2.0 CDOT Configuration file structure should be used to create the project.



**Step 2** - The Project Manager should email the team a copy of the Project Specific PCF, (Example file name and location 99999.PCF shown at left). This file should be copied from and placed into the *C:/Program Files/Workspace-CDOT/Standards-Local/Projects* Folder located on each team member's machine.



**Step 3** - Open the previously copied project PCF file with Notepad or WordPad. Edit the file on the *MS\_DEF=* line to include the Path defined by Step 1 above. Save the file. (Note: Make sure to change the backslashes to forward slashes)



**Step 4** - The Final step. Open InRoads. From the MicroStation Manager *Workspace Project* pull-down list, select the project configuration file (99999). Locate the design model and click *OK*. From the InRoads menu select *File > Project Defaults*. Key-in the path for the desired InRoads design data files (Example: \\Largentk\Projects\99999\Design\Inroads - shown at left). Apply and Close the dialog box. Open desired InRoads Design data (DTM's, ALG's, TML and RWL files) and create or modify the Project.rwk file. Click on the InRoads *File > Save As*. Select *Options*. Check the desired boxes, click *Ok* and save the file.

For additional information, see CADD Web site Library, InRoads-Tip Populating InRoads Explorer.

## ProjectWise

This document is to provide CDOT users a little background on why the Department is moving to ProjectWise, some benefits for users and the Department, potential future uses, and finally Guidelines for using ProjectWise.

CDOT is implementing the use of ProjectWise to store and backup project information, share data, and provide project managers with additional tools to manage their projects. ProjectWise stores all project documents in one central location. This allows for easy sharing and referencing of documents and information. This is a major change in the way we currently do business. ProjectWise also has the ability to archive information: implementation will be investigated in the future.

Bentley

ProjectWise is an integrated suite of collaboration servers that enable AEC project teams, their information, and their tools to **work as one**.

Bentley ProjectWise provides **managed access to AEC and geospatial content** within the workgroup, across a distributed organization, or among collaborating organizations throughout the world. By working within the Bentley ProjectWise [managed environment](#), AEC and geospatial professionals can streamline their project work and improve the efficiency of their operations, regardless of industry vertical.

### **Working as one:**

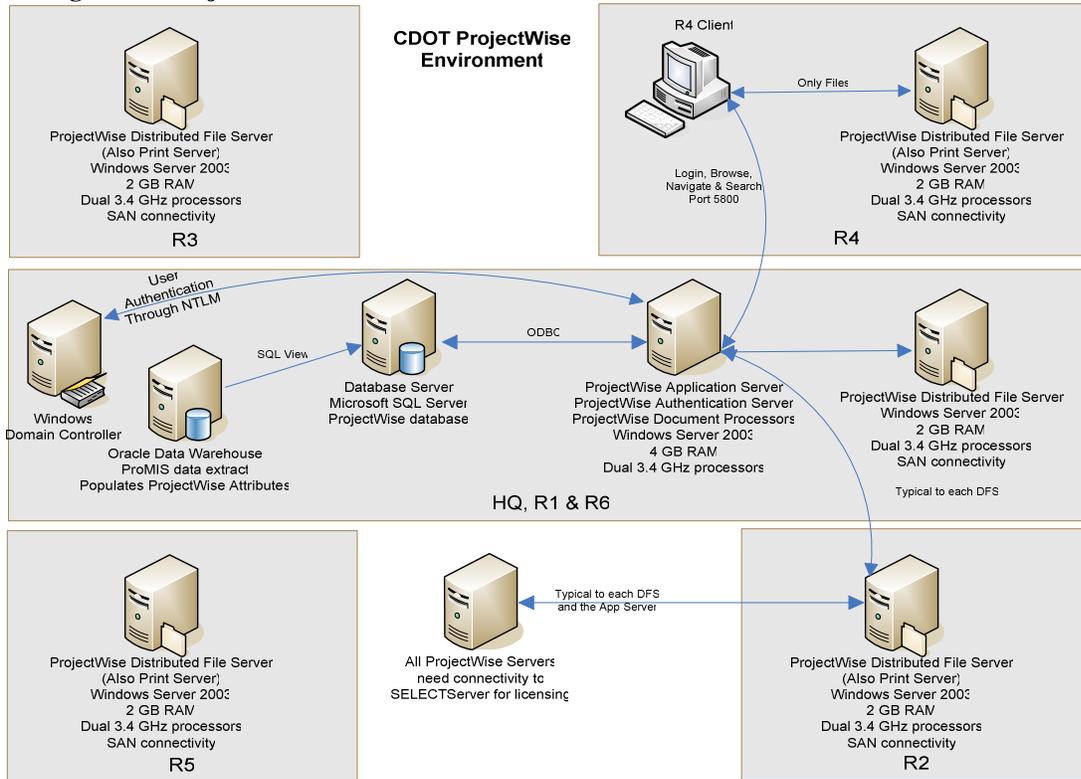
- Enables real-time communication and coordination, shortening project schedules.
- Ensures workers find the right information every time, leading to better decisions, less re-work, and higher quality deliverables.
- Connects workers through high-performance, multi-site collaboration.
- Increases data exchange efficiency and accuracy, reducing costs throughout the AEC lifecycle.
- Empowers project managers to monitor progress continuously and respond quickly to partners, owners, and agencies.

### **CDOT ProjectWise Architecture**

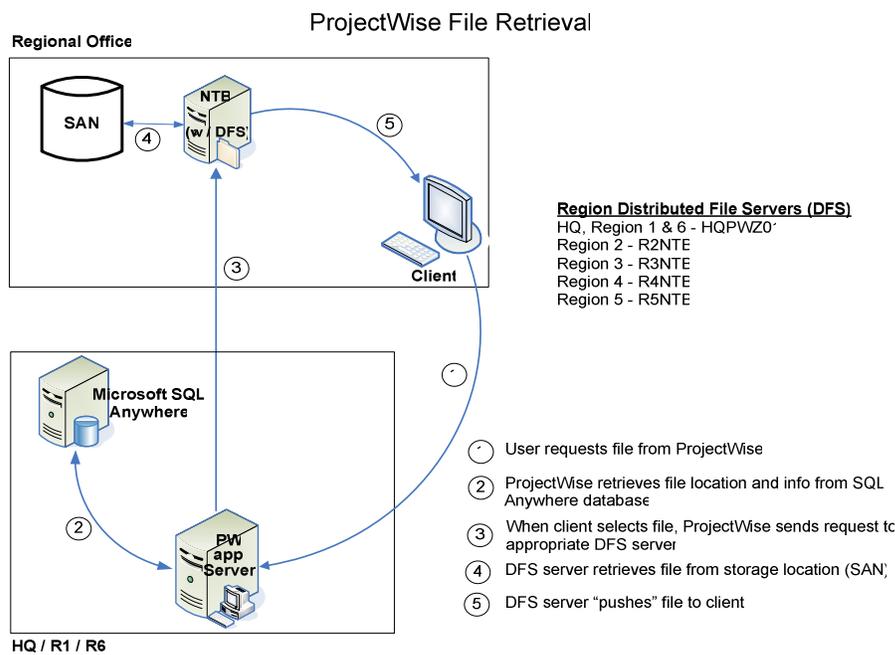
In preparation for the deployment of ProjectWise, numerous infrastructure improvements have been implemented. CDOT has upgraded the useful line capacity on the T1 lines to each of the residencies, effectively doubling the bandwidth. These upgrades involved upgrading the service on those lines and the installation of upgraded routers in 26 residencies. CDOT is implementing ProjectWise on an entirely new hardware infrastructure. New servers are being implemented for this project, as well as new storage technology and capacity. The ProjectWise Distributed File Servers (DFS) will be located in Region headquarters offices in Regions 2, 3, 4 and 5. The Region 1, 6 and HQ DFS will be located in CDOT HQ. This architecture ensures that the project data is located in the Region where the project is located and the majority of the work is

performed. Figure 1 and Figure 2 show the ProjectWise server environment the File Retrieval process.

**Figure 1 – ProjectWise Environment**



**Figure 2 – ProjectWise File Retrieval Process**



Currently, CDOT shares and recreates a lot of information between project team members from CAD drawing files, to reports and permits. The current workflow requires the creator of a document to send it out to team members where they then store it on their PC thus creating multiple instances of the same file. The creation of multiple files all over the place has obvious disadvantages of:

- Is this the latest file?
- Oops, I just overwrote the one I was supposed to be using.
- Incompatible file formats.
- Too much/too few data, not the data recipient really needs.
- Locating the necessary project files on different computers.
- Inability of passing off a project to another user (see above bullet).
- The creator of the file edits the file and forgets to re-send it out to everyone.
- Someone getting into a document and making changes when they did not have the permission to do so.

ProjectWise will help us more effectively share data and manage our projects within a collaborative environment to prevent the above from happening thereby streamlining and making the project development process more efficient.

Data managers will create a project in ProjectWise and each specialty group will have a folder where they will store their information. To date specialty advisory groups have helped create the folder structure and resulting workflows that will be implemented. These folders have file and directory security set so that only the specialty group members in the Region and HQ will have read/write permissions, everyone else will have read access. This is where the power of ProjectWise comes into play, because file and directory permissions have been set to read access, it allows them to share that information with other project team members with out fear the data will be accidentally changed or destroyed. The creator of the document can store it in one location, edit and update it as required while other team members can reference that file and know they are working with the correct and latest information.

Files will be easily accessed by reproduction for printing and advertisement needs.

ProjectWise server will be backed up on a regular schedule so the problem of losing data due to computers crashing or accidental deletion of files will be minimal.

#### Project Management

ProjectWise is also a project management tool that will allow CDOT managers to access data directly without having to call to get the information. For example check schedules, review reports, reference others files, check on clearances, etc.

ProjectWise Guidelines have been developed to enable CDOT to successfully implement this program.

**ProjectWise Guidelines:**

1. Starting in September 2005 all new projects that have a project number (i.e. are in ProMIS) will utilize ProjectWise.
2. All projects currently using MicroStation and InRoads will be transferred to ProjectWise.
3. All project related data will be stored on ProjectWise.  
Note: E-mail may be added at the end of the project so as to only include pertinent correspondence.
4. Project files will reside in the creators' directory structure and others will reference to it as needed.
5. A description for what is to be stored where and workflows for each specialty group are to be followed and can be found on the CADD Manager's website: <http://internal/CADD/>
6. No folders can be added or deleted unless submitted to and approved by the standards and configuration team.

Adopted by Steering Committee 8-19-05

Several Questions have surfaced relative to Training Materials available to the Users. The future purchase of training manuals was discussed with the CEST Steering Committee and it was determined that if individuals want additional material outside of what is included under manuals on the Webpage, that it would be the users responsibility for purchasing the books. CDOT does not presently have any additional training manuals except for the manual that are received during the CDOT Training course. The new CADD webpage contains several reference guides for MicroStation along with the MicroStation/InRoads Help provided with the software.

A few good resources are the following:

The CDOT CADD Website <http://internal/cadd/Library/Library.cfm> contains several of the standard MicroStation User manuals and other information including many tips and tricks and a Tip of the day on the Homepage.

Another is the Bentley SelectServices Website, <http://bentleyinstitute.bentley.com/subscriptions/subonline/content/Everything3D/wwhelp/wwhimpl/js/html/wwhelp.htm?courseid=TRC501330-1/0001> which has several courses that are self paced and at this point are free to CDOT. At some point it is my understanding that a Log-in will be needed, but at this time it is a very good resource at no cost to CDOT.

Check both out. I'm sure you will find them both useful. The Bentley <http://selectservices.bentley.com> website requires a password that Bentley will send you once you register with them. This also will allow users to chat with an analyst and many other Browsing capabilities. Let Elizabeth Hawkins know if you have difficulty logging into the site.

There are several other resources that are also good. One author in particular who has always been reputable is Frank Conforti. His book is Inside MicroStation. Another book is called Harnessing MicroStation by GV Krishnan. Both are available on Amazon.com. Another site that I know of is <http://shop.prosoftnet.com/> out of Utah. They have several manuals to choose from.

Hope this gives you a little better starting point for Reference Material. Book stores around town, may also be able to get the above referenced books.

Happy "CADDing",

## MicroStation and InRoads

### *Requesting a new Level or Feature*

**Did you know** that if you want to request a new level or feature in the CDOT Configuration, you should go to the CADD Support Tab on this Web Page, select a topic from the CADD Support pull-down and choose "Add a Level or Add a Preference". This will open up an email that will allow you to fill in the appropriate boxes and then send it off to the CADD Manager.

## Misc

### ***Scanned Document Size***

**Did you know** that if you can reduce the size of a scanned image by performing the following. Scan the documents you want with a high resolution of say 600 dpi, then in order to get a smaller file size, print that document to Acrobat distiller. The file size will be much smaller. *Thanks Joe Garcia- Region 2*

## Misc

### *Select Services Website Self Paced Courses*

**Did you Know** that [The Bentley Select Services Website](#) has several courses that are self-paced and at this point are free to CDOT. In the future a Log-In will be needed, but at this time, it is a very good resource at no cost to CDOT.

## Information concerning Survey Coordinate System

By Dan Smith

Colorado has a standard coordinate system established by the National Geodetic Survey (NGS) and mandated by Colorado state law which is used extensively by CDOT. The coordinate system is the Colorado Coordinate System of 1983 and divides the state into three zones, North, Central, and South, all consisting of a Lambert Conformal Conic projection of the North American Datum of 1983 (NAD 83). NGS refers to the system on a national level as the National Spatial Reference System (NSRS).

You will find the specifics for each zone include in the CRS, including counties, standard parallels and origin coordinates. It is also important to note that Colorado has mandated the U.S. Survey Foot as it's unit of measurement.

Please refer to the following link for each of the following CRS:

<http://198.187.128.12/colorado/lpext.dll?f=templates&fn=fs-main.htm&2.0>

**38-52-101. Colorado coordinate system zones defined.**

**38-52-102. Colorado coordinate system names defined.**

**38-52-103. Colorado coordinate system defined.**

**38-52-104. Federal and state coordinate description same tract - federal precedence.**

**38-52-105. Colorado coordinate system origins defined.**

**38-52-106. Colorado coordinate system - use of term.**

**38-52-107. Severability.**

All CDOT surveyed projects are tied to the NSRS and reference the Colorado Coordinate System of 1983. This is accomplished by first collecting and post processing survey grade accuracies on control monuments for Latitude and Longitude and ellipsoid height and then converting the Lat/Long to the NAD 83 coordinates and orthometric heights, however.... this is where the common reference between each and every CDOT project ends. Due to the fact that NAD 83 zones are intended to provide state plane coordinates on a grid with an acceptable amount of distortion (1 part in 10,000) the state plane coordinates must be converted to ground coordinates in order to mean anything on the surface of the Earth. The process of converting from state plane to ground takes into consideration (among others things) the difference in elevation (elevation factor), the difference in Latitudes (scale factor), is the project situated more north south or more east west, is the project long and narrow or is it windy and more of a square, and other such physical and geometric features of the project. Once the state plane coordinates are converted to ground coordinates a Project Control Diagram is completed showing all the control monuments, the Latitudes, Longitudes, State Plane Coordinates and other Geodetic data, and the finally Ground Coordinates needed for construction.

CDOT's GIS coordinate system references a Universal Transverse Mercator (UTM). There are two UTM zones in Colorado however GIS only uses one of them, zone 13. CDOT projects can be converted from Lat / Long or state plane to UTM, however, civil designers do not work in GIS, they work with AutoCAD or MicroStation drawings that are referenced to ground coordinates which would require a fair amount of work to convert back to state plane, Lat / Long and then to UTM. The work would be in defining each conversion parameter for individual projects as each project would have to be converted separately.

In conclusion.... CDOT projects have a common coordinate system as described above, that is Latitude / Longitude and state plane coordinates, and they can be converted to other coordinate systems, however project plans (e.g. AutoCAD or MicroStation drawings) and all of the other drawings (such as bridge) are on ground coordinates converted from state plane specific to the project.

I would like to emphasize that what you are proposing to do can be done, however one would have to have a solid understanding of the principles of geodesy and understand how to convert between various coordinate system.

If you are in need of further assistance there are places you can go within CDOT for help, the Survey Activities Committee is probably your best source of survey and geodetic information, there is also the GPS/GIS Users Group, of course you could always contact a region survey coordinator, (Region 4 Mark Guerrero to find out specific project info about I-25 North) however with their time being limited working through a group is probably best.

(Another topic not discussed above that you will need to pay attention to is GPS equipment and accuracies)

## Misc-Survey

### *Survey Manual Chapter 9*

**Did you know** that the survey section under the CADD website has been updated with the Survey manual Chapter 9, and the TMOSS code book (although some minor changes to the code book have been made since this posting). If you have any comments on Chapter 9 contact Dan Smith.

# Title Sheet Map Inset Request

7/28/2005

By David Reeves

This document's purpose is to educate a Titlesheet Map **requestor** of what is involved when they request a Titlesheet Map for their Titlesheet in CAD. It also describes what type of file will be returned. For requestors that have access to the GIS program called **Maps2**, there is a step by step instruction on how they can create their own titlesheets.

The document is broken into four sections.

1. Titlesheet Overview
2. Titlesheet Request
3. Making the Titlesheet map using Maps2
4. GIS GeoProcessing Model (for the GIS Analyst to read)

## 1. Titlesheet Overview

A titlesheet is the first page of a project CAD design package. Currently CAD designers use MicroStation and InRoads. The titlesheet page consists of many details and information describing the project. One component of the titlesheet is the map inset. The vector (the drawing portion) information currently comes from the GIS section when a requestor asks for it but it loses its GIS intelligence in the conversion. We return a CAD DXF file that has the following layers:

- GIS\_HIGHWAYS
- GIS\_MAJOR\_ROADS
- GIS\_LOCAL\_ROADS
- GIS\_RAMPS\_FRONTAGE\_ROADS
- GIS\_CITIES
- GIS\_BRIDGES – Point feature
- GIS\_PLSS
- GIS\_STREAMS
- GIS\_LAKES
- GIS\_RAIL\_LINES\_100K
- GIS\_MILEPOINTS

NOTE: There is no text in the DXF file since in a GIS we let the software pick where to place the labels.

## 2. Titlesheet Request

This section defines what a requestor should request. When a request is initiated, someone in the GIS section will copy and paste this section in an email or just send this whole document to the requestor to fill out.

### Titlesheet Request form

Please fill out the following section if you are going to request the GIS section to send you the GIS data for the county where your project is in. You will be receiving a CAD DXF file **GIS\_Titlesheet\_<County>.dxf** with all the GIS data in separate layers. You will only have the vector linework. There will not be any text in the CAD file and all the layers will have the same linetype, weight and color set. You will have to clip out your area of interest, set up your layer properties and anything else that you do in CAD.

Alternatively, you can use Maps2 to create the map and export it as an image that you can bring into MicroStation. For more details, go to *Section 3 - Making the Titlesheet map using Maps2*.

#### **Please complete the following.**

Name: \_\_\_\_\_

Department: \_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_

Project Route (i.e. 025A): \_\_\_\_\_

From reference point (miles): \_\_\_\_\_

To reference point (miles): \_\_\_\_\_

Project in these county(s): \_\_\_\_\_

Required Date (allow at least 3 to 5 days): \_\_\_\_\_

#### **Are there any additional GIS layers that you desire that are not in the following list?**

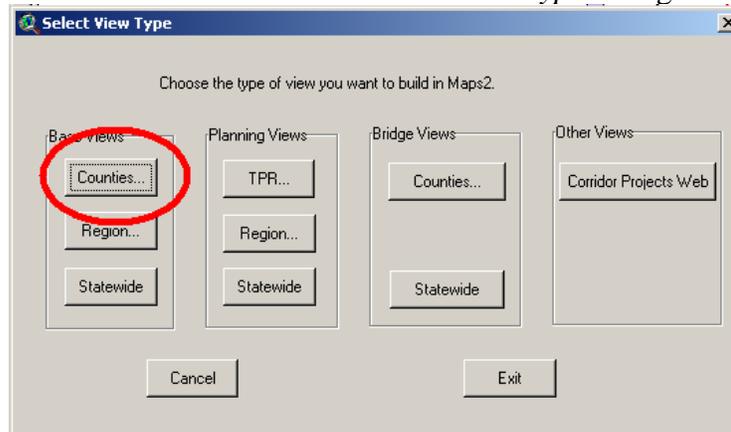
Please specify by the name that layer appears in any of the GIS applications that the GIS section supports such as Maps2 or the Straight Line Diagram.

- HIGHWAYS
- MAJOR\_ROADS
- LOCAL\_ROADS
- RAMPS\_FRONTAGE\_ROADS
- CITIES
- BRIDGES – Point feature
- PLSS
- STREAMS
- LAKES
- RAIL\_LINES\_100K
- MILEPOINTS

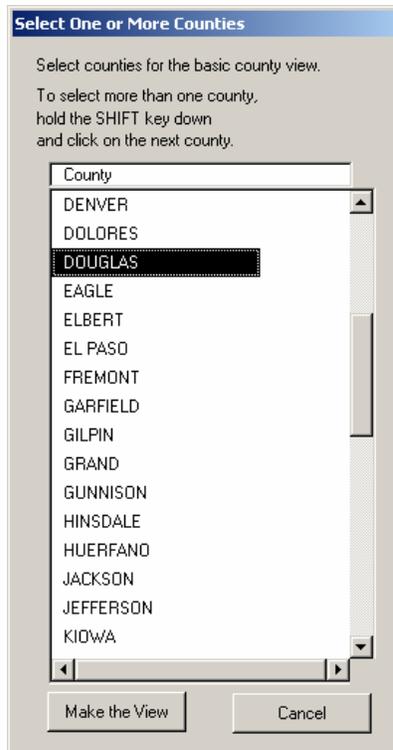
### 3. Making the Titlesheet map using Maps2

The purpose of this section is to give instructions for someone to create a titlesheet in Maps2 GIS. If you do not have Maps2 installed contact Alice Moy and she will get you set up. We also provide a one day class at head quarters and Alice handles the registration for that class as well. She can be reached at 303-757-9523 or [alice.moy@dot.state.co.us](mailto:alice.moy@dot.state.co.us).

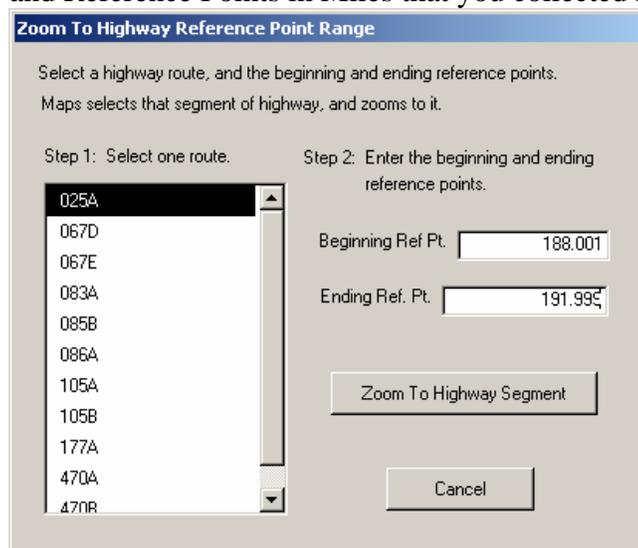
- Figure out where your project is. You will need to know the County, Route and the reference point range in miles. For this example I'm going to use Interstate I25 (Route: 025A) from MP 188 to MP 192 in Douglas County.
- Click the *Build New View* button .
- Clicking the *Counties...* button on the *Select View Type* dialog.



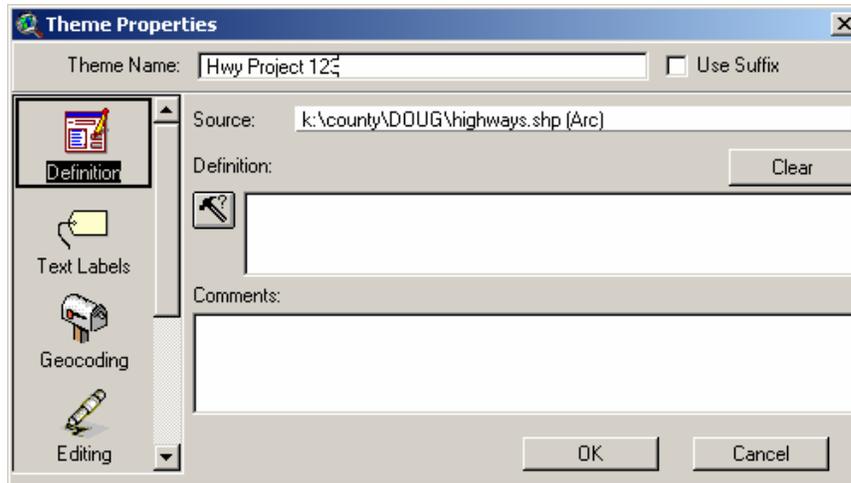
- Select the county that your project is in. For this example select DOUGLAS.



- Turn on all the layers that you want on your map. (i.e. Bridges, Ramps/Ftg Roads, Highways, Major Roads, Minor Roads, Streams, Lakes, Cities, PLSS, County Line)
- Change symbols if you wish or just accept the defaults.
- Zoom to your area of interest by activating Highways in the table of contents and using the *Zoom to Feature* function (*View > Zoom to Feature...*). Enter in your project Route and Reference Points in Miles that you collected in step one.



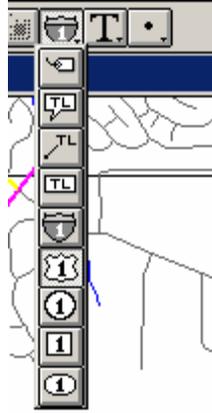
- Make a copy of highways in your view so it appears twice by activating Highways and then click *Edit > Copy Themes* and then *Edit > Paste*.
- Activate the top copy of Highways and then click *Theme > Properties*.
- Change the Theme Name to something different such as *Hwy Project 123*.



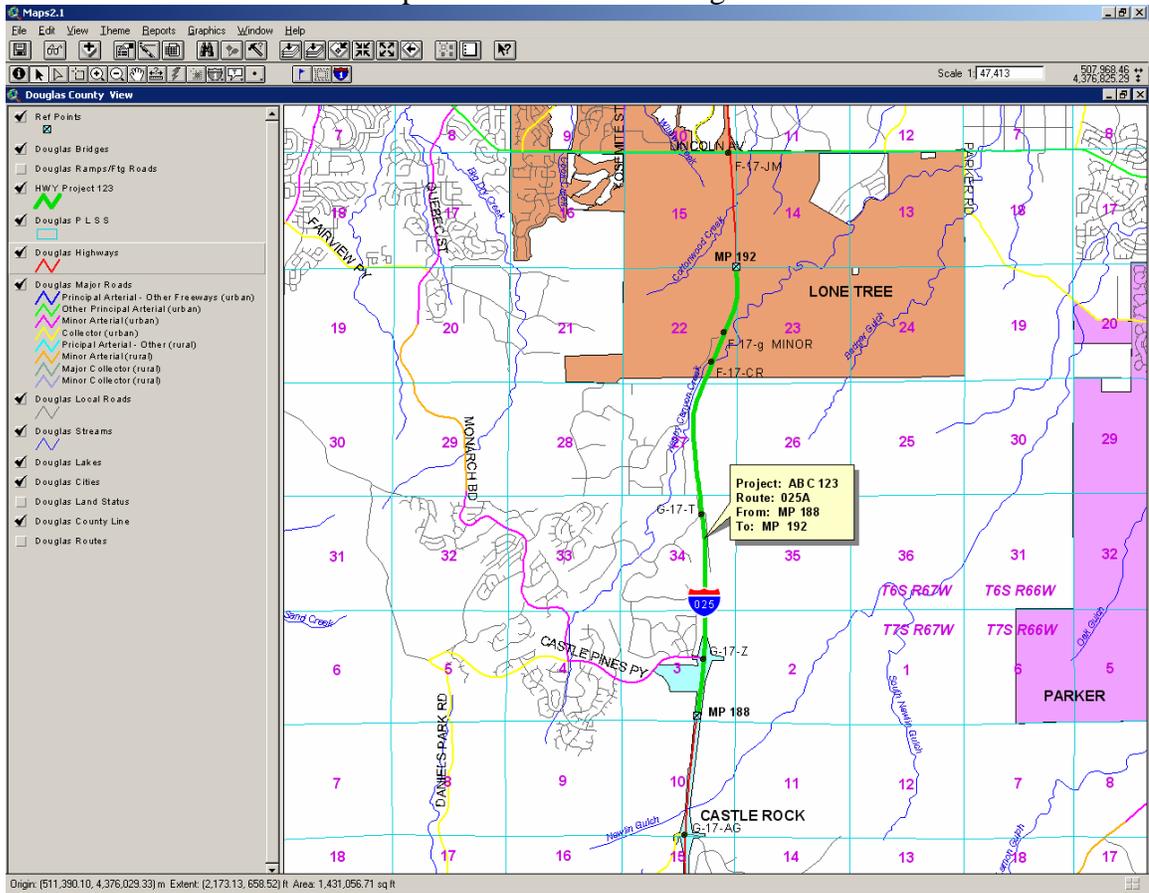
- Use the Maps2 function *Set Definition to Selection* (*Theme > Set Definition to Selection*) on the Highway copy you just made.
- Change the color and line thickness to differentiate it from the other highway layer. Try a line thickness of 4 with the color green.
- Label all the features that you wish using the *Label* tool  or Auto Label (Read ArcView help if you don't know how to label. Just go to *Help > Help Topics* with the keyword *Label*).

**Note:** You should set the symbol properties on the Symbol Palette (*Ctrl-P* or *Window > Show Symbol Window*) **before** creating a label so that labels get placed with a size and color that you specify rather than the same 14 pt Arial font.

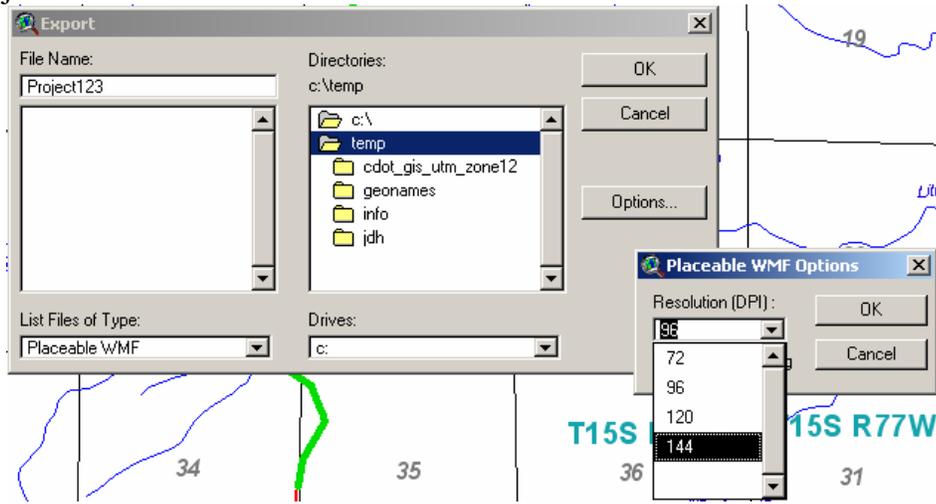
- For this example I labeled the following layers all using Arial font:
  - PLSS Sections – Size 14, Bold, Magenta
  - PLSS Township Name (Tname) – Size 14, Bold Italic, Magenta
  - Major Roads – Size 12, Bold, Black
  - Streams – Size 7, Italic, Navy Blue
  - Cities – Size 14, Bold, Black
  - Bridges – Size 12, Normal, Black
  - Ref Points – Size 12, Bold, Black
  - Project call out box using the *Callout Text* tool .
  - Highways - Label the highways using one of the *Highway Label* tools. Click and hold the *Label* tool for the other tools to appear.



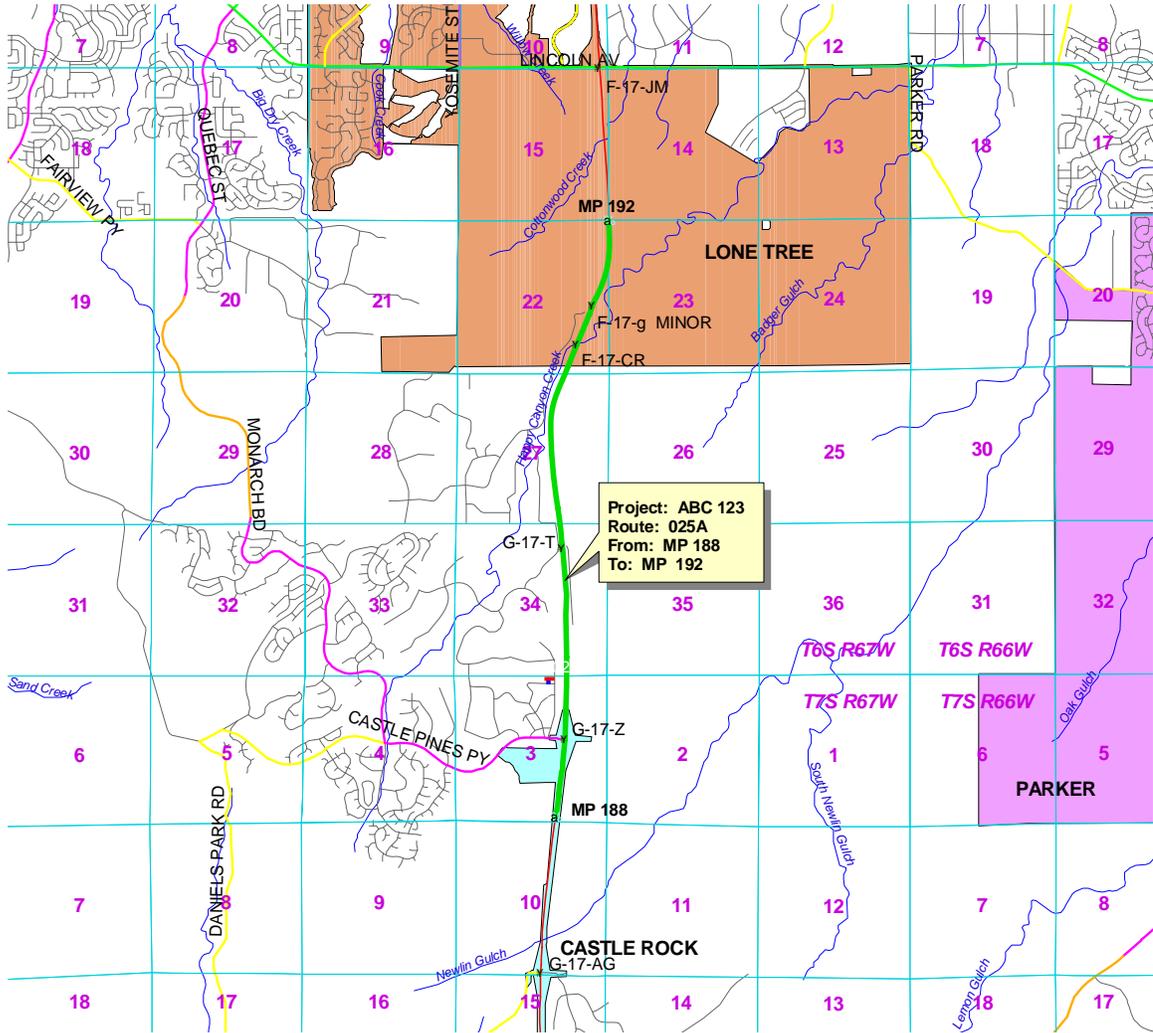
You should now have a map similar to the following:



**Export your map to image file** – When your map is complete export your view to an image file (*File > Export*). I recommend using the image default type of *Placeable WMF* and increasing the resolution to 144 DPI by clicking the *Options* button. The advantage of the WMF is that the white background is clear rather than white so you can layer with other WMF in CAD or with your own CAD objects.



□ The following image is what I exported as a WMF file and then inserted into this MS Word document. I imagine that Micro Station works the same way.

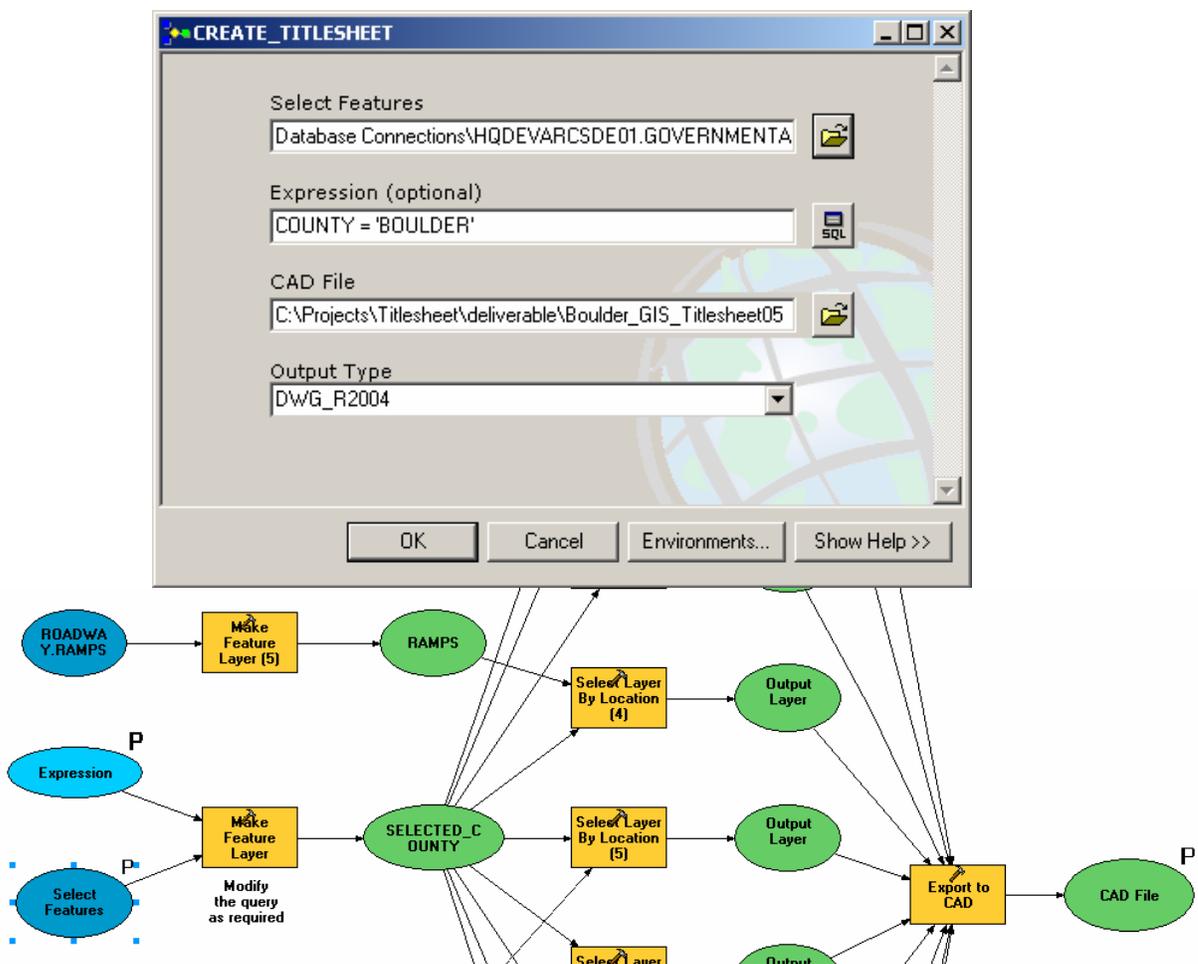


## 4. GIS GeoProcessing Model (for the GIS Analyst to read)



*This section is only relevant to the GIS Section or to someone with access to the ESRI ArcCatalog program and SDE. It is included so that a GIS Analyst can refer to this document when a request is received so that they can recreate a titlesheet in a repeatable and uniform manner.*

The following two diagrams illustrate the ESRI GeoProcessing model that is stored in SDE. Database Connections\HQDEVARCSDE01.PUB\_BETA.sde, PUB\_BETA.TITLESHEET\CREATE\_TITLESHEET.



The model has four parameters.

- Select Features – The default is the Counties polygons but it can be changed to any other polygon layer.

- Expression – This expression is based on the previous *Select Feature*. It is a query to only select the features in your area of interest so that a *Select by Location* can be made.
- CAD File – The name of the CAD file that will be created. Remember to include DWG for AutoCAD files.
- Output Type – The default is DXF.

Just run this model and a single CAD file will be created with all the relevant layers. They will not be symbolized and linetypes will not be set. That is up to the CAD Technician/Engineer.

# MicroStation

## *Using AutoTrack*

**Did you know that** if you have Autotrack loaded on your machine, the following workflow can be used...

1. Under AddOn's Launch AutoTrack
2. Should get dialog box and main AutoTrack toolbar.
3. Click on the truck to pick design vehicle.
4. Set Active level to place new path.
5. Click on AutoDrive icon.
6. Place vehicle in starting position and bearing.
7. Dialog box shows up, click on the icon with the red circle & number 5 to set speed or other properties.
8. Click Proceed when ready to set path. Click where you want the vehicle to move. Reset when finished (follow prompts).

Tip: Click on the icon with the pencil and the AutoTrack Path Edit toolbar opens. The icon on the far right allows you to delete last target point.

*Tip from Jim Biren, R2*