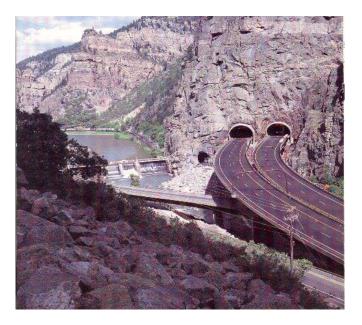
CDOT WORKFLOWS

Colorado Department of Transportation

- General MicroStation Workflows
- MicroStation Printing
- Workflows Using Microsoft Office Products
- MicroStation Information and Administration
- InRoads Related Workflows





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- **MS General MicroStation Workflows**
- **MP MicroStation Printing**
- MA MicroStation Information and Administration
- **OP Workflows Using Microsoft Office Products**
- **IR InRoads Related Workflows**

General MicroStation Workflows

Workflow MS 1 - Explaining File Types

This document describes the various file types used in plan production at CDOT.

CADD Files			
File Extention	Description		
dgn	MicroStation CADD file format. Files of this format are called Drawings or Design Files .		
cel	MicroStation Cell Library. A cell library contains small drawings that a be used over and over. The "Cell" is treated as a group so that it can be placed, moved, copied, manipulated, or deleted as one element.		
dgnlib	MicroStation Design Library. Design Libraries store standard settings for MicroStation. Items like Text Styles, Level Names and Symbology, Dimension Styles, and Line Styles. These files are stored within the workspace and should not be modified by the users.		
pcf	Project Configuration File. This file is used by MicroStation to set the directory path to reference file locations for a specific project. The pcf file is used for projects stored locally, and is only accessed when MicroStation is launched from the Start Menu or desktop icon.		
dwg/dxf	AutoCAD CADD file format. This is similar to the dgn file. MicroStation can read dgn and dxf file formats, but they need to be converted to dgn format so that CDOT standards can be applied to them.		

Image Files			
File Extention	Description		
jpg	An image file format use for aerial photos that can be attached to plan sheets. It may come with a sister file.		
tif	An image file format use for aerial photos that can be attached to plan sheets. It may come with a sister file.		
tfw	A sister file (or world file) is an ASCII text file that contains special formatted coordinate information about where the image is in relation to the surface of the earth.		
tif	GeoTiff files (also with a tif extension) but these do not have a sister file. They have the coordinate (and sometimes GeoCoordinate system) embedded within the file		

InRoads Files			
File Extention	Description		
dtm	Digital Terrain Model, sometimes called a surface file. This file contains triangulated and untriangulated data that describes the topography of the site. An existing ground dtm describes the current state of the site. A design dtm describes what is to be constructed.		
alg	Geometry Project or alignment file. This file contains the horizontal and vertical geometry (alignments) for a design project. It is used by ROW/Survey to store Right of way, property, and easement lines.		
itl	Template Library. This file contains the templates (an InRoads version of the typical sec- tions) used for a design project. It also contains various parts of templates (called sections and components) that are use to create finished templates.		
ird	Roadway Design file. This file is used to combine and compare the data from the dtm, alg, and itl files to create the design model of the proposed roadway. The alg file is used to define the Corridor of the proposed road, the itl file profides the cross section of the road prism, and the dtm is used as a target for the end conditions of the template to tie the design to the existing terrain.		
rwk	InRoads Project File. This is an ASCII text file that contains the name and directory path to the InRoads data file used for a specific project. It is used to load and save all of the data files at one time.		
fwd	Fieldbook file. This file contains survey information translated from the data collector to the InRoads format.		
sup	Superelevation Rate Tables. These are ASCII text files that contain superelevation transi- tion rate information based off of the ASSHTO Greenbook. sup files are used with in Road- way Designer to calculate superelevation for a corridor's horizontal alignment. The calculated data is stored in the ird file.		
xin	Preference file. This file contains all of the style settings that control how elements dis- played from InRoads will look in MicroStation. It also contains dialog box Preferences (predefined settings for dialox boxes).		
xsl	Style Sheets. These files are used to format xml reports generated by InRoads		
dft	Drafting Notes file. This file contains formats for commonly used notes, like station and offset notes, that can be extracted from InRoads data.		
vdf	View Definition File. This file works with Plan and Profile Generator. It contains the data for plan view and profile view settings.		
XSC	Cross Section File. This file contains the data used to define a custom cross section set.		

Workflow MS 2 - Useful MicroStation and InRoads Key-ins

This document describes and provides syntax for commonly used MicroStation and InRoads key-ins. Where 'x', 'y', and 'z' characters are entered in the Key-in Syntax column, the user will replace those characters with the desired numbers. Items in italics require the user to provide the desired cell name or view name.

MicroStation / InRoads Key-ins					
	Angle Key-ins and Precision Inputs				
Key-In Command	Key-In Syntax	Description			
Set Active Angle	aa=xx^xx'xx.xx"	This sets the Active Angle.			
Set Active Angle by 2 Points	Active angle pt2	Required input – two <d> clicks. This sets the Active Angle based on the angle defined by the two data clicks and the zero axis.</d>			
Coordinate Key-in	xy=xx.xx,yy.yy,zz.zz	This command inputs a <d> at the specified x, y, and z coordinate. The z (elevation) entry is not used in 2D drawings and is optional in 3D drawings</d>			
Relative Coordinate Key-in	dl=xx.xx,yy.yy,zz.zz	This command inputs a <d> at the specified x, y, and z distance from the last <d> or <t>. The z (elevation) entry is not used in 2D drawings and is optional in 3D drawings. The distances are measured along the design axes (x is left and right in the top view, y is up and down in the top view, z is into and out of the screen in the top view.)</t></d></d>			
View Coordinate Key-in	dx=xx.xx,yy.yy,zz.zz	This command inputs a $\langle D \rangle$ at the specified x, y, and z distance from the last $\langle D \rangle$ or $\langle T \rangle$. The distances are measured along the view axes so that x is left and right on the screen, y is up and down on the screen, z is into and out of the screen.			
Distance / Angle Key-in	di=xx.xx,xx^xx'xx"	This command inputs a $\langle D \rangle$ at the specified distance and angle from the last $\langle D \rangle$ or $\langle T \rangle$.			
Station / Offset Key-in	so=xxx+xx.xx,xx.xx	This is an InRoads key-in and a geometry project must be loaded for it to work. The command inputs a <d> at the station and offset from the active alignment. The "+" is not required in the key-in</d>			
Station / Elevation Key-in	se=xxx+xx.xx,xx.xx	This is an InRoads key-in and a geometry project must be loaded for it to work. An InRoads profile is also required. This command inputs a <d> at the station and elevation within the profile. The "+" is not required in the key-in.</d>			

MicroStation / InRoads Key-ins			
Angle Key-ins and Precision Inputs			
Key-In CommandKey-In SyntaxDescription			
Distance / Grade Key-in	dg=xx.xx,x.xx%	This is an InRoads key-in and a geometry project must be loaded for it to work. An InRoads profile is also required. This command inputs a <d> at the distance and grade from the last point entered in the profile. This command is primarily used with the Add Vertical PI command.</d>	

MicroStation / InRoads Key-ins				
	MicroStation Settings			
Key-In Command Key-In Syntax Description				
Set Key Point Divisor	ky=x	This command sets the key point devisor to the number indicated. The key point divisor divides an element in to the indicated number of equal parts and makes a snap point at each division		
Set Active Scale	as=xx.xx	This command sets the X, Y, and Z scales to the specified value.		
Set X Scale	xs=xx.xx	This command sets only the X axis scale to the specified value.		
Set Y Scale	ys=xx.xx	This command sets only the Y axis scale to the specified value.		
Set Z Scale	zs=xx.xx	This command sets only the Z axis scale to the specified value.		
Set Active Line Ter- minator	lt=cell name	This command sets the line terminator to the specified cell.		
Set Terminator Scale	ts=xx.xx	This command sets the line terminator scale factor to the specified cell.		

MicroStation / InRoads Key-ins				
View Controls				
Key-In Command	Key-In Syntax	Description		
Open Saved View	vi=saved view	After executing the key-in, <d> in the view to be updated. In addition to user created saved views, the following default views can be used: top, bot- tom, left, right, front, and back.</d>		
Create a Saved View	sv=saved view	After executing the key-in, <d> in the view to be saved. This command is used to create a saved view without using the Saved Views dialog box.</d>		
Rotate View	rv= xx^xx'xx", xx^xx'xx",xx^xx'xx"	This command rotates the view around the design axes. The angles are for the x, y, and z axis. For example to rotate a Top view 90 degrees, the key- in would be $rv=0,0,90$. This rotates the view about the z axis (the one that goes in and out of the mon- itor.) The carat symbol is not required if the rota- tion is in whole degrees.		
Set Active Z	az=xx.xx	After executing the key-in, <d> in the view. This sets the elevation at which elements are placed. Snapping to an element overrides the active depth and uses the elevation of the item snapped to unless the ACS Plane Snap lock is toggled on.</d>		
Find Active Z	az=?	After executing the key-in, <d> in the view. This displays the current active depth (elevation) in the MicroStation Message Center.</d>		
Set Delta Z	dd=xx.xx	After executing the key-in, <d> in the view. This changes the active depth (elevation) by the amount specified in the key-in.</d>		
Set Display Depth	dp=-xx.xx,xx.xx	After executing the key-in, <d> in the view. This sets the viewable elevation range. The fist num- ber in the key-in is the low elevation and the sec- ond is the high elevation. Elements outside of this range cannot be seen. If you cannot see some ele- ments or only partial elements are displayed, try setting the display depth to -100,000,100,000 (dp=-100000,100000)</d>		
Find Display Depth	dp=?	After executing the key-in, <d> in the view. This displays the current display depth (elevation range) in the MicroStation Message Center.</d>		

MicroStation / InRoads Key-ins				
	View Controls			
Key-In CommandKey-In SyntaxDescription				
Set Relative Display Depth	dd=?	After executing the key-in, <d> in the view. This adjusts the current display depth (elevation range) by the amount specified. The fist number in the key-in is the low elevation and the second is the high elevation.</d>		
Set Active Level	lv= level name or number	This command sets the active level to the specified level		
Level On	on= level name or number	This command turns the specified levels on. Key- in on=all to turn all levels on.		
Level Off	of= level name or number	This command turns the specified levels off. Key- in of=all to turn all levels (except the active level) off.		

AccuDraw Key-ins

There are a number of key-ins that make working with AccuDraw easier. The table below lists some on the most commonly used key-ins and describes what they do.

MicroStation / InRoads Key-ins			
AccuDraw Key-ins			
Key-In CommandKey-In SyntaxDescription			
Compass Type	Space Bar	This command toggles the AccuDraw compass between the distance/ direction (round) compass to the X, Y, Z (square) compass	
View Rotation	v	This command rotates the AccuDraw compass so that it is orthogonal to the view.	
Base Rotation	b	This command rotates the AccuDraw compass so that it is orthogonal to the element that was drawn last.	
Top Rotation	t	This command rotates the AccuDraw compass so that it is orthogonal to the Top view. If you are in a Front, Back, or side view you will only see the edge of the AccuDraw compass.	

r

MicroStation / InRoads Key-ins AccuDraw Key-ins			
Front Rotation	f	This command rotates the AccuDraw compass so that it is orthogonal to the Front view. If you are in a Top, Bottom, or side view you will only see the edge of the AccuDraw compass.	
Side Rotation	S	This command rotates the AccuDraw compass so that it is orthogonal to the Side view. If you are in a Top, Bottom, Front, or Back view you will only see the edge of the AccuDraw compass.	
X axis Lock	x	This command works when the AccuDraw compass is in the XYZ mode. This command locks the X axis to the distance that the cursor is from the starting point measured along the X axis.	
Y axis Lock	у	This command works when the AccuDraw compass is in the XYZ mode. This command locks the Y axis to the distance that the cursor is from the starting point measured along the Y axis.	
Z axis Lock	Z	This command works when the AccuDraw compass is in the XYZ mode. This command locks the Z axis to the distance that the cursor is from the starting point measured along the Z axis. Note: the cursor cannot move along the Z axis in a Top view.	
Distance Lock	d	This command works when the AccuDraw compass is in the distance/ angle mode. This command locks the distance that the cursor is from the starting point of the element.	
Angle Lock	a	This command works when the AccuDraw compass is in the distance/ angle mode. This command locks the angle that the cursor is from the starting point of the element based on the rotation of the AccuDraw compass.	
Set Origin	0	This command allows you to place the next element a specific distance from the last entered point using the AccuDraw toolbox.	

Workflow MS 3 - Setting a Project Geographic Coordinate System

This document guides you through the steps required to create a project or local datum MicroStation Geographic Coordinate System (GCS). This will facilitate the integration of images, GIS data, and design files that use different coordinate systems.

These instructions are intended to be used by the Survey department at the beginning of a project, allowing other divisions, like Design, to coordinately attach imagery and shape files later in the project. Without this information, it is unlikely that imagery which is typically in a different coordinate system (like State Plane Coordinates or UTM) will line up with the MicroStation design files created by ROW Survey.

The following steps describe how to create a project specific datum in MicroStation followed with an example of how to attach imagery and GIS information from different coordinate systems.

It is very important that the projection information for all files is known!

CDOT Survey Project Files

MicroStation design files created by CDOT Survey are created in a project specific, local datum plane (project coordinate system). This coordinate system is typically defined by multiplying known coordinates by a scale factor or conversion factor. This factor is project specific and published in the Project Control Diagram created by Survey. Once created, the project GCS can be assigned to the individual models within the MicroStation design file. This means files with different GCS assignments can be reprojected to fit the project GCS.

Creating a Project Geographic Coordinate System in MicroStation

In order to create a project specific GCS the coordinate datum instructions must be obtained. These can be found on the *Project Control Diagram* sheet included in CDOT plan sets.

COORDINATE DATUM: Project coordinates are modified Colorado State Plane North Zone NAD 83(2007) coordinates. The CHARN is based on NAD 83(2007) datum. The project seed point coordinates are: Northing = 377204.827m, Easting = 937274.019m, and Elevation = 1618.990m. The ground scale factor used to modify the coordinates is 1.00028596071914. Project Coordinates are truncated by 300,000m in the Northing and 900,000m in the Easting.

To get from Project to State Plane coordinates: add the truncation, subtract the seed point northing and easting, divide by the ground scale factor, then add the seed point northing and easting.

Factor Computation Worksheet

A worksheet has been created to assist the user in computing the necessary information for the custom project coordinate system. This file is called *Factor Computation Worksheet.xlsx* and can be found in the CDOT workspace under *Standards-Global\MicroStation\Data*. The worksheet is intended to help automate the process of creating a project specific Geographic Coordinate system in MicroStation. Information entered into this worksheet should be obtained from teh Project Control Diagram or the Surveyor when a PCD sheet is not available. The worksheet computes parameter information used in MicroStation to create a Geographic Project Coordinate System. Instruction on how to use the worksheet can be found on the first tab.

FACTOR COMPUTATION WORKSHEET			Compiled by:	Patrick Williams
Using Project See	ed Points			
Date:	2-Nov-11			
Project Number:	BR 157A-011			
Project Location:	SH 157 at US 36 Bridge	e Deck Replacement		
Description:				
			1	
Colorado	State Plane Grid Zone:			
		NAD83(2007)		
	Scale Factor:		-	
	Meters to Feet:	3.280833333		
Project Seed Point				
Norting:				
Easting:	937274.019			
Truncation	Meters			1
Norting:		Truncation Adjusted to	300022.071236	
Easting:	900000	Seed Coordinates	900010.655858	
		Geographic Coordinate S	ustom Daramotors	
		Affine A0 Parameter		
			-2953629.340605	
		Affine B0 Parameter	-984603.889593	
		Affine A1 Parameter	1.00028596071914	
		Afine B2 Parameter	1.00028596071914	

- 1. Using the information from ROW Survey on the Project Control Diagram, the first step will be to complete the Factor Computation Worksheet.
- 2. Next, the appropriate information from the yellow highlighted area will be used to create a Project Coordinate System in MicroStation using the Geographic Coordinate System tools.
- 3. First the program Bentley Map must be activated from within InRoads.

Activating Bentley Map

In order to create and save a Geographic Project Coordinate system that can be assigned to a MicroStation design file, the program Bentley Map must be activated. Once Bentley Map has been activated, a customized GCS can be created. Otherwise the files are read only.

- 1. Begin by opening *InRoads*. Within InRoads, there is an application that needs to be activated called **Bentley Map**.
- 2. From the MicroStation menu bar, select **Applications > Map > Activate Map**.



3. A dialog box requesting a connection to a database will appear. *Click* the **Cancel** button to *close*. Map is now activated.

Once *Bentley Map* is activated, a customized geographic coordinate system can be created.

Project Geographic Coordinate File Creation

Geographic Coordinate Projections are created within MicroStation. A file located in the CDOT Data folder called CDOT-Projects.dty is used to store custom systems and a variable has been set in the CDOT configuration to access this file. Once this file has been created, it can be copied to other computers. The CDOT-Projects.dty file is found in the following location:

C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation\Data.

When creating a project file, a copy of an existing coordinate system is used to create the Project Coordinate System. The following example lab takes you through the steps.

Example - Setting Project Geographic Coordinate System

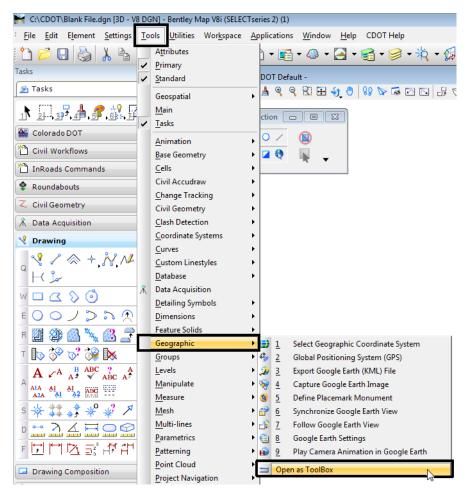
The following is an example of setting up and using a Project Geographic Coordinate System. In this example a project coordinate system is setup using information from ROW Survey. The project coordinate system is then assigned to a MicroStation design file.

Once the project coordinate system has been assigned to the design file, a survey file is referenced, a project point control file is referenced which is in UTM coordinates, an image file is referenced which is UTM coordinates, and lastly GIS data is referenced into the design file.

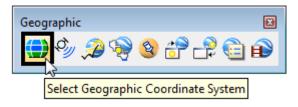
Create Project Geographic Coordinate System

- 1. Open InRoads and create a new MicroStation design file. In this example the file will be called 12345Des_Model.dgn.
- 2. From the Applications pulldown, activate Map and then cancel the window.
- 3. Create a Project Geographic Coordinates System using the information from this workflow. This data can also be found in the *Factor Computation Worksheet* using the *Sample -Seed Points* tab calculations.

4. Open the *Geographic Toolbox* from the **Tools** pulldown menu. Select **Tools > Geographic** and then the **Open as Toolbox**.



5. This will open up the Geographic toolbox. <D> the Select Geographic Coordinate System icon from the toolbox.



This opens up the *Geographic Coordinate System* dialog box. <D> the From Library icon (the second icon from the left) to open the *Select Geographic Coordinate System* dialog box (this contains the library of geographic coordinate systems).

🚔 Geographic Co	oordinate System	- • •			
🖻 🛟 🗞 🛛	# 🛱 🌮 🔁	<u>ک</u>			
From Library raphic Coordinate System					
	<none></none>				
Description:					
Source:					

- **Note:** If the model you are in does not have a GCS assigned to it, the first icon is displayed diluted and will be unusable.
- 7. Select the *Library* tab to see all the available systems.

	📕 Select Geographic Coordinate System					
I	Library	Search				
	÷	Favorites Colorado - Projected (northing, easting,) CDOT-Projects Library				
		Ok Cancel				

8. Expand the **Favorites** folder by clicking on the plus box and then expand the Colorado folder the same way. Default Colorado geographic coordinate systems can be accessed from this folder.

K Select Geographic Coordinate System
Library Search
 Favorites Colorado - Projected (northing, easting,) CO-C - NAD27 Colorado State Planes, Central Zone, US Foot CO-N - NAD27 Colorado State Planes, Northem Zone, US Foot CO-S - NAD27 Colorado State Planes, Southem Zone, US Foot CO83-CF - NAD83 Colorado State Planes, Northem Zone, US Foot CO83-NF - NAD83 Colorado State Planes, Southem Zone, US Foot CO83-C - NAD83 Colorado State Planes, Southem Zone, US Foot CO83-C - NAD83 Colorado State Planes, Southem Zone, US Foot CO83-C - NAD83 Colorado State Planes, Central Zone, Meter CO83-N - NAD83 Colorado State Planes, Northem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter
Ok Cancel

9. A copy of a base coordinate system is used to create the project coordinate system.

Note: CDOT Project coordinates created by ROW Survey are generally modified Colorado State Plane NAD 83 coordinate systems in one of three zones (Northern, Central, and Southern).

10. Select the coordinate system to be copied and right click over it.

ibrary Search	
Favorites	Coordinate
🖃 💬 Colorado - Projected (northing, easting,)	Name
CO-C - NAD27 Colorado State Planes, Central Zone, US Foot	
CO-N - NAD27 Colorado State Planes, Northern Zone, US Foot	Description
CO-S - NAD27 Colorado State Planes, Southern Zone, US Foot	Projection
CO83-CF - NAD83 Colorado State Planes, Central Zone, US Foot	Source
CO83-NF - NAD83 Colorado State Planes, Northern Zone, US Foot	Units
CO83-SF - NAD83 Colorado State Planes, Southern Zone, Cut	
CO83-C - NAD83 Colorado State Planes, Central Zone, Me Copy	•
CO83-N - NAD83 Colorado State Planes, Northern Zone, N CO83-S - NAD83 Colorado State Planes, Southern Zone, N Delete fro	om Group
CDOT-Projects Add To F	

11. **<D>** on the **CDOT-Projects** folder and **Paste** the copy into the folder.

📕 Select Geographic Coordinate System	
Library Search	
 Favorites Colorado - Projected (northing, easting,) CO-C - NAD27 Colorado State Planes, Central Zone, US Foot CO-S - NAD27 Colorado State Planes, Northem Zone, US Foot CO33-CF - NAD83 Colorado State Planes, Central Zone, US Foot CO83-NF - NAD83 Colorado State Planes, Northem Zone, US Foot CO83-SF - NAD83 Colorado State Planes, Southem Zone, US Foot CO83-C - NAD83 Colorado State Planes, Southem Zone, US Foot CO83-SF - NAD83 Colorado State Planes, Southem Zone, US Foot CO83-N - NAD83 Colorado State Planes, Central Zone, Meter CO83-S - NAD83 Colorado State Planes, Northem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter CO83-S - NAD83 Colorado State Planes, Southem Zone, Meter 	Con Nam Dess Proju Sour Unit First Secc Orig Orig Fals Fals Qua Mini Max Mini
Ok Cancel	

After pasting the file in the *CDOT-Project* folder it should be edited with project specific information.

- 12. **<R>** on the copied file and select **Edit Coordinate System Properties.**
- 13. Edit the **Name** and **Description** to represent the project. **<D>** in the right hand column to edit.

📕 Edit Geographic Coordinate System			
Coordinate Syst	tem 📃 🔨 🔺 📤		
Name	State Highway 157 at US		
Description	Modified - NAD83 Colorado State Planes, Northern Zone, US Foot		
Projection	Lambert Contormal Conic with Affine Processor		
Source	Calculated from CO83-N by Mentor Software		
Units	US Survey Foot		

Do not close the *Edit Geographic Coordinate System* dialog box. Additional information is required for the project coordinate system before it can be saved. This information is obtained from the *Factor Computation Worksheet*.

14. The base system for the copied NAD83 Colorado State Plane system has a Projection of Lambert Conformal Conic. It is important to select a system similar to the original when modifying the project system. For example: *Lambert Conformal Conic with Affine Processor* is used to modify a *Lambert Conformal Conic* projection. 15. **<D>** in the right had column over the projection. Using the down arrow, navigate to the appropriate *Affine Processor*.

Coordinate System		~
Name Description	State Highway 157 at US Nodified - NAD83 Colorado State Planes, Northem	Zone. US Foo
Projection	Lambert Conformal Conic	-
Source	Transverse Mercator Kruger Formulation	*
Units	Winkel-Tripel	
First Standard Parallel	Non-earth - Scale, Botation then Translation	
Second Standard Parallel	Lambert Conformal Conic with Affine Processor	N
Origin Longitude	Oblique I Point (Unrectified)	NS
Origin Latitude	Oblique 1 Point	
False Easting	Oblique 2 Points (Unrectified)	
False Northing	Oblique 2 Points	

- 16. Next the information from the worksheet tab for Seed Point's should be entered. The information from the yellow highlighted area into the *Edit Geographic Coordinate System* dialog box.
- 17. Affine AO Parameter is the Easting adjustment and the Affine BO Parameter is the Northing adjustment.
- 18. Affine A1 Parameter and Affine B2 Parameter are the Scale parameters.

AD83 Colorado State Planes, Nort		🛛 🖊 Edit Geographic Coordinate System	- 0
nbert Conformal Conic with Affi	ne Processor	Coordinate System	
Truncation Adjusted to Seed Coordinates	300022.071236 900010.655858	Name Description Projection Source Units First Standard Parallel Social Standard Parallel Origin Longitude Origin Longitude False Easting False Northing Quadrant Minimum Longitude Maximum Longitude	State Highway 157 at US Modified - NAD83 Colorado State Planes, Northern Z Lambert Conformal Cortic with Affine Processor Calculated from CO83-N by Mentor Software US Survey Foot 40°4700.0000°N 39°43'00.0000°N 39°43'00.0000°N 39°20'00.0000°N 3000000 1000000 Positive X and Y 110°00'00.0000°W 1011'30'00.0000°W
Geographic Coordinate System Parameters		Minimum Latitude Maximum Latitude Affine A0 Parameter	39*15'00.0000"N 41*45'00.0000"N
Affine A0 Parameter	-2953629.340605	Affine B0 Parameter	→ -2953629.340605 → -984603.889593
Affine B0 Parameter	-984603.889593	Affine A1 Parameter	1.00028596071914
ffine A1 Parameter	1.00028596071914	Affine A2 Parameter Affine B1 Parameter	0
Afine B2 Parameter	1.00028596071914	Affine B2 Parameter	1.00028596071914

19. In those cases when there is a rotation value, this would be entered in the *Affine A2* and *Affine B1* parameter area.

Coordinate System		٠
Name	State Highway 157 at US	٦
Description	Modified - NAD83 Colorado State Planes, Northern Zone, US Foot	
Projection	Lambert Conformal Conic with Affine Processor	
Source	Calculated from CO83-N by Mentor Software	
Units	US Survey Foot	
First Standard Parallel	40°47'00.0000"N	
Second Standard Parallel	39°43'00.0000"N	
Origin Longitude	105°30'00.0000"W	
Origin Latitude	39°20'00.0000"N	
False Easting	3000000	
False Northing	1000000	
Quadrant	Positive X and Y	
Minimum Longitude	110°00'00.0000"W	
Maximum Longitude	101°30'00.0000"W	
Minimum Latitude	39°15'00.0000"N	
Maximum Latitude	41°45'00 0000"N	
Affine A0 Parameter	-2953629.340605	
Affine B0 Parameter	-984603.889593	
Affine A1 Parameter	1.00028596071914	
Affine A2 Parameter	0	
Affine B1 Parameter	0	
Affine B2 Parameter	1.00028596071914	

20. Once the values have been entered they can be saved by selectin **Ok** to accept the changes and dismiss the *Edit Geographic Coordinate System* dialog box.

me	State Highway 157 at US
scription	Modified - NAD83 Colorado State Planes, Northern Zone, US Foot
pjection	Lambert Conformal Conic with Affine Processor
urce	Calculated from CO83-N by Mentor Software
its	US Survey Foot
st Standard Parallel	40°47'00.0000"N
cond Standard Parallel	39°43'00.0000"N
igin Longitude	105°30'00.0000''W
igin Latitude	39°20'00.0000"N
lse Easting	3000000
lse Northing	1000000
adrant	Positive X and Y
nimum Longitude	110°00'00.0000''W
ximum Longitude	101°30'00.0000"W
nimum Latitude	39°15'00.0000"N
ximum Latitude	41°45'00.0000"N
ine A0 Parameter	-2953629.340605
ine B0 Parameter	-984603.889593
ine A1 Parameter	1.00028596071914
ine A2 Parameter	0
ine B1 Parameter	0
ine B2 Parameter	1.00028596071914
ine A1 Parameter ine A2 Parameter ine B1 Parameter	1.00028596071914 0 0

21. Select **Ok** in the *Select Geographic Coordinate System* dialog box to apply the custom project system. This project coordinate system can now be assigned to any design file within the project.

rary Search	Coordinate System	*
Colorado - Projected (northing, easting,) Colorado - NAD27 Colorado State Planes, Central Zone, US CO-N - NAD27 Colorado State Planes, Northem Zone, U CO-N - NAD27 Colorado State Planes, Southem Zone, U CO-NAD23 Colorado State Planes, Central Zone, CO-NAD83 Colorado State Planes, Central Zone, CO-NAD83 Colorado State Planes, Southem Zon CO-CO-NAD83 Colorado State Planes, Southem Zone, CO-S-S NAD83 Colorado State Planes, Central Zone, CO-S-S NAD83 Colorado State Planes, Southem Zone, CO-S-S - NAD83 Colorado State Planes, Southem Zone, CD-S-S - Southem Zone, Southem Zone, CD-S-S - Southem Zone, Southem Zone, CD-S-S - Southem Zone, CD-S-S - Southem Zone, Southem Zone, CD-S-S - Southem Zone, Southem Zone, CD-S-S - Southem Zone, CD-S-S - Southem Zone, Southem Zone, CD-S-S -	Name Description Projection Source Units First Standard Parallel Second Standard Parallel Origin Longitude Origin Latitude False Northing Quadrant Minimum Longitude Maximum Longitude Minimum Latitude Maximum Latitude	State Highway 157 at US Modified - NAD83 Colorado S Lambert Conformal Conic with Calculated from CO83-N by N 40°47700.0000"N 39°43'00.0000"N 39°20'00.0000"N 300000 1000000 Positive X and Y 110°00'00.0000"W 39°15'00.0000"N 40°47'00.0000"N

Attach Survey Topo File

Once the Project Coordinate System has be defined and assigned to the new design file, it is time to reference files.

- **Note:** For more information on attaching imagery, review the workflow Using Geographic Images in Raster Manager.
- 1. Begin by referencing the survey existing data. This file is called **12345SURV_Topo100scale01.dgn**.
- 2. Set the *Attachment Method* do Interactive.

Attach Referer	ce - C:\Projects\CDOT Workflow Setting Geographic Project Coor	dinate System\	
Look in:	🔋 CDOT Workflow Setting Geographic Project (👻 🌀 🏂 📂	💷 🖌 🔁	3D - V8 DGN
œ	Name	Date	
	퉬 Geographic Data	12/12/2011 12:29	
Recent Places	🛃 12345DES_Model.dgn	12/12/2011 12:52	,
	12345SURV_Topo100scale01.dgn	12/12/2011 12:47	1
	🛃 UTM Control Points.dgn	12/12/2011 12:42	
Desktop			9
Libraries			
			Attachment Method
Computer			

3. Select *Coincident - World* for the Orientation.

Reference Att	achment Setting	s for 12345SURV_Topo100scale01.dgn	23		
File Name: 12345SURV_Topo100scale01.dgn Full Path:\12345SURV_Topo100scale01.dgn					
<u>M</u> odel:	•]			
Logical Name:]		
Description:	Global Origin aligr	ned with Master File]		
rientation:					
View		Description			
Coincident		Aligned with Master File			
Coincident - \	Vorld	Global Origin aligned with Master File			
Geographic -	AEC Transform	Calculated Transform, max error 1.005e-00)5'		
Geographic -	Reprojected	Reproject reference data to Master GCS			
🗄 Standard View	ws				
Saved Views	(none)				
Named Fences (none)					
Detail	Scale: 1"=100'	▼			
Sc <u>al</u> e (Master	r:Ref): 1.000000	: 1.000000			

Reference UTM Control Points

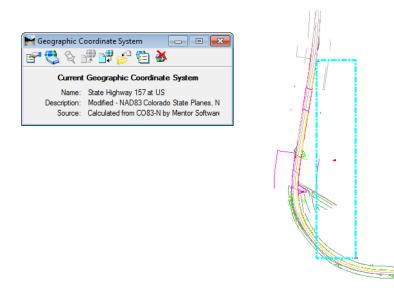
Reference the file containing control points which are in UTM coordinates. This file has a UTM-13N Geographic Coordinate System assigned to it.

1. Attach reference the file *UTM Control Points.dgn* and set the *Attachment Method* to Geographic - Reprojected.

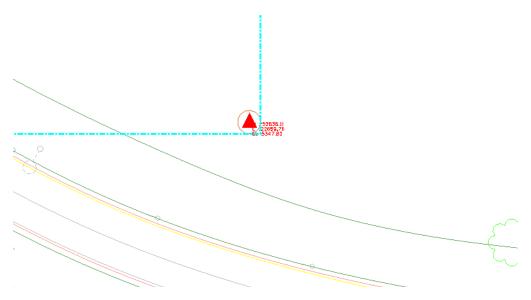
Attach Reference - C:\Projects\CDOT Workflow Setting Geographic Project Coordinate System\							
Look in:	🔋 CDOT Workflow Setting Geographic Project C 👻 🌀 🎓 ╞	ቄ 🛐 🔻	3D - V8 DGN				
e	Name	Date					
~	🌗 Geographic Data	12/12/2011 12:29					
Recent Places	🛃 12345DES_Model.dgn	12/12/2011 12:52	i i				
	12345SURV_Topo100scale01.dgn	12/12/2011 12:47					
	🛃 UTM Control Points.dgn	12/12/2011 12:42					
Desktop							
Libraries							
Computer			Attachment Method Geographic - Reprojected 🔹				

The UTM Control Points.dgn file appears as shown below represented by the blue dashed box.

Note: If the box does not appear, **<D>** the **Fit** view command (*Files* set to **All** and *Expand Clipping Planes* toggled on).



2. The control points in the referenced files should line up. The triangle is a control point in the Survey file and the circle is the same control point in the UTM control point file.



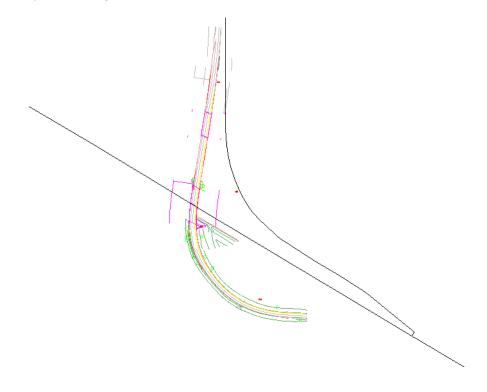
Reference GIS Shapefiles

Shape (shp) files created from GIS can be referenced in. In this example, highway linework in UTM coordinates will be referenced.

1. Attach reference the *HIGHWAYS.shp* being sure to change the *Files of type:* to **Shapefiles (*.shp)** and setting the *Attachment Method* to Geographic - Reprojected.

🙀 Attach Refere	ence - C:\Projects\CDOT Workflow Setting Geographic Project Coordinate System\	x
Look in:		
Recent Places	Name Date Geographic Data 12/12/2011 12:29 Image: A state of the stat	
Libraries Computer	Attachment Method Geographic - Reprojected	-
Network		
[Files of type: Shapefiles (*.shp) Cancel Save Relative Path	

2. Notice that after attaching the files, they all be line up even though there are two separate coordinate systems being used.



Reference Image Files

CDOT has imagery covering the state of Colorado. This imagery is in two different coordinate systems. The greater Denver area is in NAD83Colorado State Plane coordinates and the rest of Colorado is in UTM coordinates. Either system can be referenced into a design file and reprojected to the project coordinate system.

Refer to the workflow *CDOT Workflow Accessing Imagery Files* to learn more on how to find images within the state of Colorado.

1. Using Raster Manger, attach the file UTM_Project_Image.tif.

🚔 Attach Raster I	Reference					×
Look in:	DOT Work	flow Setting Geographic Project C 👻	G 🤌 📂		3 🖹	
Recent Places Desktop Libraries	Name Geographic UTM_Proje			Date 12/12/2011 12:29 J 11/9/2011 1:39 PM	Preview Attachment ✓ Raster Preview	
Network	File name: Files of type:	UTM_Project_Image tif Common Raster Formats Open as read-only	•	Open Cancel	Origin X: 1390396.846 Y: 14324088.170 □ Place Interactively ☑ Open Settings Dialog	
		-				.d

In this example, the image is from a portion of Colorado where the coordinate system is UTM. These files are GeoTIFF files with the coordinate system written into the header of the file. There is no sister file accompanying the image.

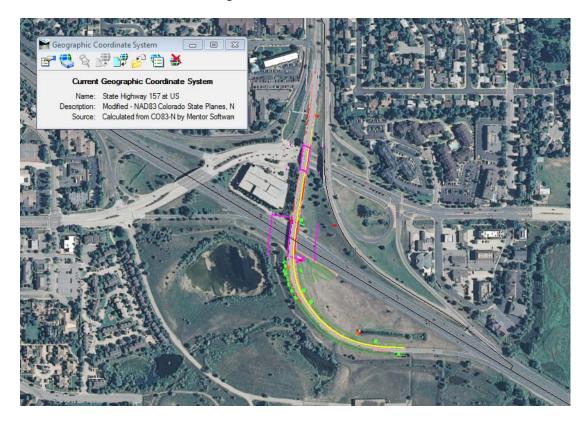
Note: The same setting used below are also used for images that have a sister file.

- 2. In the Raster Attachment Options dialog box, set the Action tab setting Place Interactively to No.
- 3. Under the *Geometry* tab, set the *Geo Priority* setting to **Raster Header** since the coordinate assignments are in the file.

4. Set the *Inherit GeoCS from Model* to **Not Inherited** since the coordinate system of the design file is different from that of the image.

📕 Raster Attachment Options	
C:\Projects\CDOT Workflow	/ Setting Geographic Project Coordinate System∖/ ►
Action	*
Place Interactively	No
General	*
Image	*
Geometry	*
Geo Priority Inherit GeoCS from Model	Raster Header Not Inherited
Color	*
Display Print	*
Extended	*
Attach Cancel	

5. Select **Attach** to reference the image.



Workflow MS 4 - Working with Model Files and Sheet Files

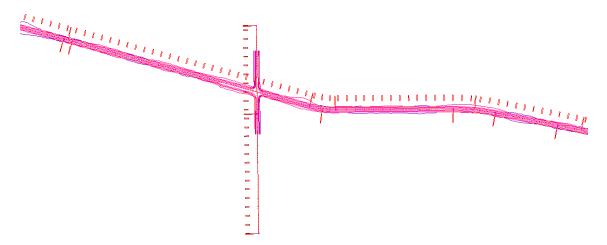
This document defines how to use and manage model and sheet files in a typical CDOT workflow. The document begins by describing the data that each type of file should contain along with typical examples to illustrate the differences. The locations for storing these files are identified. The steps to create a new model and sheet files and how to change the file settings to work with different plotting scales are explained. Finally, the process for referencing model files for review or printing is covered.

File Types

Model Files

Model files usually contain *design graphics* that are placed at the correct real world coordinates or *detail graphics* that are not dependent on real world coordinates. Model files are files that are ready to be used as a reference file to other model files for further design or to be referenced by sheet files for the purpose of plotting. Typical data included in a model file that is drawn at the correct real world coordinates would include planemetrics for alignments, contours, utility lines, building outlines, structures, and any other DTM features. Model file data that is not dependent on real world coordinates would include typical sections, profiles, detail drawings, and tabulation sheets.

A model file will usually contain only one type of data. For example, one model file would contain only existing topography data, while another would contain only geometry data. Separate model files should be used for cross-sections and profiles. Dividing the data types into separate model files will allow for the most flexibility in how the data is utilized both by the specialty group team members and the secondary users that need to reference the data. This method of managing model files also minimizes level management by not having unrelated data in the file.



Another characteristic of the design file is that the graphics in the file usually represent the entire project. These graphics will later be referenced into a sheet file and clipped to fit the boundaries of the sheet.

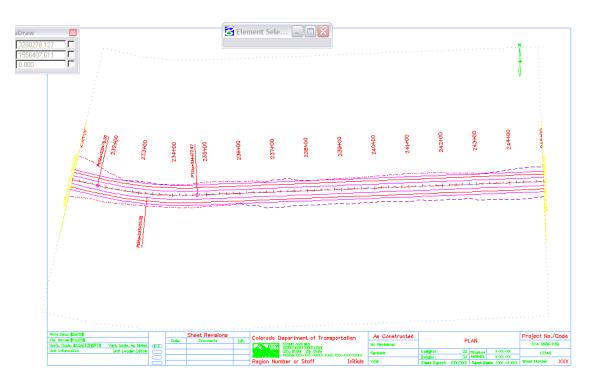
A distinct type of model file is the working file.

Working Files

Working files are model files that are being developed and/or revised and are not ready for use by other specialty groups or team members. These files usually have the owners' initials included in the filename as a way to distinguish the file from the ready-to-use model file. The differences between a model file and a working file is the completeness of the file and its availability to others.

Sheet Files

Sheet files are MicroStation DGN files that contain the data required for printing. They are created by referencing in various model files that either represent directly or add clarification to the features that will be constructed from the printed sheet and include a border file. In addition to containing reference files, typical data that would be included in a sheet would be informational text, such as callouts and dimensions, a directional arrow if appropriate, and other non-engineering information such as logos or stamps.



The graphics in a sheet file represent only a portion of the entire design and are usually included within a standard border. The image above is a portion of the graphic representing the design file shown on the previous page.

File Management

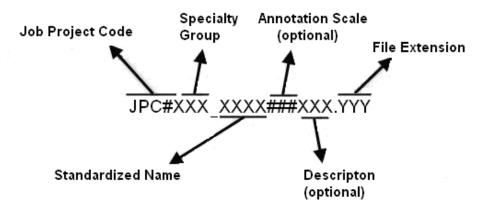
Each of these files is owned by the Project Manager of the specialty group whose data is contained in the file and updated by the assigned team member. A team member from one specialty group should not update the file(s) of a team member from another specialty group.

File Naming Conventions

The CDOT naming standard uses a formula that restricts the character placement, ensures unique file names, and identifies the information contained in the file.

All CDOT projects must follow these file naming conventions. Standardizing file names is necessary for effective management of the large numbers of files needed to produce a set of design plans.

CDOT files are named in a standard format that identifies the file's project, the data contained within it, and the product used for its creation. The naming convention is illustrated as follows:



- Job Project Code (JPC) is the CDOT project code, formerly known as the project subaccount number.
- **Specialty Group** is the standardized abbreviation for the specialty group that the owner of the file is with.
- Standardized Name denotes the type of data that is contained in the file.
- Annotation Scale including the annotation scale in the file name is optional. However, it should be included in file names for projects that use multiple annotation scales.
- **Description** A brief description can be used to further identify a model file. For sheet files, this field is used as a counter to differentiate between multiple files of a specific type.
- File Extensions define the product used for its creation. Examples would be DGN for MicroStation, DTM for an InRoads surface, etc.

An example file name for a MicroStation design file would look like the following, 12345DES Model100US285.dgn

12345 indicating the CDOT Project Number, **DES** indicates it is Roadway Design's model file and **100** indicating it uses a 1"=100' annotation scale, US285 is a description identifying the highway this model depicts. **DGN** is the default extension for MicroStation design files.

Note: A seventh segment is used on Working Files. This segment should be the initials of the designer or engineer who is working on the file.
 Example: CU12345DES_Model100.dgn where CU, are the initials of the designer or engineer (in this example, CU stands for "CDOT User").

Storing Model Files and Sheet Files

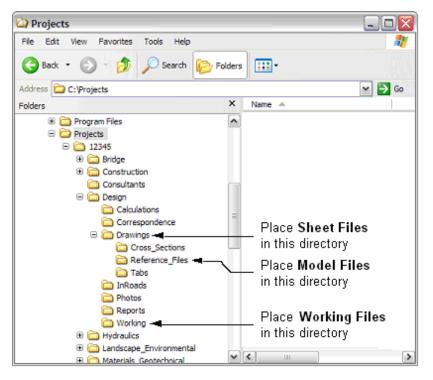
Model File Location

Model files should be stored in the JPC#\SpecialtyGroup\Drawings\Reference_Files folder. The exception to this is for cross-sections (design or construction) which have their own sub-directory under \Drawings sub-directory. Cross sections are separated from the rest of the model files at the request of the Reproduction department to simplify the process of assembling plan sets.

Working File Location

Working files should be stored in the \JPC#\Specialty Group\Working folder.

Sheet File Location



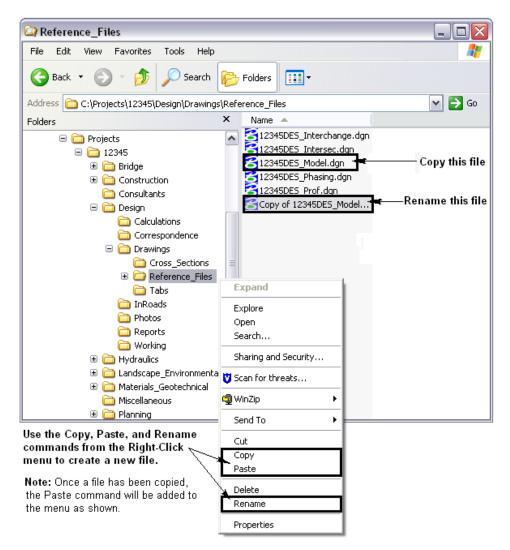
Sheet files should be stored in the \JPC#\Specialty Group\Drawings folder.

Creating a Model and Sheet Files

During the setup of a project, several model and sheet files are auto-populated into the \JPC#\SpecialtyGroup\Drawings\Reference_Files and \JPC#\Specialty Group\Drawings directories of each of the specialty group folders and have the CDOT standard file names already assigned. (Construction and Planning are exceptions and do not have any auto-populated files.) These auto-populated files can be modified to included project specific information before being used to create new drawings. In addition to the auto-populated files, standard 2D and 3D seed files are available from the C:\Program Files\Workspace-CDOT\Standards-Global\MicroStation\Seed directory. These files are global standards and are write protected so that no changes can be made. Several of methods can be used to begin a new drawing; 1) Use the Windows Explorer to copy, paste, and rename a file, or 2) use the MicroStation Manager window to create a new file using a seed file or to open a drawing and then use the "save-as" command to create the new file. If a new file with project specific data is required, use the Windows Explorer method. Otherwise, the MicroStation Manager method should be used.

Using Windows Explorer

1. Open the Windows Explorer window and navigate to the desired *Projects\JPC#\Specialty Group* folder. <**R**> on the desired file and select **Copy** from the menu.



- 2. In the blank area below the file list, right click and select Paste from the menu.
- 3. A copy of the selected file is placed in the folder. Rename the new file according to the file naming conventions. To rename the file **<R>** on the file name and select
- 4. Rename from the menu. Type in the new name and press the *Enter* key to finish.

Using a Seed File

 Open MicroStation from the Start menu (or desktop icon if available). From the *File Open* dialog box select the *New* file icon. If MicroStation is already open, select File > New from the menu. Both operations will display the *New* window.

File Open - C:\\	Projects\12345\					×
Look in:	12345		- 🧿 🌶 📂	📴 🔹 🔁	*	
Recent Places Desktop Libraries	Bridge Construction Consultants Design Hydraulics Landscape_Er Miscellaneou Planning Plot_Sets Project_Confi Project_Mana Redline	stechnical s guration	BOW_Survey Specifications Traffic_ITS Utilities			
Network	 ✓ File name: Files of type: 	III DODUOBRDG_Detail01.dgn MicroStation DGN Files (*.dg Open as read-only	(n) •	Open Cancel Options	User: (Project: (Interface: (

2. From the New window, click on the Browse button to display the Select Seed File window.

New - C:\Proje	ects\12345\					X
Save in:	12345		•	G 🤌	• 🖽	3 🗎
Recent Places Desktop Libraries Computer	Bridge Construction Design Hydraulics Landscape_Er Materials_Gee Miscellaneou Planning Plot_Sets Project_Confi Project_Mana Redline ROW_Survey Specification:	nvironmental otechnical s guration iger		Utilities	5	
Network	 ✓ File name: Save as type: 	III 12345DES_Plan01 MicroStation DGN F			•	► Save Cancel
	Seed:	C:\Workspace\Wor		T_V8i\Standa	ards-	Browse

- 3. From the Select Seed File window, highlight the desired seed file.
 - **Note:** All disciplines use the 2D-Seed_CDOT.dgn and the 3D-Seed_CDOT.dgn. The Bridge-2D-Seed_CDOT.dgn and Bridge-3D-Seed_CDOT.dgn have specific settings for Bridge.
- 4. Click the **Open** button to accept the selection. This will dismiss the **Select Seed File** window.

5. In the *New* window, type the desired file name (refer to the naming conventions above). Click the *Save* button to accept the file name. MicroStation will open with the newly created file.

Annotation and Line Style Scale

While the elements themselves are drawn at a 1' = 1' scale, a scale factor is set for line styles and text so that its size will be appropriate when printed.

Setting the Annotation Scale

Annotation Scale controls text, dimension, and linestyle sizes. It is set in the model properties dialog box or in the drawing scale toolbox docked at the bottom of the application screen.

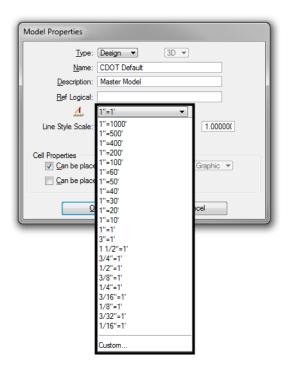
1. Select the *Models* icon from the *Primary Tools* toolbar.



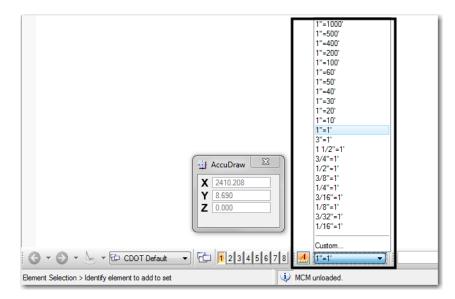
2. This displays the Models dialog box. From here, select the Edit Model Properties icon.



3. In the Model Properties dialog box, select the desired Annotation Scale.



- 4. **<D>** the **OK** icon to accept the selection. This will close the **Model Properties** dialog box. The **Models** dialog box can also be closed.
- 5. Changing the Annotation Scale from the Drawing Scale toolbox is the faster way to make this change since it doesn't require any dialog boxes to be opened.

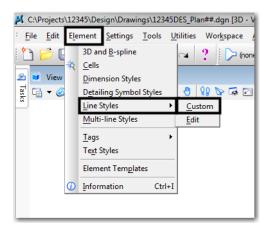


Line Style Scale Settings

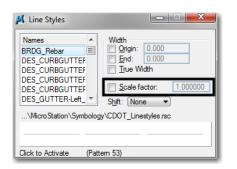
The Line Style Scale settings are set based on the type of data that is in the model or sheet file. Graphics that are generated in MicroStation will behave differently than data that is generated from InRoads. Applying the wrong setting will display the linestyle symbology incorrectly in the model and when referenced into other drawings.

MicroStation graphics are drawn at a scale of 1 and utilize the annotation scale setting to view the linework in the appropriate print scale. InRoads hard codes the line style scale to the graphics based on the *Project Options Factors*.

1. Open the *Line Styles* dialog box by selecting, **Element > Line Styles > Custom.**



2. Verify the *Scale factor:* setting is toggled off.



MicroStation graphics

1. Open the *Model Properties*.



2. Verify the *Line Style Scale* setting is set to **Annotation Scale**.

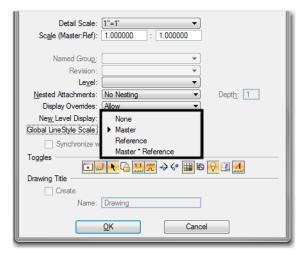
Model Properties								
<u>T</u> ype:	Design							
<u>N</u> ame:	CDOT Default							
Description:	Master Model							
<u>R</u> ef Logical:								
<u>A</u> [1"=1' 🔻							
Line Style Scale:	Annotation Scale							
[Update Fields Automatically							
Cell Properties								
Can be placed	as a cell Cell Type: Graphic 💌							
Can be placed as an annotation cell								
<u><u>o</u>k</u>	QK Cancel							

- 3. Close the *Model Properties* dialog box by selecting the **OK** button.
- 4. Changing the Annotation Scale will now modify the Line Style scales in the models
- 5. When referencing models that contain MicroStation generated graphics, set the *Global LineStyle Scale:* to **Master**

Reference Attachment S	Settings for 12345DES_Model.dgn
-	5DES_Model.dgn awings\Reference_Files\12345DES_Model.dgn r Default
Logical Name:	
Description: Globa	al Origin aligned with Master File
Orientation:	
View	Description
Coincident	Aligned with Master File
Coincident - World	Global Origin aligned with Master File
Standard Views	
Saved Views (none)	
Named Fences (nor	ne)
Detail Scale: Sc <u>a</u> le (Master:Ref):	1"=1" 1.000000 : 1.000000
Named Group:	•
Revision:	
Level:	
Nested Attachments:	No Nesting Depth: 1
Display Overrides:	
	Use MS REF NEWLEVELDH
Global LineStyle Scale:	
· · · ·	ith Saved View
Toggles	
•	🗴 🖓 🔛 完 🌛 🐓 🏢 🔊 🖓 💷
Drawing Title	
Create	
Name:	Drawing
	<u>Q</u> K Cancel

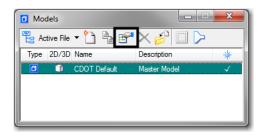
Note: This will force the reference line styles to read the sheet file annotation scale and apply it to the reference line styles.

- 6. Settings for the Global LineStyle Scale are as follows:
 - None no scaling is applied, line styles will be viewed at a 1 to 1 scale
 - Master the reference line styles will be scaled to the annotation scale setting in the open file
 - Reference the reference line styles will be scaled to the annotation scale setting in the referenced file
 - Master*Reference the line styles will be scaled to both annotation scales together



InRoads Graphics

1. Open the *Model Properties*.



2. Verify the *Line Style Scale* setting is set to Global Line Style Scale and set to a value of 1.

Model Properties	
Type:	Design
<u>N</u> ame:	CDOT Default
Description:	Master Model
Ref Logical:	
<u>A</u>	[1"=1' •
Line Style Scale:	[Global Line Style Scale ▼] 1.00000(
	Update Fields Automatically
Cell Properties	
Can be place	ed as a cell Cell Type: Graphic 🔻
Can be place	ed as an annotation cell
Q	K Cancel

3. Close the *Model Properties* dialog box by selecting the **OK** button.

- 4. If the print scale of the sheet file changes, the InRoads graphics will have to be re-displayed with the new print scale set in the *Factors* tab in InRoads. The annotation scale settings will not affect this file.
- 5. When referencing models that contain InRoads generated graphics, set the Global LineStyle Scale: to None

Reference Attachment	Reference Attachment Settings for 12345DES_Model.dgn						
File Name: 1234	I5DES_Model.dgn						
Full Path:\D	\Drawings\Reference_Files\12345DES_Model.dgn						
Model: CDO	CDOT Default						
Logical Name:							
Description: Glob	al Origin aligned with Master File						
Orientation:							
View	Description						
Coincident	Aligned with Master File						
Coincident - World	Global Origin aligned with Master File						
Standard Views							
Saved Views (none	·						
Named Fences (no	ne)						
Detail Scale: Sc <u>al</u> e (Master:Ref):							
Named Group:							
Revision:							
Level:							
Nested Attachments:							
Display Overrides:	Allow						
Ne <u>w</u> Level Display:	Use MS_REF_NEWLEVELDH						
Global LineStyle Scale:	None 🔻						
	vith Saved View						
Toggles	』 ₹ 🔓 🎢 → <* 🎟 🖻 🖗 🗹 🦽						
Drawing Title							
Create							
Name:	Drawing						
	OK Cancel						

Using Model Files From Other Users As References

A reference is a model that is attached to and displayed within the active model or sheet file for design or printing purposes. Elements in a reference display as though they were in the active model. Although you cannot manipulate the elements in a reference, you can snap to them and even copy them into the active model.

Model files created by other users can be used as references even if the file resides on a different computer. This is done by mapping the remote computer (the one containing the file to be referenced) to a drive letter on the local computer.

Mapping a Remote Computer

1. Open the My Computer window from the Start menu or desktop icon (if available).



2. From the My Computer window, select Tools > Map Network Drive.

🚽 My Computer								
File	Edit	View	Favorites	Tools	Help			
0		0		Мар	Network Drive			
G Addres	Back	My Cor) · D		onnect Network Drive hronize			
ndaro.	·· 3	Hy Cor	npacer	Fold	er Options			

- 3. In the Map Network Drive dialog box, select the desired Drive letter.
- In the Folder field, enter the desired computer name and directory. The *Browse* icon can also be used to locate and select this information. The following format is used when keying in the computer information: \\computer_name\Projects\JPC#\.
- 5. If the information on the remote computer will be required over a period of many days, check on the **Reconnect at Login** option.

6. **<D>** the **Finish** icon to complete the process.

Map Network Drive	
and ass access I Specify	is can help you connect to a shared network folder ign a drive letter to the connection so that you can the folder using My Computer. the drive letter for the connection and the folder u want to connect to:
Drive:	Y: 💌
Folder:	\\computer\Projects\JPC# 🖌 Browse
STATISTICS OF STATISTICS OF STATISTICS	Example: \\server\share
No. of Concession, Name	Reconnect at logon
No. of Concession, Name	Connect using a <u>different user name</u> ,
	Sign up for online storage or connect to a network server.
	< Back Finish Cancel

7. Files from the remote computer can now be referenced into local drawings. The procedures for referencing files are covered in the following workflows: *CDOT Sheet File Creation*, *CDOT Sheet File Creation*, *Multiple Scales*.

Nested Attachments

Reference attachment nesting determines what happens when a file containing attachments is attached to the active dgn file. The following examples are used to illustrate the different nesting options.

Four files are used in the examples. *Blank.dgn* is the active file. *Square.dgn*, *Triangle.dgn*, and *Circle.dgn* will be used as attachments. For the purposes of the examples, *Circle.dgn* has been previously attached to *Square.dgn* and *Triangle.dgn* has been previously attached to *Circle.dgn*.

No Nesting

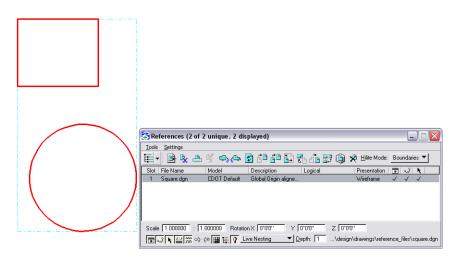
1. With this option, only the selected file will visible in the active file.



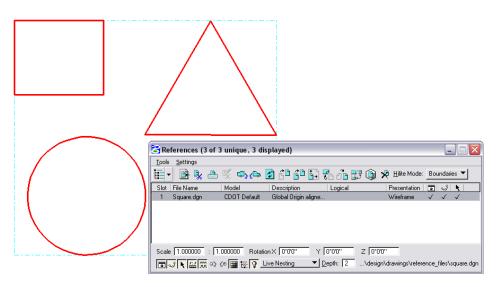
🚰 Ref	ferences ('	1 of 1 unique, 1 di	isplayed)					-	
<u>T</u> ools	Settings								
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Slot	File Name	Model	Description	Logical	1	Presentation		3	N I
1	Square.dgn	CDOT Default	Global Origin	aligne	1	Wireframe	\checkmark	~	\checkmark
	·	: 1.000000 Rotat	ion X 0°0'0'' No Nesting	······	Z 0°0'0'' \design\d	rawings\refere	nce_l	iles\s	quare.dgr

Live Nesting

1. This option allows files that are attached to the selected file to be viewed.



 The number of levels of attachments that can be viewed in this manner is controlled by the *Depth* setting. In the above illustration, *Circle.dgn* is attached directly to *Square.dgn* and is visible with a *Depth* setting of 1. By changing the *Depth* setting to 2, files attached to *Circle.dgn* (in this case *Triangle.dgn*) become visible.

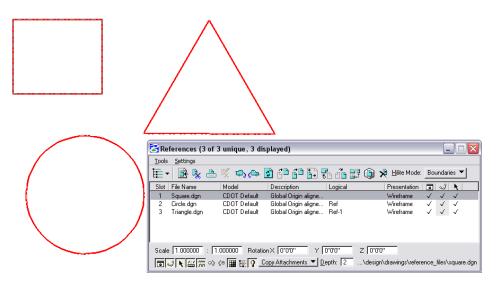


3. With live nesting, any reference file settings changes affect all of the visible files. So, for example, if the *Display* is turned off for *Square.dgn*, *Circle.dgn* and *Triangle.dgn* are turned off also.

Note: Level display of nested attachments is discussed below.)

Copy Attachments

1. This option also allows multiple levels of attachments to be viewed, however, it also allows independent control of each attachment. Compare the illustration below with those for *Live Nesting*. Here, each attached file is listed in the *References* dialog box and its settings can be adjusted independently.



Changing the Nesting Mode

The *Nesting Mode* for a single file or a group of attachments can be changed from the *References* dialog box. To change the nesting mode:

- 1. Highlight the desired files from the list.
- 2. Use the pull-down at the bottom of the dialog box to select the desired nesting mode.

🚰 References (3 of 3 unique, 3 displayed)								
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Slot	File Name	Model	Description	Logical	Presentation	• ~	N	
1	Square.dgn	CDOT Default	Global Origin align	e	Wireframe	\checkmark \checkmark	\checkmark	
2	Circle.dgn	CDOT Default	Global Origin align	ie Ref	Wireframe	\checkmark \checkmark	\checkmark	
3	Triangle.dgn	CDOT Default	Global Origin align	ie Ref-1	Wireframe	\checkmark \checkmark	\checkmark	
Scale 1.000000 : 1.000000 Rotation X 0°0'0'' Y 0°0'0'' Z 0°0'0''								
	₽∖≝‴ °)) (*) 🎛 🔄 🕅	 <u>N</u>o Nesting <u>Live Nesting</u> <u>C</u>opy Attachments 		\drawings\reference_fil	es\triangle.	dgn	

Attachment Level Display

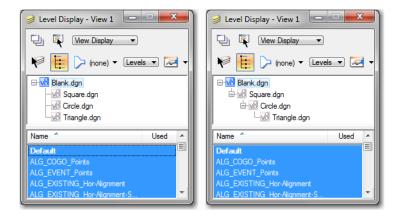
It is probable that elements in attachments will occupy levels that have the same name as levels in the active file or other attachments. This is possible because the level display operates independently on the active file and each attachment regardless of the nesting mode.

Turning Levels On and Off in Attachments

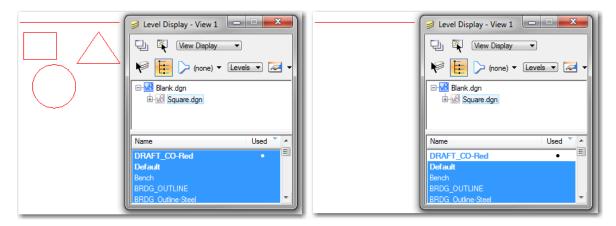
1. Select the Level Display icon from the MicroStation Primary Tools tool bar.

Primary Tools		E
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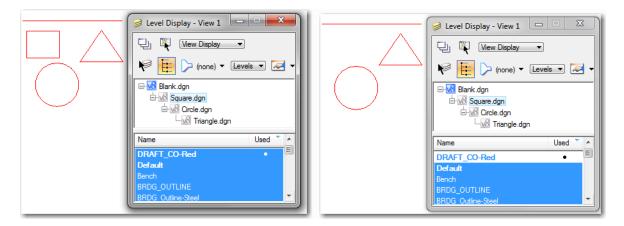
2. Select the file whose levels will be turned on or off. The file display within the Level Display dialog box will be different depending on the nesting mode.



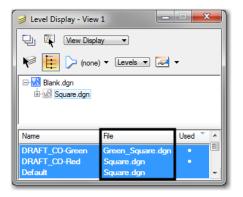
- **Note:** On the left the files were attached separately or with the **Copy Attachment** nesting mode. On the right, the files were attached using live nesting.
- 3. Click on the desired level to change its view status. When using live nesting, if the file tree is not expanded, level display changes to a particular file will affect all the files collapsed underneath it.
- 4. Continuing the examples above, the attachments were made using *Live Nesting* with a Depth of 2. All of the elements shown were drawn on the DRAFT_CO-Red level (the line is in the active file, *Blank.dgn*). In the illustration below, the DRAFT_CO-Red level is turned off in *Square.dgn* with the file tree collapsed. This causes the elements in the files collapsed under *Square.dgn* to be turned off also.



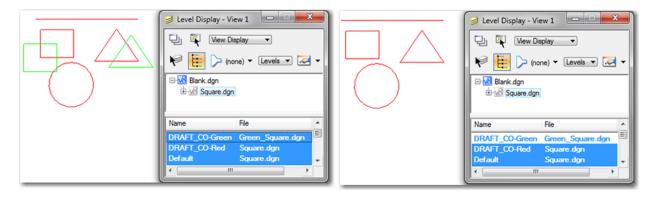
5. In this illustration, the file tree has been expanded so that when the DRAFT_CO-Red level in *Square.dgn* is turned off the other files are unaffected and only the square disappears.



6. Levels that are used in nested attachments which are not used in the main attachment will be displayed in the *Level Display* dialog box. The name of the first attachment containing the level is displayed.



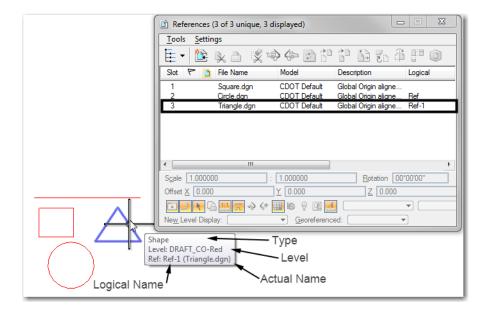
- *Note:* With the tree view collapsed, turning on or off a level in a collapsed file will affect all collapsed files using that level.
- Two more files have been added to the example, *Green_Triangle.dgn* and *Green_Square.dgn*. Each of the new files use the DRAFT_CO-Green level. These are attached to *Square.dgn* and are displayed by *Live Nesting*. With the file tree collapsed, turning off the DRAFT_CO-Green level turns off the display in both files.



8. With the file tree expanded, the levels for the individual files can be manipulated without affecting the same named levels in other attachments.

Determining an Element's File

Just by looking, there is no way to determine which file an element belongs to. However, a <T> snap on the element will display a tool tip listing the element's *Type*, *Level*, the *Logical Name* of the attachment, and its actual file name.



Logical Names and Slot Numbers for Reference Attachments

Logical Names

1. In MicroStation, a file can be used as an attachment within a single file numerous times. *Logical Names* are used to distinguish one version of the attachment from another. A logical name can be given to any attachment, but must be given to the second and subsequent attachments of a file.

2. To give a logical name to an attachment, begin the attachment procedure as normal. When the **Reference Attachment Settings** dialog box displays, *key in* the desired logical name in the field provided. Finish the attachment process as normal.

Reference Attachment S	Settings for 12345DES_Model.dgn						
Full Path:\Dr							
Logical Name: 100 s	Logical Name: 100 scale detail						
Description: Globa	al Origin aligned with Master File						
Orientation:							
View	Description						
Coincident	Aligned with Master File						
Coincident - World	Global Origin aligned with Master File						
Saved Views (none) Named Fences (nor							
Detail Scale: Sc <u>al</u> e (Master:Ref):							
Named Group:							
Revision:							
Le <u>v</u> el:							
Nested Attachments:	No Nesting Depth: 1						
Display Overrides:	Allow						
Ne <u>w</u> Level Display:	Use MS_REF_NEWLEVELD+						
Global LineStyle Scale:	Global LineStyle Scale: Master						
Synchronize with Saved View							
Toggles							
Drawing Title							
Create							
Name:	Drawing						
	QK Cancel						

3. The logical name is displayed in the *References* dialog box as illustrated below:

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Slot Numbers

1. Slot numbers are assigned to attachments to provide another method of grouping the files. They are used to assign the processing order when making shaded color or grayscale prints. For more information on using slot numbers in this process, see the workflow *CDOT Shaded Color And Grayscale Printing*.

Workflow MS 5 - Sheet File Creation

This document guides you through creating a new sheet file in MicroStation. We will be going over placing the sheet border around coordinate based model graphics. Setting up sheets this way maintains the coordinate based information and measurements are in real-world dimensions.

Workflow Outline

Setting up the Sheet File - The sheet file contains the sheet border and related data along with reference files of the project data. Setting up the Sheet File includes creating the blank dgn file, attaching the references and rotating the view to the correct orientation.

- **Create a New Drawing File** The new drawing file will contain the sheet border and related material.
 - Commands Used: **File > Open** Used to access the MicroStation Manager dialog box. From there, a new file can be created.
 - **New File** Accesses the New File dialog box. The new file is created here.
- Attach Model Files The model files are attached so that the view rotation angle can be determined.
 - Commands Used: **File > Reference** Used to access the references dialog box. From there, the model files are attached.
 - **Tools > Attach** Used to select the model files for attachment.
 - **Reference Attachment Settings** Used to select the View and Scale for the model file.
- **Rotating the View** Rotating the view so that the sheet is orthogonal to the screen makes the file easier to read and print.
 - Commands Used: **rv=0,0,## key in** A method to rotate the view.
 - Rotate View > 3 Points A method to rotate the view.
- Attaching Border and Related Cells The sheet border, north arrow, and other cells are placed to create the sheet.
 - Commands Used: **CDOT Menu > Drafting > Border** Used to set the rotation and scale, select, and place cells.
- **Clipping Reference Files** When attached, the full contents of the reference files are displayed. Clipping reduces the visible portion of the reference files to the area within the sheet border.
 - Commands Used: CDOT Menu > Drafting > Border > Clip Boundary Used to draw the clip boundary. The clip boundary is a shape that denotes the limits of the viewable area for the reference files.
 - **References > Clip Boundary** Used to hide reference file data in areas outside of the clip boundary.
- Setting The Annotation Scale For sheets that are printed at a scale other than 1" = 100', the annotation scale must be changed to match that printing scale.
 - Commands Used: **Models > Properties > Annotation Scale** Used to adjust text and linestyle scales to match the desired print scale.

Setting up the Sheet File

1. Create a new drawing file from the *File > Open* dialog box, select the *New File* icon.

File Open - C:	Projects\55555\		×
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	•		4
	File name: 999990ES_TitleSht.dgn	•	Open User: CDOT User 🗸
Network			Cancel Project: 55555
	Files of type: Micro Station DGN Files (*.dgn)		
	Open as read-only		Options Interface: CDOT

2. Enter a drawing file name that corresponds to the next consecutive sheet number and place it under the appropriate file location under C:\Projects\.....

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	8 55555DES_PI	an##.dgn	9/30/2010 10:39 AM	Bentley
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Network	•			+
	File name:	55555DES_Plan01.dgn	-	Save
	Save as type:	MicroStation DGN Files (*.dgn)	•	Cancel
	Seed:	ds-Global\MicroStation\seed\3D	-Seed_CDOT.dgn	Browse

3. Verify that the desired Seed File is selected. If it is not, <D> Select and navigate to C:\Program Files\Workspace_CDOT\Standards-Global\MicroStation\Seed\.

Save in:	🃗 Drawings	•	- 🕝 💋 📂 🛄 -	8 🔒
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6	8 55555DES_F	PnP##.dgn	9/30/2010 10:39 AM	Bentley
Libraries	8 55555DES_F	Prof##.dgn	9/30/2010 10:39 AM	Bentley
	8 55555DES_9	SAQ##.dgn	9/30/2010 10:40 AM	Bentle
	8 55555DES_9	StdPlanList.dgn	9/30/2010 10:40 AM	Bentley
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~	🕺 55555DES_1	TabConc##.dgn	9/30/2010 10:40 AM	Bentley
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Network	•			•
	File name:	55555DES_Plan01.dgn	-	Save
	Save as type:	MicroStation DGN Files (*.dgn)	•	Cancel

4. Highlight the desired seed file (for this example: **3D-Seed_CDOT.dgn**) and **<D>Open**.

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Computer						
Network	File name:	3D-Seed_CDOT.dg	IN	Open		
	Files of type:	MicroStation DGN	Files (*.dgn)	•	Cance	*

Note: All disciplines except for Bridge use the 2D-Seed_CDOT.dgn and the 3D-Seed_CDOT.dgn. The Bridge-2D-Seed_CDOT.dgn and Bridge-3D-Seed_CDOT.dgn has specific settings for Bridge only.

5. In the **New** dialog box, **<D> Save**.

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Libraries	8 55555DES_	Prof##.dgn	9/30/2010 10:39 AM	Bentle
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6. The file you created will be highlighted in the **File Open**. **<D> Open** to open that file.

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Computer	🕺 55555DES_StdPlanList.dgn		9/30/2010 10:40 AM	Bentlej 🚽	
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	File name:	55555DES_Plan01.dgn		Open	User: CDOT User
Network	Files of type:	MicroStation DGN Files (*.dgn)		Cancel	Project: 55555
	nee or type.	Open as read-only		Options	Interface: CDOT

Attaching Model Files to the Sheet File

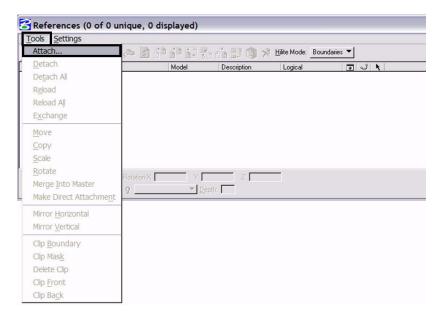
1. Select File > Reference.

Ele Edit Element Settings Tools Utilities Workspace Window	Help
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🗃 Open	Ctrl+O
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Save Settings	Ctrl+F
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Raster Manager Models Import Export	Ctrl+P
Raster Manager Models Import Export Print Preview	Ctrl+P
Raster Manager Models Import Export Print Preview Print	Ctrl+P

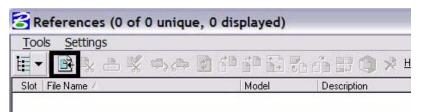
2. Or choose the **Reference** icon from the **Primary Tools** toolbar.

Primary Tools		×
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3. From the Reference Manager tool bar select Tools > Attach.



4. Or choose the Attach Reference icon



5. Search for the model file and verify the **Attachment Method** is set to *Interactive*. **<D> Open**.

Look in:	Reference	Files	- 🕝 🤌 📂 🛄 -	3 🖻	3D - V8 DGN
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	•	Save Relative Path		Options	

Note: You can select more than one file at a time by holding the **Shift** or **Ctrl** keys down while making your selection. You can also *Drag and Drop* directly from Windows Explorer into the **Reference Manager** Tool box, selecting several files at one time as mentioned above.

In the Reference Attachment Settings dialog box, key in a logical name and a description. For instance, the logical name might be *Design* for the Design Model drawing. The other settings should not have to be edited. *Coincident-World* is selected by default. Also the *Scale (Master:Ref):* is set at *1:1* by default. <D> OK.

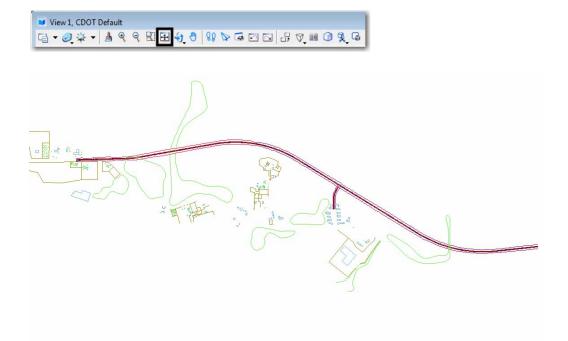
Reference Attachment	eference Attachment Settings for 55555DES_Model.dgn						
_	55DES_Model.dgn						
Model: CDO	rawings\Reference_Files\55555DES_Model.dgn						
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Description: Glob	Description: Global Origin aligned with Master File						
Orientation:	Orientation:						
View	Description						
Coincident	Aligned with Master File						
Coincident - World	Global Origin aligned with Master File						
 Standard Views Saved Views (none 	A						
Named Fences (no							
Detail Scale:	1''=100'						
Sc <u>al</u> e (Master:Ref):	Sc <u>al</u> e (Master:Ref): 1.000000 : 1.000000						
Named Group:							
Revision:							
Le <u>v</u> el:							
Nested Attachments:	No Nesting Depth: 1						
Display Overrides:	Allow						
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Toggles	Toggles						
Drawing Title							
Create							
Name:	Drawing						
	<u>O</u> K Cancel						

- **Note:** When **Coincident World** under *Orientation* is selected and a **Scale** factor of **1:1** is entered, plan graphics are being referenced to the sheet file with the true coordinate information. All other attachment methods will not maintain the true coordinate values.
- 7. The files will be shown in the **References** dialog box.

Tools	Settin	gs						
•	*	k 👌 🌾 🔶 🤄	ð 7 7 1	d 70 d P" (d)	Hilite Mode: Boundaries	•		
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Note: Whenever you make graphical model file changes, your sheet file will automatically update.

8. Fit View using the icon \blacksquare so all graphics are displayed.



9. Select File > Save Settings from the Primary toolbar.

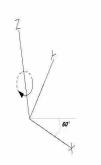
File	<u>E</u> dit	Element	Settings	Tools	Utilities	Wor <u>k</u> space	Window	Help	
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ê	Open								Ctrl+O
	Close								Ctrl+W
8	Save As								Ctrl+S
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٥	Models								
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Rotating the View

- 1. After the references are attached, you may need to rotate the view depending on the layout of the sheet.
 - **Note:** You are not rotating the reference file(s). You are only rotating the view. The coordinate system will not change.
- 2. One option to rotate the view is to Key-in *rv* = *x*,*y*,*z* and press <Enter> or <Tab>.

Key-in	×
rv=0,0,-60	

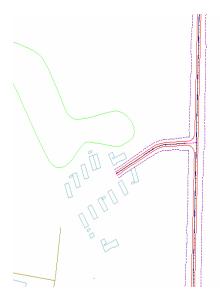
Note: Entering the recommended values x = 0, y = 0, and z = Rotation Angle will ensure the view is roatated about the z-axis in a 3D file. You are rotating the view about the z-axis. This is the axis perpendicular to the view. Otherwise, if you are working in a 2D file the key-in would be $rv = value \ of \ rotation$.



3. You will be prompted to select the view you would like to rotate in. **<D>** in the active view window to select the view.

Rotate View (Relative) > Select view

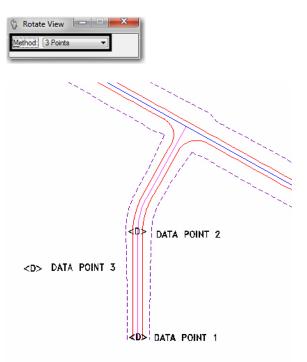
4. The view will be rotated.



5. You can also elect to rotate the graphics using **3 Points**. Select **Rotate View**.

● View 1, CDOT Default
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6. Change the **Method** to **3** *Points*.

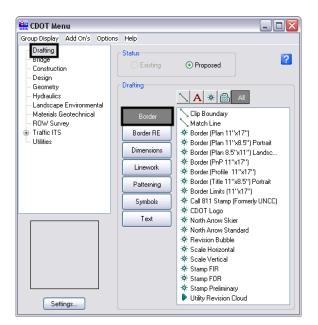


- **Note:** Make sure you are picking a data point near the 3D element. Do not snap to 3D elements because you will be rotating along the z axis instead of just the x and y plane. Turn AccuSnap off or you can hold the **<Ctrl>** and **<Enter>** keys down at the same time to temporarily disable AccuSnap while you are locating the data points.
- 7. The view will be rotated.

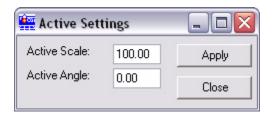


Attaching the Border, Bar Scale, North Arrow, and Resident Engineer/Survey Supervisor Cells

1. From the *CDOT Menu*, select **Drafting > Borders.**

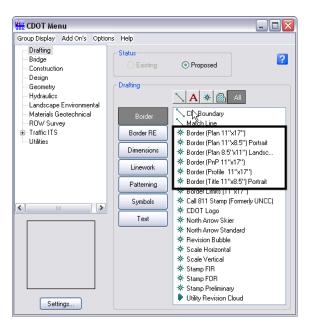


2. **<D> Settings** if the desired sheet scale is something other than 1" = 100'. In the Active Settings dialog box you can change the Active Scale and the Active Angle.

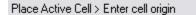


Note: The Active Angle is view independent and not associated with view rotation. Therefore, the x-axis is always horizontal regardless of the view rotation. You will not need to set this for correct placement of the North Arrow or other cells.

3. Select the desired sheet border cell from the list.



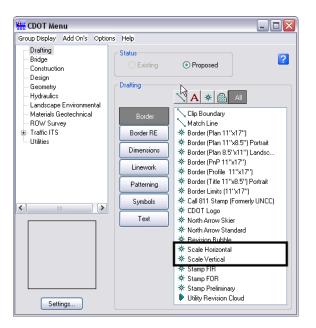
4. Once a sheet border is selected, you will be prompted to locate the lower left hand corner of the sheet border (the cell's origin). Move the cell to the desired location and **<D>**.



5. Select the desired North Arrow. Move the cell to the desired location and <D>.

CDOT Menu	_ 🗆 🔀
Group Display Add On's Options Help	
Drating Drating Drating Drating Drating Drating Design Geometry Hydraulics Landscape Environmental Materials Geotechnical ROW Survey Traffic ITS Utilities Survey Settings	Proposed Propo

6. Select a Bar Scale if desired. Move the cell to the desired location and **<D>**.



7. Finally, select the Border RE button, then select the desired Region Engineer cell. **<T>** to the location shown in the illustration below and **<D>** to accept placement.

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- **Note:** Contact the CADD Manager if any edits need to be made to a Region Engineer cell. Remember, you **can** edit the cell with the **Edit Text** command until the changes are available in the next configuration.
- 8. Double click on any of the text fields in the border to add sheet specific information.
 - **Note:** Coordinate with the Region Surveyor when you are creating sheets that are not at a 1:100 scale. They will provide you with the topography and survey MicroStation files at a different scale. Otherwise, the line work and cells will not be the correct size for the print scale.

Placing a Clip Boundary

1. From the CDOT Group Menus select Drafting > Border > Clip Boundary.

🚟 CDOT Menu		
Group Display Add On's Optic	ons Help	
Dratting Dratting Dratting Drating Drating Design Geometry Hydraulics Landscape Environmental Materials Geotechnical ROW Survey Traffic ITS Utilities	Status Status Existing Drafting Border Border RE Dimensions Linework Patterning Symbols Text	Proposed Proposed
Settings		 ✤ Stamp Preliminary ▶ Utility Revision Cloud

2. Verify the SHEET_Clip-Boundary level is active.

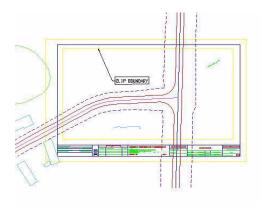
|--|

Note: The level SHEET_Clip-Boundary will not print.

3. The **Place Smart Line** command will be active. Verify the option for **Join Elements** is checked **ON** and draw a closed shape that will represent your clipping boundary of the model file.

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4. Otherwise, if the clipping boundary shape is rectangular, select the **Place Block** icon from the **Main** toolbar.



Clipping the Reference File

1. In References dialog box, highlight the Reference file to be clipped. Select the Clip Reference icon.

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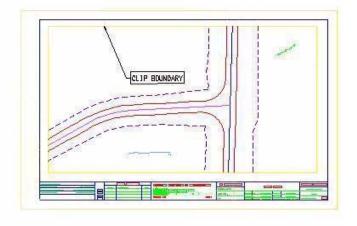
- **Note:** You can select more than one reference file at a time by holding the **<Shift>** or **<Ctrl>** keys down while you are making your selection. You can clip multiple drawings in one step when they are all selected.
- 2. The following dialog box will open. Verify Method is set to Element.



3. You will be prompted to select the **Element** you want to clip the reference from. Select the rectangular element that was placed inside the border on **GEN_SHEET_Clip-Boundary** level.

Set Reference Clip Element > Identify Clipping Element

4. Fit the MicroStation view 🗒 and Save Settings after clipping the reference files.



Note: Once the clipping boundary is placed, do not delete it. The clipping region of the reference file will be lost.

Additional Sheet File Information

- 1. Setting up text and dimension scale in the sheet file must change the Annotation Scale Factor if the border cell was scaled to a factor other than 1:100. Otherwise, the text size in the sheet file will not correspond to the scale factor chosen when placing the border cell.
- 2. Select File > Models from the Primary toolbar.



3. Or select **Models** icon **Primary Tools**.



4. Select the Edit Model Properties icon

Contract Models		
) • • • · · · · · · ·		
Type 2D/3D Name /	Description	🔆 Cell Type
🗇 🗊 CDOT Default	Master Model	
.1		

5. The **Annotation Scale** factor defaults to 1:100. Select the arrow to change the scale factor. If you try to place text before setting this, it will be too large since the drawing plot scale is at a 1:40.

Model Properties			
<u>T</u> ype:	Design		
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Description:	Master Model		
<u>R</u> ef Logical:			
<u>A</u> _	[1''=100' •]		
Line Style Scale:	Annotation Scale		
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Can be placed as an annotation cell			
L			
<u></u>	Cancel		

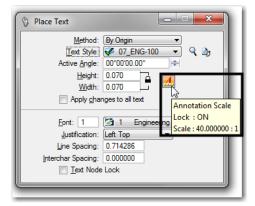
- 1''=1000' 1"=500' 1"=400' 1"=200" 1"=100' 1"=60' 1"=50' 1"=40' 1"=30' 1"=20' 1"=10' 1"=1" 3"=1' 1 1/2"=1 3/4"=1" 1/2"=1' Model Properties 3/8"=1' 1/4"=1" 3/16"=1 Type: 1/8"=1 Name: 3/32"=1' 1/16"=1 cription: De Ref Logical: Custom A 1"=100" Line Style Scale: Annotation Scale Update Fields Automatically Cell Properties Can be placed as a cell Cell Type: Graphic 💌 <u>C</u>an be placed as an annotation cell <u>0</u>K Cancel
- 6. From the pull down, select the **Annotation Scale** factor to match the scale factor used when placing the border cell.

7. In this example, an annotation scale factor of 1:40 is chosen. Select **OK**.

Model Properties			
<u>T</u> ype:	Design		
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<u>A</u>	[1''=40' 🔽]		
Line Style Scale:	Annotation Scale		
	Update Fields Automatically		
Cell Properties			
Can be place	d as a cell Cell Type: Graphic 💌		
Can be placed as an annotation cell			
<u>o</u>	K Cancel		

Note: The annotation scale will take affect immediately.

8. You can now add text to the new sheet file. It will be scaled to the correct height based on the plot scale or in this case 1:40.



- *Note:* Annotation Scale Lock must be turned **ON** when placing text or dimensions for the scale factor to take affect. Verify it is **ON** by hovering with your cursor over the
- 9. Select File > Save Settings before you exit MicroStation.

Workflow MS 6 - Sheet File Creation - Multiple Scales

This document guides you through creating a sheet file with multiple scales. First, we will be going over placing the sheet border around coordinate based model graphics. Then, we will go over attaching and scaling additional model files. Lastly, placing text and dimensions in the sheet file will be covered. For setting up plan sheets see the CDOT Sheet File Creation document.

Note: This example uses details from the Bridge discipline. This procedure applies to any sheet file with multiple scales. If you are in another specialty, please substitute with your specialty group's information.

Setting up the Sheet File - The sheet file contains the sheet border and related data along with reference files of the project data. Setting up the Sheet File includes creating the blank dgn file, attaching the references and rotating the view to the correct orientation.

- Create a New Drawing File The new drawing file will contain the sheet border and related material.
 - Commands Used: **File > Open** Used to access the MicroStation Manager dialog box. From there, a new file can be created.
 - **New File** Accesses the New File dialog box. The new file is created here.
- Attach Model Files The model files are attached so that the view rotation angle can be determined.
 - Commands Used: **File > Reference** Used to access the references dialog box. From there, the model files are attached.
 - **Tools > Attach** Used to select the model files for attachment.
 - **Reference Attachment Settings** Used to select the View and Scale for the model file.
- **Rotating the View** Rotating the view so that the sheet is orthogonal to the screen makes the file easier to read and print.
 - Commands Used: **rv=0,0,## key in** A method to rotate the view.
 - Rotate View > 3 Points A method to rotate the view.
- Attaching Border and Related Cells The sheet border, north arrow, and other cells are placed to create the sheet.
 - Commands Used: **CDOT Menu > Draffing > Border** Used to set the rotation and scale, select, and place cells.
- **Clipping Reference Files** When attached, the full contents of the reference files are displayed. Clipping reduces the visible portion of the reference files to the area within the sheet border.
 - Commands Used: CDOT Menu > Drafting > Border > Clip Boundary Used to draw the clip boundary. The clip boundary is a shape that denotes the limits of the viewable area for the reference files.
 - **References > Clip Boundary** Used to hide reference file data in areas outside of the clip boundary.

Adding Models of a Different Scale - After the basic sheet is set up, the detail reference files are added.

- Attach Model Files The model files are attached so that the view rotation angle can be determined.
 - Commands Used: **File > Reference** Used to access the references dialog box. From there, the model files are attached.

- **Tools > Attach** Used to select the model files for attachment.
- **Reference Attachment Settings** Used to select the View and Scale for the model file. The scale factor = Border Scale / Detail Plot Scale.

Setting The Annotation Scale - For sheets that are printed at a scale other than 1'' = 100', the annotation scale must be changed to match that printing scale.

Commands Used: Models > Properties > Annotation Scale - Used to adjust text and linestyle scales to match the desired print scale.

Setting up the Sheet File with Multiple Scales:

Beginning a New Drawing File

1. From the File > Open dialog box, select the *New file* icon.

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	•				•			
Network	File name:	55555DES_Plan01.dgr	1	•	Open	User:	CDOT User	
	Files of type:	MicroStation DGN Files	(*.dgn)	•	Cancel	Project:	00000	
		Open as read-only			Options	Interface:	CDOT	•

2. Enter a drawing file name that corresponds to the next consecutive sheet number and place it in the appropriate folder located under C:\Projects\.....

📕 New - C:\Proj	ects\00000\Bridge	\Drawings\		×
Save in:	📗 Drawings	•	G 🤌 📂 🛄 -	3 🖲
Recent Places	Name	iles	Date modified 12/20/2010 10:03 12/20/2010 10:00	Type File folder File folder
Computer	4	111		•
Network	File name: Save as type: Seed:	00000BRDG_Detail01.dgn MicroStation DGN Files (*.dgn)	• (Save Cancel
	Seed:	C:\Workspace\Workspace-CDOT_	vor standards-	Browse

3. Verify that the correct *Seed File* is selected. If it is not, **<D> Browse** and Navigate to **C:\Workspace\Workspace_CDOT_V8i\Standards-Global\MicroStation\Seed**\.

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New - C:\Proje	ects\00000\Bridge	\Drawings\		×
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(Here)	Name		Date modified	Туре
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Desktop				
Libraries				
Computer				
() Network	•			4
	File name:	00000BRDG_Detail01.dgn	-	Save
	Save as type:	MicroStation DGN Files (*.dgn)	•	Cancel
	Seed:	C:\Workspace\Workspace-CDOT_	V8i\Standards-	Browse

4. Highlight the desired seed file from the files list box (for this example: *3D-Seed_CDOT.dgn*) and *<D>* **Open.**

Look in:	퉬 Seed		-	G 🤌 📂 🛄	· 🛛 🗟 🖹
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	🐌 rddbs		12/16/2010	File folder	
Recent Places	🔏 2D-Seed_CD	OT.dgn	11/19/2010	Bentley Mic	64 KB
	🔏 3D-Seed_CD	OT.dgn	12/16/2010	Bentley Mic	136 KB
	🔊 Bridge-2D-Se	eed_CDOT.dgn	11/19/2010	Bentley Mic	70 KB
Desktop	🔊 Bridge-3D-Se	ed_CDOT.dgn	11/19/2010	Bentley Mic	64 KB
Libraries					
Computer					
Network					
	File name:	3D-Seed_CDOT.d	gn	-	Open

- **Note:** All disciplines use the 2D-Seed_CDOT.dgn and the 3D-Seed_CDOT.dgn. The Bridge-2D-Seed_CDOT.dgn and Bridge-3D-Seed_CDOT.dgn has specific settings for Bridge.
- 5. In the **New** dialog box, **<D> Save**.

New - C:\Proj	ects\00000\Bridge [\]	\Drawings\		×
Save in:	Drawings	•	3 🌶 🖻 🛄 🗸	3 🖲
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Desktop				
Libraries				
Computer				
Network	•	m		Þ
	File name:	00000BRDG_Detail01.dgn		Save
	Save as type:	MicroStation DGN Files (*.dgn)	-	Cancel
	Seed:	C:\Workspace\Workspace-CDOT_	V8i\Standards-	Browse

6. The file you created will be highlighted. **<D> Open** to open the file.

Look in:	Drawings	•	3 🤣 📂 🖽	🗋 🍯 🖻	3D - V8 DGN
æ	Name		Date modified	Туре	
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Recent Places	📕 Tabs		12/20/2010 10:00	File folder	
	80000BRD	G_Detail01.dgn	12/20/2010 10:36	Bentley M	
Desktop					
æa.					
67					
Libraries					
Computer					
()	•			P.	
	File name:	00000BRDG_Detail01.dgn	- Г	Open	User: CDOT User 🔻
Network					Project: 00000 -
	Files of type:	MicroStation DGN Files (*.dgn)	▼	Cancel	

Attaching Model Files to the Sheet File

1. Select File > Reference.

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D <u>N</u> ew	Ctrl+N
😅 Open	Ctrl+O
Close	Ctrl+W
Save	Ctrl+S
Save As	
Compress	
Save Settings	Ctrl+F
Reference	
Raster Manager	
O Models	
Models Import	
Models Import <u>Export</u> Print Preview	Ctrl+P
Models Import <u>Export</u> Print Preview	Ctrl+P
Models Import Export Print Preview Print	Ctrl+P

2. Or choose the **Reference** icon from the **Primary Tools** toolbar.



3. From the Reference Manager tool bar select Tools > Attach .

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firror Horizontal firror Vertical					
Dp Boundary Dp Mas <u>k</u> Delete Clip Dp Eront Dp Back					

4. Or choose the **Attach Reference** icon

Tools	Setting	JS									
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Slot	File Name /				Mode	el	D	escript	tion		

5. The first model file you reference should be the one containing coordinate based information. Search for that model file and verify the Attachment Method is set to Interactive. <D> Open. If you are creating a sheet file containing details only, with no coordinate based information, bring in the detail with the largest scale factor first and scale the border to this detail. Once the detail with the largest scale factor has been referenced, attach the remaining details into the sheet file following the procedure outlined below.

📕 Attach Referen	nce - C:\Projects\(00000\Bridge\Drawings\Referer	nce_Files\		×
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Recent Places Desktop Libraries Computer Network			Date modified 9/30/2010 10:39 AM 9/30/2010 10:39 AM 9/30/2010 10:39 AM 9/30/2010 10:39 AM	Bentley M	
	 ⊀ File name: Files of type: ▼ 	III 00000BRDG_Model.dgn (CAD Files (*.dgn;*.dwg;*.dxf) Save Relative Path		Open Cancel Options	

6. In the Reference Attachment Settings dialog box, key in a logical name and a description. For instance, the logical name might be *Plan View* for the Bridge Model drawing. The other settings should not have to be edited. *Coincident-World* is selected by default. Verify the Scale is to set to 1:1, <D> OK.

Reference Attachment	Settings for 00000BRDG_Model.dgn
	0BRDG_Model.dgn
	awings\Reference_Files\00000BRDG_Model.dgn
Model: CDO	Γ Default 🔹
Logical Name: Plan	View
Description: Globa	al Origin aligned with Master File
Orientation:	
View	Description
Coincident	Aligned with Master File
Coincident - World	Global Origin aligned with Master File
Named Fences (nor	·
Detail Scale:	[1"=100' ▼]
Scale (Master:Ref):	1.000000 : 1.000000
Named Group:	
Revision:	
Le <u>v</u> el:	
Nested Attachments:	
Display Overrides:	
Global LineStyle Scale:	Use MS_REF_NEWLEVELDH
-	ith Saved View
	in saved view
Toggles	ا الم الم الم الم الم الم الم الم الم ال
Drawing Title	
Create	
	Drawing
-	
	<u>OK</u> Cancel

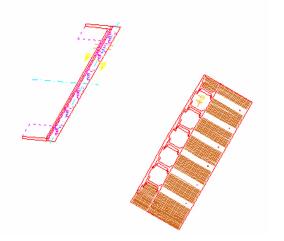
- **Note:** When **Coincident World** under **Orientation** is selected and a **Scale** factor of **1:1** is entered, plan graphics are being referenced to the sheet file with the true coordinate information. All other attachment methods will not maintain the true coordinate values.
- 7. The file will be shown in the **References** dialog box.



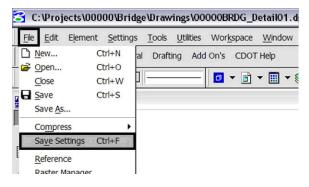
Note: Whenever you make graphical model file changes, your sheet file will automatically update.

8. Fit View using the icon $\stackrel{\textcircled{}_{\scriptstyle\square}}{=}$ so the graphics for the first model file are displayed.

View 1, CDOT [Default									
G • 🥥 🌣 •	4 9	9 81	🕀 🔂 🤇	88 0	0	5	V. 10	0	Q_(3



9. Select File > Save Settings.



Rotating the View

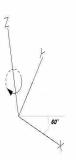
1. After the references are attached, you may need to rotate the view depending on the layout of the sheet.

Note: You are not rotating the reference file(s). You are only rotating the view. The coordinate system will not change.

2. One option to rotate the view is to Key-in *rv* = *x*,*y*,*z* and press <Enter> or <Tab>.

Key-in	
rv=0,0,-60	₩ ₩ .

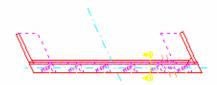
Note: Entering the recommended values of x = 0, y = 0, and z =Rotation Angle will ensure the view is rotated about the z-axis in a 3D file. This is the axis perpendicular to the view. Otherwise, if you are working in a 2D file the key-in would be rv = value of rotation.

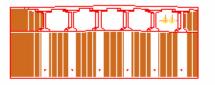


3. You will be prompted to select the view you would like to rotate in. **<D>** in the active view window.

Rotate View (Relative) > Select view

4. The view will be rotated.

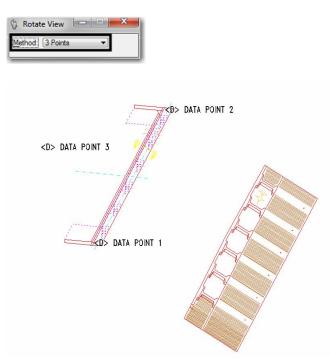




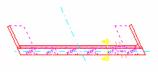
5. Or you can rotate graphics using **3 Points**. Select **Rotate View**.

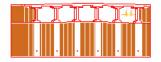


6. Change the **Method** to **3** *Points*.



- **Note:** Make sure you are picking a data point near the 3D element. Do not snap to 3D elements because you will be rotating along the z axis instead of just the x and y plane. Turn AccuSnap off or you can hold down the <**Ctrl**> and <**Enter**> keys down at the same time to temporarily disable AccuSnap while you are locating the data points.
- 7. The view will be rotated.





Attaching the Border and Resident Engineer Cell

1. From the CDOT Menu, select **Draffing** > **Borders.**

CDOT Menu			- O 🗙
Group Display Add On's Optic	ns Help		
Drafting Bridge Construction Design Geometry Hydraulics	Status Existing Drafting	Proposed	2
 Landscape Environmental Materials Geotechnical ROW Survey Traffic ITS Utilities 	Border Border RE Dimensions Linework Patterning Symbols	Clip Boundary Match Line & Border (Plan 11'%17') & Border (Plan 11'%85') Por & Border (Plan 11'%85') Por & Border (PhP 11'%17') & Border (PhP 11'%17') & Border (Title 11'%85') Por & Border (Title 11'%85') Por & Border (Title 11'%85') & Coll Stamp (Formerty U & Coll Stamp (Formerty U	ndsc trait
Setings	Text	North Arrow Skier North Arrow Standard Revision Bubble Scale Horizontal Stamp FIR Stamp F0R Stamp F0R Utility Revision Cloud	

<D> Settings if the desired sheet scale is something other than 1" = 100'. In the Active Settings dialog box you can change the Active Scale and the Active Angle. In this example, the standard 11x17 sheet border is too large for the plot area when the Active Scale is set at 1" = 100'.

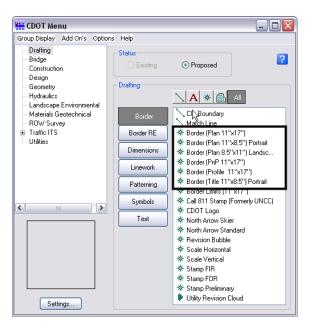
🚆 Active Set	_ 🗆 🔀	
Active Scale:	100.00	Apply
Active Angle:	0.00	Close

3. Prior to placing the border and border information, set the **Active Scale**. This should be set to the largest proposed scale factor you plan to have on your sheet. For example, if you have a plan view that should be plotted at 1" = 40' and a detail that should be plotted at 1" = 5', the largest scale detail would be 1" = 40'. Choose a scale factor in even increments such as 10, 20, 30, 40, 50, 60, 100, etc. **<D> Apply**.

Active Sett	tings	2
Active Scale:	40	Apply
Active Angle:	0.00	Close

Note: The Active Angle is view independent and not associated with view rotation. Therefore, the x-axis is always horizontal regardless of the view rotation. You will not need to set this for correct placement of the North Arrow or other cells.

4. Select the desired sheet border cell from the list.



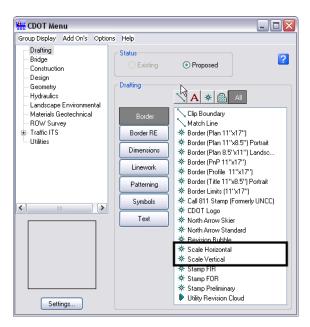
5. You will then be prompted to locate the lower left hand corner of the sheet border (the cell's origin). Move the cell to the desired location and <D>.

Place Active Cell > Enter cell origin

6. Select the desired North Arrow. Move the cell to the desired location and <D>.

CDOT Menu		_ 🗆 🔀
Group Display Add On's Optic	ins Help	
Drafting Bridge Construction Design Geometry Hydraulics	Status Existing	Proposed
Landscape Environmental Materials Geotechnical ROW Survey ⊕ Traffic ITS Utilities	Border Border RE Dimensions	Clip Boundary Match Line * Border (Plan 11"x17") * Border (Plan 11"x5") Potrait * Border (Pln 6.5"x11") Londsc * Border (Pn 11"x1")
< >	Patterning	
	Text	 ✤ North Arrow Skier ✤ North Arrow Standard ℜ Bevision Bubble
		 Trevision Euclope Scale Ventical Scale Ventical Stamp FIR Stamp FOR Stamp Preliminary
Settings		Utility Revision Cloud

7. Select a Bar Scale if desired. Move the cell to the desired location and **<D>**.



8. Lastly, select the Border RE button, then select the desired Region Engineer cell. **<T>** to the location shown in the illustration below and **<D>** to accept placement.

		_			New Provide Pr	
Print Date: \$DATES				Sheet Revision		
Hortz, Scoley \$SCALESHORTS	Vert. Scale: As Noted	(R-X)	Dates	Commente	Jreit.	
Unit Information		0				
		\square				

Note: Contact the CADD Manager if any edits need to be made to a Region Engineer cell. Remember, you **can** edit the cell with the Edit Text command until the changes are available in the next configuration.

- 9. Double click on any of the text fields in the border to add sheet specific information.

Adding Additional Model Files to the Sheet File

1. Once you have referenced the model file with coordinate based information and added the border, you can

begin referencing additional files with various scales. Select the *Attach Reference* icon located on the reference file dialog box. Locate the file you want to attach. **<D> Open.**

📕 Attach Referer	nce - C:\Projects\0	0000\Bridge\Drawings\Reference	_Files\		×
Look in:	🔒 Reference_File	es 🔻	G 🌶 🖻 🖽	3 🖻	3D - V8 DGN
e	Name		Date modified	Туре	
	🔊 00000BRDG_I	Detail_Abutment_Reinf.dgn	9/30/2010 10:39 AM	Bentley M	
Recent Places		Detail_Bearing.dgn	9/30/2010 10:39 AM	Bentley M	
	800000BRDG_I		9/30/2010 10:39 AM	Bentley M	
Desktop	800000BRDG_I	Prof.dgn	9/30/2010 10:39 AM	Bentley M	
Desktop					
Libraries					
Elbranes					
					Attachment Method
Computer					Interactive -
Network					
	1			•	
	File name:	00000BRDG_Detail_Abutment_Reir	nf.dgn 🔻	Open	
	Files of type:	CAD Files (*.dgn;*.dwg;*.dxf)	-	Cancel	
	•	Save Relative Path		Options	
					ii.

2. In the Reference Attachment Settings dialog box, key in a logical name and a description. Set the Orientation to Standard Views > Top and set the Scale. When you set the Scale, key-in the scale factor of the border sheet into the first field. In this example it is 40. In the second field, key-in the scale factor you want the detail to be plotted at. In this example 5 represents 1"=5". The overall scale factor for the detail is 40/5 = 8. MicroStation will calculate this for you.

Reference Attachment S	Reference Attachment Settings for 00000BRDG_Detail_Abutment_Reinf.dgn			
	DBRDG_Detail_Abutment_Reinf.dgn 000BRDG_Detail_Abutment_Reinf.dgn			
Logical Name: Top				
Description: Abum	ent Reinforcing Detail			
Orientation:				
View	Description			
Standard Views				
Тор				
Front Right	E			
Isometric				
Bottom				
Back				
Left	•			
Detail Scale: Sc <u>a</u> le (Master:Ref):	CUSTOM			
Named Group:				
Revision:				
Level				
Nested Attachments:				
Display Overrides:				
	Use MS_REF_NEWLEVELDI			
Global LineStyle Scale:				
Synchronize wi	th Saved View			
Toggles				
•	ا الم 🖓 🚱 🐨 🔡 🔊 🖓 الم			
Drawing Title				
Create				
Name:	Тор			
	<u>QK</u> Cancel			

Formula:

Border Scale: scale the border cell was inserted

Detail Plot Scale: scale for specific detail to be plotted (See Step 22)

Scale Factor: model file insertion value

Scale Factor = Border Scale / Detail Plot Scale

Alternatively, you could key-in 8 into the first field and 1 in the second field. This means the new detail is 8 times larger than the first detail

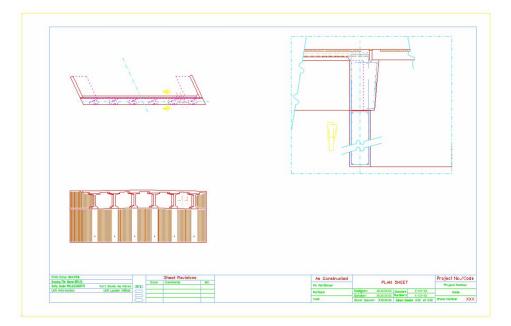
Note: Custom Line Styles will be scaled equal to the scale defined in the Scale (Master:Ref) field. If referencing topography drawings provided by the Survey discipline and uniform symbology is desired set the *Global LineStyle Scale* field to **None** to negate scaling referenced Line Styles by the active models LineStyles by Reference Scale to eliminate scaling referenced Line Styles by the Master:Ref scale factor.

Detail Scale: Sc <u>al</u> e (Master:Ref):	
Named Group:	· · · · · · · · · · · · · · · · · · ·
Revision:	
Le <u>v</u> el:	
Nested Attachments:	No Nesting Depth: 1
Display Overrides:	Allow
Ne <u>w</u> Level Display:	Use MS_REF_NEWLEVELDI#
Global LineStyle Scale:	None 🔻
Synchronize w	ith Saved View
Toggles	2 💦 🕒 🛄 🎌 🕹 🐓 🏢 🗟 😯 🗹 📶
Drawing Title	
Create	
Name:	Drawing
	OK Cancel

3. With the *Orientation* set to **Top**, the model file is anchored to your cursor and you can place it interactively.

Detail Scale: Sc <u>al</u> e (Master:Ref):	CUSTOM 40.000000 : 5.000000
Named Group:	· · · · · · · · · · · · · · · · · · ·
Revision:	
Le <u>v</u> el:	—
Nested Attachments:	No Nesting Depth: 1
Display Overrides:	Allow
Ne <u>w</u> Level Display:	Use MS_REF_NEWLEVELDI
Global LineStyle Scale:	None
Synchronize wi	th Saved View
Toggles	ا بې 😥 😥 🗞 🕼 💷 🔊 🖉 🕺
Drawing Title	
Create	
Name:	Drawing
	OK Cancel

4. After the model file is positioned in the area you would like, <D> to accept the placement of the additional model in the sheet file. The model file is placed relative to your active Z. Verify the active Z by snapping somewhere in the view, prior to placing the new detail. If the Z is not correct, you can interactively key-in AZ=0, select the view, hit reset and continue with the reference attachment.



5. Attach additional model files you would like to add to the sheet file.

📕 Attach Referer	nce - C:\Projects\0	0000\Bridge\Drawings\Refer	rence_	Files\		X
Look in:	\mu Reference_Fi	es	•	G 🌶 📂 🖽 -	3 🖲	3D - V8 DGN
(Ang	Name			Date modified	Туре	
25	800000BRDG	Detail_Abutment_Reinf.dgn		9/30/2010 10:39 AM	Bentley M	
Recent Places	🔊 00000BRDG	Detail_Bearing.dgn		9/30/2010 10:39 AM	Bentley M	
	🔊 00000BRDG_	Model.dgn		9/30/2010 10:39 AM	Bentley M	
	800000BRDG_	Prof.dgn		9/30/2010 10:39 AM	Bentley M	
Desktop						
Libraries						
						Attachment Method
						Interactive -
Computer						
Network						
	•	III			Þ	
	File name:	00000BRDG_Detail_Bearing.d	lgn	_ [Open	
	Files of type:	CAD Files (*.dgn;*.dwg;*.dxf)		-	Cancel	
	•	Save Relative Path			Options	
			_		_	

6. In the Reference Attachment Settings dialog box, key in a logical name and a description. Set the *Orientation* to Standard Views > Top and set the Scale. In this example the border cell was inserted at 40. If you want the last detail to be plotted at a 1"=10' scale, leave 40 in the first field and key-in 10 to the second field. The overall scale factor for the detail is 40/10 = 4. MicroStation will calculate this for you.

Reference Attachment S	Settings for 00000BRDG_Detail_Bearing.dgn
File Name: 0000	0BRDG_Detail_Bearing.dgn
Full Path:\Re	eference_Files\00000BRDG_Detail_Bearing.dgn
Model: CDOT	r Default ▼
Logical Name: Top	
	D. 1
Description: Bean	ng Detail
Orientation:	
View	Description
Coincident	Aligned with Master File
Coincident - World	Global Origin aligned with Master File
Standard Views	
Тор	
Front	
Right Isometric	
Bottom	-
Dottom	
Detail Scale:	CUSTOM -
Scale (Master:Ref):	40.000000 : 10.000000
Named Group:	
Revision:	
Le <u>v</u> el:	
Nested Attachments:	No Nesting Depth: 1
Display Overrides:	Allow
Ne <u>w</u> Level Display:	Use MS_REF_NEWLEVELDI
Global LineStyle Scale:	Master
Synchronize w	ith Saved View
Toggles	
•	🛃 🔁 🔛 🛫 🕹 🐓 🏢 🗞 🖓 💁
Drawing Title	
Create	
Name:	Тор
_	
	OK Cancel

Formula:

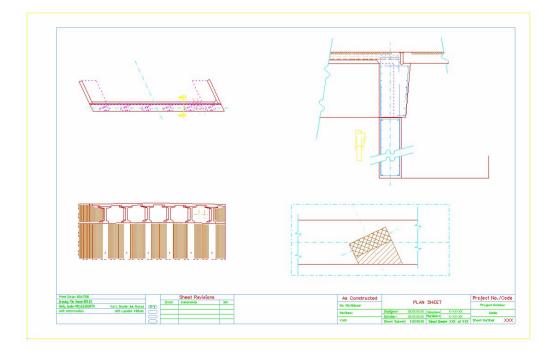
Border Scale: scale the border cell was inserted

Detail Plot Scale: scale for specific detail to be plotted (See Step 22)

Scale Factor: model file insertion value

Scale Factor = Border Scale / Detail Plot Scale

Alternatively, you could



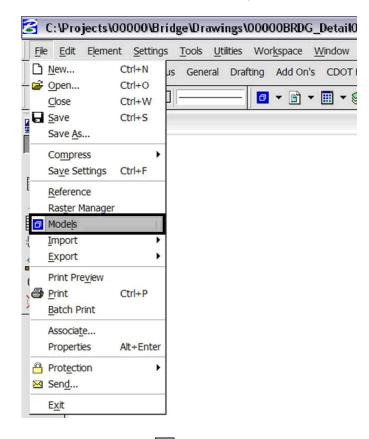
7. Place the model file interactively and <D> to accept placement in the sheet file.

Additional Sheet File Information

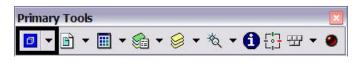
Setting up Text and Dimension Scale in the Sheet File

1. You must change the Annotation Scale Factor if the border cell was scaled to a factor other than 1:100. Otherwise, the text size in the sheet file will not correspond to the scale factor chosen when placing the border cell.

2. Select File > Models from the Primary toolbar.



3. Or select **Models** icon from **Primary Tools**.



4. Select the Edit Model Properties icon

/pe 2D/3	30 Name /	Description	※ Cell Type
	CDOT Default	Master Model	

5. The **Annotation Scale** factor defaults to *1:100*. Select the arrow to change the scale factor. If you try to place text before setting this, it will be too large since the drawing plot scale is at a 1:40.

Model Properties
Type Design
Name: CDOT Default
Description: Master Model
Ref Logical:
<u>.</u> [1"=100' •
Line Style Scale: Annotation Scale
Update Fields Automatically
Cell Properties
<u>Can be placed as a cell</u> Cell Type: Graphic
<u>C</u> an be placed as an annotation cell
<u>Q</u> K Cancel

6. From the pull down, select the *Annotation Scale* factor to match the scale factor used when placing the border cell.

Model Properties		
<u>T</u> ype:	Design	
<u>N</u> ame:	CDOT Default	
Description:	Master Model	
Ref Logical:		
<u>A</u>	1"=100' 👻	
Line Style Scale:	1"=1000'	
Line Style Scale.	1''=500'	
	1"=400'	
Cell Properties	1"=200' 1"=100'	
Can be place	1"=60'	Graphic 🔻
Can be place		
	1''=40'	
0	. 1"=30" 1"=20'	ncel
	1"=10	
	1"=1'	
	3"=1"	
	1 1/2"=1'	
	3/4"=1	
	1/2"=1' 3/8"=1'	
	1/4"=1	
	3/16"=1	
	1/8"=1"	
	3/32"=1'	
	1/16"=1'	
	Custom	

7. In this example, an annotation scale factor of **1:40** should display. **<D>** *OK* to accept.

Model Properties	
<u>T</u> ype:	Design
<u>N</u> ame:	CDOT Default
Description:	Master Model
<u>R</u> ef Logical:	
\underline{A}	1''=40' 🔹
Line Style Scale:	Annotation Scale
	Update Fields Automatically
Cell Properties	
Can be place	d as a cell Cell Type: Graphic 💌
Can be place	d as an annotation cell
<u>0</u>	K Cancel

8. Now, you can add text to the new sheet file. It will be scaled to the correct height based on the plot scale or in this case 1=40.

Place Text	×
Method: By Origin Text Style: Active Angle: 00°00'00.00"	▼ ▼ Q @j
Height: 0.070 <u>Wi</u> dth: 0.070 Apply <u>changes to all text</u>	Annotation Scale Lock : ON Scale : 40.00000 : 1

Note: Annotation Scale Lock must be turned **ON** when placing text or dimensions for the scale factor to take affect. Verify it is **ON** by hovering with your cursor over the

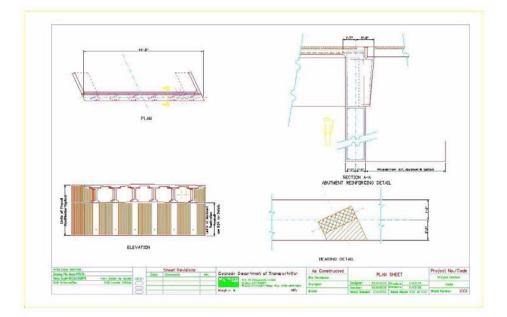
9. You can dimension the model files in the new sheet file. The dimensions will be scaled to the correct size based on the plot scale or in this case 1:40.

🖇 Element Dimensioning
Alignment: View Location: Automatic
F * #
✓ Start Extension: ← ▼ Annotation Scale ✓ End Extension: → ▼ Lock : ON Text Alignment: Standard ▼ Scale : 40.000000 : 1
Prefix Text: Ø ▼ Suffix Text: Ø ▼
✓ Association

Note: Annotation Scale Lock must be turned ON when placing text or dimensions for the scale factor to

take affect. Verify it is **ON** by hovering with your cursor over the *icon*. Also, verify the **Association** is **ON** so the dimensions will dynamically update when model changes are made. This setting is turned on by default.

10. The Sheet file now includes text and dimensions for multiple scaled details.



11. Select File > Save Settings before you exit MicroStation.

Workflow MS 7 - Creating Multiple Plan Sheets

This document guides you through manually assembling multiple plan sheets using MicroStation. Your first step will be to create a layout of how you want all your sheets printed out. Second, you will create the individual sheet files using those layouts. The major benefit of this workflow is the limits and orientations of plan sheets are determined early in the process. These sheet limits can be used to identify proper position, size, and rotation of text and tables.

Workflow Outline

Placing the Sheet Plan Limits Cell - The sheet limits cells are used to mark the location of each sheet on the project. The cells are placed along the project's alignment and rotated so that the alignment runs across the cell.

- Commands Used: CDOT Menu > Drafting > Border Used to set the rotation and scale, select, and place cells.
- **Measure Angle** Used to determine the rotation angle for the sheet.
- **Rotate** Used to rotate the cell by the angle determined above.
- **Edit Text** Use to record rotation angle and scale on the sheet limits cell.

Assembling the First Plan Sheet - The first sheet is created by rotating the view if necessary, adding the sheet border and other cells, and clipping reference files to the sheet limits.

- Commands Used: **rv=0,0,## key in** A method to rotate the view.
- **CDOT Menu > Draffing > Border** Used to set the rotation and scale, select, and place cells.
- **References > Clip Boundary** Used to hide reference file data in areas outside of the clip boundary. The Element method is used to clip the references.

Assembling the Remaining Plan Sheets - The remaining sheets are created by Copying the first sheet then modifying the copy. This is done by moving the sheet border and other cells to the location of the new sheet, rotating them to match the sheet orientation, and reclipping the reference files.

sheet border and other cells, and clipping reference files to the sheet limits.

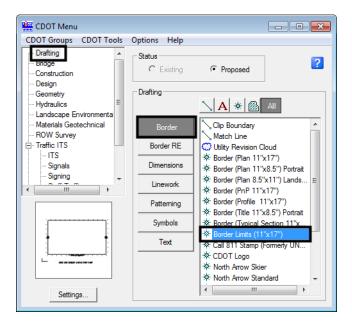
- Commands Used: **File > Save As** Used to make a copy of the first pan sheet.
- Move Used to reposition the border and other cells.
- **Rotate** Used to rotate the cells to the proper angle for the new sheet.
- rv=0,0,## key in A method to rotate the view.
- **References > Clip Boundary** Used to hide reference file data in areas outside of the clip boundary. The Element method is used to clip the references.

Placing the Sheet Plan Limits Cell

1. Open a MicroStation model file that you will be basing your plan sheets on.

📕 File Open - C:\	\Projects\12345\Desi	gn\Drawings\Reference_File	<u>•</u> s\					×
Look in:	Reference_Files		- 🕝 🌶	با 🏷	ů 🖞	3 🔒		3D - V8 DGN
Recent Places Desktop Libraries Computer	Name M 12345DES_Moo M 12345DES_Phas M 12345DES_Prof M Contours.dgn M Elbert.dgn	sing.dgn		6/1 11/ 6/1	te 15/2010 1 4/2010 1 22/2010 1 4/2010 1 4/2010 1	0:43 3:47 0:43		
Network	_	III 2345DES_Model.dgn (AD Files (*.dgn;*.dwg;*.dxf) Open as read-only		•	Ope Can Optic	cel	User: Project: Interface:	

- 2. On the *CDOT Menu*, select the **Draffing** group.
- 3. **<D>** the **Border** button.
- 4. **<D>** on **Border Limits (11"x17")** in the options list.



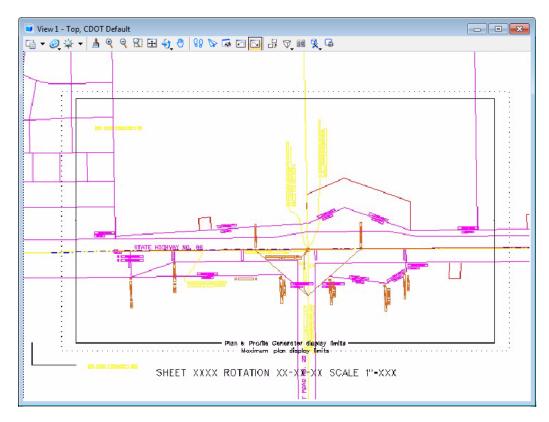
Note: About the Sheet Plan Limit cell: This cell helps to define the plan sheet limits in the model file before placing the border. It contains text characters that can be edited to indicate sheet name, rotation, & scale. The outer line-work depicts the maximum display limits for graphics as it relates to the border sheet. The inside shape reflects ¹/₂ inch inside this maximum limit and is the clipping boundary. All graphical information for this cell is on the MicroStation level, *DRAFT_INFO_No-Plot.*



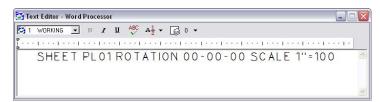
5. In the **Place Active Cell** dialog box, set the *Active Scale* to the desired plot scale and set the *Active Angle* to *O*.

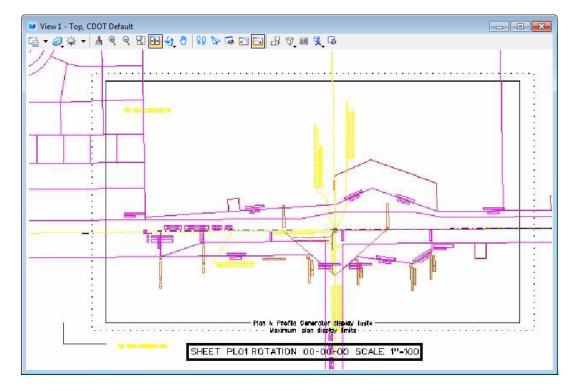
🖇 Place Acti	ve Cell 🗖 🗉 💌
······	Design-Plan-Limits
Active Angle:	00°00'00.00''
X Scale:	100.000000
Y Scale:	100.000000 🗕 🚔
Z Scale:	100.000000
	•

6. Position the **Sheet Plan Limit** cell as you see fit in the MicroStation view, then place the cell in the model file.



7. Use the **Edit Text** command to update the text at the bottom of the sheet. This will assist you in managing the sheet plan limits. Select the text at the bottom of the layout sheet and replace the appropriate sheet information in the **Text Editor**.





8. The plan sheet information text will be updated.

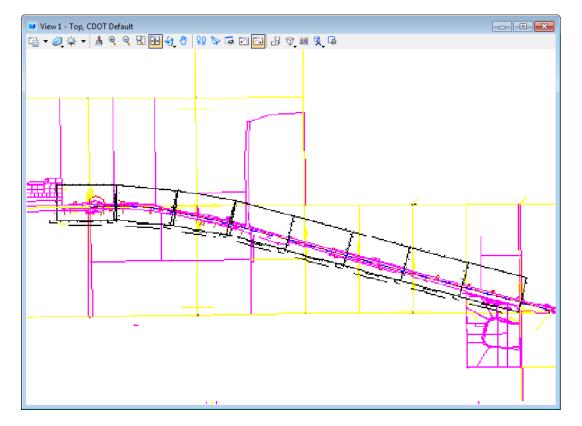
- 9. Use the MicroStation **Copy** command to duplicate the cell graphics for the second sheet.
- 10. Use the MicroStation **Rotate** command to align the graphics for the second sheet.

Note: Rotate the cell only and not the model file.

- 11. Edit the information based on the Sheet name and Rotation angle for the second sheet using the **Edit Text** command.

Note: If the *Sheet Plan Limits* cell is placed at an arbitrary rotation angle, you will have to manually measure the angle. This is done by drawing a line horizontal from the lower left hand corner of the Sheet Plan Limits cell and then using the **Measure Angle** command in MicroStation. Measure the angle in-between the horizontal line drawn and the bottom edge line of the cell.

A	A ^1A ^2A	✓ ^A Al	A∮ A1 A2	ABC V	ABC	A ⁴	A	! ↓
s	✵	** **	* *^	*°	*	Я	*** *∱	
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F	÷		\mathbb{Z}	$\overline{\Xi_0^2}^3$	r H	ŕ۲		



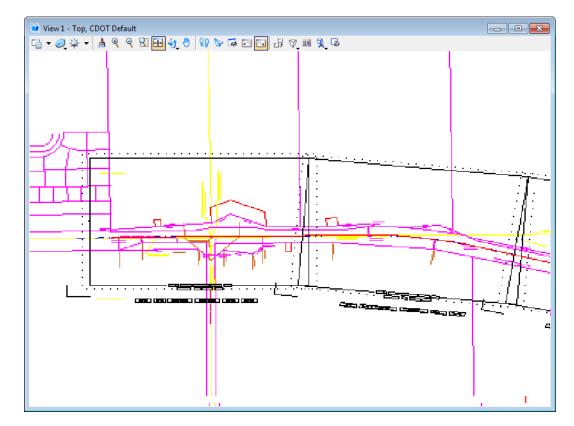
12. Continue planning the sheet layout for the remainder of the project.

Note: The **Sheet Plan Limit** cell is to be placed side by side. This cell is setup to have no overlap in the plan view.

Assembling the plan sheets

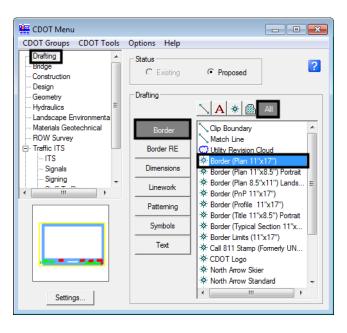
1. Open up a MicroStation Sheet file and attach the model file that contains the *Sheet Plan Limit* cells.

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2. Window or Zoom into the beginning of the project so you can begin placing the border cell.

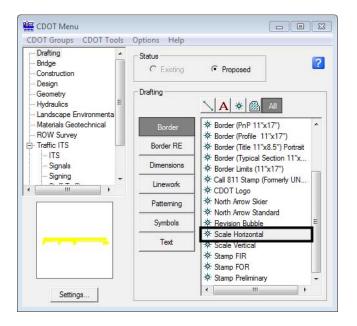
3. From the *CDOT Menu* select the **Draffing** from the group display area, **<D>** the **Border** button, use the **All** filter, and then select **Border (Plan 11x17)** from the item list.



4. **<D> Settings** if the desired sheet scale is something other than **1"=100'**. In the *Active Settings* dialog box you can change the **Active Scale** and the **Active Angle**.

🏪 Active Set	- 🗆 🔀	
Active Scale:	100.00	Apply
Active Angle:	0.00	Close

- **Note:** The Active Angle is view independent and is not associated with view rotation. Therefore, the x-axis is always horizontal regardless of the view rotation. You will not need to set this for correct placement of the North Arrow or other cells.
- 5. **<D> Apply** in the *Active Settings* dialog box after desired changes are made.
- 6. **<D>** at the desired location in the MicroStation view to accept placement of the border.
- 7. Select the **Scale Horizontal** from the item list.



8. **<D>** at the desired location inside of the sheet border to accept the placement of the bar scale.

9. Select the North Arrow Standard from the item list.

DOT Groups CDOT Tools	Options Help		
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- 10. **<D>** to accept the placement of the North Arrow inside the sheet border.
- 11. Select the **Border RE** button and then select the appropriate **Region Engineer** from the item list.

CDOT Menu		
CDOT Groups CDOT Tools	Options Help	
Drafting Bridge Construction Design	C Existing	Proposed
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	Patterning	- ☆ Chris Beller - ☆ Clark Roberts
	Symbols	☆ Corey Stewart
	Text	☆ Craig Snyder ☆ Dale Martinez
		☆ Dave Schneider
		☆ David Watt ☆ Default
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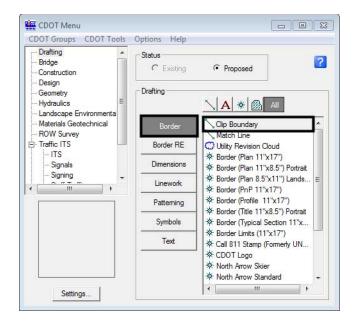
12. **<T>** the point as shown below and then **<D>** to accept placement of the cell.

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- **Note:** Contact the CADD Manager if any edits need to be made to a Region Engineer cell. Remember, you *can* edit the cell with the **Edit Text** command until the changes are available in the next configuration.
- 13. Double click on any of the text fields in the border to add sheet specific information.
 - **Note:** Coordinate with the Region Surveyor when you are creating sheets that are not at a 1:100 scale. They will provide you with the topography and survey MicroStation files at a different scale. Otherwise, the line work and cells will not be the correct size for the print scale.

Placing a Clip Boundary

1. Select the **Border** button and then select the **Clip Boundary** from the item list.



2. Once Clip Boundary has been selected, verify the SHEET_Clip-Boundary level is active.

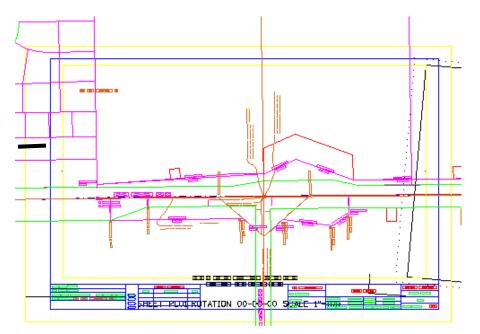


Note: The level SHEET_Clip-Boundary will not print.

3. The **Place Smart Line** command will be active. Verify the option *Join Elements* is checked **ON** and draw a closed shape that will represent the clipping boundary of the model file.

Segment Type:	Lines	-1
Vertex Type:		-
Rounding <u>R</u> adius:	0.833	

4. If the clipping boundary shape is rectangular, select the **Place Block** command from the **Drawing** task tab.



Clipping the Reference File

1. In the **References** dialog box, highlight the Reference file to be clipped. **<D>** the **Clip Reference** icon.

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1 12345DES_Model.dgn	CDOT Default Global Ori Coincident - World Wireframe 🗸	\checkmark \checkmark			
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New Level Display: Config Variable Georeferenced: No					

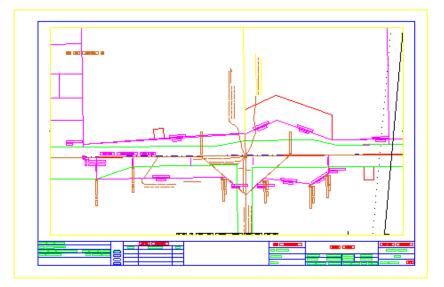
- **Note:** You can select more than one reference file at a time by holding the **Shift** or **Ctrl** keys down as you are making your selections. Multiple drawings can be clipped in one step when they are all selected.
- 2. The Set Reference Clip Boundary dialog box will open. Verify Method is set to Element.



3. You will be prompted to select the **Element** you want to clip the reference from. Select the rectangular element that was placed inside the boarder in the previous steps on the **SHEET_Clip-Boundary** level.

Set Reference Clip Element > Identify Clipping Element

4. **Fit** the MicroStation view $\textcircled{\blacksquare}$ and **Save Settings** after clipping the reference files.



- **Note:** Once the clipping boundary is placed, do not delete it. If it is deleted, the clipping region of the reference file will be lost.
- 5. Edit the title block text and add any sheet specific information. You can turn off the level **DRAFT_INFO_No-Plot** so the Sheet Plan Limits cell information does not display.
- 6. Select File > Save Settings.
 - **Note:** This completes the first sheet. It should be noted that setting up sheets this way maintains the coordinate based information and measurements are in real-world dimensions.

Subsequent sheet creation is accomplished by duplicating the first sheet. This process is streamlined because all the reference files already attached. The process for creating subsequent sheets involves moving the border sheet and redefining the clipping boundaries.

7. Select **File > Save As** and input the name of the next sheet file to be created (sheet file names should be numbered consecutively).

Save in:	🐌 Drawings		- 🕝 🤌 📂 🛄 -	*
Æ	Name	*	Date modified	Туре
2	Cross_Section	ins	12/16/2010 2:03 PM	File folder
ece y Places	Reference_F	iles	12/16/2010 3:04 PM	File folder
	퉬 Tabs		12/15/2010 11:22	File folder
·	12345DES_P	an01.dgn	12/16/2010 3:37 PM	MicroStation V8 X.
Desktop	🕌 12345DES_P	an02.dgn	12/16/2010 4:35 PM	MicroStation V8 X.
ee a	12345DES_T	tleSht.dgn	6/14/2010 10:31 AM	MicroStation V8 X.
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Libraries	🕌 12345SURV_		6/14/2010 10:31 AM	MicroStation V8 X.
	12345SURV_	-	6/14/2010 10:31 AM	MicroStation V8 X.
	🕌 b206m2_She	-	12/15/2010 1:40 PM	MicroStation V8 X.
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Network				
	•	III		
	File name:	12345DES_Plan02.dgn	•	Save
	Save as type:	MicroStation V8 DGN Files (*.dg	n) 🔻	Cancel
				Options

Note: The **Save As** command will automatically save the current drawing to the current directory, then copy and rename to the specified file name and open the new drawing.

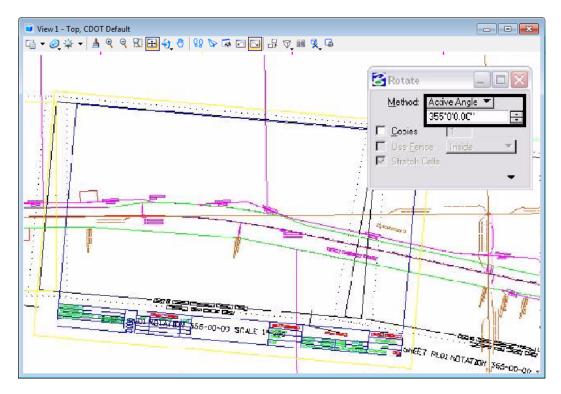
8. Place a MicroStation **fence** over an area that would encompass the next sheet in the set.

 In the References dialog, highlight all files and Select Tools > Clip Boundary. The *Method* should be set to Active Fence. <D> on the MicroStation screen to accept the new clip boundary. This will re-clip the previous Clip Boundary placed inside of the border cell.

🖻 References (1 of 1 unique, 1 displayed)
Tools Settings
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Slot 🕅 File Name Model Description Log Orientation Presentation 🗔 🎝 🍾 🔓
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Set Reference Clip Boundary □ □ □ Method: Active Fence ▼ □

10. **Turn On** the level, **DRAFT_INFO_No-Plot** in the model file where the Sheet Plan Limits cells where placed.

11. Use the MicroStation **Move** command to relocate the border cell. Also **Rotate** the border sheet to align with the predefined sheet limits if the Sheet Limits cell was placed at an angle. Remember, the value of the angle is located in the text of the Sheet Limits cell.



- You may need to rotate the MicroStation view depending on the layout of the sheet. If you are in a 3D file, key-in *rv* = *x*, *y*, *z* and press *Enter* or **Tab**.
 - *Important!* Use the following values when rotating a 3D view: x = 0, y = 0, and z = Rotation*Angle*. You are rotating the view about the z-axis because this is the axis perpendicular to the view. If you are in a 2D file, key-in rv = angle of rotation.

<D> in the active view window to initialize the rotation.

- **Note:** Rotating a MicroStation view simply rotates the viewing of the graphics. The coordinate system is still relative to the graphics and any coordinate or alignment information extracted will be correct.
- 13. Define the reference file clip boundaries as in the previous steps.
- 14. Update information in the title block of the sheet as necessary
- 15. Select File > Save Settings.
- 16. Repeat this procedure to complete the remainder of the sheets.

Workflow MS 8 - Title Sheet Vicinity Map

This document defines the procedure for inserting a Vicinity Map into the Project Title Sheet.

Vicinity Map Insertion Procedure

 Open the file JPC#DES_TitleSht.dgn under C:\Project\.....\Design\Drawings or JPC#ROW_TitleSht.dgn under C:\Projects\.....\ROW_Survey\Drawings that is automatically created when you run the Create Project Utility program upon project startup.

Note: The 'JPC#' will be replaced by the 5 digit Job Project Code.

- County Maps for all counties within Colorado have been translated from GIS information, and can be found on the Shared Drive <u>\\public\CADD County Maps\</u>. These maps should be used to build your Vicinity Map. The County of interest should be copied down to your project location Drawings folder and so it can then be attached as a reference file to the Title Map. The local map can be edited as desired without affecting the original.
 - **Note:** If you choose to attach the map directly from the Shared Drive as a reference file, the map will remain in a read-only state. No editing will be allowed nor will saving additional views be permitted.
- 3. The *CDOT-PenTable.tbl* has been updated to plot the title map with dithering on certain entities. It should be set by default. No adjustments will need to be made.



Title Map Example

Reference File Attachment

The county map should be attached as a reference file to the Title Sheet. Once the desired County
has been copied down your Project location, select File > Reference to open the References dialog
box. Select Tools > Attach, then navigate to the file, select it and <D> OK.

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Copy	E 18 9	▼ Depth: 1	-)
Scale			

2. The **Reference Attachment Settings** dialog box will appear. The Map has been designed to be inserted at a scale factor of 1:5280 (Master: Reference). Select Coincident - World.

Reference Attachn	nent Settings for Elbert.dgn
<u>F</u> ile Name: Full Path: <u>M</u> odel: Logical Name:	
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Orientation:	
View	Description
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	iroup; ision:
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Drawing Title	
Create	lame: Drawing
	<u>QK</u> Cancel

3. When <D> OK, the map will be attached to the end of the cursor. Place the map within the limits of the Title Sheet drawing, Project Location Map area, located in the middle of the sheet. If the limits of your project are not shown within the area on the screen, you can zoom out in the view, place a large *Fence Block*, and perform a **Reference File Clip Boundary** command. This will re-clip the limits of the Reference File, allowing you to see much more of the map.

Note: Your Fence Type should be set to **Block** not to **Element**.

🗧 Place Fei	
Eence Type:	▶ <u>B</u> lock
Eence Mode:	<u>S</u> hape
	<u>C</u> ircle
	<u>E</u> lement
	From <u>V</u> iew
	From <u>D</u> esign File
	From <u>Fl</u> ood

- 4. Once you have located your project limits, Zoom into the area where it is located. Re-position the project limits within the center the Title Sheet with the Move reference file command. Re-Clip the limits of the project as desired. This time you can use either a Fence Type of *Block* or *Element*, whichever you prefer. If you are going to use *Element*, <D> the Blue shape in the middle of the Title sheet and accept it on the screen. If you choose a Fence Type of *Block*, <T> to either corner of the Blue shape and <D> to accept it. This will re-define the limits of the Project Location Map.
- 5. A DGNLIB including the GIS levels has been included in the configuration and has been assigned to all the County Model Files by default. The Reference Levels can be manipulated as desired from the Level Manager dialog box.

🚮 Level Manager	
Levels <u>Filter</u> Edit	
Symbology: [ByLevel 🔹 խ (none) 🔻 🖾 👻
₽ 🔂 99999DES_TitleSht.dgn	Used Name
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- All Levels	• GIS_Bridges
🗄 🕞 Filters	GIS_Cities
	GIS_County-Lines
	GIS_Engineering-Regions
	 GIS_Highway-Text
	GIS_Highways
	GIS_Lakes
	GIS_Maintenance-Sections
	GIS_Milepoints GIS_Milepoints-Text
	GIS_Milepoints-Text GIS Rail-Lines
	GIS ROADS-Local
	GIS ROADS-Major
	GIS ROADS-Ramps-Frontage
	GIS Sections
	GIS Sections-Text
	GIS_Streams
	• GIS_Townships -
	< <u> </u>
Active Level: DRAFT_WT-0	78 of 78 displayed; 1 selected; Source: "99999DES_

6. The Township and Range Text can be copied into your sheet and positioned where you want it. Turn off the Reference file level **GIS_Townships-Text** if you have copied it into your file.

Note: If you want the map at a different scale other than 1:5280 (1 inch = 1 mile) it can be rescaled through the reference dialog box. It should be noted that the linestyle scale factors and text were defined based on a 1 mile insertion. The linework and text can be re-scaled within the original Region area, only if it has been saved to your hard drive.

Workflow MS 9 - SAQ Sheets

This document guides you through opening the Summary of Approximate Quantities Sheet created within your project folder and attaching the DXF files created from the Sumgraph software, through the use of MicroStation Reference file tools. Upon completion of the following procedures, the Sumgraph sheets can be plotted with the CDOT Batch Printing Process.

Summary of Approximate Quantities (SAQ) Sheets Creation

Saving the SAQ Sheets

 Generate your SAQ Sheets through the Sumgraph program. Ensure that the Directory Path for the DXF files is set to the Project Specific *Design\Drawings\Reference_Files* folder. The MicroStation levels have been adjusted in Sumgraph to accommodate the latest CDOT configuration. The following Menu has been modified. The default selection is shown below:

🖬 Sumgraph	
Enter PCNs (one PCN per Box)	
Paper Size C 17 x 11 (Single or Combined Project, 30 Categories) C 17 x 11 (Single or Combined Project, 30 Categories, No Title Block) C 11 x 8.5 (Single Project, 4 Categories, Landscape) C 8.5 x 11 (Single Project, One Category, Portrait)	Starting Sheet Number
Select Report Directory Run Report Quit	

Note: The designer no longer has the option to select the Sumgraph sheet creation that includes a 17x11 border. The only method available is the No Title Block option.

Creating the MicroStation Sheet Files

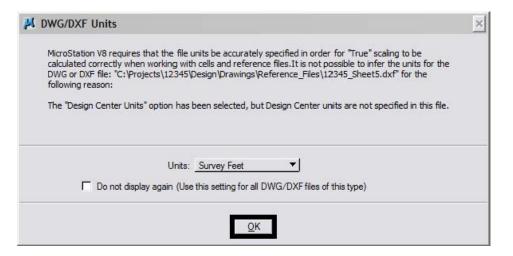
 The Drawing Sheet file to be used is located in the project directory structure under the \Design\Drawings folder called 45454DES_SAQ##.dgn. The Project Creation Utility has replaced the JPC# portion of the file name with the unique Project Code, in this example shown as 45454. The file can be renamed to 45454DES_SAQ01.dgn, replacing the ## with a sheet number value. The Windows Explorer Copy & Rename can also be used in order to preserve the orginal drawing file, if desired.

- **Note:** It is an acceptable procedure to place all your SAQ sheets within one file if desired, but this exercise will only cover the placement of one SAQ sheet per Drawing file.
- Open the 45454DES_SAQ01.dgn. Notice that the Border Cell has already been placed within the file. The cell should not need to be relocated or scaled, as it has been positioned at the correct coordinates and scaled appropriately to accommodate the Sumgraph DXF reference file attachment. Additionally, the drawing has been scaled to 1"=200' and the coordinates for the lower left hand corner of the border read X=43.50, Y=-1.00, Z=0.
- 3. From the MicroStation Main Menu, select File > Reference to open the Attach Reference dialog box. Navigate to the project specific \Design\Drawings\Reference_Files folder and select the Sumgraph DXF from the Files list. It may be necessary to manually move the desired files to this location, prior to attachment, if the sheets were not placed in this folder in step 1 above. <D> OK to proceed.

📕 Attach Ref	erence - C:\Proj	ects\12345\Design	\Drawings\R	eference_	Files			×
Look in:	🔒 Reference_Fil	es	- (3 🤣 📂	•	😤 🚯	R2000 DXF	
Recent Places Desktop CDOT User Computer	Name ▲ 12345_Sheet ▲ 12345DES_In ▲ 12345DES_In ▲ 12345DES_Ma ▲ 12345DES_Ma ▲ 12345DES_Ma ▲ 12345DES_Ma ▲ 12345DES_Ph ▲ 12345DES_Ph	5.dxf gn.dgn terchange.dgn tersec100SH86.dgn odel.dgn odel02.dgn asing.dgn	Type Autodesk Des Bentley Micro Bentley Micro	Sta Sta Sta Sta Sta Sta	2,214 KB 35 KB 29 KB 31 KB 389 KB 62 KB 27 KB 150 KB		Attachment Method Coincident World	
	File name: Files of type:	12345_Sheet5.dxf CAD Files (*.dgn;*.dwg	g;*.dxf)	• •		Open Cancel Options		
					_			/

Note: If the DXF file does not show up in the list, it may be necessary to change the *List Files of Type* to show CAD Files (*.dgn, *.dwg, *.dxf). After making the change, the list should contain the desired file.

4. The *DWG/DXF Units* dialog box will now appear. The units should be set by default to Survey Feet. Accept this setting by **<D>OK**.



- **Note:** Do not check the "Do not Display again" settings box, as this reminder is necessary for all DWG/ DXF attachments and may vary on occasion.
- 5. The Sumgraph DXF sheet will now be attached as a reference file in the correct location for printing. Place the appropriate Resident Engineer Identification cell and update any other Titleblock information desired. The CDOT Titleblock can be updated with the *Edit Text* command.
- 6. After the initial sheet has been created, each consecutive sheet can be copied and renamed using the Windows Explorer or through the File > Save As command in MicroStation. The reference file attachment will need to be updated for each sheet. Select File > Reference to open the *References* dialog box, Double click on the attached Reference file to display the *Attachment Settings* dialog box. Navigate to the desired location, select the desired sheet and <D> OK twice. The Sheet file will now contain the correct Sumgraph DXF sheet.
- After creating the desired SAQ sheets, proceed with the *CDOT Batch Printing* Process. Instructions for batch printing can be found on the Start> All Programs > _CDOT_CADD_Information > Workflows > CDOT Batch Printing or on the *CDOT Menu* under Help > Workflows.
- 8. The Sumgraph program may need to be re-run during the course of the Design Project so that SAQ DXF Sheets are updated with revised information. Make sure to maintain the identical naming convention for the DXF files that are updated and save the files to the correct folder in the Project directory structure and proceed with CDOT Batch Printing.

9.

Workflow MS 10 - Converting AutoCAD Files to MicroStation

This document guides you through translating AutoCAD files into MicroStation using a .CSV remapping file. The MicroStation dgn files produced using this workflow will have standard CDOT levels using bylevel symbology. For plotting AutoCAD files only, see the workflow, *CDOT Printing AutoCAD Files in MicroStation*.

Workflow Outline

Batch Conversion Of AutoCAD Files - All of the file within a directory can be converted at one time using Batch Processing. Because the level conversion table will be set up for only the open drawing it may no convert all AutoCAD level into Microstation levels. When these unconverted levels are discovered, repeat this process to convert the remaining AutoCAD levels.

- Commands Used: File > Open Used to access the MicroStation Manager dialog box. From there, the desired AutoCAD file can be selected.
- **DWG/DXF Units** This is a message window displayed when an AutoCAD file is opened in MicroStation. Set the Units to Survey Feet.
- Utilities > Batch Converter This command is used to select the AutoCAD files for conversion, set up the conversion table, and convert the files.
 - \circ Edit > Add Files Used to select the AutoCAD files for conversion
 - Edit > V8 Save Options Used to access the remapping CSV file.
 - **Excel > Level** This button (in the Excel spreadsheet) queries the dgn file for AutoCAD level names and places them into the spreadsheet.
 - **Excel Cut and Paste -** In the Spreadsheet, MicroStation level names are cut from their current location and pasted next to the corresponding AutoCAD level. This tells the batch converter what to rename the AutoCAD levels too.

Fixing Converted Files with Mutiple Models - Some AutoCAD files may have multiple models, usually a sheet border model and a data model. Because the CDOT standard is one model per dgn, these will have to be separated

- Commands Used: **File > Save As** Used to create a dgn file to contain the sheet border data.
- **Delete** Used to remove the data from the Default Model.
- **References > Attach** The file is attached to itself so that the sheet border data can be moved into the Default Model.
- **Copy** Used to copy the referenced sheet border data into the Default Model.
- **Models > Delete** Used to remove all models except the Default Model.
- **Color Table > File > Default** Used to set the CDOT standard color table active.
- **CDOT Menu > Drafting > Dimensions** Used to replace the AutoCAD dimensions.
- **CDOT Menu > Tools > Text to Node** Used to group lines of text into paragraphs.
- annotationscale add A MicroStation key in that adds the annotation scale attribute to the text.
- Change Text Attributes Used to assign a CDOT text style to the text.

Batch Conversion Of AutoCAD Files

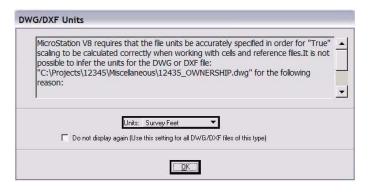
Entire directories can be processed at one time using the Batch Converter. Using this option, a large number of files can be processed quickly. However, because only one of the files can be used to create the CSV file (the open file), many AutoCAD levels may be transferred to the MicroStation files. As the user finds MicroStation files with AutoCAD levels, those files can be used to create a new csv file and the Batch Converter can be re-run on all the files. By repeating this process all of the AutoCAD levels will be gradually eliminated.

The steps below describe how to set up and run the Batch Converter.

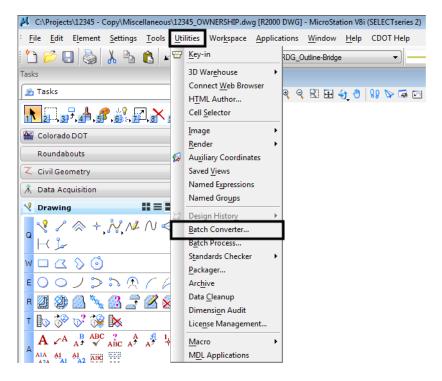
Opening an AutoCAD file in MicroStation

- 1. From the *File Open*, open an AutoCAD (*.dwg) drawing file. (Change *List Files of Type* to CAD Files (*.dwg, *.dgn, *.dxf) to see the AutoCAD files in the selected directory).
 - Kile Open C:\Projects\12345 Copy\Miscellaneous X Look in:]. Miscellaneous G 🗊 📂 🛄 -D 🔁 🗈 R2000 DWG Name Date modified Type 12345_OWNERSHIP.dwg 12/15/2010 11:26 AutoCAD Recent Places 12345_ROW.dwg 12/15/2010 11:28 PHASE3_12345LSCD.dwg 12/15/2010 11:29 ... AutoCAD PHASE3B_12345LSCD.dwg 12/15/2010 11:29 ... AutoCAD Desktop Libraries Computer Network User: CDOT Use File name 12345 OWNERSHIP.dwg Open Files of type CAD Files (".dgn;".dwg;".dbf) Cancel Project: 12345 -Open as read-only Options Interface: CDOT -
- 2. **<D>** the desired file then **<D> OK**.

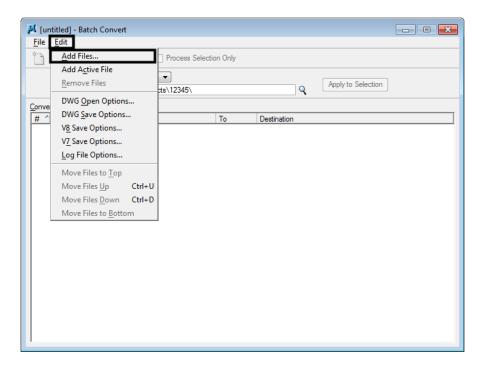
3. The *DWG/DXF Units* dialog box will appear. Verify the *Units* are set to **Survey Feet** and **<D> OK**.



Select Utilities > Batch Converter from the MicroStation menu. The Batch Convert dialog box is displayed.



5. Select **Edit > Add Files** from the menu.



6. From the *Select Files and Directories to Convert* dialog box, Navigate to the directory containing the files to be converted, then highlight the files to be converted. **<D> Done** to complete the selection.

📕 Select Files an	d Directories to co	onvert - C:\Projects\12345\Mi	scellaneous\		—
Look in:	🔰 Miscellaneou	S	- G 🤌 📂 🛄-	S 🖲	
œ.	Name	*	Date modified	Туре	
Recent Places	12345_OWN	IERSHIP.dwg	12/15/2010 11:54 12/15/2010 11:28	AutoCAD Drawing AutoCAD Drawing	
	PHASE3_123		12/15/2010 11:29	AutoCAD Drawin	
Desktop	PHASE3B_12	2345LSCD.dwg	12/15/2010 11:29	AutoCAD Drawing	
Libraries					
Computer					
Network					
	•			•	
	File name:	"PHASE3B_12345LSCD.dwg	" "12345_OWNERSHIP.d -	Done	
	Files of type:	CAD Files (*.dgn;*.dwg;*.dxf)	•	Cancel	
	•			Options	

7. Back on the *Batch Convert* dialog box, select **Edit > V8 Save Options** from the menu.

	titled] - Batch Convert			- • •
<u>F</u> ile	<u>A</u> dd Files Add A <u>c</u> tive File <u>R</u> emove Files	Process Selection Only	Apply to Selection]
Conve	DWG <u>O</u> pen Options DWG <u>S</u> ave Options	То	Destination	
1 2 3 4	V <u>8</u> Save Options V <u>7</u> Save Options Log File Options	OWNERSHIP.dwg V8 12345_ROW.dwg V8 3_12345LSCD.dwc V8 B_12345LSCD.dwc V8	C:\Projects\12345\ C:\Projects\12345\ C:\Projects\12345\ C:\Projects\12345\ C:\Projects\12345\	
4	Move Files to <u>T</u> op Move Files <u>Up</u> Ctrl+U Move Files <u>D</u> own Ctrl+D Move Files to <u>B</u> ottom		C. (Frojecis (12343)	

Editing the CSV file

In the Save As V8 Options dialog box, <D> the Browse for CSV remapping file icon to edit the CSV file.

Save As V8 Options Remap References Filter					
CSV File V050000_Level_Update.csv					
Apply Level Mapping Apply Font Mapping Apply Line Style Mapping Apply Color Mapping Apply Color Mapping Apply Weight Mapping					
QK Cancel					

 Navigate to the following directory: C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation\Tables\Level_Translation and select the V050000_Level_Update.csv file. The CSV file maps all of the previous AutoCAD layers to the standard CDOT MicroStation levels.

📕 Select Remapp	oing CSV File - C:\\	Workspace\Workspa	ace-CDOT_V8i	\Standards-Global\I	MicroSta 💌
Look in:	퉬 Level_Transla	tion	•	G 🤌 📂 🛄 -	3 💌
Ca.	Name	*		Date modified	Туре
Recent Places	평 V050000_Lev	el_Update.csv		10/15/2010 10:59 .	Microsoft (
Desktop					
Libraries					
Computer					
Network	•				•
	File name:	V050000_Level_Up	date.csv	-	Open
	Files of type:	Remapping Files (*.c	:sv)	•	Cancel

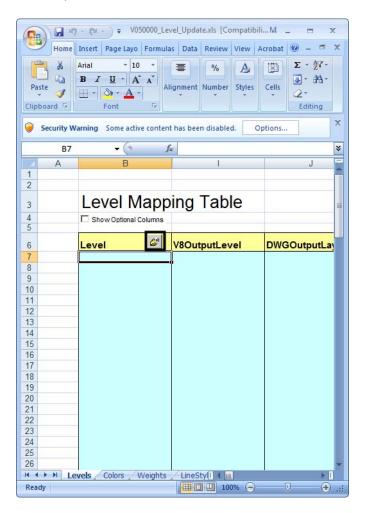
The CSV File field will be populated with the correct level mapping file. In the Save As V8 Options dialog box, <D> the Edit CSV remapping file icon.

Save As V8 Options
Remap References Filter
CSV File V050000_Level_Update.csv Q 😤 🗅
Apply Level Mapping Apply Font Mapping Apply Line Style Mapping Apply Color Mapping Apply Weight Mapping
QK Cancel

4. Microsoft Excel will activate. If the **Security Warning** dialog box appears, **<D> Enable Macros**.

"C:\Projects\12345\Miscellaneous\12345CSV.xls" contains macros by Bentley Systems, Incorporated A certificate (signing or issuer) has expired.
Macros may contain viruses. It is usually safe to disable macros, but if the macros are legitimate, you might lose some functionality.
Always trust macros from this publisher. Disable Macros Enable Macros

5. In Excel, the *Level* tab will be active. **<D>** the *icon* that is embedded in the *Level* cell.



6. The fields under **Level** will be populated with the layers that are defined in the AutoCAD file.

	A	В		J
1				
2				
3		Level Mapp	ing Table	
4		C Show Optional Columns	- -	
5				
6		Level 🔐	V8OutputLevel	DWGOutputLayer
7		TEXT		
8		BROKEN		
9		HIDDEN		
10		OUTLINE	-AutoC	AD Levels
11		TITLE		
12		HATCH		
13		Center		
14		Dimensions		
15		REBAR		
16		Defpoints		
17		Zigzag		
18		0		
19		DRAFT_Text-1		
20		DRAFT_Text-2	/MicroStat	ion Levels
21		DRAFT_Text-3		
22		DRAFT_WT-0	/	
23		DRAFT_WT-1		
24		DRAFT_WT-3		
25		DRAFT_WT-2		
26		DRAFT_WT-4		
27		DRAFT_WT-5		
28		DRAFT_WT-6		
29		DRAFT_WT-7		
30		DRAFT_Screened-40		
31		DRAFT_Screened-70		
32		DRAFT Pattern		

In the example above, the first 12 levels listed are the AutoCAD layer names. The levels below them are the CDOT standard MicroStation levels.

 In order to remap the AutoCAD layers to the standard CDOT levels, you will need to manually populate the *V8OutputLevel* fields. To do this, find the desired CDOT standard MicroStation level in the Level column. Copy/Cut the level and paste it in the *V8OutputLevel* column directly across from the AutoCAD layer it is to replace.

	A	В	1	J
1				
2				
з		Level Mapp	ing Table	
4		☐ Show Optional Columns _		
5				
6		Level 🖉	V8OutputLevel	DWGOutputLayer
7		TEXT	DRAFT_Text-3	
8		BROKEN	BRDG_BREAK	
9		HIDDEN	BRDG_HIDDEN	
10		OUTLINE	BRDG_OUTLINE	
11		TITLE	DRAFT_Text-2	
12		HATCH	BRDG_PATTERN	
13		Center	DRAFT_LC-Center_WT-0)
14		Dimensions	DRAFT_Text-1	
15		REBAR	BRDG_REBAR	
16		Defpoints		
17		Zigzag	DRAFT_CO-Violet	
18		0	Ī	
19				
20				
21			MicroStation	n Levels moved
22		DRAFT_WT-0		
23		DRAFT_WT-1	from Levels	column
24		DRAFT_WT-3		
25		DRAFT_WT-2		
26		DRAFT WT-4		
27		DRAFT_WT-5		
28		DRAFT_WT-6		
29		DRAFT_WT-7		
30		DRAFT Screened-40		
31		DRAFT Screened-70		
32		DRAFT_Pattern		

In the above example, elements that were on the AutoCAD 'TEXT' layer will be placed on the 'DRAFT Text-3' level' after conversion.

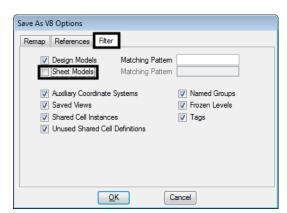
Note: Not all levels need to be populated. Blank entries in V8OutputLevel column will be ignored when processed and the AutoCAD layer (if occupied) will be brought into the MicroStation file as a new level. Be aware that some of the MicroStation levels are not in alphabetical order. And take care to search the entire list for the desired level.

Layers generated in AutoCAD that will be recreated as cells in MicroStation such as the Border, North Arrow, and Bar Scales do not need to be remapped because they will automatically come in on the correct levels when the standard CDOT workflows are followed. Also, the layers used for creating AutoCAD viewports do not need to be remapped. Items on the Defpoints layer should be remapped to the level DRAFT_INFO_No-Plot.

The line styles, color, and weight of each level has already been taken into account through the CSV file. The translation variables in the CSV file have been set to remap all levels to bylevel symbology.

- **Note:** Steps 13 and 14 below are available when converting a single file only. When doing a batch conversion, all of the models within the file will be converted.
- 8. In the Save As V8 Options dialog box, <D> the Filter tab.

9. Toggle off the **Sheet Models** check box.



- 10. **<D>** the **Remap** tab.
- 11. Check on the fields for Apply Level Mapping, Apply Line Style Mapping, Apply Color Mapping, and Apply Weight Mapping. <D> OK.

Save As V8 Options
CSV File V050000_Level_Update.csv
<u>Q</u> K Cancel

12. From the *Batch Convert* dialog box, **<D>** the **Process Batch Convert Job** icon.

📕 [untitled] - Batch Convert	
File Edit	
The second section Only	/
Default Output Format V8	
Default Destination C:\Projects\12345\	Apply to Selection
	`
<u>C</u> onversion Tasks	
# ^ Source To	Destination
1 C:\Projects\12345\Misc\12345_OWNERSHIP.dwg V8	C:\Projects\12345\
2 C:\Projects\12345\Miscellaneous\12345_ROW.dwg V8	C:\Projects\12345\
3 C:\Projects\12345\Misc\PHASE3_12345LSCD.dwc V8	C:\Projects\12345\
4 C:\Projects\12345\Mis\PHASE3B_12345LSCD.dwg V8	C:\Projects\12345\
1	

13. The *Files To Convert* dialog box is displayed. From this dialog, **<D>** the **Convert** button.

ŧ	Source	Format	Destination	To	Status
1	C:\Projects\12345\Misc\12345_OWNERSHIP.dwg	DWG	C:\Projects\12345\12345_OWNERSHIP.dgn	V8	Pending
2	C:\Projects\12345\Miscellaneous\12345_ROW.dwg	DWG	C:\Projects\12345\12345_ROW.dgn	V8	Pending
3	C:\Projects\12345\Misc\PHASE3_12345LSCD.dwg	DWG	C:\Projects\12345\PHASE3_12345LSCD.dgn	V8	Pending
4	C:\Projects\12345\Mis\PHASE3B_12345LSCD.dwg	DWG	C:\Projects\12345\PHASE3B_12345LSCD.dgn	V8	Pending
(III			

14. When the processing is complete, **<D>** the **Done** icon to dismiss the dialog box.

ŧ	Source	Format	Destination	To	Status
1	C:\Projects\12345\Misc\12345_OWNERSHIP.dwg	DWG	C:\Projects\12345\12345_OWNERSHIP.dgn	V8	Converted
2	C:\Projects\12345\Miscellaneous\12345_ROW.dwg	DWG	C:\Projects\12345\12345_ROW.dgn	V8	Converter
3	C:\Projects\12345\Misc\PHASE3_12345LSCD.dwc1	DWG	C:\Projects\12345\PHASE3_12345LSCD.dgn	V8	Converte
4	C:\Projects\12345\Mis\PHASE3B_12345LSCD.dwg	DWG	C:\Projects\12345\PHASE3B_12345LSCD.dgn	V8	Converte
1					,

This will convert all of the levels in the active file (as specified in the csv file) and convert the same levels in the other specified files.

It is possible that the other files processed will have other AutoCAD levels. When these are discovered, repeat this conversion process on the previously converted MicroStation files. This will clean up the file that is currently being used and update the levels in other specified files.

Fixing Converted Files With Multiple Models

Sheet Layout models are not used in the standard CDOT configuration. However, those models will be retained in batch converted files. If the Sheet Layouts contain information that is needed, they will need to be saved to individual dgn files. To do this we will reference a dgn file to itself, selecting the desired sheet model, in order to copy information from the sheet layout to the default model.

- 1. Open the converted dgn file that contains the Sheet Layouts to be saved.
- Select File > Save As and name the file appropriately for the Sheet Layout to be saved and <D> OK.
- 3. This will open the copy of the file. **Delete** all of the elements from the *Default Model*.
- 4. **<D>** the **References** icon from the MicroStation *Primary Tools* toolbar.



5. Select **Tools > Attach** from the References dialog box.

🔁 References (0 of 0 unique, 0 displayed)						
<u>T</u> ools <u>S</u> ettings						
<u>A</u> ttach	/ s.a. 🕅 🕫 🛱 🖓					
<u>– D</u> etach						
- De <u>t</u> ach All	lodel Description					
R <u>el</u> oad						
Reload All						
E <u>x</u> change						

6. Select the open dgn file to attach it to itself. **<D> Open.**

	nce - C:\Projects\12345\Design\Drawings\			
Look in:	🌗 Drawings	- 🔇 🌶 📂 🖽	8 🖲	3D - V8 DGN
(Pa	Name	Date modified	Туре	
<u>~</u>	Cross_Sections	12/15/2010 11:22	File folder	
ecent Places	Reference_Files	12/15/2010 11:24	File folder	
	퉬 Tabs	12/15/2010 11:22	File folder	
	🖊 12345DES_TitleSht.dgn	6/14/2010 10:31 AM	MicroStat	
Desktop	🖊 12345DES_TyplSect##.dgn	6/14/2010 10:31 AM	MicroStat	
	🖊 12345SURV_Tab.dgn	6/14/2010 10:31 AM	MicroStat	
6 3	12345SURV_WUTab.dgn	6/14/2010 10:31 AM	MicroStat	
Libraries	🖊 b206m2_Sheet.dgn	12/15/2010 1:28 PM	MicroStat	
	🚧 M&S Standard Plans List Index.dgn	6/14/2010 10:31 AM	MicroStat	Attachment Method
Computer				Interactive

In the *Reference Attachment Settings* dialog box, select the desired Sheet Layout from the *Model* drop down menu.

Reference Attachment	Settings for b206m2_Sheet.dgn
File Name: b206	m2 Sheet.dan
Full Path: C:\Pr	ojects\12345\Miscellaneous\b206m2_Sheet.dgn
Model: Layou	d1 ▼
Logical Name: Layo	t1
	al Origin aligned with Master File
Orientation:	
View	Description
Coincident	Aligned with Master File
Coincident - World	Global Origin aligned with Master File
Standard Views Saved Views (none)	
Named Fences (nor	
Named Ferrees (nor	
Detail Scale:	
Sc <u>al</u> e (Master:Ref):	1.000000 : 1.000000
Named Group:	
Revision	
Level:	
Nested Attachments:	No Nesting Depth: 1
Display Overrides:	
	Use MS_REF_NEWLEVELDH
Global LineStyle Scale:	
-	ith Saved View
Toggles	
	ا الم 🖓 🖌 🔁 🕲 🖓 👔 🗴
Drawing Title	
Create	
	Layout 1
	OK Cancel

- 8. **<D>** the **Fit** view control icon to display all of the elements in the view.
- 9. All of the elements in the view must be copied into the default model. This can be done using the **Element** Selector or with a Fence.
 - **Note:** When making the copy be sure to snap to an element when copying and the same point on the element when placing the elements. This will ensure that they are at the same coordinates in the default model as they were in the sheet layout model.
- 10. After the elements have been copied, *Detach* the reference file.

🔁 References (1 of 1 unique, 1 displayed)				
Tools Settings				
<u>A</u> ttach	0 10 100			
r <u>D</u> etach				
- De <u>t</u> ach All	lodel	Description		
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Reload All				
E <u>x</u> change				

11. **<D>** the **Models** icon from the MicroStation Primary Tools toolbar.



12. In the **Models** dialog box, **<D>** to highlight all of the models except the Default Model. **<D>** the **Delete** icon to remove all of the sheet layouts. **<D>** the **'X'** to close the **Models** dialog box.

🖸 Mo	dels			x
Re Ad	tive File	- 🗅 🔓 e	? 🗙 🚰 🗔 🕞 👘	
Туре	2D/3D	Name	Description	*
٥	Î	Model		
6	Î	Sheet 20	Layout 1	Ξ
	Û	Sheet 21	Layout 1	
6	Û	Sheet 22	Layout 1	
6	î	Sheet 23	Lavout1	Ŧ
•			4	

13. Steps 19 through 30 will have to be repeated for each sheet layout.

Converting a Single AutoCAD file

- 1. Open the desired AutoCAD file in MicroStation as described in steps 1 and 2 above.
- 2. Select File > Save As.

Fi	e <u>E</u> dit E <u>l</u> eme	nt	<u>S</u> ett	ing
D	New	C	trl+N	
- 🚅	Open	C	trl+0	
	Close	Ctrl+W		12
, 🛛	<u>S</u> ave	C	trl+S	
	Save <u>A</u> s			
1	Compress			F
P	Sa <u>v</u> e Settings	C	trl+F	
	Reference			
	Raster Manager			
٥	Models			
Į	Import			Þ
2				

Change the *Select Format to Save* to MicroStation V8 DGN Files (*.dgn) and navigate to the appropriate folder under the Projects directory. The file will be automatically saved with the same name as the AutoCAD file with a different extension. You can rename the file at this time if you choose to do so.
 <D> Options.

Save As - C:\P	rojects\12345\RO\	W_Survey\Drawings\Reference_File	es\		
Save in:	🔒 Reference_Fi	les 🗸	o 🌶 📂 🎞	*	
(Ca)	Name	*	Date modified	Туре	
Recent Places	12345ROW_I		11/20/2007 7:49 AM 11/20/2007 7:49 AM	MicroStat MicroStat	
Desktop	P4 1254550KV_	Modellagn	11/20/2007 7:49 AW	WICTOStat	
Libraries					
Computer					,
() Network	•			F	
	File name:	12345_OWNERSHIP.dgn		Save	
	Save as type:	MicroStation V8 DGN Files (*.dgn)	-	Cancel	
				Options	.H.

- **Note:** Model files should be saved to the specialty group's **Reference_Files** folder. Sheet files are saved under the specialty group's **Drawings** folder.
- 4. **<D> Save** in the *Save As* dialog box. The CSV file will execute and the AutoCAD drawing file will be converted to a MicroStation file.

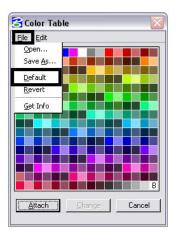
Save As - C:\P	rojects\12345\ROV	V_Survey\Drawings\Reference_Fi	les\		E
Save in:	Reference_File	es 🔹	G 🤌 📂 🖽	۲	
9	Name Name	^ Model dan	Date modified 11/20/2007 7:49 AM	Type MicroStat	
Recent Places	12345SURV_N		11/20/2007 7:49 AM	MicroStat	
Desktop					
Libraries					
				,	
Computer					
() Network	•			Þ	
INELWOIK	File name:	12345_OWNERSHIP.dgn	[Save	
	Save as type:	MicroStation V8 DGN Files (*.dgn)		Cancel	
				Options	

5. The file that is now open in MicroStation is the converted file. Running the CSV file changed the levels in the Model file to the CDOT Standard levels with bylevel symbology.

6. From the MicroStation menu, selected **Settings > Color Table** after the MicroStation drawing file has been created.

Set	ttings	Tools	<u>U</u> tilities	V
1	Tool S	Settings		
ś	Mana	ge		8
5	<u>A</u> ccul	Draw		
	Color	Table		1 A
	Data	pase		۲
	Desig	n File		

7. In the *Color Table* dialog box, select **File > Default**.



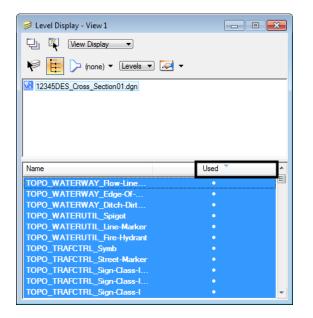
8. **<D> Attach**.



9. Verify that the conversion was successful. **<D>** the **Level Display** icon from the MicroStation *Primary* toolbar.

Primary Tools	8
	🕂 🖽 🗕 🐼

10. In the *Level Display* window, **<D>** on the **Used** tab to sort the levels by those that have elements.



Note: levels with elements will have a dot in this column. If no used levels are visible, **<D>** on the tab again. If the triangle on the tab is pointing down, the used levels are at the top of the window.)

Other Drawing Elements

Other updates will need to be made to the files so all drawing elements and sheet setups conform to the CDOT standards.

All of the Sheet Layouts will need to be recreated using CDOT standard workflows. This means there can only be one Model for each MicroStation file. All of the sheet borders will need to be placed in their own separate file, called a Sheet File. Then, the Model file will be referenced to the Sheet File. Please refer to the documents *CDOT Sheet File Creation, CDOT Sheet File Creation Multiple Scales, and CDOT Creating Multiple Plan Sheets* for additional information about this procedure.

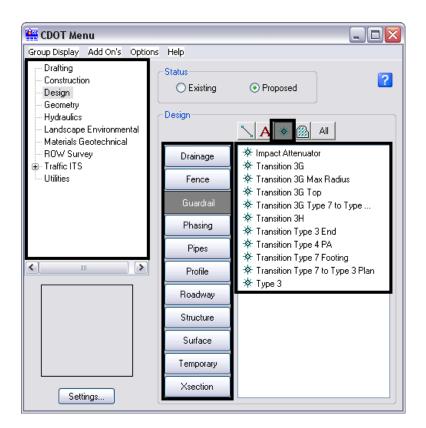
1. Recreate all Dimensions and leader lines (placed by AutoCAD) using the standard CDOT dimension styles. The dimensioning commands are found in the CDOT menu under **Drafting > Dimensions**.

🔛 CDOT Menu			_ 🗆 🛛
Group Display Add On's Optic	ons Help		
Drafting 	C Drafting	Proposed	2
Prydadius Landscape Environmental Materials Geotechnical ROW Survey Traffic ITS Utilities	Border Border PLS Border RE Dimensions Linework Patterning Symbols Text	x .12 .1234 I→ Dimension Linear S Dimension Angle Si >> Dimension Angle Si >> Dimension Element ≫ Label Line	etween ize

2. Erase all hatch patterns generated in AutoCAD recreate using the MicroStation *Patterns* tools, shown below.

Element Information Selection <u></u>	
General	* *
Description	Text Node
Level	Default
Color	ByLevel (0)
Line Style	ByLevel (0)
Weight	ByLevel (0)
Class	Primary
Template	None
Transparency	0
Contents	• =
Text String	aponfpwpoqdciuvibwb
Text Style	.07" ENG-100

3. All blocks generated in AutoCAD will need to be replaced with the standard CDOT MicroStation Cells. The cells are found on the CDOT menu. Use the CDOT Menu Explorer to select the desired specialty group. Use the Category buttons and the Filter buttons to locate the cells within the menu. Select the desired cell from the list.



Updating Text

Text created in AutoCAD with multiple text strings can be converted to a text node in MicroStation. Some multiple text strings created in AutoCAD will be translated into a text node when the file is converted.

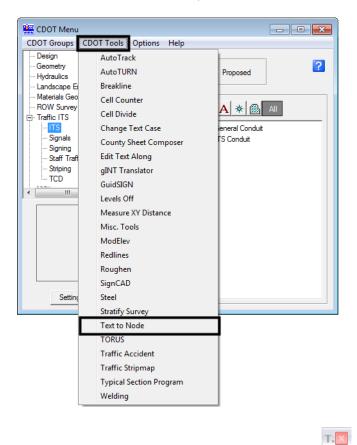
To verify this, <D> the Element Information icon . Text Nodes will display under the General Tab.

Element Information Selection Text Node	
General	<u>^</u>
Description	Text Node
Level	Default
Color	ByLevel (0)
Line Style Weight	ByLevel (0)
Class	ByLevel (0) Primary
Template	None
Transparency	0
Contents Text String	aponfpwpoqdciuvibwb
Text Style	.07" ENG-100
Formatting	~
Font Name	Engineering
Vertical	False
Height	0.070
Width	0.070
Is Annotation	True
Justification	Left Top
Italics	False
Slant Angle	0°0'0"
Line Spacing	0.023
Line Spacing Type	Exact

- 2. If not, select all text that will be combined into a text node using the **Element Selection** tool. While in the **Element Selection** command, hold down the *Ctrl* key to select individual text strings. Highlight them in the order they are to be placed into the text node.
 - **Note:** Do not *Window* around the multiple lines of text because the text strings may not merge in the desired order.

Tasks Tasks	Image: Wiew1 - Top, CDOT Default Image:
Colorado DOT	ROY Q. SMITH & JOYCE L. SMITH P.O. BOX 555
Roundabouts 🔹	KIOWA, CO 80117
Civil Geometry	RECEPTION NO. 555555
★ Data Acquisition ♥ Drawing	BOOK 555 PAGE 555

3. Select the **Text to Node** utility from the CDOT Menus under Add On's.



- 4. **<D>** the Convert Text Element to Text Node icon
- 5. The following dialog box will appear. The selected text will be anchored to the cursor.

A[‡]



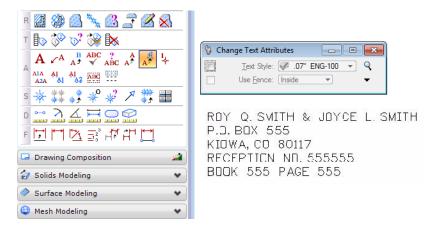
ROY Q. SMITH & JOYCE L. SMITH P.O. BOX 555 KIOWA, CO. S0117 RECEPTION NO. 555555 L. SMITH ROOK 05557565 NOWA, CO 80117 RECEPTION NO. 555555 BOOK 555 PAGE 555 6. Check on **Delete Original**, set the **Justification**, and leave the *Line Spacing* set to **1.00**. Place the text in the desired location.

Justification:	Left Top	•
Active Angle	0*0'0.0000''	÷
Line Spacing:		

- **Note:** If the Justification is set to anything other than **Left Bottom**, double **<D>** on the text after it is placed. The text will be brought into the Text Editor dialog. **<D>** again on the screen to place the text to its proper location and close the dialog.
- 7. Select all text and key-in *annotationscale add*. The text will now recognize the MicroStation Annotation Scale Factor.

Key-in	×
annotationscale add	I 型 型 ▼

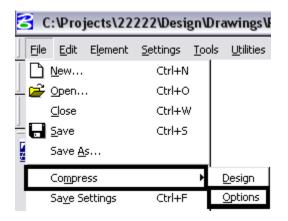
8. Update the text style by **<D> Change Text Attributes**. Select the desired CDOT *Text Style* and select the text placed previously in AutoCAD.



9. All fractions placed in AutoCAD will need to be re-typed in MicroStation so the format conforms to CDOT standards.

Compressing the Model File

1. After all changes and updates have been made to update the drawing into MicroStation using CDOT standards and standard workflows, you will need to compress the drawing in order to remove all AutoCAD information stored in the drawing buffer. This will ensure that AutoCAD data does not get repopulated into the drawing. Select **File>Compress>Options**.



2. Under *Compress > Options*, verify that all options are checked **ON** except **Delete Text Elements** Containing Only Spaces.

Select	Action	Alias		
~	Delete Empty Cell Headers	EMPTY_CELL		
	Delete Empty Text Elements	EMPTY_TEXT		
	Delete Text Elements Containing Only Space	es SPACE_TEXT		
	Delete Unused Named Shared Cells	SC_NAMED		
	Delete Unused Anonymous Shared Cells	SC_ANON		
	Delete Unused Line Styles	LINESTYLES		
	Delete Unused Dimension Styles	DIMSTYLES		
	Delete Unused Text Styles	TEXTSTYLES		
	Delete Unused Levels	LEVELS		
	Delete Unused Nested Attachment Levels	LEVELTABLES		

3. Once the correct options have been selected, **<D>** the **Compress** button.

Workflow MS 11 - Update Project Sheet Border to a ProjectWise Sheet Border

This document guides you through the conversion of an existing project sheet border that was built and stored on a local computer to a ProjectWise sheet border stored within ProjectWise. The benefits of using ProjectWise sheet borders stored in ProjectWise are; automatic backup of data, content management to reduce the potential of overwriting data, and having title block information automatically filled in using ProjectWise attribute data.

Workflow Outline

Request a ProjectWise Project - When migrating a project from the local computer to the ProjectWise server, the first step is to have the project directory built on the ProjectWise server.

• Commands Used: **E-mail Request** - to <u>help@dot.state.co.us</u>.

Store Sheet File in ProjectWise - Once the project directory has been built on the ProjectWise server, the existing sheet border files are copied to the proper location within that directory.

• Commands Used: **Drag and Drop** - Drag the sheet border files from a Windows Explorer window and drop them into the ProjectWise Explorer window.

Modify Sheet File Attributes - Attributes are project specific data that can be assigned to the dgn file once it is in ProjectWise. These attributes are used to populate tags within the dgn file to fill in sheet border information.

• Commands Used: **Properties > Attributes** - This is form used to fill in the attribute data.

Replace Border - The original sheet border in the drawing does not have the ProjectWise tags, therefore, it cannot use the attribute data added to the file. The existing border is replaced with a ProjectWise sheet border and the tags are updated with the attribute data.

- Commands Used: **Place Line** Used to mark the insertion point for the sheet border.
- **Delete** Used to remove the existing sheet border cell.
- **CDOT Menu > Drafting > Border ProjectWise** Preferred method for placing the ProjectWise sheet border cell.
- **Place Active Cell** An alternate method for placing the ProjectWise sheet border cell.
- **Delete** Used to remove the insertion line drawn above.

Populate Tags with ProjectWise Attributes - Because the ProjectWise sheet border did not exist in the file when it was opened, the tags in the border have to be manually updated.

 Update MS Tag Values with PW Attributes - Used to add the ProjectWise attribute data the sheet border tags.

Request a ProjectWise Project

If existing project data currently exists on your local computer or on a shared network drive, it is important that the extended team is aware of the transition to ProjectWise.

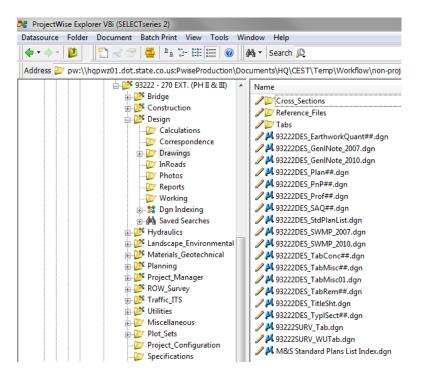
If your project has not been built in ProjectWise, submit an e-mail request to <u>help@dot.state.co.us</u> to have it done. This request should include the Project Manager's name and the Project Number.

Store Sheet File in ProjectWise

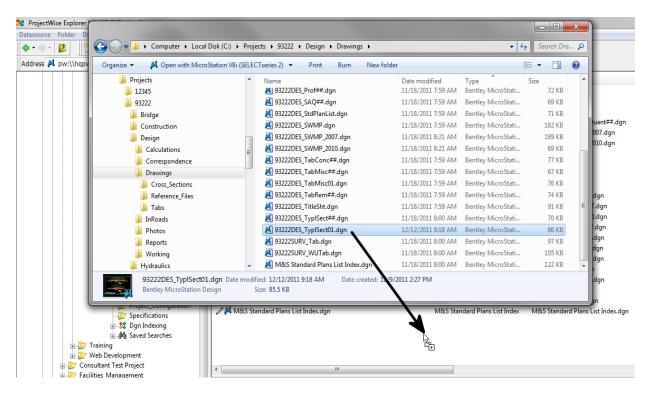
1. Open a Windows Explorer and browse to your project sheet border file.

janize 👻 📕 Open with MicroStation	n V8i (SELECTseries 2) 🔻 Print Burn New fo	lder		
퉬 Projects	 Name 	Date modified	Туре	Size
J2345	M 93222DES_Prof##.dgn	11/18/2011 7:59 AM	Bentley MicroStati	72 KB
93222	A 93222DES_SAQ##.dgn	11/18/2011 7:59 AM	Bentley MicroStati	69 KB
퉬 Bridge	93222DES_StdPlanList.dgn	11/18/2011 7:59 AM	Bentley MicroStati	71 KB
Construction	33222DES_SWMP.dgn	11/18/2011 7:59 AM	Bentley MicroStati	182 KB
퉬 Design	93222DES_SWMP_2007.dgn	11/18/2011 8:21 AM	Bentley MicroStati	189 KB
Calculations	93222DES_SWMP_2010.dgn	11/18/2011 8:21 AM	Bentley MicroStati	69 KB
퉬 Correspondence	93222DES_TabConc##.dgn	11/18/2011 7:59 AM	Bentley MicroStati	77 KB
🌗 Drawings	93222DES_TabMisc##.dgn	11/18/2011 7:59 AM	Bentley MicroStati	67 KB
Cross_Sections	93222DES_TabMisc01.dgn	11/18/2011 7:59 AM	Bentley MicroStati	76 KB
Reference_Files	93222DES_TabRem##.dgn	11/18/2011 7:59 AM	Bentley MicroStati	74 KB
🌗 Tabs	93222DES_TitleSht.dgn	11/18/2011 7:59 AM	Bentley MicroStati	91 KB
퉬 InRoads	93222DES TyplSect##.dgn	11/18/2011 8:00 AM	Bentley MicroStati	70 KB
🌗 Photos	93222DES_TyplSect01.dgn	12/12/2011 9:18 AM	Bentley MicroStati	86 KB
🌗 Reports	83222SURV_Tab.dgn	11/18/2011 8:00 AM	Bentley MicroStati	97 KB
퉬 Working	93222SURV_WUTab.dgn	11/18/2011 8:00 AM	Bentley MicroStati	105 KB
Hydraulics	M&S Standard Plans List Index.dgn	11/18/2011 8:00 AM	Bentley MicroStati	122 KB

2. Open and login into ProjectWise then browse to your project.



- Note: In ProjectWise you will see one of two different icons for your project or discipline folder called a sub project. A project folder has this icon, ↓ Design and a non project folder has this icon, ↓ Design . Regardless of this folder difference the drag and drop function works the same.
- 3. Drag and Drop the local copy into the ProjectWise folder to store the file.



Modify Sheet File Attributes

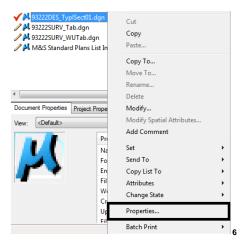
- 1. Double click on the sheet border in the ProjectWise Explorer to Check Out and open the drawing in MicroStation.
 - **Note:** A red check mark will be displayed in ProjectWise Explorer noting you have this file checked out and have read/write access.

✓料 93222DES_TyplSect01.dgn

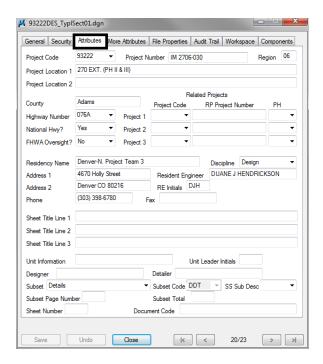
93222DES_TyplSect01.dgn

2. In ProjectWise Explorer, **<R>** on the dgn filename and select **Properties**.

93222DES_TyplSect01



3. **<D>** on the **Attributes** Tab.



Note: Since the sheet border file was placed in a ProjectWise folder, the **Attributes** applied to the ProjectWise folder were automatically applied to the sheet border file.

- 4. Fill out the following Attributes based on the values in the existing sheet border. In the example below the following values are used:
 - a. Sheet Title Line 2 TYPICAL SECTION
 - b. Subset Typical Sections
 - c. Subset Page Number 1
 - d. Subset Total 3

e. Sheet Number - 65

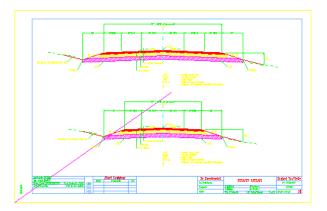
General Security	Attributes	More Attributes	File Properties	Audit Trail	Workspace	e Components			
Project Code	93222	▼ Project N	umber IM 2706-	-030		Region 06			
Project Location 1	270 EXT. (270 EXT. (PH II & III)							
Project Location 2									
County	Adams		Re						
Highway Number	076A	 Project 1 	Project Code	RP Proj	RP Project Number PH				
National Hwy?	Yes	Project 1 Project 2	· · ·						
FHWA Oversight?	No	 Project 2 Project 3 							
PHWA Oversignt?	110	Floject 5							
Residency Name	Denver-N.	Project Team 3		Discipline Design					
Address 1	4670 Holly		Resident Engi	neer DUA	NE J HEND	RICKSON			
Address 2	Denver CO		RE Initials D	JH					
Phone	(303) 398-6	5780 F	ах						
Sheet Title Line 1									
Sheet hae the t	TYPICAL S	SECTION							
Sheet Title Line 2									
Sheet Title Line 2			L	Init Leader In	itials				
Sheet Title Line 2 Sheet Title Line 3			Detailer	Init Leader In	itials				
Sheet Title Line 2 Sheet Title Line 3 Unit Information					itials SS Sub De	sc			
Sheet Title Line 2 Sheet Title Line 3 Unit Information Designer	ctions	d.	Detailer Subset Code T			sc			

5. **<D>** Save and **<D>** Close to apply the changes to the ProjectWise Attributes.

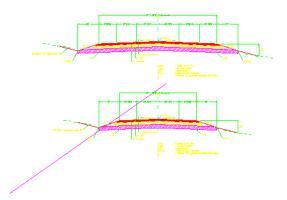
Replace Border

In the next steps, the original sheet border is replaced with a ProjectWise sheet border. The ProjectWise sheet border has MicroStation tags that are populated with the ProjectWise Attribute data entered above. The attribute data is displayed as text within the title block of the sheet border.

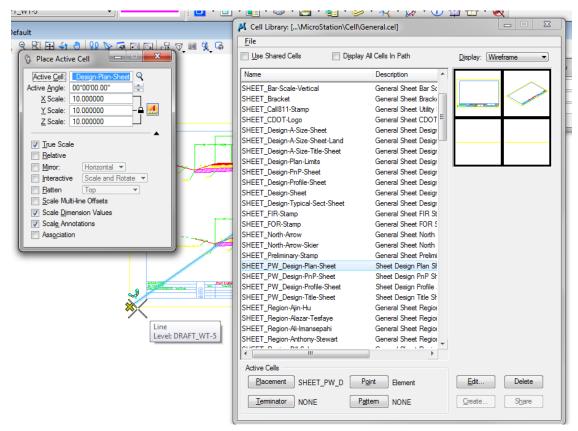
1. In MicroStation, draw a line from the bottom left corner to locate the insertion point of the new sheet border.



2. Delete the existing sheet border leaving the line drawn in step one and any project data in the file.



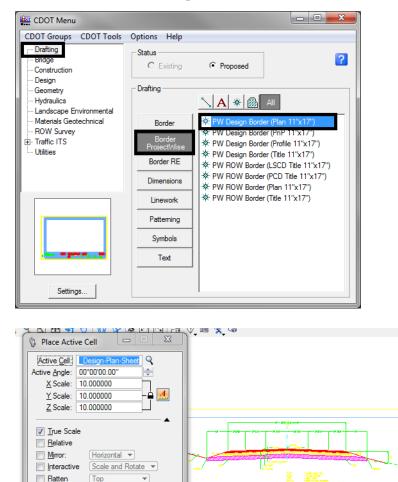
- 3. Place the ProjectWise Plan sheet border at the insertion line. There are two ways to achieve this:
 - a. The first is through the Cell Library dialog box.
 - Open the *Cell Library* dialog box, Select **Element > Cells**.
 - Attach the *General.cel* library if it is not already attached.
 - Set SHEET_PW_Design-Plan-Sheet as the active cell.
 - Place the cell at the insertion point.



Note: Be sure to set the correct scale for the sheet border prior to placing the cell.

- b. The second and preferred method is to use the CDOT Menu to locate and place the ProjectWise sheet border.
 - From the *CDOT menu* select the *Drafting* group.
 - Choose the **Border ProjectWise** tab.
 - Select **PW Design Border (Plan 11"x17")**
 - Place the cell at the insertion point.

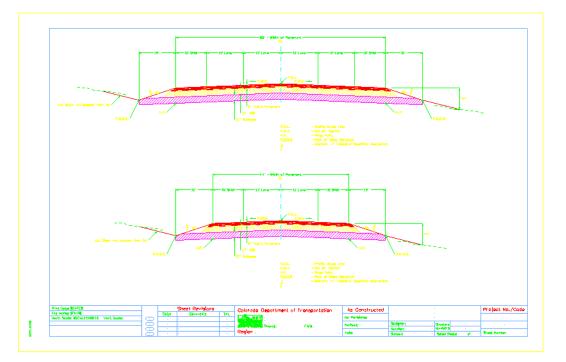
Scale Multi-line Offsets
 Scale Dimension Values
 Scale Annotations
 Association



Line

Level: DRAFT_WT-5

4. Delete the insertion line.



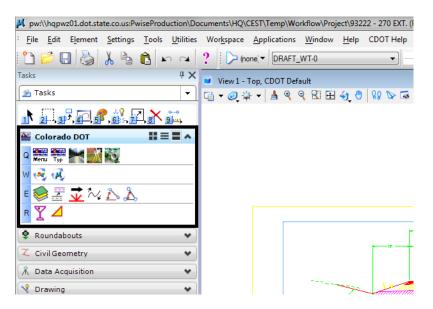
Populate ProjectWise Attributes

Typically when a sheet drawing is opened from ProjectWise the tag attributes are refreshed. Since this file was opened to place the tag set (embedded in the sheet border) they could not be populated. There are two options to refresh the attributes; reopen the drawing or manually update the attributes.

Note: The menu used in this section has two icons which will produce opposite results. The first icon takes data from the files existing sheet border and writes it to the ProjectWise attributes. The second icon takes the ProjectWise attributes and writes them into the sheet border.

If you select the first icon after you place a new sheet border into the file it will erase the ProjectWise attributes attached to the file.

1. To manually refresh the tags with the ProjectWise attributes, open the *Colorado DOT* Task menu.



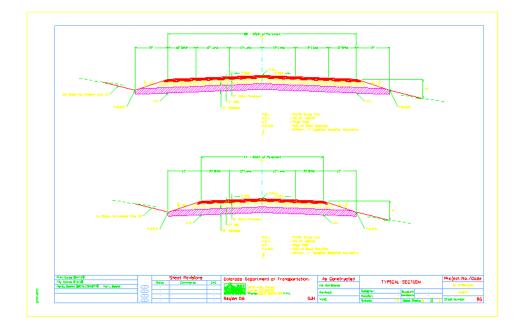
The second line of icons are the ProjectWise commands for attribute data.



2. **<D>Update MS Tag Values with PW Attributes** icon to populate the new sheet border. The second icon, updates the MicroStation tag values with ProjectWise attributes. When this icon button is used all the ProjectWise attributes for the drawing will overwrite the MicroStation tags.



Important! Only use the first icon on a file with an existing ProjectWise sheet border that has had the tags refreshed then manually modified. If this command is ran on an unpopulated sheet border is will erase all of the attributes from the ProjectWise database.



Below is an example of a sheet border with the ProjectWise tags filled in.

Push Tag Edits to ProjectWise Attributes

At anytime you can edit the tag attributes by double clicking on the blank tag value and use MicroStation to fill in the border information.

The insert point of the tag data is marked by a point.

	Designer:		Structure	
-	Detailer:		Numbers .	
	Subset:	19	Subset Sheetst 1 of 3	Sheet N

Near that point is the place holder for the tag.

	Designer:	
_	Detailer:	
	Subset:	

- 1. Double click the place holder to open the *Edit Tags* dialog box. The *Tag Set* name is displayed in the header of the dialog box. The tag set name should be *pwise*.
 - *Note:* You make find it easier to locate the tag by selecting the **Edit Tag** command then clicking in the area of the tag.

Name:	Value:	Display
project_number	IM 2706-030	\checkmark
project_code	93222	\checkmark
designer_name		\checkmark
detailer_name		\checkmark
subset	TS	\checkmark
re_initials	DJH	\checkmark
region_number	06	\checkmark
residency_addr_1	4670 Holly Street	\checkmark
residency_addr_2	Denver CO 80216	\checkmark
residency_fax		\checkmark
residency_name		\checkmark
residency_phone	(303) 398-6780	\checkmark
revision_date_01		\checkmark
revision_date_02		\checkmark
revision_date_03		\checkmark
revision_date_04		\checkmark
revision_description_01		\checkmark
evision_description_02		1
revision_description_03		\checkmark
revision_description_04		\checkmark
revision_initials_01		\checkmark
revision_initials_02		\checkmark
revision_initials_03		\checkmark
revision_initials_04		\checkmark
revision_number_01		\checkmark
revision_number_02		\checkmark
revision_number_03		\checkmark
revision_number_04		\checkmark
structure_number_1		\checkmark
structure_number_2		\checkmark
subset_number	1	\checkmark
itle_line_1		\checkmark
itle_line_2	TYPICAL SECTION	\checkmark
itle_line_3		\checkmark
unit_information		\checkmark
unit_leader_initials		\checkmark
vertical_scale		\checkmark
sheet_number	65	~
subset total	3	~
_	OK Cancel	

Note: The highlighted tag will be the place holder you double clicked on. In the example above this was the **designer_name**.

2. If a place holder can't be found, use the *Edit Tag* button from the *Drawing Tasks* menu and select any element of the border cell.

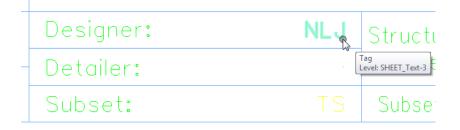
pw:\\hqpwz01.dot.state.co.us:PwiseProduction\Docu	ments\HQ\CEST\	Temp\Workflow\P	roject\93222 - 2	270 EXT. (PH	II & III)\Design\[Drawings\932	22DES_Typ
<u> </u>	Wor <u>k</u> space <u>A</u> pp	olications <u>W</u> indo	w <u>H</u> elp CDO	OT Help			
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Tasks 🕂 🕂 🗙	🔋 View 1 - To	p, CDOT Default					
室 Tasks 🗸 🔻	🖬 - 🥥 🔅	- - 🔺 🍳 🍳 🕄	I 🕀 🍕 🖲	88 ⊳ 🖙		iii 🧏 🕞	
							🖗 Eler
🔛 Colorado DOT 🔹 🗸							
Roundabouts							
Z Civil Geometry	rnative						
🕅 Data Acquisition 🔹 🔹							
✓ Drawing							
Q V ≈ +, N N < +(j=							
w 🗆 🗠 📎 🕥	ha d						
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$\mathbf{A} \xrightarrow{\mathbf{A}} \mathbf{A} \xrightarrow{\mathbf{B}} \overset{\mathbf{ABC}}{\checkmark} \overset{?}{\overset{\mathbf{A}}{\checkmark}} \overset{\mathbf{A}}{\overset{\mathbf{A}}{\checkmark}} \overset{\mathbf{A}}{\overset{\mathbf{A}}{\ast}} \overset{\mathbf{A}}{$		Detailer:			Numbers		1.0
		Subset:		TS	Subset Sh	eets: 1	of
s 🔆 ** ** ** ** ** 7 *** 🗄	ß			_			
		HEET_PW_Design-F SHEET_Linework	Plan-Sheet \ Line	e			
▪ [] [] [] <u>공</u> 같 [] []				_			

Note: This method will highlight the first tag field and will not highlight the tag in the MicroStation view. This will require some knowledge of the tag field names.

3. Modify the *Value* column for the desired tag and *<D>OK*.

Name:	Value:	Display	
project_number	IM 2706-030	\checkmark	
project_code	93222		
designer_name	NLJ	\checkmark	E
detailer_name		\checkmark	
subset	TS	~	
re_initials	DJH	~	
region_number	06	~	
residency_addr_1	4670 Holly Street	✓	
residency_addr_2	Denver CO 80216	√	
residency_fax		√	
residency_name		✓	
residency_phone	(303) 398-6780	✓	
revision_date_01		√	
revision_date_02		~	
revision_date_03		~	
revision_date_04		\checkmark	$\overline{\mathbf{v}}$

4. The new value is displayed in MicroStation. In this example, the designer's initials are displayed.



However, this value is not in the ProjectWise File attributes.

General Security	Attributes	More Attributes	File Properties	Audit Trail Work	space Components	
Project Code	93222	 Project N 	umber IM 2706	6-030	Region 06	
Project Location 1	270 EXT. (P	PH II & III)				
Project Location 2						
_	Adams		R	elated Projects		
County			Project Code	RP Project N	umber PH	
Highway Number	076A	 Project 1 	-]		
National Hwy?	Yes	 Project 2 	•			
FHWA Oversight?	No	 Project 3 	-			
Residency Name	Denver-N. F	Project Team 3		Discipline	Design	
Address 1	4670 Holly S	Street	Resident End	nineer DUANE J	HENDRICKSON	
Address 2	Denver CO	80216	RE Initials	DJH		
Phone	(303) 398-6	780 Fa	ах			
Sheet Title Line 1						
Sheet Title Line 2	TYPICAL S	ECTION				
Sheet Title Line 3						
Unit Information				Unit Leader Initials		
Designer			Detailer			
Subset Typical Se	ections	Ţ	Subset Code	TS 🔹 SS S	ub Desc	
Subset Page Number 1 Subset Total 3						
Subset Page Numb			nent Code			

5. **<D>** on the **Update PW Attributes from MS Tag Values** icon.



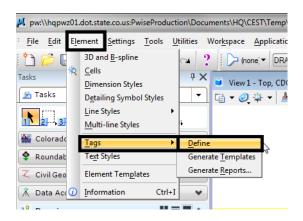
General Security	Attributes	Mon	e Attribute	es	File Pr	operties	Audit	Trail	Work	space	Compo	nents
Project Code	93222	•	Project	t Nu	umber	IM 270	6-030				Region	06
Project Location 1	270 EXT. ((PH II	& III)									
Project Location 2												
C .	Adams						Related	-				
County		_			<u> </u>	ct Code		RP Pro	•	umber	PH	-
Highway Number	076A	-	Project	1	13403	•	IMBO	0253-1	65		D	•
National Hwy?		•	Project	2		•						•
FHWA Oversight?		•	Project	3		•						•
Residency Name	Denver-N.	Proje	ct Team (3				Disci	pline	Desigr	n	•
Address 1	4670 Holly	Stree	et		Resi	dent En	gineer	DUA	NE J I	HENDR	RICKSON	
Address 2	Denver CC	802	16		REI	nitials	DJH					
Phone	(303) 398-	6780		Fa	ах							
Sheet Title Line 1												
Sheet Title Line 2	TYPICAL S	SECT	ION									
Sheet Title Line 3												
Unit Information							Unit Le	a dan k	all interest		-	
Designer NLJ				1	Detaile		Unit Le	auer I	indis		Ξ	
Subset Details				Ţ		t Code	TS	-	SS S	ub Des		•
Subset Page Numb	er 1					t Total	3	_	50 0			
Sheet Number 65			Do	cum	nent Co							

The attribute is now listed in ProjectWise File Attributes dialog box.

Troubleshooting

If for some reason the ProjectWise attributes will not populate into the MicroStation tags or MicroStation tags will not populate the ProjectWise attributes, check the MicroStation Tag Set name.

1. In MicroStation, **<D> Elements > Tags > Define**.



2. Verify that the *Tag Set* name of **pwise** is listed.

ile		
Gets	Tags	
inciv_ftr	county	
inciv_ftrdim	designer_name	=
inciv ftrlink	detailer_name	
pwise	file_name	
	highway_no	*
Add <u>R</u> emove	Add	e <u>m</u> ove
Rename Duplicate	Edit	

Note: Any variation of this name should be renamed to **pwise**. Typical variations would be **pwise1** or **pwise2**.

- 3. Highlight the pwise variation name in the *Sets* field.
- 4. **<D>** the **Rename** button.
- 5. Key-in *pwise* for the *Name*.
- 6. **<D> OK** to accept the new file name.

Tag S	et Name	
Name	: pwise	
	<u>0</u> K	Cancel

Important! Do not use the Remove button under the Sets or Tags sections. This will result in having to replace the sheet border cell in MicroStation to get those items back.

Workflow MS 12 - Accessing Imagery Files

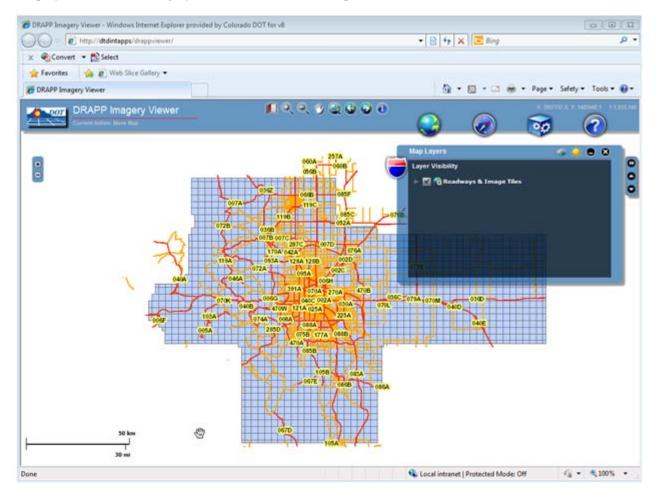
This document guides you through the process of locating and downloading imagery stored on CDOT servers.

Obtaining Image File Names

In order to download the correct image files for a project, the names of the image files must first be determined. The file names can be identified by using the DRAPP Imagery Viewer for Denver area files or the NAIP Imagery Viewer for statewide files. The process of identifying the image names is the same for both viewers. The steps below use the DRAPP Imagery Viewer.

- 1. Open an Internet Explorer window.
- 2. In the CDOT internal web site, navigate to **Organizations**. Scroll down to the **Project Development** heading and select the **Data Files Imagery Viewer (or Statewide Imagery Viewer)** link. or use the following link: <u>http://dtdintapps/drappviewer/ (http://dtdintapps/naipviewer/</u> for statewide images).

This displays the DRAPP Imagery Viewer in the Internet Explorer window.



3. In the *Map Layers* dialog box, **<D>** the arrow next to *Roadways & Image Tiles* to expand the layer list.

4. Toggle on the desired image formats. The grid lines and names of the image tiles are displayed in the viewer.



- 5. Use the view controls at the top of the window or the mouse scroll wheel to zoom in to the area of your project.
- 6. **<D>** the **Identify** icon to display the *Identify* dialog box. The name of the selected image file is displayed in this dialog box.



7. In the map area, **<D>** in the location that contains the image needed. This places the Identify icon at the point you picked and shows the image name in the Identify dialog box.

CO-INO70Wb Map Layers Layer Visibility CUINBARTEL AV	() ((((((((((90		X: 3084557 0, Y:	1799381.2 1.25,776
			Layer Visibility	RELAY.	ODINO TOWA
			Highways Major Roads Tiff 6inch Mainer 11 Sid 1ft		
PY PALO PY	THIST		Identify P Tiff 1ft TILE_NAME: 001N070V 001N070Wf		

- 8. In the Identify dialog box, highlight the image name.
- 9. **<R>** on the filename and select **Copy** from the menu. You can also press the Ctrl + c keys to make the copy.

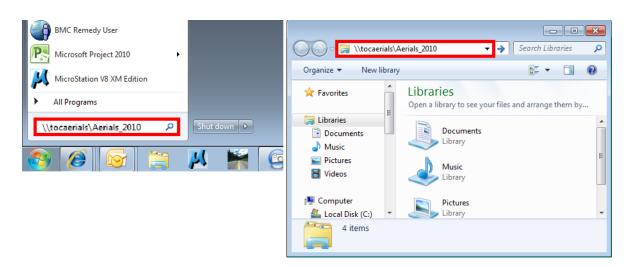
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	001N070Wf	Cut	
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E RD		Paste	
		Delete	
		Select All	
		Settings	
		Global Settings	
		About Adobe Flas	h Player 11.1.102.55

This image name is used as a search string in the next section of the workflow.

Downloading an Image From the Server

Once the name of the image has been identified, it can then be retrieved from the server for use. There are two servers that contain the image data, one for Denver area data and one for Statewide imagery data. The servers can be accessed from either the Start Menu or from the Windows Explorer. The process is the same for each server. The steps below use the DRAPP Imagery server.

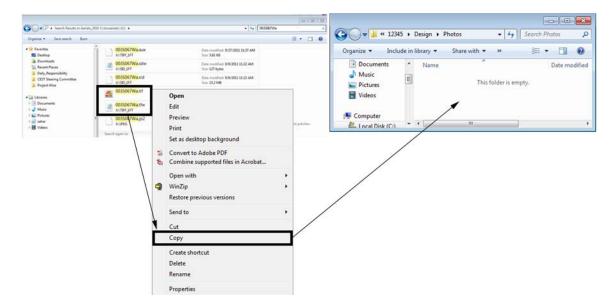
1. In either the Start Menu Search field or the Windows Explorer address field, key in **\\tocaerials\Aerials_2010(\\hqprdgisimg\NAIP09** for statewide images).



- 2. Open a second Windows Explorer session and navigate to the project folder where the images will be stored.
- 3. In the **\\tocaerials\Aerials_2010** Windows Explorer session, paste the image name copied above into the *Search* field. The files found that match the name are displayed in the window.

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Favorites	003S067Wa.aux	Date modified: 9/27/2011 11:37 AM Size: 5.81 KB	
Downloads	003S067Wa.sdw X\SD_1FT	Date modified: 9/9/2011 11:22 AM Size: 127 bytes	
Delly,Responsibility CEST Steering Committee Project Wise Documents Documents Documents Differences D	003S067Wa.sid X\SD_LFT	Date modified: 9/9/2011 11:22 AM Size: 15.2 M8	
	0035067Wa.tif	See 321 M8	
	003S067Wa.tfw X\TIFF_1FT	Date modified: 9/7/2011 8:13 PM Size: 92 bytes	
	0035067Wajp2 xuPEG	Date modified: 6/3/2011 7:00 PM Size: 579 MB	Select a file to preview.

4. **Copy** the desired image from the **\\tocaerials\Aerials_2010** Windows Explorer session and **Paste** it into the Project Windows Explorer session.



Note: Some image formats also have an associated sister (or world) file. If the file you are retrieving has a sister file, it will need to be copied as well. Otherwise it will not display at the correct location when referenced into MicroStation. *NAIPO9* image files have the georeferencing data embedded within the file, so there are not sister files associated with these images.

For information on how to use georeferenced images with MicroStation, refer to the following workflows:

- CDOT Workflow Raster Manager
- CDOT Workflow Setting Geographic Project Coordinate System
- CDOT Workflow Placing Images to Project Datum
- CDOT Workflow Using Georeferenced Images in Raster Manager

Workflow MS 13 - Image Draping

This document guides you through the basic functions for draping a aerial photo over a digital terrain model (DTM). It is used to create a visual representation of the image in 3D. Make sure the MicroStation design file, Raster Imange, and InRoads DTM files coordinately match up.



Workflow Outline

Setting up Preferences - The default value for a dgn background color is black. However when making images for printed material, a white background is preferred.

Commands Used: Workspace > Preferences > View Options - Used to change the background color from black to white.

Attaching the Raster Image - A raster image will be used to texture the triangles of the surface. In order to specify a raster image as a texture, it must be attached to the drawing.

• Commands Used: **Raster Manager** - Used attach a raster image to a dgn file.

Displaying Triangles - Trinagles are used to give the image shape.

Commands Used: InRoads > Surface > View Surface > Triangles - Used to display the surface triangles within the drawing.

Draping the Image on to the Triangles - Now that both the image and the triangles are in the drawing, the image is draped on to the triangles to a textured surface.

- Commands Used: **Rotate View > Isometric** Used to adjust the view angle so that the image and the triangles can be seen as separate elements.
- Fit View Used to all elements within the drawing visible on the screen.
- Visualization > Assign Material Used to drape the image to the triangles.
 - **Assign by Level/Color** Used to Identify the level of the triangles so the the image will know what elements to drape to.
 - **Raster Manager > Draping** Used to identify which image to drape.

1. For printing purposes, begin by changing the background color of MicroStation to white. This can be completed through **Workspace > Preferences**. This will open up the **Preference** dialog box

Wor <u>k</u> space	Applications		
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Function Keys			
Button Assignments			
<u>D</u> igitizing			
<u>A</u> bout Workspace			

2. Under the *Category* column, select **View Options**. Toggle **ON** the box for **Black Background -> White** then select **OK** to close teh dialog box.

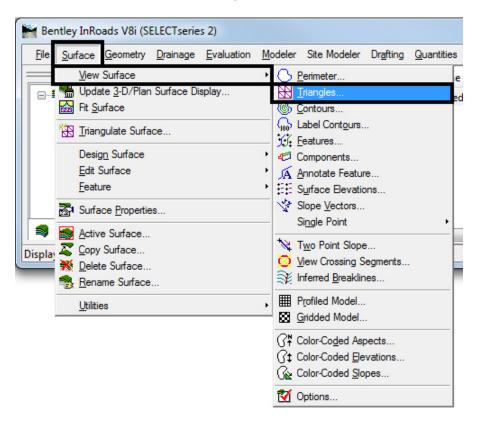
Preferences [CDOT User]		
Category	Name for preferences Default Preferences	
Database	Set View Window Look/Layout Preferences.	
Look and Feel	Show View ToolBox Top	ОК
Mouse Wheel	Scroll Bars on View Windows	
Operation	✓ Black Background -> White	Cancel
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Raster Manager Reference	Fast Visible Edges	Defaults
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Tags	Anti-alias Text: On	
Task Navigation	Update Refresh Frequency (secs): 1.0	
Text View Options - Civil	Frame Rate for View Tools (frames/sec): 5.0	
View Options	Gamma Correction: 1.70	
view Options		
	Dynamics Transparency:	
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	Selection Set Color:	
	Easure New Description	
	Focus Item Description	
	For more options, click on the category list at left.	

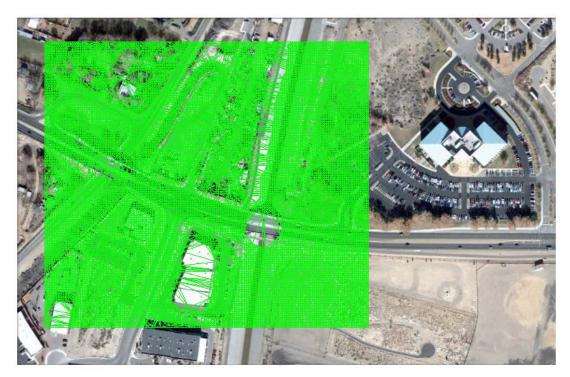
3. Begin by attaching an image using *Raster Manager*. Refer to the workflow document <u>*CDOT Raster Manager.pdf*</u> for guidance. Be sure Open as read-only is turned off.

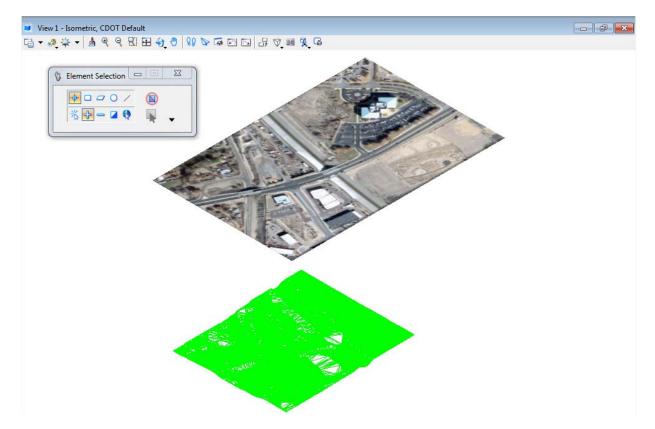
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Network		Channel.jpg Common Raster Formats Open as read-only			•	pen Incel	Origin X: 1354477.271 Y: 1343196.375 Place Interactively Ø Open Settings Dialog

4. From InRoads, view the surface triangles for the DTM.





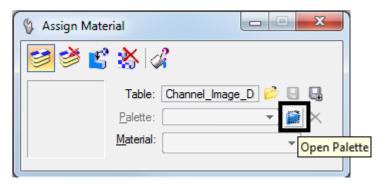


5. *Rotate* the view to **Isometric** and then complete a **Fit View**.

6. From the *Task Menu*, select the Visualization tab.

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7. Select the Apply Material command. This will bring up the Assign Material dialog box.



8. Select the Open Palette icon and navigate to dcdrape.pal and select OK.

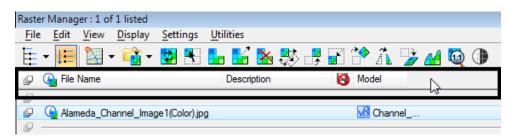
Open Palette
Current Workspace
stone&gravel.pal [Bentley_Materials.dgnlib] water.pal [Bentley_Materials.dgnlib] Widget.pal [Bentley_Materials.dgnlib] wood.pal [Bentley_Materials.dgnlib] automobile.pal Brick.pal Concrete.pal
dcdrape.pal
Fabrics.pal
Floors.pal
Glass.pal Interiors.pal
Landscapes.pal
4
<u>O</u> K Cancel

9. From the *Assign Material* dialog box, select **Assign by Level/Color**. MicroStation will ask you to **Assign Material**.

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Assign Material > Acce	pt, Assign Material			

10. In the MicroStation Isometric view, *select* the DTM triangles and then accept by clicking a data point in the MicroStation view window.

11. Open Raster Manager and Right Click on the column bar. This will bring up a drop down menu.



12. From the drop down menu, Toggle **ON** the **Draping** function.

Raster Manager : 1 of 1 listed	
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13. From the View Attributes, change the Display Style to Smooth with Shadows.

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- 14. Complete a Fit View.
 - *Note:* The image will be clipped to the DTM triangles. Any part of the image that is not draped onto the DTM will not show.



15. Using the *View Rotation* command, rotate the view to a final position.

Note: The image brightness can be controlled by turning on Default Lighting and adjusting the view brightness.



Workflow MS 14 - Raster Manager

This document guides you through *MicroStation Raster Management* including Attaching Rasters, Clipping Rasters, Masking Rasters, and setting Raster Transparency. For additional settings on raster images including text clarity see *CDOT Printing Raster Images.pdf*.

Raster Manager Dialog Box

1. The **Raster Manager** is used to display images as a reference to a DGN file. To access Raster Manager select **File > Raster Manager** or **<D>** the **Raster Manager** icon from MicroStation's Primary Tool Bar.

Primary Tools	
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Attaching a Raster Image

1. In the Raster Manager dialog box, select File > Attach >Raster (This Workflow uses C:\Projects\12345\Design\Drawings\12345DES_PnP10.dgn as the master design file.)

Raster Manager : 0 of 0 listed								
<u>File Edit View E</u>	File Edit View Display Settings Utilities							
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- 2. In the *Attach Raster Reference* dialog box, navigate to the folder containing the image that will be referenced.
- 3. Highlight the file to be attached.

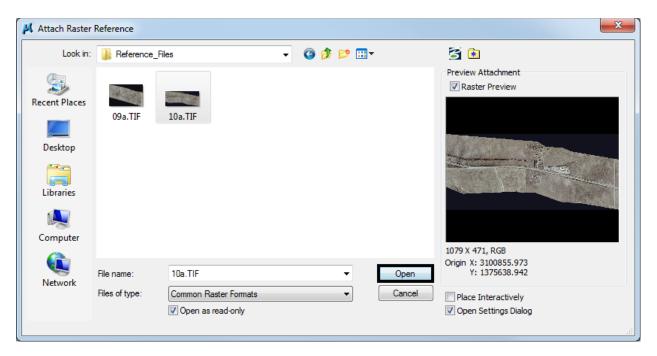
4. Toggle On or Off *Place Interactively* as desired.

Note: If the file is Georeferenced, then Place Interactively should be toggled off.

Note: Placing a non-georeferenced file with the **Place Interactively** toggled off will cause the image to be placed at the **Global Origin**.

Toggle on **Open Settings Dialog**. This will display the *Raster Attachment Options* dialog box which is used below.

5. **<D> Open.**



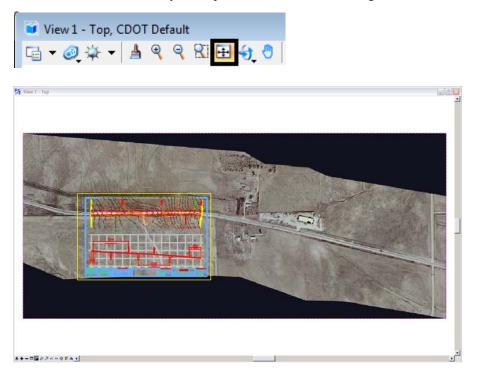
6. In the *Raster Attachment Options* dialog box, expand the **Image** leaf and key in a *Logical Name* and *Description*

7. If the file attached is a georeferenced file, expand the **Geometry** task.

Raster Attachment Options		
	wings\Reference_Files\10a.TIF	
Action		
General		
Image		
Logical Name	GeoTiff 10a	
Description	228+00 to 281+00	
Geometry		
Geo Priority	Sister File	
Color		
Display Print		
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Attach Cancel		
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- 8. Verify that the *GeoPriority* is set correctly for the file being attached.
 - **Note:** The the **Raster Attachment Options** dialog box may appear different based on the size the box has been set to and the options selected when starting the attachment. However, the **Image** leaf will always be available. The Geometry leaf is only available when **Place Interactively** is toggled off.
- 9. Select Attach.

Note: A Fit View may be required to see the raster image.

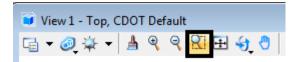


Note: The above screen capture was captured with a white MicroStation background for ease of viewning (the referenced image has a black background). To rid raster image of black borders see *Setting Raster Transparency* at the end of this document. Geo-Referenced Files typically will not need any modifying or relocating. These files have their coordinates and scaling embedded either within the tif itself or in an accompanying world file (.twf).

Clipping and Masking Raster Images

If for some reason there are portions of the raster image that you do not want to see, two commands are available to accomplish this: **Clip Raster** and **Mask Raster**. These parallel the options available for MicroStation reference files. **Clip Raster** hides the image outside the selected area while **Mask Raster** hides the image inside the selected area.

1. Window Area to show your area of interest.





2. From Raster Manager, select Edit > Clip.

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3. The **Clip** dialog box presents the clipping options. Select the appropriate **Method** and **Mode** from the drop-down lists.

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Method Options
```

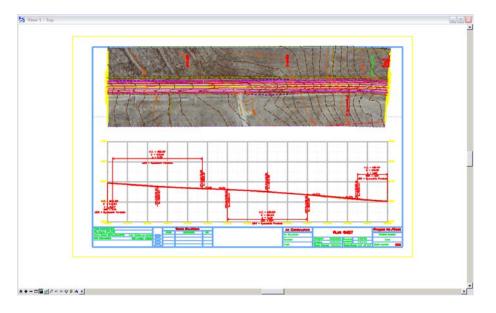
Mode Options

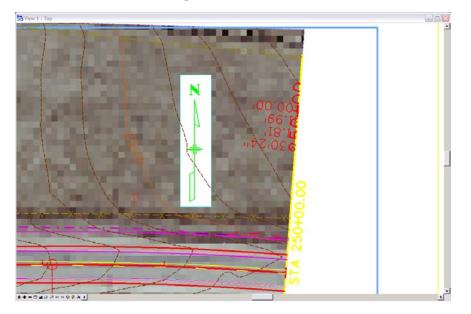


4. Define the clip boundary.

Note: To use the Fence option, the fence must be in place before the Clip command is selected.

- 5. **<D>** to accept element selection.
- 6. **<D>** in the view to complete the command. The illustration below shows and example of a *Clip Boundary*.



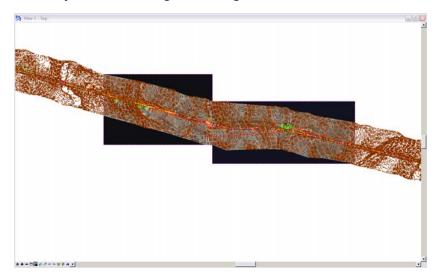


This illustration shows and example of a *Clip Mask*.

Note: Once defined, Clip Boundaries can be modified by selecting **Edit > Modify Clip** from the **Raster Manager** menu. Clipping can be defined by the methods **Blocks**, **Elements**, and **Fences**.

Setting Raster Transparency

The dark, unused portion of your raster image (see black image outlined below) can be set to transparent allowing the user an alternative to clipping that is easier. This is extremely useful when printing raster images as this portion of the drawing is omitted. (This workflow uses the file C:\\Project12345\Design\Drawing\ Reference_Files\12345DES_Model.dgn)



1. Open Raster Manager.

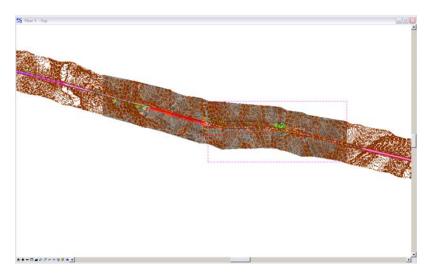
2. **<R>** on a raster attachment file and select **Transparency** from the fly-out menu.

📑 Ras	ter Manager :	3 of 3 list	ed						
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3. In the Attachment Settings dialog box, place a check in the Transparent check box, make sure the Transparent Color is at 100%, <D> OK.

Transparency	
Transparent Transparent Colors:	100.0 % 0 • • • 100
All Colors:	0.0 % 0 • 111 • 100
<u>Ō</u> K	Cancel

4. Repeats step 2 and 3 for any additional attachments.



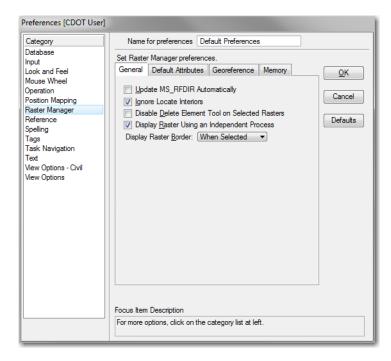
Note: Transparent color can be set to any color, but is black by default (Red:0, Blue:0, Green:0). Use graphics programs such as Adobe Photoshop to determine the RGB settings of your raster images.

Workflow MS 15 - Using Georeferenced Images in Raster Manager

This document guides you through the Raster Manager settings in MicroStation for accurate placement of georeferenced image files. The section *Setting the Default Preferences* only needs to be done once. If your Raster Manager preferences have been previously set correctly you may proceed directly to *Placing Georeferenced Images* section of this document.

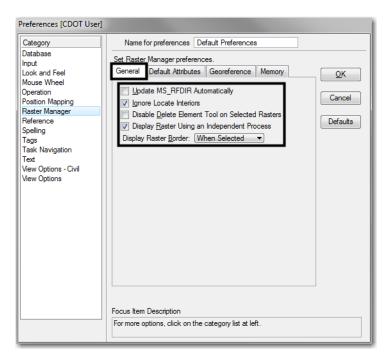
Setting the Default Preferences

- 1. From the MicroStation pull-down menu select **Workspace > Preferences**. The **Preferences** dialog will appear.
- 2. Select the **Raster Manager** option in the *Category* list in the left pane.



- 3. The User Preferences for Raster Manager have been broken out into four tabs:
 - ♦ General
 - Default Attributes
 - ♦ Georeference
 - Memory
- 4. Many of the setting are the same as they are in previous version and new functionally has been added to enable users to change the functionality of MicroStation.

5. In the *General* tab set the following toggles.



Note: The settings in this tab help MicroStation process imagery faster and select the rasters images.

6. In the Default Attributes tab, toggle on the following.

Preferences [CDOT User]	
Category Database Input Look and Feel Mouse Wheel Operation Position Mapping Raster Manager Reference Spelling Task Task Navigation Text View Options - Civil View Options	Name for preferences Default Preferences Set Raster Manager preferences. General General Default Attributes Image: Use Active Level Image: Cancel Image: Use Active Line Style Image: Cancel Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style Image: Use Active Line Style <
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Note: These settings only apply to the level, symbology and element properties of the raster image borders when they are attached.

7. The Georeference tab has the most important settings. Set the following settings for the Sister file and Unit Settings to ensure the proper placement of your raster images.

Preferences [CDOT User]	and the second se	
Category Database Input Look and Feel Mouse Wheel Operation Position Mapping Raster Manager Reference Spelling Tags Task Navigation Text View Options - Civil View Options	Name for preferences Default Preferences Set Raster Manager preferences. Georeference General Default Attributes Georeference Sister File Settings Image: Sister File if Present, for Georeferenced Files Save Location Info in Sister File if Required Default Unit Settings Sister File: 1 Unit = 1.000000000 Survey Feet Raster file: 1 Unit = 1.00000000 Survey Inches Image: Use Unit Definition Geokey if Present (override PCS unit)	QK Cancel Defaults

8. The Memory tab has been added to the Raster Manager User Preferences. These settings were only possible in previous versions through a series of configuration variables. The default values are set as seen below, but if you are having problems seeing your raster images these settings should be adjusted.

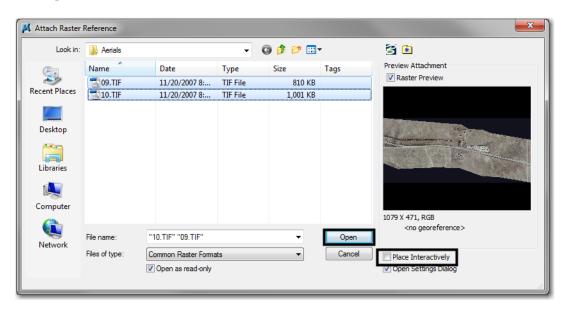
Note: When adjusting these settings take into account the computer's hardware.

9. **<D>** OK button to save these preferences. Once these preferences have been saved they should not have to be changed again.

Note: Some settings will require you to restart MicroStation before they will take affect.

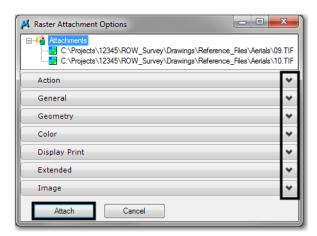
Placing Georeferenced Images

- 1. From the MicroStation pull-down menu select File > Raster Manager. The Raster Manager dialog will appear.
- From the Raster Manager menu select File > Attach > Raster... The Attach Raster Reference dialog will appear.
- 3. *Navigate* to the location of the raster image files and select the file(s) to attach.
- 4. It is important that the *Place Interactively* check box is unchecked. **<D> Open** to attach the image(s).

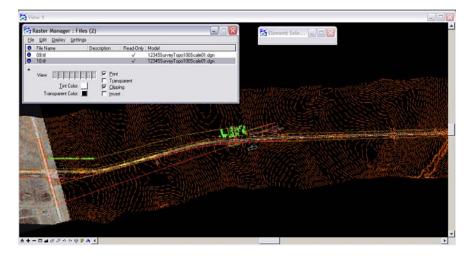


Note: Having the **Open Settings** dialog toggled on is optional. When toggled on you can review the Raster Attachment Options before attaching the rasters.

5. Click on the arrows to expand the settings. **<D>** *Attach* when finished.



- 6. After attaching the image a **Fit View** may be needed to display the image.
- 7. If the image does not appear in the correct location adjust the placement location. Select the image from the **Raster Manager** dialog box.

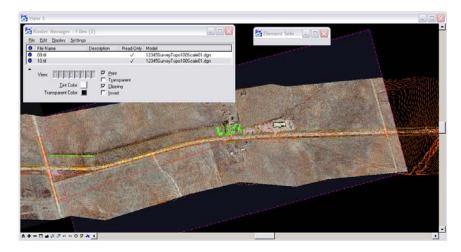


- 8. From Raster Manager select all the images.
- 9. Click on the *Element Information* icon on the Primary tool bar.

10. Expand the *Geometry* field and change the *Geo Priority* to Sister File.

	rojects\12345\ROW_Survey\Drawings\Reference_Files\Aerials\09.TI rojects\12345\ROW_Survey\Drawings\Reference_Files\Aerials\10.TI				
General					
Geometry					
Geo Priority	Sister File				
Aspect Ratio	Locked				
	Varies,**Varies**,178956.971				
Directional Vectors					
Pixel Size					
Scale					
🕀 Dpi					
Dimension					
 Number of Pixels 					
Rotation	0°0'0"				
Affinity	0°0'0"				
Worldfile					
Unit	Survey Feet				
Unit Factor	1.000000				
Extended					
Raw Data					
Image					
Color					
Display Print					

11. Fit View to display the image. The image should now appear in the correct location.



Workflow MS 16 - Image Reprojection to Project Coordinate Datum

Images to Project Datum Coordinate System

Images at CDOT are typically oriented to Colorado State Plane coordinate systems. This workflow guides you through the steps required to attach an image in a Colorado State Plane Coordinate system and modify its location so the image will re-project to the Project Datum coordinate system.

In order for this to be completed, information from the Survey must be obtained. This information can be found on the Project Control Diagram sheet of the plan set.

Project Coordinate Datum

A modified coordinate system is computed for each CDOT project to provide horizontal values for mapping and surveying purposes. CDOT project modified coordinates are based on the Colorado State Plane Coordinate System of 1983(92) in unites of US Survey Feet.

Project Control Diagram sheets are included in CDOT plan sets and a note explaining the Project Coordinate Datum can be found on this sheet.

An example:

Project coordinates are modified Colorado State Plane XXXXXX Zone NAD '83/(XX) coordinates. The combined elevation/scale factor used to modify the coordinates from state plant to project coordinates is 1.XXXXXXXXXXX. The resulting project coordinates are truncated by 200,000m in the Northing and 400,000m in the Easting after converting from state plane coordinates to project coordinates. The CHARN is based on the NAD '83(XX) datum.

Project Coordinates Northing US Survey Feet = (State Plane Coordinate Northing * 1.XXXXXXXXXX - 200,000) * (3937/1200).

Project Coordinates Easting US Survey Feet = (State Plane Coordinate Easting * 1.XXXXXXXXX - 400,000) * (3937/1200).

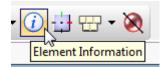
Relocate the Image

The workflow to relocate an image that is defined with Colorado State Plane Coordinates into a Project Coordinate Datum can be completed by editing the origin and pixel size of the referenced image.

- 1. Create a new design file and using Raster Manager, attach the project image. Be sure the *Place Interactive* option is **Not** selected.
- 2. The Raster Attachments Options dialog box opens.
- 3. Expand the *Geometry* tab and set the *Geo Priority* to Sister File.

Geometry		*
Geo Priority	Sister File	-
	Attachment	
Color	Sister File	
Display Print		√ *

- 4. Click the Attach button.
- 5. Select the attached image by using the Element Selection tool.



6. Expand the *Geometry* tab and change the *Geo Priority* to Attachment.

Geometry		^
Geo Priority	Attachment	-
Aspect Ratio	Attachment	N
Origin	Sister File	13
Directional Vectors		

7. Modify the Origin X and Y using the procedures for the *Project Control Diagram*.

*
Attachment
Locked
3133472.000,1695032.000,178956.971
3133472.000
1695032.000
178956.971

- 8. For example: (State Plane Coordinate Northing * 1.XXXXXXXXX 200,000) * (3937/1200) and (State Plane Coordinate Easting * 1.XXXXXXXXX 400,000) * (3937/1200).
- 9. Next, modify the pixel size X and Y.

	Geometry	~
	Geo Priority	Attachment
	Aspect Ratio	Locked
Ð	Origin	3133472.000,1695032.000,178956.971
Ð	Directional Vectors	
Ξ	Pixel Size	
	x	0.500
	У	0.500

10. For example: Pixel Size X * 1.XXXXXXXXXX and Pixel Size Y * 1.XXXXXXXXXXX.

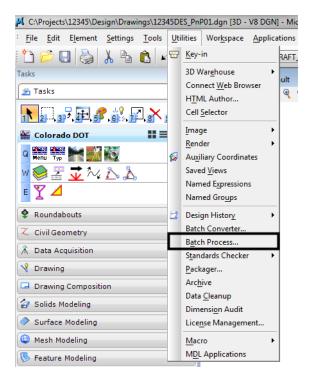
Note: The precision is set to 3 decimals places so the pixel size values may not appear to change.

11. Once values have been adjusted, close the Element Information dialog box.

Workflow MS 17 - Batch Processing

This document guides you through using the Batch Process tool in MicroStation. Additional Batch Process files can be substituted into this workflow. This example uses a specific batch process file that changes the level of the North Arrow cell and the Match Lines. In 2.04 and prior versions of the configuration, Plan and Profile Generator placed the North Arrow cell and the Match Lines on the incorrect level. This process will correct this error in multiple sheets at the same time.

1. Select Utilities > Batch Process in MicroStation.



2. **<D>** on the *Search* icon to browse for the Batch Process command file.

📕 [untitled] - Batch Process	
<u>File E</u> dit	
🗅 📂 🖯 🖧 🗙 🛃	Process Selection Only
Command File	۹ 🖉 🗅
Initial Model All Models	Apply to Selection
Process Tasks	
# ^ File	Model
p	

3. Navigate to C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation\Data.

4. **<D>** the command file *PnP_Cell-Fix.txt* then **<D>** *Open*.

Look in:]]] Data		-	G 🤌 📂 🛄	🔻 📓 🖲
(Ha	Name		Date modified	Size	
	Colortable_Re	set.txt	9/30/2010 11:37 AM	1 KB	_
Recent Places	PnP_Cell-Fix.b	đ	9/30/2010 11:37 AM	2 KB	
	SyncDGNLeve	ls.txt	9/30/2010 11:38 AM	1 KB	•
	SyncReference	Levels.txt	9/30/2010 11:38 AM	1 KB	
Desktop	UpdateAndRe	scale.txt	9/30/2010 11:38 AM	1 KB	
<u> </u>	UpdateCR.txt		9/30/2010 11:38 AM	1 KB	
6	UpdateGlobal	Origin.txt	9/30/2010 11:38 AM	1 KB	
Libraries					
i 🌉					
Computer					
Network					
	File name:	PnP_Cell-Fo	cbt	-	Open

- **Note:** The file, *PnP_Cell-Fix.txt*, changes the level of the North Arrow cell and the Match Lines from Default to the correct levels, GEN_SHEET_North-Arrow and GEN_SHEET_Match-Line.
- 5. **<D>** the *Add Files* icon.

📕 [untitled] - Batch Process	
<u>F</u> ile <u>E</u> dit	
🛅 📂 🖯 🔂 🗶	Process Selection Only
Command File PnP_Cell-Fix.txt	۹ 🖉 🗅
Initial Model All Models	Apply to Selection
<u>P</u> rocess Tasks	
# ^ File	Model
1	

Look in:	Drawings		•	🎯 🤌 📂 🛄	r 🛛 🕃 💽
(Ang	Name		Date modified	Туре	Size
-	12345DES_Pn	P##.dgn	11/20/2007 8:	Bentley Micr	38 KE
ecent Places	🔏 12345DES_Pn	P01.dgn	12/14/2010 9:	Bentley Micr	87 K
	📕 12345DES_Pn	P02.dgn	12/13/2010 2:	Bentley Micr	76 K
	📕 12345DES_Pn	P03.dgn	2/18/2010 12:	Bentley Micr	71 K
Desktop	🛃 12345DES_Pn	P04.dgn	2/18/2010 12:	Bentley Micr	71 K
<u></u>	🛃 12345DES_Pn	P05.dgn	2/18/2010 12:	Bentley Micr	71 K
1	🛃 12345DES_Pn	P06.dgn	2/18/2010 12:	Bentley Micr	71 K
Libraries	🛃 12345DES_Pn	P07.dgn	2/18/2010 12:	Bentley Micr	71 K
	🔏 12345DES_Pn	P08.dgn	2/18/2010 12:	Bentley Micr	71 K
	🔏 12345DES_Pn	P09.dgn	2/18/2010 12:	Bentley Micr	71 K
Computer	🔏 12345DES_Pn		2/18/2010 12:	Bentley Micr	71 K
	12345DES_Pn	-	2/18/2010 12:	Bentley Micr	72 K
	🛃 12345DES_Pn		2/18/2010 12:	Bentley Micr	71 K
Network	12345DES_Pn		2/18/2010 12:	Bentley Micr	71 K
	12345DES_Pn	-	2/18/2010 12:	Bentley Micr	71 K
	12345DES_Pn		2/18/2010 12:	Bentley Micr	71 K
	12345DES_Pn		2/18/2010 12:	Bentley Micr	71 K
	12345DES_Pn		2/18/2010 12:	Bentley Micr	71 K
	12345DES_Pn	P18.dgn	2/18/2010 12:	Bentley Micr	69 K
	•	744 1		B 11 11	•
	File name:	"12345DE	S_PnP18.dgn" "12345DI	ES_PnP01/ 🔻	Done
	Files of type:	CAD Files	(*.dgn;*.dwg;*.dxf)	•	Cancel

6. Select the sheet files created by the Plan and Profile Generator in InRoads. Then **<D>** Done

Note: You can hold down the *Ctrl* or *Shift* key to select multiple files.

7. **<D>** the *Process Batch* icon. This will execute the Batch Process command file.

📕 [untitled] - Batch Process	- • • ×
<u>File</u> <u>E</u> dit	
🎦 📂 🔛 🦮 🗙 🗾 🗆 Process Selection Only	r
Command File PnP_Cell-Fix.txt	Q 2 1
Initial Model All Models	ly to Selection
Process Tasks	
# ^ File	Model 🔺
1 C:\Projects\12345\Design\Draw\12345DES_PnP01.dgn	All Models
2 C:\Projects\12345\Design\Draw\12345DES_PnP02.dgn	All Models
3 C:\Projects\12345\Design\Draw\12345DES_PnP03.dgn	All Models
4 C:\Projects\12345\Design\Draw\12345DES_PnP04.dgn	All Models
5 C:\Projects\12345\Design\Draw\12345DES_PnP05.dgn	All Models
6 C:\Projects\12345\Design\Draw\12345DES_PnP06.dgn	All Models
7 C:\Projects\12345\Design\Draw\12345DES_PnP07.dgn	All Models 👻
	4

8. Review the file list before processing. If this is correct, **<D>** *Process*.

<mark>⊬(</mark> F	iles to Process				x
#	1 File	Model	Status	Time	
1	C:\Projects\12345DES_PnP01.dgr	CDOT Default	Pending		
2	C:\Projects\12345DES_PnP02.dgr	n CDOT Default	Pending		
3	C:\Projects\12345DES_PnP03.dgr	n CDOT Default	Pending		=
4	C:\Projects\12345DES_PnP04.dgr	n CDOT Default	Pending		
5	C:\Projects\12345DES_PnP05.dgr	n CDOT Default	Pending		
6	C:\Projects\12345DES_PnP06.dgr	n CDOT Default	Pending		
7	C:\Projects\12345DES_PnP07.dgr	n CDOT Default	Pending		
8	C:\Projects\12345DES_PnP08.dgr	n CDOT Default	Pending		
9	C:\Projects\12345DES_PnP09.dgr	n CDOT Default	Pending		
10	C:\Projects\12345DES_PnP10.dgr	n CDOT Default	Pending		
1				•	-
	Process	Cancel			

- 9. Review the *Status* field to make sure all files were processed without an error.
- 10. After verifying this, **<D>** *Done*.

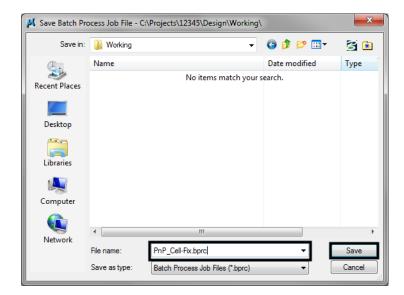
# 1	File	Model		Status	Time	
10	C:\Projects\12345DES_PnP10.dgr	1 CDOT De	efault	Processed	2.1	_
11	C:\Projects\12345DES_PnP11.dgr	n CDOT De	efault	Processed	1.7	
12	C:\Projects\12345DES_PnP12.dgr	n CDOT De	efault	Processed	1.7	
13	C:\Projects\12345DES_PnP13.dgr	n CDOT De	efault	Processed	1.8	
14	C:\Projects\12345DES_PnP14.dgr	n CDOT De	efault	Processed	1.8	
15	C:\Projects\12345DES_PnP15.dgr	n CDOT De	efault	Processed	1.7	
16	C:\Projects\12345DES_PnP16.dgr	n CDOT De	efault	Processed	1.8	
17	C:\Projects\12345DES_PnP17.dgr	n CDOT De	efault	Processed	1.7	=
18	C:\Projects\12345DES_PnP18.dgr	n CDOT De	efault	Processed	1.8	

11. **<D>** the *Save* icon to save the files included in the Batch Process. Every time you rerun the Plan and Profile generator in InRoads, the changes to the North Arrow cell and the Match Lines will be lost. You can recall the *.bprc file to execute the batch process.

📕 [untitled] - Batch Process	- • ×
<u>File</u> <u>E</u> dit	
🛅 🖻 🔲 🔁 🗶 🧾 🗆 Process Selection Only	
Command File PnP_Cell-Fix.txt	♀ / 🗅
Initial Model All Models	y to Selection
Process Tasks	
# ^ File	Model 🔺
1 C:\Projects\12345\Design\Draw\12345DES_PnP01.dgn	All Models 🖃
2 C:\Projects\12345\Design\Draw\12345DES_PnP02.dgn	All Models
3 C:\Projects\12345\Design\Draw\12345DES_PnP03.dgn	All Models
4 C:\Projects\12345\Design\Draw\12345DES_PnP04.dgn	All Models
5 C:\Projects\12345\Design\Draw\12345DES_PnP05.dgn	All Models
6 C:\Projects\12345\Design\Draw\12345DES_PnP06.dgn	All Models 👻
	4

Note: If additional Plan and Profile sheets are created, be sure to update the file list.

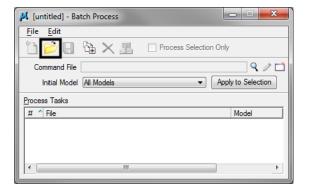
12. Give the saved file an extension of *.bprc. Navigate to C:\Projects\.....\Design\Working and <D> OK.



13. Verify the name in the dialog header.

NP_Cell-Fix.bprc Batch Process		x
<u>F</u> ile <u>E</u> dit		
🛅 产 🔲 強 🗙 🧾 🗆 Process Selection Only	,	
Command File PnP_Cell-Fix.txt	🤍 🌶	
Initial Model All Models	ly to Selection] [
Process Tasks		
# ^ File	Model	*
1 C:\Projects\12345\Design\Draw\12345DES_PnP01.dgn	All Models	
2 C:\Projects\12345\Design\Draw\12345DES_PnP02.dgn	All Models	
3 C:\Projects\12345\Design\Draw\12345DES_PnP03.dgn	All Models	
4 C:\Projects\12345\Design\Draw\12345DES_PnP04.dgn	All Models	
5 C:\Projects\12345\Design\Draw\12345DES_PnP05.dgn	All Models	
6 C:\Projects\12345\Design\Draw\12345DES_PnP06.dgn	All Models	-
	4	

14. To open a Batch Process file **<D>** the **Open** icon.



15. **Navigate** to the **.bprc* file previously saved, **<D>** the filename then **<D>** *Open*. Follow steps 7-9 to execute the Batch Process command file.

Workflow MS 18 - Two Line Note Placement

This document guides you through placing a note with two lines of text with a leader line located between the lines of text.

Setting Symbology

- 1. To set the proper symbology for the note, select **Draffing** from the **CDOT Menu** *Explorer*.
- 2. Select the **Dimension** category button from the *Drafting* area.
- 3. Select any one of the items displayed in the item list.

CDOT Menu			- 0	x
CDOT Groups CDOT Tools	Options Help			
···· Drafting ··· Bridge ··· Construction ··· Design	C Existing	Proposed		?
···· Geometry ···· Hydraulics ··· Landscape Environmental	Drafting	cx'B.xx'	.xxxx' x'-x"	x'
···· Materials Geotechnical ···· ROW Survey ⊡·· Traffic ITS		Dimension Linear Dimension Angle B Dimension Angle S	Between	
Utilities	Dimensions	Dimension Elemen		
	Patterning			
	Symbols			
	Text			
Settinas				
Jeungs				

4. This sets the level to *DRAFT_Text-1* and the symbology to *By-Level*. The **CDOT Menu** can now be minimized.

Placing A Two Line Note

1. Turn AccuDraw On from the Primary Tool Bar. This will display the AccuDraw window.

C:\Projects\99999\Design\Drawings\99999DES_Tit	leSht.dgn [3D - V8 DGN] - MicroStation V8i (SELECTseries 2)
[:] <u>File E</u> dit Element <u>S</u> ettings <u>T</u> ools <u>U</u> tilities	Wor <u>ks</u> pace <u>Applications</u> <u>Window H</u> elp CDOT Help
🛅 📂 🖯 😓 👗 🔓 🖍 🛰	? DRAFT_WT-0 -
Tasks 4 X	View 1 - Top, CDOT Default
🔄 Tasks 🔹	[] - () ☆ - 1
ı 2., 3 ³ , 4 , 6 , ∰, 1 , Primary Tools	
🔛 Colorado DOT	📗 🗖 • 🖻 • 💼 • 🧶 • 🚰 • 🥞 • 🖗 • 🛱 • 🕧 🖶 🐄 • 🔌 📗
	H AccuDraw
Roundabouts	X -17.580
✓ Civil Geometry	Y -19.979
🕅 Data Acquisition 🔹	Z 0.000
💙 Drawing 🔹	

2. Select **Place Note** icon from the **Tasks > Drawing**.

🖆 Tasks 📃 🗖 🗮 🗶
🔎 Tasks 🔍
<u>1 2</u> , 3 [,] 4 ¹ , 5 ² , 6 ² , 1 ² , 8 [×] 3 [∞]
🔛 Colorado DOT 🔹 👻
Roundabouts
∠ Civil Geometry 🔹
🕅 Data Acquisition 🔹
火 Drawing 📰 🗮 🔺
<mark>∘</mark> ? ∕ ⊗ +,∛, <i>№ ℕ ≪</i> ∺ີ ມ
E O O ノ つ わ 魚 イ P
R 🖉 🕸 🗟 🍾 🚳 📑 🗭 😣
T 🗈 🗞 🖓 🐝 隊
$A \xrightarrow{\wedge A} A \xrightarrow{A} A A$
s ☆ *** ** ** * ⁰ * ² ↗ *** ≡
╸┇┍┑┢╴╧┊╄╝╄╴╘╝
🖵 Drawing Composition 🗳

- 3. In the **Place Note** dialog box:
 - a. Select the desired **Text Style** from the drop-down list.
 - b. Use the **Dimension Style** drop-down list to set the desired dimension style.
 - c. **<D>** on the **Expand** arrow.

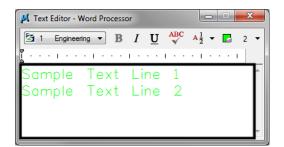
Place Note	
A A	
Text Style: 🞸 .07" ENG	G-100 🔻 🤍 🌛
Dimension Style: CDOT 3	- Q 👌
Text <u>R</u> otation: Horizontal	-
Text Frame: None	•
<u>H</u> eight: 0.070	
<u>Wi</u> dth: 0.070	<u> </u>
Apply <u>changes</u> to	all text

- 4. In the *Expanded Settings* area:
 - a. Set the Location to *Manual* using the drop-down list.
 - b. Set the Leader Type to *Line* using the drop-down list.
 - c. Remove the check from the In-line Leader check box.

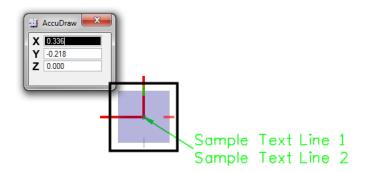
S Place Note	
×A A	
<u>T</u> ext Style: 💞 .07" El	NG-100 🔻 🤍 🎰
Dimension Style: T CDOT	3 🔻 🤍 🎰
Text <u>R</u> otation: <u>Horizontal</u>	▼
Text Frame: None	•
<u>H</u> eight: 0.070	
<u>Wi</u> dth: 0.070	<u>.</u>
Apply changes	to all text
	<u> </u>
Location: Manual	▼]
Leader Type: Line	▼
Start At: Terminator	•
Horizontal <u>At</u> tachment: Auto	•
In-line Lea <u>d</u> er	
Association	

Note: Depending on the Dimension Style selected, some of the above settings may be set by default.

5. Key-in the desired text. Type the first line of text; press the Enter key then, type the second line of text.



6. **<T>** (if desired) then **<D>** on the location of the note terminator.

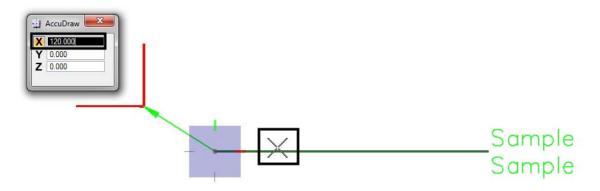


Note: In the example above a **<T>** then **<D>** was used to place the note terminator on the corner of the red linestring. If AccuSnap is on, it can be used to locate the terminator end of the leader.

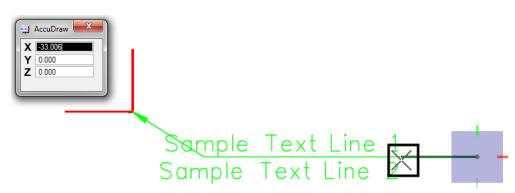
7. **<D>** to place the end of the first leader segment. The AccuDraw compass will now be centered on this point.

AccuDraw		
9.306		
Y: 0.000		
Z: 0.000		
L		
	- 🐘 🔊 Somple Text Line 1	
	Somple Text Line 1 Somple Text Line 2	6
	· ·	

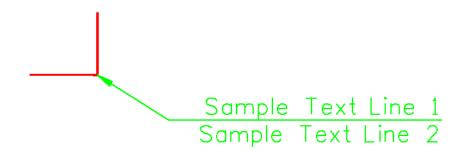
 Move the cursor on to the AccuDraw compass point that is in the direction the second segment is to be placed, then *key in* the desired length. The keyboard automatically defaults to the AccuDraw window and the proper field will be active. <D> to place the end of the second segment.



- **Note:** Placing the cursor on the AccuDraw compass point "locks" in the angle of the line. Also, the second segment of the leader can be placed dynamically if desired.
- 9. Move the cursor on to the leader segment that was just drawn and **<R>**. This action will place the text on the leader line.



10. The finished note is shown in the illustration below.

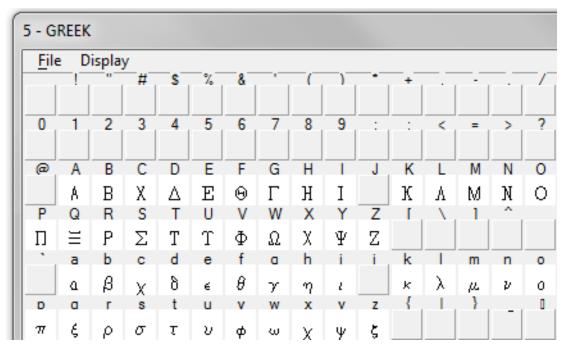


Workflow MS 19 - Greek Characters

This document guides you through placing Greek characters using the MicroStation *Text Editor*. Greek characters can be placed within the typed text string using this procedure.

Available Characters

The following is a list of available characters in the GREEK font (Font 5).



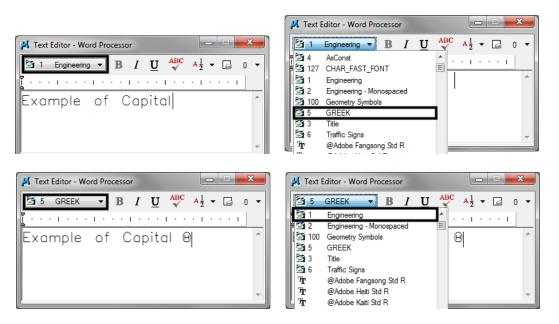
Note: This Graphic shows what Keyboard Characters will produce the desired Greek Character. The Keyboard characters will show up in the **Text Editor** Dialog Box when placing and editing these characters. The actual Greek Character will show up in MicroStation and print.

Placing Text with Greek Characters

1. Before entering text into the Word Processor, uncheck the Apply Changes To All Text check box.

🖇 Place Text	
	By Origin
Active Angle:	00°00'00.00''
<u>H</u> eight:	0.070
<u>Wi</u> dth:	0.070 📫
Apply char	nges to all text
	•

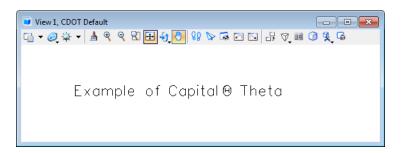
2. When placing text using the MicroStation *Word Processor*, select **Font 5 (GREEK)** from the drop-down list as shown below, and type the appropriate character from above into the Word Processor. Switch back to the original font to continue typing text.



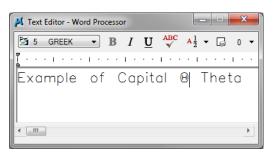
Note: The F is automatically changed to the Theta symbol in the Word Processor.

📕 Text Editor - Word Processor	x
$\boxed{\begin{array}{c} \textcircled{} 1 \text{Engineering} \bullet \end{array} } \begin{array}{c} \mathbf{B} I \underline{\mathbf{U}} \frac{\mathbf{ABC}}{\sqrt{}} \mathbf{A}\frac{1}{2} \bullet \mathbf{\Box} 0 \end{array}$	•
Example of Capital 🛛 Theta	
·	F

3. Example of text placed in MicroStation.



4. Example of text being edited with MicroStation *Text Editor*



Note: The keyboard character does not display in the editor, the actual Greek Character does.

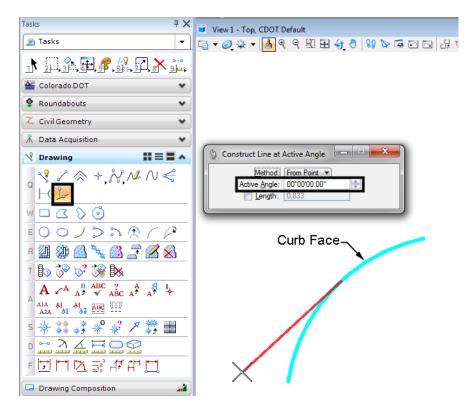
Workflow MS 20 - Using Curb Ramp Cells

This document guides you through the use of the pedestrian curb ramp cells. These are dynamic cells that can be modified "on the fly" using predefined parameter sets and user input.

The pedestrian curb ramp cells are designed to be placed at a 90° angle to the curb. The steps below describe the method used to set the Active Angle for the ramp.

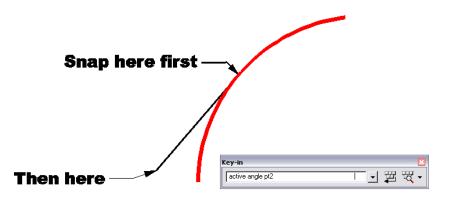
Preparation

- 1. Zoom in around the area on the curb where the ramp is to go. Select the **Construct Line At Active Angle** command from *Tasks > Drawing > Linear*.
- 2. Set the Active Angle to **0**°.
- 3. **<D>** on the curb face where the center of the ramp is to be located and extend the line in a direction tangent to the back of the ramp at the center.



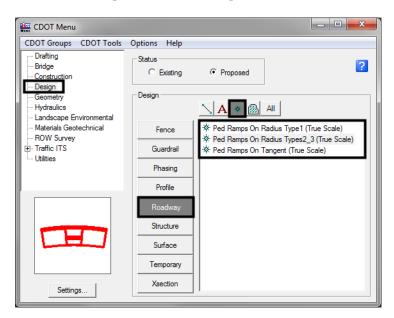
4. In the **MicroStation Key-In** window, type *active angle pt2* and press the **Enter** key. This is used to set the active angle to that of the line that was just drawn.

5. **<T>** to the end of the line on the curb face and **<D>**. Then, **<T>** to the other end of the line and **<D>**. The Active angle is now set to the angle of the line.

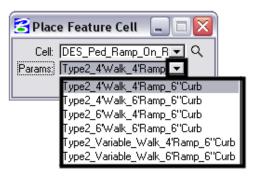


Placing A pedestrian Curb Ramp Cell

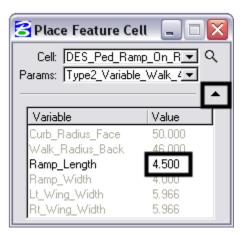
- 1. **<D> Design** from the *CDOT Menu explorer*.
- 2. **<D>** the **Roadway** category.
- 3. **<D>** the **Cell** filter.
- 4. **<D>** the desired pedestrian curb ramp cell from the list.



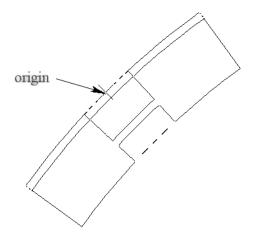
5. Select the desired parameter set from the **Params** drop-down list.



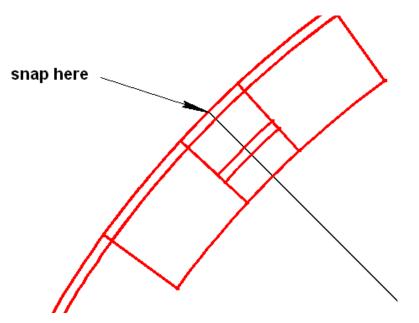
- 6. Some parameter sets have options for user defined values for some variables. These will typically have "variable" in the name. To modify a variable, select the expand icon in the lower right corner of the tool settings box.
- In the list, locate the variable to be changed (grayed out settings can not be changed). Highlight the desired variable then <R> in the Value field and key in the desired number. Press the Enter key to accept the key in.



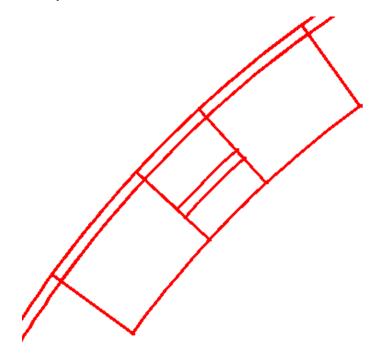
8. The cell is now ready for placement. The origin of the cell is at the curb face in the center of the ramp.



9. Follow the steps above to select a cell. Once the cell is selected and set up (if it has an undefined variable),
 T to the line at the curb face and **D** to place the cell.



10. Finally, *Delete* the construction line.



Workflow MS 21 - Using AutoTurn

This document guides you through the use of the AutoTrack software. AutoTrack is used to determine the space required to maneuver vehicles.

Workflow Outline

Opening AutoTurn - AutoTurn runs within MicroStation. Once MicroStation is running, AutoTurn can be launched.

• Commands Used: **CDOT Menu > Tools >AutoTURN** - Used to launch the AutoTURN program.

Setting up AutoTURN - Before a path can be laid out, there are a number of settings that should be made.

- Selecting a Vehicle The first step in defining a vehicle path is selecting the vehicle to be used.
 - Commands Used: Vehicles icon Used to open the Select Current Vehicle dialog box.
 - Group Vehicles by Used to arrange the vehicles in the list.
 - Select Vehicle Used to identify the vehicle to be used.
- **Drawing Settings** These control things like units of measure and steering angles.
 - Commands Used: **Program Settings** Used to launch the AutoTURN program.

Creating a Path - This is what the vehicle will follow to generate the turning data. There are a number of methods available for creating a path.

- Generate Arc Path, Generate Corner Path, and Generate Oversteer Corner Path Each of these methods uses input into Smartpath Tools dialog box and user defined start and stop locations to define the vehicle path.
 - Commands Used: Generate Arc Path Use to follow a bend in the road.
 - Generate Corner Path Used when turning a corner from one road to another.
 - Generate Oversteer Corner Path Used when large vehicles are turning a corner from one road to another.
- Steer a Path This option tracks the cursor's motion to define the vehicle's path.
 - Commands Used: Steer a Path Use to create an interactive path.

Modifying a Path - Once a path has been completed, modifications to that pah can be made with a number of tools.

- Commands Used: **Restart Path** Used to add additional segments to the path.
- Delete Last Section Used to remove segments of the path.
- **Path Control** Used to modify an existing segment.

Creating a Path from MicroStation Graphics - With this option the vehicle's path is drawn in advance, using MicroStation drawing commands. These elements are then identified as an AutoTURN path.

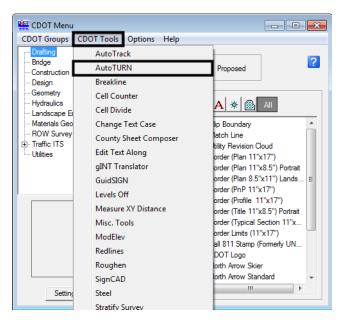
- Commands Used: Select Active Path Used to identify the MicroStation elements to be used for the path.
- **Place Simulation** Used to place a vehicle on the path.
- Place Offset Simulation Used to create a parallel path offset to the left or right of the MicroStation elements.

Placing and Deleting Vehicles - Vehicle cells can be placed on the path without creating all of the envelope data. This can be used to check clearances at critical locations for example. Vehicle cells placed in this manner ca also be deleted.

- Commands Used: Select Active Path Used to identify the path
- **Place Vehicle** Used to put a vehicle cell on a path.
- **Delete Vehicle** Used to remove a vehicle cell from the path.

Opening AutoTurn

1. From the CDOT Menu, select CDOT Tools > AutoTURN.



2. The AutoTURN toolbar will also displayed along with the Welcome to AutoTURN wizard.

	Welcome to AutoTURN
	This screen is intended for new or infrequent users of AutoTURN
	Vehicle: MH-BM To change click:
	Vehicle paths will be drawn in feet To change click:
	Simulations will go on current layer To change click:
	For a detailed description of each of the AutoTURN tools, click the help icon to the right.
	Play Auto TURN Tutorials
	✓ Display on startup Close
AutoTURN	8
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Setting Up AutoTURN

There are a number of settings that control the behavior of AutoTURN. These settings include: vehicle type, drawing units, display options, and vehicle defaults.

Selecting a Vehicle

1. **<D>** the **Vehicles** button from the toolbar or the wizard to display the *Select Current Vehicle* dialog box.



The vehicles in the library can be sorted by *Library, Class, number of parts, Recent selections, Style, Region,* or *No Group*.

Note: All options except Library show vehicles from all of the other libraries.

2. **<D>** one of the seven buttons to choose a sorting method.

Group Vehicles By:	Units: feet						
Library Type Class Region # of Parts No Gro # of Parts No Gro Acstro 2001 (US) AASHTO 2001 (US) AASHTO 2001 (US) AASHTOM 2004 (US) AASHTOM 2004 (US) ALBERTA INFRA +IGDE		34.80		2.00	21.2	。 	
ALDERTA INFIRA-RODG (ARCHITECTURAL AUSTROADS (AU) AUSTROADS 2006 (AU) CALTRANS 2005 (US) CALTRANS 2008 (US)	- - -	22.00	6.20		13.20		æ (*
ARCHITECTURAL AUSTROADS (AU) AUSTROADS 2006 (AU) CALTRANS 2005 (US)	8.60	22.00 Type	6.20 Region	Lock	13.20 # Parts	Length	wi
ARCHITECTURAL AUSTROADS (AU) AUSTROADS 2006 (AU) CALTRANS 2005 (US) CALTRANS 2008 (US)	8.60	Туре		Lock			WI
ARCHITECTURAL AUSTROADS (AU) AUSTROADS 2006 (AU) CALTRANS 2005 (US) CALTRANS 2008 (US)	Vehicle Name	Type Articulat	Region	Lock	# Parts	Length	WI
ARCHITECTURAL AUSTROADS (AU) AUSTROADS 2006 (AU) CALTRANS 2005 (US) CALTRANS 2008 (US) Library AASHTO 2004 (US)	Vehicle Name	Type Articulat Coach Bus	Region North A	Lock 38.3 39.3	# Parts	Length	WI 22
ARCHITECTURAL AUSTROADS (AU) AUSTROADS 2006 (AU) CALTRANS 2005 (US) CALTRANS 2008 (US) Library AASHTO 2004 (US) AASHTO 2004 (US)	Vehicle Name	Type Articulat Coach Bus Coach Bus	Region North A North A	Lock 38.3 39.3	# Parts 2 1	Length 60.00 40.00	WI 22 25.
ARCHITECTURAL AUSTROADS (AU) AUSTROADS 2006 (AU) CALTRANS 2005 (US) CALTRANS 2008 (US) Library AASHTO 2004 (US) AASHTO 2004 (US) AASHTO 2004 (US)	Vehicle Name A-BUS BUS-40 BUS-45	Type Articulat Coach Bus Coach Bus Standar	Region North A North A	Lock 38.3 39.3 44.3 41.4	# Parts 2 1 1	Length 60.00 40.00 45.00	WI 22 25. 28.
ARCHITECTURAL AUSTROADS (AU) AUSTROADS 2006 (AU) CALTRANS 2005 (US) CALTRANS 2008 (US) Library AASHTO 2004 (US) AASHTO 2004 (US) AASHTO 2004 (US) AASHTO 2004 (US)	Vehicle Name A-BUS BUS-40 BUS-45 CITY-BUS	Type Articulat Coach Bus Coach Bus Standar Motor H	Region North A North A North A North A	Lock 38.3 39.3 44.3 41.4	# Parts 2 1 1 1 1	Length 60.00 40.00 45.00 40.00	WI 22 25. 28. 25.

3. To select a vehicle, highlight the name from the list box at the bottom, and **<D> OK**. The *Select Current Vehicle* dialog box will be dismissed.

	oup Vehicles By: Library 💿 Type	Units: feet						
	Class Region # of Parts No Grou Recent 5 ASHTO 2001 (US) ASHTO 2004 (US) ASHTOM 2001 (US) ASHTOM 2004 (US) BASHTOM 2004 (US) BERTA INFIRA HGDG (C/		30.00	<u> </u>	3.00	20		
AL AL CA	RCHITECTURAL USTROADS (AU) USTROADS 2006 (AU) ALTRANS 2005 (US)	4.00	20.00	6.0	0	15.00		
AL AL CA	USTROADS (AU) USTROADS 2006 (AU)	4.00 4.00 Vehicle Name	20.00 Type	6.0 Region	Lock	15.00 # Parts	Length	b
AL AL CA	JSTROADS (AU) JSTROADS 2006 (AU) ALTRANS 2005 (US) ALTRANS 2008 (US)	•	Туре		Lock			
AL AL CA	JSTROADS (AU) JSTROADS 2006 (AU) ALTRANS 2005 (US) ALTRANS 2008 (US) Library	Vehicle Name	Type Articulat	Region	Lock 38.3	# Parts	Length	W
AL AL CA	USTROADS (AU) JSTROADS 2006 (AU) ALTRANS 2005 (US) ALTRANS 2008 (US) Library AASHTO 2004 (US)	Vehicle Name A-BUS	Type Articulat Coach Bus	Region North A	Lock 38.3 39.3	# Parts 2	Length 60.00	WI -
AL AL CA	JSTROADS (AU) JSTROADS 2006 (AU) JSTROADS 2006 (AU) ALTRANS 2005 (US) ALTRANS 2008 (US) Library AASHTO 2004 (US) AASHTO 2004 (US)	Vehicle Name A-BUS BUS-40	Type Articulat Coach Bus Coach Bus	Region North A North A	Lock 38.3 39.3 44.3	# Parts 2 1	Length 60.00 40.00	WI - 22. <u>-</u> 25.
AL AL CA	USTROADS (AU) USTROADS 2006 (AU) ALTRANS 2005 (US) ALTRANS 2008 (US) Library AASHTO 2004 (US) AASHTO 2004 (US) AASHTO 2004 (US)	Vehicle Name A-BUS BUS-40 BUS-45	Type Articulat Coach Bus Coach Bus Standar	Region North A North A	Lock 38.3 39.3 44.3 41.4	# Parts 2 1 1	Length 60.00 40.00 45.00	WI - 22. : 25. 28.
AL AL CA	JSTROADS (AU) JSTROADS 2006 (AU) JSTROADS 2006 (AU) ALTRANS 2005 (US) ALTRANS 2008 (US) Library AASHTO 2004 (US) AASHTO 2004 (US) AASHTO 2004 (US) AASHTO 2004 (US)	Vehicle Name A-BUS BUS-40 BUS-45 CITY-BUS	Type Articulat Coach Bus Coach Bus Standar Motor H	Region North A North A North A North A	Lock 38.3 39.3 44.3 41.4 25.8	# Parts 2 1 1 1	Length 60.00 40.00 45.00 40.00	WI / 22. 25. 28. 25.

Drawing Settings

The remaining settings mentioned above are controlled through the Program Settings dialog box.

1. **<D>** the **AutoTURN Program Settings** button from the toolbar to display the **Program Settings** dialog box.



2. Select the **General** category to set the **Units**. This should be set to the **Master Units** used in the MicroStation dgn file. **Feet** is equivalent to **Survey Feet** for this purpose.

🗊 Program Settings	—
Select Category: General Display Options Vehicle Defaults Permissions Vehicle Library Display Hints Vehicle Libraries Licensing Contact Transoft	Units Select units to match the drawing's units Units: feet InVision Data Generate InVision Data Save Simulation In Drawing Folder in Output Folder
	Reverse Overrides Steering Lock Angle: 40.0 Articulating Angle: 70.0
	Insert Profile Units Program Settings Units Vehicle Creation Units
	OK Cancel Help

Creating a Path

Once the desired settings have been made, a path can be created for the vehicle to use. There are five commands that are used to create a path: Generate Arc Path, Generate Corner Path, Oversteer Corner Path, Steer a Path, and Place Offset Simulation.

Creating a Path with Generate Arc Path, Generate Corner Path, or Oversteer Corner Path

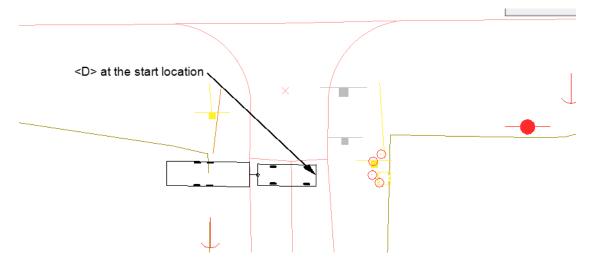
- 1. Zoom in on the area where the path is to begin.
- 2. Select one of the three Generate Path icons.



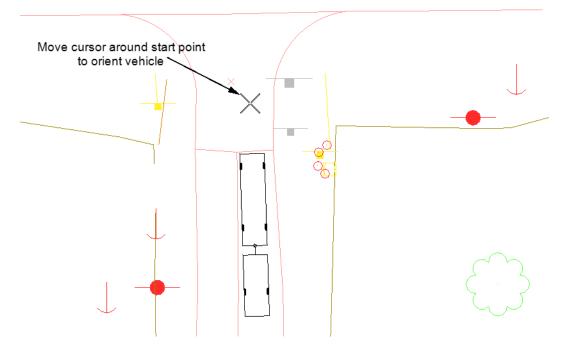
A cell of the vehicle is attached to the cursor.

Note: If you cannot see the vehicle, left click twice in the view in the area where you would like to place the vehicle. This will place the vehicle. Do a Fit View this will make the vehicle visible. Zoom in on the vehicle, delete the cell, and reinitiate the command.

3. Move the cursor to the desired start point and **<D>** to identify the vehicle's starting location.



4. The vehicle cell will pivot around the selected location. Rotate the cell to the desired orientation and **<D>**.



If desired, the *SmartPath Tools* dialog box can be used to set the angle. To use this option, key in the desired angle in the *Vehicle Starting Angle* field, then *<D>* the *Apply* button. Be aware that the angle is based on the MicroStation compass, with 0.00 facing right.

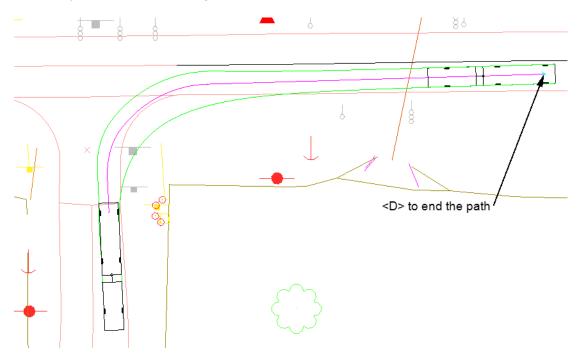


Once the starting angle is defined, the first leg of the path can be defined.

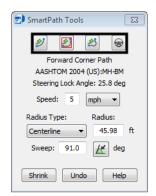
- 6. Set the desired *Speed* in the *SmartPath Tools* dialog box.
- 7. Set the *Sweep* in the *SmartPath Tools* dialog box.

🔊 SmartPath Tools 🛛 🖾
2 2 2 😔
Forward Corner Path
AASHTOM 2004 (US):MH-BM
Steering Lock Angle: 25.8 deg
Speed: 5 mph 🔻
Radius Type: Radius:
Centerline 🔻 45.98 ft
Sweep: 91.0 🗶 deg
Shrink Undo Help

8. To identify the end of the first leg **<D>** at the desired location.



9. If additional legs for the vehicle path are required, the type of path is selected from the SmartPath Tools dialog box. The second leg is extended from the end of the first.



10. **<R>** to end the Path.

Creating a Path with Steer a Path

The Steer a Path command tracks the cursor location to define the vehicle path. To create a path using this option:

- 1. Zoom in on the area where the path is to begin.
- 2. Select the Steer a Path icon.

AutoTURN 83 🛞 🤌 🧚 🚷 🗮 🖓 🐺 🔛 🚱 😭 🚱 😭 📀 2 2 2 2

A cell of the vehicle is attached to the cursor.

- 3. Move the cursor to the desired start point and **<D>** to identify the vehicle's starting location.
- 4. The vehicle cell will pivot around the selected location. Rotate the cell to the desired orientation and <D>. If desired, the *SmartPath Tools* dialog box can be used to set the angle. To use this option, key in the desired angle in the *Vehicle Starting Angle* field, then <D> the **Apply** button. Be aware that the angle is based on the MicroStation compass, with 0.00 facing right.
- 5. Move the cursor along the desired path and the vehicle will follow.

Note: The vehicle moves toward the location of the cursor only while the cursor is in motion.

Note: It can be helpful to toggle off AccuSnap while using the Steer a Path command.

- 6. **<D>** to stop the vehicle and display the vehicle envelope.
- 7. **<D>** again to restart the vehicle along the path.
- 8. To end the path, $\langle D \rangle$ then $\langle R \rangle$.

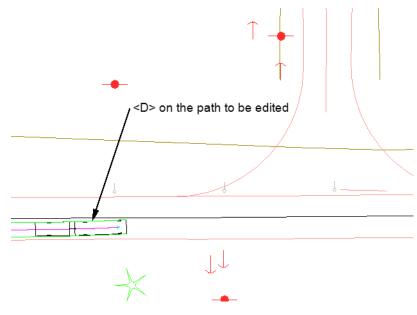
Restarting a Path

To add to a completed path:

1. **<D>** the **Continue Simulation** button on the **AutoTURN** toolbar.



2. **<D>** on the vehicle at the end of the desired path. The additional leg will use the last selected mode. A different mode can be selected from the *SmartPath* Tools dialog box. Additional legs are added in the same manner described above.



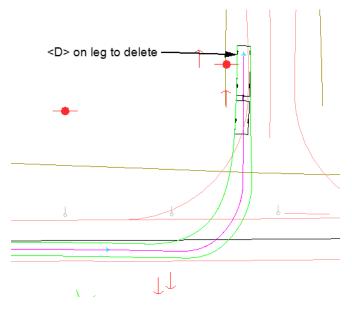
Deleting the Leg of a Path

To delete the last leg of a path:

1. **<D>** the **Delete Last Section** button on the *AutoTURN* toolbar.



2. **<D>** on the vehicle cell at the end of the desired path. The last leg of the path is removed.



Modifying a Path

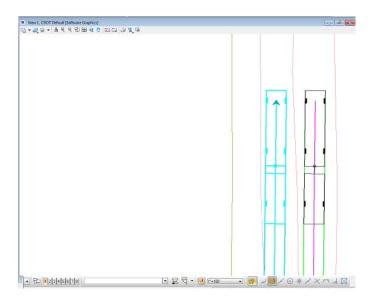
Minor changes can be made to Arc, Corner, and Oversteer Corner path legs. To make a change in one of these legs:

1. **<D>** the **Path Control** button on the *AutoTURN* toolbar.



- <D> and Hold to move vehicle
 <D> on path to select
- 2. **<D>** on an element that makes up the path to be edited. This can be the vehicle cell or one of the lines that make up the envelope.

3. **<D> and hold** on a circle in the path, then move the circle to the desired location.



4. Release the button in the desired location, then $\langle \mathbf{R} \rangle$ to exit the command.

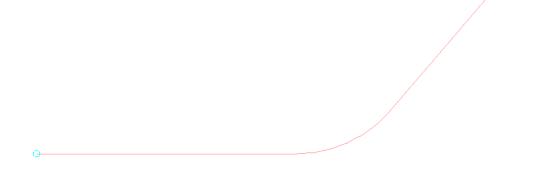
Creating A Path To Follow A Graphic Element

There are two methods of creating an AutoTURN path that follows a MicroStation graphic element or elements. One method identifies the element as an AutoTURN path then applies a vehicle to that path. The second method works similarly, but allows the user to apply an offset from the selected element.

- 1. Select the desired vehicle as described above.
- 2. **<D> Select Active Path** from the *AutoTURN* toolbar.



3. **<D>** on the element(s) that describe the path, then **<D>** to accept. The path is indicated with a circle at the beginning and an arrowhead at the end.



- *Note:* If the element selected is a complex chain, **<D>** the element near the starting end for the path. If the path is a series of individual elements, identify the elements in order, from the beginning of the path.
- 4. *<D> Place Simulation* from the *AutoTURN* toolbar.



The vehicle and envelope are placed on the path.

Place Offset Simulation

1. **<D> Place Offset Simulation** from the *AutoTURN* toolbar.



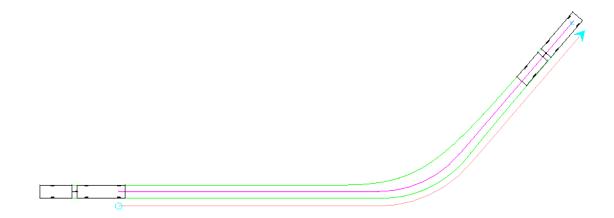
2. **<D>** the element(s) that describe the path, then **<D>** to accept. The path is indicated with a circle at the beginning and an arrowhead at the end.

- **Note:** If the element selected is a complex chain, **<D>** the element near the starting end for the path. If the path is a series of individual elements, identify the elements in order, from the beginning of the path.
- 3. The *Place Offset Simulation* dialog box is displayed. In the *Place Offset Simulation* dialog box, key in the desired offset value in the *Minimum Offsets* field. This is the distance from the path to the near edge of the envelope.

- 4. Use the *Direction* drop down menu to identify which side of the path the offset is applied to.
- 5. **<D>** the **Apply** button.

🕄 Place Offset Simulation 🛛 💽
(for low speeds only)
Minimum Offset: 5.00 ft
Direction:
Apply Close Help

The vehicle and envelope are placed in the drawing.



Placing and Deleting Vehicles

Vehicles may be placed along a path without generating the envelope. Vehicles placed in this manner can also be deleted.

Place Vehicle

- 1. Select the desired vehicle as described above.
 - *Note:* If there is an existing simulation on the desired path, the vehicle cell used in that simulation will be used by this command.
- 2. **<D> Select Active Path** from the *AutoTURN* toolbar.

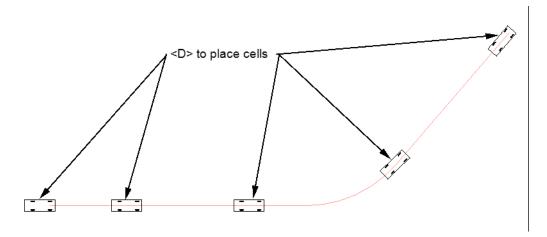


3. **<D>** the element(s) that describe the path. The **<D>** to accept.

4. **<D> Place Vehicle** from the *AutoTURN* toolbar.



- 5. The Vehicle cell is shown on the path. The cell is moved along the path by moving the mouse.
- 6. **<D>** in the desired location to permanently place the cell in that location. Additional vehicle cells can be placed in this manner.
- 7. **<R>** to exit the command.



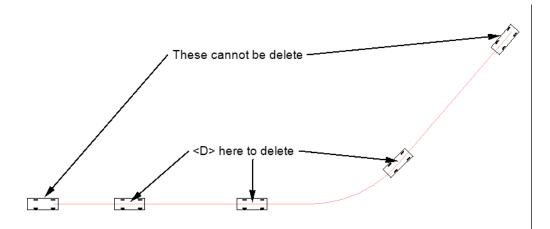
Delete Vehicle

Vehicle cells displayed using the Place Vehicle command can be removed from the path using the Delete Vehicle command.

1. **<D> Delete Vehicle** from the *AutoTURN* toolbar.



2. **<D>** inside the vehicle cell to be removed.



Note: Cells placed at the beginning, the end, or at a direction change (from forward to reverse, for example) cannot be deleted.

Workflow MS 22 - Basic Rendering Techniques

This document guides you through the use of the MicroStation rendering tools. In this example, a roadway design project is rendered so that images can be created that are suitable for exhibits at a public meeting. These images give the general public a better idea of what the finished project will look like. This workflow uses both MicroStation and InRoads data, as well as aerial photos and other raster images.

When creating a rendering of a project, the existing surface outside of the construction area should be rendered along with the design surfaces. Because the design surface may be below the existing ground in some locations, the existing surface should be removed in the area of the project.

Once the surfaces are modified, the surface data is displayed in the drawing and materials are applied to give the surfaces a more natural appearance. Then, to enhance the appearance of the model, 3 dimensional cells that represent a variety of landscape and other features.

Workflow Outline

The following outline describes the steps needed to complete a rendered drawing along with a brief explanation of what each step does.

Modifying the Existing Ground - The first section describes how to create a modified existing ground surface that can be modified for the rendering.

- **Copy the Existing Ground DTM** This workflow requires the existing ground surface to be modified. So that the surveyed dtm is not altered (which could adversely affect the design) a copy of the existing ground is made.
 - Command Used: Copy Surface.
- Clip Out the Area Of the Design Ground Parts of the design surface may lie underneath the existing ground. These areas will not be visible in the rendering if the existing ground triangles are left intact. The design surface's perimeter is used to define an untriangulated area within the existing ground surface, thus exposing the entire design surface.
 - Commands Used: View Perimeter Used to display the surface design perimeter.
 - **Import Surface From Graphics** Used to incorporate the design perimeter into the existing ground surface and an Interior breakline.
 - **Triangulate Surface** Used to recalculate the triangles of the existing ground surface so that triangles within the design perimeter are excluded.

Assigning Material to the Existing Ground - By themselves, rendered triangles look rather plain. by applying a natural looking material or an aerial photo to the triangles a more visually appealing appearance can be achieved. In this example an aerial photo is used.

- Commands Used **View Triangles** Used to display the triangles of the modified existing ground surface.
- **Raster Manager** Used to attach the photo to the dgn file.
- **Assign Material** Used to drape the aerial photo over the modified existing ground triangles.

Assigning Material to the Design Surface - There are a wide variety of materials that can be used to render a drawing. There are options that allow you to assign different materials to parts of your design model. For the majority of the design model surface components can be displayed and rendered. However, because of the way that side slope components are built in InRoads, these areas are better suited to having the triangles rendered.

- **Creating Side Slope Surfaces** The components for cut and fill are not suitable for rendering because the components are not created in areas where the slope changes. (This does not affect volume calculations because the surface is still triangulated in these areas). Therefore a separate surface for these areas is created.
 - Commands Used: **View Features** Used to display the POSS, Top of Cut, and Toe of Fill features that will be used to create the side slope surfaces.
 - **Place Smartline** Used to connect the toe of slope features to the POSS feature. This defines the boundary for the new surface
 - **Create Complex Shape** Used to create a single closed shape element from the toe of slope features to the POSS features. This will be used as the data and exterior boundary for the side slope surface.
 - Import Surface From Graphics Used to create the new side slope surface and to add the data to it.
- **Displaying the Design Components and Surfaces** The design components and side slope surfaces are displayed so that materials can be assigned to their levels.
 - Commands Used: **View Surface Components** Used to display the surfacing and Z-Slope components.
 - **View Triangles** Used to display the side slope surfaces. Remember to use a different preference than was used for displaying the existing ground triangles.
- Assigning Material to the Design Surface This is done to make the rendered components and surfaces appear more lifelike.
 - Commands Used: **Assign Material** Used to apply different materials to the components and side slope surfaces.

Adding Additional Details - Items other than the surfaces can be added to the rendering in order to better illustrate the impact of the proposed design.

- ◆ 3D Cells These are like other MicroStation cells except they are as 3 dimensional elements that can be rendered. An assortment of 3D cells is available from the landscape3d.cel library, delivered with MicroStation. Others can be found on-line.
 - Commands Used: **Attach Cell Library** Used to make the cells in the library file available for placement in the drawing.
 - **3D Warehouse Import Model** Used to obtain additional 3d cells from the internet.
 - **Place Cell** Used to place the cell into the dgn file.
- Using A Background Image A background image is used to replace whitespace with a more realistic looking image.
 - Command Used: **Design File Settings > Views** Used to identify the raster image to be used for the background.
- Lighting Adjustments These are used to make the rendering more visually appealing by adjusting brightness, lighting direction, and the definition of shadows. All of these adjustments are made in the Lighting Manager.
 - Commands Used: Lighting Manager Brightness Used to adjust the overall lighting for the rendering.
 - **Lighting Manager Ambient** Used to adjust the environmental lighting for the rendering. It is used to reduce the harshness of shadows.

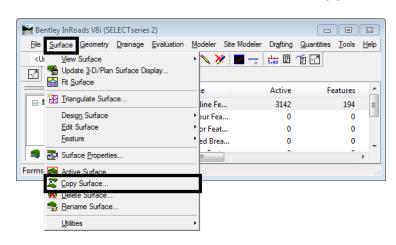
• Lighting Manager - Solar - Used to adjust the direction from which the light comes.

Modifying the Existing Ground

Copy the Existing Ground DTM

The first step in the rendering process is to clip out the existing ground in the area of the project. For this, a copy of the existing ground surface is made. Then the perimeter of the design surface is imported into this copy as an Interior Breakline. This will insure a seamless edge between the existing and design surfaces.

- 1. Open MicroStation and InRoads.
- 2. Load the appropriate InRoads data files. DTM the alg file are required. (The .alg file is required below to display the design components.)



3. From the InRoads main menu, select **Surface > Copy Surface**.

- 4. In the *Copy Surface* dialog box, verify that the existing ground surface is selected for the *Name* field in the *From* area.
- 5. In the *Name* field of the *To* area, key in the desired name. Existing Ground Rendered is used in this example.
- 6. In the *Description* field, key in the desired description.
- 7. Using the drop down menu, select the desired *Preference* for the surface.

Note: Be sure to make the name and description for this copy unique and specific to its use so that it isn't confused with the original existing ground surface when doing design work on the project.

8. **<D>** the **Apply** button. This writes the copy to memory and displays the surface in the InRoads Explorer.

9. **<D> Close** to dismiss the *Copy Surface* dialog box.

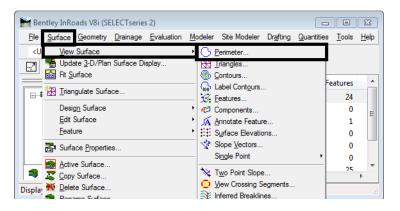
🐂 Copy Surfa	ace	- • ×
From Name: Description: Preference:	Existing Ground CDOT	Apply Close Help
To Name: Description: Preference:	Existing Ground Rendered Existing Ground modified for rendering Existing	

Note: You can close the original existing ground file if desired, to avoid accidentally modifying the wrong surface.

Clip Out the Area Of the Design Ground

Now that there is a working copy of the existing ground, it can be modified to exclude data within the limits of the design surface. The perimeter of the design surface is used to define the clipping area.

- 1. Set the *Design Surface* active. In this workflow Design_Model is used as the design surface.
- 2. From the InRoads Main menu, select **Surface > View Surface > Perimeter**. This displays the *View Perimeter* dialog box.



- 3. Verify that the Design Surface is selected as the *Surface*.
- 4. **<D>** the **Apply** button. This displays the perimeter in the dgn file.
- 5. **<D> Close** to dismiss the *View Perimeter* dialog box.

🐂 View Perimeter		×
Surface: Design_	Model 🔻	Apply
		Close
		Preferences
Symbology:		Help
Object	Name	
Perimeter		BYL

Below is an illustration of the results.

Next, the design surface's perimeter graphic is imported into the working existing ground dtm as an Interior breakline.

From the InRoads main menu, select File > Import > Surface. The Import Surface dialog box is displayed.

File	Surface	Geometry	Drainage	Evaluation	Modeler	Site Modeler	Drafting	Quantities	Tools	Help
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	Export Translators	8						👞 surrace 🚟 <u>G</u> eometr		ea

- 7. In the *Import Surface* dialog box, Set the *Surface t* o the working existing ground dtm. (Existing Ground Rendered in this example)
- 8. Set *Load From* to Single Element.
- 9. Set *Elevations* to Use *Element Elevations*.
- 10. In the Features area, key in a Seed Name. In this example Design Perimeter is used. Use a name that describes what the feature represents. This will make it easier to identify the feature if it needs to be modified in the future.
- 11. Set the Feature Style to DTM_Interior. This matches the Point Type for the line being imported.
- 12. Set the *Point Type* to **Interior**. The Interior point type excludes data from being triangulated within the boundary of the feature. This will prevent existing ground data from covering over design data in cut areas.

13. **<D>** the **Apply** button then **<D>** on the design perimeter line. **<D>** again in a blank area of the view to accept the element.

import Surface	- • •
From Graphics DEM Fro	m Geometry
Surface: Exist	ng Ground Renderec 👻 Apply
	e Element
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Drape Vertices Only	Help
Thin Surface	
Tolerance: 5.00	
Features	Information
Seed Name:	Design Perimeter 👻 🕂
Feature Style:	DTM_Interior
Point Type:	Interior 👻
Maximum Segment	Length: 0.00
Point Density Interv	al: 0.00
Duplicate Names:	lace   Rename
Exclude from Triangula	tion
	Close

14. **<D> Close** to dismiss the *Import Surface* dialog box.

The working existing ground surface now has the cutout for the design surface. It needs to be retriangulated and have the triangles displayed.

15. Delete the perimeter that is currently displayed in the view. When the MicroStation **Display Style** is changed to show shading, the perimeter will be displayed filled, which can obstruct the view of the other design data.

# **Applying Materials to the Surfaces**

Materials are associated to levels and closed element on that level will take on that material. The process for assigning materials is the same for the existing ground surface as it is for the design surface. In this example, the existing ground surface uses an aerial photo as its material. For the Design surface, each component type will be assigned a different material from the available material libraries.

### **Assigning Material to the Existing Ground**

1. In the InRoads Explorer pane, select the **Surfaces** tab.

2. **<R>** on the working existing ground dtm and select **Triangulate** from the right click menu. This updates the triangles of the surface to incorporate design perimeter.

Bentley InRoads V8i (SELECTseries 2)	1			×
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Toggles the Feature Filter Lock	Set Active			ы
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3. From the InRoads main menu, select **Surface > View Surface > Triangles**. This displays the *View Triangles* dialog box.

ile Surfa	ace Geometry	Drainage	Evaluation	Modeler	Site Modeler	Drafting	Quantities	Tools	Hel
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7	_ Jpdate <u>3</u> -D/Plan	Surface Di	splay	88	Triangles				
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- 4. In the *View Triangles* dialog box, set the *Preference* to **Existing**.
- 5. Select the working existing ground dtm for the *Surface* and *<D>* the **Apply** button.

🕌 View Triangle	s			×
Surface:	Existing	Ground Ren	•	Apply
Fence Mode:	Ignore		-	Close
Colored Model				Preferences
Mesh				Help
Symbology:				
Object		Name		
Triangles				BYL

- 6. **<D> Close** to dismiss the *View Triangles* dialog box. Below is an illustration of the modified surface.

 Follow the instructions in the CDOT Workflow Image Draping to apply the aerial photo to the existing ground surface. Other helpful workflows are: CDOT Workflow 5 - Raster Manager and CDOT Workflow 13 - Using Georeferenced Images in Raster Manager. At the completion of the Image Draping workflow, the existing ground surface is shaded with the aerial photo. Notice that the area of the design surface is not shaded with the aerial photo.



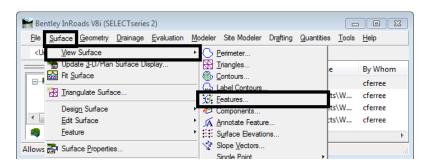
# Assigning Materials to the Design Surface

In this section the components of the design surface are displayed and given a material. Because of the way Roadway Designer creates side slopes, those will have to be created a separate surfaces.

### Creating Side Slope Surfaces

Side slope surfaces can be created from the Top of Cut, Toe of FIII, and POSS features from the design model.

1. From the InRoads main menu, select **Surface > View Surface > Features**.

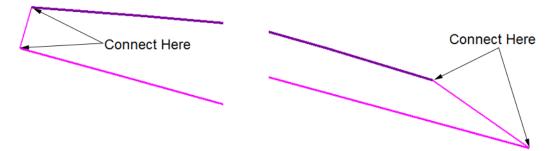


- 2. In the *View Features* dialog box, select the design surface from the *Surface* drop down menu.
- 3. In the *Features* list box, highlight all of the POSS and cut and fill features.

4. **<D>** the **Apply** button to display the features.

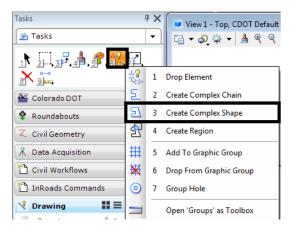
🕌 View Features		<b>—</b>
Surface: Design Model	•	Apply
Fence Mode: [Ignore	Ŧ	Close
		Filter
		Edit Style
Features:		Help
Name	Style	[ ^ <del>4</del>
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LT_SubBase_EOP-Top	D_EOP	d
LT_SubBase_Hinge-Top	D_HINGE	C
LT_SubBase_Laneline-Top	D_LANELINE	C ≡
LT_Toe-of-Fill	D_Toe-of-Fill	9
LT_Toe-of-Fill1	D_Toe-of-Fill	C
LT_Toe-of-Fill2	D_Toe-of-Fill D Top-of-Cut	C C
LT_Top-of-Cut LT_Top-of-Cut1	D_Top-of-Cut D_Top-of-Cut	
LT_Top-of-Cut2	D Top-of-Cut	<u> </u>
· [		*

- 5. **<D> Close** to dismiss the *View Features* dialog box.
- 6. Using the MicroStation Place Smartline command, connect the POSS line to the toe of slope line on each end.



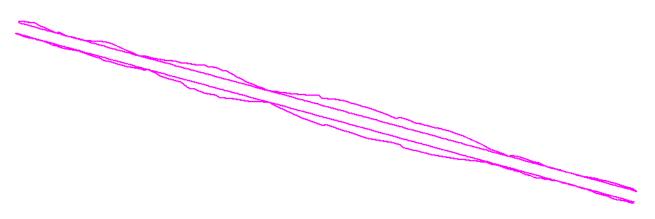
Next, these features are chained together to create a Complex Shape.

7. Select **Create Complex Shape** from the MicroStation Task menu.



8. In the *Create Complex Shape* tool settings dialog box, set the *Method* to Automatic.

- 9. **<D>** on one of the elements then **<D>** in a blank area to create the chain.
- 10. Repeat steps 6 through 9 for the other side slope. An example of the result is shown below.



Finally, Each shape will be imported into a new surface.

11. From the InRoads main menu, select **File > Import > Surface**. This displays the *Import Surface* dialog box.

File	Surface	Geometry	<u>D</u> rainage	Evaluation	Modeler	Site Modeler	Dr <u>a</u> fti	ng	<u>Q</u> uantities <u>T</u> ools	<u>H</u> elp	
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	Export						- • i	1	Surface Advanced		
	Translators	s					•	;;;	Geometry		

- 12. In the *Import Surface* dialog box, key in the desired name in the *Surface* field. *LT_Side* is used in this example.
- 13. Set *Load From* to Single Element.
- 14. Set *Elevations* to Use Element Elevations.
- 15. In the *Features* area, key in the desired name in the *Seed Name* field. *LT_Side* is used in this example.
- 16. Set the desired *Feature Style*. **D_Toe-of-Fill** is used in this example.

17. Set the *Point Type* to **Exterior**. This feature type will allow all of the data to be triangulated but prevent triangles from being formed outside the data area.

🕌 Import Surface			- • •
From Graphics DEM	From Geom	etry	
Surface:	LT_Side	•	Apply
Load From: Level:	Single Elemer		Filter
Elevations:	Use Element	Elevations 🔻	Preferences
Drape Vertices Onl		•	Help
Thin Surface Tolerance:	5.00		
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Duplicate Names:	Replace	<ul> <li>Rename</li> </ul>	
Exclude from Tria	ngulation		
-		Close	

- 18. **<D>** the **Apply** button then **<D>** on the appropriate shape. This creates the surface and imports the shape as data.
- 19. Change the *Surface* name and *Seed Name* for the other side slope and import the other shape.
- 20. **<D> Close** to dismiss the *Import Surface* dialog box.
- 21. Delete the shapes that were just imported.

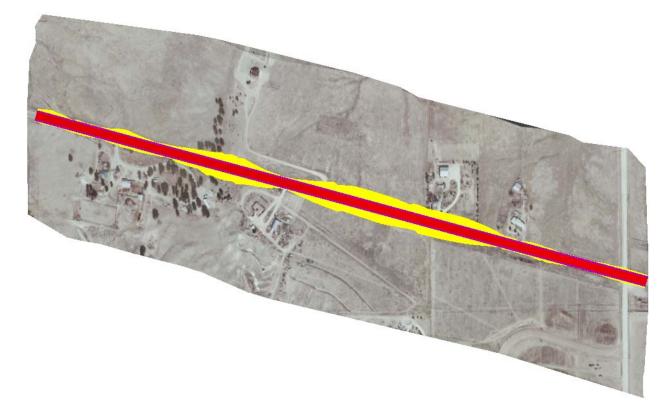
#### **Displaying the Design Components and Surfaces**

- 1. Display the triangles for the two new surfaces. Be sure to use a different preference (this example uses the *Proposed* preference) than that used to display the existing triangles. If they are displayed on the level with the existing ground triangles, they will be rendered with the aerial photo.
- 2. From the InRoads main menu, select **Surface > View Surface > Components**. This displays the *View Surface Components* dialog box.
- 3. Set the *Surface* to the desired design model. (Design Model is used in this example)
- 4. In the *View Surface Components* dialog box, select the desired design surface using the *Surface* drop down menu.
- 5. In the *Component* area, highlight the desired components. These should be the topmost pavement components, curb and gutter components, Z-Slope components, etc. In this example HMA_Lift 1, LT_Z-Slope_12_6_to_1, and RT_Z-Slope_12_6_to_1 are used.

6. **<D> Apply**. The components of the design surface are displayed in the hole in the existing ground.

🕌 View Surface Components	×
Surface: Design Model 🔹	Apply
Component:	Close
Name	Style ^
LT_Cut_4/1	D_Top-of Help
LT_Cut_6/1	D_Top-of
LT_Fill_3/1	D_Toe-of
LT_Fill_4/1	D_Toe-of
LT_Fill_6/1	D_Toe-of
LT_Z-Slope_12_6_to_1	D_SHOU
RT_Cut_3/1	D_Top-of
RT_Cut_4/1	D_Top-of
RT_Cut_6/1	D_Top-of
RT Fill 3/1	D Toe-of
	4
Stitch Mesh Faces	

7. **<D> Close** to dismiss the the *View Surface Components* dialog box. Below is an example of the displayed components.



8. From the MicroStation task menu, select the *Visualization* tab.

9. **<D>** the **Apply Material** button. This will display the **Assign Material** dialog box.



- In the Assign Material dialog box, <D> the Open Palette button and select the desired palette from the Open Palette dialog box. In this example, the concrete.pal is selected.
- 11. **<D> OK** to dismiss the *Open Palette* dialog box.

🖇 Assign Materi	ial 🗖 🗉 💌	Open Palette
🥩 🤔	🔆 🍕	Current Workspace
	Table: Working Palette: Concrete	Luxology Preset Materials lightwidgets pal [Bentley_LightWidgets.dgnlib] blocks&bncks pal [Bentley_Materials.dgnlib] carpet&fabito: pal [Bentley_Materials.dgnlib] Clearcoat_Paints.pal [Bentley_Materials.dgnlib] curtains & lampshades pal [Bentley_Materials.dgnlib] glow.pal [Bentley_Materials.dgnlib] glow.pal [Bentley_Materials.dgnlib] interior_finishes pal [Bentley_Materials.dgnlib] laminate&tile.pal [Bentley_Materials.dgnlib] Luxology_Presets.pal [Bentley_Materials.dgnlib] marble&granite.pal [Bentley_Materials.dgnlib] we III Concel

- 12. From the Material drop down menu, select the desired material. In this example Asphalt (Black) is used.
- 13. **<D>** the **Assign by Level/Color** button then **<D>** on the desired element. **<D>** in an open area to accept the assignment. In this example a surfacing component is selected.
- 14. Repeat steps 8 through 11 for the remaining components and the side slope surfaces.

The illustration below shows the design surface rendered.



# **Adding Additional Details**

# **3D Cells**

There are a variety of cells that can be used to add interest to your rendering. MicroStation comes with a 3d landscape cell library (*landscape3d.cel*). This library has been copied to the following directory:

#### C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation\Cell

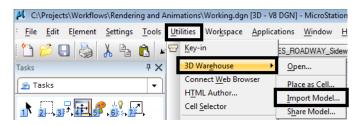
When selecting a cell, check the preview to be sure that the cell is a full 3D cell. The illustration below shows and example of two cells from the landscape3d.cel library; the cell on the left is a full 3D cell, the one on the right is not.

🚰 Cell Library: [C:\Projects\3d Cells\landscape3d.cel]	🕥 📔 Cell Library: [C:\Projects\3d Cells\landscape3d.cel] 🛛 📃 🗉 🕰
File	<u>F</u> ile
Use Shared Cells Display All Cells In Path Display: Wireframe	Display: Wireframe
Name Description	Name  Description    F2    E3
E4 EVR1EL EVR3EL EVR4EL 4 III +	E4         2000           EVR1EL         2000           EVR2EL         2000           EVR3EL         2000           EVR4EL         2000
Active Cells       Point       Element       Edit       Delete         Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Ima	Active Cells     Point     Bement     Edit     Delete       Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Image: Imag

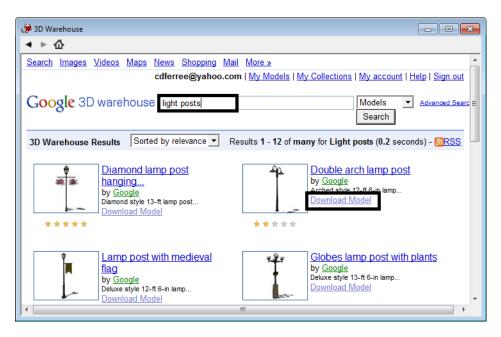
The origin of these cells is at the bottom center of the object. Therefore, they can be easily placed on the surface by tentative snapping to a triangle or component.

Another location for finding 3D cells to spruce up your rendering is the 3D Warehouse. To access the 3D Warehouse:

- 1. Open a blank drawing.
- 2. From the MicroStation main menu, select **Utilities > 3D Warehouse > Import Model**. This opens Internet Explorer to the Google 3D Warehouse web site.



- 3. In the search field, key in the item you are looking for. In this example, "light posts" was used.
- 4. When the desired item is found, **<D>** the **Download Model** link.



- 5. The item is added to the dgn as a new models or you can add additional models if desired.
- 6. Close the Internet Explorer when you have finished downloading models.
  - **Note:** Some of these models may require additional work after they are downloaded. A common problem with these cells is that their origin is not at 0,0,0.
- 7. While in the new model, open the **Model Properties** dialog box.

8. Toggle on **Can be placed as a cell**. **<D> OK** to accept the change and dismiss the Model Properties dialog box.

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Description:	CDOT Default Master Model
<u>R</u> ef Logical:	Image: Contract of the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second seco
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- 9. Open your rendering dgn file.
- 10. From the MicroStation menu, select **Element > Cells**. This displays the *Cell Library* dialog box.
- 11. In the *Cell Library* dialog box, select **File > Attach File**.
- 12. Navigate to the location of the 3D cell library created above highlight the filename and **<D> Open**. The cells are now ready for use.
- 13. To use a cell, highlight the cell name then **<D>** the **Placement** button in the *Cell Library* dialog box.

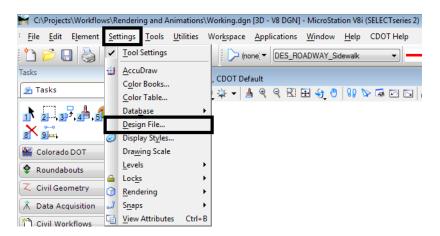
File         Use Shared Cells       Display All Cells In Path       Display:       Wireframe         Name       Description       T;         2XLightPost4_4       C       Imp_Post_Double_Arch       Imp_Post_Double_Arch         Active Cells       Imp_Post_2XLightPost4_4       Point       Edit       Delete	📕 Cell Library: [\3d	l Cells.dgn]		[	- • •
Name     Description       2XLightPost4_4     C       Lamp_Post_Double_Arch     C       Active Cells     C	<u>F</u> ile				
2XLightPost_4     Imp_Post_Double_Arch       Imp_Post_Double_Arch     G       Imp_Post_Double_Arch     G       Active Cells	Use Shared Cells	Display All Cells In Path		Display: Wire	frame 💌
2XLightPost4_4       Lamp_Post_Jouble_Arch       G       Active Cells	Name	Description	Ţ		-15
Active Cells		ch			
	<	III	Þ		
Placement 2XLightPost4_4 Point Element Edit Delete	Active Cells				
	Placement 2XI	ightPost4_4 Point Element		<u>E</u> dit	Delete
Terminator         NONE         Pattern         NONE         Create         Share	Terminator NO	NE Pattem NONE		Create	Share

14. The *Cell Library* dialog box can be dismissed. Select the Place Cell command from the task menu and place the cell at the desired locations.

# Using a Background Image

Adding a background image to your rendering can help bring the image to life. To add a background image:

1. From the MicroStation main menu, select **Settings > Design File**. This displays the *Design File Settings* dialog box.

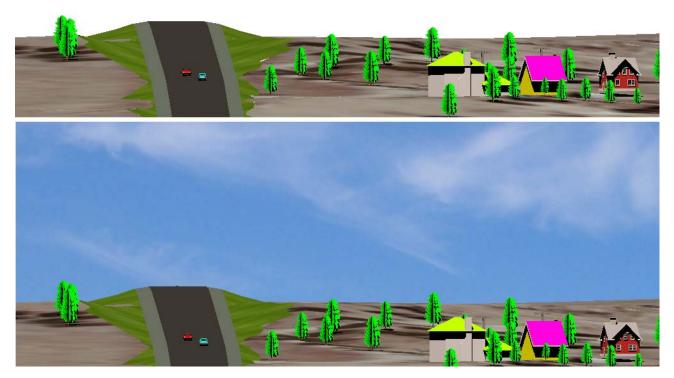


- 2. In the *Category* pane of the *Design File Settings* dialog box, **<D> Views**.
- 3. In the *Modify View Settings* area, toggle on **Background**.
- 4. Use the search icon  $\Im$  to locate and select the desired background image.

Design File Settings	
Category	Modify View Settings
Active Angle	View 1 -
Active Scale	
Angle Readout	Proportional Resize
Axis	Pixel Width 1008
Civil Formatting	Pixel Height 801
Color	
Data Acquisition	
Element Attributes	<u>         Background:</u> \Sky2.jpg         Q
Fence Grid	Buokground
Isometric	
Locks	
Snaps	
Stream	
Views	
Working Units	
	Former New Description
	Focus Item Description
	If on, the selected background image will be displayed in the view.

5. **<D>** the **OK** button to accept the changes. The background image is now displayed and the **Design File Settings** dialog box is dismissed.

Below is an example of a rendering without the background on top and with the background on bottom.



# **Lighting Adjustments**

Lighting is used to highlight your rendering and make it more visible. To adjust the lighting:

1. Select the Light Manager from the *Visualization* task tab. This displays the *Light Manager* dialog box.



There are three areas that are generally used to adjust the lighting for the rendering. These are Brightness, Ambient, and Solar.

#### **Brightness**

This setting adjusts the overall lighting of the drawing.

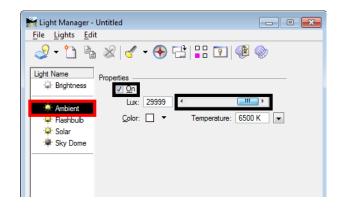
- 1. Highlight Brightness in the Light Name list.
- 2. Use the slider in the *Display Brightness* area to modify this setting.

🙀 Light Manager -	- Untitled	×
<u>F</u> ile <u>L</u> ights <u>E</u> d	lit	
🥩 🕇 🖗	e 🖉   🗹 🕶 🛟 급   🏪 🕐   🏶 📎	
Light Name Brightness Ambient Flashbulb Solar Sky Dome	Display Brightness Brightness Multiplier: 1.68 Select Display Range (umens per square meter): 0.53 100000. Global Illumination Brightness Brightness Multiplier: 0.037 Select Display Contrast: 0.0 Display Gamma: 2.1 Display Range (umens per square meter): Photographic Tone Mapping	

#### Ambient

The Ambient settings can be used to reduce on increase the harshness of shadows.

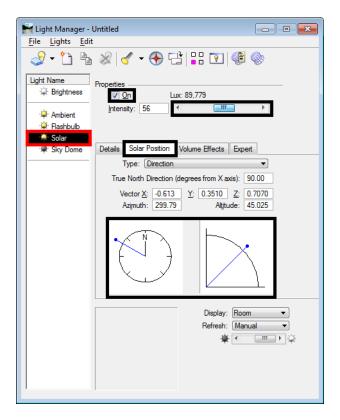
- 1. Highlight **Ambient** in the *Light Name* list.
- 2. In the *Properties* area toggle on the **On** check box.
- 3. Use the **Lux** slider to modify this setting.



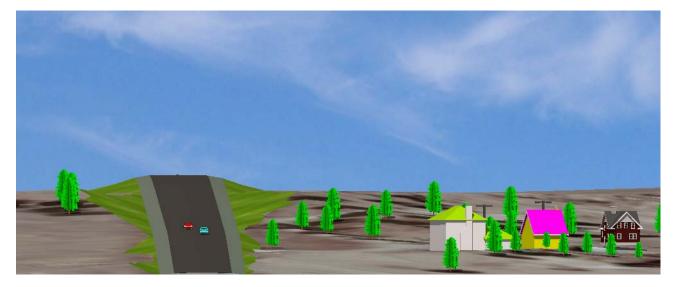
#### Solar

The Solar settings can also adjust the overall brightness of the rendering. It is also used to orient the sun in relation to the drawing.

- 1. Highlight **Solar** in the *Light Name* list.
- 2. In the *Properties* area toggle on the **On** check box.
- 3. Use the **Intensity** slider to modify this setting. This adjusts the brightness of the rendering.
- 4. **<D>** on the **Solar Position** tab.
- 5. Use the **Azimuth** and **Altitude** dials to adjust the sun's orientation.



Below is an example of the finished rendering.



**MicroStation Printing** 

# **Workflow MP 1- MicroStation Printing**

This document guides you through the basic functions of MicroStation printing. It is used for printing single sheets on a sheet basis. See workflow document *CDOT Workflow Print Organizer* for guidance on printing multiple sheets at one time.

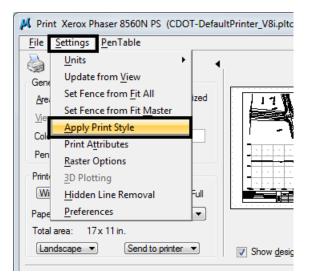
There are two procedures that can be used to set printing properties. The first is using a *Print Style* (new in MicroStation V8i SS2) and the second is using a *Print Driver* (similar to past versions of MicroStation).

**Note:** Mixing the two printing procedures is known to create some inconsistencies. If you find that something does not look correct, it is best to cancel out of the Print dialog box and start over using only one of the procedures.

### **Using Print Styles**

A Print Style is a collection of frequently used print properties that have been saved for later use. Default CDOT Print Styles have been created for common settings and are included in the CDOT workspace. These Print Styles automatically set a Printer Driver, Pen Table, scale, page size of 11x17 landscape orientation, toggles on line styles and line weights, and sets the printer.

- 1. Print Style settings are accessed from the *Print* dialog box.
- 2. From the *Settings* pull down menu, select *Apply Print Style*.



3. Nine Print Styles have been created. Two drivers have been created for default Adobe PDF file creation; one for draft quality and one for high quality outputs.

📕 Print -	Apply Print Style
Print style	CDOT Default Plotter
	CDOT Default Plotter
	CDOT Default Printer
	CDOT PDF (Color)
	CDOT PDF (Draft Quality)
	CDOT PDF (High Quality)
	CDOT ROW Plotter
	CDOT ROW Printer
	CDOT Shaded Plotter
	County Sheet Composer

- 4. Select a Print Style and *<D>OK*. This will automatically set the appropriate print settings.
- 5. **<D>** the *printer icon* or use *File > Print* to print the document.
- 6. If a Print Style was selected for a printer or plotter, the file will be sent to the device.
- 7. If a Print Style was selected for Adobe PDF creation, the user will be asked to name the file and save it. Navigate to the correct directory and enter a file name to save the file. Select **Save**.

📕 Save Print As	- C:\Projects\871	07\Plot_Sets\		×
Save in	: 🚺 Plot_Sets	•	G 🌶 📂 🛄 -	3 🖲
(Pa)	Name	*	Date modified	Туре
Recent Places	🐌 AD		2/4/2011 8:25 AM	File folder
Recent Places	iii FIR		2/4/2011 8:25 AM	File folder
	<b>FOR</b>		2/4/2011 8:25 AM	File folder
Desktop	ROWPR		2/4/2011 8:25 AM	File folder
Desktop				
Libraries				
-				
Computer				
Network	•			•
Network	File name:	12345DES_PnP09.pdf		✓ Save
	Save as type:	Print Output Files (*.*)		Cancel

*Note:* For tips on printing raster references (e.g. aerial photos), see the workflow **Printing Raster Images**.

#### **Using Default Printer Driver Settings**

- **Note:** When using this method of printing, it is important to check the line weight setting under the print attributes to make sure it is toggled on before creating a plot.
- 1. In MicroStation V8i, place a fence to define the print area.

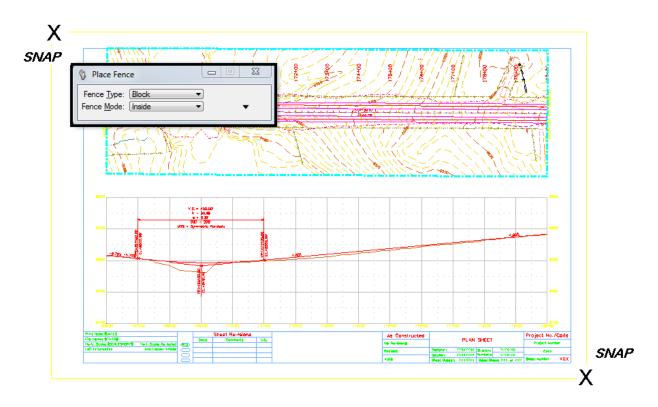


**Note:** As of this printing if you place the fence BEFORE activating the Print command, the line weight toggle will be turned off. This will be fixed in the next service pack (SS3) from Bentley due out in the fall of 2011.

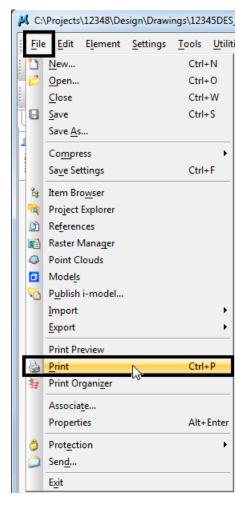
2. Set the *Fence Type* to **Block**. This *Fence Type* will work for both sheet borders placed as reference files and as cells.



3. Place the fence by snapping to the outer corners of the plot boundary. The shape defining the outer edge of the border (in this example) is called SHEET_Plot-Boundary.



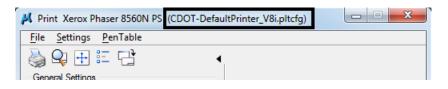
4. Open the **Print** dialog box by selecting **File > Print**.



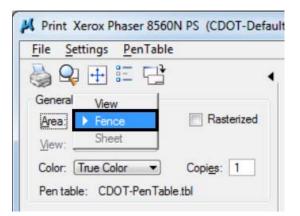
5. Optionally, **<D>** the *Printer* icon an the **Standard Tool Box**.



6. The current *Printer Driver* will display in the title bar at the top of the *Print* dialog box.



7. Make sure the *Fence* option is selected under *General Settings*.



8. The current **Pen Table** will display under the *General Settings* area of the dialog box.

📕 Print Xerox Phaser 8560N PS (CDOT-DefaultPrinter_V8i.pltcfg)	
<u>F</u> ile <u>S</u> ettings <u>P</u> enTable	
General Settings	
Area Fence Rasterized	וון
View: View 1 -	
Color: True Color  Copies: 1	
Pen table: CDOT-Pen Table.tbl	:
Printer and Paper Size	
Paper: 17x11	
Total area: 17x 11 in.	
Landscape ▼ Send to printer ▼ Show design in preview	
Print Scale and Position	
Scale: 100.000 Q 1 in. (paper) to 100.000 ' (design)	
Size: 17.000 11.000 in. 🕂 Maximize Rotation: None 💌	
Origin: 0.000 0.000 in. 🔽 Auto-center	
	2

9. If these settings are correct (default printer using CDOT-PenTable.tbl), check to make sure pen weights have been toggled on under the *Settings > Print Attributes* pull down.

Print Xerox Phaser 8560N PS (CDOT-DefaultPrinter	
File Settings PenTable	
<u>≥ U</u> nits → ∢	
Gene Update from View	
Arei Set Fence from <u>F</u> it All ized	
Set Fence from Fit <u>M</u> aster	
Columnation Columnation	
Per Print Attributes	
Raster Options	
Print <u>3</u> D Plotting	
Wi <u>H</u> idden Line Removal ^F ull	
Pape Preferences	
Total area: 17 x 11 in.	
Landscape  Send to printer  Sh	1
N Print Attributes	X
✓ Clip Back  Level Overrides	
Clip Front	
Clip Volume Constructions V Patterns	
♥         Operation         ●         Operation         Operation         ●         Operation         Operation	
☑ Data Fields ☑ Tags	
Displayset	
☐ Fast <u>C</u> ells	
Print broken associations with different symbology	
<ul> <li>Apply print color mode to raster</li> </ul>	
Use view background color when rendering	
Print border Print fence	
Border comment:	
<u>O</u> K Cancel	

- 10. Once toggled on, **<D>** *OK* to close the Print Attributes dialog box.
- 11. **<D>** the *printer icon* or use *File > Print* to print the document to the default printer.

### **Changing the Default Printer Driver Settings**

Seven default CDOT printer drivers have been created for common settings and are included in the CDOT workspace. Settings like Pen Table can be changed by the user. Follow the same steps in the above section *Using Default Printer Driver Settings* to start the printing workflow.

1. The default printer driver sets the *CDOT-DefaultPrinter_V8i* printer driver. To change this, **<D>** the magnify glass icon under the Printer and Page Size section in the print dialog box.

N Print Xerox Phaser 8560N PS (CDOT-DefaultPrinter_V8i.pltcfg)
<u>File</u> <u>Settings</u> <u>P</u> enTable
General Settings
Area: Fence Rasterized
View: View 1 ▼
Color: True Color  Copies: 1
Pen table: CDOT-Pen Table.tbl
Printer and Paper Size
Windows driver
Paper: 17x11
Total area: 17x 11 in.
Landscape ▼         Send to printer ▼           ✓         Show design in preview
Print Scale and Position
Scale: 100.000 Q 1 in. (paper) to 100.000 ' (design)
Size: 17.000 11.000 in. +1+ Maximize Rotation: None -
Origin: 0.000 0.000 in. 🕼 Auto-center

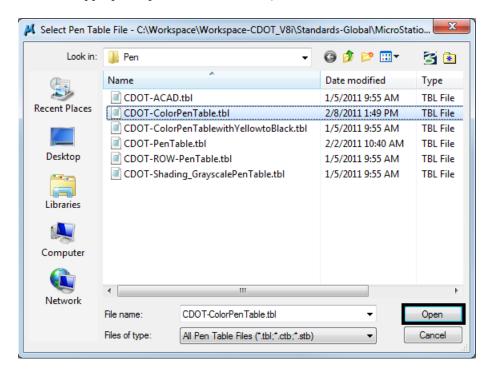
2. Select the appropriate *Printer Driver* (for example, *CDOT-PDFHighQuality_V8i.pltcfg*) and **<D>** *Open*.

📕 Select Printer I	Driver Configurati	on File - C:\Workspace\Wo	rkspac	e-CDOT_	V8i\Standa	rds	23
Look in:	📔 Plotter Driver		•	G 🤌	⊳ 🖽	3	*
Recent Places Desktop Libraries Computer	CDOT-Defau CDOT-PDFD CDOT-PDFH CDOT-ROW	ultPlotter_V8i.pltcfg ultPrinter_V8i.pltcfg raftQuality_V8i.pltcfg lighQuality_V8i.pltcfg -DefaultPlotter_V8i.pltcfg -DefaultPrinter_V8i.pltcfg ed_PlotterDriver_V8i.pltcfg					
Network	•				_		•
	File name:	CDOT-DefaultPlotter_V8i.pltc	cfg		<b>-</b>	Open	
	Files of type:	Printer Driver Configuration F	iles (*.p	ltcfg;*.plt)	▼	Cance	

3. Check the *Pen Table* setting. If it needs to be changed (for example to the color pen table), select the *PenTable* pulldown and *<D> Attach*.

Normal Print (CDOT-						
<u>File</u> <u>S</u> ettings	PenTable					
🚵 🗣 🕂	New		•			
General Settings	<u>A</u> ttach					
Area: Fence	<u>E</u> dit	Rasterized				
View: View 1	<u>D</u> etach	Print to 3D				
Color: True Color  Copies: 1						
Pen table: CD	OT-PenTable	tbl				

4. Select the appropriate pen table and **<D>** *Open*.



5. Once the settings are correct, check to be sure pen weights have been toggled on under the *Settings > Print Attributes* pull down.

Normal Print Xerox Phaser 8560N PS (CDOT-Defailed)	ultPrinter_
<u>File</u> <u>Settings</u> <u>P</u> enTable	
Units •	
Gene Update from <u>V</u> iew	
Area Set Fence from <u>Fit</u> All ized	
Set Fence from Fit <u>M</u> aster	а 
Apply Print Style	
Print Attributes	
<u>R</u> aster Options	
Pape Preferences	
Total area: 17x 11 in.	
Landscape   Send to printer	Sh Sh
H Print Attributes	X
Clip Back	
Clip Back  Clip Front  Clip Front  Level Over  Line Styles	nues
V Clip Volume	ts
Constructions	
Dimensions     Points     Data Fields     Tags	
Displayset V Text	
Fast <u>C</u> ells Text Nodes	3
Fast Curves I Transparer	су
Print broken associations with different symbolo	gy
Apply print color mode to raster      Use view background color when rendering	
Print border Print fence	
Border comment:	
OK Cancel	

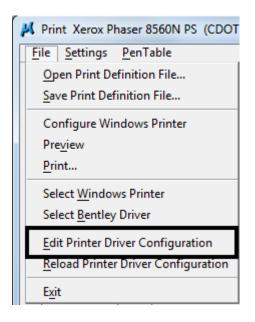
- 6. Once toggled on, **<D>** OK to close the Print Attributes dialog box.
- 7. **<D>** the *printer icon* or use *File > Print* to print the document to the default printer.

## **Workflow MP 2 - Printer Driver Adjustments**

This document guides you through the basic steps you will need to edit a CDOT Printer Driver.

The Print Driver configuration file format was changed with MicroStation XM and is now stored in XML format. Each of the new print driver configuration files now has an extension **.pltcfg**. Each default Print Driver configuration file has default settings that should not have to be edited. However, printers can vary in the naming convention for 11x17 inch sized paper and default plotters are usually not set as user default printers. If the default paper size does not set automatically, you can make the necessary adjustments. Also, if you have a default plotter, you can set the network path in the printer driver configuration path. The CDOT default printer driver configuration file is located under: *C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation\Plotter Driver*.

The name of the file is *CDOT_DefaultPrinter_V8i.pltcfg*. *Open* the file from within MicroStation V8i using the *Print Driver Configuration Editor*. It can be invoked from the *MicroStation Print* dialog's *File/Edit Printer Driver Configuration* menu.



2. Navigate to *C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation\Plotter Driver* and *open* the printer driver.

📕 Select Printer I	Driver Configuration File - C:\Workspace\Workspace-CDOT_V8i\Standards	x
Look in:	🔋 📔 Plotter Driver 👻 😨 🍺 📂 📰 👻 💈	i 💽
Recent Places Desktop Libraries	Name CDOT-DefaultPlotter_V8i.pltcfg CDOT-DefaultPrinter V8i.pltcfg CDOT-PDFDraftQuality_V8i.pltcfg CDOT-PDFHighQuality_V8i.pltcfg CDOT-ROW-DefaultPlotter_V8i.pltcfg CDOT-ROW-DefaultPrinter_V8i.pltcfg CDOT-ROW-DefaultPrinter_V8i.pltcfg CDOT-Shaded_PlotterDriver_V8i.pltcfg	
Computer Computer Network		► Den

3. You will see this display after the file is opened.

CDOT-DefaultPrinter_V8i - Printer Driver Configuration	×
File	
General Base Properties Paper Sizes Color Maps Weight Maps Line Styles Font Maps Programs	
C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation\Plotter Driver\CDOT- DefaultPrinter V8i.pltcfq	
Driver:	
Bentley Windows printer driver	
Notes:	
CDOT Plot Config File CDOT-DefaultPrinter_V8i.pltcfg for 17" x 11" printing using Windows printers	
CDOT-DetaultPrinter_vol.pitcigfor 17 x 11 printing using windows printers	

### Setting the Default Form Size

File		_						
General	Base Properties	Paper Sizes	Color Maps	Weight Maps	Line Styles	Font Maps	Programs	
Ger	neral							•
Wir	ndows Printer							
Defa	ult Windows Print	ter Name						
Defa	ult Form Name			17x11				
Deta	ult Tray Name							
Full	Sheet Mode			True				
Orie	ntation			Default Or	ientation			
Defa	ult Create Metafil	e		False				
Def	fault Print File N	lame						•
Prin	nt Border							•
Ras	ter Printing							•
	/anced							

- 1. The line item highlighted in the above screen capture needs to be edited with the proper sheet size definition for the default printer. Check your printer preferences for the sheet size definition. Typically the sizes will be one of the three: **11x17**, *Tabloid* or **"11x17"**.
- Once the file has been edited, save a copy of *CDOT-DefaultPrinter_V8i.pltcfg* in your project's *Plot_Sets* folder. If you save the changes back to the original file located at *C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation\Plotter Driver*, the file will be overwritten the next time you log into your workstation.

Save Printer Driver Configuration File					×			
📀 🗢 🕨 « Projects 🕨 12348 🕨 🖡	Plot_S	Sets 🕨 👻 👻	<b>4</b> 7	Search Plot_Sets	٩			
Organize 🔻 New folder 🛛 🖽 👻 🔞								
<ul> <li>12346</li> <li>12348</li> <li>Bridge</li> <li>Construction</li> <li>Consultants</li> <li>Design</li> <li>Hydraulics</li> <li>Landscape_Environmental</li> <li>Materials_Geotechnical</li> <li>Miscellaneous</li> </ul>	A III	Name AD FIR FOR ROWPR	*		Date modified 1/11/2010 8:11 11/21/2007 2:38 11/21/2007 2:38 11/21/2007 2:38			
Planning	-	•			Þ			
File name: CDOT-DefaultPrint Save as type: Printer Driver Config	•							
🔿 Hide Folders				Save	Cancel			

In the Print dialog box, <D> the Search icon next to the *Bentley driver*. Navigate to your project's *Plot_Sets* directory and select the edited *pltcfg* file. This will now become the default settings until you select a different *pltcfg* file.

Print Xerox Phaser 8560N PS (CDOT-DefaultPrinter_V8i.pltcfg)
<u>File</u> <u>S</u> ettings <u>P</u> enTable
General Settings
Area: Fence Rasterized
View: View 1
Color: True Color Copies: 1
Pen table: Tables/Pen/CDOT-Pen Table.tbl
Printer and Paper Size
Windows driver
Paper: Letter
Total area: 11 x 8.5 in.
Landscape ▼ Send to printer ▼ Show design in preview
Print Scale and Position
Scale: 154.545 Q 1 in. (paper) to 154.545 ' (design)
Size: 11.000 7.118 in. 🕂 Maximize Rotation: None 🔻
Origin: 0.000 0.691 in. 📝 Auto-center

4. Once you have selected the correct *pltcfg* file, you will notice the *Paper* size is defaulting to the new settings and the print view is now correct.

File Settings   General Settings   Area:   Fence   Rasterized   View:   View:   View:   Color:   True Color   Coolor:   True Color   Copies:   1   Pen table:   Tables/Pen/CDOT-Pen Table tbl   Printer and Paper Size   Windows driver   Qist   Full   Paper:   17x11   Total area:   17x11   Total area:   17x11   Total area:   17x11   Total area:   17x10   Send to printer   Print Scale and Position   Scale:   100.000   Q:igin:   0.000   0.000   in.   Waximize   Rotation:   None	📕 Print Xerox Phaser 8560N PS (CDOT-DefaultPrinter_V8i.pltcfg)
General Settings   Area:   Fence   Image:   Color:   True Color   Color:   Total area:   17x 11   Total area:   17x 10   In:   (paper)   Scole:   100:000   In:   (paper) to 100:000' (design)   Size:   17:000   11:000   in:   In:   Maximize   Rotation:   None	<u>File</u> <u>Settings</u> <u>P</u> enTable
Area: Fence   Area: Rasterized   View: View:   Color: True Color   Color: True Color   Copies: 1   Pen table: Tables/Pen/CDOT-Pen Table tbl   Printer and Paper Size Image: Tx11   Windows driver Image: Full   Paper: Tx11   Total area: 17x 11 in.   Landscape Send to printer   Print Scale and Position   Scale: 100.000   Size: 17.000   In. Maximize   Rotation: None	
View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View:       View: <td< td=""><td>General Settings</td></td<>	General Settings
Color: True Color Copies: 1 Pen table: Tables/Pen/CDOT-Pen Table tbl Printer and Paper Size Windows driver C Copies: 1 Paper: 17x11 Total area: 17x 11 in. Landscape C Send to printer C Show design in preview Print Scale and Position Scale: 100.000 C 1 in. (paper) to 100.000 '(design) Size: 17.000 11.000 in. + Maximize Rotation: None C	Area: Fence  Rasterized
Pen table: Tables/Pen/CDOT-Pen Table tbl Printer and Paper Size Windows driver  Q Full Paper: 17x11 Total area: 17x 11 in. Landscape  Send to printer V Show design in preview Print Scale and Position Scale: 100.000 Q 1 in. (paper) to 100.000 ' (design) Size: 17.000 11.000 in.  Maximize Rotation: None	View: View 1 🔻
Pen table: Tables/Pen/CDOT-Pen Table tbl Printer and Paper Size Windows driver  Q Full Paper: 17x11 Total area: 17x 11 in. Landscape  Send to printer V Show design in preview Print Scale and Position Scale: 100.000 Q 1 in. (paper) to 100.000 ' (design) Size: 17.000 11.000 in.  Maximize Rotation: None	Color: True Color  Copies: 1
Printer and Paper Size         Windows driver         Paper:         17x11         Total area:       17x11 in.         Landscape       Send to printer         Print Scale and Position         Scale:       100.000         Size:       17.000         11.000       in.         Image:       Print Scale and Position	
Windows driver       Q       Full         Paper:       17x11         Total area:       17x 11 in.         Landscape       Send to printer         Print Scale and Position         Scale:       100.000         Q       1 in. (paper) to 100.000 ' (design)         Size:       17.000         II.000       in.         H       Maximize         Rotation:       None	
Paper:       17x11         Total area:       17x11 in.         Landscape       Send to printer         Print Scale and Position         Scale:       100.000         Size:       17.000         in.       ++         Maximize       Rotation:         None       •	
Total area:       17x 11 in.         Landscape       Send to printer         Print Scale and Position         Scale:       100.000         Q       1 in. (paper) to 100.000 ' (design)         Size:       17.000         in.       ++         Maximize       Rotation:	Windows driver 🔹 🤉 💦 🕡 Full
Landscape       Send to printer         Print Scale and Position         Scale:       100.000         Q       1 in. (paper) to 100.000 ' (design)         Size:       17.000         in.       ++         Maximize       Rotation:	Paper: [17x11
Print Scale and Position         Scale:       100.000         Q       1 in. (paper) to 100.000 ' (design)         Size:       17.000         In.       ++         Maximize       Rotation:	Total area: 17x 11 in.
Scale:         100.000         Q         1 in. (paper) to 100.000 ' (design)           Size:         17.000         11.000         in.	Landscape  Send to printer Show design in preview
Size: 17.000 11.000 in. +++ Maximize Rotation: None	Print Scale and Position
	Scale: 100.000 Q 1 in. (paper) to 100.000 ' (design)
<u>O</u> rigin: 0.000 in. ♥ Auto- <u>c</u> enter	Size: 17.000 11.000 in. ++→ Maximize Rotation: None ▼
	Origin: 0.000 0.000 in. V Auto-center

### **Setting the Default Plotter Path**

The default path for a plotter or non default printer can be edited and set inside the *Print Configuration* file.

1. The name of the file that should be edited for a default plotter is *CDOT_DefaultPlotter_V8i.pltcfg*. *Open* the file from within MicroStation V8i using the Print Driver Configuration Editor. It can be invoked from the MicroStation Print dialog's **File > Edit Printer Driver Configuration** menu.

Print Xerox Phaser 8560N PS (CDOT
File Settings PenTable
Open Print Definition File
Save Print Definition File
Configure Windows Printer
Pre <u>v</u> iew
Print
Select Windows Printer
Select <u>B</u> entley Driver
Edit Printer Driver Configuration
Reload Printer Driver Configuration
Exit

2. Navigate to *C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation\Plotter Driver* and open the printer driver.

K CDOT-DefaultPrinter_V8i - Printer Driver Config	guration	X
File		
General Base Properties Paper Sizes Color Maps	Weight Maps Line Styles Font Maps Programs	
General		*
Windows Printer		*
Default Windows Printer Name		
Default Form Name	1/x11	
Default Tray Name		
Full Sheet Mode	True	
Orientation	Default Orientation	
Default Create Metafile	False	
Default Print File Name		*
Print Border		*
Raster Printing		*
Advanced		*

3. The line item in the above screen capture needs to be edited with the proper default plotter path. Typically the path will be: **\\Server_Name\Plotter_Name**.

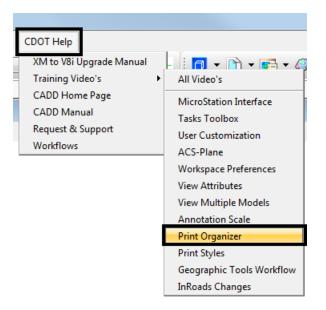
📕 CDOT-DefaultPrinter_V8i - Printer Driver Con	figuration	×
File		
General Base Properties Paper Sizes Color Maps	s Weight Maps Line Styles Font Maps Programs	
General		*
Windows Printer		*
Default Windows Printer Name	\\Server_Name\Plotter_Name	
Default Form Name	1/x11	
Default Tray Name		
Full Sheet Mode	True	
Orientation	Default Orientation	
Default Create Metafile	False	
Default Print File Name		*
Print Border		*
Raster Printing		*
Advanced		*

## **Workflow MP 3 - Print Organizer**

This document guides you through the basic functions for using *Print Organizer*. *Print Organizer* is a new utility in MicroStation that replaces the *Batch Print* utility in MicroStation and MicroStation PDF composer. Any past *Batch Print* job set (.job) files can be opened and converted to the new format.

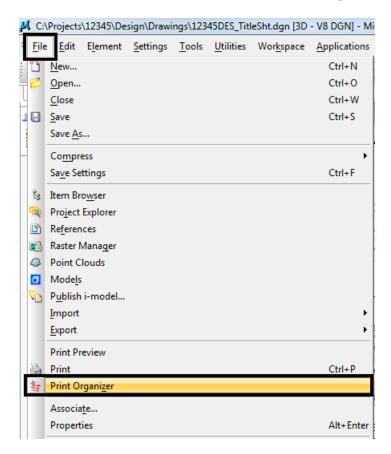
📕 12345.pset - Print Organizer								X
File Edit View Tools								
🗅 📂 日 🗋 🍳 📂 😘	$\times {\rm er}     \overline{}  \wedge  \overline{} $	⊻   📰 -	1					
□ 12345	Name	Print Area	Pap	S.,	X Size	Y Size	Pen Table	-
<pre>12345DES_TitleSht 12345DES_StdPlanList 12345DES_GenINote01 12345DES_Plan01 12345DES_Plan02 12345DES_Plan03 12345DES_PnP01 12345DES_PnP01 12345DES_PnP02 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 12345DES_PnP03 13345DES_PnP03 /pre>	<root> 12345DES_TitleSht 12345DES_StdPlan 12345DES_GenlNot 12345DES_Plan01 12345DES_Plan02 12345DES_Plan03 12345DES_PnP01 12345DES_PnP01 12345DES_PnP02 12345DES_PnP03</root>	Fence Vew Fence Fence Fence Fence Fence Fence Fence Fence	17x11 17x11 17x11 17x11 17x11 17x11 17x11 17x11 17x11 17x11	1 6 1 1 1 1 1 1	17.000 14.642 17.000 17.000 17.000 17.000 17.000 17.000 17.000	11.000 11.000 11.000 11.000 11.000 11.000 11.000 11.000 11.000	CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable	4 III

For more information on using *Print Organizer* for Batch Printing, watch the training video "*Using Print Organizer for Batch Printing*". This can be accessed from within MicroStation by using the *CDOT Help* pull down menu and selecting **Print Organizer**.



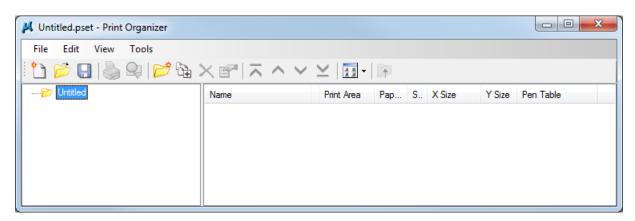
## **Basic Print Organizer Workflow**

1. Select **File > Print Organizer** from the MicroStation pull down menu.



Note: You can be in any MicroStation file when you run Print Organizer.

2. The *Print Organizer* dialog box will display. The print set name is Untitled. When you save the print set with a project related name, the root folder in the left hand column will change along with the file name. The saved file will have an extension of PSET.



r

3. Files can be added either by **<D>** the **Add Files to Set** icon, or by dragging and dropping files from *Windows Explorer*.

📕 Untitled.pset - Print Organizer		
File Edit View Tools		
É 🏠 📂 🔛   🌺 Q₂   📂 ₽ Untitled	Name	
📕 Untitled.pset - Print Organizer		8
File Edit View Tools		
1 🔁 🔁 🗋 🖓 📂 🖧	< @"   <b>⊼ ^ ∨ ⊻</b>   <b>⊡</b> -   际	
······ 📂 Untitled	Name Print Area Pap S X Size Y Size Pen Table	
	Organize       Open       Print       Burn       New folder         Organize       Open       Print       Burn       New folder         Planning       Name       12345DES_EarthworkQuant01.dgn         Plot_Sets       12345DES_GenlNote01.dgn         FIR       12345DES_Plan01.dgn         FOR       12345DES_Plan02.dgn         ROWPR       12345DES_Plan03.dgn         Project_Configuration       12345DES_PnP01.dgn         Redline       12345DES_PnP02.dgn         Redline       12345DES_Prof03.dgn	

4. When the *Add Files to Set* icon method is used, the **Create Print Definitions** dialog will appear. Here you can add files and set a print style. Begin by **<D>** the **Add** button to add files.

		Add
Print definition creation	options	
	- Provide and a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	
		Q
Print style name:	ed Options	Q

5. Navigate to your project directory and select the files you want to add to *Print Organizer*. **<D> Done** to add the files.

Look in:	📗 Drawings		•	G 🤌 📂 🖽 -	3 🗎
<b>A</b>	Name	*		Date modified	Туре
2	Cross_Sectio	ns		8/18/2010 12:50 PM	File folder
ecent Places	Reference_Fi	les		11/10/2010 8:27 AM	File folder
	🐌 Tabs			8/18/2010 12:50 PM	File folder
-	<b>12345DES Ea</b>	rthworkOuant01.don		6/24/2010 12:31 PM	MicroStation DGN
Desktop	2345DES_Ge	enlNote01.dgn		6/24/2010 12:31 PM	MicroStation DGI
<b>F</b>	12345DES_PI	an01.dgn		11/10/2010 8:47 AM	MicroStation DGI
	12345DES_PI	an02.dgn		11/10/2010 8:39 AM	MicroStation DGI
Libraries	312345DES_PI	an03.dgn		11/10/2010 8:39 AM	MicroStation DGI
	12345DES_Pr	nP01.dgn		11/30/2010 1:27 PM	MicroStation DGI
	12345DES_Pr	nP02.dgn		10/11/2010 9:53 AM	MicroStation DGI
Computer	212345DES_Pr			10/11/2010 9:53 AM	MicroStation DGI
	12345DES_Pr	of01.dgn		10/11/2010 11:07	MicroStation DGN
	12345DES_SA			6/24/2010 12:31 PM	MicroStation DG
Network	12345DES_St	2		6/24/2010 12:31 PM	MicroStation DGN
	12345DES_SV	-		6/24/2010 12:31 PM	MicroStation DGI
	212345DES_Ta	-		6/24/2010 12:31 PM	MicroStation DGN
	212345DES_Ta			6/24/2010 12:31 PM	MicroStation DGN
	212345DES_Ta	-		6/24/2010 12:31 PM	MicroStation DGN
	12345DES_Ta	-		6/24/2010 12:31 PM	MicroStation DGN
	< [			C (24 (2010 12 21 D14	F F
	File name:	"12345DES_PnP03.dgr	" "12345D	ES_GenINote01.dgn" "	Done
	Files of type:	CAD Files (*.dgn;*.dwg)		•	Cancel
	•				Options

*Note:* You can hold down the *Ctrl* or *Shift* key to select multiple files.

6. *Print Styles* have been created to control print settings such as print area, paper size, workspace, color, rater quality, and fence area. **<D>** the **Browse** icon (magnify glass) to select the appropriate print style.

Create Print Definitions	×
Input files C:\Projects\12345\Design\Drawings\12345DES_GenlNote01.dgn C:\Projects\12345\Design\Drawings\12345DES_Plan01.dgn C:\Projects\12345\Design\Drawings\12345DES_Plan02.dgn C:\Projects\12345\Design\Drawings\12345DES_PnP01.dgn C:\Projects\12345\Design\Drawings\12345DES_PnP02.dgn C:\Projects\12345\Design\Drawings\12345DES_PnP03.dgn C:\Projects\12345\Design\Drawings\12345DES_StdPlanList.dgn C:\Projects\12345\Design\Drawings\12345DES_TitleSht.dgn	Add Remove
Print definition creation options Print style name:	٩
Manually Specified Options OK	Cancel

7. The default print style names match the CDOT Print Driver naming conventions. For more on *Print Styles*, watch the "*Using Print Styles*" training video.

elect a print style to apply:	
Print Style Name	File Name
CDOT Default Plotter CDOT Default Printer CDOT PDF (Color) CDOT PDF (Draft Quality) CDOT PDF (High Quality) CDOT ROW Plotter CDOT ROW Printer CDOT Shaded Plotter	CDOT_PrintStyles.dgnlib CDOT_PrintStyles.dgnlib CDOT_PrintStyles.dgnlib

8. After selecting the appropriate print style, **<D> OK** in the Apply Print Style dialog box.

**Note:** Any additional files that are added in the future will take on the definitions of these first files unless you select otherwise.

- 9. Next **<D>** *Manually Specified Options* to bring up the *Print Definition Creation Option* dialog box. Here is where you define the printing area.
- 10. When adding sheet files, there is a layer defined for the printing border called SHEET_Plot-Boundary. This can be used as the fence definition.

11. From the *Fence* tab, there are two settings. First set the *Create Print Definitions from Models* to All models.

Print Definition Creation Options	x
Main Advanced Fence Display	
Create Print Definitions from Models	
All models	
Fence creation methods:	
None	
Define from shape	
Define from cell	
Fit to master model	
Eit to master model and all reference files	
Fit to element range	
Enter fence points	
OK Cance	

Next select *Define from shape* and enter the shape properties. For example *SHEET_Plot-Boundary*. <D> OK.

Fence - Define from shape	x
Search V Master model Reference files References:	Shape properties Levels: SHEET_Plot-Boundary Colors: (0-255) Weights: (0-31)
	Styles: (0-7)
Oreate one print definition from f	irst matching shape
Create one print definition for early	ch matching shape
	OK Cancel

- **Note:** When adding cross sections, toggle on *Create one definition for each matching shape*. This will create a seperate file for each cross section in the model.
- 13. **<D> OK** in the Print Definition Creation Option dialog box.
- 14. **<D> OK** in the Create Print Definitions box. This will add the file(s) to your print organizer.

15. To view the print style assignments or override them, double click on the file name. This will open the *Properties* dialog box for that file.

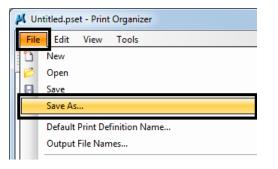
Main Advanced Fence Display Filename: C:\Projects\12345\Design\Drawing	s\12345DES_Plan01.dgn
Area	Paper
Print area: Fence 💌	Paper size: 17x11
Model: CDOT Default	Limits: 17.000 x 11.000 in
View group: CDOT Default	Orientation: Landscape 🔹
View: View 1	Source: Automatically Select
Rasterized	✓ Full sheet
Scale:       1.0000:1.0000         Size:       17.000         Origin:       0.000         Ørigin:       0.000         Ørore	Refresh
Pen table: Vorkspace-CDOT_V8\\Standards-Global	VMicro Station \Tables \Pen \CDOT-Pen Table tbl Q

16. Print definitions can be edited on more than one file at a time. If you select more than one file and then **right click** and select **Properties**, the **Modify Properties** dialog box becomes available.

Untitled.pset - Print Organizer								×	
File Edit View Tools									
$[1] \cong \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes \boxtimes $									
⊡	Name	Print Area	Pap	<b>S</b>	X Size	Y Size	Pen Table		
	<root></root>							=	
12345DES_Plan01	12345DES_GenINot	Fence	17x11	1	17.000	11.000	CDOT-PenTable	-	
12345DES_Plan02	12345DES_GenINot	Fence	17x11	1	17.000	11.000	CDOT-PenTable		
123450ES_Han02	12345DES_Plan01	Fence	17x11	1	17.000	11.000	CDOT-PenTable		
	12345DES_Plan02	Fence	17v11	1	17.000	11.000	CDOT-PenTable		
12345DES_PnP01	12345DES_Plan03	Print			17.000	11.000	CDOT-PenTable		
12345DES_PnP02	(12345DES PnP01	Print Pre	view		17.000	11.000	CDOT-PenTable	-	
		Rename				-			
		Delete							
		Propertie	es						

17. Changes can also be made to a single file by using *in-place print definition editing*. This can be done by selecting the file you wish to edit in the right hand pane and double-clicking on the property in a specific column.

18. Once all the settings have been assigned, select **File > Save As.** 



Recent Places	me AD FIR FOR ROWPR	*	8/18/201 8/18/201	dified 10 8:43 AM 0 12:50 PM 0 12:50 PM 0 12:50 PM	Type File folder File folder File folder File folder	Size	
Recent Places	FIR FOR		8/18/201 8/18/201	0 12:50 PM 0 12:50 PM	File folder File folder		
	FOR		8/18/201	0 12:50 PM	File folder		
	ROWPR		8/18/201	0 12:50 PM	File folder		
Desktop							
Libraries							
Computer							
Network File r	name:	12345				[	Save
	e as type:	Print Set Files					Cancel

19. Navigate to the appropriate project folder and assign a new name to the file. **<D> Save** when complete.

### **Printing From Print Organizer**

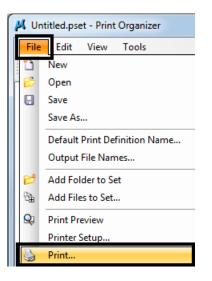
The files in the *Print Organizer* file will be printed in the order the sheets appear in the display. If they are displayed in the incorrect order this will have to be changed.

1. Select the sheets to change. Using the **Move** buttons, move the selected sheets to the desired location.

📕 Untitled.pset - Print Organizer								
File Edit View Tools								
$\textcircled{1} \not\cong \bigcup \bigcup \bigcup u \not\cong f \not\cong f \cong f \boxtimes f \boxtimes f \boxtimes f \boxtimes f \boxtimes f \boxtimes f \boxtimes f \boxtimes f $								
	Name	Print Area	Paper Size	S.,	X Size	Y Size	Pen Table	
	<root></root>							
	<pre>(12345DES_GenINot</pre>	Fence	17x11	1	17.000	11.000	CDOT-PenTable	
	12345DES_GenINot	Fence	17x11	1	17.000	11.000	CDOT-PenTable	
	12345DES_Plan01	Fence	17x11	1	17.000	11.000	CDOT-PenTable	
	12345DES_Plan02	Fence	17x11	1	17.000	11.000	CDOT-PenTable 😑	
	12345DES_Plan03	Fence	17x11	1	17.000	11.000	CDOT-PenTable	
	12345DES_PnP01	Fence	17x11	1	17.000	11.000	CDOT-PenTable	
	12345DES_PnP02	Fence	17x11	1	17.000	11.000	CDOT-PenTable	
	12345DES_PnP03	Fence	17x11	1	17.000	11.000	CDOT-PenTable	
	12345DES_StdPlan	View	17x11	6	14.642	11.000	CDOT-PenTable	
	12345DES_TitleSht	Fence	17x11	1	17.000	11.000	CDOT-PenTable	
							-	

2. Be sure to *save* the changes.

3. Once all settings have been completed, select **File > Print** or **<D>** the printer icon to print the files.



4. The print dialog box will appear.

Print	×
	Configuration CDOT-PDFHighQuality_V8i.pltcfg Bentley PDF printer driver Printer Setup
Print Range All Selection Submit	Copies Number of copies: 1
Submit as: Destination:	Create print file  Single print job C:\Projects\12345\Design\Drawings\Untitled.pdf Open print file after creation
	OK Cancel

5. The entire plot set can be printed or individual files. Select **All** or **Selection** for the print range.



6. *Printer Driver* settings can be changed at this time if needed. Select the *Printer Setup* to select a different printer driver.

Printer Driver Configuration							
File name: CDOT-PDFHighQuality_V8i.pltcfg							
Type:	Bentley PDF printer driver	Printer Setup					

Finally, if you are creating an Adobe PDF file using a PDF driver, select the location where the file will be saved by <D> the Browse button

Submit	
	Create print file 👻
Submit as:	Single print job
Destination:	C:\Projects\12345\Design\Drawings\Untitled.pdf
	Open print file after creation

8. Navigate to the appropriate project folder. Enter a file name and **<D> Save**.

📕 Save Output F	File - C:\Projects\1	2345\Plot_Sets\AD\			×
Save in:	鷆 AD		•	G 🤌 📂 🛄 -	8 🖲
æ	Name	*		Date modified	Туре
Recent Places	鷆 Revisions			8/18/2010 12:50 PM	File folder
Desktop					
Libraries					
Computer					
	•				4
Network	File name:	12345_AD pdf		•	Save
	Save as type:	*.pdf		¥	Cancel

9. **<D> Ok** to activate the **Print** command.

Print	X
	Configuration CDOT-PDFHighQuality_V8i.pltcfg Bentley PDF printer driver Printer Setup
Print Range	Copies Number of copies: 1
Submit	Create print file *
Submit as:	Single print job
Destination:	C:\Projects\12345\Plot_Sets\AD\12345_AD.pdf Q Open print file after creation
	OK Cancel

### **Print Preview Files**

1. Select the *Print Preview* icon to review files

📕 Untitled.pset - Print Organizer										
File       Edit       View       Tools $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$										
	Name	Print Area	Paper Size	S.,	X Size	Y Size	Pen Table			
<ul> <li>[12345DES_GenINote01</li> <li>[12345DES_GenINote01</li> <li>[12345DES_Plan01</li> <li>[12345DES_Plan02</li> <li>[12345DES_Plan03</li> <li>[12345DES_PnP01</li> <li>[12345DES_PnP02</li> <li>[12345DES_PnP03</li> <li>[12345DES_StdPlanList</li> <li>[12345DES_TitleSht</li> </ul>	<pre><root></root></pre>	Fence Fence Fence Fence Fence Fence Fence View Fence	17x11 17x11 17x11 17x11 17x11 17x11 17x11 17x11 17x11 17x11 17x11	1 1 1 1 1 1 6	17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000 14.642 17.000	11.000 11.000 11.000 11.000 11.000 11.000 11.000 11.000 11.000	CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable CDOT-PenTable			

2. If more than one sheet has been selected, use the navigation buttons to page through the sheets.

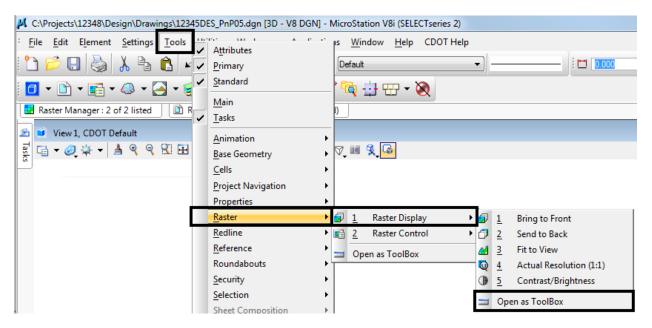
			[	12345DES_Title	eSht 👻	6
Dversight / NHS MAA ROOM VILLOVENIDE? 0 NO 1 MATORA HISHAA \$13109 0 NG 0	, vis	ARTMENT OF TRANSI STATE OF COLOR		)N	Related Projects: P. C. Letter PROJECT: Project Court R. D. W. Project Court P. J. M. Project Description prospectors pro-	NULLER OF STREET
		EIGHWAY CONSTRUCTION OID PLANS (	ST PROPOSED	L		
TABULATION OF LEN	GTH & DESIGN DATA	FEDERAL AID PROJECT NO. XXX				
STAT 22N	ROUDIALY HUUDR	STATE HIGHWAY ND XXX XXXXXXXXXX COUNTY		SHEET NO.	INDEX OF SHEETS	
EPPROACH TO PROJECT	XXX.XX	CONSTRUCTION PROJECT CODE NO	XXXXX	1 17145 84557		
BESTN X0001-0001-				S-X TIPICAL SEC X SEVERAL NOT	NG LIST SHEET TICKS SHEET TO SHEET	
STD. X-W.XX DI XXX00000X, R.P. W.XX	300.300			X-X SUMARY OF A	PROVING GUNTITURE	
ST5. X-W.XX BESTN STRUCTURE NO. X-XXXXX	100.00			X DEATL BIES	ALTOHONT DISTO	
STS. XX40X.XX END STRUCTURE				X-X COTSTRUCT: X PLAN AND PR	IN STADDO SHEETS	
10. X-XX+XX	808.800	11		X HLICR "BEC	TALTED SHOUP SHEETS	
STD. X040X-X08+ STD. X0440X-XX CN X08000X, R.P. XX-XX	300.30	n				
APPROLCH TO PROJECT		U				_
STANDER TO PROJECT						
						_
FOTAL SUMMERY OF PROJECT LENTH	0 0 0 RET KLES					
HAUGR STRUCTURE PROJECT GROUP LENGTH	30080X X.300X 30080X X.300X					
DESIGN DATA	2.H. 30K *2.H. 30K					
HUXDER GADE	X.30 X.30					
HINDRE S. S.D. HORIZOTAL	XXX FT. XXX FT.					
HINDREM S.S.D. VERTICAL HANDREM DESIGN SPEED	XX 19N XX 19N					
DENCE DESIGN TRAFFIC	DH/ # 20 DH/ # 200 2017 # 2000 2017 # 2000					
DH/ TRUCK IN	XA XA					
CLEUR ZONE DISTURCE (TAKSENT)	X XX FT. X.W FT.	PROJECT LOCATION MAP				
CLEAR ZONE DISTANCE (OK MIN. RADIUS)	X.X.FT. X.X.FT.	, <del></del> ,				
CONSTRUCTION CLEAR ZONE (MIN 101)	X FT. X FT.					
Print Date: 12/22/2000 File Hone: 12/22/2000	Sheet Revision	08	As Constructed	Contract In Selected		
Horiz, Scala (20) Mari, Scola An Uni, Information Uni Lacan	Hoted (FEE)		No Revisions)	Reddert England	Project	
			Ran beet:		6027103 / / Sect Marter	_
			100	C++#34	Sheel Harde	•

# **Workflow MP 4 - Printing Raster Images**

This document guides you through the display settings of raster images and modifying text for better clarity.

### **Adjusting Raster Display Settings**

1. Contrast and Brightness controls are used to adjust the display characteristics of raster images. Select *Tools* > *Raster* > *Raster* > *Display* > *Open as ToolBox*.



2. The Raster toolbox will appear. **<D>** the **Contrast/Brightness** icon.



- 3. If more than one raster image is displayed in the drawing, the image you want to adjust may not be active. To select a different image, **<R>** then select the desired image (**<D>**) from the view.
- 4. Determine how you want to adjust the selected raster image. To make an image appear lighter, move the *Brightness* slider to the right or key in a positive value. To increase the contrast of the image (setting apart the display of different entities within the raster file), move the *Contrast* slider to the right or key in a positive value. Using a negative value for contrast will result in a darkened image.

Contrast/Brightness							
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Brightness:	0	-100	•		•	100	

5. Continue adjusting *Brightness* and *Contrast* until the desired result is achieved then dismiss the setting dialog.

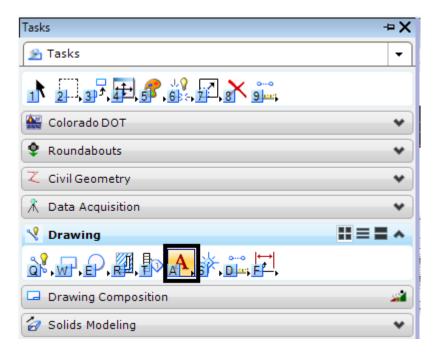
## Using a Text Style with a Background

If a raster image is dominated by dark colors, it may be necessary to use a text style with a background.

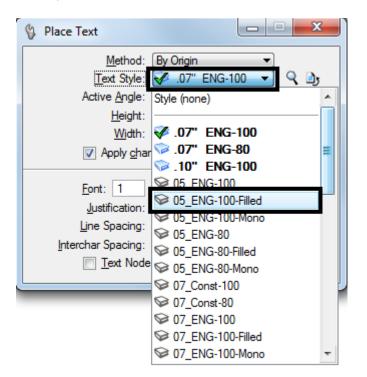
#### Placing Text with a Background

The only change required for placing text with a background is to select one of the "Filled" Text Styles.

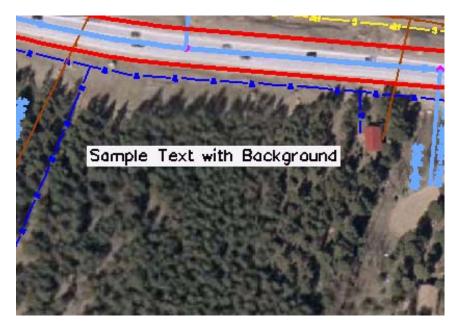
1. Select the **Place Text** icon from the **Main** toolbar.



2. In the **Place Text** settings dialog box, use the **Text Style** pull down menu and select the desired *"Filled"* Text Style.



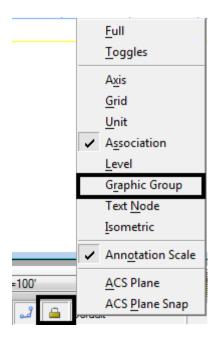
3. In the **Text Editor**, key in the desired text and place as normal. The result will look like the example below:



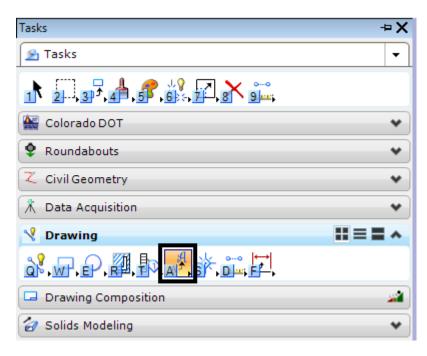
*Note:* The color of the text in this example has been changed for clarity.

# Modifying InRoads Text to Have a Background

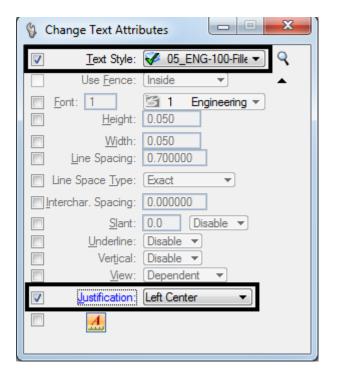
- 1. InRoads does not use Text Styles or Annotation Scale. Therefore, text displayed by this program will have to be modified to display a background.
- 2. Turn *off* the **Graphic Group Lock.** All Cardinal Point text and all P.I. text are contained in graphic groups. Turning off the **Graphic Group** lock will allow the justification to be set for each piece of text as needed.



3. Select Change Text Attributes from the *Main* toolbar.



 In the Change Text Attributes dialog box, set the Text Style. Use.10" ENG-100 Filled for Major Stations and.07" ENG-100 Filled for PC, PT, and PI stationing Points. Also, set the desired Justification.



Note: <u>Note:</u> the following justifications are used by InRoads: Major Stations - Left Center P.I. Left of Centerline - Right Center P.I. Right of Centerline - Left Center Cardinal Left of Centerline - Right Bottom Cardinal Right of Centerline - Left Bottom

5. Select the desired text from the MicroStation view. Text may be selected individually or use the MicroStation element selection tools to select multiple text entities. Use the element selection tools to select a large number of elements that have the same Text Style and Justification (like Major Stations, for example). For Cardinal Points and P.I. stations, selecting them individually may be a better option as their justification is dependent on the direction of the curve.

**Note:** The text will change to a very small size. Do not worry about that for now. An **Annotation Scale** will be added to all of the text that was modified at one time. This will restore the text to its proper size. As shown below, the text size in the image on the left is correct, but the text styles are wrong. The text in the image on the right has the correct text style applied, but no adjustment to the text size has been made.



- 6. Repeat steps 10 and 11 for all of the text placed by InRoads.
- 7. Highlight all of the InRoads placed text that has been changed to a "Filled" text style.
- 8. If no text is highlighted when the "*annotationscale add*" keyin is run, then the annotation scale is applied to all text. This will enlarge InRoads geometry symbols (which come from symbol fonts) by the annotation scale factor.
- 9. In the **Key-in** window, type "*annotationscale add*" and **<D>** the **Run Key-in** icon or press the **Enter** key. This will restore the text to its proper size.





10. Below is an example of InRoads text with a filled background and correct annotation scale.

# Workflow MP 5 - Shaded Color and Grayscale Printing

This document guides you through the set-up and printing process for shaded and grayscale Sheet Files. This workflow may be used any time the user wants to highlight specific areas for things such as phasing plans, public meetings, ROW exhibits, etc. Please note that the use of raster images (jpg, bmp, tif, etc.) will dramatically increase the processing time during printing

### **Reference File Management**

Adjustments must be made to some of the reference file settings in order to achieve the desired print quality. The settings that may need changing are the **Slot Numbers** and **Update Sequence**. **Slot Numbers** are unique identifiers assigned to reference files and can be called out individually or in groups within a pen table for special processing during printing. **Update Sequence** determines the order in which files are refreshed on the screen and printed on paper.

#### **Reference File Slot Number Categories:**

0= Sheet File (black) - this is the active dgn file

1-99 = Proposed Primary Discipline (Black)

100-199= Existing Topo (light gray)

200-299= Proposed Other Discipline (dark gray)

300-399= Color Shaded Areas

**Note:** All data placed in the Sheet File will be printed black. Items to be printed in color should be contained in their own file. Create a new file using the standard CDOT seed file and reference design elements to create color areas. If printing to a black and white printer all colors will be printed grayscale. Files can still be printed using the default printer drivers and pen tables, however shaded areas will lose their transparency and may print black depending on their level.

# **Assigning Slot Numbers**

 Open the Reference Files dialog by selecting File > Reference or <D> the Reference icon on the Primary toolbar.

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2. *Highlight* the desired reference file that you want to apply shaded color, grayscale or a combination of both to for printing purposes.

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3. Once a reference file is highlighted, **<D>** in the **Slot Number** field.

4. **Key-in** the desired number and press the **Enter** key. Refer to the Reference File Slot Number Categories on Page 1. In this example, **200** is entered, which will result in reference file information be plotted Dark Gray, indicating Other Discipline. The reference files will be re-ordered in the window based on their slot numbers after you have updated the Slot Numbers for all reference files.

References (6 of 6 unique, 6 displayed)			
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5. Repeat this process for each of the reference file attached. The illustration below shows a group of files with updated slot numbers.

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**Note:** Reference files whose slot numbers are not changed will print black because they will be in the 1-99 range.

# **Re-Ordering Sequence**

1. Select **Settings > Update Sequence**. This displays the **Update Sequence** dialog box.

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Ne <u>w</u> Leve	el Display:	<u>G</u> eoreferenced		<b>•</b>				

- 2. If a reference file in the list contains shaded areas, move it directly below **Raster References**. If there are no raster references, move it to the top.
- Move the Active Design File to the bottom of the list. When updating the sequence of reference files, highlight the desired file then <D> the Move Up or Move Down icon until it is in its desired location. The Move Up icon is outlined below.

Slot	File Name	Model	Logical Name		
300 200	12345FIOW_OwnershipColor.dgn 12345DES_Model.dgn 12345SUBV_Terce205cal=01.dcn	CDOT Default CDOT Default CDOT Default			
301	12345ROW_Model-Color.dgn	CDOT Default			
2	12345HoW_Wooel.ogn 12345SURV_SectionComers100Sca 12345ROW_Plan505.dgn	CDOT Default CDOT Default CDOT Default	Active Design File		

- Any file containing Area Patterns should be moved under the files containing shaded areas. Highlight the desired file then <D> the Move Up icon until it is in its desired location. <D> OK to proceed with plotting.
  - **Note:** If area patterns are to be printed in color they should reside in the file containing shaded areas to be printed in color, or in their own file.

5. Select **File > Save Settings** from the MicroStation main menu after reordering slot numbers so these changes will remain each time this file is plotted.

### Selecting the Pen Table

1. Select **PenTable > Attach** from the **Print** dialog pull-down menu.

📕 Print Xerox Phaser 8560N PS (CDOT-DefaultPrinter_V8i.pltcfg)
File Settings PenTable
General Settings Attach
Area: Fence Edit Rasterized
View: View 1 Detach
Color: True Color  Copies: 1
Pen table: CDOT-Pen Table.tbl
Printer and Paper Size
Windows driver 🔹 🤉 🕌 👿 Full
Paper: 17x11
Total area: 17 x 11 in.
Landscape  Send to printer  Show design in preview
▲ 
Print Scale and Position Scale: 100.000 Q 1 in. (paper) to 100.000 ' (design)
Size: 17.000 11.000 in. Imaximize Rotation: None
<u>O</u> rigin: 0.000 0.000 in.

2. From the Select Pen Table File dialog, select the CDOT-Shading_GrayscalePenTable.tbl then <D> OK.

Look in:	🔰 Pen	•	G 🌶 📂 🛄 🕇		3 🔒	
(Pa	Name	*	Date modified	Туре		
	CDOT-AC	AD.tbl	9/30/2010 11:48 AM	TBL File		
lecent Places	CDOT-Co	lorPenTable.tbl	9/30/2010 11:49 AM	TBL File		
	CDOT-Co	lorPenTablewithYellowtoBlack.tbl	9/30/2010 11:49 AM	TBL File		
·	CDOT-Pe	nTable.tbl	12/13/2010 3:04 PM	TBL File		
Desktop	CDOT-RO	W-PenTable.tbl	9/30/2010 11:49 AM	TBL File		
Libraries	CDOT-Shi	ading_GrayscalePenTable.tbl	9/30/2010 11:49 AM	TBL File		
Computer						
Network	< III >>					
	File name:	-	Open			
	Files of type: All Pen Table Files ("tbl;".ctb;".stb)					

- 3. Select **File > Save Settings** from the MicroStation main menu before exiting the file.
- 4. The remainder of the printing process does not change. For additional information refer to the workflow document *CDOT Workflow MicroStation Printing*.

### **Creating A PDF File**

To create a PDF file of the shaded print follow the steps above, then continue by completing the steps below.

Print (CDOT-PDFHighQuality_V8i.pltcfg)
<u>File</u> <u>S</u> ettings <u>P</u> enTable
General Settings
Area: Fence Rasterized
View: View 1  Print to 3D
Color: True Color  Copies: 1
Pen table: CDOT-Pen Table.tbl
Printer and Paper Size
Bentley driver
Paper: 17x11 Select Printer Driver Configuration File
Usable area: 17x 11 in.
Landscape ▼     Create plot file ▼       ✓     Show design in preview
Print Scale and Position
Scale: 100.000 Q 1 in. (paper) to 100.000 ' (design)
Size:         17.000         11.000         in.         + +         Maximize         Rotation:         None
<u>O</u> rigin: 0.000 0.000 in. <b></b> Auto- <u>c</u> enter

1. **<D>** the **Select Print Driver** icon from the *Print* dialog.

- 2. From the *Select Printer Driver File* dialog, select the correct Printer Driver file. **<D> OK** to accept the change and dismiss the window.
- 3. **<D>** the **Print** icon in the **Print** dialog box. The **Save Print As** dialog box will be displayed.
- 4. Set the desired directory path for the file in the *Directories* area.
- 5. Key in the desired name for your file in the **Files** filed and **<D> Save**.

*Note:* A default name (the DGN file name with the pdf extension) is supplied by the computer.

6. **<D> OK** to accept the changes and create the PDF file.

📕 Save Print As	C:\Projects\1234	5\Plot_Sets\AD\		×
Save in:	\mu AD	•	G 🤌 📂 🛄 -	8 🖲
æ	Name	*	Date modified	Туре
Recent Places	퉬 Revisions		12/6/2010 11:06 AM	File folder
Desktop				
Libraries				
Computer				
Network	•	III		4
	File name:	12345ROW_Plan505.pdf	•	Save
	Save as type:	Print Output Files (*.*)	•	Cancel

# Workflow MP 6 - Printing AutoCAD Files in MicroStation

This document guides you through printing AutoCAD files in MicroStation.

# **Workflow Outline**

**Open an AutoCAD File in MicroStation** - To ensure that the printed AutoCAD file matches printed MicroStation files, the AutoCAD file is printed from MicroStation.

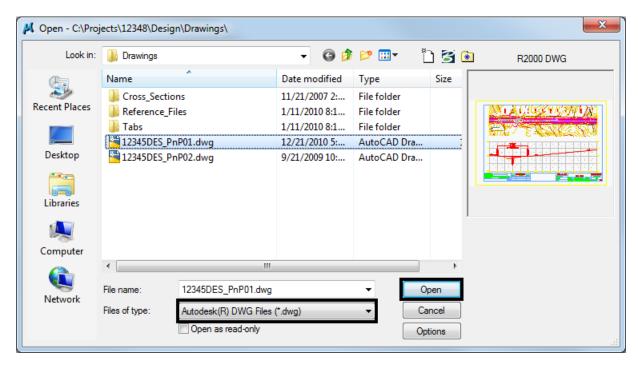
- Commands Used: File > Open Used to access the MicroStation Manager dialog box. From there, the AutoCAD file is opened.
- DWG/DXF Units This sets the units for the AutoCAD file to match MicroStation units.

**Print the File** - There are two items that need to be set before sending the file to the printer; the printer driver and the pen table.

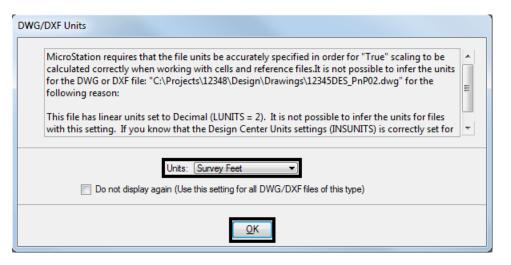
- Commands Used: **Print** Used to access the Print dialog box.
- **Printer Driver** Used to select the proper driver for the desired print type.
- **Pen Table > Attach** Used to attach the CDOT_ACAD.tbl pen table.
- **Send Print** Used to submit the file to the drawing to the printer (or file for a pdf).

# **Opening an AutoCAD file in MicroStation**

 From the Open dialog, select an AutoCAD (*.dwg) drawing file. Change Files of Type to Autodesk(R) DWG Files (*.dwg) to view all the AutoCAD files residing in the specified directory. Select a file and <D> Open.



2. The DWG/DXF Units dialog box will appear. Verify the Units are set to Survey Feet and <D> OK.



- **Note:** If the AutoCAD drawing file contains the **WWWW** PICS linestyle then change these elements and place them on the standard CDOT MicroStation Level called **ROW_MONUMENT_City-Limit-***Line-Text* and update to use bylevel symbology.
- 3. Select **File > Print** to open the **Print** dialog box.

×	۲	C:\	Projects	\12348\De	sign\Drawi	ngs\1234	45DES_Pn	01.dwg [R20	00 DWG] - I
	:	<u>F</u> ile	<u>E</u> dit	E <u>l</u> ement	<u>S</u> ettings	<u>T</u> ools	<u>U</u> tilities	Wor <u>k</u> space	<u>A</u> pplicatio
		Ľ)	New						Ctrl+N
	1	B	Open						Ctrl+0
44	1		<u>C</u> lose						Ctrl+W
	T		Save						Ctrl+S
	H		Save <u>A</u> s						
			Compre	ess					•
			Sa <u>v</u> e Se	ttings					Ctrl+F
		8	Item Bro	o <u>w</u> ser					
G		<b>B</b>	Project	Explorer					
		È	Re <u>f</u> eren	ces					
			Raster N	/lana <u>q</u> er					
		4	Point C	louds					
			Mode <u>l</u> s						
		<b>•</b>	P <u>u</u> blish	i-model					
			<u>I</u> mport						•
			Export						· ·
			Print Pr	eview					
		5	<u>P</u> rint						Ctrl+P
		4	Print Or	rgani <u>z</u> er					

4. Optionally, **<D>** the printer icon on the **Standard Tool Bar**.



5. The current **Printer Driver** will display in the title bar at the top of the **Print** dialog box and the current **Pen Table** is displayed under the *General Settings* area.

Print Xerox Phaser 8560N PS (CDOT-Defa	aultPrinter_V8i.pltcfg)
General Settings	•
Area     Fence     Rasterized       Mew:     View 1        Color:     True Color     Copies:	
Pen table: CDOT-Pen Table.tbl Printer and Paper Size Windows driver  Full	
Paper: 17x11   Total area: 17x 11 in.  Landscape   Send to printer	Show <u>d</u> esign in preview
	aper) to 100.000 (design)
	laximize <u>R</u> otation: None

- **Note:** If you are printing Sheet Layouts, *Print Scale and Size* settings will update automatically. If you are printing from a Model Layout set the scale as desired. For more information or additional printing questions, see the workflow document *CDOT Workflow MicroStation Printing*.
- The default Printer Driver is *CDOT-DefaultPrinter_V8i.pltcfg* and the default Pen Table is *CDOT-PenTable.tbl*. To change the Printer Driver, <D> the magnifying glass located under *Printer and Paper Size*.

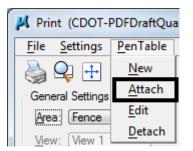
Printer and Paper Size Windows driver	
Paper: 17x11 Select Printer Driv	er Configuration File
Total area: 17 x 11 in.           Landscape         Send to printer	Show design in preview

- 7. Seven printer drivers are available in the... \Microstation\Plotter Driver directory.
- *CDOT-DefaultPrinter_V8i.pltcfg* should be used to send plots to the default printer.

- *CDOT-DefaultPlotter_V8i.pltcfg* should be used to send plots to the default plotter.
- *CDOT-PDFDraftQuality_V8i.pltcfg* should be used for the creation of draft quality (300psi) Adobe PDF files.
- *CDOT-DPDFHighQuality_V8i.pltcfg* should be used for the creation of high quality (600psi) Adobe PDF files.
- *CDOT-Shaded_PrinterDriver_V8i.pltcfg* should be used for MicroStation drawings only.
- *CDOT-ROW-DefaultPlotter_V8i.pltcfg* should be used to send ROW plots to the default plotter.
- *CDOT-ROW-DefaultPrinter_V8i.pltcfg* should be used to send ROW plots to the default printer.

📕 Select Printer I	Driver Configuration	on File - C:\Workspace\\	Vorkspa	ce-CDO	T_V8i\Stand	lards
Look in:	🔒 Plotter Driver		•	G 🕻	۰ 对 🍕	· 🗟 🖻
Recent Places Desktop Libraries	CDOT-Defau CDOT-PDFD CDOT-PDFH CDOT-ROW- CDOT-ROW-	ltPlotter_V8i.pltcfg ltPrinter_V8i.pltcfg raftQuality_V8i.pltcfg ighQuality_V8i.pltcfg DefaultPlotter_V8i.pltcfg DefaultPrinter_V8i.pltcfg ed_PlotterDriver_V8i.pltcf	J			
Network	•					· · ·
	File name:	CDOT-DefaultPlotter_V8i	pltcfg		-	Open
	Files of type:	Printer Driver Configuratio	n Files (*.	pltcfg;*.pl	t) 🔻	Cancel

8. For printing AutoCAD files, change the Pen Table. Select **PenTable > Attach** from the pull-down menu.



 Select the CDOT_ACAD.tbl Pen Table. The other options are for printing MicroStation Files only. <D> Open.

Look in:	🕌 Pen 👻	G 🤌 📂 🖽 -	8
(Her	Name	Date modified	Туре
	CDOT-ACAD.tbl	9/30/2010 11:48 AM	TBL Fil
Recent Places	CD01-ColorPenTable.tbl	9/30/2010 11:49 AM	TBL Fil
	CDOT-ColorPenTablewithYellowtoBlack.tbl	9/30/2010 11:49 AM	TBL Fil
	CDOT-PenTable.tbl	12/13/2010 3:04 PM	TBL Fil
Desktop	CDOT-ROW-PenTable.tbl	9/30/2010 11:49 AM	TBL Fil
<b>Eibraries</b>	CDOT-Shading_GrayscalePenTable.tbl	9/30/2010 11:49 AM	TBL Fil
Computer			
	٠ III		
Network	File name: CDOT-ACAD.tbl		Open

- *Note:* The *CDOT-ACAD.tbl* includes the standard colors and pen weights represented in the *CDOT* Design Manual - Volume IV, Section 6.2.8. If the standard colors were not used, the printout will contain actual colors or a grey scale representation of that color. To get a correct print out, the user must update the file to match the *CDOT* Design Manual.
- 10. Once everything has been set, **<D>** the print ^{SOP} icon. This will send your plot to the designated printer.

11. If you selected the *CDOT_PDFDraftQuality_V8i.pltcfg* or *CDOT_PDFHighQuality_V8i.pltcfg* printer driver to create an Adobe PDF file, you will be prompted to define a file name and a location to save the PDF file.

📕 Save Print As -	C:\Projects\1234	5\Plot_Sets\		×
Save in:	Plot_Sets	•	G 🤌 📂 🛄 -	8
(Ha	Name	*	Date modified	Туре
Recent Places	鷆 ad 鷆 fir		12/6/2010 11:06 AM 12/6/2010 11:05 AM	File folder File folder
Desktop	鷆 FOR 퉬 ROWPR		12/6/2010 11:05 AM 12/6/2010 11:05 AM	File folder File folder
Libraries				
Computer				
	•			4
Network	File name:	12345DES_PnP01.pdf	•	Save
	Save as type:	Print Output Files (*.*)	<b>•</b>	Cancel

**MicroStation Information and Administration** 

# **Workflow MA 1 - Directory Structure**

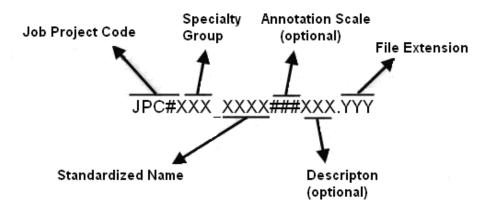
# **PROJECT DESIGN FILES**

The CDOT workflow of projects requires that graphic and design data be created into multiple design files during the course of project development. These design files need standard, informative, and unique file names.

# **File Naming Conventions**

The CDOT naming standard uses a formula that restricts the character placement, ensures unique file names, and identifies the information contained in the file. All CDOT projects must follow these file naming conventions. Standardizing file names is necessary for effective management of the large numbers of files needed to produce a set of design plans.

CDOT files are named in a standard format that identifies the file's project, the data contained within it, and the product used for its creation. The naming convention is illustrated as follows:



- Job Project Code (JPC) is the CDOT project code, formerly known as the project subaccount number.
- **Specialty Group** is the standardized abbreviation for the specialty group that the owner of the file is with.
- Standardized Name denotes the type of data that is contained in the file.
- Annotation Scale including the annotation scale in the file name is optional. However, it should be included in file names for projects that use multiple annotation scales.
- **Description** A brief description can be used to further identify a model file. For sheet files, this field is used as a counter to differentiate between multiple files of a specific type.
- File Extensions define the product used for its creation. Examples would be dgn for MicroStation, DTM for an InRoads surface, etc.

An example of a MicroStation design file would look like the following.

#### 12345DES_Model100US285.dgn

**12345** indicating the CDOT Project Number, **DES** indicates it is Roadway Design's model file and **100** indicating it uses a 1"=100' annotation scale, **US285** is a description identifying the highway this model depicts. **DGN** is the default extension for MicroStation design files.

**Note:** A seventh segment is used on Working Files. This segment should be the initials of the designer or engineer who is working on the file. For example, **CU12345DES_Model100.dgn** where **CU**, are the initials of the designer or engineer (in this example, CU stands for "CDOT User").

# DIRECTORY STRUCTURE

Project files follow a standardized scheme. This section describes the location of project files and the standard directory structure for each group within CDOT.

## **Project Directory**

At the beginning of each project, the Project Manager will create a project directory structure using the *CreatePrjDir.exe*. This executable will create a directory that is the single storage location for all information pertaining to a given project. The Project Manager is required to assign access permissions to every person on the design team and is also responsible for maintaining the access list to keep it current.

#### **Top Level Directory**

Each project includes a unique top-level directory and a set of standardized sub-directories. The job project code (JPC) indicates the top-level directory name.

#### Group Sub-Directories

Below the top-level directory, you will find sub-directories for each group. Each group at CDOT which works on the project is required to store its data in the appropriate sub-directory for that group.

#### **Group Sub-Directory Structure**

The following tables show the project directories for each group and the file types that go into these directories.

# Bridge Project Folder (\Bridge)

Sub-directories

\Construction_Engineering
\Computer_Files
\Hand_Calcs
\Submittals
\FIR_Design
\Computer_Files
\Hand_Calcs
\FOR_Design
\Computer_Files
\Hand_Calcs

Description

	\Email
ć	\Memos
\ Drawings	Sheet Files - Plan set sheets and detail sheets
	\Reference_Files
	All final Model files to be referenced to the sheets
	JPC#BRDG_Model.dgn
	JPC#BRDG_Prof.dgn
\Tabs	
\Geometry	Bridge Geometry Files and output
	########.dat Structure Number and File Extension
	########.cmd
	#########.dxf
	<i>########</i> .lis
	#########.pcf
	##########.scr
	#######.dgn
\InRoads	All InRoads data: dtm, alg, tml, rwl, rwk and reports.
\ Photos	Electronic photo files or scanned photos concerning the project and
	surroundings
\ Reports	
\Schedules	
\ Working	Design iterations and miscellaneous drafting without impacting final Model Files found in the Reference_Files subdirectory. The designers' initials should pre-fix all files in this directory so multiple designers can work in this directory. No working files should be used as Reference Models. When a working design is complete, copy it into the Reference_Files Folder and rename it to the standard naming convention. This directory will be deleted at project close-out.
<b>Construction Project</b>	t Folder (\Construction)
Sub-directories	Description

Description

\ Diaries	
\ Drawings	Sheet Files - Plan set sheets and detail sheets
\Cross_Sections	All cross section Models and Cross Section *.job files
\Reference_Files	All final Model files to be referenced to the sheets
\Tabs	
\ EEO	
\ Estimates	
$\Final_Documentation$	
\ Photos	Electronic photo files or scanned photos concerning the project and surroundings
\Public_Relations	
\Speed_Memos	
\Working	Design iterations and miscellaneous drafting without impacting final Model Files found in the Reference_Files subdirectory. The designers' initials should pre-fix all files in this directory so multiple designers can work in this directory. No working files should be used as Reference Models. When a working design is complete, copy it into the Reference_Files Folder and rename it to the standard naming convention. This directory will be deleted at project close-out.

### **Consultants Project Folder (\Consultants)**

The Consultant Project Folder does not contain any folders or files. This will be the location of the CDOT approved directory structure delivered from the consultant. The project manager is responsible for ensuring the folder and file structure conforms to the CDOT standard directory structure.

### Roadway Design Project Folder (\Design)

Sub-directories	Description
\Calculations	
\Correspondence	
\ Drawings	Sheet Files – Plan set sheets and detail sheets
	JPC#DES_EarthworkQuant##.dgn
	JPC#DES_GenlNote.dgn
	JPC#DES_Plan##.dgn
	JPC#DES_PnP##.dgn
	JPC#DES_Prof##.dgn
	JPC#DES_SAQ##.dgn
	JPC#DES_StdPlanList.dgn
	JPC#DES_SWMP.dgn

Sub diverteries	Description
Hydraulics Project	Folder (\Hydraulics)
\Reports \Working	Design iterations and miscellaneous drafting without impacting final Model Files found in the Reference_Files subdirectory. The designers' initials should pre-fix all files in this directory so multiple designers can work in this directory. No working files should be used as Reference Models. When a working design is complete, copy it into the Reference_Files Folder and rename it to the standard naming convention. This directory will be deleted at project close-out.
	surroundings
\InRoads \Photos	All InRoads data: dtm, alg, tml, rwl, rwk and reports Electronic photo files or scanned photos concerning the project and
) ha Dia anala	JPC#DES_TitleSht.xls
	JPC#DES_TabMisc.xls
	JPC#DES_TabEarthwork.xls
	JPC#DES_SWMP.doc
	JPC#DES_GenNote.doc
\Tabs	All tabulation support data: xls, doc, and pdf files
	JPC#DES Prof.dgn
	JPC#DES Phasing.dgn
	JPC#DES Model.dgn
	JPC#DES_Interchange.dgnJPC#DES_Intersec.dgn
\Reference_Files	All final Model files to be referenced to the sheets
\Cross_Sections	All cross section Models and Cross Section *.job files
	JPC#SURV_WUTab.dgn M&S Standard Plans List Index.dgn
	JPC#SURV_Tab##.dgn
	JPC#DES_TyplSect##.dgn
	JPC#DES_TitleSht.dgn
	JPC#DES_TabRem##.dgn
	JPC#DES_TabMisc##.dgn
	JPC#DES_TabConc##.dgn

Sub-directories	Description
\Calculations	
	\Cost_Estimates
	\Hydrology_Ponds

	\Spread_Width_Inlets
	\Storm_Sewer_Culverts_Channels
\Correspondence	
	\Email
	\Meeting_Minutes
	\Memos
\ Drawings	Sheet Files – Plan set sheets and detail sheets
	JPC#HYDR_StrQuant##.dgn
	\Reference_Files All final Model files to be referenced to the sheets
	JPC#HYDR_Model.dgn
	JPC#HYDR_Prof.dgn
\Tabs	
	JPC#HYDR_TabStrmsewer.xls
\ InRoads	All InRoads data: dtm, alg, tml, rwl, rwk and reports
\Manufacturers_Data	
\ Photos	Electronic photo files or scanned photos concerning the project and surroundings
\Program_Data	
	\HEC-2
	\HEC-RAS
\ Report	
	\Field_Notes
	\Final
	\Preliminary
	\Technical_Memorandum
\Working	Design iterations and miscellaneous drafting without impacting final Model Files found in the Reference_Files subdirectory. The designers' initials should pre-fix all files in this directory so multiple designers can work in this directory. No working files should be used as Reference Models. When a working design is complete, copy it into the Reference_Files Folder and rename it to the standard naming convention. This directory will be deleted at project close-out.

# Landscape Project Folder (\Landscape_Environmental)

Sub-directories	Description	
\Calculations		
\Correspondence		

\Drawings	Sheet Files – Plan set sheets and detail sheets
\Reference_Files	All final Model files to be referenced to the sheets
	JPC#LAND_ENVI_Model.dgn
\Tabs	\Form_128
\InRoads	All InRoads data: dtm, alg, tml, rwl, rwk and reports
\Natural_Resouces	
	\4(f)_6(f)
	\Air_Noise_Farmland
	\Cultural
	\Hazmat
	\T&E
	\Wetlands_Delineation_Findings
\ Permits	
\ Photos	Electronic photo files or scanned photos concerning the project and surroundings
\Public Involvement	
\ Reports	
\ NEPA	
\Technical	
\Social_Resources	
\Working	Design iterations and miscellaneous drafting without impacting final Model Files found in the Reference_Files subdirectory. The designers' initials should pre-fix all files in this directory so multiple designers can work in this directory. No working files should be used as Reference Models. When a working design is complete, copy it into the Reference_Files Folder and rename it to the standard naming convention. This directory will be deleted at project close-out.
Aaterials Project F	Folder (\Materials_Geotechnical)
Sub-directories	Description
\Calculations	
\Correspondence	
\Drawings	Sheet Files - Plan set sheets and detail sheets

All final Model files to be referenced to the sheets

\Reference_Files

\Photos	Electronic photo files or scanned photos concerning the project and surroundings
\As-Built	
\Construction	
\Existing_Condition	
\ Reports	
\Working	Design iterations and miscellaneous drafting without impacting final Model Files found in the Reference_Files subdirectory. The designers' initials should pre-fix all files in this directory so multiple designers can work in this directory. No working files should be used as Reference Models. When a working design is complete, copy it into the Reference_Files Folder and rename it to the standard naming convention. This directory will be deleted at project close-out.

#### **Miscellaneous Project Folder (\Miscellaneous)**

Typical Section Program Data input files, JPC#.csv (used for converting nonstandard levels to CDOT standards.), and other project specific files that do not have a designated folder.

## Planning Project Folder (\Planning)

Sub-directories	Description
\Correspondence	
\RTP_TIP_STIP	
\Working	Design iterations and miscellaneous drafting without impacting final Model Files found in the Reference_Files subdirectory. The designers' initials should pre-fix all files in this directory so multiple designers can work in this directory. No working files should be used as Reference Models. When a working design is complete, copy it into the Reference_Files Folder and rename it to the standard naming convention. This directory will be deleted at project close-out.

### Plot Sets Project Folder (\Plot_Sets)

The files located in this folder are project specific General Plan Set Sheets. The files located in the subfolders will be files reflecting plan set sheets captured at time of submittal. Final Plan Sets should be in Adobe Acrobat PDF file format for the Reproduction Department. The Reproduction Department will access the PDF from this location for submittals.

Sub-directories	Description
\Plot_Sets	
\AD	Advertisement
	\Revisions
\ FIR	Field Inspections
\ FOR	Final Office Revisions

#### \ ROWPR

## **Project Specific Configuration (\Project_Configuration)**

This folder contains copies of the CDOT Workspace InRoads Preference files only when a project is archived and will be brought back at a later date. Software changes and Configuration upgrades affect InRoads preference files. It is important to have copies of the preference files used when the project was created. The files will be useful for reviewing how InRoads Features, Styles and Survey Data displayed for the duration of a specific configuration release. However, software and configuration upgrades may not work seamlessly with these preference files because levels and features are renamed and linestyles are redefined.

The following files should be saved in this folder:

- C:\Program Files\Workspace-CDOT\Standards-Global\InRoads\Preferences\CDOT-Preferences.ini
- C:\Program Files\Workspace-CDOT\Standards-Global\InRoads\Preferences\CDOT-Styles.ini
- C:\Program Files\Workspace-CDOT\Standards-Global\InRoads\Preferences\CDOT-Survey_Features.fwf
- C:\Program Files\Workspace-CDOT\Standards-Global\InRoads\Preferences\CDOT-Survey_Preferences.fxp
- C:\Program Files\Workspace-CDOT\Standards-Global\InRoads\Notes\CDOT-Notes.dft.

All other InRoads data files should be stored in the appropriate Project InRoads folders.

### Project Manager Project Folder (\Project_Manager)

Sub-directories	Description
\Budget	
\Clearances	
\Contract_&_Task_Order	
\Correspondence	
\Bridge	
\Construction	
\ Design	
\ EEO	
\Environmental_Landscape	
\Governmental_Agencies	
\Hydraulics	
\ Letters	
\Materials_Geotechnical	
\Public_Relations	

#### \ ROW

\Senior_Management

- \Traffic
- \ Utilities
- \Meeting_Minutes
- $\$

## **Redline Project Directory (\Redline)**

# Right Of Way and Survey Project Folder (\ROW_Survey)

Sub-directories	Description
\Correspondence	
\Acquisition	
\ Appraisal	
\Permission_To_Enter	
\Property_Management	
\ ROW	
\Survey	
\ Drawings	Sheet Files - Plan set sheets and detail sheets
	JPC#ROW_Cnty-24x18_##.dgn
	JPC#ROW_Cnty-24x36_##.dgn
	JPC#ROW_Mon##.dgn
	JPC#ROW_Ownership##.dgn
	JPC#ROW_Plan##.dgn
	JPC#ROW_TabProp01.dgn
	JPC#ROW_TabProp02.dgn
	JPC#ROW_TabProp03.dgn
	JPC#ROW_TabProp04.dgn
	JPC#ROW_TabProp##.dgn
	JPC#ROW_TitleSht.dgn
	JPC#ROW_MonRcrd##.dgn
	JPC#SURV_PlanLSCD##.dgn
	JPC#SURV_PlanPCD##.dgn
	JPC#SURV_TitleLSCD.dgn
	JPC#SURV_TitlePCD.dgn

\Reference_Files	All final Model files to be referenced to the sheets
	JPC#ROW_Model.dgn
	JPC#SURV_Model.dgn
	JPC#SURV_Topo##Scale##.dgn
	JPC#SURV_TopoCodes##Scale##.dgn
	JPC#SURV_TopoContour##Scale##.dgn
	JPC#SURV_TopoElevations##Scale##.dgn
	JPC#SURV_TopoNames##Scale##.dgn
	JPC#SURV_TopoNotes##Scale##.dgn
	JPC#SURV_TopoSymbols##Scale##.dgn
	\Tabs
	JPC#ROW_TabMon.xls
	JPC#ROW_TabProp.xls
\InRoads	All InRoads data: dtm, alg, tml, rwl, rwk and reports
\DTM	DTM files
\Field_Books	Field Books
\Geometry	Geometry Files
\Legals	
\Reports	ROW Report Files
\Research	
\Governmen <del>t</del>	
\Miscellaneous	
\Plans	
\Title	
\Survey	
\Level	
\Monument_Information	
\Photogrammetry	
\Photos	Electronic photo files or scanned photos concerning the project and surroundings
\Raw_Data	
\ <b>IGO</b>	Trimble Geomatics files in a zipped format.

#### \Working Design iterations and miscellaneous drafting without impacting final Model Files found in the Reference_Files subdirectory. The designers' initials should pre-fix all files in this directory so multiple designers can work in this directory. No working files should be used as Reference Models. When a working design is complete, copy it into the Reference_Files Folder and rename it to the standard naming convention. This directory will be deleted at project close-out.

### **Specifications Project Folder (\Specifications)**

Project Specifications (DOCand PDF formats only). Post the Project Specifications for the Reproduction Department in one Adobe Acrobat PDF file. The Reproduction Department will access the PDF file from this location.

Sub-directories	Description
\Calculations	
\Traffic_Modeling	
\Correspondence	
\Access	
\ Email	
\ Drawings	Sheet Files – Plan set sheets and detail sheets
	JPC#TRAF_Schedule##.dgn
	JPC#TRAF_TabPvmtMrk##.dgn
	JPC#TRAF_TabSigns##.dgn
\Reference_Files	All final Model files to be referenced to the sheets
	JPC#TRAF_Light.dgn
	JPC#TRAF_Model.dgn
	JPC#TRAF_Signal.dgn
\Tabs	All tabulation support data: xls, doc, and pdf files
	JPC#TRAF_Tabs.xls
\InRoads	All InRoads data: dtm, alg, tml, rwl, rwk and reports
\ Photos	Electronic photo files or scanned photos concerning the project and surroundings
\ Reports	
\ Signs	SignCAD drawing files & other Misc. sign files

#### Traffic Project Folder (\Traffic_ITS)

Design iterations and miscellaneous drafting without impacting final Model Files found in the Reference_Files subdirectory. The designers' initials should pre-fix all files in this directory so multiple designers can work in this directory. No working files should be used as Reference Models. When a working design is complete, copy it into the Reference_Files Folder and rename it to the standard naming convention. This directory will be deleted at project close-out
This directory will be deleted at project close-out.

# **Utilities Project Folder (\Utilities)**

Sub-directories	Description
\Calculations	
\Correspondence	
\ Drawings	Sheet Files – Plan set sheets and detail sheets
\Reference_Files	All final Model files to be referenced to the sheets
	JPC#UTIL_Model.dgn
\Tabs	
\InRoads	All InRoads data: dtm, tml, rwl, rwk and reports
\Photos	Electronic photo files or scanned photos concerning the project and surroundings
\ Reports	
\Working	Design iterations and miscellaneous drafting without impacting final Model Files found in the Reference_Files subdirectory. The designers' initials should pre-fix all files in this directory so multiple designers can work in this directory. No working files should be used as Reference Models. When a working design is complete, copy it into the Reference_Files Folder and rename it to the standard naming convention. This directory will be deleted at project close-out.

# Workflow MA 2 - PCF Management

This document explains how the Project Configuration File (PCF) is created, where it is saved, and how to update it. The PCF file defines a specific directory that MicroStation defaults to when opening up a DGN file or referencing model files. PCF files are extremely useful when multiple users are accessing the same project directory across the network, or when DGN files are moved from one directory to another.

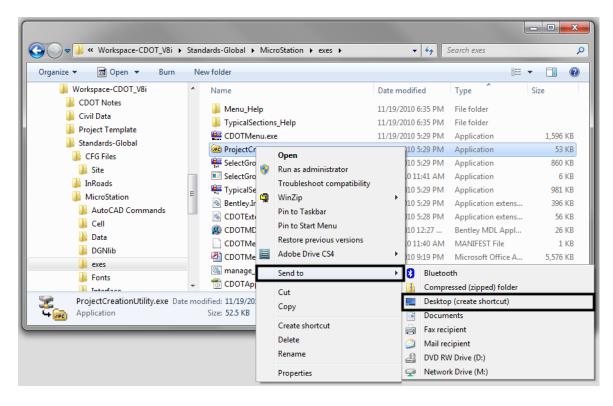
## **ProjectWise and PCF's**

Projects that reside in ProjectWise do not require a MicroStation PCF file. The ProjectWise engineering document management system replaces the functionality of the MicroStation PCF files.

# **Creating the PCF File**

For all projects outside of ProjectWise the following steps are required.

- 1. The PCF file is created when the *CDOT Project Creation Utility* program is run. This program is accessed from the CDOT Workspace *C:\Workspace-CDOT_V8i\Standards-Global\MicroStation\exes*.
- 2. If you typically create projects, adding this as a shortcut on your desktop is recommended.
- 3. Right click on the ProjectCreationUtility.exe and select Send To > Desktop (create shortcut).

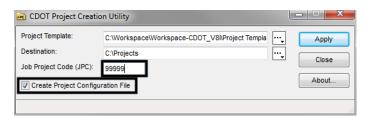




4. After selecting the *ProjectCreationUtility* program, the *CDOT Project Creation Utility* dialog box will appear. The *Project Template* Browse button can be used to identify a different Project Template. The *Destination* Browse button can be used to specify a different location for the new project directory.

🚾 CDOT Project Creation	on Utility	
Project Template: Destination: Job Project Code (JPC):	WorkspaceWorkspace-CDOT_V8NProject Template C:Projects	Apply Close
Create Project Configu	ration File	About

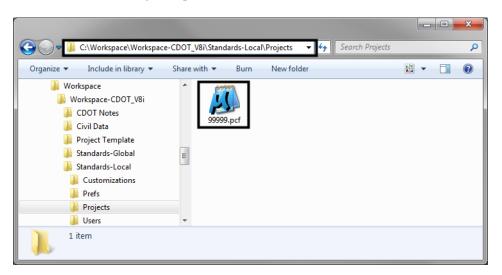
Enter the 5 digit Job Project Code (JPC) in the *Job Project Code (JPC)* field. For this example we will use **99999**. Verify the *Create Project Configuration File* check box is checked **On**. This should be on by default. 
 Apply. After the program has executed, 
 Close.



- **Note:** The **CDOT Project Creation Utility** program now allows the creation of "M" projects. Use an M to start the JPC number.
- 6. Open up Windows Explorer again and browse to *C:\Projects\99999* to verify the project folder and corresponding folder structure was created.

## **Opening the PCF File**

 View the PCF file that was created when the CDOT Project Creation Utility program was executed. In Windows Explorer browse to C:\Workspace\Workspace-CDOT_V8i\Standards-Local\Projects and open the 99999.pcf file using Notepad.



2. Notice that the second line of text displays MS_DEF=C:/Projects/99999/. The CDOT Project Creation Utility program places the newly created project location on this line. MicroStation reads this line as a configuration variable and sets the primary Search Path to this location. When MicroStation reads the variable 'MS_DEF' it substitutes the default project location (C:/Projects/99999/). If we look under the Reference Files heading below, you will see that all of the paths are set with the (MS_DEF) substitution. This means, whenever you browse for a file to reference (or more specifically a 'model' file), MicroStation will automatically point to the desired directory.

99999.pcf - Notepad
File Edit Format View Help
₩ Project Directory MS_DEF=C:/Projects/99999/
# Reference Files
MS_RFDIR=\$(MS_DEF) MS_RFDIR>\$(MS_DEF)Bridge/Drawings/
MS_RFDIR>\$(MS_DEF)Bridge/Drawings/Reference_Files/
MS_RFDIR>\$(MS_DEF)Construction/Drawings/
MS_RFDIR>\$(MS_DEF)Construction/Drawings/Reference_Files/
MS_RFDIR>\$(MS_DEF)Landscape_Environmental/Drawings/
MS_RFDIR>\$(MS_DEF)Landscape_Environmental/Drawings/Reference_Files/ MS_RFDIR>\$(MS_DEF)Hydraulics/Drawings/
MS_RFDIR>\$(MS_DEF)Hydraulics/Drawings/Reference_Files/
MS_RFDIR>\$(MS_DEF)Materials_Geotechnical/Drawings/
MS_RFDIR>\$(MS_DEF)Materials_Geotechnical/Drawings/Reference_Files/
MS_RFDIR>\$(MS_DEF)Design/Drawings/ MS_RFDIR>\$(MS_DEF)Design/Drawings/Reference_Files/
MS_RFDIR>\$(MS_DEF)Design/Drawings/kererence_Fires/ MS_RFDIR>\$(MS_DEF)ROW_SURVEY/Drawings/
MS_RFDIR>\$(MS_DEF)ROW_SURVEY/Drawings/Reference_Files/
MS_RFDIR>\$(MS_DEF)Traffic_ITS/Drawings/
MS_RFDIR>\$(MS_DEF)Traffic_ITS/Drawings/Reference_Files/
MS_RFDIR>\$(MS_DEF)Utilities/Drawings/ MS_RFDIR>\$(MS_DEF)Utilities/Drawings/Reference_Files/
MS_PLTFILES=\$(MS_DEF)Plot_Sets/
MS_DGNOUT=\$(MS_DEF)
MS_IMAGEOUT=\$(MS_DEF)
MS_RASTER_DEF_DIR=\$(MS_DEF)ROW_SURVEY/Drawings/Reference_Files/Aerials/
#
" CDOT_WK5P=C:/Workspace/Workspace-CDOT_V8i/
CDOT_PREF=\$(CDOT_WKSP)Standards-Global/InRoads/Preferences/
w.
<ul> <li>★</li> </ul>

# **Editing the PCF File**

- If multiple users are accessing the same project directory, the PCF file will need to be distributed to everyone on the team accessing the project directory. Each member of the team should have their own copy of the PCF file and it should be saved to the same location, C:\Program Files\Workspace-CDOT\Standards-Local\Projects.
- 2. When team members are sharing the project manager's machine, the path MS_DEF=C:/Projects/99999/ will need to be updated to reflect the path of the computer that is being shared i.e., MS_DEF=//CDOTUSER/ Projects/99999/ (Be sure to note the double // as in MS_DEF=//SMITHS/Projects/99999/. After the edit has been made to the PCF file, select File > Save in Notepad.

99999.pcf - Notepad	x
File Edit Format View Help	
/# Project Directory MS_DEF=//SMITHS/Projects/99999/ # Reference Files	
MS_RFDIR=\$(MS_DEF) MS_RFDIR>\$(MS_DEF)Bridge/Drawings/ MS_RFDIR>\$(MS_DEF)Bridge/Drawings/Reference_Files/ MS_RFDIR>\$(MS_DEF)Construction/Drawings/	E
MS_RFDIR>\$(MS_DEF)Construction/Drawings/Reference_Files/ MS_RFDIR>\$(MS_DEF)Landscape_Environmental/Drawings/ MS_RFDIR>\$(MS_DEF)Landscape_Environmental/Drawings/Reference_Files/ MS_RFDIR>\$(MS_DEF)Hydraulics/Drawings/ RFDIR>\$(MS_DEF)Hydraulics/Drawings/Reference_Files/	
MS_RFDIR>\$(MS_DEF)Materials_Geotechnical/Drawings/Reference_Files/ MS_RFDIR>\$(MS_DEF)Materials_Geotechnical/Drawings/Reference_Files/	• •

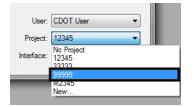
**Note:** Each person wanting to work on the project must be given appropriate access to the folders they will be working with. The Project Manager should determine the level of access. Contact the help desk for additional assistance on sharing files and changing security settings.

## Using the PCF File with MicroStation

1. In the MicroStation Manager, the PCF file can be selected from the **Project** field drop-down list found in the *Workspace* portion of the *MicroStation Manager*.

the open let	\Projects\99999\				
Look in:	99999		- 🕝 🌶 📂 🖽 -	🗋 줄 💼	
(Ha	Name		Date modified	Туре 🔶	
	퉬 Bridge		12/17/2010 7:53 AM	File fol	
Recent Places	Construction	on	12/17/2010 7:53 AM	File fol	
	🛯 🔒 Consultant	s	12/17/2010 7:53 AM	File fol	
	퉬 Design		12/17/2010 7:53 AM	File fol	
Desktop	Hydraulics		12/17/2010 7:53 AM	File fol	
<u></u>	🛯 📕 Landscape	Environmental	12/17/2010 7:53 AM	File fol	
6 <b>3</b>	🛯 🛯 Materials_G	eotechnical	12/17/2010 7:53 AM	File fol	
Libraries	Miscellane	ous	12/17/2010 7:53 AM	File fol	
	퉬 Planning		12/17/2010 7:53 AM	File fol	1
	Plot_Sets		12/17/2010 7:53 AM	File fol	
Computer	Project_Co	nfiguration	12/17/2010 7:53 AM	File fol 🚽	
	•	III		•	
	File name:	12345DES_PnP01.dgn		Open	User: CDOT User
Network	Files of type: Micro Station DGN Files (*.dgn)			Creat	Project: 99999
				Cancel	Project: [35555
		Open as read-only		Options	Interface: CDOT

2. If you are working on multiple projects, you will have more than one PCF file to choose from. You can easily switch between projects using this drop-down list. **<D>** the arrow to display the list, than choose the project to work on.



3. The file path in MicroStation will be redirected to the project folder after the desired project has been selected. All dialog boxes within MicroStation that require a path to be defined will default to the root directory chosen at the *Workspace > Projects* location.

Look in:	99999	•	G 🤌 📂 🖽 🗸	Ö 🚰 🖻	
Ca.	Name		Date modified	Туре 🔺	
	🌗 Bridge		12/17/2010 7:53 AM	File fol	
lecent Places	Construction	n	12/17/2010 7:53 AM	File fol	
	l Consultants	;	12/17/2010 7:53 AM	File fol	
	퉬 Design		12/17/2010 7:53 AM	File fol 🗮	
Desktop	Hydraulics		12/17/2010 7:53 AM	File fol	
	퉬 Landscape	Environmental	12/17/2010 7:53 AM	File fol	
67	Materials_G	eotechnical	12/17/2010 7:53 AM	File fol	
Libraries	🔋 Miscellaneo	ous	12/17/2010 7:53 AM	File fol	
d	퉬 Planning		12/17/2010 7:53 AM	File fol	1
	Plot_Sets		12/17/2010 7:53 AM	File fol	
Computer	Project_Cor	nfiguration	12/17/2010 7:53 AM	File fol 🛫	
	•	m	-	*	
Network	File name:	12345DES_PnP01.dgn	•	Open	User: CDOT User
Network	Files of type:	MicroStation DGN Files (*.dgn)		Cancel	Project: 99999
		Open as read-only		Options	Interface: CDOT

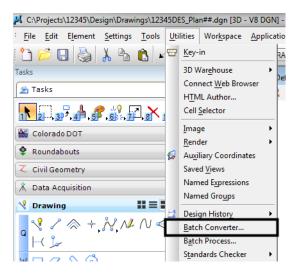
- 4. If your folder structure changes and/or files are moved to different locations than initially path to, you can update your reference file attachment location here without having to reattach the files in MicroStation. Simply edit the reference file paths in the PCF file and open MicroStation. You will notice that the files are now being found.
  - *Note:* It should be noted that **Save Full Path** when referencing files within MicroStation should never be used if you want the PCF file changes to take affect.

# Workflow MA 3 - Level Update for V05.04.00

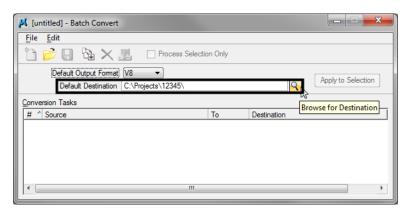
This document guides you through updating the MicroStation levels that were changed, deleted, and renamed from the Configuration Releases prior to V05.00.00. All drawing files created in prior Configuration Releases will need to be updated to the current CDOT standard levels. See CDOT Configuration Readme.pdf file located in the level library section.

# **Converting Levels in MicroStation as a Batch Routine**

- 1. From the MicroStation Manager, Open a drawing file
- 2. It is recommended that a new project folder is created for the translated data to insure the original project data is not lost. Using the same JPC# number appended with a "-(initials)". Once the data is verified the original data can be backed up to disc and deleted. The "-(initials)" then can be dropped from the project folder. The example used for this workflow will be **12345-NLJ**.
- 3. It is recommended to change a User Preference before proceeding that sets the open dialog box settings. Open the User preferences by clicking **Workspace > Preferences**
- 4. Select the *Look and Feel Category*
- 5. Toggle off the option for *Use Windows File Open Dialogs*. Turn this feature off will allow a toggle later to open all files in a directory.
- 6. Select Utilities > Batch Converter



7. Change the **Default Destination** to the temporary project folder



8. *Navigate* to the temporary project folder and **<D> OK** 

Select Destination Directory		
Directory:		
c:\projects\12345-NLJ\		
C:\		
projects		
Bridge	-11	
Construction	=	
Consultants		
Hydraulics		
Landscape_Environmental		
Materials_Geotechnical		<u>0</u> K
Planning	-	Cancel
Dri <u>v</u> es:		Cancel
💷 C:	•	<u>H</u> elp

9. **<D>** the Add Files or Directories to Convert icon.

🕌 [untitled] - Batch Convert			_ <b>_</b> X
<u>F</u> ile <u>E</u> dit			
🛅 📂 🔲 強 🗙 🖪 🛛 Process Selecti	on Only		
Default Output Add Files or Directories to Conv Default Destination C:\Projects\12345-NLJ	ert	٩	Apply to Selection
Conversion Tasks			
# ^ Source	То	Destination	
			4

Using the Add Files or Directories dialog box, files or entire directories can be added to the list of Selected Files to be processed. Check On Include Subdirectories prior to specifying entire folders to a convert process. <D> to highlight the folder name, then <D> Add. <D> Done when you are finished adding files and/or folders.

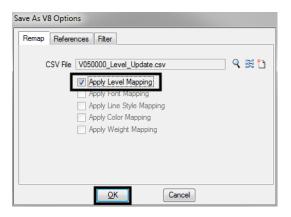
11. Select Edit > V8 Save Options... from the *Batch Convert* dialog box

<mark>ሥ</mark> [u	ntitled] - Batch Convert	
File	Edit	
1	<u>A</u> dd Files	Process Selection Only
$\vdash$	Add A <u>c</u> tive File	
	<u>R</u> emove Files	ts\12345-NLJ\
Conv	DWG Open Options	
#	DIMC Cours Outlines	To Destination
1	V <u>8</u> Save Options	V8 c:\projects\12345-NLJ\
	V <u>7</u> Save Options	
	Log File Options	
	Move Files to <u>T</u> op	
	Move Files Up Ctrl+U	
	Move Files Down Ctrl+D	
	Move Files to <u>B</u> ottom	
•		III

12. In the *Save As V8 Options* dialog box, a standard CSV file is located in the configuration which is already set up to remap all of the previous versions' levels to the standard CDOT MicroStation V05.00.00 levels.

Save As V8 Options
Remap References Filter
CSV File V050000_Level_Update.csv Q 😹 🗅
Apply Level Mapping     Apply Font Mapping     Apply Line Style Mapping     Apply Color Mapping     Apply Color Mapping     Apoly Weidht Mapping
_ Аруу wegnit маррing
QK Cancel

- Note: If not already there, browse to C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation\Tables\Level_Translation. Select the file V050000_Level_Update.csv. <D> OK.
- 13. In the *Save As V8 Options* dialog box, check on the option to **Apply Level Mapping**. **<D> OK**.



14. **<D>** the *Process Batch Convert Job* icon when all files and directories have been added to the conversion tasks list.

📕 [untitled] - Batch Convert		
File     Edit       Image: Constraint of the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second		Apply to Selection
Default Destination C:\projects\cz3457765	11 700	Apply to Selection
# ^ Source	То	Destination
1 c:\projects\12345*\	V8	c:\projects\12345-NLJ\
		Þ

#### 15. **<D> Convert**

#	Source	e	Format	Destination	То	Status	Time	-
1	c:\pr	jects\12345\Bridge\Drawi\12345BRDG_Model.dg	V8	c:\projects\12345\12345BRDG_Model.dg	V8	Up to date		
2	c:\pro	jects\12345\Bridge\Drawin\12345BRDG_Prof.dg	r V8	c:\projects\12345\12345BRDG_Prof.dgn	V8	Up to date		
3	c:\pro	jects\12345\12345DES_EarthworkQuant##.dgn	V8	c:\proj\12345DES_EarthworkQuant##.dgr	V8	Up to date		=
4	c:\pro	jects\12345\Desig\12345DES_GenINote##.dgn	V8	c:\projects\1\12345DES_GenINote##.dgr	V8	Up to date		
5	c:\pro	jects\12345\Design\Dr\12345DES_Plan##.dgn	V8	c:\projects\12345\12345DES_Plan##.dgr	V8	Pending		
6	c:\pro	jects\12345\Design\Dr\12345DES_PnP##.dgn	V8	c:\projects\12345\12345DES_PnP##.dg	V8	Up to date		
7	c:\pro	jects\12345\Design\Dr\12345DES_Prof##.dgn	V8	c:\projects\12345\12345DES_Prof##.dgn	V8	Up to date		
8	c:\pro	jects\12345\Design\Dr\12345DES_SAQ##.dgn	V8	c:\projects\12345\12345DES_SAQ##.dg	V8	Up to date		
9	c:\pro	jects\12345\Desig\12345DES_StdPlanList.dgn	V8	c:\projects\\12345DES_StdPlanList.dgn	V8	Up to date		
10	) c:\pro	jects\12345\Design\Dr\12345DES_SWMP.dgn	V8	c:\projects\12345-N\12345DES_SWMP.d	V8	Up to date		
1	c:\pro	jects\12345\Design\12345DES_TabConc##.dgn	V8	c:\projects\12\12345DES_TabConc##.dg	V8	Up to date		
12	c:\pro	jects\12345\Design\12345DES_TabMisc##.dgn	V8	c:\projects\12\12345DES_TabMisc##.dg	V8	Up to date		
13	C:\pro	jects\12345\Design\12345DES_TabMisc01.dgn	V8	c:\projects\12\12345DES_TabMisc01.dgr	V8	Up to date		
14	c:\pro	jects\12345\Design\12345DES_TabRem##.dgn	V8	c:\projects\123\12345DES_TabRem##.d	V8	Up to date		
15	c:\pro	jects\12345\Design\D\12345DES_TitleSht.dgn	V8	c:\projects\123\12345DES_TitleSht.dgn	V8	Up to date		
10	c:\pro	jects\12345\Desig\12345DES_TyplSect##.dgn	V8	c:\projects\1\12345DES_TyplSect##.dgn	V8	Up to date		
17	7 c:\pro	jects\12345\Design\Draw\12345SURV_Tab.dgn	V8	c:\projects\12345-N\12345SURV_Tab.dg	V8	Up to date		
18	C:\pro	jects\12345\Design\\12345SURV_WUTab.dgn	V8	c:\projects\12345\12345SURV_WUTab.c	V8	Up to date		
19	) c:\pr	jects\123\M&S Standard Plans List Index.dgn	V8	c:\\M&S Standard Plans List Index.dgn	V8	Up to date		
20	) c:\pr	jects\12345\Design\\12345DES Interchange.dgr	· V8	c:\projects\\12345DES Interchange.dgn	V8	Up to date		

- 16. The conversion process runs and the status column will be updated from *Pending to Converted* once completed. The *Up to date* items will not be processed.
- 17. When all the files have been converted **<D> Done**.

#	Source	Format	Destination	То	Status	Time	
1	c:\projects\12345\Bridge\Drawi\12345BRDG_Model.dg	V8	c:\projects\12345\12345BRDG_Model.dg	V8	Up to date		
2	c:\projects\12345\Bridge\Drawin\12345BRDG_Prof.dgr	V8	c:\projects\12345\12345BRDG_Prof.dgn	V8	Up to date		
3	c:\projects\12345\12345DES_EarthworkQuant##.dgn	V8	c:\proj\12345DES_EarthworkQuant##.dgr	V8	Up to date		
4	c:\projects\12345\Desig\12345DES_GenINote##.dgn	V8	c:\projects\1\12345DES_GenINote##.dgr	V8	Up to date		
5	c:\projects\12345\Design\Dr\12345DES_Plan##.dgn	V8	c:\projects\12345\12345DES_Plan##.dgr	V8	Converted	1.0	
6	c:\projects\12345\Design\Dr\12345DES_PnP##.dgn	V8	c:\projects\12345\12345DES_PnP##.dg	V8	Up to date		
7	c:\projects\12345\Design\Dr\12345DES_Prof##.dgn	V8	c:\projects\12345\12345DES_Prof##.dgn	V8	Up to date		
8	c:\projects\12345\Design\Dr\12345DES_SAQ##.dgn	V8	c:\projects\12345\12345DES_SAQ##.dg	V8	Up to date		
9	c:\projects\12345\Desig\12345DES_StdPlanList.dgn	V8	c:\projects\\12345DES_StdPlanList.dgn	V8	Up to date		
10	c:\projects\12345\Design\Dr\12345DES_SWMP.dgn	V8	c:\projects\12345-N\12345DES_SWMP.d	V8	Up to date		
11	c:\projects\12345\Design\12345DES_TabConc##.dgn	V8	c:\projects\12\12345DES_TabConc##.dg	V8	Up to date		
12	c:\projects\12345\Design\12345DES_TabMisc##.dgn	V8	c:\projects\12\12345DES_TabMisc##.dg	V8	Up to date		
13	c:\projects\12345\Design\12345DES_TabMisc01.dgn	V8	c:\projects\12\12345DES_TabMisc01.dgr	V8	Up to date		
14	c:\projects\12345\Design\12345DES_TabRem##.dgn	V8	c:\projects\123\12345DES_TabRem##.d	V8	Up to date		
15	c:\projects\12345\Design\D\12345DES_TitleSht.dgn	V8	c:\projects\123\12345DES_TitleSht.dgn	V8	Up to date		
16	c:\projects\12345\Desig\12345DES_TyplSect##.dgn	V8	c:\projects\1\12345DES_TyplSect##.dgn	V8	Up to date		
17	c:\projects\12345\Design\Draw\12345SURV_Tab.dgn	V8	c:\projects\12345-N\12345SURV_Tab.dg	V8	Up to date		
18	c:\projects\12345\Design\\12345SURV_WUTab.dgn	V8	c:\projects\12345\12345SURV_WUTab.c	V8	Up to date		
19	c:\projects\123\M&S Standard Plans List Index.dgn	V8	c:\\M&S Standard Plans List Index.dgn	V8	Up to date		
20	c:\projects\12345\Design\\12345DES_Interchange.dgr	V8	c:\projects\\12345DES_Interchange.dgn	V8	Up to date		

18. Take time to verify your data. The translation will only build folders and copy the translated data. You will need to copy all missing folders and data from you original project to the translated project folder. When folders and data have been verified, either delete or archive your original project folder and rename the translated project folder by removing your initials. This step will ensure that all references will display.

### **Converting Levels in MicroStation**

- 1. From the MicroStation Manager, Open a drawing file.
- 2. Open the User preferences by clicking **Workspace > Preferences**

#### 3. Select the *Look and Feel Category*

- 4. Toggle on the option for *Use Windows File Open Dialogs*. Turn this feature off will allow a toggle later to open all files in a directory.
- 5. Select File > Save As.

File	<u>E</u> dit	Element	<u>S</u> ettings	<u>T</u> ools	<u>U</u> tilities
<u>b</u>	New			C	Ctrl+N
B	Open			C	Ctrl+O
	<u>C</u> lose			C	Ctrl+W
	<u>S</u> ave			C	Ctrl+S
	Save <u>A</u> s				
	Compre	255			•
	Sa <u>v</u> e Set	ttings		C	Ctrl+F
8	Item Bro	owser			
<b>G</b>	Project	Explorer			
	Re <u>f</u> eren	ces			
	Raster N	/lana <u>q</u> er			
4	Point C	louds			
٥	Mode <u>l</u> s				
<b>S</b>	P <u>u</u> blish	i-model			
	<u>I</u> mport				+
	Export				+

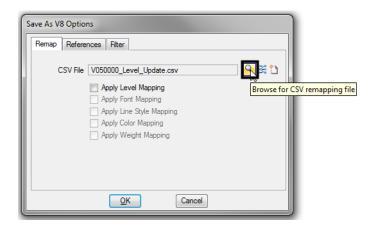
6. Enter a new name into the *File name:* field to rename the current open drawing file, then **<D> Options**.

Save in:	) Drawings	- G 👂 🛤	• 🖽 🔹 🔹	3D - V8 DGN
(Pa)	Name	Date modified	Туре	
24 M	A12345DES_PnP01.dgn	2/18/2010 12:21 PM	Bentley MicroSta	
ecent Places	📕 12345DES_PnP02.dgn	12/10/2010 8:23 AM	Bentley MicroSta	100000 MILLION
	🛃 12345DES_PnP03.dgn	2/18/2010 12:21 PM	Bentley MicroSta	
	🛃 12345DES_PnP04.dgn	2/18/2010 12:22 PM	Bentley MicroSta _≡	
Desktop	🛃 12345DES_PnP05.dgn	2/18/2010 12:22 PM	Bentley MicroSta	
<b>F</b>	A12345DES_PnP06.dgn	2/18/2010 12:22 PM	Bentley MicroSta	<u> </u>
6 <b>33</b>	🛃 12345DES_PnP07.dgn	2/18/2010 12:23 PM	Bentley MicroSta	
Libraries	🛃 12345DES_PnP08.dgn	2/18/2010 12:23 PM	Bentley MicroSta	
	🛃 12345DES_PnP09.dgn	2/18/2010 12:23 PM	Bentley MicroSta	J
	🛃 12345DES_PnP10.dgn	2/18/2010 12:24 PM	Bentley MicroSta	
Computer	A12345DES_PnP11.dgn	2/18/2010 12:24 PM	Bentley MicroSta	
( <b>A</b> )	🛃 12345DES_PnP12.dgn	2/18/2010 12:24 PM	Bentley MicroSta	
	Al12345DES PnP13.dan	2/18/2010 12:25 PM	Bentlev MicroSta *	
Network	•		-	
	File name: 12345DES_PnP02	2a.dgn	Save	
	Save as type: Micro Station V8 D	GN Files (*.dgn)	Cancel	

7. A standard CSV file is located in the configuration which is already set up to remap all of the previous versions' levels to the standard CDOT MicroStation V03.01 levels. The CDOT configuration automatically loads the remapping CSV file.

Save As V8 Options           Remap         References         Filter
CSV File   V050000_Level_Update.csv   🔍 😤 🗋
Apply Level Mapping     Apply Font Mapping     Apply Line Style Mapping     Apply Color Mapping     Apply Color Mapping     Apply Weight Mapping
QK Cancel

8. By chance the file is not found, in the *Save As V8 Options* dialog box, **<D>** the *Browse for CSV remapping file* icon.



9. Navigate to C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation \Tables\Level_Translation. Select the file V03.02_Level_Conversion.csv. <D> OK.

📕 Select Remap	ping CSV File · C:\\	Workspace\Workspace-CDOT_V8	i\Standards-Global\Mi	croStation\Tables\Leve	I_Translation\
Look in:	脂 Level_Transla	tion 👻	G 🤌 📂 🛄 -		3 主
Ca	Name		Date modified	Туре	Size
Recent Places	(🐴) V050000_Lev	el_Update.csv	10/15/2010 10:59	Microsoft Office E	22 KB
Desktop					
Libraries					
Computer					
Network	File name:	V050000_Level_Update.csv			✓ Open
	-				
	Files of type:	Remapping Files (*.csv)			Cancel

10. In the *Save As V8 Options* dialog box, check **On** the option to *Apply Level Mapping*. **<D> OK**.

s	ave As V8 Options
	Remap References Filter
	CSV File V050000_Level_Update.csv Apply Level Mapping Apply Font Mapping Apply Line Style Mapping Apply Color Mapping
	Apply Weight Mapping

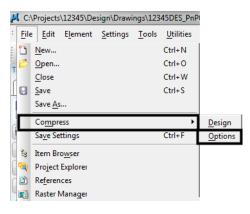
11. **<D> OK** in the *Save As* dialog box. The CSV file will execute and the previous levels will be converted to the updated levels in the V03.01 configuration release.

Save in:	Drawings		•	G 🤌 📂		*	3D - V8 DGN
(And	Name		Date mo	dified	Туре	^ ^	
-	A 12345DES_Pr	P01.dgn	2/18/201	0 12:21 PM	Bentley	MicroSta	
Recent Places	🔊 12345DES_Pr	P02.dgn	12/10/20	10 8:23 AM	Bentley	MicroSta	THE PROPERTY OF
	🔏 12345DES_Pr	P03.dgn	2/18/201	0 12:21 PM	Bentley	MicroSta	
	🔏 12345DES_Pr	P04.dgn	2/18/201	0 12:22 PM	Bentley	MicroSta _≡	
Desktop	🔏 12345DES_Pr	P05.dgn	2/18/201	0 12:22 PM	Bentley	MicroSta	
<u></u>	🔏 12345DES_Pr	P06.dgn	2/18/201	0 12:22 PM	Bentley	MicroSta	
1000 A	🔏 12345DES_Pr	P07.dgn	2/18/201	0 12:23 PM	Bentley	MicroSta	
Libraries	🔏 12345DES_Pr	iP08.dgn	2/18/201	0 12:23 PM	Bentley	MicroSta	
	🔏 12345DES_Pr	iP09.dgn	2/18/201	0 12:23 PM	Bentley	MicroSta	1
	🔏 12345DES_Pr	P10.dgn	2/18/201	0 12:24 PM	Bentley	MicroSta	
Computer	🔏 12345DES_Pr	P11.dgn	2/18/201	0 12:24 PM	Bentley	MicroSta	
	🔏 12345DES_Pr	P12.dgn	2/18/201	0 12:24 PM	Bentley	MicroSta	
	12345DES Pr		2/18/201	0 12:25 PM	Bentlev	MicroSta 👻	
Network	•				_	•	
	File name:	12345DES_PnP02a	.dgn	-		Save	
	Save as type:	MicroStation V8 DGN	V Files (* dan)	•	I T	Cancel	Ī

**Note:** Once the new file is created, there will be two files with the same data. From windows explorer delete the old file and rename the newly created file to the old name. This will allow all reference file calls to be correct and will eliminate having duplicate data

### **Compressing the Model File**

1. After the level updates have been made to the drawing files created in previous versions, select *File > Compress Design > Options*.



2. In the *Compress Options* window, all options should be checked on **except** *Delete Text Elements Containing Only Spaces.* <D> the *Compress* button, then <D> OK.

Select	Action	Alias
	Delete Empty Cell Headers	EMPTY_CELL
7	Delete Empty Text Elements	EMPTY TEXT
3777 37	Delete Text Elements Containing Only Spaces	SPACE_TEXT
	Delete Pre 8.11 Render Setup Entries	RENDER_SETUP
<b>~</b>	Delete Unused Named Shared Cells	SC_NAMED
<b>~</b>	Delete Unused Anonymous Shared Cells	SC_ANON
	Delete Unused Line Styles	LINESTYLES
	Delete Unused Dimension Styles	DIMSTYLES
	Delete Unused Text Styles	TEXTSTYLES
	Delete Unused Levels	LEVELS
	Delete Unused Nested Attachment Levels	LEVELTABLES
	Delete Unused Multi-line Styles	MLINESTYLES
~	Delete Unused Element Templates	ELEMENTTEMPLATES

# Workflow MA 4 - Workspace Update

This document describes the steps to update an existing project when a new workspace is released.

- 1. Review the *CDOT Configuration ReadMe* file before processing any files.
- 2. To update the MicroStation files to the latest levels refer to workflow, *CDOT Level Update for VXX_XX*, where the *X*'s represent the version number. Using the batch process on the project directory is recommended to ensure all files are updated.
- 3. Next, the InRoads Feature Styles for the project's design surfaces need to be updated. Follow the workflow, *CDOT Update InRoads Features* to update these files.
- 4. The project directory structure and PCFs need to be verified. All changes to the directory structure are documented in the ReadMe file. For example, in V03.02 there was a folder added, *Redline*. Going forward this folder will have to be added to existing projects. All new projects will have this folder built. The same is true for the PCF file. If a folder is added to an existing project that contains dgn files, it will have to be added to the existing PCF file. If in doubt run a sample project and compare the PCF files.

# Workflow MA 5 - Consultant Workspace

This document describes the setup of the CDOT Workspace if it is to reside on a server.

1. Read the CDOT MicroStation/InRoads Configuration requirements and installation instructions. This information is found at the following link on the CDOT website:

http://www.coloradodot.info/business/designsupport/cadd/microstation-inroads-configuration

2. This will place the workspace on the server at the specified location.

Note: In the examples below, the following server location is used. "S:\Client Standards\CDOT\"

- 3. Open and review the CDOT Configuration ReadMe file. It is located in *S:\Client Standards\CDOT\Workspace-CDOT_V8i\CDOT Notes*.
- 4. Follow step 8 on the installation instructions to activate the server based workspace for MicroStation and InRoads. For MicroStation and InRoads, edit the following file:

For 64-bit operating systems, C:\Program Files (x86)\MicroStation V8i (SELECTseries)\MicroStation\ config\system\zCDOT_System.cfg

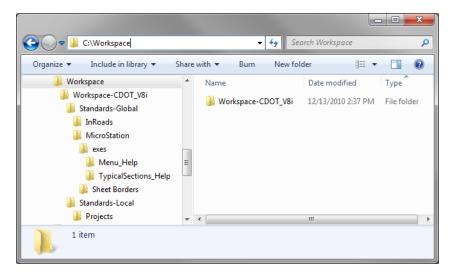
For 32-bit operating systems, C:\Program Files\MicroStation V8i (SELECTseries)\MicroStation\config\ system\zCDOT_System.cfg

zCDOT_System.cfg - Notep	ad		x			
File Edit Format View	Help					
<pre>####################################</pre>						
_CDOT_WORKSPACE	=	S:/Client Standards/CDOT/Workspace-CDOT_V8i/				
_USTN_SITE MS_OTWREG_NOCHECK	= =	\$(_CDOT_WORKSPACE)/Standards-Global/CFG Files/Site/ 1      # Keep the Registration Form from showing	+			
•			▶			

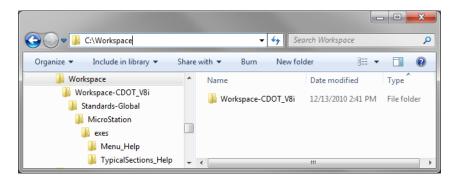
5. The exe folder in the configuration must be copied onto the user's computer in order for the programs to function properly. The exes folder should be placed in the following location: C:\Workspace\Workspace\CDOT_V8i\Standards-Global\MicroStation\. This is required because the custom extensions are built on .NET framework and there are Windows securities that forbid running them on a server.

					x
C:\Workspace\Workspace-CD	OT_V8i\Standards-Global\MicroStation\exes	<b>▼</b> ⁴ 7	Search exes		2
Organize 🔻 Include in library 👻 Sh	are with 🔻 Burn New folder			·= • 🚺	0
🎉 Standards-Global 🔷	Name	Date modified	Туре	Size	-
CFG Files	퉬 Menu_Help	11/22/2010 5:06 PM	File folder		=
InRoads MicroStation	TypicalSections_Help	11/22/2010 5:06 PM	File folder		
AutoCAD Commands	🗱 CDOTMenu.exe	11/19/2010 5:29 PM	Application	1,596 KB	
Cell	ProjectCreationUtility.exe	11/19/2010 5:29 PM	Application	53 KB	
Data	SelectGroup.exe	11/19/2010 5:29 PM	Application	860 KB	
	SelectGroup.vshost.exe	9/30/2010 11:41 AM	Application	6 KB	
DGNlib	🐖 TypicalSection.exe	11/19/2010 5:29 PM	Application	981 KB	
🚽 exes 👻	Rentley Interon MicroStationDGN dll	11/19/2010 5·29 PM	Application extens	396 KB	-

- 6. For those using the **CreatePrjDir.exe**, the following workspace folders (and their data) must be copied to the *C:\Workspace* directory:
  - Workspace-CDOT_V8i\Standards-Local\Projects
  - Workspace-CDOT_V8i\Standards-Global\InRoads\Preferences
  - Workspace-CDOT_V8i\Standards-Global\MicroStation\Sheet Borders
- 7. The pcf file created by the **CreatePrjDir.exe** program will be placed in the following location on the computer used to run the program:
  - ◆ C:\Workspace\Workspace-CDOT_V8i\Standards-Local\Projects\
- This pcf file should be copied to the S:\Client Standards\CDOT\Workspace-CDOT_V8i\ Standards-Local\Projects. All users accessing this project will use the pcf file located on the server because the MicroStation configuration variables point to this directory.
- 9. Below is an example of the folder structure required on the local drive for those using the **CreatePrjDir.exe**:



10. The folder structure required on the local drive for those not using the CreatePrjDir.exe is:



- 11. These folders and files do not control the resources used by the program.
- 12. Follow step 14 on the installation instructions to deactivate the workspaces.

Workflows Using Microsoft Office Products

# Workflow OP 1 - Linking Word Documents to MicroStation

This document guides you through the creation of CDOT Notes sheets. This includes general notes for each of the specialty groups, SWMP notes for Landscape and Environmental, as well as any other sheets with notes. The Design general notes will be illustrated in this workflow, but the process is the same for each type of notes sheet.

## **Workflow Outline**

**Updating Links to the Word Doc** - The existing link in the notes file points to the seed Word document. This needs to be changed to point to the Word document in the project folder.

 Commands Used: Edit > Links > Change Source - Used to change the directory path to the linked Word document.

**Editing the Notes** - How the notes are edited will depend on the extent of the editing. If the edits do not change the line count of the document, the current link can be edited. If the edits will change the line count then the notes should be opened through Word and edited. After editing, the existing links in MicroStation must be deleted and re-created.

• Commands Used: **Double Click on Link** - Used to open Word from MicroStation so that the existing link can be edited.

**Setting Up a Word Document for Linking** - If you are building a notes file from scratch, the page layout must be set up.

- Commands Used: Word > Page Layout Used set up the page formatting.
  - **Margins** Used to set the margins.
  - **Size** Used to define the paper size.
  - **Columns** Used to format to two columns.
  - **Indents** Used to set the indents.

**Creating a New Link** - If a new notes file was created or if extensive edits were done on an existing file, a new link will need to be made.

- Commands Used: **MicroStation > Delete** Used to remove the old link.
- Word > Copy Used to identify the text to be linked.
- **MicroStation > Paste Special** Used to create the new link in MicroStation.

# Updating Links to the Word Doc

The JPC#DES_GenlNote##.dgn is created in ...**Design****Drawings** project folder when the Create Project Utility is run. This file is linked to a Word document that contains generic notes. The links are pointing to the JPC#DES_GenNote.doc that resides in the Project Template and must be redirected to the file in the specific folder.

#### Note:

• A Word 2007 document has a maximum viewable width of 13" when linked to MicroStation.

- A Word 2010 document has a maximum viewable width equal to the paper size when linked to MicroStation.
- When changing the source of a linked Word document in MicroStation, the viewable area of the document will match the version of Word installed on the computer.
  - If a link containing a Word 2010 document has the source changed on a computer with Word 2007 installed, the reduction of the viewable area will result in approximately 3" of data on the right side of the document being hidden. It may also affect fonts used in the Word document.
  - If a link containing a Word 2007 document has the source changed on a computer with Word 2010 installed, the image of the document is reduced in size to fit the entire paper area into the area of the existing link. It may also affect fonts used in the Word document.
- 1. Open the JPC#DES_GenlNote##.dgn located in ProjectWise or, for locally stored projects, C:\Projects\JPC#\Design\Drawings directory.
- 2. Select Edit > Links from the MicroStation Main Menu.



3. In the Links dialog box, highlight one of the documents shown, then <D> Change Source.

Links				?
Links:		Туре	Update	Cancel
	ES_GenNote.docIOLE_L ES_GenNote.docIOLE_L		Unavail Manual	Update Now
				Open Source
				Change Source
				Break Link
Source:	C:\\Drawings\Tabs\	XXXXDES_GenNot	e.doc!OLE_LINK1	
Туре:	Microsoft Word Docum	ient		
Update:	C Automatic	Manual		

4. In the **Change Source** dialog box, use the drop-down list next to the **Look In** field to select the desired directory.

🛣 Change Sourc	e			? 🔀
Look in: My Recent Documents Desktop My Documents My Computer	Carl Tabs My Recent D Desktop My Docum My Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui Compui	ents ter sk (C:) ts J5 JTabs JTabs TT44 (Lkg Je Disk (G:) on 'a-co-main' (M:) uction on 'A-abq-spat\gs4\070271' [Z ng Folders	← 1 → 10	
My Network Places	File name: Files of type: LE_LINK1	XXXXDES_GenNote.doc All Files (".")	<b>v</b>	Open Cancel

5. Highlight the JPC#DES_GenNote.doc file and <D> Open.

🛣 Change Sourc	e				? 🔀
Look in:	Tabs		•	💠 🗈 💣 🗉	∃-
My Recent Documents Desktop My Documents My Computer	■ 12345DE5_Ge ■ 12345DE5_SV ■ 12345DE5_Ta ■ 12345DE5_Ta ■ 12345DE5_Ta ■ 12345DE5_Tit	/MP.doc bEarthwork.xls bMisc.xls			
My Network Places	File name: Files of type:	12345DES_GenNote.doc All Files (*.*)		•	Open Cancel
Item Name: 0	LE_LINK1				

- 6. Repeat this process for the other link.
- 7. **<D> Cancel** to dismiss the *Change Source* dialog box.

*Note:* both links use the same JPC#DES_GenNote.doc.

### **Editing the Notes**

1. The General Note text document is located in the project directory under:

*C:\Projects\JPC#\Design\Drawings\Tabs\JPC#DES_GenNote.doc* 

- 2. This file is then linked twice to the JPC#DES_GenINote##.dgn sheet files, once for each sheet border in the file. These links act independently of each other, however. Adding or deleting text from one link will not scroll text to the other link.
- Editing that will not change the number of lines in the Word document can be done through the existing link in the JPC#DES_GenlNote##.dgn file. For editing that will change the line count, open the JPC#DES_GenNote.doc and make the desired changes. After changes are made, delete the existing links in the JPC#DES_GenlNote##.dgn file and create new ones from the edited Word document.

### **Editing an Existing Link**

1. Select the Element Selector tool from the MicroStation Main toolbar.

Tasks	<del>4</del> Х
💁 Tasks	•
<b>₩</b> ₽,3 ² ,4 ⁴ , <i>5</i> °,	8. <b>F. X </b>
💒 Colorado DOT	<b>∷</b> ≡≡∧

- 2. Move the cursor on to the edge of the linked text (the edge will highlight) and double click (**<D> <D>**). This will open the **JPC#DES_GenNote.doc** file in a session of Word.
- 3. Make the desired changes in the text, **Save**, and **Close** the Word document. The changes will be automatically displayed in the **JPC#DES_GenlNote##.dgn** file.
- 4. Select **Edit > Update Links** so that the change will show in document.

# Setting Up a Word Document for Linking

The following section contains guidelines for setting up a Word document for linking to MicroStation. Please be aware that MicroStation interprets Word 2007 documents and Word 2010 documents differently. Because of this, the setting for both Word 2007 and Word 2010 are given below. Other information, detailed below the page set-up section, pertains equally to both versions of Word.

### Page Set-up for Word Documents

#### Settings for Word 2007

The following settings are used when creating a new Word 2007 document for General Notes or SWMP Plans.

Page Size	11x17 (11" x 17")
Orientation	Landscape
Top Margin	1.00"
Bottom Margin	1.40"
Left Margin	1.00"
Right Margin	3.00"
Columns	Two
Column 1 Width	6.25"
Column 2 Width	8.85"
Column Spacing	0.00"
Column 1 Left Indent	0.13"
Column 1 Right Indent	0.15"
Column 2 Left Indent	0.50" for General Notes 0.13" for SWMP Plans
Column 2 Right Indent	2.35" for General Notes 2.22" for SWMP Plans
Font	Arial Monospaced for SAP
Font Size	10

#### Settings for Word 2010

The following settings are used when creating a new Word 2010 document for General Notes or SWMP Plans.

Page Size	11x17 (11" x 17")
Orientation	Landscape
Top Margin	0.50"
Bottom Margin	0.50"
Left Margin	0.25"
Right Margin	0.25"
Columns	Two
Column 1 Width	8.00"
Column 2 Width	8.00"
Column Spacing	0.50"
Column 1 Left Indent	0.00"
Column 1 Right Indent	0.00"
Column 2 Left Indent	0.00"
Column 2 Right Indent	0.00"\
Font	Arial Monospaced for SAP
Font Size	10

### **General Information for Creating Word Documents**

• The Auto-numbering function in Word will not function properly. Once the copied text is pasted into MicroStation, the first item of the copied text is renumbered starting at 1. This occurs even if the auto-numbering is set to stat with a number other than 1.

• If you wish to number the items, set the *Indentation Special* to **Hanging** with a *By* value of **0.25**", then physically type in the numbers. Also, clear any tabs set, as these may cause problems with the formatting.

Paragraph			? 💌
Indents and Spa	acing Line and Page	Breaks	
General			
Alignment:	Left		
Outline level:	Body Text 💌		
Indentation			
Left:	0.5"	Special:	В <u>ү</u> :
<u>R</u> ight:	0.13"	Hanging	▼ 0.25" ≑
Mirror inde	nts		
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Before:	0 pt 🌲	Line spacing:	<u>A</u> t:
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**Note:** The image above shows the indents for a 2007 Word document. The Left and Right Indentation settings are 0.00 for a 2010 Word document.

- Use a "hard" return (by pressing the Enter key) at the end of each page. This will ensure that there is no text wrapping between pages.
- A Word 2007 document has a maximum viewable width of 13" when linked to MicroStation.
- A Word 2010 document has a maximum viewable width equal to the paper size when linked to MicroStation.
- When changing the source of a a linked Word document in MicroStation, the viewable area of the document will match the version of Word installed on the computer.
  - If a link containing a Word 2010 document has the source changed on a computer with Word 2007 installed, the reduction of the viewable area will result in approximately 3" of data on the right side of the document being hidden. It may also affect fonts used in the Word document.
  - If a link containing a Word 2007 document has the source changed on a computer with Word 2010 installed, the image of the document is reduced in size to fit the entire paper area into the area of the existing link. It may also affect fonts used in the Word document.

### **Creating a New Link**

Use the following procedure when changes to the JPC#DES_GenNote.doc will increase or decrease the original number of lines in the document.

- 1. Select **Delete** from the **MicroStation Main** toolbar.
- 2. **<D>** on the linked text. **<D>** again to accept the command and delete the link.

3. Open the edited JPC#DES_GenNote.doc and highlight the entire page of text that is to be linked.

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4. Select Edit > Copy from the menu (or press CTRL + C) to copy the text to the clipboard.

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5. Go to the MicroStation session with the JPC#DES_GenINote##.dgn file open and select Edit > Paste Special.



6. From the Paste Special window, select *Linked Microsoft Office Word Document*, then <D> Paste.



7. In the Paste OLE tool dialog box, set the Method to By Corners.

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- 8. **<T>** to the left end of the guide line and **<D>**.
- 9. **<T>** to the right end of the guide line and **<D>** to complete the link.

Tentative to this point second, then Data

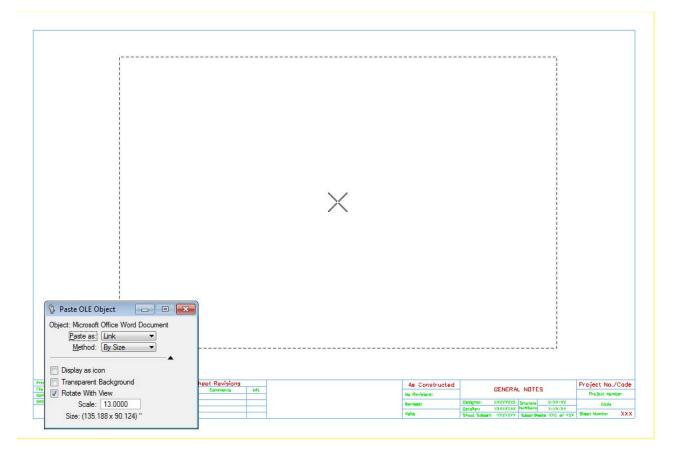
An alternative method when attaching the linked document is to use the size option in the Paste OLE dialog box.

- 1. Follow steps 1 through 6 described above.
- 2. In the Paste OLE tool dialog box, set the **Method** to **By Size**.

3. Expand the dialog box and set the *Scale* to *13.00*.



- **Note:** Using the 13 scale factor will produce a text height of approximately.07", which is the CDOT standard for a 1"=1' annotation scale. This number can be adjusted if larger text is required.
- 4. Center the outline of the link in the sheet border and **<D>** to place it.



Once the linked document has been placed, it can be repositioned using the MicroStation Move command.

# **Notes Placed From a PDF**

A PDF file of the notes can be displayed within the MicroStation file to create General Notes and SWMP plan sheets. As with the other options, using a PDF file has advantages and disadvantages. Some of the advantages to using a PDF file are:

- The Word 2010 formatting can be used even on computers with Word 2007
- The autonumbering functions in Word can be used
- If the PDF is recreated, the new PDF in MicroStation is updated as well

Some of the disadvantages to using a PDF are:

- The Word file can be different from the PDF file. You will need to create a new PDF each time the document is edited
- A separate PDF is required for each page in the document
- A PDF that is attached in MicroStation cannot be overwritten while the DGN file is open.
  - Close MicroStation.
  - Create a new pdf. Give it the same name to overwrite the existing one.
  - Open up MicroStation and PDF will be updated

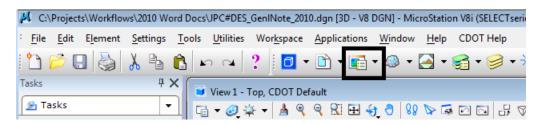
To link a PDF to MicroStation, follow the steps below:

1. Open the Word document (the JPC#DES_GenNote_2010.doc is used in this example) and create a separate PDF print of each sheet to be linked.

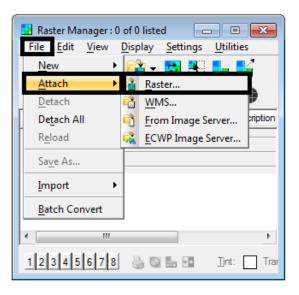
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- **Note:** Be sure to name the PDF something meaningful for the print (in this example the PDF was named *JPC#DES_GenNote_2010-pg1.pdf*).
- 2. ).Open MicroStation using the drawing that will contain the PDF (in this example *JPC#DES_GenNote_2010.dgn* is used).

3. Open the MicroStation Raster Manager.



4. In the Raster Manager dialog box, select File > Attach > Raster. This displays the Attach Raster Reference dialog box.



- 5. In the *Attach Raster Reference* dialog box, navigate to the desired location, highlight the desired file, and toggle on **Place Interactively**.
- 6. **<D>** the **Open** button.

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7. **<T>** to the left end of the bottom snap line within the sheet border then **<D>**.

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8. **<T>** to the right end of the bottom snap line within the sheet border then **<D>**.

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This completes the attachment of the PDF file. Below is an example of a completed sheet.

-					GENERA	L NOTES																
	[Motor within [ ] are designed directions - delets all directions prior to final plan saturity. All NOT shall be filled to by the designed during design phase. If the net does not apply dates (t) for prolining plan quantities of present metericals, the following rests of spillation are used:					Prior to placing bituefnous present, the paved surface shall be swept and clasmed. This will not be paid for separately, but shall be included in the cost of the hot file Asphale Pavement item.																
	Prime Cost (MC-70) [XX Seal Cost (RC[XX]) Dil	xx]	Asphalt[XXXX].# [XX]	Gals./Sq Gals./Sq	. Yd. . Yd.(Diluted)	The Conterpeter shall considered the shallowing operation such that full compliance to the existing gradue in shallowing on shall besis following the paring operation for the effected area unless otherwise approved by the Engineer. Overlay of placed areas shall communce within 5 working days following the planning unless otherwise approved by the Engineer.																
	Cover Cost Material [X Tack Cost Diluted Emul	xxx). sified Asphalt		Lbs./Sq. Gals./Sq.	Yd. Yd.(Diluted)																	
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	Diluted emulsified asphalt for t					It is estimated that the o	old road is to be obliterat	ted at the following loc	ations: [XX + XX]													
	Asphalt rejuvenating agent shall					Moisture-density control a	will be required for the f	ull depth of those emban	kments on this project.													
	estimating purposes, [2003] galions of asphalt rejuvenating agent to one galion of water was used. It should be noted that the use of asphalt rejuvenating agent is dependent on results of tests performed after completion of surfacing and may not be regulated by the follower. Rejuvenzing agent, if regulared, will be applied as seal cost at the time of construction. Rates of application shall be as determined by the follower that the time of construction.						Depth of maincre-density control for this project think is as follows: med the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second															
	Diloted [DXX] shall be used as a dust palletive where required and shall consist of a dilution of [DXX] and where, the portions of which shall be [DXX] part(b) matter and [DXX] part [DXX], based on viluan measurement. Locations shall be a directed by the foglame. Note: shall be used as a dust palletive where required. Locations shall be as directed by the foglame. Requestion Chicride shall be used as a dust palletive where required. Locations shall be as directed. It is settimeted that [DXX] part [DX] and that DX] are also be a directed.					Bases of fills [XX] free or less in height [XX] Feet. Full depth of spor disk (ode) with bridge action). Full depth of methodismic sections used for ditches and charmel changes. Excension required for compaction of bases of cuts and fills will be considered as subsidiary to that operation may will not be paid for segarativy.																
						The minimum thickness of topsoil shall be (XXX Inches. It is estimated that $[XX]$ Cu. Yds. will be required based on the average thickness of $[XX]$ Inches.																
	to be exclusive out out, be furthermore with each bighterm to be project. The following shall be furthermore with each bightermore project. 1. A set type devices at least 50 Feet in length. 2. [200] Feet of control line and testes.						Type of compaction for this project will be AddWD T-[200]. Concrete pipe dioted features and non the Schwards are expected as: All concrete culture installations excluding side relate. All concrete culture installations including side relate.															
Any layer of bituminous pavement that is to have a succeeding layer placed thereon shall b full width before succeeding layer is placed.						Guard posts, delineators and (XXX) will be removed by State forces at no cost to the project. Mile posts will be adjusted or reset by State forces at no cost to the project.																
	Asphalt joints shall fail on lines, shoulders lines or median lines, except where stated in the plans. All trends lanes are subject to secotheres incentive/disincentive payments. Pavement smoothness incentive/disincentive shall be based on Zoches/Alls. Road appreaches with regide trutingious payment shall be primed and an [20] Inches thickness of						It is estimated that [22] gallons of persent marking paint will be required on this project as follows: With															
provement (and [XX] includes thickness of ARC) placed as follows: Pholic approaches and entropies to building or residences shall be preed to freet out free the adge of shoulder or to the tight-Orizey line, whichever is less. Field entronces shall be preed 4 freet out free the adge of shoulder. The Contractor shall not park any whiches or equipment is, or disturb any areas not approved by the Engineer. millings shall become the property of the foste. The Contractor shall respire adjecter.						It is a setLanded that [XX] hours of blading with a motor grader in the [XX] to [XX] flywheal heresponer range will be explored an directed by the figures. It is astignated that [XX] hours of doing with a power contact type tractor in the [XX] to [XX] horespower renge will be required as directed by the figures. It is astignated that [XX] also posts will be adjusted or reast by the Contractor and paid for as Smoot American . It is estimated that [XX] days of Traffic Control Ranagement will be required on this project. It is estimated that [XX] days of Traffic Control Ranagement will be required on this project.																
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£1							Vold:	Steel Subsels 200000	(X Subset Streets 3 of 2	Sheet Number												

#### **Notes Placed as MicroStation Elements**

Included in the workspace are files called *JPC#DES_GenINoteMsta##.dgn* and *JPC#DES_SWMP-Msta.dgn*. These are MicroStation files that have the respective notes placed as MicroStation text elements instead of using links to Word. These files do not have an external data source and all editing occurs solely within the MicroStation environment using the **Edit Text** command.

							GENERA	NOTES							
sube	es within [ ] are designe rittal. All XXX shall be f y delete it.]	lind n by	the de	signer durin	g dan's	phase.	fina' plan 2f two nutw dawn rot	Rillings shall ber	one the property fo the this exterial to a site						
	Far proliminary plan qui mula usud:	etities of	paveror	it materials,	the fe	0110W.41	etes of application	Prior to placing t be paid for suppre	'tuminous payement, the tely, but shall be 'sc's	paved sarfs ded in tel	ce sha'' be cost of the	i saupt ard	claaned Thi	s s'' rot	
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	- 1 -
For preliminary plan quantities of pavement materials, the following rates of application were used:	
Prime Coat (MC-70) [XXXX]	
Diluted emulsified asphalt for tack coat shall consist of 1 part emulsified asphalt and 1 part water.	
	Þ

If used, these files should replace those containing the linked Word documents and should not be used in addition to them.

# Workflow OP 2 - Linking Excel Documents to MicroStation

This document guides you through linking Microsoft Office Documents within MicroStation.

#### **Workflow Outline**

**Creating a New Link** - To create a link to an Excel file within MicroStation; copy the data from the Excel file, then Paste Special the data into MicroStation.

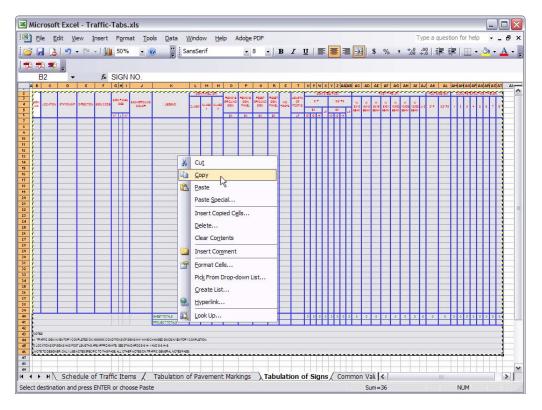
- **Excel > Copy** Used to identify the text to be linked.
- MicroStation > Paste Special Used to create the new link in MicroStation.
  - **Method** Use the By Size option.
  - **Scale** Use 10 so that the text will be the correct size.

**Updating Links to the Excel** - If a linked document gets moved or renamed, teh link to that file can be restored without re-creating the link.

 Commands Used: Edit > Links > Change Source - Used to change the directory path to the linked Word document.

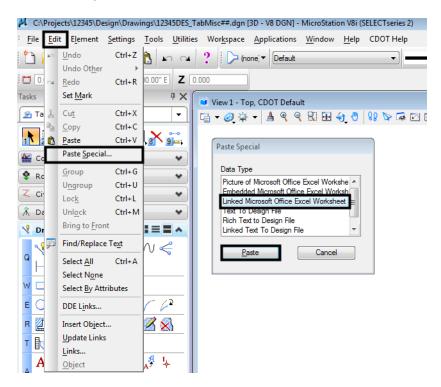
### **Linking Excel Documents**

- 1. Open your MicroStation File and your Microsoft Excel file.
- 2. Within the Excel file, select the information you would like in the MicroStation Sheet file and copy by *right clicking* and selecting **Copy**.

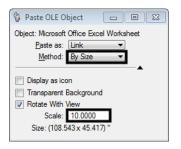


Colorado Department of Transportation

3. Within the MicroStation file, select Edit > Paste Special ... from the MicroStation menu. On the *Paste Special* dialog box, <D> Linked Microsoft Office Excel Worksheet and <D> Paste.



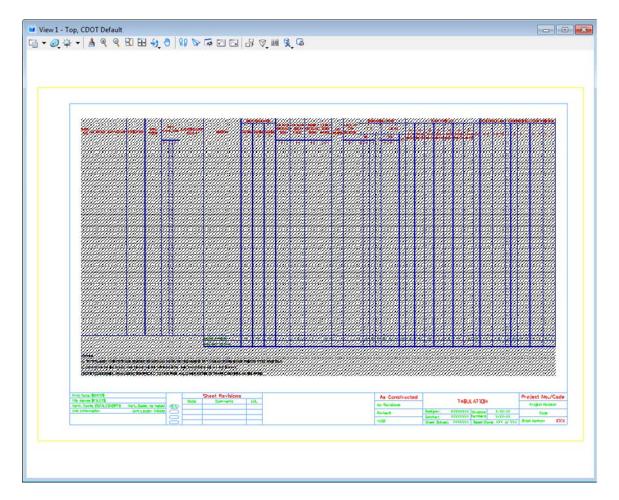
4. This brings up the *Paste OLE* dialog box. Select **By Size** as the *Method:* and enter a *Scale* of *10*.



**Note:** The San Serif font should be used as the default Font in Microsoft Excel documents. The San Serif 8 pt font in Excel, is equivalent to CDOT Standard Text (.07"), and the San Serif 12 pt font is equivalent to CDOT Title Text (.10") for a 1"=1' Drawing with a Scale of 10 noted above. The fonts are not exact duplicates but the San Serif will be the most similar Font to the CDOT Standard.

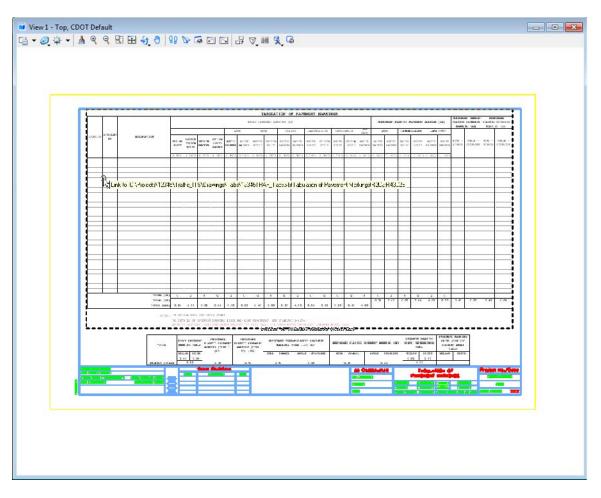
5. The limits of the selected Excel data to be placed in the MicroStation Sheet will display in the MicroStation Window. Select the location for the Excel File and **<D>** to place the file.

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**Note:** The link will display with hatching which indicates that the Excel file containing the linked data is currently open. If you close out of your Excel file, the hatching will go away.

6. You can single click on the Linked graphics and use MicroStation Commands to move the image. Do not resize the linked window with the handles, as the text size will also resize and will not plot as desired.



**Note:** You can hover over the linked image to display the location of the Excel file. Double clicking the link will open the Microsoft Excel document. You can edit the Excel file, close the file, and the updates will be displayed in the MicroStation file.

#### **Updating Document Link Source and Properties**

 If the Excel document has been moved or renamed, you can simply update the link instead of redoing the above procedure. This is also the case for MicroStation files with links that were created with the *Create Project Directory* program. These files will be linked to Office files in a standard template and need to be updated to link to the Office files in the Project Directory Structure. 2. From the *MicroStation* menu, select Edit > Links...



This will bring up the *Links* dialog box. You can select an available document link and <D> Change Source...

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Links:	Type ns!R2C2:R46C46 Worksheet	Update Vinavail	Cancel	
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	ffice Excel Worksheet utomatic			Break Link

4. This brings up the *Change Source* dialog box. Use this to navigate to and select the file with its new location. **<D> Open**. This dismisses the *Change Source* dialog box and re-displays the Links dialog box.

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Look in:	퉬 Tabs		- 🕝 🌶 📂 🖽 -	
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Network	File name:     Files of type: Workflows!R1C1:	III 12345DES_Tab Misc xls All Files (*.*) R28C8		▶ Open Cancel

5. You can select another available document link to update or **<D> Close** to exit the **Update Links** dialog box.

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Update Now	
Open Source	
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Break Link	

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*Note:* You can select either to have the link update manually or automatically by selecting the method you prefer. You can do a manual update from the *Links* dialog box by selecting the link and **<D>** Update Now.

# **Workflow OP 3 - Monumentation Sheets**

This document describes the process used to assemble a Right of Way Monumentation Sheet. An InRoads XML report is used to display the required data from the geometry project. This data is copied and pasted into the *JPC#ROW_TabMon.xls* Excel file and then linked to the *MicroStation JPC#ROW_Mon##.dgn* file.

#### **Workflow Outline**

**Creating the InRoads XML File** - The data used to create the Right of Way Monumentation sheet is stored in an Geometry Project. The InRoads Clearance report is used to extract that data for use on the sheet.

- Commands Used: Tools > XML Reports > Clearance Used to create the geometry report data used on the Monumentation sheet.
- InRoads Report Browser > Templates Used to select the template that formats the report.
- Format Options Used to set the number of decimal places shown in the report.

**Copying the Report** - After the report is formatted, it is copied and pasted into Excel.

- Commands Used: InRoads Report Browser > Copy Used to copy the data from the report browser.
- **Excel > Paste** Used to paste the report data into Excel.
- **Protect Sheet** Used to give the user the ability to turn off the sheet gridlines.
- **Options > View** Used to turn the gridlines off.

Creating a New Link - Once the report is in Excel and formatted, it can be linked to the MicroStation file..

- Commands Used: **MicroStation > Delete** Used to remove the old link.
- Word > Copy Used to identify the text to be linked.
- **MicroStation > Paste Special** Used to create the new link in MicroStation.

## **Creating the InRoads XML File**

The data used to create the Right of Way Monumentation sheet is stored in an InRoads Geometry Project (*.alg). Depending on the data required, one of two different reports are used to extract the data from the geometry project. Both reports display Point Number, Northing, Easting, and Elevation. If this is all the data that is required, a Geometry report is used. If Station and Offset information is also required, then the Clearance report is used.

#### **Geometry Report**

A geometry project containing the data is the only prerequisite for creating a Geometry Report.

1. From the *InRoads* menu, select **Tools > XML Reports > Clearance**. The *Clearance Report* dialog box is displayed.



- 2. **<D>** the **Cogo Points** leaf.
- 3. In the *Include* field, key in the desired COGO point numbers then Tab to accept the keyed in information. COGO points can be specified as a range (*XXX-XXX*), a list of individual points (*XXX,XXX,XXX*) or a combination of both (*XXX-XXX,XXX,XXX-XXX*). If the required point numbers are unknown, all points can be listed by keying an asterisk (*) into the *Include* field. The asterisk can be used in conjunction with text to limit the list of points. For example, keying in '10*' would find all points whose first two digits were' 1' and '0'.
- 4. **<D> Apply** to start the report compilation process. The **Bentley InRoads Report Browser** dialog box displays.

Clearance Report General Horizontal Alignments	Include: Selected:	+	Filter
Cogo Points	Name	Description	Style ^
Features	1250	Control Monument-Project	T_Control
	1270	Control Monument-Project	T_Control
	1290	Control Monument-Project	T_Control
	1320	Control Monument-Project	T_Control
	1360	Control Monument-Project	T_Control
	1380	Control Monument-Project	T_Control
	1405	Control Monument-Project	T_Control 🔻
	•		•

#### The Bentley InRoads Report Browser

The **Bentley InRoads Report Browser** is a modified version of the Internet Explorer web browser used specifically for InRoads XML reports. It is launched automatically when an XML report is ran. It can also be launched by selecting **Tools > View XML Reports** from the InRoads main menu. The illustrations below use the *List Coordinates* report, however procedures are the same for the *Clearance* report.

#### Selecting an XML Report Template

- 1. Report templates are program files that format the raw data contained within the XML file. When the **Bentley InRoads Report Browser** opens, it selects a default report template for the type of report that was created.
- CDOT's custom report templates are stored in the CDOT folder. <D> on the CDOT folder to display the available templates. Two custom templates are provided for creating Monumentation sheets;
   CDOT_Monumentation_ListCoordinates and CDOT_Monumentation_Clearance. <D> on the desired template name to activate that template.

Sentley InRoads Report Browser - C:\Project
File Tools Help
C:\Program Files\Workspace-CDOT\Standards-Global\
Eridge
- A: CDOT A-line Description.xsl
- Air CDOT Air Rights Easement Description.xsl
- A CDOT Fee Parcel Description.xsl
CDOT Permanent Easement Description.xsl
CDOT Slope Easement Description.xsl
CDOT Temporary Easement Description.xsl
CDOT Utility Easement Description xsl
CDOT ListCoordinates.xsl
CDOT_Monumentation_ListCoordinates.xsl
CDOT_Monumentation_Clearance.xsl
CDOT_PropertyDescription.xsl
Clearance

3. This updates the report layout automatically in the browser window.

List Coordinates Report								
Report Created: 5/25/2007 Time: 10:16am								
	Project: S.H. No. 86							
Des	cription: Elbert County							
			InRoads\Geometry\S.H. N	io. 86.alg				
Last Revised: cferree 5/23/2007 9:36:54 AM								
Last	Revised: cferree 5/23/20	U/ 9:36:54 AM						
	Revised: cferree 5/23/20	U7 9:36:54 AM						
	Revised: cforree 5/23/20 NORTH (ft)	EAST (#)	ELEV (ft)	DESCRIPTION				
Points			ELEV (#)	DESCRIPTION N 1/4 Comer Sec. 14				
Points POINT NAME	NORTH (ft)	EAST (#)						
Points POINT NAME 104	NORTH (ft) 1558514.31	EAST (#) 3277056.40	0.00	N 1/4 Corner Sec. 14				
Points POINT NAME 104 105	NORTH (ft) 1558514.31 1558527.87	EAST (#) 3277056.40 3279643.18	0.00	N 1/4 Corner Sec. 14 NW Corner Sec. 13				
Points POINT NAME 104 105 106	NORTH (ff) 1558514.31 1558527.87 1553239.97	EAST (ft) 3277056.40 3279643.18 3279699.86	0.00 0.00 0.00	N 1/4 Corner Sec. 14 NW Corner Sec. 13 SW Corner Sec. 13				
Points POINT NAME 104 105 106 107	NORTH (ff) 1558514.31 1558527.87 1553239.97 1653924.17	EAST (#) 3277056.40 3279643.18 3279699.86 3281413.94	0.00 0.00 0.00 0.00	N 1/4 Corner Sec. 14 NW Corner Sec. 13 SW Corner Sec. 13 SW Corner Sec. 13				
Points POINT NAME 104 105 106 107 108	NORTH (ft) 1558514.31 1558527.87 155329.97 155329.97 1553239.97	EAST (ft) 3277056.40 3279643.18 3279699.86 3281413.94 3279699.86	0.00 0.00 0.00 0.00 0.00	N 1/4 Corner Sec. 14 NW Corner Sec. 13 SW Corner Sec. 13 SW Corner Sec. 13 SW Corner Sec. 13				
Points POINT NAME 104 105 106 107 108 109	NORTH (#) 1558514.31 1558527.87 1553239.97 155324.17 1553239.97 1558460.37	EAST (ff) 3277056.40 3279643.18 3229899.86 3281413.94 3279699.86 3269305.79	0.00 0.00 0.00 0.00 0.00 0.00 0.00	N 1/4 Corner Sec. 14 NW Corner Sec. 13 SW Corner Sec. 13 SW Corner Sec. 13 SW Corner Sec. 13 SW Corner Sec. 13				

#### **Format Options**

- 1. The default precision for reporting is set to two decimal places. If a different precision is required, it can be set using **Format Options**.
- 2. From the *Bentley InRoads Report Browser*, select Tools > Format Options. This displays the Format Options dialog box.

3. Use the pull downs to set the desired precision for the different options. For the reports discussed in this document, the following fields are used: Northing/Easting, Elevation, Linear (for offsets), and Station.

Format Options				<b>×</b>
Northing/Easting: Bevation: Angular: Slope: Use Alternate Slope if Alternate Slope: Linear:	Mode Degrees •	Precision 0.12 • 0.12 • 0.12 • 0.12 • 0.12 • 0.00% 0.00% 0 • 0.12 •	Format	Close Help
Station: Acres/Hectares: Area Units: Cubic Units: Direction: Face: Vertical Observation:	Bearings Right Face Zenith		ss+ss.ss  Convert to Cubi ddd^mm'ss.s"	c Yards

4. Selecting a different precision will automatically update the column or columns in the report that uses that format option. **<D> Close** to dismiss the dialog box when finished.

#### **Copying the Report to the Monumentation Spreadsheet**

- Now that the report has been generated and formatted properly, the contents of the report can be copied into the *JPC#ROW_TabMon.xls* Excel file. This file contains separate sheets for different types of monuments. These are; ROW Markers To Be Set, Control Points To Be Set, ROW Markers To Be Reset, Permanent Easement Markers, Aliquot Corners, and Temporary Easement Points. Because any number of these monument types may be stored in the geometry project, it may be necessary to copy different blocks of data from the report to paste into different sheets in the spreadsheet.
- 2. Open the JPC#ROW_TabMon.xls file with Excel then minimize it.
- 3. Go back to the Bentley InRoads Report Browser and highlight the desired data in the report.
- 4. Right Click on the highlighted data to display the menu. Select **Copy** from that menu.

POINT NAME	NORTH (ft)	EAST (ft)	ELEV (ft)	DESCRIPTION
104	1558514.31	3277056.40	0.00	N 1/4 Corner Sec. 14
105	1558527.87	3279643.18	0.00	NW Corner Sec. 13
106	1553239.97	3279699.86	0.00	SW Corner Sec. 13
107	1553924.17	3281413.94	0.00	SW Corner Sec. 13
108	1553239.97	3279699.86	0.00	SW Corner Sec. 13
109	1558460.37	3269305.	Lut	SW CORNER SECT 1
123	1559379.09	3Z7917Z.	Copy Paste	ROW MONUMENT to be
124	1558494.08		ielect All	ROW MONUMENT to be
125	1557449.77	3284676. ^F	Print	ROW MONUMENT to be
202	1558228.58	62746761	Convert selected links to Adobe PDF	ROW MONUMENT to be
203	1557378.97		Convert selected links to existing PDF Convert selection to Adobe PDF	ROW MONUMENT to be
204	1556263.86	3283756.	Convert selection to existing PDF	ROW MONUMENT to be

- 5. Minimize the Bentley InRoads Report Browser and maximize the Excel.
- 6. Using the tabs at the bottom, select the sheet for the copied data.

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36												
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38												
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14 4	► ► \\ \\ R	DW Markers	To Be Reset	Permenen	t Easement Markers	/ Ali	quot Corners	/ Tempo	rary Easeme	ent Points	/ <	Ė
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7. **<D>** in cell A3 of the selected sheet. This is where the copied data will be pasted. *Right click* in the same cell and select **Paste** from the menu that displays.

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8. The illustration below shows the result of this operation.

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4	124	1558494.08	328 1809.39	2202.8	ROW MONU	MENT to be set		
5	125	1557449.77	3284676.82	2202.8	ROW MONU	MENT to be set		
6	200	1556228.46	3282411.2	2202.8	STATE HWY	DEPT MONUMENT		
7	201	1554582.34	3285207.83	2202.8	STATE HWY	DEPT MONUMENT		
8	202	1558228.58	3274676.21	2202.8	ROW MONU	MENT to be set		
9	203	1557378.97	3280570.38	2202.8	ROW MONU	MENT to be set		
10	204	1556263.86	3283756.41	2202.8	ROW MONU	MENT to be set		

- 9. Because the example is a List Coordinates report, the **Station** and **Offset** columns are empty. These two columns will be hidden in order to center the title over the data.
- 10. **<D>** and hold the mouse button on the 'F' column label and drag the cursor over the 'G' column label. Both columns highlight.
- 11. *Right Click* on the highlighted columns (in the body of the table) and select Hide from the menu.

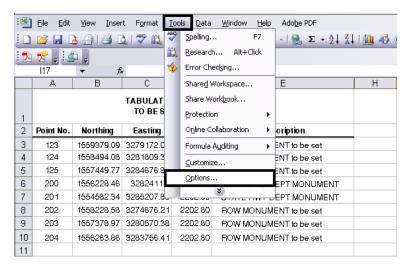
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- 12. The Station and Offset columns vanish and the title is centered over the remaining columns.

- 13. Before the sheet can be linked to the *JPC#ROW_Mon##.dgn* file, the grid lines need to be turned off. If they are left on, they will appear in a print of the dgn file.
- 14. Select Tools > Protection > Protect Sheet to maintain the new sheet formatting. This will display the Protect Sheet dialog box.
- 15. Toggle on Protect worksheet and contents of locked cells near the top of the dialog. In addition toggle on Select locked cells, and Select unlocked cells under *Allow all users of this worksheet to:*. <D> OK to accept the changes and dismiss the dialog box.

Protect Sheet 🛛 🔀
Protect worksheet and contents of locked cells
Password to unprotect sheet:
Allow all users of this worksheet to:
Select locked cells
Select unlocked cells
Format cells
Format columns
Format rows
Insert columns
Insert rows
Insert hyperlinks
Delete columns
Delete rows
OK Cancel

16. Select **Tools > Options** from the Excel menu.



- 17. From the **Options** dialog box, select the *View* tab.
- 18. In the *Windows Options* area, toggle off **Gridlines**. **<D> OK** to accept the changes and dismiss the dialog box.

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19. The left most column in the *JPC#ROW_Mon##.dgn* file can hold 50 rows of data (not counting the two title rows). Other columns can hold 41 rows of data. If there are more rows of data than a column can hold, the sheet can be copied and the duplicate data deleted from the sheets.

20. To make a copy of a sheet, right click on the sheet tab (at the bottom of the window) and select **Move or Copy** from the menu.

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In the Move or Copy dialog box, toggle on Create a copy. <D> OK to create the copy and dismiss the dialog box.

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- 22. The Copy of the sheet is named with (2) appended to the sheet name. The sheets can be renamed by right clicking on the tab and selecting **Rename** from the menu. Key in the new name and press the *Enter* key to accept the change.
- 23. In the original sheet, delete all the data below row 52 for the long column, below row 43 for the short columns (the long column can hold 50 rows of data and there are two rows of headings).
- 24. In the copied sheet, delete the data from rows 3 through 52.

#### Linking the Spreadsheet to the MicroStation Sheet File

Once the data has been copied to the spreadsheet and the sheets formatted, they can be linked to the MicroStation sheet border.

- 1. Open *JPC#ROW_Mon##.dgn* in MicroStation then minimize it.
- 2. In the *JPC#ROW_TabMon.xls* file, highlight the data to be linked. Be sure to include only columns and rows with data (including the two title rows).

3. From the Excel menu, select **Edit > Copy** (or right click in the highlighted area and select **Copy** from the menu).

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4. Maximize the MicroStation window. From the MicroStation Menu select Edit > Paste Special.



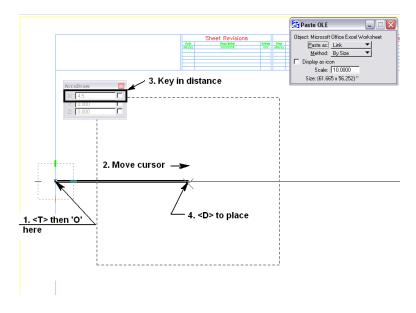
5. The **Paste Special** dialog box is displayed. Select *Linked MicroSoft Office Excel Worksheet* from the list and **<D> Paste**.



- 6. In the Paste OLE dialog box, set the Method to By Size.
- 7. In the Scale field, key in 9.25.

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- 8. An outline of the linked file is now attached to the cursor.
- 9. With AccuDraw active, <T> to the no-plot line in the middle of the sheet. Press the '**O**' key to identify this point as the origin on the link placement.
- Move the cursor along the line, away from the sheet border, then key in the desired value in the AccuDraw tool setting box. This should be 4" for a table with the Station and Offset columns and 4.5" for a table without. <D> to accept the location.



# Workflow OP 4 - Right of Way Property Tab Sheets

This document guides you through the use of the Excel spreadsheet JPC#ROW_TabProp.xls with the JPC#ROW_TabProp##.dgn to create a finished "Tabulation Of Properties" sheet file.

## Using the ROW_TabProp.xls file:

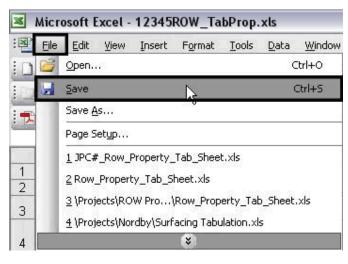
1. The ROW_TabProp.xls file is set up to hold data for up to four complete tabulation sheets. This file is protected to maintain the column widths and number of rows. Data entry is allowed in the body of each table only. The illustration below highlights the body of table 1.

Parcel No.				1 - Tabulation of Properties           Area Of Area Of Properties         Bush and Properties         Date has and Properties         Date has and Properties         Trafs           Area Of Proved         Exclusion         Resultation Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resultation         Resulta								
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a. Data is entered beginning in cell 5A.

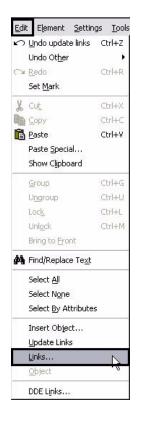
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- 2. After typing in the desired data, press the Tab key to move to the next available cell. This will move the cursor across each row, one cell at a time until the end of the row is reached. A tab at the end of the row will move the cursor to column A of the next row. A tab at the end of a table will move the cursor to the first row and column of the next table.
- 3. After the desired data is entered select File > Save. Do not close the document.



#### Updating the Link to the ROW_TabProp.xls file

- 1. Open the JPC#ROW TabProp##.dgn in MicroStation.
- 2. Select Edit >Links from the menu. This will display the Links dialog box.



3. In the **Links** dialog box, highlight the link to the spreadsheet and <D> **Change Source**.

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4. From the **Change Source** dialog box, highlight the JPC#ROW TabProp.xls file and **<D> Open**.

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5. Repeat steps 4 through 7 for other spreadsheets if needed.

#### Editing the ROW_TabProp.xls file

 The Excel file (and thus the MicroStation tab sheet) can be edited from MicroStation by selecting the Element Selector then double clicking (<D> <D>) on the table. This opens Excel and the linked spreadsheet.

- 2. Make the desired edits in Excel, **Save** then **Close** the file. The corrections will be updated automatically.
  - **Note:** If the link to the spreadsheet is lost or additional sheets are required, refer to the workflow document **CDOT Linking MicroStation to Excel Documents** for directions on reestablishing or creating new links.

# Workflow OP 5 - Numbering Plan Sets In Adobe

This document guides you through the use of the page numbering option within Adobe Acrobat Professional.

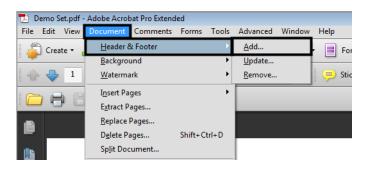
#### **Prerequisites**

Before you begin, you will need a pdf file of the plan set that is not numbered in MicroStation.

### **Basic Page Numbering**

This section, explains how to set up header/footers to number sheets when the title block is located at the bottom of the sheet and at the top of the sheet.

- 1. Open the plan set PDF using Adobe Acrobat Professional.
- 2. Because Right-of-Way plans have the title block at the top of the sheet, the numbering at the bottom of the sheet must end prior to encountering the Right-of-Way sheets. Make a note of the page number of the last design plan sheet for use in the steps below.
- 3. From the menu bar, select **Document > Header & Footer > Add**. This displays the *Add Header and Footer* dialog box.



4. In the *Font* area of the *Add Header and Footer* dialog box, select **Tahoma** for the *Name* and **11** for the *Size*.

Saved Settings: [Custom-not s	aved]   Delete Save Settings.	
Font		Margin (Inches)
Name: Tahoma	▼ Size: 11 ▼	U         Top:         0.5         ▲         Bottom:         0.5
Appearance Options		Left: 1 Right: 1

Next the margins and page numbers are set up for sheets with the title block at the bottom of the sheet.

#### Settings for Numbers in the Lower Right Corner

Use the following steps to set the right and bottom margins.

1. In the *Margins* area of the *Add Header and Footer* dialog box, key in *O.71* for the *Bottom* margin and key in *O.75* for the *Right* margin.

Add Header and Footer		<b>—</b>
Saved Settings: [Custom-not saved]	Delete     Save Settings	
Font		Margin (Inches)
Name: Tahoma	▼ Size: 11 ▼ <u>U</u>	Top: 1 Bottom: 0.71
Appearance Options		Left: 1 A Right: 0.75
Left Header Text	Center Header Text	Right Header Text

- 2. **<D>** in the **Right Footer Text** field.
- 3. **<D>** the **Insert Page Number** button. This places the page numbering variable in the R*ight Footer Text* field.

Appearance Options		Left: 1 Right: 0.75
Left Header Text	Center Header Text	Right Header Text
Left Footer Text	Center Footer Text	Right Footer Text
		<<1>>>
Insert Page Number	Insert Date	Page Number and Date Format
Preview		

If the plan set contains Right-of-Way plans, then the page range for this header/footer will have to be set. This will prevent the Right-of-Way plans from being numbered in the wrong location. To set the page range:

- 4. **<D>** The **Page Range Options** link. This displays the **Page Range Options** dialog box.
- 5. In the Page Range Options dialog box, toggle on Pages From.
- 6. In the **to** field, key in the page number noted in the above section. This will stop this header/footer from being applied to the Right-of-Way sheets.

7. **<D>** the **OK** button to accept the page range.

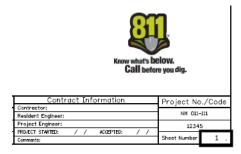
Left Header Text	Center Header Text	Right Header Text
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WITSHUL KOHWAY SYSTEM? O HO B YES	EPARTMENT OF TRANSPORTAT STATE OF COLORADO HIGHWAY CONSTRUCTION BID PRANS OF PROPOSED FEDERAL AID PROJECT SO. NHOIL-111	R.O.W. Projecta: K.O.R. Project Gasey Ster

- 8. **<D>** The **Save Settings** button. This displays the *Save Settings* dialog box.
- In the Save current settings as field, key in the desired name (e.g. Bottom Page Number) and <D> the OK button.

Save Settings	]
Save current settings as:	
Bottom Page Number	
OK Cancel	

10. **<D>** the **OK** button on the *Add Header and Footer* dialog box. This applies the changes and dismisses the dialog box.

This completes the set up for page numbers at the bottom of the sheet. Below is an example of the sheet numbering.



#### Settings for Numbers in the Upper Right Corner

For sheets that are numbered in the upper right corner, the font size, right margin and top margin need to be set.

1. In the *Font* area, set the *Size* to **8**.

2. In the *Margins* area of the *Add Header and Footer* dialog box, key in *1.42* for the *Top* margin and key in *0.67* for the *Right* margin.

Jpdate Header and Footer		
Saved Settings: [Custom-not saved]	Delete Save Settings	
Font		Margin (Inches)
Name: Tahoma	▼ Size: 8 ▼ <u>U</u>	Top: 1.42 Bottom: 1
Appearance Options		Left: 1 Right: 0.67
Left Header Text	Center Header Text	Right Header Text

- 3. **<D>** in the **Right Header Text** field.
- 4. **<D>** the **Insert Page Number** button. This places the page numbering variable in the R*ight Header Text* field.

Left Header Text	Center Header Text	Right Header Text
		<<1>>>
Left Footer Text	Center Footer Text	Right Footer Text
Insert Page N	Number Insert Dat	e Page Number and Date Format

- **Note:** If the plan set contains Design plans, then the page range for this header will have to be set. To set the page range:
- 5. **<D>** The **Page Range Options** link. This displays the **Page Range Options** dialog box.
- 6. In the *Page Range Options* dialog box, key in the desired page range.
- 7. **<D>** the **OK** button to accept the page range.

Left Header Text	Center Header Text	Right Header Text
		<<1>>
Left Footer Text	Page Range Options	Right Footer Text
	🔘 All Pages	
Insert Page Number	Pages from: 22 ← to: 25 ←	Page Number and Date Format
Preview Preview Page 1 of 25	Subset: All pages in range 💌	Page Range Options
Dversight / MHS mins.nebox.vz:0=etbo=ri7 ■ Ni o vos Nic73imu, Eda#wir svisticu? • Ni ∎ Yos	DEPARTMENT OF TRANSPORTAT	TON Reinted Projects: A project projects: Project State R.R.W. Projects: R.R.W. Projects: State Angele Gavey Name 1
	HIGHWAY CONSTRUCTION BID PLANS OF PROPOSED FEDERAL AID PROJECT 20. NH011-111	

If this page numbering set up starts in the middle of the plan set, the starting number will have to be set to reflect its starting location within the plan set.

## *Important!* If the *Page Number and Date Format* isn't set, the Right-of-Way plans will be numbered starting with 1.

Left Header Text	Center Header Text	Right Header Text
		<<1>>
Left Footer Text	Center Footer Text	Right Footer Text
Insert Page Number	Insert Date	Page Number and Date Format
Preview Page 22 of 25		Page Range Options
Colorodo Deportment of Transportation	Revisions Shest Revisions Sheet Revision	Right of Way Plans     Right of Way Plans     Right Mark Title State     Right Mark     Right Mark Title     Right Mark Titl
Region 4. Right of Way PTS		Project Constant ILY AVECUMPACE IN A 10 N. AVENT IL . REALIZED Project Constant Lagrange Avec

8. Select Page Number and Date Format from the dialog box.

- 9. In the Page Number and Date Format dialog box, key in or select the desired Start Page Number.
- 10. **<D> OK** to accept the page number.

Left Header Text	Center Header Text	Right Header Text <pre></pre>
Left Footer Text	Page Number and Date Format	Right Footer Text
Insert Page N	Date Format: m/d	Page Number and Date Format
Preview	Start Page Number: 22	
Preview Page 22 of 25	OK	Page Range Options
Colorado Department of Transportation		Avances Right of Woy Plans Title Sheet Project Name In 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 2007 490 Project Canceling Line 200 Proj

- 11. **<D>** The **Save Settings** button. This displays the *Save Settings* dialog box.
- In the Save current settings as field, key in the desired name (e.g. Top Page Number) and <D> the OK button.

Save Settings		<b>—</b> ×
Save current settings	as:	
Top Page Number		
	ОК	Cancel

<D> the OK button on the Add Header and Footer dialog box. This applies the changes and dismisses the dialog box.

This completes the set up for page numbers at the top of the sheet. Below is an example of the sheet numbering.

Sheet Revisions	Right of Way Plans
Description Drities	Title Sheet
****	Project Number: STA 0072-010
	Project Location: S.H. 7: CHERRYVALE RD. TO N. 75TH ST.
	BOULDER
	Project Coder Lost Mod. Date Sheet No. 22 11873 07-15-10 1.01
PORTATION ADO ^{DSED} 1072-010	SHEET ND,         INDEX OF           1.01         0         The Etr Sheet           2.01=2.09         9)         Tabulation of Properties           3.01=3.07         (7)         Project Control Diogram           4.01=4.04         (4)         Land Survey Control Diogram           5.01=5.04         (3)         Monumentation Sheets           6.0.1=6.04         (4)         V1A Tabulation of Road Approach Sheets           7.01=7.14         (14)         Plan Sheeta           8.01=8.04         (4)         Dumarship Map           (42)         Total Sheeta

#### **Updating Headers/Footers When Pages Are Added**

When a sheet is inserted into a PDF plan set, the inserted sheet does not automatically acquire the header/footer information. To update the page numbering:

1. From the menu bar, select **Document > Header & Footer > Update**. This displays the *Add Header and Footer* dialog box.

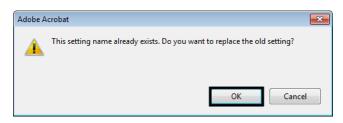
🔁 Demo Set.pdf	- Adobe Acrobat Pro Extend	led	
File Edit View	Document Comments	Forms Tools	Advanced Window Help
🔎 Create 🕶	<u>H</u> eader & Footer	•	<u>A</u> dd
• 🐙	<u>B</u> ackground	۱.	Update
合 🕹 23	<u>W</u> atermark	•	Remove 🤛 St
	I <u>n</u> sert Pages	+	
	E <u>x</u> tract Pages		
	<u>R</u> eplace Pages		
	D <u>e</u> lete Pages	Shift+Ctrl+D	
Colorad	Sp <u>l</u> it Document		Sheet Revisions

2. In the Add Header and Footer dialog box, select the Saved Settings that are affected by the added sheet.

lpdate Header and	Footer		
Saved Settings:	[None specified]	Delete     Save Settings	
Font	[None specified] [Custom-not saved]		Margin (Inches)
Name: Taho	Bottom Page Number Top Page Number	▼ Size: 11 ▼ U	Top: 1 & Bottom: 0.71
Appearance Opti	ons		Left: 1 A Right: 0.75
Left Header Te	xt	Center Header Text	Right Header Text

- 3. **<D>** The **Page Range Options** link.
- 4. In the *Page Range Options* dialog box, key in the desired page range.
- 5. **<D>** the **OK** button to accept the page range.
- 6. **<D>** The **Save Settings** button.
- 7. In the Save current settings as field, key in the same name as the setting you selected above.

8. A dialog box asking if you want to replace the original settings is displayed. **<D> OK**.



- 9. **<D>** the **OK** button on the *Add Header and Footer* dialog box. This applies the changes and dismisses the dialog box.
- 10. Repeat the process for other headers/footers affected by page additions.

### **Adding Sub-Set Numbering**

Sub-set numbering can also be added to the sheet border. Creating the header/footer for sub-set numbering is done in the same manner as described in the previous sections, with the following changes.

*Note:* Sub-set numbering is added to each individual pdf as needed. Sub-set numbering is not part of the Bates numbering described below, however, it can be used in addition to Bates numbering.

#### Settings for Sub-set at the Bottom of the Sheet

- Font Tahoma
- Size 8
- **Top** 0.50
- **Bottom** 0.65
- *Left* 1.00
- **Right** 2.10

#### Settings for Sub-set at the Top of the Sheet

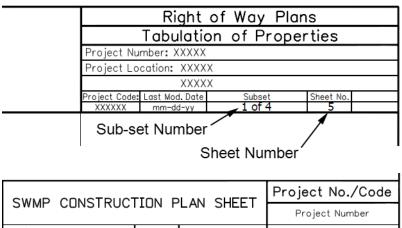
- Font Tahoma
- Size 8
- **Top** 1.51
- **Bottom** 1.00
- *Left* 1.00
- **Right** 1.70
- 1. **<D>** in the appropriate text field (*Right Header Text* or *Right Footer Text*).
- 2. **<D>** the **Insert Page Number** button.

3. At the right end of the page number text, key in the following: of # where the # is the number of sheets in the sub-set.

Appearance Options		Left: 1 Right: 1.7 N	
Left Header Text	Center Header Text	Right Header Text	
		<<1>> of 4	
Left Footer Text	Center Footer Text	Right Footer Text	
Insert Page Number	Insert Date	Page Number and Date Format	
Preview			

- 4. **<D>** The Page Range Options link.
- 5. In the *Page Range Options* dialog box, key in the desired page range.
- 6. **<D>** the **OK** button to accept the page range.
- 7. **<D>** The **Save Settings** button.
- 8. In the *Save current settings as* field, key in the desired name. This name should describe the sub-set the header/footer is used for.
- 9. **<D>** the **OK** button on the *Add Header and Footer* dialog box. This applies the changes and dismisses the dialog box.
- *Note:* A different header/footer is required for each sub-set in the plans.

Below are examples of top and bottom page numbering with sub-set numbers included.



SWMF CUNSTRUCTION FLAN SHEET				Project Number		
Designer:	XXXXXXXX	Structure	X-XX	(-XX	Code	
Detailer:	XXXXXXXX	Numbers	X-XX	-XX		
Sheet Subset:	SWMP	Subset Sh	eets:	1 of 4	Sheet Number 4	
Sub-set Number Sheet Number						

**Note:** Sub-set numbering will need to be updated when pages are inserted into the plan set. Use the steps from the **Updating Headers/Footers When Pages Are Added** section above to make changes to sub-set numbering.

#### **Using Bates Page Numbering**

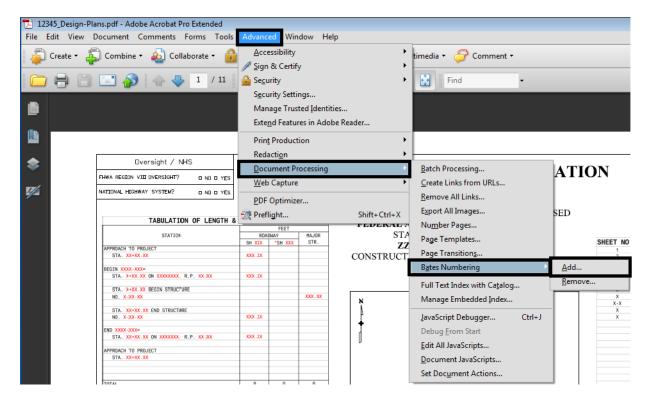
Bates page numbering is used to number multiple pdf documents with a consistent series of numbers. This process replaces the Basic Page Numbering above when the plan sets are made up of multiple PDF files. Please note that the process for sub-set numbering remains the same as defined above.

Because Bates Numbering does not use page ranges across all of the files selected, this option requires sections that have the page number in a different location to be renumbered. In the example below, the second section (using the 12345_ROW-Plans.pdf file) has the page numbering in the upper right corner while the other three files have it in the lower right corner. The Bates Numbering will be added to all four files. then it will be removed from the 12345_ROW-Plans.pdf file and reapplied using the proper header/footer definition.

1. Launch Adobe Acrobat Pro, selecting the first PDF used in the plan set.

Look in:	Plot_Sets		- 🕝 🤌 📂 🖽 -		
Ca.	Name	*	Date modified	Туре	
2	📕 AD		7/11/2011 9:38 AM	File folder	-
Recent Places	퉬 FIR		7/11/2011 9:38 AM	File folder	BUILDER BUILDER BUILDER BUILDER BUILDER
	<b>FOR</b>		7/11/2011 9:38 AM	File folder	
	ROWPR		7/11/2011 9:38 AM	File folder	Botan da A
Desktop	12345_Des	ign-Plans	5/7/2012 10:52 AM	Adobe Acro	
	12345_HYDR-Plans		5/7/2012 10:56 AM	Adobe Acro	And a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second sec
in the			5/7/2012 11:21 AM	Adobe Acro	
Libraries	12345_TRAF_Plans		5/7/2012 11:13 AM	Adobe Acro	Type: Adobe Acrobat Docume File Size: 2751 KB Modified:5/7/2012 10:52 AM
Computer					
	•	m		۲	
Network	etwork File name: 12345_Design-Plans Files of type: Adobe PDF Files (*,pdf)		-	Open	
			•	Cancel	

2. From the *Adobe Acrobat Pro* Menu bar, select **Advanced > Document Processing > Bates Numbering > Add**. This displays the *Bates Numbering* dialog box.



3. In the *Bates Numbering* dialog box, Select Add Files > Add Files. This displays the *Add Files* dialog box.

😂 Bates Numbering					- • ×
Add Files •					
Add <u>F</u> iles Add Folde <u>r</u> s	numbered. er in which ye	ou want the	want the Bates numbers to appear.		
Name	Size	Created	Modified	Warnings/Errors	
👚 Move Up 🛛 🕹 Move Dov	vn 💿 Remove				
Help Output Options					OK Cancel

- 4. In the Add Files dialog box, navigate to the folder that contains the desired PDF files.
- Select the desired files to be included in the plan set. <D> the Open button to add the files. In this example, 12345_Design-Plans.pdf, 12345_HYDR-Plans.pdf, 12345_ROW-Plans.pdf, and 12345_TRAF-Plans.pdf are used.

🖉 🖓 🖉 🕌 « Local Disk (C:) 🕨 Projec		12345 ▶ Plot_Sets ▶ -	Search Plot_Sets	
Organize 🔻 New folder			: : :	
☆ Favorites	-	Name	Date modified	Туре
		퉬 AD	5/9/2012 7:53 AM	File fold
🥽 Libraries		퉬 FIR	4/27/2012 8:19 PM	File fol
Documents		🐌 FOR	4/27/2012 8:19 PM	File fol
🁌 Music		🐌 ROWPR	4/27/2012 8:19 PM	File fol
Pictures		🔁 12345_Design-Plans.pdf	5/9/2012 7:56 AM	Adobe
📑 Videos		12345_HYDR-Plans.pdf	5/9/2012 7:54 AM	Adobe
		12345_ROW-Plans.pdf	5/9/2012 7:56 AM	Adobe
🖳 Computer		12345_TRAF_Plans.pdf	5/9/2012 7:55 AM	Adobe
🚢 Local Disk (C:)				
💿 DVD RW Drive (D:) InRoads Lab Data				
🖵 dpt_colorado (\\a-co-fs1) (H:)				
🙀 Admin (\\a-abq-fs) (K:)				
坖 co-public (\\a-co-fs1) (L:)				
🚽 cferree (\\a-co-fs1\co-users) (M:)	-			
	-			
File name: "12345_T	RAF_I	Plans.pdf" "12345_Design-Plans.pdf" "1234.	<ul> <li>Adobe PDF Files (*.pdf)</li> </ul>	-

Next, organize the files into the desired order. In this example the **12345_ROW-Plans.pdf** is moved up to the second position.

6. Highlight the file to be moved. In this example the **12345_ROW-Plans.pdf** will be moved.

7. Use the **Move Up** and **Move Down** buttons to change the file's location. In this example the *Move UP* button is used.

Add the files to be Bat Arrange them in the or		want the Ba	ates numbe	rs to appear.	
Name	Size	Created	Modified	Warnings/Errors	
12345_Design-Plans 12345_HYDR-Plans	2.15 MB 1.47 MB	5/8/2012 2: 5/7/2012 1			
12345_ROW-Plans	1,021.97 KB	5/8/2012 1:	5/9/2012 7:		
12345_TRAF_Plans	1.25 MB	5/8/2012 1:	5/9/2012 7:		

8. **<D> OK**. This accepts the files and opens the *Add Header and Footer* dialog box.

Use the following settings for Bates Numbering at the bottom of the sheet:

- *Font* Tahoma
- Size 11
- **Top** 0.50
- **Bottom** 0.71
- *Left* 1.00
- **Right** .75
- 9. **<D>** in the **Right Footer Text** field.

Font		Margin (Inches)
Name: Tahoma	▼ Size: 11 ▼ <b>U</b>	Top: 0.5 Bottom: 0.71
Appearance Options		Left: 1 Right: 0.75
Left Header Text	Center Header Text	Right Header Text
Left Footer Text	Center Footer Text	Right Footer Text
Insert Bates	Number	Page Number and Date Format
Preview Page 1 of 1		Page Range Options
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	***************************************

10. **<D>** the **Insert Bates Number** button. This displays the **Bates Numbering Options** dialog box.

- 11. In the *Bates Numbering Options* dialog box, set the *Number of Digits* to **3**.
- 12. Set the *Start Number* to **1**.
- 13. **<D> OK** to accept the changes and dismiss the **Bates Numbering Options** dialog box.

Bates Numbering Options
Number of Digits: 3
Start Number: 1
Prefix:
Suffix:
OK Cancel

This completes the set up for the Bates Numbering for the bottom right corner. Next, save these settings so that they can be used on other projects.

#### Bates Numbering Options In Adobe Acrobat Pro 9

The Adobe Acrobat Pro 9 Bates Numbering Options dialog box does not allow less than **6** in the **Number of Digits** field. This can be corrected once the numbering code has been placed into the **Add Header and Footer** dialog box.

1. In the *Add Header and Footer* dialog box, highlight the "6" in the Bates numbering code located in the *Right Footer Text* field.

ld Header and Footer		
Saved Settings: [Custom-not saved]	Delete Save Settings	
Font		Margin (Inches)
Name: Tahoma	▼ Size: 11 ▼ <u>U</u>	Top: 0.5 A Bottom: 0.71
Appearance Options		Left: 1 Right: 0.75
Left Header Text	Center Header Text	Right Header Text
Left Footer Text	Center Footer Text	Right Footer Text
		< <bates 1="" number="">&gt;</bates>
Insert Bates Number	Insert Date	Page Number and Date Format
Preview		

2. Key in *3*. This resets the digits to 3.



#### Saving and Applying a Bates Numbering Definition

1. **<D>** the **Save Settings** button. This displays the *Save Settings* dialog box.

Add Header and Fo	oter		
Saved Settings:	[Custom-not saved]   Delete Save Settings		
Font		Margin (Inches)	

- 2. In he *Save Settings* dialog box, key in the desired settings name. In this example *Bates Numbering Bottom* is used.
- 3. **<D> OK** to accept the entry and dismiss the he *Save Settings* dialog box.

Save Settings	<b>—</b>
Save current settings as:	
Bates Numbering Bottom	
ОК	Cancel

4. In the *Add Header and Footer* dialog box, **<D> OK**. This adds the Bates Numbering to the selected files and dismisses the *Add Header and Footer* dialog box.

A *Progress* message box is displayed which shows the program adding the page numbering to the selected files. When the processing is complete, another message window is displayed indicating the successful completion of the numbering.

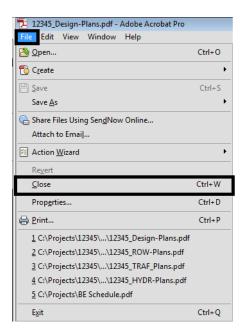
5. In the *Adobe Acrobat* message window, **<D> OK** to dismiss the window.

Adobe A	Acrobat
i	Bates Numbering has been successfully applied to 4 of 4 PDF files.
	ОК

The Bates Numbering has been added to each of the selected files. Even though the numbering is placed in the wrong location on the 12345_ROW-Plans.pdf file, it was included here in order to get the correct numbers on the files that follow. Next, the Bates Numbering is removed from the 12345_ROW-Plans.pdf file and reapplied with the correct page numbers in the upper right corner of the sheets.

#### Replacing Bates Numbering on a File

1. In the Adobe Acrobat Pro dialog box, Select File > Close to close the open file.

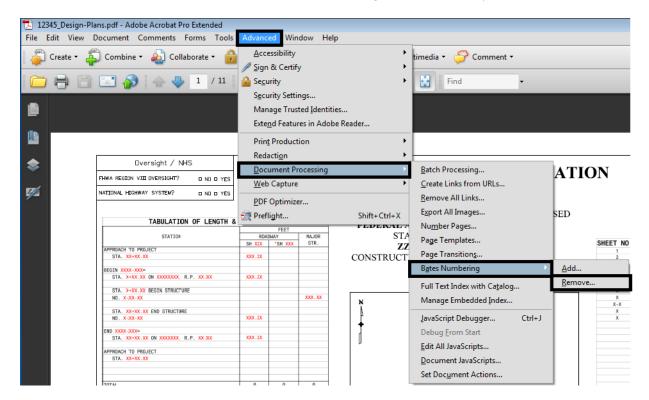


2. Open the file that needs to have the numbering replaced. In this example, the **12345_ROW-Plans.pdf** file is used.

3. Make a note of the page number currently on the page. This will be the starting Bates Number when the correct formatting is applied.

Sheet Rev bre the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon		s Right of Way Plans Network Right of Way Plans Title Sheet Projet Number: XXXXX Projet Locetion: XXXXX Project Locetion: XXXX Project Locetion: XXXXX Proj
DE	PARTMENT OF TRANSPORTAT	TION
	STATE OF COLORADO	SHEET ND.       INDEX OF SHEETS         RW 1.01       (1)       Title Sheet         RW 2.01-RW 2.0X       00       Tobulstion of Properties         RW 3.01-RW 3.0X       00       Control Diagram         RW 4.01-RW 4.0X       00       Monumentation Sheets         RW 5.01-RW 5.0X       00       Dumorthic Sheets         RW 5.01-RW 6.0X       00       Dumorthic Sheets         M-100-1       (3)       Standard Symbols         M-629-1       (2)       Survey Monumentation         OX0       Total Sheets       OX0
	PROJECT LOCATION MAP	DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
	0 20 200 2000	AUTORISEER

4. From the *Adobe Acrobat Pro* Menu bar, select **Advanced > Document Processing > Bates Numbering > Remove**. This deletes the Bates Numbering from this file only.



5. Select Advanced > Document Processing > Bates Numbering > Add. This displays the *Bates Numbering* dialog box.

6. In the *Bates Numbering* dialog box, Select Add Files > Add Open Files. This displays the *Open PDF Files* dialog box.

Bates Numbering					
Add <u>F</u> iles Add Folde <u>r</u> s	numbered. er in which y	ou want the	Bates numbe	ers to appear.	
IVame	Size	Created	Modified	Warnings/Errors	
Move Up 😽 Move Down	Remove				
Help Output Options	Concernove				OK Cancel

7. In the *Open PDF Files* dialog box, highlight the desired files and **<D> Add Files**. this adds the files to the list and dismisses the *Open PDF Files* dialog box.

Open PDF Files	
Open PDF Files:	
Name	Date
12345_ROW-Plans.pdf	5/9/2012 9:24:00 AM
A	Add Files Cancel
	H.

8. In the *Bates Numbering* dialog box, **<D> OK**. This accepts the files and opens the *Add Header and Footer* dialog box.

Use the following settings for Bates Numbering at the top of the sheet:

- Font Tahoma
- Size 8

- **Top** 1.42
- **Bottom** 0.50
- *Left* 1.00
- **Right** 0.67
- 9. **<D>** in the **Right Header Text** field.
- 10. **<D>** the **Insert Bates Number** button. This displays the **Bates Numbering Options** dialog box.

aved Settings: [Custom-not saved]	Delete Save Settings	
Font		Margin (Inches)
Name: Tahoma	▼ Size: 8 ▼ <b>U</b>	Top: 1.42 Bottom: 0.5
appearance Options		Left: 1 Right: 0.67
Left Header Text	Center Header Text	Right Header Text
Left Footer Text	Center Footer Text	Right Footer Text
Left Footer Text	Center Footer Text	Right Footer Text

- 11. In the Bates Numbering Options dialog box, set the Number of Digits to 3.
- 12. Set the *Start Number* to that generated in the first run of the Bates Numbering. In this example *11*.
- 13. **<D> OK** to accept the changes and dismiss the **Bates Numbering Options** dialog box.

This completes the set up for the Bates Numbering for the top right corner. Next, save these settings so that they can be used on other projects.

14. **<D>** the **Save Settings** button. This displays the *Save Settings* dialog box.

Add Header and Fo	oter	
Saved Settings:	[Custom-not saved]   Delete Save Settings	
Font		Margin (Inches)

- In he Save Settings dialog box, key in the desired settings name. In this example Bates Numbering Top is used.
- 16. **<D> OK** to accept the entry and dismiss the he *Save Settings* dialog box.

Save Settings	<b>×</b>
Save current settings as:	
Bates Numbering Top	
ОК	Cancel

17. In the *Add Header and Footer* dialog box, **<D> OK**. This adds the Bates Numbering to the selected files and dismisses the *Add Header and Footer* dialog box.

This completes the page numbering for the plan set.

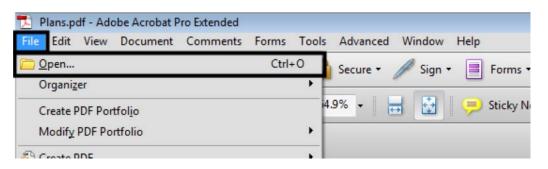
#### Notes on Using Bates Numbering

- After the Bates Numbering is applied to a set of files, there is no further connection between the files. Therefore, if the page count changes for some reason, each file will have to be opened and the Bates Numbering removed before the files can be re numbered.
- Bates Numbering cannot be updated. If the page count changes for some reason, each file will have to be opened and the Bates Numbering removed before the files can be re numbered.
- A file cannot have more than one set of Bates page numbers.
- A Page Range setting in the Add Header and Footer dialog box will affect every PDF file selected for Bates page numbering.
- Each PDF file will have to be opened and printed then collated manually to assemble the plan set.

# Workflow OP 6 - Adding a Watermark to PDF Files

This document guides you through the process of adding a watermark to a PDF plan set. This method uses Adobe Acrobat Professional to add a watermark to an existing set of plans in PDF format.

1. Open the desired plan set in Adobe Acrobat Professional.



2. From the menu bar, select **Document > Watermark > Add**. This displays the **Add Watermark** dialog box.

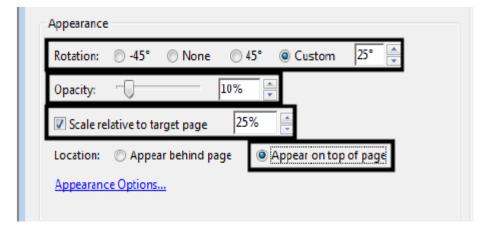
🔁 Plans.pdf - Ado	be Acrobat Pro Extended			
File Edit View	Document Comments Forms	Tools	Advanced Windo	w Help
Create - Header & Footer		Secure 🔹 🥖 Sig	n 🔹 📑 Forms 🔹 📑	
1	<u>W</u> atermark	•	<u>A</u> dd	📃 📁 Sticky Note
	I <u>n</u> sert Pages E <u>x</u> tract Pages	•	<u>U</u> pdate <u>R</u> emove	

- 3. In the Source area of the Add Watermark dialog box, toggle on Text.
- 4. In the *Text* key in field, type the desired text (FIR, FOR, etc.).

5. Select the desired text color. Use **Black** for a watermark on line drawings. Use **White** for a watermark on sheets with aerial photos.

Add Watermark		
Saved Settings:	[Custom-not saved]   Delete Save Settings	]
Source		Previ
I Text	18	Prev
	Font: Arial   Size:	

- 6. In the *Appearance* area, set the desired **Rotation**. In this example, the *Rotation* was set to *Custom* and **25** degrees.
- 7. Set the desired **Opacity**; 25% is used for black text, 50% is used for white text.
- 8. Toggle on **Scale relative to target page** and set the desired scale. In this example **100%** was used.
- 9. Toggle on Appear on top of page for Location.



- Dversight / NHS DEPARTMENT OF TRANSPORTATION IDN VIII OV 530.079 D HD D 105 HOCHWAY SYSTEM? D NO D YES STATE OF COLORADO HIGHWAY CONSTRUCTION BID PLANS OF PROPOSED FEDERAL AID PROJECT NO. BR549 STATE HIGHWAY NO. 86 ELBERT COUNTY CONSTRUCTION PROJECT CODE NO. 12345 TABULATION OF LENGTH & DESIGN DATA KOADHAY RAUGH SH 100 STR INDEX OF SHEETS SHEET -----STA. 3-KK XX BEGIN STRUCTURE NO. X-XX-XX STA. XI-IX. XI END STRUCTURE NO. E-XX-EX 1001.2 STA. MINT IN ON HUMBER & P. IN SX 001.3 田田田 STA. XI-XX XI . . THE P PROJECT LENGTH DESIGN DATA S.H. 118 -S.H. 100 NYL XX FT. 100 XX FT 1.15 CHUN 5 S.D. HORIZONTAL uni pt. -INUM S.S.D. VERTICA 104451 INVI DESIGN OFEER --DHV = 10. DHV = 10 ADT = 10.1 ADT = 10.1 DESIGN TRAFFIC W TRUCK % AR ZONE DESTANCE (TANGENT) .XX FT 1.0. FT PROJECT LOCATION MAP ZONE DISTANCE CKOR MIN. R. . K. FT. ..... TRUCTION CLEAR 20NE (RDR 18-1) 10. 10. 14/11/2011 123450(5_TitleDH.dgn Vert.Scolet As No Vert.Scolet (et Sheet Revis Contract Information As Constructed Project No Dates 0
- 10. **<D> OK** to accept the changes. This adds the watermark to each sheet in the plan set and dismisses the *Add Watermark* dialog box.

11. To change the watermark settings, reopen the *Add Watermark* dialog box and make the desired changes.

## **Using Multiple Watermarks in a Plan Set**

Plan sets may contain both line drawings and aerial photos combined into a single file. In these cases, multiple watermarks are required; black watermarks are used on line drawings while white watermarks are used on aerial photos.

- 1. Follow steps 1 through 9 above to set up the first watermark.
- 2. **<D>** the **Save Settings** button.

Add Watermar	k	_
Saved Setting	Js: [Custom-not saved]  Delete Save Settings	
Source		Preview
Text	FIR	Preview Page 1 of 20
	Font: Arial Size:	

- 3. In the *Save Settings* dialog box, key in the desired setting name. The setting name should identify what the watermark is for. In the illustration below, the name indicates that the watermark is used for FIR line drawings.
- 4. **<D> OK** to save the settings.
- 5. Using the same process, create the other watermarks needed.
- 6. Select the desired watermark from the *Saved Settings* menu.

Saved Settings:	[None specified]	Delete	Save Settings	1	
Source	[None specified] [Custom-not saved]			Preview	
<ul> <li>Text</li> </ul>	FIR - Black FIR-White FOR-Black			Preview Page	1 of 203
	FOR-White	▼ Size:	v +		

7. **<D>** the **Page Range Options** link (in the upper right corner).

Add Watermark		[ <u></u> ]
Saved Settings	[None specified]  Delete Save Settings	Page Range Options
Source		Preview
<ul> <li>Text</li> </ul>		Preview Page 1 of 203
	Font: Arial 💌 Size: 💌	

- 8. In the Page Range Options dialog box, toggle on Pages From.
- 9. Key in or select the desired number in the *From* and *To* fields.
- 10. **<D> OK**. This sets the specified watermark for the indicated pages.

Page Range Options
All Pages
Pages from:     1     to:     29
Subset: All pages in range 🔻
OK

Add Watermark	
Saved Settings: FIR - Black	Page Range Options
Save settings: PIX - black  Delete Save settings Source  Text Font: Arial Size: Font: Arial Size: Font: Arial Size: Page Number: Page Number: Page Number: Page Number: Page Number: Page Absolute Scale: Size:	Preview Page 29 review Page 29 review Page and the preview Page 29 review Page 29
Position	
Vertical Distance: 0 Inches r from Center r Horizontal Distance: 0 Inches r from Center r	
Help	OK Apply to Multiple Cancel

11. In the *Add Watermark* dialog box, **<D> OK**. This applies the specified watermark to the indicated pages.

- 12. From the menu bar, select **Document > Watermark > Add**. An *Adobe Acrobat* information dialog box is displayed. It explains that the document already has a watermark.
- 13. **<D>** the **Add New** button. This allows you to add an additional watermark.
- 14. Repeat steps 6 through 11 to add the additional watermark.

Any number of watermarks can be added in this manner. Also, the watermark settings are saved within Adobe Acrobat Professional (on your local computer) so they will be available for the next plan set to be printed.

InRoads Related Workflows

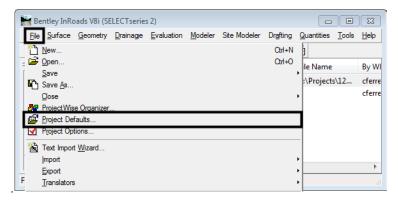
## Workflow IR 1 - InRoads V8i Project Defaults Management

This document describes the set-up procedure InRoads Project Defaults in the V8i version of the software. InRoads project defaults perform two functions; firstly they load the appropriate CDOT standard resource files such as the standard XIN file, annotation resources, XML style sheets, etc. Additionally they define default paths to project specific directory folders that contain project data such as DTM's, alignments, survey data, etc.

## **Setting Up Project Defaults**

To set up a Project Default:

- 1. Launch InRoads V8i.
- 2. select File>Project Defaults from the InRoads menu bar.



- 3. Click on the **New** button.
- 4. In the New Configuration dialog box, key in the desired Project Code.
- 5. **<D> OK** to accept the key-in and dismiss the *New Configuration* dialog box.

Set Project Defaults				23
Configuration Name:	<none></none>		•	Apply
Default Preferences	New Configuration	- • •	Read	Close New
Preferences (*.xin):	Name: 12345	ОК	Only I	Сору
Turnouts (*.txt):		Cancel		Rename
Drainage Structures (*.)		Help		Delete
Rainfall Data (*.idf):				Browse
Drafting Notes (*.dft):				Import
Pay Items (*.mdb):				Export
Site Modeler Options (*.s	pf):			Help

This activates the Set Project Defaults dialog box so that it can be edited.

6. **<D>** in the **Preferences (*.xin)** field then **<D>** the **Browse** button.

#### 7. Browse to:

#### 

- **Note:** If you are logged into ProjectWise, the ProjectWise browser will be displayed. **<D>** the **Cancel** button to dismiss it and display the (local) file Browser.
- 8. Select the file: *CDOT_Civil.xin*

🔛 Open				×
Look in:	Preferences	•	G 🤌 📂 🛄 <del>-</del>	
Recent Places	Name	xin	Date modified 12/20/2010 2:30 PM	Type XIN File
Desktop				
Libraries				
Computer				
	•			+
Network	File name:	CDOT_Civil.xin	L	Open
	Files of type:	Preferences (* xin)		Cancel Help

- 9. **<D>** in the **Drafting Notes (*dft)** field then **<D>** the **Browse** button.
- 10. Browse to:

#### C:\Workspace\Workspace-CDOT_V81\Standards-Global\InRoads\Notes.

- 11. **Cancel** the ProjectWise browser if necessary.
- 12. Select the file: CDOT-Notes.dft.

This completes the Default Preferences part of the dialog box. Next the directory paths are filled in. If your project data resides on the ProjectWise server, fill in only the ProjectWise Directory field.

- 13. **<D>** in the **ProjectWise Directory** field.
- 14. **<D>** the **Browse** button. This displays the ProjectWise *Select Folder* dialog box.
- 15. Navigate to the desired folder and highlight it.

16. **<D>** the **OK** button to select the folder and dismiss the *Select Folder* dialog box.

🗁 Select Folder
Select
Folders
HQ
⊕- <u>0</u> ∕⁄ R3 ⊕- <mark>0</mark> ∕⁄ R4
i⇔-2027 R5 i∋-2027 16575 - US 550 Farmington Hill
E-C US 550 at US 160 Alternatives
B-∑ S-C Committee B-∑ Seed_Files
pw:\\hqpwz01.dot.state.co.us:PwiseProduction\Document 💌
OK Cancel

If the project data is stored locally, then the fields below the ProjectWise Directory field should be used.

- 17. **<D>** in the **Project Default Directory** field.
- 18. **<D>** the **Browse** button. This displays the *Open* dialog box.
- 19. Navigate to the desired folder then **<D>** the **Open** button.

		×
🐌 InRoads 🗸 🗸	G 🤌 📂 🛄 -	
Name	Date modified	Туре 🔺
퉬 InRoads	12/8/2010 8:25 AM	File fol ≘
퉬 Lab - Interchange Data	11/11/2010 2:31 PM	File fol
퉬 Lab - Intersections Data	11/11/2010 2:31 PM	File fol
12345 SH119 SH52 Interchange.alg	11/19/2009 4:32 PM	ALG Fi
12345_Geometry Training.alg	11/17/2010 4:27 PM	ALG Fi
12345DES_Design.alg	11/12/2010 7:33 AM	ALG Fi
12345DES_Geometry.alg	12/13/2010 12:31	ALG Fi
12345DES_Geometry_Overlay.alg	6/14/2010 10:32 AM	ALG Fi
12345DES_Geometry_Toes.alg	6/14/2010 10:32 AM	ALG Fi
12345DES_Geometry-Create End Cond Searc	6/14/2010 8:54 AM	ALG Fi
12345DES_Geometry-Create Raised Median	6/14/2010 8:50 AM	ALG Fi 🛫
		•
		Open
	_	
		Cancel
		Help
	Name InRoads Lab - Interchange Data Lab - Intersections Data 12345 SH119 SH52 Interchange.alg 12345DES_Design.alg 12345DES_Geometry.alg 12345DES_Geometry_Overlay.alg 12345DES_Geometry_Toes.alg 12345DES_Geometry-Create End Cond Searc 12345DES_Geometry-Create Raised Median	Name         Date modified           InRoads         12/8/2010 8:25 AM           Lab - Interchange Data         11/11/2010 2:31 PM           12345 SH119 SH52 Interchange.alg         11/11/2010 2:31 PM           12345 SH119 SH52 Interchange.alg         11/17/2010 4:32 PM           12345 SDES_Design.alg         11/17/2010 4:37 PM           12345DES_Design.alg         11/17/2010 7:33 AM           12345DES_Geometry.orerlay.alg         6/14/2010 10:32 AM           12345DES_Geometry.Toes.alg         6/14/2010 10:32 AM           12345DES_Geometry-Create End Cond Searc         6/14/2010 8:54 AM           12345DES_Geometry-Create Raised Median         6/14/2010 8:50 AM

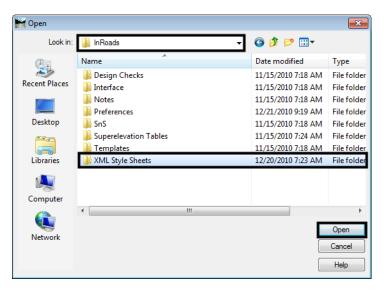
Note: Typically, the Projects (*.rwk), Surfaces (*.dtm), Geometry Projects (*.alg), Template Libraries (*.itl), and Roadway Design (*.ird) will use the same directory path as the Project Default Directory. Therefore, you do not have to fill in those fields unless they are different than the Project Default Directory.

The path to the Style Sheet directory should be set for both ProjectWise and locally stored projects.

- 20. **<D>** in the **Style Sheet (*.xsl)** field.
- 21. **<D>** the **Browse** button. This displays the *Open* dialog box.
- 22. Navigate to the following directory:

#### C:\Workspace\Workspace-CDOT_V8i\Standards-Global\InRoads\XML Style Sheets

23. **<D>** the **Open** button.



24. Once the desired fields are filled in, **<D>** the **Apply** button to accept the changes.

THe Project Defaults are now active and will be used when opening and saving files.

#### **Setting Project Defaults**

1. Users can use the **Configuration Name** field to choose the appropriate Project Defaults for the project .

🕌 Set Project Defaults			<b>_</b>
Configuration Name:	21903 👻		Apply
Default Preferences	<none> 12345</none>		Close
		Read Only	New
Preferences (*xin):	33673		Сору
Tumouts (*.bd):			Rename
Drainage Structures (*.dat):			Delete
Rainfall Data (*.idf):			Browse
Bridge Sections (*.bxt):			Import
Drafting Notes (*.dft):			Export
Pay Items (*.mdb):			Help
Site Modeler Options (*.spf):			rielp

## **Using Project Defaults Example**

The following example demonstrates the benefits of using project defaults. Here, the project data is stored onProjectWise.

- 1. Open InRoads.
- 2. Select File > Project Defaults.
- 3. In the *Set Project Defaults* dialog box, select any discipline from the *Configuration Name* drop-down list. Then Select the **Apply & Close** buttons.

🕌 Set Project Defaults			×
Configuration Name:	12345 -	1	Apply
Default Preferences		-	Close
		Read Only	New
Preferences (* xin):	C:\Workspace\Workspace-CDOT_V8i\Standards-Global\InRoads		Сору
Turnouts (*.txt):			Rename
Drainage Structures (*.dat):			Delete
Rainfall Data (*.idf):		<b>V</b>	Browse
Bridge Sections (*.bd):			Import
Drafting Notes (*.dft): Pay Items (*.mdb):	C:\Workspace\Workspace-CDOT_V8i\Standards-Global\InRoads		Export
Site Modeler Options (*.spf):			Help
		_	
Default Directory Paths ProjectWise Directory: Project Default Directory:	pw:\\hqpwz01.dot.state.co.us:PwiseProduction\Documents\Traini	ng\123	45\Design\InF
Report Directory:			
Projects (*.rwk):			
Surfaces (*.dtm):			
Geometry Projects (*.alg):			
Template Libraries (*.itl):			
Roadway Design (*.ird):			
Survey Data (*.fwd):			
Drainage (*.sdb):			
Style Sheet (*xsl):	C:\Workspace\Workspace-CDOT_V8i\Standards-Global\InRoads	XML S	tyle Sheets\
Quantity Manager (*.mdb): Site Modeler Projects (*.gsf):			
Default Grid Factor Grid Factor: 1.0000	Export Preferred Preference	Defau	ult

4. From the InRoads interface, select **File>Open** 

Б В	entley InRo	pads V8i (SE	LECTserie	5 2)						8
<u>F</u> ile	e <u>S</u> urface	<u>G</u> eometry	<u>D</u> rainage	Evaluation	Modeler	Site Modeler	Dr <u>a</u> fting	<u>Q</u> uantities	<u>T</u> ools	<u>H</u> elp
*	New						Ctrl+N			
1 🖻	<u>O</u> pen						Ctrl+O	le Name		By WI
	<u>S</u> ave							7		cferre
<b>K</b>	Save <u>A</u> s									ciene
	Close							•		
82	<b>ProjectWis</b>	e Organizer.								
6	<u>P</u> roject De	faults								
- <del>3</del>	Project Op	tions								
圝	Text Impor	t <u>W</u> izard								
l i	Import							•		
	Export							•		- F
C	Translators	3						•		

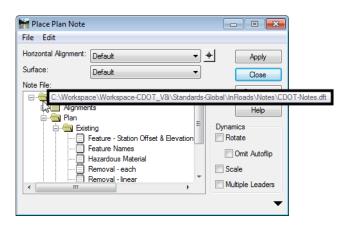
Notice that the ProjectWise **Open** dialog box is already set to the default directory specified in the Project Defaults.

Documents		
Folder 💟 InRoad	ls	- 🔶 🔰 📰 💽
MA 🔍		
Name		De 🔺
Nov Lab - Inte	-	
	sting ground.dtm	12:
2 12345 exi	12:	
✓ 12345 SH	1119 SH52 Interchange.alg	12: -
		4
Application	All Applications	•
		5
	Add Remove	ļ
Selected Document	s, check mark for read-only	
Name		Description

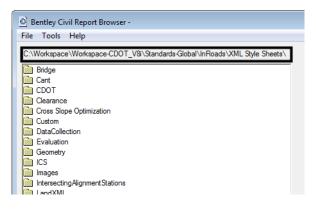
5. Select the **Preferences** tab at the bottom of the InRoads Explorer. Notice that the default CDOT xin file is loaded.

<unnamed> ✓ 12 😤 🚳 🖊 🎉 🔳 🚽 🐜 🗉 12</unnamed>	
File Name	
	Туре
Preferences C:\Workspace\Workspace-CDOT_V8i\Standards-Global\InRoads\Preferences\Cl	DOT_Civil.xin (IN
C:\Workspace\Workspace	

- 6. Select **Drafting > Place Plan Note** from the InRoads main menu.
- 7. Notice that the *CDOT-Notes.dft* file is loaded here.



- 8. Select **Tools > View XML Reports** from the InRoads Main menu.
- 9. In the Bentley InRoads Report Browser, notice that the Style Sheet folder is located within the CDOT workspace.



# **Workflow IR 2 - InRoads Feature Filters**

This document guides you through the use of InRoads feature filters.

## **InRoads Feature Filters**

### **Purpose of using Feature Selection Filters**

InRoads utilizes feature based digital terrain models (DTM). Often users find the need to sort, or filter, through the contents of various InRoads dialog boxes that allow the users to display, annotate, or review the contents of a DTM. By creating Feature Selection Filters, the user will more efficiently be able to:

- Identify or view different categories of features found in a DTM
- Create a selection set of specific features

## **Example Feature Filters**

A variety of feature filters have been developed for the CDOT configuration. A user may elect to use the developed feature filters or build and/or refine filters to suit individual needs.

Feature filters have been created based on major categories such as Design, Hydraulics, Topography and pay item number. Additional filters have been developed to allow the filtering of select subsets within the major categories.

For example, the filter:

- T_* ..... will display only features beginning with the T-under bar designation (all topography features)
- T_Gate* (ALL)...... will display all features that relate to Topo_Gate. (i.e. T_Gate Barbed Wire, T_Gate Combination, T_Gate Chain Linked etc.)
- Pay Items 403*..... pay items beginning with the primary number 403

## **Example 1 - No Feature Filter**

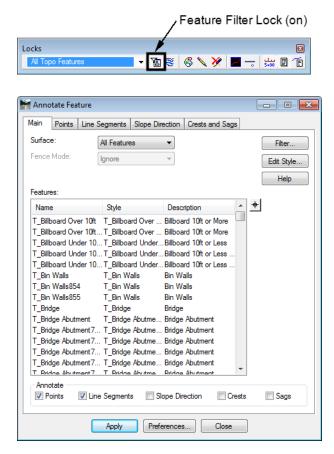
In the *Locks* toolbar shown below, the **Feature Filter Lock** is off, or deactivated, so the selected filter _All Topo Features is not active. If the **Surface > View Surface > Annotate Feature** command is selected, the *Annotate Feature* dialog box would display all features located in that particular DTM in the *Features* list.

*Note:* Features within a Feature Filter can be verified by executing the View Features, Edit Feature, or Annotate Feature commands.

		/Feature Filter	Lock (off)
Locks	/		
<unnamed></unnamed>	- <u>a</u>	🧟 💊 🏏 📕 🗕	T 5+00 E E
🕌 Annotate Feature			
Main Points Line S	egments Slope Din	ection Crests and Sags	
Surface:	All Features	•	Filter
Fence Mode:	Ignore	-	Edit Style
			Help
Features:			
Name	Style	Description	+
ABC_Centerline-Top	Centerline	Created by roadway	
HMA_Lift1_Centerlin		Created by roadway	
HMA_Lift2_Centerlin		Created by roadway	
HMA_Lift3_Centerlin LT_ABC_EOP-Top		Created by roadway Created by roadway	
LT ABC Hinge-Top	-	Created by roadway	
LT ABC Laneline-To	-	Created by roadway	
LT HMA LIft2 EOP	-	Created by roadway	
LT_HMA_LIft2_EOP	-	Created by roadway	
LT_HMA_Lift1_EOP	. D_EOP	Created by roadway	
LT_HMA_Lift1_Lanel	.D_LANELINE	Created by roadway	
LT_HMA_Lift2_Hing	D_HINGE	Created by roadway	
LT_HMA_Lift2_Lanel	-	Created by roadway	
LT_HMA_Lift3_EOP		Created by roadway	
IT HMA LAR FOP.	D FOP	Created hy madway	
Annotate Points Line	Segments 🔲 Sk	ope Direction 🔲 Crests	Sags
	Apply Prefe	erences Close	

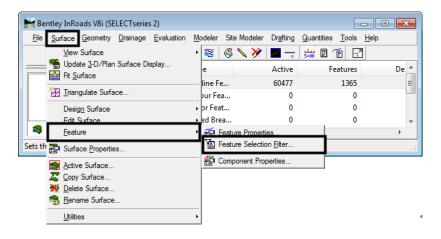
### **Example 2 - Applied Feature Filter**

To display the results of the selected **Feature Filter**, in this case _*All Topo Features*, the **Feature Filter Lock** is simply toggled *on*, or activated, and the filter will then sort the assigned features. Notice in the **Annotate Feature** dialog box shown below, the features are displayed once the filter is activated, when compared to Example #1 when the filter was deactivated.



## **Creating a Selection Filter**

1. From the Surface pull down menu Surface>Feature>Feature Selection Filter.



2. In the *Feature Selection Filter* dialog box, create a name in the *Filter Name* field by **<D> Save As...** 

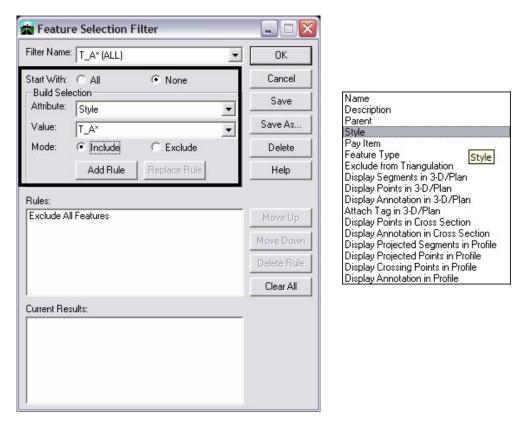
Featur	e Selection Filter	
Filter Name:	<unnamed></unnamed>	• OK
Start With:	The Provide	Cancel
<ul> <li>Build Sele</li> <li>Attribute:</li> </ul>	tion	Save
Value:		Save As
Mode:	Include C Exclude	e Delete
	Add Rule   Replace Ru	le Help
		Move Dowr
		Delete Rule
		Clear All
Current Res	ults:	
B_RAIL_T B_RAIL_T B_RAIL_T B_RAIL_T B_RAIL_T B_RAIL_T B_RAIL_T B_RAIL_T B_RAIL_T	-10M 1 -10M 2 -10R -3	

- 3. In the *Save Filter As* dialog box, *key in* a name for the filter and *<D> OK*. The newly created filter name will appear in the *Filter Name* drop-down list in the *Locks* toolbar.
  - **Note:** The *Feature Filter* drop-down list in the *Locks* toolbar has a limited amount of viewing display capability, so the filter name should be created accordingly.

Save Filter As	
Name:	ОК
	Cancel
	Help

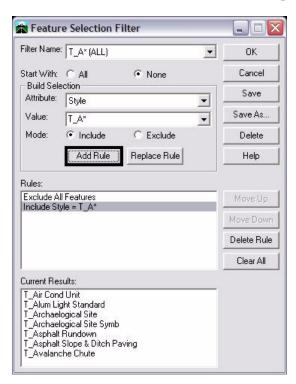
- 4. The first step in defining any filter is the *Start With* toggle. Toggle either **All** or **None** on. This selection allows the user to build the filter by adding or removing features with subsequent rules.
- 5. Complete the *Build Selection* section of the *Feature Selection Filter* dialog box by selecting an Attribute and keying in a *Value*, and selecting the appropriate Mode.

**Note:** A wide variety of Attributes are available as criteria for building filters. These include display properties as defined by the feature style assigned to the features.

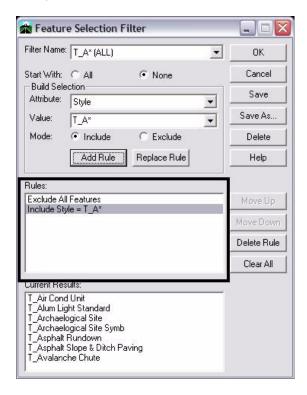


**Note:** The wild card symbol "*" is often used in filters created for CDOT. This particular symbol matches any number of characters at and following the location of the symbol.

6. **<D> Add Rule**. The *Current Results* list box updates as rules are added, deleted, updated, or re-ordered.



7. Verify that the rule was added in the *Rules* list box.



8. Verify that the correct Feature(s) were added in the *Current Results* list box.

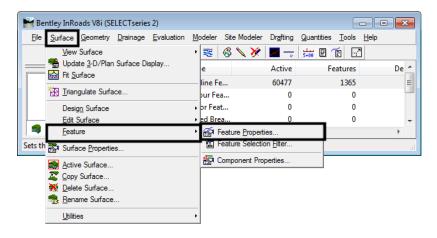
#### 9. **<D> Save**.

📩 Featur	e Selection F	ilter		
Filter Name	T_A* (ALL)		•	ок
Start With:	C All	None		Cancel
-Build Sele Attribute:	Style		-	Save
Value:	T_A*		7	Save As
Mode:	• Include	C Exclude		Delete
	Add Rule	Replace Rule		Help
			[	Move Down Delete Rule
			- 1	Clear All
T_Archael T_Archael T_Asphalt	d Unit ght Standard ogical Site ogical Site Symb Rundown Slope & Ditch Pa			

**Note:** The previous Feature Filter example was created by the use of only two rules: **Exclude All Features** and **Include Style = T_A^***. It should be noted that when creating rules, they can include any of the following attributes: style, name, description, parent, pay item, triangulation, etc. Multiple rules can be incorporated to further refine the filtering. The order in which the rules are listed in a filter is important. They are always read from top to bottom and build sequentially based on the Results that passed the previous rule. Also, be aware that when inputting value(s) as rules, the input is case sensative.

## **Using a Feature Selection Filter**

1. From the InRoads menu, select Surface>Feature>Feature Properties.



2. Verify that the Feature Filter Lock is toggled on.



3. In the Locks Toolbar, use the Feature Filter drop-down list to select a Feature Filter.

💏 Bentley InRoads V8i (SE	LECTseries 2)	)			
<u>File</u> Surface <u>G</u> eometry	Drainage Ev	valuation <u>M</u> odeler Si	te Modeler Dr <u>a</u> fting	<u>Q</u> uantities <u>T</u> ools <u>H</u>	lelp
Profile no lines	<u>اح</u>	Ta 📚 🛛 🗞 🏏	5+00 E	Ē	
<ul> <li>Profile no lines</li> <li>Profile no pts.</li> </ul>	^	Data Type	Active	Features	De 🔦
Profile project lines		Reakline Fe	60477	1365	E
Profile project pts		🛛 🧏 Contour Fea	0	0	
Q Notes site		Exterior Feat	0	0	
T_A*		🦉 Inferred Brea	0	0	-
T_A* (ALL)					4
R T_B* T_Bridge*		_			.4
T_Bus Stop*					
T_C* T Cable*					
T_Camp*	Ш				

4. The selected Features will be displayed in the appropriate dialog boxes.

Feature Properties								- 0 🛃
urface: All Fe	atures 🔻			Style				Apply
eature:				Available:				
Name	Style	Description	+	B_RAIL_Ty-10M B_RAIL_Ty-10R			~	Close
		Description	<u> </u>	B_RAIL_Ty-3				Filter
F_Air Cond Unit F_Air Cond Unit1	T_Air Cond Unit T Air Cond Unit			B_RAIL_Ty-7	- A			
[_Archaelogical Site	-	. Billboard 10ft or N		B_RAIL_Ty-7_SECT Breakline	-A		-	Edit Style
[_Archaelogical Site Sy				Primary:				New Style
 T_Asphalt Slope		. Edge of Driveway		T_Air Cond Unit			-	List Points.
T_Avalaanche Chute	T_Avalanche Chu			Secondary:				List Forma.
				Secondary.				Help
				Pay Items	_		اھ	
				Name [	Description	From Style	<b>1</b>	
							26	
•	III	4						
lame: T_Air	Cond Unit			Triangulation				
escription:				Feature Type:	Breakline	•		
				Point Density Inter	val: 0.00	+		
arent: Alignm	ient			Exclude from Triar	0.00	<u> </u>		
Refresh/Display in 3-	D/Plan View			Exclude from Than	ngulation			
T_Archaelogical Site T_Asphalt Slope	T_Air Cond Unit T_Air Cond Unit T_Archaelogical Billbox		+	Filter Edit Style Help				

**Note:** Remember to disable the *Feature Filter Lock* when it is no longer needed.

## Workflow IR 3 - Update InRoads Features

This document is a guide for updating Digital Terrain Model (DTM) feature styles within InRoads. These changes are necessary due to new feature styles being developed and modifications or deletions to previous feature style names in previous CDOT Configuration Releases.

## **Opening InRoads Files**

- 1. Open MicroStation and InRoads
- 2. Load design DTM's that have been created with a prior configuration.
  - **Note:** Existing topographic DTMs will not require this update. The version of the CDOT configuration can be determined by pausing the cursor over the CDOT logo located on the Colorado DOT Task Tab.

Tasks	Ψ×
💁 Tasks	-
1 2. 3 ² <b>4 3 3</b>	•• 9juu;
💒 Colorado DOT 🛛 🔡 🚍	= ^
<b>a a a a a a a a a a a</b>	
V05.00.00 CDOT Menu	*
Civil Geometry	*
🕅 Data Acquisition	*

## **Updating Digital Terrain Models Feature Styles**

#### **DTM Evaluation**

Determine if the design DTM contains features that require re-association to any new or modified Feature Styles. This can be accomplished by Scrolling through the feature list in the Feature Properties dialog box, looking for entries colored red.

**Note:** The **Feature Filter** named **CDOT v3.0 Update** can be used to locate features in older DTMs that had style changes.

#### DTMs that require feature re-association

1. From the InRoads menu select **Surface > Feature Properties**. The *Feature Properties* dialog will appear.

🖌 Feature Proper	ties							- • •
Surface: [] Feature:	2345 existing	ground 👻		Style Available: B RAIL Ty-10M				Apply
Name T_Bridge Abutmeni T_Bridge Abutmeni T_Bridge Abutmeni T_Bridge Abutmeni T_Bridge Abutmeni T_Bridge Curb T_Bridge Parapet N T_Bridge Pier T_Bridge Pier 69 T_Bridge Rail>Stl2 T_Bridge Rail>Stl2 T_Bridge Rail>Stl2 T_Cattleguard T_Centerline of Dir T_Centerline of Dir T_Conc Box Culve	t746 t757 t758 t759 Wall 91 t Road t Road t Road470 t Road495 eft	Style T_Bridge Abutme T_Bridge Abutme T_Bridge Abutme T_Bridge Abutme T_Bridge Autme T_Bridge Curb T_Bridge Pier T_Bridge Pier T_Bridge Rail>Stl T_Bridge T_Cattleguard T_Centerline of Di T_Centerline of Di T_Conc Box Culv	Bridge Abutm Bridge Abutm Bridge Abutm Bridge Abutm Bridge Curb Bridge Pier Bridge Pier Bridge Pier Bridge Pier Bridge Rail-St Bridge Rail-St Bridge Cattleguard Centerline of I Centerline of I	B RAIL Ty-10R B RAIL Ty-3 B RAIL Ty-7 B RAIL Ty-7 B RAIL Ty-7 SECT Breakline Primary: T_Billboard Over 10f Secondary: Pay Items		From Style		Filter Edit Style Ust Points Help
-	III _Billboard Ove Villboard 10ft of r in 3-D/Plan \	More	• •	Triangulation Feature Type: Point Density Inter	0.00	•	1	

2. Scroll through the Feature list until a red entry is found.

- 3. Highlight the feature name that requires re-association. In the example shown here, **T_Bridge Curb** is the selected feature.
- 4. In the *Style* section of the dialog box, select an appropriate *Feature Style* from the *Primary* and then **<D> Apply**.
- 5. Continue updating other feature styles by repeating steps 5 and 6 until no features are displayed in red.
  - **Note:** To expedite the update process, sort the features by style and select several features that have common styles in a single selection. Using this method, multiple features can have their Primary Feature Style updated in a single execution of the command. Remember to hold down the *<CTRL>* or *<SHIFT>* keys while selecting features.
- 6. Once all feature styles have been updated, close the *Feature Properties* dialog box and toggle the **Feature Filter** lock off.
- 7. **Save** the DTM Surface.

#### **Updating graphics**

DTM features that are currently displayed in a MicroStation file will require redisplay to refresh the graphic display based on the new feature properties.

- Miew Features X Surface: All Features Ŧ Apply Fence Mode: Ignore Ŧ Close Filter. Edit Style ... Help Features: + . Name Style Description Centerlin linge-Top ated by roadway Llft2 EOP-IMA LIft2 EOP-...D EOP ated by roadway HMA Lift1 EOP-D EOP IMA Lift1 Lanel...D LANELIN ated by roadway
- 1. From the InRoads menu select **Surface > View Surface > Features**.

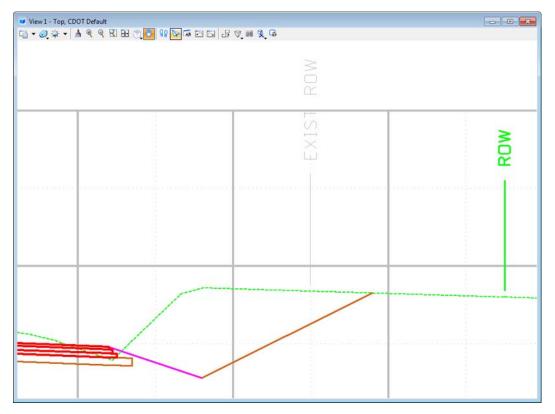
2. Highlight all, or only the features that require redisplay, from the *Feature* list box and **<D> Apply**. Both the DTM and graphics display should now be up to date with the current CDOT configuration.

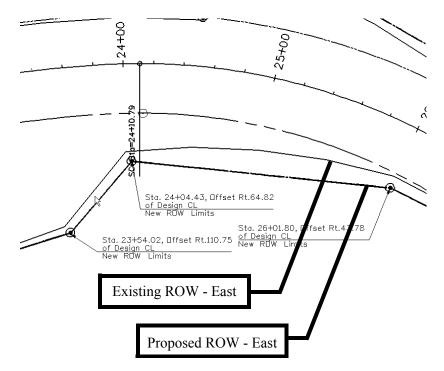
# Workflow IR 4 - Alignment Display in Cross Section

This document guides you through the process of displaying the location of alignments such as Right-of-Way locations in cross section or profile views.

## **Desired Result**

The overall workflow is to export horizontal alignments to a surface as features with the appropriate feature styles assigned. A surface feature that is defined as having breakline properties can be displayed as a 'crossing point' in cross sections or profiles. A cell is used to indicate this 'crossing point'.





#### **Exporting the Alignment**

- 1. Once the alignment has been created, as shown above, select **File > Import > Surface** from the InRoads menu. The *Import Surface* dialog will appear.
- 2. Select the **From Geometry** tab.

🕌 Import Surface		- • ×
From Graphics DEM From	m Geometry	
Target Surface: ROW	<b>▼</b>	Apply
Points/Alignments Points	Selected:	Filter
Alignments Name:	Exist_ROW-RT Prop_ROW-RT	New Style
		Help
Features Name:   From Geometry	y 💿 Specify	
Seed Name:	Existing ROW	
Style:	RW_ROW-Existing -	
Туре:	Breakline 💌	
Point Density Interval:	0.00	
Duplicate Names: Append Repl	ace () Rename tion	
Elevation		
Source:	Surface 🔻	
Suface:	12345 existing ground	
	Close	

• *Target Surface*: Surface to be created or appended that will contain the alignment features

- *Alignments:* Alignments identified for importing
- ♦ Name: Set to Specify
- **Seed Name:** key-in the name of initial feature to be created. InRoads will automatically increment the seed name for multiple features.
- Style: Select RW_ROW-Existing or RW_ROW-Proposed
- *Type:* Breakline
- Point Density Interval: 0
- Duplicate Names: Rename is a good default setting
- Under *Elevation:* Set *Source* to **Surface**
- Under *Elevation:* Select the **Surface** for extraction of Elevation information for placement of the annotation.
- **Note:** Existing and proposed alignments should be exported separately as they require different feature styles assignments.
- 3. **<D> Apply** to create or append the target surface
- 4. Repeat above steps to export additional alignments. Continue to Step 5 when all alignments have been exported.
- 5. Make sure that **12345ROWSurface01** is the *Active Surface*. From the InRoads pull down menu select **Surface > Feature Properties** the *Feature Properties* dialog box will appear.

Feature Properties									- • •
Surface: 12345RC Feature:	WSurface01 👻			Style Available:	м				Apply Close
Name EXIST_ROW-LT EXIST_ROW-RT PROP_ROW-LT PROP_ROW-RT	Style RW_ROW-Existin RW_ROW-Existin RW_ROW-Propo RW_ROW-Propo		+	B_RAIL_Ty-16 B_RAIL_Ty-18 B_RAIL_Ty-3 B_RAIL_Ty-7 B_RAIL_Ty-7 B_RAIL_Ty-7 Breakline Primary: Secondary:	R			•	Filter       Edit Style       New Style       List Points       Help
				Pay Items					
				Name	Desc	cription	From Style	<b>*</b>	
Name:     Description:     Parent:	m	4		Triangulation Feature Type: Point Densit	/ Interval:	Breakline 0.00	•	]	
Refresh/Display in 3-D/	Plan View			Exclude from	n Triangula	ation			

6. Verify that the features were added to the surface.

7. Select the features created and place a check in the **Exclude from Triangulation** check box

Feature Properties								- • •
Surface: 12345R01 Feature:	WSurface01 👻			Style Available:				Apply Close
Name	Style	Description	+	B_RAIL_Ty-10 B_RAIL_Ty-10	M R			
EXIST_ROW-LT	RW_ROW-Existin			B_RAIL_Ty-3 B_RAIL_Ty-7				Filter
EXIST_ROW-RT PROP_ROW-LT	RW_ROW-Existin RW_ROW-Propo			B_RAIL_Ty-7_ Breakline	SECT-A		-	Edit Style
PROP_ROW-RT	RW_ROW-Propo			Primary:				New Style
							•	List Points
				Secondary:				Help
				Pay Items				
				Name	Description	From Style	<b>%</b>	
							26	
•	m	•						
Name:			1	Triangulation				
Description:				Feature Type:	Breakline	-		
Parent:				Point Densit	/Interval: 0.00	+		
☑ Refresh/Display in 3-D/P	'lan View			Exclude from	Triangulation			

- 8. **<D> Apply** then **<D> Close**.
  - **Note:** Excluding the features from triangulation eliminates the possibility of the exported alignments becoming part of a surface (contoured) model. Features excluded from triangulation can be displayed in cross sections or profiles as crossing features, which is why these alignments were imported into the Surface as features.
- Select Evaluation > Cross Section > Cross Sections
   (or Evaluation > Profile > Update Profile) to add, remove, or update the display for the new features.
- 10. **<D>** the **Update Cross Section** folder from the dialog box explorer.

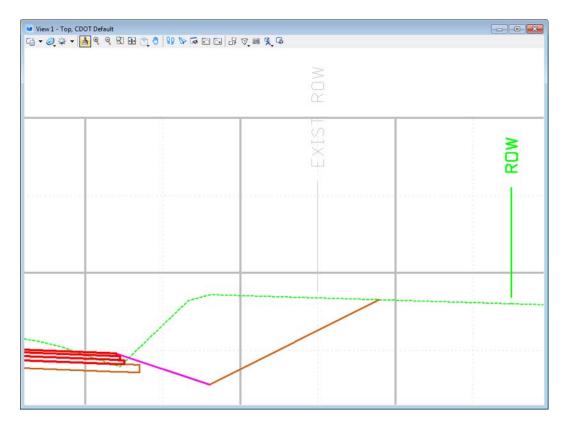
Cross Sections				
Cross Section Set: SH 86 Create Cross Section Annotate Cross Section Update Cross Section Components Consong Features Frojected Features Stom and Sanitary End-Area Volumes	Mode:  Refresh  Start: 203+80.28 Surface: Name 12345ROWSurface01 Feature: Name	Display On O Display I Stop: 260+43.16 Descripti		Edit Style Fitter
		Apply	Preferences	Close Help

11. Highlight the **Crossing Features** leaf.

- 12. Select the desired **Cross Section Set** from the drop-down list.
- 13. Highlight the **Display On** radio button.
- 14. From within the *Surface* list box, highlight the surface containing the alignment features.

15. In the *Features* list box, highlight the features to be displayed then **<D> Apply**. **<D> Close** to dismiss the window.

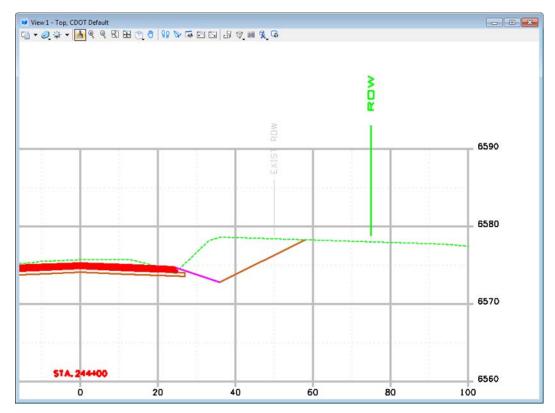
K Cross Sections				- • •
File Cross Section Set:	Mada: @ B.C. I			
SH 86	Mode: O Refresh Start: 203+80.28	<ul> <li>Display On 01</li> <li>Stop: 260+43</li> </ul>	Display Off 3.16	
Create Cross Section	Surface:			
Annotate Cross Section	Name	C	escription	
General Surfaces Components	Default 12345 existing ground SH 86		isting Ground from multi eated from roadway de	
Crossing Features     Projected Features     Stom and Sanitary	12345ROWSurface01 SH 86-2		eated from roadway de	
End-Area Volumes	Feature: Name	Style	Description	<u>+</u>
	EXIST_ROW-RT PROP_ROW-RT	RW_ROW-Existing RW_ROW-Propose	d	
	1			
			F	
				Edit Style
		Apply	Preferences	Close Help



**Note:** The InRoads global scale factor values should be set as they were when the cross sections were originally created. Additionally, the default vertical exaggeration for CDOT cross sections is a factor of 2:1. The feature styles used to place the cells depicting the ROW locations have been created at this ratio. See the following workflow to accommodate varying ratios.

## Adjusting vertical distortion

Adjusting vertical scale of cells representing ROW limits can be accomplished in 2 ways. First is scaling the cells placed, second is temporarily modifying the named Symbologies used to place the cells.



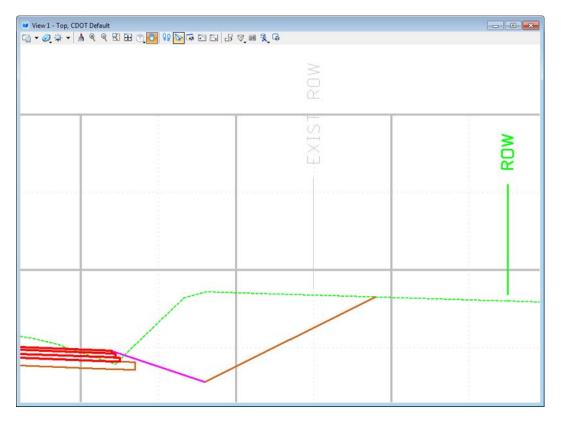
#### **Method One**

- 1. Select the cells for scaling using the **Element Selection**, **Power Selector**, **Select by Element**, or by isolating the level(s) and using a **Fence**.
- 2. Select the MicroStation **Scale** command
- 3. Ensure that the scale lock is opened as shown in graphic under Step 5. Set X & Z scale factors to 1.
- 4. Set the Y scale factor to the appropriate value (2:1 is the default in the configuration). This example used 1:1 for the cross sections. Consequently, the cells are scaled (distorted) ¹/₂ the required amount.

5. Place a check in the About Element Center check box (scales about the cell origin).

🖇 Scale	
_	Active Scale
X Scale:	1.000000
<u>Y</u> Scale:	0.500000
Z Scale:	1.000000
About Element	C <u>enter</u>
Copies	1
Use <u>F</u> ence:	Inside 💌
	•

6. **<D>** in the MicroStation view to execute the scale command.



*Note:* The cells should now be updated to the desired scale factor.

#### **Method Two**

The second method is to temporarily modify the named symbology used to place the annotation.

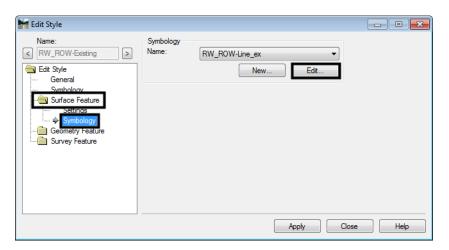
- 1. Select **Tools > Style Manager** to display the *Style Manager* dialog box.
- 2. Toggle on Include Surface in the Show Styles with Properties area.

3. Identify and highlight the appropriate feature style from the list and **<D> Edit**.

Show Styles with Properties Include Surface	Surface Properties Display Plan	Geometry Ta	-	Close	
Include Geometry Point	Display Cross Section	Line Tabl	ing	New.	
Include Geometry Line	Display Profile	Arc Tablir	ng	Edit	
Include Geometry Arc	Pay Item	Spiral Tat	bling	Сору.	
Include Geometry Spiral	Survey Properties			Copy Setti	ngs.
Include Survey	Custom Operations		Delete		
				Rename	e
Preference File: C:\Workspace\	Workspace-CDOT V8i\Stand	dards-Global\InR	oads\Pr	Rename Help	
Preference File: C:\Workspace\ Name	Workspace-CDOT_V8\\Stand	dards-Global\lnR Alpha Code	_		
Name			_	Help	
Name H_P_UnderDrain6in	Description		Num	Help	
Name H_P_UnderDrain6in H_P_UnderDrain6in_Perf	Description 6 Pipe Underdrain		Num	Help	
Name H_P_UnderDrain6in H_P_UnderDrain6in_Perf H_P_UnderDrain8in_Perf	Description 6 Pipe Underdrain 6 Perforated Pipe		Num O O	Help	
Name H_P_UnderDrain6in H_P_UnderDrain6in_Perf H_P_UnderDrain8in_Perf Random	Description 6 Pipe Underdrain 6 Perforated Pipe 8 Perforated Pipe		Num O O O	Help	
Name H_P_UnderDrain_Gin H_P_UnderDrain_Gin_Perf H_P_UnderDrain_∈_Perf Random RW_ROW-Existing	Description 6 Pipe Underdrain 6 Perforated Pipe 8 Perforated Pipe Random Surface P		Num 0 0 0	Help	
Preference File: C:\Workspace\ Name H_P_UnderDrain6in H_P_UnderDrain6in_Perf H_P_UnderDrain8in_Perf Random RW_ROW-Existing RW_ROW-Proposed T_Air Cond Unit	Description 6 Pipe Underdrain 6 Perforated Pipe 8 Perforated Pipe Random Surface P Right-of-WayExsti		Num 0 0 0 0	Help heric Code	

The named symbology that is associated with the feature style(s) used to create the features will be edited. In this example RW ROW-Existing and RW ROW Proposed will be modified.

- 4. **<D>** the **Surface Feature** folder in the dialog box explorer.
- 5. Highlight the *Symbology* leaf.
- 6. **<D> Edit** in the *Symbology* section of the *Edit Style* dialog box. The *Edit Named Symbology* dialog box will appear.



In the *Edit Named Symbology* dialog box, highlight the Cross Section Point and <D> Edit. The *Point Symbology* dialog box now appears.

🕌 Edit Nam	ed Symbo	ology		- • •
Name:	RW_RO	N-Line_ex		Apply
Description: RW_ROV		N-Line_ex		Close
Symbology				
Use		Level		
Default Lin	e	ROW_LINE_Existing	BYL	
Default Tex	đ	ROW_LINE_Existing-Text	BYL	
Default Poi	nt	ROW_LINE_Existing	BYL	
Plan Line		Not Initialized		Copy
Plan Text		Not Initialized		
Plan Point		Not Initialized		Help
Profile Line		Not Initialized		
Profile Text		Not Initialized		
Profile Poin	t	DRAFT_WT-0	BYL	
Cross Secti	ion Line	Not Initialized		
Cross Sect	on Text	Not Initialized	_	
Cross Secti	ion Point	DRAFT_WT-0	BYL	
		Uninitialize Edi	t	

- **Note:** The **Y** *scale* is set to **0.5** by default to compensate for the default vertical distortion of 2:1 as the cell is created proportionally correct as a 1:1 graphic. In other words, when creating a cross section at 2-Vertical:1-Horizontal, the cell would be stretched a factor of 2. The *Named Symbology* compensates for this by 'offsetting' the effect of vertical distortion.
- 8. Set the appropriate **Y** Scale For a cross section without a vertical exaggeration (1:1), input a value of **7** in the **Y** Scale field.
- 9. **<D> OK** in the *Point Symbology* dialog box. This closes the *Point Symbology* dialog box.

Point Sy	mbology					- • 💌
	Symbol				Cell	OK
Display:	Symbol	Ŧ				Cancel
Level:	DRAFT_WT-0	Ŧ				Help
Color:	ByLevel	]				
Weight:	(0)ByLevel	Ŧ		<b>V</b> Display:	ROW_XSEC-Existing	-
Font:	🖊 Engineering	Ŧ		Level:	DRAFT_WT-0	•
Character:	X			X Scale:	1.0000	
Height:	0.10			Y Scale:	0.5000	
Width:	0.10		_	Z Scale:	1.0000	
Rotation Angle F	Relative to Object			Rotation Angle F	Relative to Object	
Absolute	e Angle			Absolut	e Angle	
Angle:	0^00'00''			Angle:	0^00'00''	

*Note:* Other useful values for scaling cells with MicroStation or symbology modification would be:

Vertical exaggeration - Y Scale
 1:1 - 1.0
 2:1 - 0.5
 5:1 - 0.2
 10:1 - 0.1

10. **<D> Apply** then **Close** in the *Edit Named Symbology* dialog box.

11. Use the update commands for Cross Sections or Profiles to add, remove, or update the display for the required features.

Cross Sections					
File					
Cross Section Set:	-	Mode: 🔘 Refresh 💿 Display On 🔘			
SH 86	• •	Start: 203+80.28 Stop: 260+	-43.16		
Create Cross Section		Surface:			
Annotate Cross Section		Name	Description	_	
General		Default 12345 existing ground	Existing Ground from multi		
Surfaces Components		SH 86	Created from roadway de		
		12345ROWSurface01			
Projected Features Storm and Sanitary			Created from roadway de		
End-Area Volumes		Feature:			
		Name Style	Description	<u>+</u>	
		EXIST_ROW-RT RW_ROW-Existin PROP_ROW-RT RW_ROW-Prope			
				-	
		•		·	
				Edit Style	
				Filter	
		Ap	Preferences	Close Help	
View 1 - Top, CDOT Default					×
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12. Repeat the above steps for the Feature Style **RW_ROW-Proposed**.

## Workflow IR 5 - Annotating Horizontal and Vertical Alignments

This document demonstrates the procedure for displaying annotation for horizontal and vertical alignments. It further presents the workflow for annotating horizontal alignments that contain spiral components.

InRoads can display most alignment annotation as per the M&S standards. However some annotation will require editing and/or repositioning using standard MicroStation commands.

## **Annotating a Horizontal Alignment**

Two InRoads commands are required to annotate a horizontal curve in the CDOT format. The first command (horizontal annotation) is used to display the linework and annotate the tangents. The second command (horizontal curve set annotation) is used to display the PI symbol, short tangents, and curve data. Once the InRoads annotation tools have been used the user needs to modify the text content and positioning to have it appear as per the M&S standards.

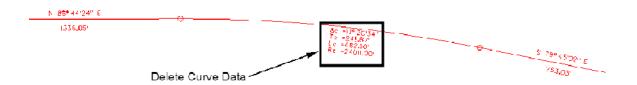
#### **Display the alignment**

This first example illustrates annotating a circular curve. This is followed by the workflow required for annotating circular curves with spiral transitions.

1. Display the horizontal alignment using **Geometry > View Geometry > Horizontal Annotation**. The *View Horizontal Annotation* dialog box is displayed.

🗑 View Horizontal Annotation 📃 📼 💌			
Main Tabling Styles			
Apply Style            Assigned       Horizontal Alignment:           RW_County-Line_ex       Cogo Points:       Default	v Filter		
Horizontal Alignments Cogo Include: SH 86 4 Include	Points		
	cted:		
Name         Desc         Style         Name           SH 86         SH 86          ALG_PRO	ne Descri Style		
✓         III           Display         ✓           ✓         Points	Annotate Points		
☑ On-Alignment  Event Points	✓ Elements		
Off-Alignment Station Equations	Duplicates		
Elements     Dual Dimensions			
Radials Tangents IV Atemate Styles			
Chords Subtangents Extend Beyond Elem			
☑ Display As Complex Linestring	Planarize		
Apply Interactive Graphics	Preferences Close		

2. Select the correct alignment for display, **<D> Apply** then **<D> Close**.



- 3. Use the MicroStation **Delete Element** command to remove the curve annotation from the display, as this information will be re-displayed in the following steps.
  - **Note:** Prior to deleting the curve information, the MicroStation **Graphic Group** lock must be disabled (Settings > Locks). Otherwise the entire alignment will be deleted.
- 4. Display the curve annotation using **Geometry > View Geometry > Curve Set Annotation.** The **Curve Set Annotation** dialog box is displayed.
- 5. In the *Main* tab, select the correct **Horizontal Alignment** (SH 86 in this example) from the drop down list.

Kurve Set Annotation		- • •
Curve Set Annotation	Horizontal Alignment: SH 86 • • • Limits Station Start: 203+80.28 • Stop: 260+43.16 • Annotate Each Element of Curve Set Drop Station Equation Name	
	Apply Preferences Close	Help

6. **<D> Preferences**, as shown above, and choose the appropriate *Spiral* preference (*Proposed Spiral* was selected in this example). **<D> Load** and then **<D> Close**.

Name:	Close
CDOT Default Existing Circular	Load
Existing Spiral Other Circular	Save
Other Spiral Proposed Circular	Save As
Proposed Spiral Secondary Circular	Delete
Secondary Spiral	Help

- *Note:* The preferences established for spirals serve the dual purpose of annotating curves with either circular or spiral components. The central curve information required is common between the two types of geometry.
- 7. The InRoads *Write Lock* must be set to **PEN** mode prior to the next command. The curve requires annotation twice and **PEN** mode will retain previous annotation displays.

Locks	E	3
<unnamed></unnamed>	🔹 🔻 🖀 🧭 🖊 🎉 🔳 🛶 🐜 🗉 숱	ġ

8. **<D> Apply** on the *Curve Set Annotation* dialog box. The central curve is annotated

N 89° 44'24" E	<u>_</u>
1335,05	Es - 12.16
	S 78e re
	S 78° 45'02" ε 753 α.2

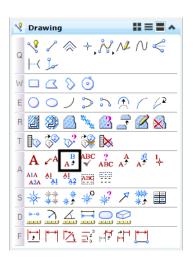
9. **<D> Preferences** again and choose the appropriate *Circular* preference (*Proposed Circular* in this example). **<D> Load** then **<D> Close**.

Name:	Close
CDOT Default Existing Circular	Load
Existing Spiral Other Circular	Save
Other Spiral Proposed Circular	Save As
Proposed Spiral Secondary Circular	Delete
Secondary Spiral	Help

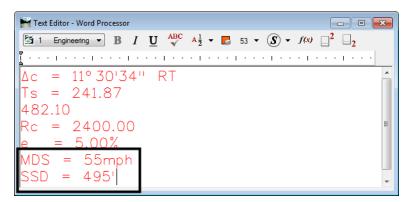
10. **<D> Apply** on the *Curve Set Annotation* dialog box. The remainder of the central curve information is annotated

N 89°44'24" E	
1335.05	<u>Fs - 24187</u> Es - 12,16
	$\begin{array}{c ccccc} Ac = 11^{6}30'34'' RJ & O & S & 78^{6} & 45'02'' E \\ Ts = 241.87 & & & \\ 482.10 & & & \\ Rc = 2400,000 & & & & \\ rc = 5.00\% & & & & \\ e = 5.00\% & & & & \\ \end{array}$

- **Note:** The M&S standards specify that curve information should include the Mean Design Speed (MDS) and Stopping Sight Distance (SSD) information. This information is not annotated by InRoads and will have to be added with MicroStation.
- 11. Select the MicroStation Edit Text command.



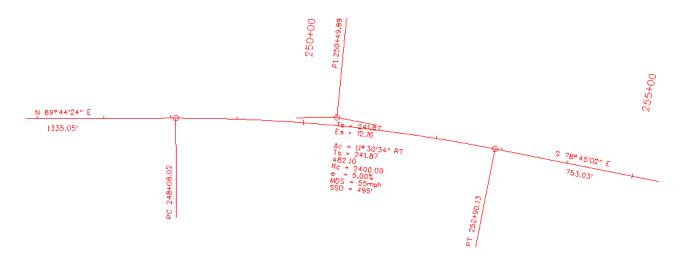
12. Select the desired text. The text editor will appear allowing the user to add the required information for MDS and SSD.



13. Use MicroStation commands to reposition the text as desired.

N 89° 44'24" E		
1335.05	<u>Fa - 24187</u> Ea - 12.16	
	$\frac{4c}{T_{s}} = \frac{11930'34''}{241.87} RT$ $\frac{482.10}{R}$	S 78° 45'02'' E
	Ac = 11*30'34" RT Ts = 241.87 482.10 Rc = 2400.00 e = 5.00% MDS = 55mph SSD = 495'	753.03

14. If necessary, display the alignment stationing by selecting **Geometry > View Geometry > Stationing**.



#### Annotating a Horizontal Curve – Spiral Curve

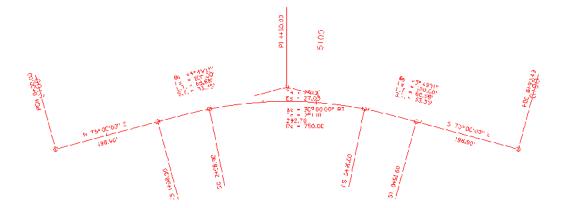
The workflow is almost identical to the above steps 1-12. The exceptions are noted below.

1. Display the horizontal alignment using **Geometry > View Geometry > Horizontal Annotation.** 

pply Style		Filter		
	verwrite	Help		
orizontal Alignment: ALG_EXISTING				
logo Points: Default	v			
lorizontal Alignments	Cogo Points			
clude:	Include:	- <del>ф</del> -		
elected:	Selected:			
Name Desc Simple Curve with Spirals	Name Descri	Style		
lisplay ] Points	Annotate Points			
)isplay				
On-Alignment Event Points	_			
Off-Alignment Station Equa				
Elements	🔲 Dual Dim			
Radials Tangents	Try Alter	-		
Chords Subtangents	Extend E	Beyond Element		
Display As Complex Linestring	🔲 Planarize	•		
Apply Interactive Grap	hics Preferences	Close		
	65 -30 49 10 10 -36.88 1.1 - 36.88 1.1 - 35.88 5.1			le ≪3°αρη Le ≈ 100.00. S.1 €3×55.
		a Ic	-22° 21 2	
N 75° 02°74″ F. 128 90		-0 -0	250.0	-96 90- -96 90-

- 2. Use the MicroStation **Delete** command to remove the central curve data leaving the spiral curve annotation intact.
  - **Note:** Prior to deleting the curve information, the MicroStation 'Graphic Group' lock must be disabled (Settings>Locks). Otherwise the entire alignment will be deleted.

3. Follow steps 4-12 above to complete the annotation.



#### **Annotating a Vertical Curve**

#### **Display the Alignment**

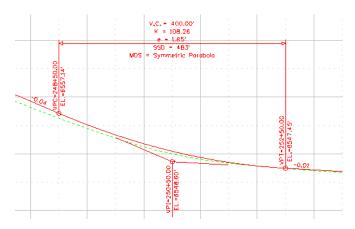
- 1. The fist step is either have, or generate a profile view along the alignment using **Evaluation > Profile >** Create Profile.
- 2. Display the vertical alignment using **Geometry > View Geometry > Vertical Annotation...**
- 3. Select the appropriate Profile Set, Horizontal Alignment, and Vertical Alignment.

🐂 View Vertical Anno	tation	- • •
Main Points Curve	es Tangents Affixes	
Horizontal Alignment: Vertical Alignment: Profile Set:	SH 86     •       SH 86 V     •       \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$	Help
Limits Station Stat: 100+00.00 Stop: 366+60.50		
A	pply Preferences	Close

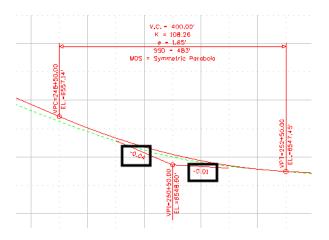
4. **<D> Preferences** and highlight the preference for the appropriate symbology (*Proposed* in example below). **<D> Load** then **<D> Close**.

Preferences	<b>×</b>
Name:	Close
CDOT Default Existing	Load
Other Proposed	Save
Secondary	Save As
	Delete
	Help
Active Preference: CDOT	

5. **<D> Apply** on the *View Vertical Annotation* dialog box to display the annotation.



6. Using the MicroStation **Move** command, relocate the tangent grade annotation to the short tangent lines.



#### **Known Issues**

1. The arrowheads in the vertical annotation are not user definable. They are hard-coded by the software as open arrow heads.

## **Workflow IR 6 - Creating Combined Surfaces**

This document explains the procedures for creating an exterior boundary, merging surfaces, and copying features from one surface to another.

An exterior boundary eliminates inaccurate triangles that can occur in concave areas within the data.

The **Merge Surfaces** command can be used to create a single surface from two or more "existing" surfaces, update the "existing" surface with additional data, or to make an "as constructed" surface for the project by combining a proposed surface with an existing surface.

The **Copy Portion of Surface** command copies features (or portions of features) from one surface and places them in another surface. This can be used to create a new surface from elements of one or more other surfaces or to update a surface with data from another surface.

These tools can be used singularly or in conjunction with each other to achieve the desired results. The Creating an Exterior Boundary, Merging Surfaces, and Copy a Portion of a Surface sections will each have their own outline.

#### **Creating an Exterior Boundary**

An Exterior Boundary is a closed shape DTM feature that defines the area where triangulation can occur. InRoads will triangulate the surface (without an exterior boundary) across concave areas creating inaccurate triangles that could adversely affect proposed surface models. An exterior boundary will prevent the creation of false triangles outside of the actual data.

An exterior boundary should be created for a surface that does not currently have a boundary or for a surface that has been modified and now has usable data outside the current boundary.

### **Workflow Outline**

The following outline describes the steps needed to create an exterior boundary for a surface along with a brief explanation of what each step does.

**Creating an Exterior Boundary** - To create an accurate exterior boundary, erroneous triangles are removed, the perimeter of the modified surface is displayed, and the perimeter graphic is imported as the exterior boundary.

**Removing Inaccurate Triangles** - A surface that does not contain an exterior boundary may contain triangles that do not represent actual data. Removing these triangles is essential to creating an accurate exterior boundary.

- **Triangulate Surface** The Triangulate Surface dialog box has settings that allow the user to set the maximum length of a triangle leg. Because most erroneous triangles are long and narrow, setting a maximum length shorter than these triangles will remove many of them.
  - Command Used: View Triangles Used to display the triangle data so that inaccurate triangles can be identified.
  - Measure Distance Used to determine an appropriate maximum triangle length.
  - **Triangulate Surface** Used to set a maximum triangle length, thus reducing the number of inaccurate triangles.
- **Delete Triangles** The Triangulate Surface command will get rid of many of the erroneous triangles, but not all of them. The Delete Triangle command is used to get rid of the rest.

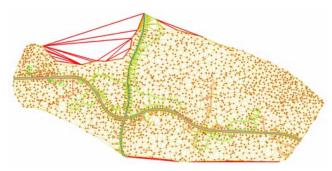
• Commands Used: **Delete Triangles** - Used to remove erroneous triangles.

**Creating an Exterior Boundary** - Now that the surface triangles are cleaned up, the exterior boundary can be created.

- **Displaying the Perimeter** The perimeter of the modified surface will be used as the exterior boundary.
  - Commands Used: **3D/Plan Surface Display** Used to display the surface perimeter.
  - **View Perimeter** Used to display the surface perimeter. May be used instead of 3D/Plan Surface Display.
- Importing the Exterior Boundary The final step is to import the z perimeter as an exterior boundary feature. This will contain the triangles within the area of the data.
  - Import Surface Used to create the exterior boundary feature.
  - **Triangulate Surface** Use to incorporate the exterior boundary into the triangulated surface.

#### Creating an Exterior Boundary for a Surface Without One

It may occur that a surface does not include an exterior boundary. If this is the case, an exterior boundary should be created and added to the surface. Adding the boundary will eliminate inaccurate triangles from the surface. Below is an example of a surface with no exterior boundary. The example is representative of what can happen when a boundary is omitted and a maximum triangle length is not defined. In the event of a missing exterior boundary, the software will calculate the inaccurate triangles shown in bold red below.



To create an exterior boundary for this surface three steps are required. One, the erroneous triangles are removed, two, the perimeter of the surface is displayed, and three, the MicroStation graphic representing that perimeter is then imported as an exterior boundary feature into the DTM.

#### **Removing Inaccurate Triangles**

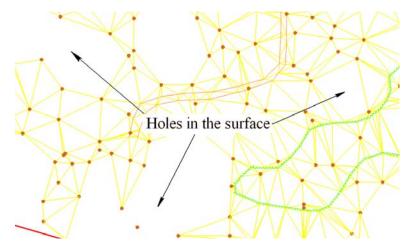
Inaccurate triangles are usually long narrow triangles or those that span concave areas of a DTM. InRoads has two commands that can be used to reduce, then eliminate the number of inaccurate triangles, namely the **Triangulate Surface** and **Delete Triangle** commands.

The **Triangulate Surface** command is used to set a limit on the length of a triangle edge, thereby reducing the number of inaccurate triangles. The **Delete Triangle** command is then used to eliminate the remainder of the inaccurate triangles.

It should be noted that neither of these commands affect the data which was collected for the surface. The commands either modify the computation used to define triangles (in the case of **Triangulate Surface**) or delete specific triangles that have been defined (in the case of **Delete Triangle**).

#### **Triangulate Surface**

There is no definitive rule for setting the *Maximum Length* when triangulating a surface. If the length is set too short, triangles will not be defined in areas they should be, forming holes where good data was not used. Below is an example of a surface whose *Maximum Length* is set too short.



When the length is set to long, an undesirable number of inaccurate triangles will remain. A general rule of thumb is to err on the long side. It is better to have the inaccurate triangles that can later be deleted than to lose data.

To get an idea of what *Maximum Length* to use, display the surface's features and triangles. Look for the longest triangles that lie within the data area (there is no need to be exact here, the object is to get an idea for the *Maximum Length*). Measure the long side of the triangle and use that as a starting point.

1. Select Surface > Update 3D/Plan Surface Display. The Update 3-D/Plan Surface Display dialog box is displayed.

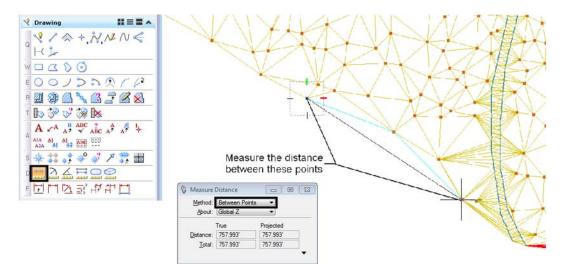
**Note:** If available, reference files showing the location of survey data can be used to view the DTM features without having to display them.

- 2. In the Update 3D/Plan Surface Display dialog box, set the Mode to Display On.
- 3. In the *Surfaces* drop down menu, select the desired surface.
- 4. Below the *Surface* drop down menu are a number of toggles. Toggle on **Triangles**.
- 5. Right click in the *Features* list at the bottom of the dialog box and choose **Select All** from the menu.

6. The items selected are automatically displayed if they were not previously displayed. If some of these items were previously displayed in the dgn file, **<D> Refresh All** to update those existing items.

Bentley InRoads V8i (SELECTseries 2)	Update 3-D/Plan Surface Display
Ele       Surface       Geometry       Drainage       Evaluation       Mod         VU       View Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface       Image: Surface<	Fence Mode:     Ignore     Close       Surfaces:     12345 existing groun     Refresh All       Perimeter     Surface Elevations     Color-Coded Aspects       Triangles     Slope Vectors     Color-Coded Elevations       Contours     Profiled Model     Color-Coded Slopes       Gridded Model     Help       Features:     -
Fits su       Surface Properties         Active Surface         Copy Surface         Delete Surface         Rename Surface         Utilities	Name     Style     Description       T_Bilboard Over 10ft     T_Bilboard Over     Bilboard 10ft or More       T_Bilboard Over 10ft     T_Bilboard Over     Select All       T_Bilboard Under 10     T_Bilboard Under 10     Select None       T_Bilboard Under 10     T_Bilboard Under 10     Select None       T_Bilboard Under 10     T_Bilboard Under 10     Select None       T_Bin Walls     T_Bin Walls     T_Bin Walls

- 7. Scan the triangles displayed and identify a large triangle within the data area.
- 8. Select the MicroStation Measure Distance command.
- 9. In the *Measure Distance* tool settings box, set the *Distance* to **Between Points**.
- 10. **<D>** at one triangle corner then the other. The distance measured will be displayed in the tool settings box.



11. From InRoads select **Surface > Triangulate Surface**. This displays the *Triangulate Surface* dialog box.

File	<u>S</u> urface	<u>G</u> eometry	<u>D</u> rainage	Evaluation	Mod	deler Site	e Modeler	Dr <u>a</u> fting	<u>Q</u> uantities	<u>T</u> ools <u>H</u>	elp
<u< th=""><th></th><th>Surface</th><th></th><th></th><th>۰ľ</th><th><b>&gt; ※</b></th><th></th><th>و 🖭 🗤</th><th>Ē</th><th></th><th></th></u<>		Surface			۰ľ	<b>&gt; ※</b>		و 🖭 🗤	Ē		
	Hit Su	te <u>3</u> -D/Plan Iface	Surface Di	splay	•	2		Active	Fe	atures	De
<b>.</b>					-	ne Fe		0		0	
	Ba Inang	Triangulate Surface				ur Fea		0		0	
	Desig	<u>n</u> Surface			۰Þ	r Feat		0		0	
	<u>E</u> dit S	Surface			• =	d Brea		0		0	
-	<u>F</u> eatu	re			-						•

- 12. In the *Surface* drop-down, select the surface.
- 13. In the *Maximum Length* field, *key in* the desired length. Because this length is just an estimate, it is advisable to increase the measured length as a buffer.
- 14. **<D> Apply** to launch the command.

🐂 Triangulate Surface	- • •
Surface: 12345 existing ground 👻	Apply
Description: Existing Ground from multiple	Close
Maximum Length: 800.00 +	Help
Extended Data Checks	
Results Number of Points:	
Number of Triangles:	
Elapsed Time (Seconds):	More

- **Note:** In the example above, the measured distance of the triangle edge was 757.993'. Because this may not be the biggest triangle within the data, 800' is used for the Maximum Length to insure all actual data is included.
- 15. Go back to the *Update 3D/Plan Surface Display* dialog box and **<D> Refresh All** to will re-display the triangles as computed using the *Maximum Length* set above.

16. Examine the triangles to be sure no actual data was lost. Look for features not connected by triangles. If good triangles were lost, go back to the *Triangulate Surface* dialog box, increase the *Maximum Length* and **Apply** the new settings. Repeat this process as necessary until the desired results are obtained.

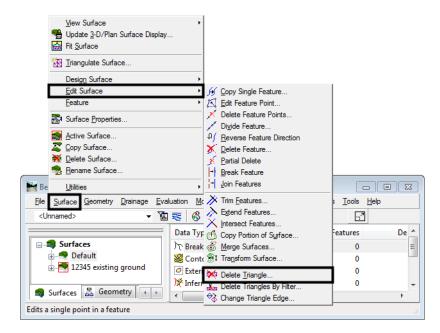


In the example above, most of the inaccurate triangles have been deleted by setting the *Maximum Length* and re-triangulating the surface. The remainder will be eliminated using the **Delete Triangle** command.

#### **Delete Triangle**

Now that the number of inaccurate triangles has been reduced to a manageable level, the rest can be removed easily with the Delete Triangle command.

1. Zoom in on the area where triangles are to be deleted.



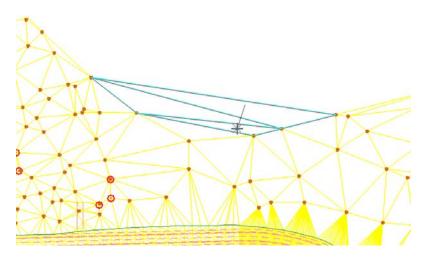
2. From InRoads, select **Surface > Edit Surface > Delete Triangle**. This displays the **Delete Triangle** dialog box.

3. In the *Delete Triangle* dialog box, use the *Surface* drop-down to select the desired surface.

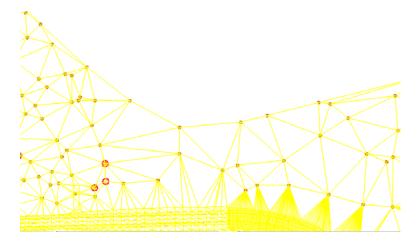
#### 4. **<D> Apply**.

🕌 Delete Triangle	
Surface: 12345 ex	kisting groun 🔻 Apply
	Close
	Help

5. The *Delete Triangle* dialog box will minimize. **<D>** inside the first triangle to be deleted, then move the cursor through other adjacent triangles that are to be deleted. Be sure not to pass through triangles you do not want to delete. The triangles will highlight as they are passed through.



6. After the last triangle in the group is selected, release the left mouse button to end triangle selection. The *Accept/Reject* prompt is displayed. **<D>** to confirm deletion of the triangles, **<R>** to reject the selection.

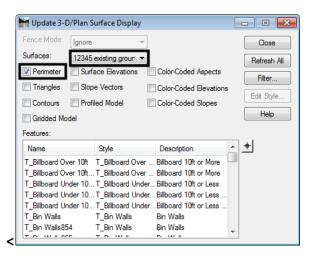


- Using the same process, delete the remaining inaccurate triangles. After all of the desired triangles are deleted, <D> Close to dismiss the *Delete Triangle* dialog box.
- **Note:** Do not re-triangulate the surface until the exterior boundary is added to the DTM. Otherwise all deleted triangles will regenerate.

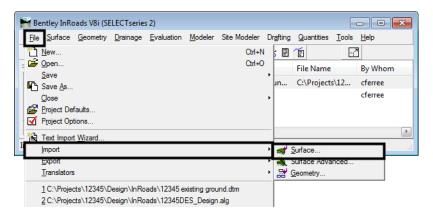
#### **Creating the Exterior Boundary**

After the triangles have been edited, the exterior boundary can be created. To create the boundary, the perimeter of the triangulated area will be displayed and that perimeter will be imported as the exterior boundary.

- 1. From the InRoads dialog box, select Surface > Update 3D/Plan Surface Display.
- 2. In the *Surfaces* list box, select the desired surface.
- 3. Toggle on **Perimeter**. All other toggles should be off and all features in the list deselected. This will turn off the display of the triangles and the features.

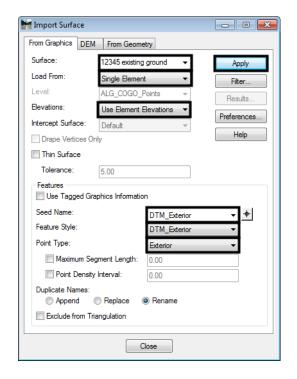


- 4. To complete the exterior boundary process, the perimeter must now be imported as a feature into the surface.
- 5. From InRoads, select File > Import > Surface. The Import Surface dialog box will be displayed.



- 6. Select the From Graphics tab. Select the desired surface from the Surface drop-down.
- 7. Select Single Element from the *Load From* drop-down.
- 8. Verify that *Elevations:* is set to Use Element Elevations.
- 9. In the *Features* area of the dialog box, *key in DTM_Exterior* in the *Seed Name* field.

- 10. From the *Feature Style* drop-down list, select **DTM_Exterior**.
- 11. From the *Point Type* drop-down list, select **Exterior**.
- 12. After the specified changes are made, **<D> Apply**.



- 13. **<D>** on the boundary shape. The shape will highlight. **<D>** again in the blank area of the screen to accept the element and add it to the surface. Dismiss the *Import Surface* dialog.
- 14. To verify that the data was imported, select **Surface > Feature Properties**. This displays the *Feature Properties* dialog box.
- 15. Verify that the desired surface is selected in the *Surface* drop-down.
- 16. Verify that **DTM_Exterior** appears in the **Feature** list box. Also verify that the **Feature Type** is set to **Exterior** in the **Triangulation** area.

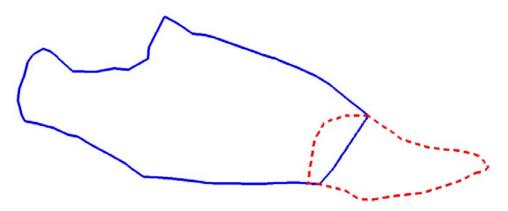
Name	Style		
CL Old US 100	T_Centerline of Dirt T_Centerline of Dirt.		
DTM Exterior	DTM Exterior		
Edge of Dirt Road	I_Edge of Dirt Roa		
Edge of Dirt Road1	T_Edge of Dirt Roa		
Edge of Dirt Road2	T_Edge of Dirt Roa		
Edge of Dirt Road3	T_Edge of Dirt Roa		
Edge of Dirt Road4	T_Edge of Dirt Roa		
Edge of Dirt Road5	T_Edge of Dirt Roa		
Edge of Dirt Road6	T_Edge of Dirt Roa		
Edge of Gravel Road	I T_Edge of Gravel		Triangulation
Edge of Gravel Road	I T_Edge of Gravel		Feature Type:
Edge of Gravel Road	I T_Edge of Gravel		Exterior
Edge of Gravel Road	I T_Edge of Gravel		Point Density Interval: 0.00 +
Edge of Gravel Road	I T_Edge of Gravel		0.00
Edge of Gravel Road	I T Edge of Gravel	~	Exclude from Triangulation
<	>		

17. To complete the process, the surface must be re-triangulated.

## **Merging Surfaces**

The InRoads Merge Surfaces command is used to create a single surface from two surfaces. The surfaces being merged must be adjacent or overlapping. The merging of surfaces that are not adjacent or overlapping would result in inaccurate triangles between the areas of data.

In the examples below, the original surface is being extended by using information contained in an additional surface. The solid line represents the perimeter of the "Original" surface. The dashed line represents the perimeter of the additional surface to be merged, identified as the "Design" surface in the Merge Surfaces dialog box.



#### **Workflow Outline**

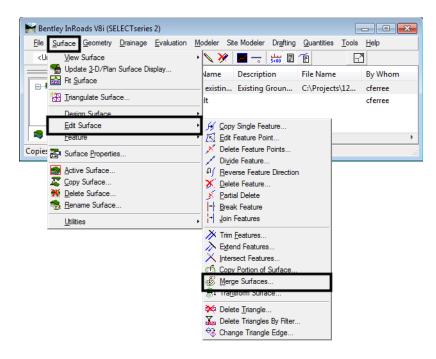
**Merge Surfaces** - Merging surfaces creates a single surface from two surfaces. If one surface is not fully contained within the limits of the other, an exterior boundary for the merged surface must be built also.

- Merge Surfaces This combines two surfaces.
  - Commands Used: Merge Surfaces Used to create the combined surface.
  - Feature Properties Used to identify residual exterior boundary features.
  - **Delete Feature** Used to remove residual exterior boundary features.
- **Creating an Exterior Boundary for the Merged Surface** Once the surfaces are combined a new exterior boundary is required to contain the data. This boundary will be created using the boundaries from the original surfaces.other boundary.
  - Commands Used: **View Features** Used to display the exterior boundaries from the two original surfaces.
  - **Place Fence** Used to define a fence around one of the exterior boundarys. This will be used to clip the other boundary.
  - Delete Fence Contents Used to clip the exterior boundary not fenced.
  - **Partial Delete** Used to clip the other boundary so that the two clipped lines can be used to create the new boundary.
  - **Create Complex Shape** Used to combine the two clipped features into a single element that will be imported for the new boundary.
  - Import Surface Used to create the exterior boundary feature.
  - **Triangulate Surface** Use to incorporate the exterior boundary into the triangulated surface.

#### **Prerequisites**

Before two surfaces can be merged, they must both be opened in InRoads.

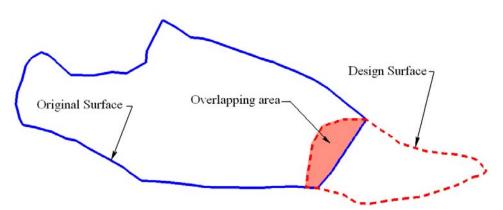
1. From InRoads main menu, select **Surface > Edit Surface > Merge Surfaces**. This will result in the display the *Merge Surfaces* dialog box.



This command operates with three surfaces; the original surface, the design surface, and the destination surface which will be created upon execution of the command.

- Original Surface- This is the surface whose features can be deleted or partially deleted in areas that overlap with the merging (Design) surface. Typically, this will be the Existing surface received from ROW/Survey, however it can be any surface. If the original and design surfaces overlap, the common area between the two will be occupied by data from the Design Surface and data from the Original Surface may be removed, depending on the toggle settings described below.
- Design Surface- This surface usually contains additional existing surface data or the Finished Grade surface generated from Roadway Modeler. Design Surface data can either replace or supplement the Original Surface data in areas where they overlap depending on the toggled setting Retain All Original Surface Points. In the illustration below, the shaded area shows the overlap between the original and design surfaces. The data from the Original Surface in this area will be deleted and only the Design Surface data will remain unless Retain All Original Surface Points is toggled on.

*Note:* The *Original Surface* and the *Design Surface* remain intact. The **Retain All Original Surface Points** setting only affects the creation of the *Destination Surface*.



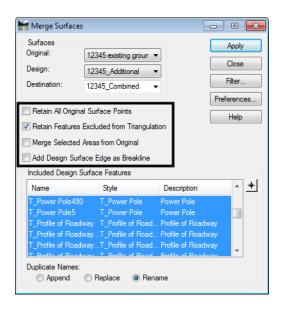
- **Destination Surface-** This surface stores the results of the **Merge** command.
- Use the pull downs in the *Surfaces* area of the dialog box to select the desired surface for Original, Design, and Destination. If a destination surface has not previously been created or loaded, it can be created "on the fly" by typing the desired name in the *Destination* field.

💏 Merge Surf	aces		
Surfaces		Apply	
Original:	12345_Existing	Close	
Design:	12345_Additional	Filter	
Destination:	12345_Combined	·	
	ginal Surface Points	Preferences	
		Help	
_	es Excluded from Triangula	ation	A L
	urface Edge as Breakline		in k

A Destination surface name can be keyed in here to create the surface "on the fly".

- 3. The next area of the *Merge Surfaces* dialog box contains four toggles: **Retain All Original Surface Points**, **Retain Features Excluded from Triangulation**, **Merge Selected Areas from Original**, and **Add Design Surface Edge as Breakline**.
  - ♦ Retain All Original Surface Points- When checked on, all of the original surface's features will be stored in the destination surface. When checked off, the original surface features that cross into the design surface's perimeter will be clipped at the perimeter leaving only the design surface's features in that area. By default the option is checked off.
  - ♦ Retain Features Excluded From Triangulation- When checked on, features excluded from triangulation from the original surface, like underground utilities, will be stored in the destination surface, regardless of their relationship to the design surface. When checked off, features excluded from triangulation will be treated as any other feature in the original surface. Un-triangulated features from the design surface by default are <u>always</u> included in the destination surface.

- Merge Selected Areas from Original When toggled on, Merge Surfaces scans the active selection set for closed shapes (these are MicroStation elements selected with the Element Selector tool). Data from the original surface inside the shape is used to replace any data from the design surface in that area. If Add Design Surface Edge as Breakline is turned on, boundary features are added for each selected shape.
- ♦ Add Design Surface Edge as Breakline- When checked on, the perimeter of the design surface is added to the destination surface as a breakline. This will ensure that the design surface maintains its original triangle structure. When off, the perimeter is not added and the design surface's triangle structure can be modified by the original surface data. This option should be turned **on** when creating an "as constructed" surface. It should be turned **off** when extending or modifying the existing surface.
- 4. Turn on or off the toggles as desired.



5. The *Merge Surfaces* dialog box contains an area for including and excluding design features from the destination surface. In the *Included Design Surface Features* area, highlighted features will be added to the destination surface and un-highlighted features will not. By default all features are highlighted.

Add Design Surface Edge as Breakline					
Included Design Su	face Features				
Name	Style	Description	<u>^</u> +		
Exterior Boundary	DTM_Exterior				
T_Billboard Over 10 T_Billboard Under 1 T_Billboard Under 1	ft T_Billboard Over ft T_Billboard Over 0 T_Billboard Under. 0 T_Billboard Under.	Billboard 10ft or More Billboard 10ft or Less Billboard 10ft or Less	Ŧ		
Duplicate Names:	) Replace 🛛 🔘 Rena	ame	-		

- **Note:** Because this is an example of extending a surface, the Exterior Boundary of the design surface is not highlighted. When creating an "as constructed" surface leave all the features on.
- 6. Options for resolving feature naming conflicts are located at the bottom of the settings box under *Duplicate Names*. The options are:

- **Append-** This adds the points from the new feature to those of the existing feature, making one feature out of the two. The combined feature will have a discontinuity (a gap) from the last point of the existing feature to the first point of the new feature.
- *Replace-* The existing feature will be deleted and replaced by the new feature with this option.
- *Rename* The new feature will be renamed by appending a '1' to the end of the name.
- 7. By default the **Rename** option is selected.

🕌 Merge Surfaces			- • •			
Surfaces Original: Design: Destination:	Original:     12345_Existing       Design:     12345_Additional					
Retain Features      Merge Selected /	Retain All Original Surface Points     Retain Features Excluded from Triangulation     Merge Selected Areas from Original     Add Design Surface Edge as Breakline					
T_Billboard Over 1 T_Billboard Over 1 T_Billboard Under T_Billboard Under	Style DTM_Exterior Oft T_Billboard Over OftT_Billboard Unde 10T_Billboard Unde 11T_Billboard Unde	Billboard 10ft o erBillboard 10ft o erBillboard 10ft o	or More or Less or Less			

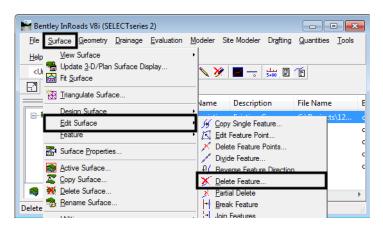
8. Once the desired settings are made, **<D> Apply** to execute the command. If the destination surface did not exist when the command was launched, it will be created now. After the command has been run, the destination surface will be added to the file list in the main InRoads interface. The *Merge Surfaces* dialog box can now be dismissed.

		Merge Surface	:5			
		Original:	12345 Existing	•	App	ply
🚔 Bentley InRoads V8i (SELECTseries 2)		Design:	12345_Additional	•	Clo	se
<u>File Surface G</u> eometry <u>D</u> rainage <u>E</u> valuat	tion <u>M</u> ode	Destination:	12345_Combined	•	Filte	er
Unnamed> ▼ Ta ₹	¥   🚳 🎙		al Surface Points Excluded from Triang	ulation	Preferen	
S	urface N	Merge Selected	Areas from Original			
🗄 🦛 Defectio	12 <b>2</b> 45 e		face Edge as Breakline	e		
- 1224E - inti-	Default 12345_E	·····				اله ا
🗄 🌅 12345_Existing	12345_A	INdifie	Style	Description		≜≜
🗇 🎫 12245 Additional 🖌	12345_0	T_Billboard Over T_Billboard Unde T_Billboard Unde	10ft T_Billboard Ove 10ftT_Billboard Ove er 10T_Billboard Und er 10T_Billboard Und er 10T_Billboard Und	r Billboard 10ft IerBillboard 10ft IerBillboard 10ft	or More or Less or Less	•
		Duplicate Names		ename		

9. If the design surface was at least partially outside the area of the original surface (as is the case in this example), a random feature will be created in the combined surface using the original surface's exterior boundary name. This feature should be deleted prior to creating the new exterior boundary. To determine if the random exterior boundary feature was created, look at the *Feature* list in the *Feature Properties* dialog box (Surface > Feature > Feature Properties).

🕌 Feature Properties						- • •
Surface: 12345_Combin Feature:	ned 👻		Style Available:			Apply
	Style Description  T_Billboard Over Billboard 10ft  T_Billboard Over Billboard 10ft  T_Billboard Under Billboard 10ft  T_Billboard Under Billboard 10ft  T_Billboard Under Billboard 10ft  T_Bin Walls Bin Walls  T_Bin Walls Bin Walls  T_Bin Walls Bin Walls  T_Bindge Abutme Bridge Abutm  T_Bridge Curb Bridge Curb	<b>▶</b> ]	Available: B_RAIL_Ty-10M B_RAIL_Ty-10R B_RAIL_Ty-3 B_RAIL_Ty-7 B_RAIL_Ty-7_SI Breakline Primary: DTM_Exterior Secondary: Pay Items Name Triangulation Feature Type: Point Density I Exclude from	ECT-A Description	From Style	Close Filter Edit Style New Style List Points Help
Refresh/Display in 3-D/Plan V	View					

- 10. If the design surface is entirely within the area of the original surface, the original surface's exterior boundary should be retained.
- 11. To delete the random feature that uses the original surface's exterior boundary name, select the InRoads command *Surface > Edit Surface > Delete Feature*.



- 12. The *Delete Feature* dialog box will be displayed. Use the *Surface* drop-down to select the merged surface.
- 13. From the *Features* list, highlight the exterior boundary feature (this will usually be named **DTM Exterior**).

14. <D> Apply. A "Delete selected feature(s)?" warning message will display. <D> OK to complete the deletion. The Delete Feature dialog box can be dismissed. It is advisable not to re-triangulate the surface until a new exterior boundary is added.

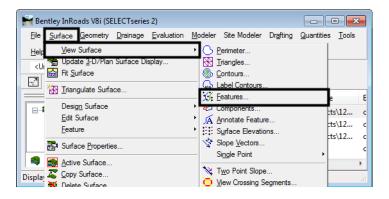
🕈 Delete Feature			
Surface:	12345_Combined	<b>•</b>	Apply
Fence Mode: 🛛 🗍	gnore	<b>*</b>	Close
Features:			Filter
Name	Style	Description	
DTM_Exterior Bou	nd DTM_Exterior		Results
-	-	er Billboard 10tt or Mo	HelD
-	-	er Billboard 10ft or Mo	
-	-	iderBillboard 10ft or Les iderBillboard 10ft or Les	
-	-	iderBillboard 10ft or Les	
T Bin Walls	T Bin Walls	Bin Walls	
T D: 14/1 05/	T D: 14/1	THE NAME IN	Ŧ
Delete Feature	12345_Combined	•	Apply
Surface:	-	▼ ▼	
Surface:	12345_Combined	▼ ▼ Description	Apply Close Filter
Surface: Fence Mode: Features: Name	12345_Combined	▼ ▼ Description	Apply Close
Surface: Fence Mode: Features: Name DTM_Exterior Bou T_Billboard Over	12345_Combined gnore Style IndDTM_Exterior 10ft T_Billboard Ov	ver Billboard 10ft or Mo	Apply Close Filter Results Help
Surface: Fence Mode: Features: Name DTM_Exterior Bou T_Billboard Over T_Billboard Over	12345_Combined gnore Style IndDTM_Exterior 10ft T_Billboard Ov 10ftT_Billboard Ov	ver Billboard 10ft or Mo ver Billboard 1 <u>0ft or Mo</u>	Apply Close Filter Results Help
Surface: Fence Mode: Features: Name DTM_Exterior Bou T_Billboard Over 1 T_Billboard Over 1 T_Billboard Under	12345_Combined gnore Style IndDTM_Exterior 10ft T_Billboard Ov 10ftT_Billboard Ov 10T_Billboard Un	ver Billboard 10ft or Mo ver Billboard 1 <u>0ft or Mo</u> nderBillboard Bentley	Apply Close Filter Results Help
Surface: Fence Mode: Features: Name DTM_Exterior Bou T_Billboard Over T_Billboard Under T_Billboard Under	12345_Combined gnore Style IndDTM_Exterior 10ft T_Billboard Ov 10ftT_Billboard Ov	ver Billboard 10ft or Mo ver Billboard 1 <u>0ft or Mo</u> nderBillboard Bentley nderBillboard	Apply Close Filter Results Help
Surface: Fence Mode: Features: Name DTM_Exterior Bou T_Billboard Over 1 T_Billboard Under T_Billboard Under T_Billboard Under T_Billboard Under T_Billboard Under T_Billboard Under	12345_Combined gnore Style ndDTM_Exterior 10ft T_Billboard Ov 10T_Billboard Un 10T_Billboard Un 10T_Billboard Un T_Billboard Un	ver Billboard 10ft or Mo ver Billboard 10ft or Mo derBillboard Bentley nderBillboard Bin Walls	Apply Close Filter Results Help
Surface: Fence Mode: Features: Name DTM_Extenor Bou T_Billboard Over 1 T_Billboard Over 1 T_Billboard Under T_Billboard Under T_Billboard Under	12345_Combined gnore Style andDTM_Exterior 10ft T_Billboard Ov 10ftT_Billboard Ov 10T_Billboard Un 10T_Billboard Un	ver Billboard 10ft or Mo ver Billboard 1 <u>0ft or Mo</u> nder Billboard Bentley nder Billboard	Apply Close Filter Results Help InRoads V8i (SELECTseries 2)
Surface: Fence Mode: Features: Name DTM_Exterior Bou T_Billboard Over 1 T_Billboard Under T_Billboard Under T_Billboard Under T_Billboard Under T_Billboard Under T_Billboard Under	12345_Combined gnore Style ndDTM_Exterior 10ft T_Billboard Ov 10T_Billboard Un 10T_Billboard Un 10T_Billboard Un T_Billboard Un	ver Billboard 10ft or Mo ver Billboard 10ft or Mo derBillboard Bentley nderBillboard Bin Walls	Apply Close Filter Results Help InRoads V8i (SELECTseries 2)
Surface: Fence Mode: Features: Name DTM_Exterior Bou T_Billboard Over 1 T_Billboard Under T_Billboard Under T_Billboard Under T_Billboard Under T_Billboard Under T_Billboard Under	12345_Combined gnore Style ndDTM_Exterior 10ft T_Billboard Ov 10T_Billboard Un 10T_Billboard Un 10T_Billboard Un T_Billboard Un	ver Billboard 10ft or Mo ver Billboard 10ft or Mo derBillboard Bentley nderBillboard Bin Walls	Apply Close Filter Results Help InRoads V8i (SELECTseries 2)

15. The combined surface is now ready for a new exterior boundary.

#### Creating an Exterior Boundary for the Merged Surface

To create the exterior boundary for the merged surface, the exterior boundaries of the source surfaces will be used. This will only be required if the design surface used in the Merge Surfaces operation lays at least partly outside the area of the Original surface. If the design surface is entirely within the area of the original surface, the original surface's exterior boundary will be retained and this process can be omitted.

1. Select **Surface > View Surface > Features** from the InRoads dialog box.



2. This will result in the display of the *View Features* dialog box. From the *Surface* drop-down, select the *Design* surface, **12345_Additional** in this example, see *Merging Surfaces* Step 2.

View Features			<b>_</b>
Surface: 12345	Apply		
Fence Mode: Defau	Additional		Close
	Combined Existing		Filter
			Edit Style
eatures:			Help
Name	Style	Description	<u> </u>
Exterior Boundary	DTM_Exterior		
T_Billboard Over 10ft	T_Billboard Over	Billboard 10ft or	More
T_Billboard Over 10ft	. T_Billboard Over	Billboard 10ft or	More
T_Billboard Under 10	. T_Billboard Under	Billboard 10ft or I	less
			2000
T_Billboard Under 10	. T_Billboard Under	Billboard 10ft or I	
T_Billboard Under 10 T_Billboard Under 10			Less
	. T_Billboard Under	Billboard 10ft or I	Less
T_Billboard Under 10	. T_Billboard Under T_Bin Walls	. Billboard 10ft or I Bin Walls	Less
T_Billboard Under 10 T_Bin Walls	. T_Billboard Under T_Bin Walls T_Bin Walls	. Billboard 10ft or I Bin Walls Bin Walls	Less
T_Billboard Under 10 T_Bin Walls T_Bin Walls854 T_Bin Walls855	. T_Billboard Under T_Bin Walls T_Bin Walls	Billboard 10ft or I Bin Walls Bin Walls Bin Walls	Less

- 3. By default, all of the features are highlighted. **<D>** on the exterior boundary feature (Exterior Boundary in this example) so that only the exterior boundary feature is highlighted.
- 4. **<D> Apply** to display the exterior boundary feature. Do not dismiss the *View Features* dialog box yet, as it will be used again.

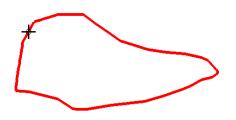
🐂 View Features			<b>-</b> ×
Surface: 1234	5_Additional 👻	- E	Apply
Fence Mode: Ignor	e 👻		Close
			Filter
			Edit Style
			Help
Features:			нер
Name	Style	Description	<u>+</u>
Exterior Boundary	DTM_Exterior		
T_Billboard Over 10ft	T_Billboard Over	Billboard 10ft or M	ore
T_Billboard Over 10ft.	T_Billboard Over	Billboard 10ft or M	ore
T_Billboard Under 10.	T_Billboard Under	rBillboard 10ft or Le	ss
T_Billboard Under 10	T_Billboard Under	rBillboard 10ft or Le	ss
T_Billboard Under 10.	T_Billboard Under	rBillboard 10ft or Le	ss
T_Bin Walls	T_Bin Walls	Bin Walls	
T_Bin Walls854	T_Bin Walls	Bin Walls	
T_Bin Walls855	T_Bin Walls	Bin Walls	
T_Bridge	T_Bridge	Bridge	
T_Bridge Abutment	T_Bridge Abutme	Bridge Abutment	-

Place a fence using the exterior boundary of the design surface as the fence shape. By placing the fence, the exterior boundary of the original surface can be displayed clipping out the overlapping area so that less editing is required to finish the new exterior boundary.

5. Select the **Place Fence** command from the MicroStation Main toolbar. Set the *Fence Type* to **Element** and *Fence Mode* to **Inside**.

Tasks 7 X	View 1 - Top, CDOT Default     G → Ø ☆ → ▲ ④ ♀ ♀ ಔ ⊞ ↔ ♥ ♀ ♀ ♡
Colorado DOT	Place Fence
Roundabouts	Fence Mode: Inside
Civil Geometry       X       Data Acquisition	

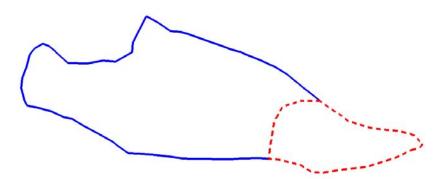
6. Select the design surface's exterior boundary displayed in Step 3 above. Left click again, anywhere in the view to accept the element. This places a fence on the element.



- 7. Go back to the *View Features* dialog box. Set the *Surface* to **12345_Existing** (the *Original* surface from *Merging Surfaces* step 2).
- 8. Using the *Fence Mode* drop-down, select the **Outside** option. This will only display the part of the original exterior boundary that is outside of the design exterior boundary.
- Highlight the DTM Exterior boundary feature only. <D> Apply to display this feature. The View Features dialog box can now be dismissed.

🕌 View Features			×
Surface: 1234	5_Existing 🔹	·	Apply
Fence Mode: Outsi	de 🔻	·	Close
			Filter
			Edit Style
			Help
Features:			
Name	Style	Description	<u>+</u>
DTM_Exterior Bound	T_Exterior Boun	d	
I_Billboard Over 10tt	I_Billboard Ove	r Billboard 10ft o	or More
T_Billboard Over 10ft	T_Billboard Ove	r Billboard 10ft o	or More
T_Billboard Under 10	T_Billboard Und	erBillboard 10ft o	or Less
T_Billboard Under 10	T_Billboard Und	erBillboard 10ft o	or Less
T_Billboard Under 10	T_Billboard Und	erBillboard 10ft o	or Less
T_Bin Walls	T_Bin Walls	Bin Walls	
T_Bin Walls854	T_Bin Walls	Bin Walls	
T_Bin Walls855	T_Bin Walls	Bin Walls	
T_Bridge	T_Bridge	Bridge	
T_Bridge Abutment	T_Bridge Abutm	e Bridge Abutme	nt 👻

10. Dismiss the fence by selecting the **Place Fence** command again. The results of this operation will look similar to the example below:

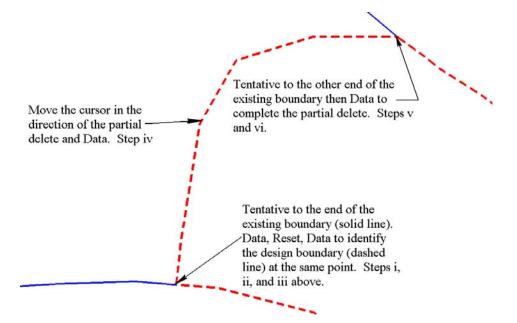


In order to get the element ends to match properly, use the following procedure, starting with selecting the **Partial Delete** command from the MicroStation Main Task toolbar:

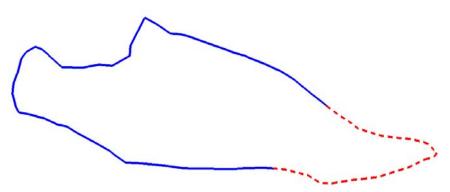
Tasks	4 🗙 📦 View 1 - Top, CDOT Defa
💁 Tasks	
1 2 3 4 5 4 5	
🔛 Colorado DOT	1 Modify Element
Roundabouts	2 Partial Delete
Z Civil Geometry	3 Break Element By Point
🕅 Data Acquisition	🗡 4 Extend Line
T Civil Workflows	5 Trim To Intersection
1 InRoads Commands	🔑 6 Trim To Element
V Drawing	丰 7 Trim Multiple
\$ 2 ≈ + 38 N	👯 8 IntelliTrim
	→ 9 Insert Vertex
W D C S O	]. ^{sh} 0 Delete Vertex
	Q Construct Circular Fillet
	W Construct Chamfer
<u> </u>	Open 'Modify' as Toolbox

- 11. Move the cursor near the end of the original exterior boundary (solid line) and **<T>** (left/right cord or middle mouse click, depending on the mouse settings).
- 12. **<D>** to accept the snap. The original boundary will be highlighted.
- 13. Next, **<R>** (right mouse click). This will un-highlight the original boundary and highlight the design boundary (dashed line) where the two meet.
- 14. To identify the direction of the partial delete, move the cursor along the part of the element to be deleted and **<D>**.
- 15. **<T>** to the other end of the original exterior boundary.

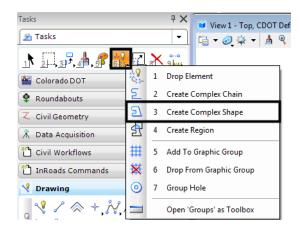
16. **<D>** to accept the snap and complete the partial delete.



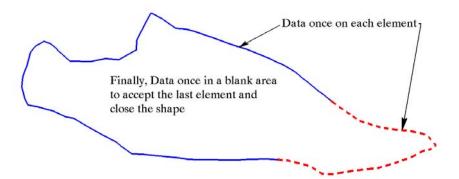
The result will be two elements that represent the desired extent of the exterior boundary of the merged surfaces.



17. Next, a closed shape must be made of the two elements. Select the **Create Complex Shape** command from the MicroStation Main toolbar. From the *Method* drop-down list select **Manual**.



18. **<D>** on element one (solid line) then **<D>** on element two (dashed line). **<D>** once more in a blank area on the screen to finalize the command.



The shape is now ready to be incorporated into the combined surface as an exterior boundary.

19. From InRoads, select **File > Import > Surface**. The *Import Surface* dialog box will be displayed.

Bentley InRoads V8i (SELECTseries 2)											
	File	<u>S</u> urface	Geometry	<u>D</u> rainage	Evaluation	<u>M</u> odeler	Site Modeler	Dr <u>a</u> ftin	g <u>Q</u> uantities	Tools	
Ľ		New					Ctrl	+N			
ŀ	Ê	Open					Ctrl	•	1 👍		
	_	<u>S</u> ave						가는			
-	Ю	Save <u>A</u> s									
ľ	_	<u>Close</u>						•	File Name	*	
	ø	Project Def							C:\Project	s\12	
	☑	Project Opt	tions						C:\Project		
	懰	Text Import	t <u>W</u> izard						C:\Project	s\12	
		Import						•	🔮 <u>S</u> urface		
		Export							🐧 Surface Ad		
I		<u>T</u> ranslators	•					· -	🕈 <u>G</u> eometry		
1			-+e\12245\F	eeion\lnRo	ade\ 122/15 a	vietina arou	ind dtm				

- 20. Select the **From Graphics** tab. Select the combined surface created with the *Merged Surfaces* command (*Merge Surfaces* step 2 above) from the *Surface* drop-down.
- 21. Select Single Element from the Load From drop-down.
- 22. Select Use Element Elevations from the *Elevation* drop-down.
- 23. In the *Features* area of the dialog box, key in *DTM_Exterior* in the *Seed Name* field. This will not appear in the drop down list because the original exterior boundary features were deleted from the surface.
- 24. In the Feature Style drop-down, select DTM_Exterior.
- 25. Using the *Point Type* drop-down, select Exterior.

26. After the above settings are made **<D> Apply**.

🕌 Import Surface				
From Graphics DEM	From Geom	ietry		
Surface:	12345_Comb	ined	·	Apply
Load From:	Single Eleme	nt	•	Filter
Level:	ALG_COGO_	Points	-	Results
Elevations:	Use Element	Elevations	-	Preferences
Intercept Surface:	12345_Additi	onal	-	
Drape Vertices On	ly			Help
Thin Surface				
Tolerance:	5.00			
Features	phics Informati	on		
Seed Name:		DTM_Ext	erior	+
Feature Style:		DTM_Ext	erior	•
Point Type:		Exterior		<b>•</b>
Maximum Seg	ment Length:	0.00		
Point Density	Interval:	0.00		
Duplicate Names:	Replace	Rename		
Exclude from Tria	angulation			
		Close		

- 27. **<D>** on the complete boundary shape created earlier. The shape will highlight. **<D>** again in a blank area on the screen to accept the element and add it to the merged surface. Dismiss the *Import Surface* dialog box
- 28. To verify that the data was imported, select **Surface > Feature Properties.** This displays the **Feature Properties** dialog box.
- 29. Verify that the merged surface is selected from the *Surface* drop-down list.

30. Verify that **DTM_Exterior** appears in the *Feature* list box. Also verify that the *Feature Type* is set to **Exterior** in the *Triangulation* area.

Surface: 12345_Comb	pined 🔻			Style Available:				Apply
eature:			- 1	B RAIL Ty-10M				Close
Name	Style	Description 🔶	+	B_RAIL_Ty-10R				
DTM_Exterior Boundary	DTM_Exterior			B_RAIL_Ty-3 B_RAIL_Ty-7				Filter
I_Billboard Over 10tt	I_Billboard Over	Billboard 10tt		B_RAIL_Ty-7_SE	CT-A			Edit Style
T_Billboard Over 10ft280	T_Billboard Over	Billboard 10ft		Breakline			*	
T_Billboard Under 10ft	T_Billboard Under	Billboard 10ft		Primary:				New Style
T_Billboard Under 10ft Light	T_Billboard Under			DTM Exterior			-	List Points
T_Billboard Under 10ft Light5	T_Billboard Under	Billboard 10ft		Secondary:				
T_Bin Walls	T_Bin Walls	Bin Walls		Secondaly.				Help
T_Bin Walls854	T_Bin Walls	Bin Walls						
T_Bin Walls855	T_Bin Walls	Bin Walls						
T_Bridge	T_Bridge	Bridge						
T_Bridge Abutment	T_Bridge Abutme	Bridge Abutm						
T_Bridge Abutment 745	T_Bridge Abutme	Bridge Abutm		Pay Items	1		1	
T_Bridge Abutment 746	T_Bridge Abutme	Bridge Abutm		Name	Description	From Style	<b>%</b>	
T_Bridge Abutment757	T_Bridge Abutme	Bridge Abutm					*	
T_Bridge Abutment758	T_Bridge Abutme	-					7.1.12	
T_Bridge Abutment 759	T_Bridge Abutme	-						
T_Bridge Curb	T_Bridge Curb	Bridge Curb 🔫						
•		•						
Name: DTM Exterio	r Boundary			Triangulation				
Description:				Feature Type:	Exterior	-		
Description.				Point Density Ir				
Parent:				Foint Density in	nterval: 0.00	<u>+</u>		
	n View			Exclude from T	riangulation			

- 31. To complete the process, the surface must be re-triangulated.
- 32. From InRoads select **Surface > Triangulate Surface**. The *Triangulate Surface* dialog box is displayed. One could also right click on the surface name in the InRoads Explorer and select **Triangulate** from the menu.

Bentley InRoads V8i (SELECTseries 2)		8
File Surface Geometry Drainage Evaluation	Modeler Site Modeler Drafting Quantities To	ools
Help View Surface	• • • • • • • • • • • • • • • • • • • •	
Triangulate Surface	Jame Description File Name	*
Design_Surface Edit Surface Feature	existin Existing Groun C:\Projects\12 Additi C:\Projects\12 Com C:\Projects\12	2 =
Surface Properties	Com C:\Projects\12	
Chang & Copy Surface		► I

- 33. From the *Surface* drop-down list, select the merged surface.
- 34. In the *Maximum Length* field, key in the desired length. This option will automatically remove any triangles that have at least one edge longer than the specified distance. Zero indicates no restriction to length. Because the surface has an exterior boundary, '*O*' should be used to ensure that all of the data is included in the triangulated surface.

35. **<D> Apply** to execute the command.

🐂 Triangulate Sui	face		• 💌
Surface:	12345_Combined		Apply
Description:			Close
Maximum Length:	0.00 🔶		Help
Extended Data	Checks 📃 Lock Triangula	tion	
Results Number of Points:			
Number of Triang	es:		
Elapsed Time (Se	conds):	Mo	ore

36. When the command has finished processing, surface information will be displayed in the *Results* area of the *Triangulate Surface* dialog box. The exterior boundary is now part of the surface and the *Triangulate Surface* dialog box can be dismissed.

🕌 Triangulate Su	rface			- • •
Surface:	12345	Combined	•	Apply
Description:				Close
Maximum Length:	0.00		+	Help
Extended Data	Checks	Cock Tri	angulation	
Results Number of Points	c	35061		
Number of Triang	les:	66573		
Elapsed Time (Se	econds):	3		More
				_

- 37. Now that the merged surface is complete, it should be saved.
- 38. From InRoads, select File > Save > Surface. If the surface has been saved previously, the updated data will be written to the DTM file. If the surface has not been saved before, then a new DTM file will be created. One could also right click on the surface name in the InRoads Explorer and select Save from the menu.

M	Bentley InR	oads V8i (SI	LECTserie	s 2)				- • •	
E	ile <u>S</u> urface	<u>G</u> eometry	<u>D</u> rainage	Evaluation	Modeler	Site Modeler	Dr <u>a</u> ftir	ng <u>Q</u> uantities <u>T</u> ools	
*	<u>N</u> ew					Ctrl	+N		
- 2	🗳 Open					Ctrl		a 🧝	
Ł	<u>S</u> ave						- • L	Project	Ctrl+P
_ 14	Save <u>A</u> s							Surface	Ctrl+S
5	Close						- • T	<u>Geometry Project</u>	Ctrl+G
i 🖻	🗳 <u>P</u> roject De	efaults						🛓 Template Library	Ctrl+T
	Project Op	otions					1	<u>R</u> oadway Design	Ctrl+R
*	😫 Text Impo	rt Wizard						ite <u>M</u> odeler Project	Ctrl+M
1	Import	_					•	C:\Projects\12	
ľ	Export						•		
_	Translator	8					- + -		
s	1 C·\Pmie	ote\12345\[	)esian\lnRa	ads\12345.e	vistina aro	ind dtm		.4	

39. The *Save As* dialog box will display. Use the *Save In* drop-down to specify the desired folder for the DTM.

Next the file name must be specified. There are two ways to do this; one, by keying in a filename (not recommended), or two, by selecting the surface from the *Active* list at the bottom of the dialog box. Selecting the surface from the *Active* drop-down will ensure that the DTM has the same name in InRoads memory as it does on the hard drive.

- 40. Select the down arrow on the *Active* drop-down then highlight the desired surface. This should be done even if the desired surface is already displayed in the *Active* drop-down. Selecting the surface in the *Active* drop-down will auto-populate the *File Name* field with the surface name.
- 41. **<D> Save** to add the file to the 'Save In' directory. After the file has been saved the *Save As* dialog box can be dismissed (**<D> Cancel**).

Save As				×
Save in:	📗 InRoads	•	G 🤌 📂 🖽 -	
Recent Places Pesktop Libraries Computer	Name		Date modified 12/8/2010 8:25 AM 12/8/2010 8:25 AM	Type DTM File DTM File
Network	File name: Save as type: Active:	III 12345_Combined.dtm Surfaces (*.dtm) 12345_Combined		Save Cancel Help Options

# Copy a Portion of a Surface

There may be occasions when only a portion of a surface is needed. For example, one might wish to extend their existing DTM with a few hundred feet from an adjacent project or perhaps specific features from one surface are required in another. Both copying an area of a surface, and copying whole features can be accomplished using the **Copy Portion of Surface** command.

Two examples will be used to illustrate the **Copy Portion of Surface** command. In the first, all of the features within a given area will be copied into a new surface. In the second example specific features will be copied into a new surface.

# Workflow Outline-

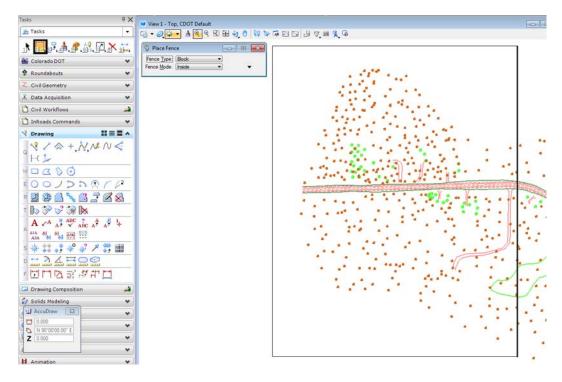
**Copy a Portion of a Surface -** This command can be used to copy part of a surface, either an area or individual features, to a new DTM file.

• Commands Used: Copy a Portion of a Surface - Used to create a new surface from part of another surface. The new surface can come from a region of the original surface (defined by a fence or shape) and/or by selected features.

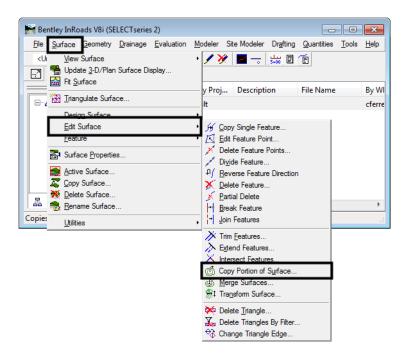
#### Example 1 – creating a subset of a DTM

In this example, all of the surface data in the box will be copied to create a new surface.

1. A MicroStation fence is used to identify the data to be copied. Select the **Place Fence** command from the MicroStation Main toolbar. Place the fence around the area to be copied. The blue box in the illustration below shows the location of the fence.



 From InRoads, select Surface > Edit Surface > Copy Portion of Surface. The Copy Portion of Surface dialog box is displayed.



3. In the *Copy Portion of Surface* dialog box, from the *Source Surface* drop-down list select the surface to be copied from.

- 4. From the *Destination Surface* drop-down list select the surface to be copied to. If the surface does not exist, the name for the new surface can be keyed in here.
- 5. Select **Inside** from the *Fence Mode* drop-down.

CDOT Workflows

Copy Portion of	Surface				- • 💌
Source Surface:	12345_Existing	-			Apply
Destination Surface:	12345_Partial	-			Close
Clip By:	Fence	•			Filter
Fence Mode:	Inside	-			
Features:	Innore				Results
Name	Outside	scription	-	+	Help
		. Billboard 10ft or More			
		. Billboard 10ft or More Billboard 10ft or Less			
		Billboard 10ft or Less			
-		Billboard 10ft or Less			
T_Bin Walls					
T_Bin Walls854			Ŧ		
Duplicate Names:					
Append	Replace 🔘 Ren	ame			

- To select all the features from the Features list box, right click in the Features list box and choose <D> Select All.
- 7. For *Duplicate Names*, toggle on the **Rename** option.
- 8. **<D> Apply** to initiate the command. The *Copy Portion of Surface* dialog box will minimize then reappear when the process is completed. Dismiss the dialog box.

Copy Portion of	Surface				
Source Surface:	12345_Existing	•		- 6	Apply
Destination Surface:	12345_Partial	•		ſ	Close
Clip By:	Fence	•			Filter
Fence Mode:	Inside	•		0	Results
Features:				U	nesults
Name	Style	Description	*	+	Help
T_Billboard Over 10ft	T_Billboard Over	Billboard 10ft or More Billboard 10ft or More			
T_Billboard Under 10 T_Billboard Under 10		Select All Ct	rl+A		
T_Billboard Under 10	_	Select None Ct	rl+N		
T_Bin Walls	T_Bin Walls	Invert Selection			
T_Bin Walls854	T_Bin Walls	Bin Walis	Ŧ		_
Duplicate Names:	Replace 💿 Rena	ame			

9. From the InRoads dialog box, select **File > Save > Surface** and save the surface. The newly created surface is now ready for use once it's been triangulated.

#### **Example 2 -Copying a single element or multiple elements**

In this example, the Edge of Gravel Road features will be copied into a new surface. The fence will not be used in this example because the whole feature is to be copied.

 From InRoads, select Surface > Edit Surface > Copy Portion of Surface. The Copy Portion of Surface dialog box is displayed.

- 2. In the *Copy Portion of Surface* dialog box, use the *Source Surface* drop-down to select the surface to be copied from.
- 3. Use the *Destination Surface* drop-down to select the surface to be copied to. If the surface does not exist, a name to be used for the new surface can be keyed in here.
  - **Note:** The **Fence Mode** drop-down is grayed out because no fence is present. If a fence is present, select the **Ignore** option to copy the whole element. If the fence is defining an area to be copied or not to be copied then set the **Fence Mode** as needed.
- 4. In the *Features* area, find the desired features in the list and highlight them individually. Hold the *Ctrl* key down to select a group of individual features or hold the *Shift* key to select a block of features.
- 5. For *Duplicate Names*, toggle on the **Rename** option.
- 6. **<D> Apply** to initiate the command. The *Copy Portion of Surface* dialog box will minimize then reappear when the process has completed. Dismiss the dialog box.

Copy Portion of S	Surface					- • 💌
Source Surface:	12345_Exis	ting 🔻				Apply
Destination Surface:	12345_Grav	vel Road 👻				Close
Clip By:	Fence	•				Filter
Fence Mode:	Ignore	-				Results
Features:						nesuits
Name		Style	Desc	ription 🔺	+	Help
T_Edge of Driveway	(Gravel)828	T_Edge of D	)rivewEdge	of Driv		
T_Edge of Gravel Ro	ad	T_Edge of G	GravelEdge	of Gra		
T_Edge of Gravel Ro	ad209	T_Edge of 0	GravelEdge	of Gra		
T_Edge of Landscap	ed Area	T_Edge of L	ands Edge	of Lan		
T_Edge of Landscap	ed Area871	T_Edge of L	ands Edge	of Lan		
T_Edge of Oil Parking	g Lot	T_Edge of C	)il ParEdge	of Oil 🖕		
	1.070	T C 1 1	NID FI	*		
Duplicate Names:	Replace	Rename	]			

7. To verify that the data was copied, select the InRoads command **Surface > Features > Feature Properties.** The copied features should appear in the *Feature* list box.

Feature Properties		- • •
Surface: 12345_Gravel Road ▼ Feature: Name Style Description T_Edge of Gravel Road T_Edge of Gravel Edge of Gravel T_Edge of Gravel Road209 T_Edge of Gravel Edge of Gravel	IR     B_RAIL_TYSECT-A Breakline       Primary:       T_Edge of Gravel Road       Secondary:         Pay Items       Name     Description   From Style	Filter Edit Style
Image: Name: T_Edge of Gravel Road       Description: Edge of Gravel Road       Parent:       Image: Refresh/Display in 3-D/Plan View	Triangulation Feature Type: Point Density Interval: 0.00 Exclude from Triangulation	

- **Note:** The destination surfaces in the above examples were empty, newly created surfaces. However, the same process will work to copy portions of a surface into another preexisting surface. This, along with *Creating an Exterior Boundary* can be used to merge two adjacent, non-overlapping, surfaces.)
- **Note:** The **Parent** field in the **Feature Properties** dialog can be populated on a feature level in their respective DTMs prior to the merging or copying of features. Doing so allows the user to track where data originated. Any changes made require the surface to be saved for those changes to be retained for subsequent use.

# Workflow IR 7 - Displaying Features in Cross Section and Profile

This document is a guide for displaying features in both cross sections and profiles. Two types of cell placement will be considered in this workflow. One type is based on true scale meaning that the feature has a measurable size. For example a 24" pipe. The other type of cell is the pictorial location of a crossing feature for example overhead electric line. In order to compensate for the two types each needs to be scaled differently. Feature Filters have been developed to display them at their appropriate scale.

# **Cross Section**

# Workflow Outline-

Creating Cross Sections - Cross sections are used to evaluate a design surface.

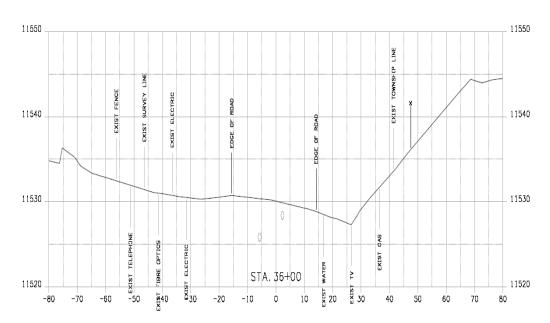
- Commands Used: **Global Scale Factor** Used to set size for text and cells displayed by InRoads.
- Create Cross Section Use to make the set of cross sections.

**Displaying True Scale Cells** - These are cells that represent actual design elements like drainage culverts and pipes. These items should be displayed at their actual size (allowing for vertical exaggeration).

- Commands Used: Global Scale Factor Used to set size for text and cells displayed by InRoads. Use a cell factor of 1 when displaying True Scale Cells.
- **Feature Filter Lock** Use to show only True Scale features in the dialog box. This will help to prevent the user from selecting the wrong feature
- Update Cross Section > Crossing Features This command is used to display the feature points in the cross sections.

**Displaying Plot Cell Scale Cells** - These are informational cells that identify the location of linear features like right-of-ways, existing pavement edges, and utility lines.

- Commands Used: **Global Scale Factor** Used to set size for text and cells displayed by InRoads. Use the same scale factor that was used when the cross sections were created.
- **Feature Filter Lock** Use to show only Plot Scale features in the dialog box. This will help to prevent the user from selecting the wrong feature
- Update Cross Section > Crossing Features This command is used to display the feature points in the cross sections.



## **Displaying Features in Cross Sections**

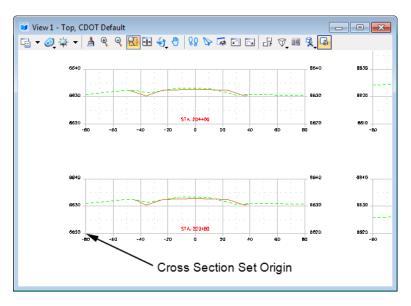
#### Note: Example Cross Section

The procedure for displaying features in cross sections follows.

- 1. Verify that the **Global Scale Factor** is set to the desired scale prior to creating the cross sections.
- From the InRoads, menu select Evaluation > Cross Section > Cross Sections. The Create Cross Section dialog box will appear. <D> Preferences to load the appropriate saved preferences. In this example the CDOT preferences will be used.

K Cross Sections							- • •
File							
Cross Section Set:	Mode:      Refresh (     Start:     Set Name:     Create:	S SH 86	top:	ay Off			
Source     Include     Controls     Custom     Layout     Axes     Grid     Details     ASCII or LandXML	Interval: Left Offset: Right Offset: Vertical Exaggeration: Show Data Outside	50.00 -80.00 80.00 2.000	D	+ +			
Annotate Cross Section Update Cross Section End-Area Volumes	Surfaces: Object Default 12345 existing grou SH 86	un	Name Default T_Existing_Grou Default	nd	BYL BYL BYL	All	]
			Apply	Propert	ies	Close	Help

- 3. On the *Include* leaf in the *Cross Sections* dialog box, verify that **Crossing Features** and **Projected Features** are checked off.
- 4. **<D> Apply**. The dialog box will minimize allowing the selection of the origin for the cross section set with a **<D>** in a MicroStation View.



### **Display True Scale Cells**

1. **<D>** the **Update Cross Section** folder in the dialog box explorer.

K Cross Sections		- • -
File		
Cross Section Set: SH 86   Create Cross Section Annotate Cross Section Cyclete Cross Section Cyclete Cross Section Components Components Crossing Features Storm and Santary End-Area Volumes	Mode:      Refresh Display On Display Off Start: 203+80.28 Stop: 260+43.16      Limits     Station Range     Start: 203+80.28      fop: 260+43.16      Stop: 260+43.16      Display Features Outside Elevation Range     Display Feature and Structure Bands	
	Apply Preferences) Close	Help

The first set of features to display will be the features that are defined to be true scale. These features have a defined size, such as pipes. In order to display these types of features, setting the scale factor and feature filter is required prior to displaying.

2. Change the InRoads *Scale Factor* to *1*.

🛣 Scale Facto	rs 💶 🗆 🔀
Text: 1.0000	Apply
Cell: 1.000	Close
Line Style: 1.000	

*Note:* Scale Factor should be 1:1 for true scale cells so that cells come in at actual scale.

3. From the *Locks* toolbar Select the *CELL_True-Scale* filter from the drop-down list and toggle on the *Feature Filter* lock button.

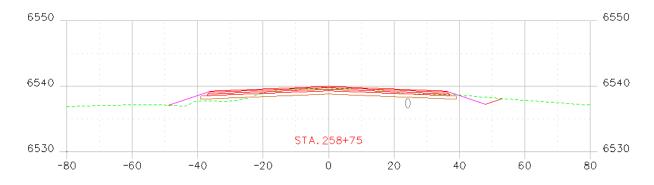
CELL_True-Scale 🛛 🔻 🖀 🚳 🖋 🎉 🜌	

- 4. Verify the correct **Cross Section Set** selected.
- 5. **<D>** the Crossing Features Leaf.
- 6. Toggle on the **Display On** radio button.
- 7. From the *Surface* list box, select the surface name or names to display. The *Feature* list box will then populate with the list of features found in the highlighted surface(s). Use the *Ctrl* or *Shift* keys to select multiple names. Also, by right clicking in the *Feature* list displays a menu that can be used to select all of the features.

K Cross Sections				- • 💌
File				
File Cross Section Set: SH 86	Mode: Refresh Start: 203+80.28 Surface: Name Default 12345 existing ground SH 86	Stop: 260+43.16 Descrip Edisting (		
Projected Features     Storm and Sanitary     End-Area Volumes	Feature: Name T_Cul Corr Sti 12" T_Cul Corr Sti 12"2"629 T_Cul Corr Sti 18" T_Cul Corr Sti 18"143 T_Cul Corr Sti 18"153 T_Cul Corr Sti 18"153 T_Cul Corr Sti 18"153	T_Cul Corr Stl 18"	Description	<u>+</u> ]
		Apply	Preferences	Edit Style Filter Close Help

**Note:** The feature names in bold are Feature Styles that can be displayed in cross sections. Any names that are dithered are not configured to be displayed in a cross section view.

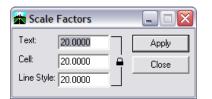
- Note: If no features are shown in the feature list box, there are no features that meet the criteria for the filter selected in step 5. It may be necessary to associate the correct feature styles to the desired features if this is the case. Feature styles can be re-associated by using the Surface > Feature > Feature Properties command. See CDOT Update InRoads Features.pdf for more information on the process involved.
- 8. **<D> All** (lower right corner of dialog box). The Features that *can* be displayed in cross section view will be highlighted.
- 9. **<D> Apply**. The dialog will minimize as the features are generated in the cross sections. When the process is finished, the dialog will reappear.



# **Displaying Plot Scale Cells**

The second set of features to display is those that have *location only* defined with annotation. In order to display these types of features, the scale factor and the desired feature filter must be set prior to displaying.

1. Change the InRoads Scale Factor to 20.



**Note:** This is the desired plot scale for the set of Cross Sections we are working with. The scale should be changed accordingly to match the scale of the original cross sections.

2. From the *Locks* toolbar select the **CELL_Plot-Scale** filter from the pull down list. Verify that the feature filter is toggled on.

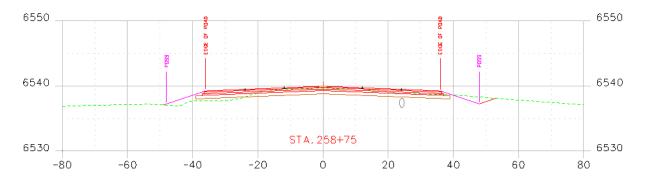


- 3. Verify that the correct **Cross Section Set** is selected.
- 4. **<D>** the **Crossing Features** Leaf.

5. From the *Surface* list box, select the surface name or names to display. Once a surface or surfaces are selected, the *Feature* list box will populate with the list of features. Use the *Ctrl* and *Shift* keys to select multiple feature names. Also, by right clicking in the *Feature* list displays a menu that can be used to select all of the features.

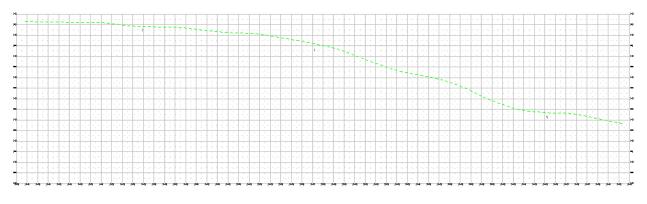
K Cross Sections				- • 💌
File				
Cross Section Set: SH 86  Create Cross Section  Annotate Cross Section  Update Cross Section  General  General  General  Components  Components  Cossing Features	Mode: Refresh Start: 203+80.28 Surface: Name Default 12345 existing ground SH 86	Display On Stop: 260	<ul> <li>Display Off</li> <li>D+43.16</li> <li>Description</li> <li>Existing Ground from multi Created from roadway de.</li> </ul>	
Projected Features     Storm and Sanitary     End-Area Volumes	Feature: Name DES12345-ABC_Cent DES12345-HMA_Lift DES12345-HMA_Lift DES12345-HMA_Lift	Centerline Centerline	Description Created by road Created by road Select All Ctrl	▲ ◆
		D_EOP	Select None Ctri	+ N Edit Style Filter
		A	pply Preferences	Close Help

- **Note:** The names in bold are Feature Styles that can be displayed in cross sections. Any names that are dithered are not configured to be displayed in a cross section view.
- 6. **<D> Apply**. The *Update Cross Section* dialog box will minimize as the features are generated in the cross sections. When the process is finished, the dialog will reappear.



# Profile

# **Displaying Features in Profile**



*Note:* Example Profile

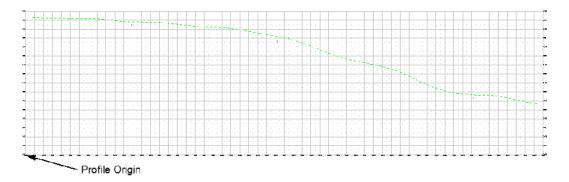
The procedure for displaying features in profiles follows.

 From the InRoads menu, select Evaluation > Profile > Create Profile. The Create Profile dialog box will appear. <D> Preferences to load the appropriate saved preferences. In this example the CDOT preferences will be used.

Kreate Profile				- • •
Create Profile  General  Source Include  Offsets  Marken  Axes	Set Name: SH 86 Direction	Exaggeratio Vertical: Horizontal:	n 10.0000 1.0000	
Grid Details	Surfaces: Object Default 12345 existing groun SH 86	Name Default T_Existing_Ground D_Finished-Grade	BYL BYL BYL	
		Pro	perties	All None
		Apply Prefere	nces	Close Help

2. In the *Create Profile* dialog box, verify on the *Include* leaf that Crossing Features and Projected Features are checked off.

3. **<D> Apply**. The *Create Profile* dialog box will minimize allowing the selection of the origin for the profile set. **<D>** in a MicroStation View to specify this location. After the profile is created **<D> Close**.



4. From the InRoads menu select **Evaluation > Profile > Update Profile**. The *Update Profile* dialog box will appear.

The first set of features to display will be the features that are defined to be true scale meaning the features have a defined size such as pipes. In order to display these types of features, set the scale factor and feature filter prior to displaying.

5. Change the InRoads *Scale Factor* to *1*.

🛣 Scale Factors		
Text: 1.0000		Apply
Cell: 1.0000	- <b>-</b>	Close
Line Style: 1.0000		

6. From the *Locks* toolbar select the **CELL_True-Scale** filter from the drop- down list and toggle on the **Feature Filter** lock.

Locks	
CELL_True-Scale	- 👔 😤 🚳 🖊 🎉 🔳 🚽 🔐 🗉 🗈

- 7. Verify the correct *Profile Set* is selected in the *Update Profile* dialog box.
- 8. For the *Mode*, select the **Display On** radio button

9. <D> the Crossing Features leaf.

🕌 Update Profile			- • •
Profile Set: SH 86	Mode: 🔘 Refresh 💿 Display On	Display Off	
Update Profile	Surfaces:		1 - 1
····	Name	Description	<u>+</u>
Crossing Features Projected Features	Default SH 86	Created from roadway de	
	Show Data Outside Elevation Rang	je	
		Apply Close	Help

10. From the *Surfaces* list box, select the surface name or names to display. Once surfaces have been selected, the *Crossing Features* list box will populate with the list of features. Use the *Ctrl* or *Shift* keys when you want to select multiple Surface names.

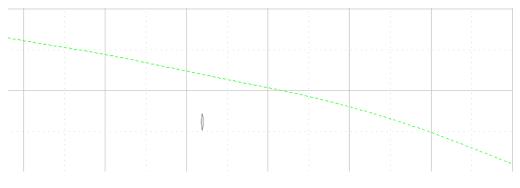
🐂 Update Profile				- • •
Profile Set: SH 86	Mode: 🔘 Refresh	🖲 Display On 🛛 🔘	Display Off	
🔄 Update Profile	Surfaces:			_
Surface Offsets	Name	0	escription	
Crossing Features	Default	E.	isting Ground from mul	
Projected Features	12345 existing ground SH 86		eated from roadway de	
	Crossing Features:			<b>J</b>
	Name	Style	Description	<u>+</u>
	T_Cul Corr Sti 12"	-	Culvert Corr Steel Pip Culvert Corr Steel Pip	
	_	-	Culvert Corr Steel Pip	
	_	-	Culvert Corr Steel Pip	
	T_Cul Corr Stl 18"15		Culvert Corr Steel Pip	-
		Tratae Gille	T dual f an Choi Din	Edit Style
			Apply Close	Help

**Note:** The names that are black are Feature Styles that can be displayed in profile. Any names that are dithered are not configured to be displayed in a profile view.

11. **<R>** in the *Crossing Features* list box and choose **Select All** from the menu.

🐂 Update Profile			[	- • -
Profile Set: SH 36 Update Profile Surface Offsets	Mode: © Refresh @ Surfaces: Name Default		Display Off Description	
	12345 existing ground SH 86		isting Ground from mul eated from roadway de	
	Crossing Features:	Style	Description	+
	T_Cul Corr Stl 12"	T_Cul Corr Stl 12" T_Cul Corr Stl 12" T_Cul Corr Stl 12" T_Cul Corr S T_Cul Corr S T_Cul Corr S	Culvert Cor Steel Pip Culvert Cor Steel Pip Select All Ctrl+A Select None Ctrl+N Invert Selection	
				Edit Style
			Apply Close	Help

12. **<D> Apply**. The dialog will minimize as the features are drawn in the profile. When the process is finished the dialog will reappear.



#### **Displaying Plot Scale Cells**

The second set of features to be displayed is those that have *location only* defined with annotation. In order to display these types of features, set the scale factor and the desired feature filter prior to displaying.

1. Change the InRoads *Scale Factor* to *20*.

🛣 Scale	Factors		
Text	20.0000	7	Apply
Cell:	20.0000	- <b>-</b>	Close
Line Style	20.0000		

*Note:* This is the desired plot scale; change accordingly.

2. From the *Locks* toolbar select the **CELL_Plot-Scale** filter from the pull down list and toggle on the **Feature Filter** lock.

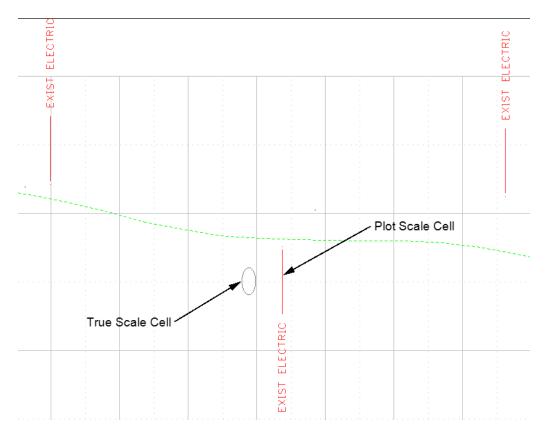


- 3. Verify the correct **Profile Set** is selected in the **Update Profile** dialog box.
- 4. **<D>** the **Crossing Features** leaf.
- 5. For the *Mode*, select the **Display On** radio button.
- 6. From the *Surfaces* list box, select the surface name or names to display. Use the *Ctrl* or *Shift* keys when you want to select multiple Surface names.
- 7. **<R>** in the *Crossing Features* list box and choose **Select All** from the menu.

🕌 Update Profile				
Profile Set: SH 86 • • •	Mode: (© Refresh Surfaces:	Display On	Display Off	
Surface 	Name		Description	
Crossing Features	Default			
Projected Features	12345 existing ground		Existing Ground from mul	
	SH 86		Created from roadway de	
	Crossing Features:			
	Name	Style	Description	<u>+</u>
	T_Billboard Over 10ft	T_Billboard Over	r Billboard 10ft or More	
	T_Billboard Over 10		Ctrl+A	
	T_Billboard Under 1	Select All		
	T_Billboard Under 1	Select Non		
	T Dio Mollo	Invert Selec	ction	Ŧ
				Edit Style
				Filter
			Apply Close	Help

**Note:** The feature names that are black are Feature Styles that can be displayed in profile. Any names that are dithered are not configured to be displayed in a profile view.

8. **<D> Apply**. The *Update Profile* dialog box will minimize as the features are generated in the profile. When the process has completed the dialog will reappear.



# Workflow IR 8 - Plan & Profile Generator

This document guides you through using the Plan and Profile Generator command in InRoads. The InRoads Plan and Profile Generator can be used for:

- Creating Roadway plan sheets depicting both plan and profile views on a single sheet.
- Full plan view sheets and double plan sheets (suitable for Roadway or Right-of-way plans).
- Full profile view sheets and double Profile Sheets.

# **Workflow Outline**

**Open Profile DGN File and Plan and Profile Generator** - When the Plan and Profile Generator command is executed, it creates the profiles for the sheets first. Therefore, the dgn file that will contain the profiles must be opened at the time the command is launched.

- Command Used: MicroStation File > Open Used to open a dgn file for editing.
- Drafting > Plan and Profile Generator This opens the dialog box use to generate plan sheets.

**User Input for Plan and Profile Generator** - This command requires a number of user inputs to obtain the desired results. These inputs are entered on various tabs within the Plan and Profile Generator dialog box. The inputs

- Global Scale Factor Used to set the InRoads text size. Set this before the command is executed.
  - Command Used: **Tools > Global Scale Factor** Used to set the size factor for text and cells.
- Main Tab This tab is used to set the Preference, alignment used, station extents, etc.
  - **Preferences** Used to set the basic settings for most of the tabs. This should be selected before any other settings are made.
  - Horizontal Alignment Used to define which alignment the plan and profile sheets will follow.
  - **Station Limits** Used to define where along the horizontal alignment the sheets are made and how long each sheet will be.
- Plan Controls Tab Used to specify the Reference Files used for the plan part of the sheet.
  - **Model Files** button Used to select reference files for the plan section of the sheets.
- **Profile Controls Tab** Used to set the profile preference, size, and data used.
  - **Profile Preference** This determines some of the basic profile settings, like vertical exaggeration.
  - Vertical Alignment Used to adjust the profile settings to accommodate the data.
  - **Corridor** Used to specify which corridor will be used for superelevation data.
  - **Surface** Used to specify which surfaces are displayed and which surface controls profile shifts.
  - **Profile Elevation Shifts** Used to specify where profile shifts occur.
- Sheet Layout Tab Used to specify the name for the plan sheets and identify the seed file used to create them.
  - Host File Used to specify the name for the plan sheets.
  - Seed Host File Used to specify the seed file used to create the plan sheets.
- **Border and Title Tab** Used to specify the sheet border cell to be used for the plan sheets.
  - **Cell > Name** Used to specify the sheet border cell to be used for the plan sheets.

- **Symbols and Details Tab** Used to specify two cells to be placed on each sheet.
  - North Arrow > Cell Name Used to specify the north arrow cell to be used on the plan sheets.
  - **Miscellaneous > Cell Name** Used to specify any other cell to be used on every plan sheet.

**Editing Sheet Definitions** - InRoads does not always create the sheets as the user desires. The following tabs are used to adjust the sheets.

- Main Tab This tab is used to adjust sheet extents and add additional reference files to sheets.
  - **Plan Views > Use Plan Views -** This toggle tells InRoads to use the defined plan view settings instead of recreating these settings based on the station limits.
  - Plan View List Used to select individual plan view definitions for editing.
- **Sheet InDex Tab** Used to navigate between plan sheets and to adjust the location of reference files.
  - Sheet Index List Used to select a plan sheet for display or editing.
  - Show Sheet Button Used to open the selected sheet in MicroStation.
  - **Regenerate Sheet Button** Used to recreate the selected sheet with data modified on the Main tab and the Sheet Index tab.
  - **Delete Sheet Button** Used to remove a sheet from the plan list.
  - **Sheet Views List** Use to select and edit the location of the Plan and Profile reference fiels.

# **Required Resources:**

Before you begin, a number of resources are required for this command.

*Horizontal Alignment* - Plan view limits are defined relative to a horizontal alignment (length and right/left offsets). Therefore, a project specific Geometry Project must be loaded into memory.

*Digital Terrain Models* - Profile view limits are determined by the vertical relief of profiled DTM's. At least one project specific DTM must be loaded into memory.

*Cells* - Cells are used to place the Drawings border and north arrows. The cell library General.cel must be attached for the Plan and Profile Generator to operate correctly.

Border Sheet - A Cell is used to generate the border sheet and is placed in each drawing created.

Source cell library:

#### $\label{eq:c:Program Files} Work space-CDOT \ Standards-Global \ MicroStation \ cells \ General. cells \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \ Control \$

#### Cell Placed: SHEET_Design-Sheet

*Scale* - Before the P&P command is run, the user needs to determine the final plot scale of the drawings being created. Current preferences exist for 20, 40, 50, 100, 200, and 500 scale plots. This is reflected on specific tabs within the command. See below for additional information.

Under **Tools > Options > Factors** the *Global Scale Factor* must be set to match the *Plan & Profile Generator* preference (horizontal scale) selected.

**Note:** If you are using ProjectWise, start InRoads and MicroStation from the Start Menu or desktop icon. This allows you to log in to the ProjectWise server through MicroStation establishing a link between the two programs so that file can be written directly to the ProjectWise server.

# **Dialog Settings:**

Project specific parameters need to be defined prior to command execution:

- Verification of Border Cell
- Location of MicroStation seed file
- Location for sheet output (project directory)
- Length along the alignment that will display in plan view
- Left and right offsets from a horizontal alignment for plan view display.

# **User Input:**

1. Select Drafting > Plan and Profile Generator...

By default, the dialog will populate with the CDOT preference (100 horizontal scale by 1x vertical exaggeration Plan & Profile sheet).

2. **<D> Preferences** if a different scale or full plan sheet or double plan sheet or full profile sheet is desired:

References	×
Name 100 Scale Full Profile 10x 100 Scale Full Profile 1x 100 Scale Full Profile 2x 100 Scale Full Profile 5x 100 Scale Full Profile 5x 100 Scale P&P (1x Vert) 100 Scale P&P (2x Vert) 100 Scale P&P (5x Vert)	Close Load Save Save As
	Delete Help

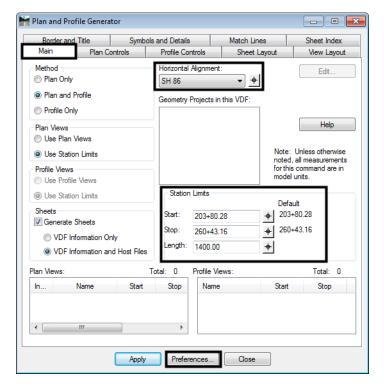
Developed Preferences are:

- ◆ **100 Scale Double Plan** 100 scale (plot factor) double plan sheet
- ◆ 100 Scale Full Plan Sheet 100 scale (plot factor) plan sheet
- ◆ 100 Scale Full Profile 10x 100 scale (plot factor) full sheet profile with 10 times vertical exaggeration applied
- ◆ 100 Scale Double Profile 10x 100 scale (plot factor) double profile sheet with 10 times vertical exaggeration applied
- ♦ 100 Scale Full Profile 1x 100 scale (plot factor) full sheet profile with 1 times vertical exaggeration applied
- ♦ 100 Scale Full Profile 2x 100 scale (plot factor) full sheet profile with 2 times vertical exaggeration applied
- ♦ 100 Scale P&P (1x Vert) 100 scale (plot factor) plan & profile with 1 times vertical exaggeration applied
- ♦ 100 Scale P&P (2x Vert) 100 scale (plot factor) plan & profile with 2 times vertical exaggeration applied

- 100 Scale P&P (5x Vert) 100 scale (plot factor) plan & profile with 5 times vertical exaggeration applied
- 100 Scale ROW Plan Sheet
- Replicas of the above for *20, 40, 50, 200,* and *500* scale as appropriate
- *Note:* There is a second copy of the preferences that are prefixed with a 'PW'. These use a ProjectWise sheet border. Once the file is saved then reopened, ProjectWise will fill in the title block information automatically.

# Main Tab

By default, the preference **CDOT 100 Scale P&P (1xVert)** will load & populate the dialog for generation of plan and profile sheets.



#### User input – Main Tab

Load the appropriate *Preference* (if necessary)

- 1. Select the *Horizontal Alignment* to be centered in the plan view
- 2. Define Start and Stop stations to define limits of sheet generation

3. *Length* defines the length along the alignment that will fit in a plan view. 1400 feet is the default for a 100 scale 11" x 17" plotted sheet. See graphic below.

	Medeured	1400'				
/ /	(14" in a 11	" x 17" plan	view at 100 so	cale>		
	5.8	M			y	
     •						

#### **Changing Scale**

A 50 scale plot will display 700 feet along the alignment in plan view, a 200 scale plot will display 2800 feet.

If something other than 100 scale is desired, the different scaled preferences are created to proportionally change the following:

- *Main* tab modifies *Length* along Alignment
- *Plan Controls* tab modifies *Width Left* and *Width Right* of reference line (alignment)
- ◆ **Profile Controls** tab modifies **Profile Height**
- *View Layout* tab modifies *Scale*
- ♦ Symbols and Details tab modifies Scale
- One item that is not set by the preferences and that needs to be set by the user is the overall InRoads scale which is set by selecting the command:
   Tools> Options> Factors or Tools > Global Scale Factor set Text, Cell, LineStyle to the

**Tools> Options> Factors** or **Tools > Global Scale Factor** – set **Text, Cell, LineStyle** to the desired plot scale

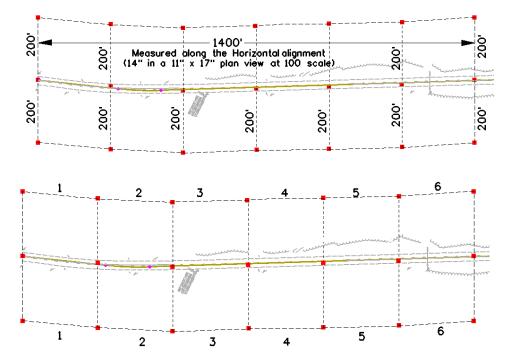
# **Plan Controls Tab**

1. **<D> Model Files** to pick the Drawing files (references) for display in plan view. These files can be located on ProjectWise or on the local hard drive.

🕈 Plan and Profile	Generator			
Border and Title		ols and Details	Match Lines	Sheet Index
Main	Plan Controls	Profile Controls	Sheet Layout	View Layout
Seed View Name:	STA			Model Files
Width Left:	-200.00	- <del>ф</del> -		
Width Right:	200.00	<del>.</del>		
Overlap:	0.00	<del>.</del>		Help
Boundary Chords:	6			neip
Force Rectangu Model Files:  pw:\\hqpwz01.dc  <	ot.state.co.us:Pwise	Production\Documents\	Train	

**Note:** Nested Attachments can be checked, but you will only be able to manipulate levels (on or off) through Level Display and not in the Level Manager. Also, you can switch to live nesting in the actual P&P sheets by changing the reference file attachment settings.

2. The inputs *Width Left* and *Width Right* define plan view limits perpendicular from the reference line (left is negative).



3. The *Boundary Chords* setting will create a clipping limit that will fit the extents of the upper plan window area. This reference file clipping edge should be considered a "first pass limit" and may have to be edited on curved portions of the corridor path in locations where the cut / fill limits extend outside this "calculated" clipping limit. This plan limit editing, along with any shifting of the plan window position, is accomplished on the **Sheet Index** tab after the sheets have been created.

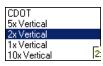
#### Model Files & Levels

The Model files selected (along with the profile generated) will be attached as reference files. The attached files will have the levels turned on that contain data. If additional data (levels) are added to the referenced files after the sheets are created, the user is required to turn on the appropriate levels through the use of the level display dialog box.

Additionally, the files referenced will have the design file 'CDOT Default' model attached. It is CDOT policy that only the model titled 'CDOT Default' should be used in any MicroStation file.

#### **Profile Controls Tab**

1. *Profile Preference* defines profile grid settings (ticks, annotation, grid/tick spacing etc.) as stored as a preference in **Evaluation > Profile >Generate Profile**.



2. Enter an appropriate profile *Set Name*. For better tracking and locating, this field will default to the name of the *Horizontal Alignment* from the *Main* tab.

- 3. Select the *Vertical Alignment* from the drop-down list. (This tells InRoads to create a profile window with an elevation range compatible with the vertical design.) The alignment specified determines window clearance (top/bottom profile grid clearance) and vertical profile shifts if necessary.
- 4. Check on (X) any *Surface* that you wish to display in the profile window as it is created (you can always display additional data after the profiles have been constructed).
- 5. Hold down the *CTRL* key and select any *Surface* that should be considered when establishing the elevation range position of the profile window. These selected surfaces can also affect the *Profile Elevation Shifts* locations.
- 6. Highlight the superelevation control lines that will be displayed in the profile from the *Super Control Lines* list box. The **All** and **None** buttons to the right of the *Super Control Lines* list box can be used to select or deselect all of the superelevation control lines.

Border an	J TAL	Comb	ala and Dataila	-	Match Lines	Sheet Index
Border an Main		ontrols	ols and Details Profile Controls		Sheet Layout	View Layout
Mairi	Fidnit	ontrois		' I	Sheet Layout	view Layout
Seed View Na Set Name: Profile Prefere Vertical Alignn Corridor:	nce: 10 nent: SH		Section Section Section	n1 HN n1 HN n1 LT	I Lines: //A_Lift1_Centerline //A_Lift1_Centerline _HMA_Lift1_Lanelii _HMA_Lift1_Laneli	-Tc All
Surface: Default 12345 ex SH 86	sting ground	<ul> <li>Shift</li> <li>Shift</li> <li>Shift</li> <li>Do N</li> <li>Note: High</li> </ul>	levation Shifts at Major Stations at Minor Stations Where Needed ot Shift ghlighted surfaces levation shifts.	Di Di	ertical Spacing Bottom to Bottom	Right to Left 2.00      Top to Bottom 0.00
Profile Height: Profiles per Co Margins Top: 125	olumn: 1	0.00 Bottom:	25.00	Ē	xample	
Left: 75.0	00	Right:	75.00			

*Note:* The Margin on the Top has additional space provided in case a superelevation diagram is shown in combination with the profile window.

From the InRoads help menu:

When a profile is shifted (vertically), the starting elevation will always be a multiple of the Spacing value for the ticks on the left axis in the *Create Profile* command. To set this parameter, go to the **Axes** tab on the *Create Profile* dialog box, set *Axis* to **Left**, set *Annotation* to **Ticks**, and key in the *Spacing* value in the *Major Ticks* group box. Therefore, if you get a message stating that the profile will not fit in the given profile height, you have two choices: (1) increase the profile height or (2) specify a smaller spacing value for the left axis.

#### **Sheet Layout Tab**

Border and Title	Symbols and Details	Match Lines	Sheet Index
Main Plar	Controls Profile Cont	rols Sheet Layout	View Layout
-	Name: 1	Host File Content	
Seed Host File: Station Sheet Location (a) Layout along Alignr (c) Round To Nearest (c) Alternate Plan and (c) Profile Sheet Fir First Sheet Location (N X: Y: Sheets per Column:	Degree   Profile st lodel Units) 0.00	All Sheets in One     Horizontal Spacing     Left to Left     Distance: 100.     Vertical Spacing     Bottom to Bottom     Distance: 100.	Top to Bottom
Clipping Boundary Level: Symbology: Unique Level for E Level Step:	SHEET_Clip-Boundary SHEET_Clip-Boundz sch Sheet 0	Example	

<D>... next to the *Host File* field to identify the path and initial sheet name for the new drawing set. The Host File refers to the new MicroStation plan and profile drawings that will be created by this tool. The last number, "1", will be automatically updated as each new sheet is created. This should be set to the project directory, i.e.: C:\Projects\12345\ Design\Drawings\12345DES PnP01.dgn.

*Note:* This can also be a path to a ProjectWise location.

- The Seed Host File is the 'prototype' file used to create the Host files. Verify the path is set to:C:\Workspace\Workspace-CDOT_V8i\Standards-Global\MicroStation\seed\3D-Seed_CDOT.dgn
- 3. The *Symbology* for the *Clipping Boundary* will be blank since the **Level** specified will determine the clipping boundary symbology.

#### **View Layout Tab**

1. This tab sets location (origin) for the profile and plan views relative to the border sheet. No user input is required in this dialog unless creating sheets at a scale other than 1"=100'

Border and	Title	Symbols	s and Details	Match Lines	Sheet Index
Main	Plan Co	ntrols	Profile Controls	Sheet Layout	View Layout
Views					
Number:		1			
Distance betw	iaan Diana:	<u> </u>			
		0.00			
Distance betw	een Profiles:	0.00			
Lanation (Dea					Help
Location (Pap	X	Y			
Plan: 1.75		8.50			
Profile: 1.75		1.75			
1.75		1.75			
cale: 1.00		= 100.00	_		
1.00		100.00			

- **Note:** The *Location* of the *Profile Y* position was determined by  $1.50^{\circ}$  of outside title block border plus 0.25" of clear space for the station text at that bottom of the profile window. (1.50+0.25 = 1.75)
- **Note:** The **Location** of the **Plan Y** position was determined by 1.50" of outside title block border plus 0.25" clear space for the station text below the profile window plus 4.5" of space required for 45' of profile elevation plus 0.25" of clear space above the profile window plus  $\frac{1}{2}$  of the remaining 4" width of the plan window. (1.50+0.25+4.50+0.25+2.00 = 8.50)

## **Border and Title Tab**

The only user input on this tab is to ensure the correct cell is specified for the border sheet and turn off the **User** *Text* if it is not used.

- 1. Cell Placed:
  - SHEET_PW_Design-Plan-Sheet
  - SHEET_Design-Sheet

Plan and Profi	le Generator			
Main	Plan Controls	Profile Controls	Sheet Layout	View Layout
Border and 1	Title Sym	bols and Details	Match Lines	Sheet Index
Border Cell		Reference File	Name:	Browse
Name:	SHEET_Design-{	Sheet Size:	B (11 x 17) -	
0	vel for Each Sheet	Custom Width:	16.00	Help
O Unique L	evel for Each Sheet			
Sheet Level:	1	Title Block Dat	a File Name:	
Level Step:	1		Edit	
Scale:	100.0000			
Symbology: Object Date Time	Nar	me	Location in Paper Un X: 15.74 Y: 0.87	its:
User Text 1 User Text 2 User Text 3			User Text: enter the code	
User Text 3 User Text 4 User Text 5			Station Format:	~
•	m	•	Use Sheet Level	
	Арр	ly Preferences	Close	

**Note:** Use the *SHEET_PW_Design-Plan-Sheet* with projects located on ProjectWise. Use *SHEET_Design-Sheet* with projects stored on a local computer.

#### Symbols and Details Tab

The **North Arrow** cell is preset on this tab. The **ProjectWise Title Block** area is not used because the ProjectWise tags are imbedded in the sheet border cell. The **Miscellaneous** area can be used to place another cell in the sheet. To use the Miscellaneous area:

- 1. Toggle on *Attach*.
- 2. Select the desired *Cell Name*.
- 3. Toggle on Retain Cell Levels for Each Sheet.
- 4. Key in the desired *Scale*.

5. Key in the **X** and **Y** values for the *Location in Paper Units*.

Main	Plan Contr		Profile Controls		Sheet Layout	View Layout
Border an	nd Title	Symbols a	nd Details		Match Lines	Sheet Index
North Arrow			Miscellaneo	us		
Attach			🗸 Attach			
Cell Name:	SHEET_North	n-Arrow 🔻	Cell Name:	SHE	ET_Call811-Sta 🔻	
Retain C	ell Levels for Ead	h Sheet	Retain C	ell Leve	els for Each Sheet	
Ouse She	et Level		O Use She	et Leve	ł	Help
Same Le	vel for Each She	et	Same Le	vel for	Each Sheet	
Level:	1		Level:	1		]
Scale:	100.0000		Scale:	100	0000	
Location in	Paper Units		Location in I	Paper L	Inits	
X:	15.00		X:	1.75		
Y:	9.50		Y:	9.25	j	
ProjectWise	Title Block					
Attach			Level:	1		]
Cell Name:	Advisory-Rad	io 👻	Scale:	10.0	000	
Retain C	ell Levels for Ead	h Sheet	Location in I	Paper L	Jnits	
Ose She	et Level		X:	32.0	0	]
Same Le	vel for Each She	et	Y:	20.0	0	j

- **Note:** The **North Arrow** position is specified by the *Location in Paper Units* input and is set to the upper right corner of the sheet. This is a rough placement and will likely have to be moved for clarity and conflicts on many sheets. Once the sheets are constructed each sheet should be checked for optimum cell position.
- *Note:* The **North Arrow** and matchline information are not being placed on the correct level. A workflow document has been created to assist you in moving the **North Arrow** and matchline information to the correct level through a batch process. If these elements are not moved to the correct level, they will not plot. InRoads places these elements on a no plot level. See the *CDOT Batch Processing* workflow document for more information on this process.

## **Match Lines Tab**

1. No user input is required in this dialog.

Main	Plan Co	ntrols	Profile Control	s	Sheet Layout	View Layout
Border and	Title	Symbol	ls and Details		Match Lines	Sheet Index
ymbology:					Extend	Help
Object		Name		Â	To Clipping	Boundary
✓ Plan Line ✓ Plan Start ✓ Plan Stop ✓ Plan Prev	Station Sheet		_Match-Line _Match-Line	BYL BYL BYL =	Distance fro     Distance Left:     Distance Right:	0.00
Plan Next	011001					
	t Station	III		□ □ -	Station Format: ss+ss.ss	vel

#### **Executing the Command**

The workflow process for this command follows the sequence:

- 1. New profiles are generated for referencing to individual sheets.
- 2. Plan view reference limits are established.
- 3. New drawing files are created based on the host file name.
- 4. Each new drawing file has 3 items generated (Sheet Border, North Arrow, and one user specified cell).
- 5. Plan views or Plan and Profile views.
- 6. Profile views.
- 7. Border sheet placed as a cell in each generated drawing.
- 8. North arrows are placed in all sheets.
- 9. The Plan and Profile dialog (sheet index tab) will populate with sheets created and sheet limits.

**Note:** Because new profiles will be generated, you should execute the command in a drawing specific for this use. For example:

C:\Projects\12345\Design\Drawings\Reference_Files\12345DES_Prof.dgn

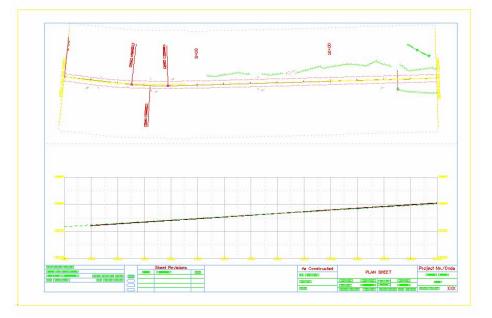
## **Sheet Index Tab**

1. Nothing is required by the user on this tab prior to Plan & Profile sheet creation.

Main	Plan (	Controls	Profile Controls	S	heet Layout	View Layout
Border	and Title	Sym	bols and Details	Mate	ch Lines	Sheet Index
/DF File Na	ame:				New	Open
Show She	eet					
Clipping B	oundary Mode	: 💿 Calcu	ılate 💿 Use Existin	ng		Save
Sheet Index	x:					Save As
Sheet	Sheet Name		Host File	Sheet	Rotation	Help
1 1	1	C:\Projects	s\12345\Design\Drawi	ngs 105^0	0'00''	Create Plot Set
	2	-	s\12345\Design\Drawi	-		
3 3	3	C:\Projects	s\12345\Design\Drawi	nge 100^0	0'00''	
		-	-	-		
	4	C:\Projects	s\12345\Design\Drawi	ings 91^0(	00''	All
	4 5	C:\Projects	-	ings 91^0(	00''	All
	5	C:\Projects C:\Projects	s\12345\Design\Drawi s\12345\Design\Drawi	ings 91^00 ings 101^0	0'00''	
5 5	5 Delete She	C:\Projects C:\Projects	s\12345\Design\Drawi s\12345\Design\Drawi	ings 91^0(	0'00''	
5 8	5 Delete She	C:\Projects C:\Projects	s\12345\Design\Drawi s\12345\Design\Drawi	ings 91^00 ings 101^0	0'00''	
5 5 Sheet View	5 Delete She	C:\Projects C:\Projects	s\12345\Design\Drawi s\12345\Design\Drawi generate Sheet	ings 91^00 ings 101^0	0'00'' 0'00'' et	None
5 5 Sheet View Sheet	5 Delete She vs: View Ty	C:\Projects C:\Projects eet Re ype S	s\12345\Design\Drawi s\12345\Design\Drawi generate Sheet	ings 91^00 ings 101^0	0'00" 0'00" et Anchor X	None Anchor Y
5 5 Sheet View Sheet 1	5 Delete She rs: View Ty Plan	C:\Projects C:\Projects eet Re ype S	s\12345\Design\Drawi s\12345\Design\Drawi generate Sheet View Name TA 203+80.28	ings 91^00 ings 101^0	0'00'' 0'00'' et Anchor X 1.75	None Anchor Y 8.50
5 5 Sheet View Sheet 1	5 Delete She rs: View Ty Plan	C:\Projects C:\Projects eet Re ype S	s\12345\Design\Drawi s\12345\Design\Drawi generate Sheet View Name TA 203+80.28	ings 91^00 ings 101^0	0'00'' 0'00'' et Anchor X 1.75	None Anchor Y 8.50
5 5 Sheet View Sheet 1	5 Delete She rs: View Ty Plan	C:\Projects C:\Projects eet Re ype S	s\12345\Design\Drawi s\12345\Design\Drawi generate Sheet View Name TA 203+80.28	ings 91^00 ings 101^0	0'00'' 0'00'' et Anchor X 1.75	None Anchor Y 8.50
5 5 Sheet View Sheet 1	5 Delete She rs: View Ty Plan	C:\Projects C:\Projects eet Re ype S	s\12345\Design\Drawi s\12345\Design\Drawi generate Sheet View Name TA 203+80.28	ings 91^00 ings 101^0	0'00'' 0'00'' et Anchor X 1.75	None Anchor Y 8.50

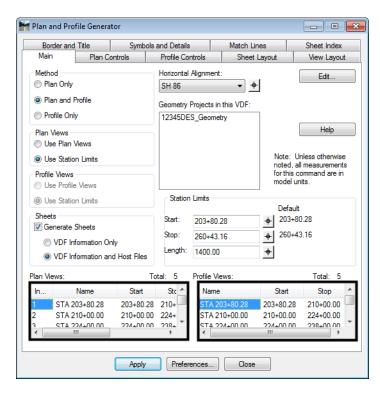
- 2. After the *Plan and Profile Generator* has been run, each sheet should be reviewed for:
  - North Arrow position and Miscellaneous Cell. (Manually move the Cell if necessary).
  - Plan view Clipping limits (Using MicroStation Modify, edit the clipping shape). This level is set to be on a no plot level.
  - Plan View Position (Select the sheet on the *Sheet Index* tab, modify the anchors as necessary, and *Regenerate Sheet* to reconstruct).
- Save a project specific View Definition File (VDF) so that sheet definitions can be recalled and modified if necessary. This file should be saved to your InRoads project folder location, not within the CDOT Workspace.

4. By highlighting a specific sheet and **<D> Show Sheet**, MicroStation will open the selected drawing.

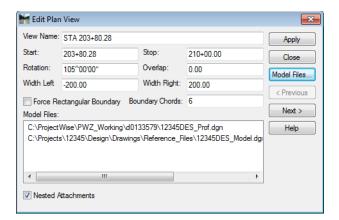


## Main Tab

1. Once the command has been run the *Geometry Projects in this VDF*, *Plan View* and *Profile View* list boxes are updated.



2. **<D> <D>** on a Plan or Profile View in the list to open an *Edit* dialog box. Sheet limits can be modified and reference files can be added or removed from this location.



**Note:** If you are using ProjectWise and you are going to regenerate the P and P sheets, you must first delete the sheets off of the ProjectWise server. InRoads cannot overwrite files on the ProjectWise server as it does with locally stored files.

## Workflow IR 9 - InRoads Place Note Command

This document guides you through using the InRoads Place Plan Note command, which places annotation based on a combination of manual input and information extracted from InRoads geometry, surfaces, profiles, or cross sections. A major benefit of using this command is generation of annotation based on the engineering model and the ability to automate updating the annotation if the engineering information changes.

## **Plan Notes**

#### **Setting Defaults**

- 1. Launch both MicroStation and InRoads with the CAD file that requires annotation. This document follows C:\Projects\12345\Design\Drawings\Reference_Files\12345DES_Model.dgn.
- From the InRoads menu, select File>Projects Defaults. Select the appropriate configuration name for the active project. If not already defined, the *Drafting Notes* field should be directed to: C:\Program Files\Workspace-CDOT\Standards-Global\InRoads\Notes\CDOT-Notes.dft.
- 3. **<D> Apply** and **Close**.

onfiguration Name:	12345 👻	Apply
Default Preferences		Close
Derdalt i fereferites		New
Preferences (* xin):	DOT_V8i\Standards-Global\InRoads\Preferences\CDOT_Civil.xin	Copy
Turnouts (*.txt):		Rename.
Drainage Structures (*.dat)	•	Delete
Rainfall Data (*.idf):		Browse
Bridge Sections (*.txt):		Import
Drafting Notes (*.dft):	C:\Workspace\Workspace-CDOT_V8\\Standards-Global\InRoads`	Export
Pay Items (*.mdb):		Help
Site Modeler Options (*.spf)	):	Holp
Default Directory Paths		
ProjectWise Directory:		
Project Default Directory:	C:\Projects\12345\Design\InRoads\	
Report Directory:		
Report Directory: Projects (*.rwk):		
	C:\Projects\12345\Design\InRoads\	
Projects (*.rwk):	C:\Projects\12345\Design\InRoads\ C:\Projects\12345\Design\InRoads\	
Projects (*.rwk): Surfaces (*.dtm):		
Projects (*.rwk): Surfaces (*.dtm): Geometry Projects (*.alg):	C:\Projects\12345\Design\InRoads\	
Projects (*.rwk): Surfaces (*.dtm): Geometry Projects (*.alg): Template Libraries (*.itl):	C:\Projects\12345\Design\InRoads\ C\Projects\12345\Design\InRoads\	
Projects (* rwk): Surfaces (* dtm): Geometry Projects (* alg): Template Libraries (* iti): Roadway Design (* ird):	C:\Projects\12345\Design\InRoads\ C\Projects\12345\Design\InRoads\	
Projects (*.rwk): Surfaces (*.dtm): Geometry Projects (*.alg): Template Libraries (*.itl): Roadway Design (*.ird): Survey Data (*.fwd):	C:\Projects\12345\Design\InRoads\ C\Projects\12345\Design\InRoads\	Style Sheets∖
Projects (*.rwk): Surfaces (*.dtm): Geometry Projects (*.alg): Template Libraries (*.itl): Roadway Design (*.ird): Survey Data (*.fwd): Drainage (*.sdb):	C:\Projects\12345\Design\InRoads\ C:\Projects\12345\Design\InRoads\ C:\Projects\12345\Design\InRoads\ C:\Projects\12345\Design\InRoads\ C:\Workspace\Workspace-CDOT_V8\Standards-Global\InRoads\XML	Style Sheets\
Projects (*.rwk): Surfaces (*.dtm): Geometry Projects (*.alg): Template Libraries (*.iti): Roadway Design (*.ird): Survey Data (*.fwd): Drainage (*.sdb): Style Sheet (*.xsl): Quantity Manager (*.mdb):	C:\Projects\12345\Design\InRoads\ C:\Projects\12345\Design\InRoads\ C:\Projects\12345\Design\InRoads\ C:\Projects\12345\Design\InRoads\ C:\Workspace\Workspace-CDOT_V&\Standards-Global\InRoads\XML	Style Sheets\
Projects (*.rwk): Surfaces (*.dtm): Geometry Projects (*.alg): Template Libraries (*.iti): Roadway Design (*.ird): Survey Data (*.fwd): Drainage (*.sdb): Style Sheet (*.xsl):	C:\Projects\12345\Design\InRoads\ C:\Projects\12345\Design\InRoads\ C:\Projects\12345\Design\InRoads\ C:\Projects\12345\Design\InRoads\ C:\Workspace\Workspace-CDOT_V&\Standards-Global\InRoads\XML	Style Sheets\

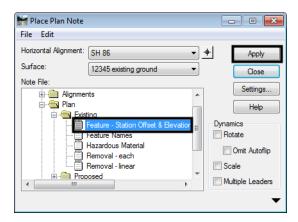
**Note:** Project specific DFT (drafting notes) files can be created and stored in the project directory structure. Creating this file will be discussed later in this document.

Open project related data files such as geometry projects and surfaces. If developed, choose the projects RWK file to open project related data. (File > Open). Select the appropriate project file and <D> OK.
 <D> Cancel to dismiss the *Open* dialog box.

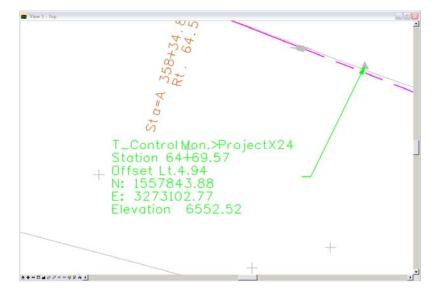
Open				? 🗙
Look in: 隘	InRoads	-	· 🗕 🕂	* 💷 *
<ul> <li>12345.rwk</li> <li>place note</li> </ul>				
File name:	place note.rwk			Open
Files of type:	Projects (*.rwk)		-	Cancel
				Help

#### **Placing Notes**

- 1. Select Drafting>Place Plan Notes.
- Expand the file tree structure (+) for Plan > Existing. Select Feature Station Offset & Elevation and <D> Apply.



3. **<D>** on any element, **<D>** to accept, move mouse to desired location, and **<D>** again to insert note into drawing.



**Note:** In order for InRoads to generate annotation extracted from a surface feature, that feature must be displayed in the CAD file using the **Surface > View Surface > Feature** command. If text fields appear empty (non quantitative) it is more than likely due to the feature's properties. Either a description is not provided or the element is not displayed as a feature in the design file.

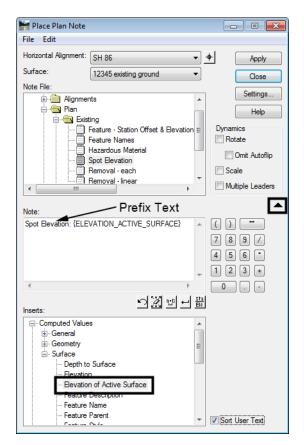
#### **Creating a Plan Note**

1. From the **Place Plan Note** dialog box, **<R>** in desired folder to insert note. Select **New > Note**.

🐂 Place Plan Note		- • ×
File Edit		
Horizontal Alignment: SH	86	Apply
Surface: 12	345 existing ground	▼ Close
Note File:	•	Settings
Existing	New 🕨	Folder
Feat Haza	Cut	Note
Rem	Paste	Scale
•	Delete	Multiple Leaders
	Rename	· · ·

- 2. Enter a name for the note (*Spot Elevation* for this example) and hit *Enter* to complete.
- 3. Expand dialog box using the downward arrow in the lower right of the dialog box. Use the keyboard to insert any prefix text (*Spot Elevation:* in this example) into the *Note:* field.

4. **<D> <D>** the desired computed values (**ELEVATION_ACTIVE_SURFACE** in this example) from the *Inserts:* list box

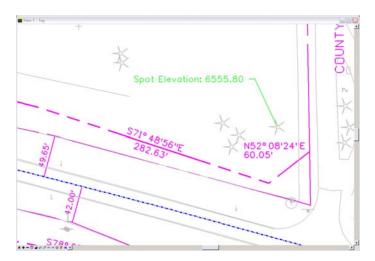


5. **<D> Settings**.

6. In the *Settings* dialog box, make the desired settings then **<D> OK**.

🕌 Settings		- • •
Placement Mode: Rotate By: Scale By: Format Station:	Data Point ▼ 10^00'00'' 1.0000	OK Cancel Help
Drop Equation Na Slope:     Display Absolute	ame 50%	
Named Symbology: Text: Frame: Leader: Delimiter:	InRoads_Misc1 InRoads_Misc1 InRoads_Misc1 InRoads_Misc1	
Frame Shape: Sides: Primary Radius: Secondary Radius:	None         ▼           5         0.00           0.00         0.00	Size Auto Fixed
Leader Type: Terminator: Cell:	2 Point ▼ None ▼	Attachment

- **Note:** To keep note settings for future use, save the DFT file in a project specific folder (**Projects\####\Project_Configuration**) by selecting **File>Save As** from the *Place Plan Note* dialog box. Saving to the CDOT workspace will not retain this information.
- 7. **<D> Apply** in the *Place Plan Note* dialog box. **<D>** at any location in the MicroStation view, **<D>** to accept, move mouse to desired location, and **<D>** again to insert note into drawing.



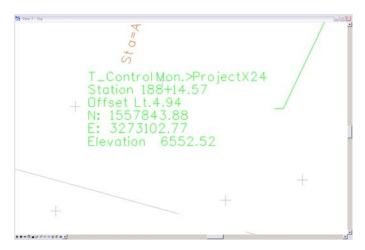
### **Updating Plan Notes**

If design information such as stationing, surface elevations or feature information changes, annotation placed with the *Place Note* command does not have to be deleted and regenerated. However, it does need to be updated. The following example shows the procedure assuming the stationing of an alignment has been modified.

1. Select Drafting > Update Plan Note. To update a single note, toggle Single From Graphic on. If multiple changes are desired, the *Update* modes All or Fence can be used. <D> Apply.

🔚 Update	Plan Note	
Note File:	al\InRoads\Notes\CDOT-Notes.dft	Apply
Update		Close
Fence		Preferences
Single	From Graphic	Help

2. **<D>** on note to update, **<D>** again to accept. The note will automatically be updated with new stationing information.



#### **Moving Notes**

- 1. Select **Drafting > Move Note.**
- 2. **<D>** on note to be moved; **<D>** to accept selection; **<D>** to choose new location.
  - **Note:** When using the **Drafting > Move Notes** command, the leader will stay associated with the original insertion point. Using the MicroStation **Move** command would reposition both the note and leader.

#### **Editing Notes**

1. From the MicroStation Drawing Task Tab, select Edit Text.



2. **<D>** on any note to edit the text in the *Text Editor*. **<D>** anywhere in MicroStation view to accept changes made to text.

*Note:* Editing text will disassociate values, disabling the automatic updates to text feature.

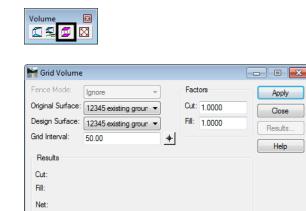
# Workflow IR 10 - Calculate Volume

This document guides you through three methods to calculate volume: Grid, Triangle, and End Area.

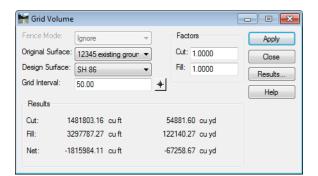
## **Calculating Grid Volumes**

Calculate the volume between the existing surface and the proposed surface using the grid volume method.

- 1. Select **Tools > Customize > [Toolbars]** and check on **Volume. <D> Close** to dismiss the *Customize* dialog.
- 2. Select the **Grid Volume** command.



- Select the desired **Original Surface**.
- Select the desired **Design Surface**.
- Enter the *Grid Interval*. Ideally, this should be equal to or a factor of the template drop interval or the interval at which data was collected.
- Set the desired the *Cut Factor* and *Fill Factor*.
- 3. **<D> Apply**.



4. Record the results.

If you would like an electronic copy of the Grid Volume:

5. **<D>** the **Results** button. This displays the Results dialog box with the volume data.

🗑 Grid Volume				
Fence Mode:	Ignore	-	Factors	Apply
Original Surface:	12345 existing grou	in 🔻	Cut: 1.0000	Close
Design Surface:	SH 86	•	Fill: 1.0000	Results
Grid Interval:	50.00	+		Help
Results				Пор
Cut: 14	481803.16 cu ft	į	54881.60 cu yd	
Fill: 32	297787.27 cu ft	12	22140.27 cu yd	
Net: -18	815984.11 cu ft	-(	67258.67 cu yd	

- 6. In the *Results* dialog box, **<D>** the **Save As** button.
- 7. Navigate to the desired folder, enter a *File name*, then **<D> Save** to create the report file.

Save As		(	x
Save in:	📔 Reports 💌	🧿 🎓 📂 🛄 <del>-</del>	
Recent Places	Hecent Items Desktop Vetwork Cubraries	Date modified Type search.	
Desktop	B Chris Ferree ↓ Computer ▲ Local Disk (C:) ↓ Projects		
Libraries	12345 Design Reports Drawings		
	BVD RW Drive (D:) 102_FUJI		
Computer	LifeCam Files     I''     I'' File name: SH 86 Grid Volume.txt	- Save	•
Network	Save as type: Text Files (*.bd)	Cance     Help	

- 8. **<D> Close** to dismiss the *Results* dialog box.
- 9. **<D> Close** to dismiss the *Grid Volume* command.

## **Calculating Triangle Volumes**

Calculate the volume between the existing surface and the proposed surface using the triangle volume method.

1. From the *Volumes* toolbar select the **Triangle Volume**.



🐂 Triangle Volum	e		
Mode: Surface Sets Original Surface: Design Surface:	Entire Surface    I2345 existing groun    SH 86	Cut Factor: 1.0000 Fill Factor: 1.0000	Apply Close Help
Original Surface	Design Surface	Cut Factor Fill Factor	
	Add	Change Delete	

- Set the *Mode* to Entire Surface.
- Select the desired *Original Surface*.
- Select the desired *Design Surface*.
- Set the *Cut Factor* and *Fill Factor* as required for the project.
- 2. **<D>** the **ADD** button.
- 3. **<D> Apply**.

This method will take longer to process than the grid method.

- 4. The results are displayed in the **Bentley Civil Report Browser** dialog box.
- 5. Use the **Triangle Volume.xls** template to review the report.

If you would like an electronic copy of the Triangle Volume:

- 6. Select **File > Save** from the menu bar.
- 7. Navigate to the desired folder, enter a *File name*, then **<D> Save** to create the report file.
- 8. **<D> Close** to dismiss the *Triangle Volume* command.

## **Calculating End-Area Volumes**

Calculate the volume between the existing surface and the proposed surface using the end-area volume method (CDOT standard method). With the first run, you will not take the subgrade into account.

In order to use this command, you must be in the design file where your final cross sections were cut.

1. Open the desired cross section design file.

2. From the **Cross Sections** dialog box, select the *End-Area Volumes* from the dialog box explorer.

Cross Section Set:       Mode:       @ Refresh       Display On       Display Off         SH 86       •       •       Statt:       203+80.28       Stop:       260+43.16         Create Cross Section       •       •       Surface       Type       Method         Image:       •       •       Surface       Type       Image:       Method         Image:       •       •       •       Surface       Type       Image:       Method       Image:       Image:       •       Compute Counce       Image:       Image:<	Cross Sections File		
Forced Balance     As Built     Annotation     Annotation     Consts YML Brack     Dist Mars Used Discourse	SH 86   Create Cross Section  Annotate Cross Section  Uodate Cross Section  Grad-Area Volumes  Compute Quantities  Unsuitable Materials by Feature  Unsuitable Materials by Station  Classifications  Compaction/Expansion	Start:         203+80.28         Stop:         260+43.           Surface         Type         ☑         12345 existing         Existing	Method Standard Correct for Curvature Limits Station Range Statt: 203+80.28
Create XML Report     Prot Mass Haul Diagram	Added Quantities Forced Balance As Built		Ignore Areas Smaller Than: 0.00

- 3. Select the desired Cross Section Set using the drop down menu.
  - **Note:** End area volumes are calculated based on the cross section graphics. If the selected set does not contain sections for the full length of the project, or the design toes fall outside the cross section grid, then the volumes will not be correct for the project.

4. Identify the surfaces to be compared from the Surfaces list. There must be one Existing type surface and one Design type surface.

File		
Cross Section Set: SH 86   Create Cross Section Annotate Cross Section Update Cross Section End-Area Volumes	Mode:       ● Refresh       Display On       ● Displa         Start:       203+80.28       Stop:       260+43.16         Surface       Type         ♥ 12345 existing       Existing         ♥ SH 86       Design	y Off Method ⊚ Standard © Correct for Curvature
		Limits Station Range Start: 203+80.28  Stop: 203+80.28
Forced Balance     As Buit     Annotation     Mass Haul Diagram	Imperial Units	Ignore Areas Smaller Than: 0.00
	Apply	Preferences Close Help

- 5. Set Imperial Units to Cubic Yards.
- 6. Toggle on Create XML Report.

ross Sections		
File		
Cross Section Set:	Mode:      Refresh      Display On      Di	16
Create Cross Section Annotate Cross Section Update Cross Section End-Area Volumes	Surface Type ♥ 12345 existing Existing ♥ SH 86 Design	Method Standard Correct for Curvature Limits Station Range Start: 203+80.28 • + Stop: 203+80.28 • +
	Imperial Units © Cubic Yards © Cubic Feet © Create XML Report	Ignore Areas Smaller Than: 0.00
L	Apply	Preferences Close Help

7. **<D> Apply**.

- 8. The *Bentley Civil Report Browser* appears. There are several report templates that are useful. Some recommended templates to look at are:
  - ♦ EndAreaVolume.xsl
  - EndAreaVolumePage Totals.xsl
  - ♦ Volumes.xls

The first two are standard end area volume reports. the Volume.xls also has the same volume data, but is formatted differently. It also contains volume information on the closed shape template components contained in the design surface.

If you would like an electronic copy of the End Area Volume:

- 9. Select **File > Save** from the menu bar.
- 1. Navigate to the desired folder, enter a *File name*, then **<D> Save** to create the report file.
- 2. Close the Bentley Civil Report Browser.

# Workflow IR 11 - Calculating Quantities With InRoads and Quantity Manager

This document guides you through the use of InRoads and Quantity Manager to calculate and extract quantities from InRoads data. The processes included in this document cover:

- Editing the Pay Item database to calculate quantities for materials that use the same pay item code but use different variables or formulas to compute the quantity
- Importing MicroStation graphic elements into a surface (DTM) so that they can be quantified
- Using the Shapes Tool to create surface features from closed areas
- Using the Compute Quantities tool to calculate quantities and store the output to a database
- Working with Quantity Manager to input quantities that were not calculated and create various reports on the quantity data

## **CDOT Customizing the Pay Items Database**

When figuring quantities, it is possible that two or more features will use the same pay item code but require different values for some formula variables. For example, the same paving material may be used for both the roadway and driveways but the thickness of that material can vary. Pay Item Manager will be used to copy a pay item and edit that copy for use with different variables or formulas.

## Copying The CDOT Pay-Items.mdb:

Because the changes made to the pay items database will be unique to the project, a copy of the CDOT Pay-Items.mdb should be placed in the project directory.

#### Making The Copy

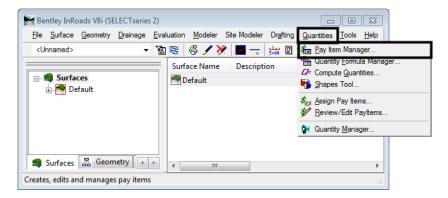
1. Open an Explore window to the C:**Program Files****Workspace-CDOT****Standards-Global****InRoads** directory and **Copy** the entire **CDOT Pay Items** folder.

- InRoads _ D × File Edit View Favorites Tools Help G Back 🔹 🕥 1 🔎 Search 🛛 😥 Folders 🛛 🛄 🔻 Addr C:\Program Files\Workspace-CDOT\Standards-Global\InRoad 🕶 🛃 Go Size Type Date Modified Fold CDOT P File Folder 9/6/2006 9:39 AM 🖃 🧰 Standards-Global 🖲 🧰 CFG Files File Folder 7/5/2006 4:18 PM Notes Open File Folder 7/5/2006 4:18 PM 😑 🚞 InRoads Search.. File Folder 7/10/2006 2:23 PM CDOT Pay Items Design Checks C Supere Sharing and Security. File Folder 7/5/2006 4:18 PM Templa File Folder 7/5/2006 4:18 PM XML St: Scan for Viruses. 7/5/2006 4:18 PM File Folder Preferences Guperelevation Tables
   Templates Send To 🗉 🚞 MicroStation 😂 InRoads _ 🗆 🛛 File Edit View Favorites Tools Help 🔇 Back 🔹 🕥 - 🎓 🔎 Search 📂 Folders ..... C:\Projects\13606\Design\InRoads 🖌 🔁 Go Folders Size Type Date Modified Name BTP Phase II Design Log.doo 21 KB Microsoft Word Doc... 8/23/2006 4:08 PM 🕀 🚞 i386 ~ 🗈 🫅 plotwork Decision Table Guardrail.txt 2 KB Text Document 8/23/2006 4:10 PM Decision Table.txt 2 KB Text Document 8/23/2006 4:10 PM 🗄 🚞 Program Files Design Schedule Jan 06.mpp 276 KB MPP File 8/23/2006 4:10 PM Projects 🗉 🧰 11111 🖃 🧰 13606 🗄 🧰 Bridge Construction
   Consultants View 🗉 🦳 Design Arrange Icons By Calculations Refresh Correspondence Customize This Folder 🗄 🧰 Drawings DinRoads Paste C Reports Undo Delete Ctrl+Z ⊕ Working
   ⊕ Hydraulics
   New Environmental Properties Materials Gentechnical Miscellaneous
- 2. Change the directory to C:\Projects\JPC#\Design\InRoads and Paste.

#### **Copying A Pay Item**

Now that a copy of the master database has been made, customizing the copy for the particular project can be accomplished.

- 1. Start InRoads (and MicroStation), opening the; C:\Projects\JPC#\Design\Working\XXXJPC#Quantity-Model##.dgn file.
- From the InRoads menu, select Quantities > Pay Item Manager. This displays the Pay Item Manager dialog box.



3. From the *Pay Item Manager* dialog box, select File > Open.

- 4. In the Open dialog box, Set the directory path to: C:\Projects\JPC#\Design\InRoads\CDOT Pay Items\.
- 5. Select CDOT Pay-Items.mdb and Open.

Pay Item Manager					_ 🗆 🗙
File Edit Help					
New	Name	Description	Unit Name	Formula	
		CDDT Pay Items -Items.mdb	<u> </u>	? 🗙	
	File <u>n</u> ame: Files of <u>type</u> :	CDOT_Pay-Items.mdb Access Files (*.mdb)		<u>O</u> pen Cancel <u>H</u> elp	

#### Locate The Pay Item To Be Copied

- 1. Select Edit > Find from the Pay Item Manager dialog box. This displays the Find dialog box.
- 2. In the **Find What** field of the *Find* dialog box, **key in** the desired *Pay Item Code*. And select **Find Next**. The desired pay item will be displayed, highlighted in the right pane of the *Pay Item Manager* dialog box.

Pay Item Manager			
File Edit Help Find ts\13606\Design\InRoad	Name 1401 Plant Mix Pavement	Description	Unit Name Formula
	403 Hot Mix Asphalt 405 Heating and Scarify 406 Cold Bituminous Pa		
	407 Prime Coat, Tack C     408 Joint and Crack Se     409 Seal Coat		
900 Added Item	410     411 Bituminous Material     412 Portland Cement Co		
	420 Geosynthetics		
	Find what: 403-326	21	Find Next
	<	<ul> <li>Name</li> <li>Code</li> </ul>	Help
		C Description	

3. Select **Close** from the *Find* dialog box.

#### Making The Copy

1. In the right pane of the *Pay Item Manager* window, *<***R***>* on the desired Pay Item Name. **Note:** be sure that the cursor is in the *Name* column. Select **Copy** from the menu that is displayed.

e Edit Help					
= 📋 C:\Projects\13606\Design\InR 💉	Name		Description	Unit Name	Form ^
- 📋 000 Design and Constructic	100 400 00C01		Hot Bituminous Pavement (Grading G) (50)	TON	TON
🗈 🧰 200 Earthwork	\$ 403-32621	er la	"of Bituminous Pavement (Grading G) (50) (PG 58-28.	TON	TON
🗄 🚊 300 Bases 🛛 📕	403-32631	Edit	Bituminous Pavement (Grading G) (50) (PG 58-34.	. TON	TON
😑 🧰 400 Pavements	8 403-32641	Сору	Bituminous Pavement (Grading G) (50) (PG 64-22.	TON	TON
401 Plant Mix Pavemer	8 403-32651		Bituminous Pavement (Grading G) (50) (PG 64-28.	TON	TON
403 Hot Mix Asphalt	<b>8</b> 403-32671	Delete	at Bituminous Pavement (Grading G) (50) (PG 76-28.		TON U
- in the string and Scarify	<b>8</b> 403-32701		Hot Bituminous Pavement (Grading G) (75)	TON	TON
	S 403-32721		Hot Bituminous Pavement (Grading G) (75) (PG 58-28.	TON	TON
407 Prime Coat, Tack C	<b>3</b> 403-32731		Hot Bituminous Pavement (Grading G) (75) (PG 58-34.		TON
400 Joint and Clack Se	<b>S</b> 403-32741		Hot Bituminous Pavement (Grading G) (75) (PG 64-22.		TON
	<b>3</b> 403-32751		Hot Bituminous Pavement (Grading G) (75) (PG 64-28.		TON
🛁 411 Bituminous Materia	<b>S</b> 403-32771		Hot Bituminous Pavement (Grading G) (75) (PG 76-28.		TON
412 Portland Cement Cu	<b>3</b> 403-32801		Hot Bituminous Pavement (Grading G) (100)	TON	TON
420 Geosynthetics	<b>S</b> 1403-32821		Hot Bituminous Pavement (Grading G) (100) (PG 58-2.	TON	TON
🛨 🧰 500 Structures	<b>3</b> 403-32831		Hot Bituminous Pavement (Grading G) (100) (PG 58-3.		TON
🗄 🫅 600 Miscellaneous Construc	<b>S</b> 403-32841		Hot Bituminous Pavement (Grading G) (100) (PG 64-2.		
	< 100 020 III		nor skalling al (nos) (na o nz.		>

2. Move the cursor to the *Description* column, **<R>** and select **Paste**. A copy of the pay item with (2) appended to the name is placed under the original.

#### Editing The Pay Item:

1. In the right pane of the *Pay Item Manager* window, *<D>* on the copied Pay Item Name.

**Note:** be sure that the cursor is in the Name column. This will highlight the copied Pay Item.

2. **<R>** on the Pay Item Name and select Edit. This displays the *Edit Pay Item* dialog box.

e Edit Help					
C:\Projects\13606\Design\InR 🔺	Name	Description		Unit Name	Form
000 Design and Constructic	403-32601	Hot Bituminous Pavemer	nt (Grading G) (50)	TON	TON
🗄 🧰 200 Earthwork	403-32621	Hot Bituminous Pavemer	nt (Grading G) (50) (PG 58-28	TON	TON
⊞	S 403-32 Edit	Hot Bituminous Pavemer	nt (Grading G) (50) (PG 58-28	TON	TON
	<b>5</b> 403-32	Hot Bituminous Pavemen	nt (Grading G) (50) (PG 58-34	TON	TON
102 Hat Min Apphalt	3 403-32 Copy	Hot Bituminous Pavemer	nt (Grading G) (50) (PG 64-22.	. TON	TON
A05 Heating and Scarify	6 403-321 Delete		nt (Grading G) (50) (PG 64-28		TON
ADE Cold Bituminous Pa	<b>35</b> 403-32L	Hot Bituminous Pavemer	nt (Grading G) (50) (PG 76-28.	TON	TON
407 Prime Coat, Tack C	🔊 4 🔊 4 🛣 Edit Pay Iten	1			
409 Seal Coat		403-32621 (2)		Apply	N
6 410 6 411 Bituminous Materia	S 4 Pay Item Code:	403-32621			
- 12 Portland Cement C	4 Description:	Hot Bituminous Paven	nent (Grading G) (50		N
- 🗎 420 Geosynthetics	5 4 Unit Name:	TON		Help	N
500 Structures	<b>S</b> 4	1			N
	3 4 Quantity Calculat	on	Deduct from Pay Item Pay Items:		NN
	Formula: TON	<b>•</b>			1 2
	Variables:		Pay Item De	duction 📗 🏪	
	Name	Value		*	
	Thickness	1.00			
	WeightCFT	150.00			
			-		
	Value: 0.00		Value: 0.00		
	Measurement				
	Mode: 📀 Pla	anarized	Apply Quantity Factor:	0.00	
	C Sk	ре	F Apply Rounding Factor:	0.00	1
			Round Up C F	Round Down	

3. **<D>** just to the left of the '(2)' in the *Pay Item Name* field. **Key in** a brief, descriptive addition to the name. **Delete** the '(2)'.

4. For Example, if pay item 403-32621 is to be laid down 6" thick, the name could read, 403-32621 – 6 Thick.

🛣 Edit Pay Ite	n	
Pay Item Name:	< 403-32621 - 6" Thick	oply
Pay Item Code:	403-32621	ose
Description:		elp
Unit Name:	TON	

- 5. Do not change the **Pay Item Code**, **Description**, or **Unit Name**. Doing so will result in errors in the pay quantity calculations.
- 6. A different formula may be selected from the Formula pull-down in the *Quantity Calculation* area.
- 7. For example, there are two formulas for computing tons; 'Ton' and 'Ton L'. 'Ton' uses the area of a feature and the variables Thickness and WeightCFT. 'Ton L' uses the length of the feature and the variables Width, Thickness, and WeightCFT.

🛣 Edit Pay Item	$\sim$
Pay Item Name: < 403-32621 6" Thick	
Pay Item Code: 403-32621	
Description: Hot Bituminous Paver	nent (Grading G) (50 Help
Unit Name: TON	
Quantit <u>u Calculation</u> Formula TON Variables: Name Value Thickness 1.00 WeightCFT 150.00	Deduct from Pay Item Pay Items: Pay Item Deduction 6
Value: 1.00	Value: 0.00
Measurement	
Mode: 💽 Planarized	Apply Quantity Factor: 0.00
C Slope	Apply Rounding Factor: 0.00
	Round Up C Round Down

#### **Editing Formula Variables**

1. **<D>** on the desired variable from the *Variables* list in the *Quantity Calculation* area.

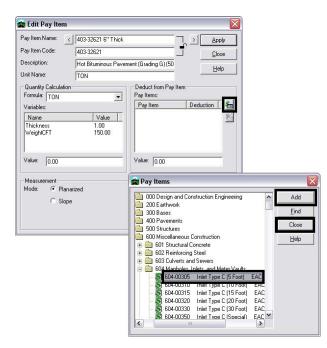
2. *Highlight* the data in the *Value* field directly below the *Variables* list and *key in* the desired value. Press the **Tab** key to accept the value.

Quantity Calculation Formula: TON	Deduct from Pay Item Pay Items:
Variables:	Pay Item Deduction 🔚
Name Value	1
Thickness 0.50	
weightern 150.00	
Value: 0.50	Value: 0.00

#### Deduction From Pay Items

This option is used when two features occupy the same location (are coincident) and one of those features can reduce the quantity of the other. For example, suppose a curb feature is stored as a continuous Breakline and inlet features are stored as random points on the curb Breakline. For each occurrence of an inlet on the curb, the quantity of the curb can be reduced by a defined value.

- To add a pay item for deduction <D> on the Pay Item Browser button. This displays the Pay Item browser dialog box.
- <D> on the desired pay item and select Add. The *Pay Item* is add to the *Deduct From Pay Items* list. <D> on the Close button to dismiss the *Pay Item* browser dialog box.



3. **<D>** on the desired pay item from the list in the **Deduct From Pay Items** area.

4. **Highlight** the data in the *Value* field directly below the *Pay Items* list and *key in* the desired value. Press the **Tab** key to accept the value.

-Quantity Calculation Formula: TON	Deduct from Pay Item Pay Items:
Variables:	Pavitem Deduction
Name Value	604-00305 5.00
Thickness 1.00 WeightCFT 150.00	
Value: 0.00	Value: 5.00

#### The Measurement Area

The options in this area are used to determine how areas and lines are measured. It is also used to specify quantity factors and rounding.

- 1. There are two mode of measurement; Planarized and Slope. Planarized projects the shape to a flat (2D) plane for measurement. Slope measures the actual (3D) shape.
- 2. **<D>** on the desired radio button to select the measurement **Mode**.

🛣 Edit Pay Item	
Pay Item Name: < 403-32621 6" Thick	
Pay Item Code: 403-32621	
Description: Hot Bituminous Pavem	ent (Grading G) (50
Unit Name: TON	
Quantity Calculation       Formula:     TON       Variables:	Deduct from Pay Item       Pay Items:       Pay Item       604-00305       5.00
Measurement Mode: Slope	Apply Quantity Factor: 0.00     Apply Rounding Factor: 0.00     Round Up C Round Down

- 3. A *Quantity Factor* is a multiplier applied to the calculated quantity.
- 4. If a *Quantity Factor* is to be used, **<D>** the check box to the left of **Apply Quantity Factor**.

5. **Highlight** the data in the field to the right of **Apply Quantity Factor** and *key in* the desired value. Press the **Tab** key to exit the field.



- 6. A *Rounding Factor* is used to modify the computed value to the nearest specified increment. There is also the option to round up or down.
- 7. If a *Rounding Factor* is to be used, **<D>** the check box to the left of **Apply Rounding Factor**.
- 8. **Highlight** the data in the field to the right of **Apply Rounding Factor** and *key in* the desired value. Press the **Tab** key to exit the field.
- 9. Select the desired rounding option from the two radio buttons below Apply Rounding Factor.

Measure	ement	
Mode:	Planarized	Apply Quantity Factor: 0.00
	C Slope	Apply Rounding Factor: 1.00
		Round Up     Round Down

- 10. **<D>** the **Apply** button to accept all of the changes made to the pay item.
- 11. **<D>** the **Close** button to dismiss the **Edit Pay Item** dialog box.

🛣 Edit Pay Item	
Pay Item Name: < 403-32621 6" Thick	
Pay Item Code: 403-32621	
Description: Hot Bituminous Paver	nent (Grading G) (50 Help
Unit Name: TON	
Quantity Calculation       Formula:     TON       Variables:     Value       Name     Value       Thickness     1.00       WeightCFT     150.00       Value:     0.00	Deduct from Pay Item       Pay Items:       Pay Item       604-00305       5.00       Value:       5.00
Measurement Mode:	Apply Quantity Factor: 0.00     Apply Rounding Factor: 1.00     Round Up C Round Down

12. This completes the edit.

le <u>E</u> dit <u>H</u> elp				
🖃 🧰 C:\Projects\13606\Design\InR 📉 [	Name	Description	Unit Name	Form
🛑 000 Design and Constructic	<b>3 403-32601</b>	Hot Bituminous Pavement (Grading G) (50)	TON	TON
🕀 🧰 200 Earthwork	8 403-32621	Hot Bituminous Pavement (Grading G) (50) (PG 58-28	TON	TON
🕀 🧰 300 Bases	8 403-32621 6" Thick	Hot Bituminous Pavement (Grading G) (50) (PG 58-28	TON	TON
E 1400 Pavements	403-32631	Hot Bituminous Pavement (Grading G) (50) (PG 58-34	TON	TON
- A01 Plant Mix Pavemer 403 Hot Mix Asphalt	403-32641	Hot Bituminous Pavement (Grading G) (50) (PG 64-22	TON	TON
403 Hot Mix Asphalt	403-32651	Hot Bituminous Pavement (Grading G) (50) (PG 64-28	TON	TON
405 Heating and Scally 406 Cold Bituminous Pa	<b>56</b> 403-32671	Hot Bituminous Pavement (Grading G) (50) (PG 76-28	TON	TON
- in 400 Cold Bitaminous Fe	<b>53</b> 403-32701	Hot Bituminous Pavement (Grading G) (75)	TON	TON
- A08 Joint and Crack Se	403-32721	Hot Bituminous Pavement (Grading G) (75) (PG 58-28	TON	TON
	403-32731	Hot Bituminous Pavement (Grading G) (75) (PG 58-34	TON	TON
410	403-32741	Hot Bituminous Pavement (Grading G) (75) (PG 64-22	TON	TON
- 🛅 411 Bituminous Materia	403-32751	Hot Bituminous Pavement (Grading G) (75) (PG 64-28	TON	TON
- 🛅 412 Portland Cement C	403-32771	Hot Bituminous Pavement (Grading G) (75) (PG 76-28	TON	TON
	8 403-32801	Hot Bituminous Pavement (Grading G) (100)	TON	TON
	8 403-32821	Hot Bituminous Pavement (Grading G) (100) (PG 58-2	TON	TON
🗉 🗄 📋 600 Miscellaneous Construc 🔽	8 403-32831	Hot Bituminous Pavement (Grading G) (100) (PG 58-3	TON	TON 🛛
	<			>

## **Importing Graphics To surface**

This command takes the X, Y, and Z coordinate information from a MicroStation element and stores it in a DTM file. This command will be primarily used for creating pay quantity data. Because of the high level of data control required, the *Load From Fence* option is inappropriate and will not be described.

#### **Creating Or Opening The Surface**

Data imported from graphics can be either loaded into a new or existing surface.

#### **Creating A Surface**

1. In the InRoads menu, **<D>** on the bottom **Surfaces** tab. **<R>** on the word '**Surfaces**' at the top of the left pane then select **New** from the menu.

🙀 Bentley InRoads V8i	(SELECTseries 2)				×
<u>File S</u> urface <u>G</u> eome	try <u>D</u> rainage <u>E</u> va	luation <u>M</u> odeler Sit	e Modeler Dr <u>a</u> fting	<u>Q</u> uantities <u>T</u> ools	<u>H</u> elp
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		Surface Name	Description	File Name	By W
Surfaces		Pefault			cferr
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÷ 1234	Open	SH 86	Created from r	C:\Projects\12	cferr
🗄 - 🍧 SH 8	Active				
	Close All				
	Empty All				
😂 Surfaces 🔠 Ge	eometry 🛛 🔹 🕨	<			Þ
ile 'C:\Projects\InRoa	ads\SH 86.dtm' Op	ened			

- 2. Set the *Type* to **Ignore**.
- 3. In the Name field of the New window, key in the desired name.
- 4. In the **Description** field, *key in* the desired description.

5. **<D>** the **Apply** button then **<D>** Close.

Geometry	/ Site Modele	er	
Туре:	Ignore	-	Apply
Name:	10000 Pay Q	uantity	Help
Description:	For Pay Quan	tity Features	
Maximum Length:	0.00		
Preference:	Default	•	
Name		Descriptio	n
Name Default 12345 existing gro	und		n ound from
Default	und	Existing Gr	

#### **Opening An Existing Surface**

1. In the InRoads menu, **<D>** on the bottom **Surfaces** tab. **<R>** on the word '**Surfaces**' at the top of the left pane then select **Open** from the menu.

🔛 B	entley InR	oads V8i (SE	ELECTserie	; 2)								×
_	e <u>S</u> urface Unnamed>	<u>G</u> eometry	<u>D</u> rainage	_		_		e Modeler			<u>T</u> ools	<u>H</u> elp
	- <b>Surfa</b> ⊪ <b>Surfa</b>	New	·		Surfa	ce Nam	e	Descript For Pay (	ion	File Name		By WI cferre cferre
	<b>⊕</b> <mark>≫</mark> 10	Oper Activ Clos	ve									
	Surfaces	몶 Geon	-	•	•	m	1					<b>∢</b> E.

- 2. In the **Open** dialog box, use the **Look In** pull down menu to select the desired directory path.
- 3. **<D>** on the desired file name.

4. **<D>** on the **Open** button, then **<D>** on the **Cancel** button to dismiss the **Open** dialog box.

Open			? 🔀
Look jn: 🗀	InRoads		* 💷 •
COOT Pay	Items Quantity,dtm		
File <u>n</u> ame:	13606 Pay Quantity.dtm		<u>O</u> pen
Files of type:	Surfaces (*.dtm)	•	Cancel
		-	<u>H</u> elp

#### Importing Graphic Data

1. In the InRoads menu, select File > Import > Surface. The Import Surface dialog box will be displayed.

Be	entley InRo	oads V8i (SE	LECTserie	s 2)					, .	<b>—</b>
File	<u>S</u> urface	<u>G</u> eometry	<u>D</u> rainage	<u>E</u> valuation	Modeler	Site Modeler	Dr <u>a</u> fting	<u>Q</u> uantities	<u>T</u> ools	<u>H</u> elp
	<u>N</u> ew						Ctrl+N	5		
	Open						Ctrl+O	le Name		By WI
_	<u>S</u> ave Save <u>A</u> s									cferre
	Close							•		cferre
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	Project Opt	tions						_		
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	Import							• 🚅 Surf	ace	
	Export								ace Adv	anced
	<u>T</u> ranslators	;						• 🚟 <u>G</u> eo	metry	
[r	1 C:\Projec	cts\12345\E	)esign\InRa	ads\SH 86.d	tm					ii

- 2. Using the **Surface** pull down menu, select the desired surface.
- 3. With the Load From pull down menu, select the desired method.

*Note:* If all of the elements on a particular level are to be imported, select Level.

- 4. If some elements on a level are to be imported and others are not, then select Single Element.
- 5. If Load From is set to Level, then with the Level pull down menu select the desired level. If Load From is set to Single Element this field is inactive.
- 6. In the **Seed Name** field, *key in* the desired name. This will be used to name the features imported from the graphic elements.

*Note:* this field may be populated if an existing surface is being used.

- 7. Use the Feature Style pull down menu to select the desired feature style.
- 8. Select the desired **Point Type** from the pull down menu. **Note:** when importing graphics for pay quantities, **Random** should be used for items paid for as each. **Breakline** is used for items whose quantity is figured from a linear measurement.
- 9. **<D>** the **Apply** button.

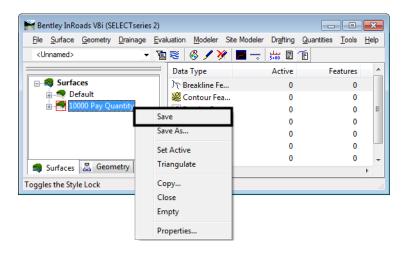
- a. If the Load From is set to Level, all elements on the selected level are imported.
- b. If Load From is set to Single Element, then <D> on the desired element. <D> a second time to **Accept** the selection.

Import Surface		
From Graphics ASCII DEM   IGRDS		
S <u>u</u> rface:	13606 Pay Quantity 🖃	Apply
Loa <u>d</u> From:	Level	
Level:	TOPO_ROADWAY_Sing 👻	
Ele <u>v</u> ations:	Use Element Elevations 👤	Filter
Intercept Surface:	Default 🚽	
<u>I</u> hin Surface		<u>R</u> esults
Toler <u>a</u> nce:	5.00	Preferences
		<u>H</u> elp
Features         Use Tagged Graphics Name         Seed Name:         Feature Style:         T_Traffic Singl Yellow Strip ▼         Point Type:         Maximum Segment Length:         0.00         Duplicate Names:         C Append C Replace         ✓ Exclude from Triangulation		
Close		

10. After all Levels and Elements are imported, **<D>** the **Close** button.

#### Saving The Surface

1. In the InRoads menu, <**R**> on the surface name in the left pane then select **Save** from the menu. If the file existed prior to importing data then the data is saved to that file and no further action is required.



- 2. If the file was new then the **Save As** dialog box will appear. Select the directory path using the **Save In** pull down menu.
- 3. In the File Name field, *key in* the desired name.
- 4. **<D>** on the **Save** button, then **<D>** on the **Cancel** button.

Save As			? 🗙
Save jn: 🗀	InRoads 🗾 🗲	🗈 💣	<b>.</b>
CDOT Pay 1 13606 Pay			
File <u>n</u> ame:	13606 Pay Quantity.dtm	⊒Г	<u>S</u> ave
Save as <u>t</u> ype:	Surfaces (*.dtm)	<u> </u>	Cancel <u>H</u> elp
<u>A</u> ctive:	13606 Pay Quantity	-	Options

# **Using The Shapes Tool**

The Shapes Tool is used to create dtm features that define an area. The advantage of this tool is that it does not affect the graphic elements used to create the features. So, some of the same elements used to define an area feature can also be used to define linear features as well.

# **Creating A Working DGN file:**

Because the *Shapes Tool* may require additional graphic elements to be added to the model file, or existing elements to be modified, a copy of this file should be used.

## Creating A Copy of the DGN File

1. Start InRoads (and MicroStation). Set the directory path and highlight the desired file. Select OK.

<u>File Directory H</u> elp		
Files:	Directories:	
13606DesignModel01.dgn	\Design\Drawings\Reference_Files\	3D - V8 DGN
19606_DR 258 dgn 13606_DR 273 dgn 13606_DR 288 dgn 13606_DR 288 dgn 13606ERC don 13606ERC don 13606E arthwork Quantities dgn 13606E arthwork Quantities dgn 13606EradingPlan1. dgn 13606EradingPlan3. dgn 13606EradingPlan3. dgn 13606EradingPlan3. dgn	C:\ C:\ C:N ISO6 C:Design C:Drawings C:Reference_Files D:BLM C:PDF	
List Files of <u>Type:</u> MicroStation DGN Files [*.dgn]		<u> </u>
<u>R</u> ead-Only     Show File Icons		Cancel
Workspace	Leer: [cferree] jeet: [11111] ace: [CD0T]	

2. Select **File > Save As** from the MicroStation Menu.

🔭 c	:\Proj	ects\136	06\Desig	gn\Dra•	wings\R	eference_F	iles\136	06Des	signModel01.d	gn, C
Eile	e <u>E</u> dit	Element	<u>S</u> ettings	<u>T</u> ools	<u>U</u> tilities	Wor <u>k</u> space	<u>Wi</u> ndow	<u>H</u> elp		
٦J	<u>N</u> ew								Ctrl+N	
∦≌	Open.								Ctrl+O	F
g -	<u>⊂</u> lose								Ctrl+W	
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[	Sa <u>v</u> e S	Settings							Ctrl+F	
	<u>R</u> efere	ence								

- 3. In the Save As dialog box, set the directory to the Working directory.
- 4. Key in the new name for the copied file and select OK. The copied file is now open in MicroStation.

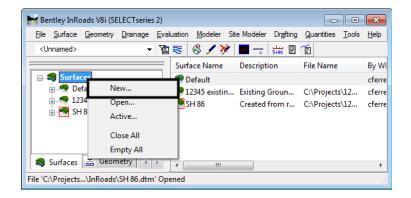
rectory		
les:	Directories:	
CDF13606QuantityModel01.dgn	C:\Projects\13606\Design\Working\	
DF13606QuantityModel01.dgn	C:\	
	🗁 13606	
	📂 Working	
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	Cance	el I

# **Preparations For Using The Shapes Tool:**

## Creating A surface For Quantity Data

The design DTM will contain a large number of features that will not be used for quantity calculation. Using this surface could produce unwanted or erroneous quantity data. To avoid this problem a surface will be created to contain only pay quantity data.

1. In the InRoads menu, **<D>** on the bottom **Surfaces** tab. **<R>** on the word '**Surfaces**' at the top of the left pane then select **New** from the menu.



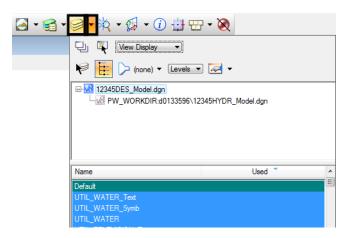
- 2. In the Name field of the New window, key in the desired name.
- 3. In the **Description** field, *key in* the desired description.
- 4. **<D>** the **Apply** button then **<D>** Close.

Surface Geomet Type:	Ignore	•	Apply
Name:	10000 Pay Qua	ntity Shapes	Help
Description:	For Pay Quantit	ty Features	
Maximum Length	0.00		
Preference:	Default	•	
Preference:	Default	▼ Description	1
Name Default			
Name			n antity Feat
Name Default			

## Setting The Level Display

- 1. The *Shapes Tool* works with all of the visible graphic elements. Therefore, it is necessary to turn off those levels that do not contain elements that will be used define the area feature.
- 2. Select the Level Display.

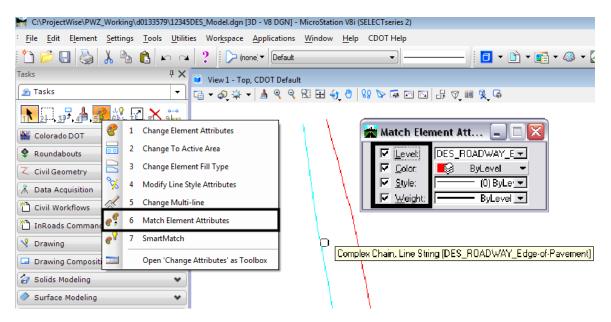
**Note:** if the down arrow next to the *Level Display* button is selected, the *Level Display* menu will be automatically dismissed when the cursor is moved off the menu.



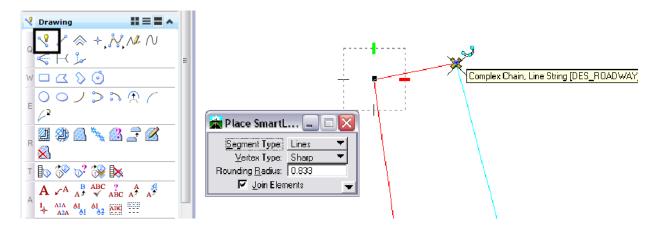
- 3. **<R>** on the desired level and select **Set Active** from the menu.
- 4. **<R>** on the *Level Display* and select **All Off** from the menu. This will leave only the desired elements displayed.

Name		Used 🔺
DES_REMOVALS		•
DES_ROADWAY_	Approach	• –
DES_ROADWAY_	Edge-of-Pavement	•
DES_ROADWAY	Lane-Line	•
DES_ROADWAY	Set <u>A</u> ctive	•
DES_ROADWAY	All 0-	ection •
DES_ROADWAY	All On	•
DES_ROADWAY	All Off	•
DES_ROADWAY	Invert Selection	•
DES_SURFACE_	Off By Element	•
DES_SURFACE_		•
DES_SURFACE_	All Except Element	•
DES_TEMP_DTN	Save Filter	•
DES_TEMP_InR ₁	20101100	•
DES_XSEC_Misc	Level <u>M</u> anager	•
ENVI_Brush-Laye	Duranaukina	•
GEN_MISC_1	Properties	•
GEN_QUANTITIE		•
GEN_QUANTITIE	S_2	• •

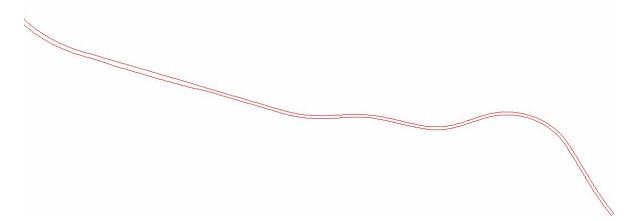
5. Use the **Match Element Attributes** command. Turn on all of the check boxes. **<D>** on the desired element to match its attributes.



- 6. Select the **Place Smartline** (or **Place Line**) command. <**T**> to the end of one of the elements that will form the area then <**D**>.
- 7. <**T**> to the end of the next element that will form the area then <**D**>.



8. Repeat this process until all of the gaps in the area are filled. Below is an example of a closed area.



## Creating The Area Feature

1. From the InRoads menu, select **Quantities > Shapes Tool**. The **Shapes Tool** dialog box will be displayed.

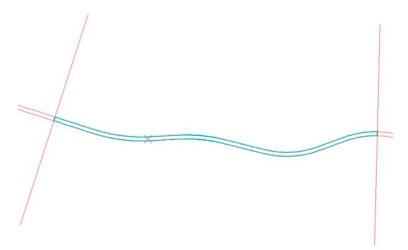
Bentley InRoads V8i (SELECTseries 2)		
<u>File</u> <u>Surface</u> <u>Geometry</u> <u>Drainage</u> <u>Ev</u>	valuation <u>M</u> odeler Site Modeler Dr <u>a</u> fting	Quantities Tools Help
	Surface Name   Surface Name   Description	♣ Pay Item Manager ♣ Quantity Formula Manager Q= Compute Quantities
□ <b>■ Surfaces</b> 	n Default	Shapes Tool
		Review/Edit Payltems
Surfaces 믎 Geometry ↔		Quantity Manager
Creates, edits, and manages quantity for	_	land and a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second seco

- 2. On the Shapes Tool dialog box, select Fill for the Shape entry.
- 3. Using the **Surface** pull down menu, select the surface created above.
- 4. In the Feature Name field, key in the desired feature name.
- 5. In the **Description** field, *key in* the desired text.
- 6. Using the Feature Style pull down menu, select the desired feature style.
- 7. Select Rename for the Duplicate Names setting.

🛣 Shapes Tool	_ 🗆 🖂
Shape: 💽 Fill O Union	Apply
Surface: 13606 Pay Quantity 💌	Close
Feature Name: 2"_HBP_Top_Mat +	- <u>H</u> elp
Description: (GR SX 100) PG 58-34	
Feature Style: D_HMA_Pvmt_(GR 💌	
Maximum Gap: 0.00	
Duplicate Names: 🔿 Replace 💽 Renam	e
✓ Use Dynamics	_
Exclude From Triangulation Limits	
<u>Station</u>	
Start: 0+00.00 +	-
Stop: 0+00.00	-

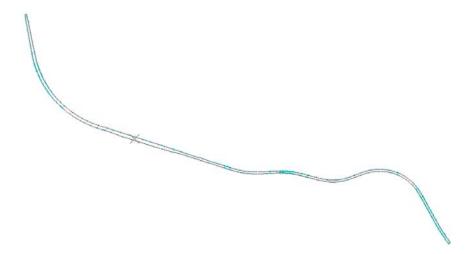
8. Toggle on Use Dynamics and Exclude From Triangulation.

- 9. In the *Limits* area, toggle Station on if desired. If used, *key in* the Start and Stop stations in their respective fields.
  - **Note:** If station limits are used, temporary lines extending perpendicular to the active alignment 1,000 feet in either direction will be placed at the Start and Stop stations. These will be used to define areas both inside and outside the station limits.



- 10. Select the **Apply** button.
- 11. Move the cursor inside the desired area. Closed areas will highlight as the cursor is moved through them.

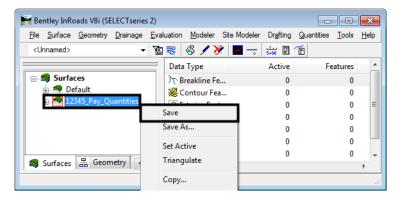
12. **<D>** inside the area to create the feature. **<D>** a second time to accept. If additional features are to be created using the same settings, these can be selected at this time. The first additional feature will have a '1' appended to its name. This will be incremented by 1 for each additional feature thereafter.



After the desired areas have been selected, **<R>** to re-display the *Shapes Tool* dialog box and then select **Close**.

## Saving The Surface

1. In the InRoads menu, <**R**> on the surface name in the left pane then select **Save** from the menu. If the file existed prior to importing data then the data is saved to that file and no further action is required.



- 2. If the file was new then the **Save As** dialog box will appear. Select the directory path using the **Save In** pull down menu.
- 3. In the File Name field, key in the desired name.

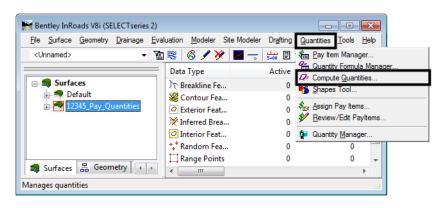
4. **<D>** on the **Save** button, then **<D>** on the **Cancel** button.

Save As	? 🔀
Save in: 🧀 InRoads 💽 🗲 🛍	r 🖬 🕶
CDOT Pay Items	
🖾 13606 Pay Quantity.dtm	
File <u>n</u> ame: 13606 Pay Quantity.dtm	<u>S</u> ave
Save as type: Surfaces (*,dtm)	Cancel
	Help
Active: 13606 Pay Quantity	Options

# **InRoads Compute Quantities**

The compute Quantities command collects pay quantity data from a DTM and stores it in a database to be used with Quantity Manager. This command requires a surface with pay items assigned to the features and a geometry project with a horizontal alignment.

1. From the InRoads menu, select **Quantities > Compute Quantities**. This will display the **Compute Quan***tities* dialog box.



2. Select the desired alignment using the **Alignment** pull down menu. Quantities will only be calculated for features within the station range of the specified alignment.

3. Using the **Mode** pull down menu, select either **All** or **Fence**. The **All** mode uses all features within the alignment, the **Fence** mode uses only those features that are within a defined fence.

🚰 Compute Quantities	
Main Payltems Features Sheet	
Alignment: SH 86	
Mode: All	Help
Include	
Pay Items:	
Features:   All  Selected	
Graphic Elements: (a) All (C) Selection Set	
Output Database:	
Mode:  O Create	
Phase: Design 👻	
Run:	
Deduction Tolerance: 5.00	
Sheet Number:	
Purge	
Symbology:	
Object Name	
Highlight Elements	
Apply Preferences Clo	se

4. In the Include area, <D> either the All or Selected radio button for Pay Items, Features, and Graphic Elements.

Compute Quantities	- C ×
Main Payltems Features Sheet	
Alignment: SH 86	•
Mode: All	▼ Help
Include Pay Items: <ul> <li>All</li> <li>Selected</li> </ul>	
Features:   All  Selected	
Graphic Elements:	Set
Output Database:	
Mode: O Create Append	
Phase: Design Run:	•
Deduction Tolerance: 5.00	
Sheet Number: Purge	
Symbology:	
Object Name Highlight Elements	
Apply Preferences	Close

- *Note:* If the Selected radio button is chosen, then the items to be processed must be identified on their respective tab. If the All radio button is selected all data of that type is processed and its tab is not used.
- 5. In the **Output** area, **<D>** on the browser button next to the **Database** field. This will display the **Browse** window.

🐂 Compute	Quantities	- • -
Main Payl	tems Features Sheet	
Alignment:	SH 86 💌	
Mode:	All	Help
Include Pay Items:	All     Selected	
Features:	All     Selected	
Graphic Ele	ements:   All	
Output Database:		
C:\Project	s\12345\Design\InRoads\12345 Pay Quna	tities.mdb
Mode:	Oreate Append	
Phase:	Design 👻	
Run:		
Deduct	on Tolerance: 5.00	
Sheet N	lumber:	
Purge		
Symbology:		
Object	Name It Elements	
	Apply Preferences Clo	se

- 6. Select the desired directory path from the **Save In** pull down menu.
- 7. In the File Name field, key in the desired filename or select an available one from those listed.
- 8. **<D>** on the **Save** button. This will dismiss the **Browse** window and fill in the **Database** field.

Browse	? 🔀
Save in 🔁 InRoads 📃 🖛 🔁 👩	* III *
CDOT Pay Items	
File name: 13606_Pay_Quantity	<u>S</u> ave
Save as type: Access Files (*.mdb)	Cancel
	Help

9. Select a **Mode**. Choose **Create** to make new file or to overwrite an existing file. Choose **Append** if adding additional data to an existing file.

Compute	Quantities	
Main Payl	tems Features Sheet	
Alignment:	SH 86 🗸	
Mode:	All	Help
Pay Items:	All     Selected	
Features:	All     Selected	
Graphic Ele	ements: () All () Selection Set	
Mode: Phase: Run:	s\12345\Design\InRoads\12345 Pay Quna Create Append Design  Tolerance: 5.00 Iumber:	tities.mdb
Symbology: Object	Name t Bements	
	Apply Preferences Clo	ose

- 10. Select a **Phase** from the combo box to the right. A new **Phase** can be created by *keying in* a name in the combo box. Phases are used to group quantities.
- 11. The **Run** field is another method of grouping quantities. If desired, *key in* a **Run** name in the field to the right.
- 12. <D> in the Deduction Tolerance check box to turn it on or off. The field to the right is used to define the distance at which features are considered coincident. *Key in* the desired value. For more information on pay item deductions see the "*Customizing The Pay Items Database*" workflow.
- 13. **<D>** in the **Sheet Number** check box to turn it on or off. When on, the field to the right is made active and a **Sheet Number** can be *keyed in*. This field is for informational purposes when quantities are tabulated on a per sheet basis.

14. **<D>** in the **Purge** check box to turn it on or off. When on, this option deletes pay quantities from the database if the feature used to calculate the quantity has been deleted from the DTM.

🕌 Compute	Quantities	
Main Payl	tems Features Sheet	
Alignment:	SH 86 🔹	
Mode:	All	Help
Include		
Pay Items:	All  Selected	
Features:	All     Selected	
Graphic Ele	ements: <ul> <li>All</li> <li>Selection Set</li> </ul>	
Output		
	s\12345\Design\InRoads\12345 Pay Qunatii	ties.mdb
Mode:	Create      Append	
Phase:	Design 👻	
Run:		
Deducti	on Tolerance: 5.00	
Sheet N	0.00	
Purge		
Symbology:		
Object	Name	
	t Elements	
	Apply Preferences Clos	e

15. The **Symbology** area is used to set the parameters for highlighting elements that quantities were computed for. **<D>** on the check box in the **Display** column to turn the highlight on or off.

## The Pay Items Tab

This tab is used if **Pay Items** in the **Include** area is set to **Selected**.

1. **<D>** on the **Pay Items** tab to bring it to the front.

2. Select the **Pay Items** to be computed by clicking in the check box to its left.

🔚 Com	ipute Quan	tities					- 0	×
Main	Payltems	Features	Sheet	1				
Pay Ite	ems:						Find	
	C:\Wo	orkspace\\	Vorkspa	ce-CDOT	V8i\Sta			
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		0 Structure						
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			00400	Guardrail				
			00405	Guardrail				
			00410	Guardrail		-		
4								
	A	pply	Prefer	ences	C	ose		

**Note:** All of the pay items in the list can be selected by selecting the 'Root' directory at the top of the list. If a Category is selected ('300 Bases' in the example above) then all of the items in that category and its sub-categories are selected. If a Sub-Category is selected ('603 Culverts and Sewers 'above) then all of the items in that sub-category are selected. Finally, individual pay items can be selected ('606-00350 Guardrail Type 3 above).

## The Features Tab

- 1. This tab is used if **Features** in the **Include** area is set to **Selected**.
- 2. **<D>** on the **Features** tab to bring it to the front.
- 3. In the **Surface** area, **<D>** on the desired surface. Multiple surfaces can be selected by holding the **Shift** or **Ctrl** key and then clicking on the desired surfaces.
- 4. In the **Features** area, **<D>** on the desired **Feature**. A consecutive range of features can be selected by holding the **Shift** key then clicking on the first and last feature in the range. A number of individual features can be selected by holding the **Ctrl** key then clicking on the desired features.

The Locator button can be used to identify features from the graphic elements displayed. The Ctrl key can be used with this option, however, the Shift key can not. To use it, <D> on the Locator button then <D> on the desired graphic element.

🕌 Compute Quant	ities			[	- • •
Main Payltems	Features	Sheet			
Surfaces:					Filter
Name		Descrip	tion		Help
Default					пер
12345_Pay_Quan	tities				
Features:					
Name	Style	Desc	ription		- <del>\$</del> -
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A	oply	Preference	s (	Close	

6. **<D>** the **Apply** button to calculate the quantities.

🖌 Compute	Quantities	
Main Payl	ems Features Sheet	
Alignment:	SH 86	-
Mode:	All	▼ Help
Include		
Pay Items:	Al O Sel	ected
Features:	Al O Sel	ected
Graphic Ele	ments: 💿 All 🛛 🔘 Sel	ection Set
Output Database:		
	12345\Design\InRoads\123	345 Pay Qunatities.mdb
Mode:	Create O Append	
Phase:	Design	•
Run:		
	on Tolerance: 5.00	
Sheet N	lumber:	
Symbology:		
Object	Name	
Highligh	t Elements	
	Apply Preferences	S Close

7. When processing is completed, a message stating that the *.mdb file has been created will appear in the lower left corner of the InRoads interface.

<u>F</u> ile	<u>S</u> urface	Geometry	<u>D</u> rainage	<u>E</u> val	uation	<u>M</u> odel	er Sit	e Modeler	Drafting	<u>Q</u> uantities	<u>T</u> ools	<u>H</u> elp			
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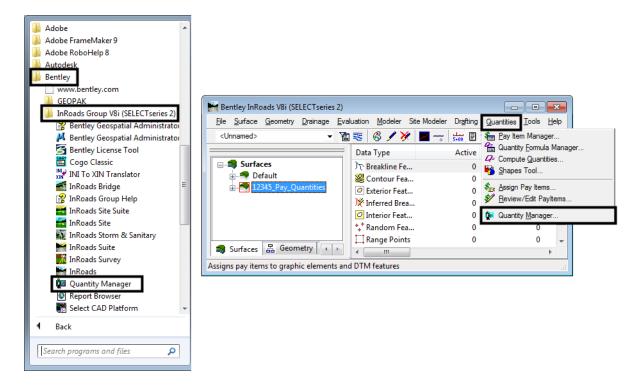
8. **<D>** the **Close** button to dismiss the **Compute Quantities** dialog box.

# Working With Quantity Manager

Quantity Manager is a "Stand Alone" interface with the pay quantity database created by the InRoads **Compute Quantities** command. It is used to update the database with quantities not computed by InRoads and to create reports on the quantity data.

#### **Opening Quantity Manager**

Quantity Manager can be started from the InRoads menu by selecting Quantities > Quantity Manager. It can also be started from the Start menu by selecting Start > All Programs > Bentley > InRoads Group V8i (SELECTseries 2) > Quantity Manager. MicroStation and InRoads do not have to be running for Quantity Manager to work.



2. Select **Project > Open**. This option is used to load the database created by the InRoads **Compute Quantifies** command. The *Connect to Database* window will appear.

💯 Quantity Manager	
Project Edit View Insert Tools Help	
🗋 New C 😅 Open	×
Close	
New Phase	
Import  Export	
Properties	
Preferences	
Exit	

- 3. Set the **Database** pull down to: **MS Access 2000**. This is the format used by the **Compute Quantities** command (SQL Server 2000 and Oracle formats can also be used by Quantity Manager).
- 4. In the **File** box, type in the directory path and file name of the desired file. The **Browse** button to the right of the field can be used to locate and select the desired file.
- 5. **<D>** the **Connect** button. (unless otherwise noted, the **User Name** and **Password** fields are left blank.) The database is now loaded into Quantity Manager and editing can begin.

Connect To D	atabase 🛛 🔀
Databas	se: MS Access 2000 💌
File:	45DES_Quantities.mdb
User Name:	43DE3_@dantities.indb
Password:	
	Connect

#### **Properties And Preferences**

Information about the project that is used by Trns*port is stored in the **Project Properties**. A data file that facilitates the manual entry of quantities is attached to through the **Project Preferences**. This information should be filled in after the project is opened the first time.

# **Properties Data**

1. Select **Project > Properties** from the menu bar.

Quantity Manager - C:\Projects\12345\Design\InRoads\1	2345DES_Q	uantities.m	ıdb
roject Edit View Insert Tools Help			
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Close	Payitem	Phase	
	04-05000	Design	_
New Phase	03-34731	Design	
Import	03-01425	Design	
Export	03-05042	Design	_
,	03-05042	Design	_
Properties	06-00350	Design	_
Preferences	06-00350	Design	_
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C:\Projects\12345\Design\InRoads\12345DES_Quantities.mdb	07-32200	Design	_
Exit	27-00005	Design	_

 In the Project Properties dialog box, fill in the desired information for: Project Number (JPC Code), Description (optional), Unit System, and Spec. Year. This information is used when creating a data file to be used with Trns*port. After the data is entered, <D> the OK button.

Project Properti	es 🛛 🛛
Project	
Project Informatio	n
Project Number:	12345
Description:	JS 40 Reconstruction
Unit System:	ENGLISH 🗸
Spec Year:	2007
	OK Cancel

## Preference Data

1. Select **Project > Preferences** from the menu bar.

🙀 Quantity Manager - C:\Projects\12345\Design\InRoads\12	345DES_Q	uantities.mdb
Project Edit View Insert Tools Help		
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😅 Open		
Close	Payitem	Phase
New Diverse	0405000	Design
New Phase	03-34731	Design
Import	03-01425	Design
Export	03-05042	Design
	03-05042	Design
Properties	06-00350	Design
Preferences	06-00350	Design
ONDestantes (22) (5) Destanting Destates (22) (5) DER. Output Man and h	07-32200	Design
C:\Projects\12345\Design\InRoads\12345DES_Quantities.mdb	07-32200	Design
Exit	27.00005	Design

From the Project Preferences dialog box, <D> the Browse icon for the Payitem field. Navigate to the C:\Projects\JPC#\Design\InRoads\CDOT Pay Items\ directory and select the CDOOT_Payitem_Reference_v33.xml file. <D> the Open button.

Project Prefer	ences	×			
ecXML Import	ble Adhoc Attribute E	۵			
Payer:	OK	Cancel			
	💯 Open				X
	Look in:	🗀 CDOT Pay It	ems	~	1
	My Recent Documents Desktop My Documents My Computer Wy Network My Network	File name: Files of type:	yttem_Reference_v33.xml CDOT_Payttem_Reference_v33.xml *.xml		Open Cancel

- **Note:** This file contains a searchable pay item code list that will allow users to select pay item data from the file instead of manually keying in the information.
- 3. **<D>** the **OK** button from the **Project Preferences** dialog box. This will dismiss the **Project Preferences** dialog box.

Project Preferences 🛛 🔀						
Enable Adhoc Attribute Editing						
aecXML Import Documents						
Payitem:	)T_PayItem_Reference_v33.xml					
Payer:	<u>Q</u>					
	OK Cancel					

4. The data stored in the pay quantity database is now displayed in the Quantity Manager window. The window is divided into three parts; the Pay Items Table, the Quantities Table, and the Elements Table. The Pay Items table is used to add, edit, and delete Pay Items and Categories within the database. It is also used to add additional quantities. The Quantities Table is used to add, edit, and delete specific quantities within the database. The Elements Table is for informational purposes only.

🖉 Quantity Manager - C:\Projects\12345\	Design\InRoa	ds\12345DF	S. Quantitie	s mdb						
Project Edit View Insert Tools Help	Designativo	0311231302	5_Quantitie	3.11100						
	🐀 Phase	: ALL PHASE	s [	•						
Payitem Tree Payitem Table	Category	Payitem	Phase	Chain	Net Value	Measurem	Remarks	Description	Extended	Computati
Caroot	root\600 Mi	606-00350	Design	SH52-H (SH5	400	Linear		606-00350	1	[ELEMENT
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<ul> <li>60:01125 42 Inch Reinforced</li> <li>60:05042 42 Inch Reinforced</li> <li>606 Guardrail</li> <li>606:00350 Guardrail Type 3 (Di</li> <li>607 Fonces</li> <li>627 Pavement Marking</li> <li>Pay Items Table</li> </ul>	G03-05042 42 linch Reinforced (     Gost 00500 Guardrail Type 3 (D)     Cost 00500 Guardrail Type 3 (D)     Cost 00507 Fences     G07 Fences     G07 Pavement Marking									
	<	111								3
	👮 Elemen	ts 🚿 Adhoc	Attributes	Payer Partic	ipation 🚺 🗭 F	unding Partic	ipation 🚯 F	unding Rules	]	
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		E	lement	s Table						
<	<						]			>

## The Pay Item Table

The majority of the work done in **Quantity Manager** will be accomplished through the **Pay Item Table**. It is used to add or delete categories and pay items and can also be used to add quantity data to new or existing pay items within the pay quantity database.

The **Pay Item Table** is broken down into two basic types of data; **Categories** and **Pay Items**. **Categories** (and **Sub-Categories**) are used to divide the pay item data up into manageable pieces. They work much like the folders in the project directory structure, with the pay items organized by the first three digits of the pay item code. **Sub-Categories** are used to further divide pay items.

The pay item contains data on each element that had a quantity calculated for it using its pay item code. It also contains quantity data that was added manually to the database.

The illustration below identifies Categories, Sub-Categories, and Pay Items within the Pay Item Table's tree view.

🛿 Quantity Manager - C:\Projects\12345\Design\InRoads\12345DES_Quantities.mdb								
Project Edit View Insert Tools Help	roject Edit View Insert Tools Help							
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Payitem Tree Payitem Table	Category	Payitem	Phase	Chain	Net Value	Measurem	Remarks	Di
root     Job Bases     Job Bases     Job Aggregate Base Course     Job Job Aggregate Base Course     Job Job Job Mark Asphalt     Job Job Mark Asphalt     Bob Miscellaneous Construction     Bob Okisellaneous Construction     Bob Goudratal     Do Goudratal     Go Courbers and Severs     Job Goudratal     Go 27 Powement Marking     Job 27 Powement Marking     Job 27-00005 Epoxy Pavement Marking     Job C27-00005 Epoxy Pavement Marking		Categor – Sub – Pay	-	жу				
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Information can be displayed within the **Pay Item Table** in two ways; the **Payitem Tree** and the **Payitem Table**. The **Payitem Tree** (illustrated above) shows only the **Category** and **Pay Item** names. The **Payitem Table** displays data specific to each pay item code used in the database. Below is an illustration of a sample **Payitem Table**:

Paylem Tree Paylem Table											
Category	Total Cost	Total Net	Payitem	Description	Unit	Unit Cost	Total Rounding	Lump Sum	Document	DEFAULT PAYER	DEFAULT FUNDING
root\300 Bases\304 Aggregate Base Course	0.0	12,085.161	304-05000	Aggregate B	TON	0	0		Í	C	0
root \ 400 Pavements \ 403 Hot Mix Asphalt	0.0	12,085.161	403-34731	Hot Bitumino	TON	0	0			0	0
root \ 600 Miscellaneous Construction \ 603 Culverts and Servers	0.0	120	603-01425	42 Inch Rein	LF	0	0			C	0
root \ 600 Miscellaneous Construction \ 603 Culverts and Seivers	0.0	2	603-05042	42 Inch Rein	EACH	0	0			C	0
root \ 600 Miscellaneous Construction \ 606 Guardrail	0.0	800	606-00350	Guardrail Ty	LF	0	0			C	0
root \ 600 Miscellaneous Construction \ 607 Fences	0.0	5,159.491	607-32200	Fence Wood	LF	0	0			0	0
root \600 Miscellaneous Construction \627 Pavement Marking \	0.0	41.107	627-00005	Epoxy Pave	GAL	0	0			0	0

Because the Payitem Tree is generally easier to work with, it will be used throughout this workflow.

#### **Displaying Pay Item Information**

1. Expand the **Pay Item Tree** to show the desired pay item. **<D>** on the desired pay item. The data for that pay item is displayed in the quantity table.



2. To show all of the items within a category or sub-category, **<D>** on the category in the pay item tree. All items within the category are displayed. In the example below, by selecting category 600, the pay items in subcategories 603,606,607,and 627 are displayed.

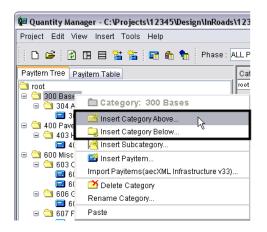
🕶 Quantity Manager - C:\Projects\12345\Design\InRoads	🛛 Quantity Manager - C: 🖓 rojects \1 2345 Design \InRoads \1 2345 DES_Quantities.mdb 📃 📃 🔀										
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Payitem Tree Payitem Table	Category	Payitem	Phase	Chain	Net Value	М	Description	Computa	tion Method	Measurement	Computed Value
Ca root	root1600 Mi	003-05042	esign	SH52-H (SH5	1	Each	003-05042	[ELEMEN1	COUNT=1	1	
🖃 🚞 300 Bases	root\600 Mi	603-05042	resign	SH52-H (SH5	1	Each	603-05042	[ELEMENT	COUNT=1	1	
E 🔄 304 Aggregate Base Course	reat1600 Mi	603-01-925	resign	SH52-H (SH5	120	Lin	603-01425	[ELEMENT	LENGTH=1.	120	10
304-05000 Aggregate Base Course (Class 5)	root1600 Mi	606-00350	esign	SH52-H (SH5	400	Lin	606-00350	(ELEMENT	LENGTH=4	400	4
B 🔄 400 Pavements	100t1600 Mi	606-00350	Pesign	SH52-H (SH5	400	Lin	605-00350	DELEMENT	LENGTH#4	400	
🗏 🔄 403 Hot Mix Asphalt	reat\600 Mi	607-32200	resign	SH52-H (SH5	2,435.515	Lin	607-32200	(ELEMENT	LENGTH=2.	2,435.516	2,435.5
403-34731 Hot Bituminous Pavement (Grading §	reot1600 Mi	607-32200	Pesign	SH52-H (SH5	2,723.976	Lin	607-32200	[ELEMENT	_LENGTH=2.	2,723.970	2,723.0
G00 Miscellaneous Construction	10-011600 Mi	627-00005	Hazign	SH52-H (SH5	10.27	Lin	627-00005 1	<b>ELEMENT</b>	_LENGTH=5.	6,765	10.3
G G 603 Culverts and Sewers	root1600 Mi	627-00005	resign	SH52-H (SH5	4.567	Lin	627-00005 1	<b>JELEMENT</b>	LENGTH-S.	5,754.007	4.5
603-01425 42 Inch Reinforced Concrete Pipe (C	reat \ 600 Mi	627-00005	resign	SH52-H (SH5	18.209	Lin	627-00006 1	[ELEMENT	_LENGTH=5.	6,764.013	18.2
603-05042 42 Inch Reinforced Concrete End Se	٤										
606-00350 Guardrail Type 3 (Double) (6-3 Post § 607 Fences	触 Elemen	ts 🔯 Adhoc	Attributes	Payer Partic	ipation 🚺 🚱 F	undir	g Participatio	n 😫 Fu	nding Rules		
607-32200 Fence Wood Snow	Туре	Name	Radius	Delta	Length	Dire	ction Nat	ive Id	Document	Begin X Be	egin Y Begi
<ul> <li>G27 Pavement Marking</li> <li>G26 627 Pavement Marking</li> <li>G27 00005 Epoxy Pavement Marking</li> <li>G27 00005 Epoxy Pavement Marking</li> </ul>		,	,		,						

3. Items from multiple categories can be displayed by holding the **Shift** or **Ctrl** key and selecting the desired categories or items.

🕼 Quantity Manager - C:\Projects\12345\Design\InRoads	I Quantity Manager - C: Projects/12345Design/InRoads/12345DES_Quantities.mdb									
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Payitem Tree Payitem Table	Category	Payitem	Phase	Chain	Net Value	М	Description	Computation Method	Measurement	Computed Value
C3 root	10-011600 Mi	603-05042	Design	SH52-H (SH5	1	Each	603-05042	[ELEMENT_COUNT=1	1	
😑 🗀 300 Bases	reat1600 Mi	603-060-42	Design	SH52-H (SH5	1	Each	603-05042	[ELEMENT_COUNT=1	1	
B 304 Aggregate Base Course	reot\300 Ba	304-05000	Design	SH52-H (SH5	12,085.101	Area	304-05000	(ELEMENT_AREA=101	101,135.479	12,085.10
304-05000 Aggregate Base Course (Class 5)	Not1400 Pa	403-34731	Design	SH52-H (SH5	12,005.161	Area	403-34731	[ELEMENT_AREA=161	161,135.479	12,005.16
= 1400 Pavements										
😑 🔁 403 Hot Mix Asphalt										
403-34731 Hot Bituminous Pavement (Grading §										
😑 🛄 600 Miscellaneous Construction										
🗏 🔁 603 Culverts and Sewers										
603-01425 42 Inch Reinforced Concrete Pipe (C										
603-05042 42 Inch Reinforced Concrete End Se										
😑 🛄 606 Guardrail	<									3

## Adding Data To The Database

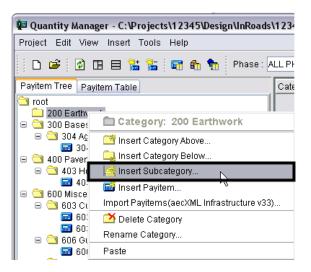
- 1. Quantities for earthwork and many lump sum items will not be included in the dtm and, therefore, not incorporated into the database by the **Compute Quantities** command. To include these additional **Categories**, **Sub-Categories**, and **Pay Items** may need to be added to the database.
- 2. To add a new category **<D>** on the category next in sequence to the one to be added.
- 3. Right Click and select Insert Category Above... or Insert Category Below... This displays the New Category Properties dialog box.



4. In the **New Category Properties** dialog box, *key in* the desired category name. Select **OK** to create the new category.

New Category Properties - Inserting Above: 30 🔀	🚇 Quantity Manager - C:\Projects\12345\Design\InRoads\
Category Name: 200 Earthwork	Project Edit View Insert Tools Help
OK Cancel	📄 🗅 🗃 😰 🖪 🖶 🔚 🔚 🖬 👘 🐂 Phase: A
	Payitem Tree Payitem Table
	😂 root
	200 Earthwork
	🖃 🔤 300 Bases 🛛 🚺
	🖃 🔤 304 Aggregate Base Course
	🔜 304-05000 Aggregate Base Course (Class 5)
	🗉 🔤 400 Pavements 👘 🚺
	🗉 🖂 403 Hot Mix Asphalt
	🔜 403-34731 Hot Bituminous Pavement (Grading 🗧
	🛛 🖃 🚞 600 Miscellaneous Construction

- 5. Note: A new category can not be placed above or below the **Root** category they must be placed as subcategories.
- 6. To add a new sub-category **<D>** on the category that will contain the new sub-category.
- 7. Right Click and select Insert Subcategory... This displays the *New Category Properties* dialog box.



8. In the **New Category Properties** dialog box, *key in* the desired category name. Select **OK** to create the new category.

New Category Properties - Inserting Subcatego 🔀	📲 Quantity Manager - C:\Projects\12345\Design\InRoads\
Category Name: 203 Excavation and Embankment	Project Edit View Insert Tools Help
	<ul> <li>200 Examinut</li> <li>203 Excavation and Embankment</li> <li>300 Bases</li> <li>304 Aggregate Base Course</li> <li>304-05000 Aggregate Base Course (Class 5)</li> <li>400 Pavements</li> <li>400 Add Hux Asphalt</li> <li>403 Hot Mix Asphalt</li> <li>600 Miscellaneous Construction</li> <li>603 Culverts and Sewers</li> <li>603-01425 42 Inch Reinforced Concrete Pipe (C</li> </ul>

- 9. To add a new pay item **<D>** on the pay item next in sequence to the one to be added (or **<D>** on the category the pay item is to be added to).
- 10. Right Click and select Insert Payitem Above... or Insert Payitem Below... (or Insert Payitem... if a category was selected above). The New Payitem Properties dialog box appears.
- 11. Select the Search icon next to the **Payitem Name** field. This displays the Select Payitem dialog box.

New Payitem P	roperties - Inserting in Category: 🔀
Payitem Name:	
Description:	
Unit Cost:	0.0 🗌 Lump Sum
Unit:	~
Total Rounding:	0.0
	OK Cancel

- 12. *Key in* the desired value in the **Payitem Filter**. This will greatly reduce the number of items that will have to be scrolled through.
- 13. **<D>** on the pay item to be used, then select the **Import** icon.

😰 Select Payitem 🔤							
🗹 Payitem Fil	Payitem Filter: 203						
Description Filter: *							
Payitem	Desc	ription					
203-00000	······································						
203-00010	Unclassified Excavation (Complete In Place)						
203-00012	Uncla	assified Excavation (Complete In Place) (Spec	1				
203-00040	Uncla	assified Excavation (Special)	]				
203-00060	Emba	ankment Material (Complete In Place)					
203-00061	Emba	ankment Material (Complete In Place)	]				
203-00062	Emba	ankment Material (Complete In Place) (Special)					
203-00100	Muck	Excavation	~				
Import							

14. The *Select Payitem* dialog box is dismissed and the *New Payitems Properties* dialog is populated with the selected data. Select the **OK** icon and the pay item is added to the **Pay Item Tree**.

New Payitem Properties - Inserting in Category: 🔀	🖗 Quantity Manager - C:\Projects\12345\Design\InRoads
Payitem Name: 203-00000	Project Edit View Insert Tools Help
Description: Unclassified Excavation	🗅 😅 😰 🖪 🖶 🕌 🔚 🖬 🏠 🖬 🖍
Unit Cost: 0.0	Payitem Tree Payitem Table
Unit CY	Troot
Total Rounding: 0.0	300 Bases     302 Carthwork     320 Earthwork     3203 Excavation and Embankment     3203 Concerning 203-00000 Unclassified Excavation
	<ul> <li></li></ul>

- 15. To add a **Quantity** to a pay item **<D>** on the pay item then **Right** Click.
- 16. From the **Right Click** menu select **Insert Quantity**... The *New Quantity Properties* dialog box is displayed.

🕮 Quantity Manager - C:\Projects\12	345\Design\InRoads\	12345DES_	Quantities.m	ndb
Project Edit View Insert Tools Hel	p			
D 📽   🕑 🗉 🖶 🔚 📼	🏤 🐀 🛛 Phase : A	LL PHASES	~	
Payitem Tree Payitem Table		Category	Payitem	Pha
Contemporal and the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the s				
🕀 🧰 400 Pavements	Payitem: 203	3-00000 Un	classified .	
⊕	🖼 Insert Payitem A	lbove		
	🔜 Insert Payitem E	Below		
	😰 Insert Quantity			
	🗾 Edit		.0	
	醚 Delete			
	Rename			
	Cut			
	Review Fund Partici	ipation		
	📑 Customize View	/		

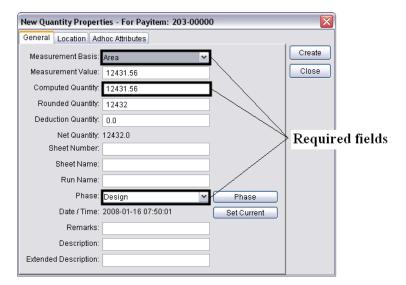
Only the **Measurement Basis**, **Computed Quantity**, and **Phase** are required fields. The others may be filled in as desired so that the data included with the manually entered quantity will match those of the ones imported from InRoads.

- 17. Select the desired Measurement Basis. This is how the feature would have been measured if there was one. There are three options; Area, Linear, and Each. Items measured by volume (Tons, Gallons, Cubic Yards, etc.) or area (Square Feet or Square Yards) should be set to Area. Those measured in Linear Feet or Linear Yards should be set to Linear. Items listed as Each or Lump Sum should use Each. Use the pull down menu to select the desired entry.
- 18. Select the desired **Measurement Value**. This equates to the area of a shape feature, the length of a line feature, and the number of points in a random feature. For a Lump Sum payitem this should be 1. This number is not used for any calculation. It is here to make this payitem record consistent with those imported from the DTM. *Key in* the desired value.

- 19. Key in the desired Computed Quantity. If a formula was utilized, this field is the result of the computation. Using a pavement quantity example, a formula computing tons from square feet could be utilized. In this case, the tonnage is the Computed Quantity. Entering data into this field auto-fills the Rounded Quantity with the same value. Key in the desired value.
- 20. *Key in* the desired **Rounded Quantity**. Some payitems use a **Rounding Factor** which is applied to the **Computed Quantity**. If the quantity being entered uses a rounding factor, change the number in this field to the rounded computed quantity. For example, concrete pipe is rounded to 2 foot increments. An 83 foot long pipe would be rounded to 84 feet. *Key in* the desired value.
- 21. Select the desired **Deduction Quantity**. The quantity of some payitems may be reduced by the presence of another payitem. While the payitem causing the reduction is not listed here, the amount of the reduction is. *Key in* the desired value.
- 22. *Key in* the desired **Sheet Number**. This is the name of the sheet upon which the quantities are located. This can be useful when computations are tabulated for individual sheets.
- 23. *Key in* the desired **Run Name**. This is a user-defined name. The run name is a grouping mechanism to permit segregation of quantities under the same payitem. It could be used to represent quantities of different stages or different alternatives.
- 24. Select the desired **Phase**. To assign the quantity to a particular phase.

*Note:* If this data is to be exported to Trns*port the **Phase** must be set to **Design**.

- 25. Key in the desired Remarks. Key-in field for remarks is limited to 256 characters.
- 26. Key in the desired **Description**. Key-in field for the Description is limited to 256 characters.
- 27. *Key in* the desired **Extended Description**. Key-in field for the Extended Descriptionis limited to 256 characters.



**Note:** It is not required to enter location data. However, this information may be used when generating some reports.

- 28. Select the **Location** tab. This tab is used to identify the location of the quantity in relation to an alignment.
- 29. Select the desired **Baseline Chain** from the pull down menu. This is the alignment to be measured from.
  - **Note:** Minimum and Maximum Stations are used to set a boundary around the quantity. The station numbers do not represent the beginning or end of a feature, but the lowest and highest station at which the quantity would occur. The same can be said about the offsets, they represent denote the furthest distance to the left and right of the alignment that the quantity occurs.
- 30. Key in the desired Minimum Station number.

*Note:* Station numbers should be computed as if there is no station equation.

- 31. Key in the desired Minimum Offset. Left of the alignment is negative, right of the alignment is positive.
- 32. Select the desired **Region**. This is used if the alignment has a station equation. This option is usually selected automatically when the station number is entered.
- 33. Key in the desired Maximum Station number.
- 34. Key in the desired Maximum Offset.

New Quantity Properties For Payitem: 203-00000	
General Location Adhoc Attributes	
Baseline Chain: SH52-H (SH52-H)	Create Close
Maximum Station Station: 13500.0 Region: 1	

35. Select the Create icon to complete the quantity.

#### **Editing Quantities**

*Note:* The quantity value of pay items imported from InRoads can not be changed in **Quantity Manager** only those entered manually can.

1. To edit a quantity, **<D>** on the quantity in the *Quantities Table*, then **Right** Click and select **Edit** from the menu.

elect Edit View Insert Tools Help										
🗅 🧀 🖻 🗏 🐮 🐮 🏠 🏷 Phase	ALL PHASES	Y								
yttem Tree Paytem Table	Category	Paytem	Phase	Chain	Net Value	M	Description	Computation Methor	Measurement	Computed Valu
root	rest1200 Ea	203-00000	DEFAULT P.	EH52.H (SH5	12,431.66	5 Ares		1	0 1	12.431
#      200 Bases     300 Earthwork     203 Excavation and Embankment								Payitem: 203-00	000-Computer	I Quantity: 12
							6	Insert		
203-00000 Unclassified Excavation								Edit		
400 Pavements								Delete %		
600 Miscellaneous Construction     603 Culverts and Servers							Ap	ply Funding Rule		
605 Controls and Sewers     606 Guardrail								Customize View		
😑 🛄 607 Fences							-			
607-32200 Fence Wood Snow © 627 Pavement Marking	e		- 25.)							
a bzr r arendes mansing										

2. This displays the *Edit Quantity Properties* dialog box. This dialog box is the same as the *New Quantity Properties* dialog box. The illustration on the left shows the fields that can be edited for a quantity imported from InRoads. The illustration on the right shows fields that can be edited for a quantity that is manually entered.

Edit Quantity Propert	ties - Payitem: 607-32200- Computed Quantity: 2	2723.9 🔀	Edit Quantity Properties - Payitem: 203-00000- Computed (	Quantity: 12431.56 🔀			
General Location Ac	Ihoc Attributes		General Location Adhoc Attributes				
Measurement Basis:	Linear	Update	Measurement Basis: Area	Update			
Measurement Value:	2723.976325507437	Close	Measurement Value: 0.0	Close			
Computed Quantity:	2723.9763255074		Computed Quantity: 12431.56				
Rounded Quantity:	2723.9763255074		Rounded Quantity: 12431.56				
Deduction Quantity:			Deduction Quantity: 0.0				
Net Quantity:	2723.9763255074		Net Quantity: 12431.56				
Sheet Number:			Sheet Number:				
Sheet Name:			Sheet Name:				
Run Name:			Run Name:				
Phase:	Design 💙 Phase		Phase: DEFAULT PHASE Pha	ase			
Date / Time:	2007-12-31 09:26:22 Set Current		Date / Time: 2008-01-16 08:55:17 Set C	urrent			
Remarks:			Remarks:				
Description:	607-32200		Description:				
Extended Description:			Extended Description:				

## **Creating A Report**

Reports are used to display the quantity data in a meaningful way.

- 1. Display the quantities to be reported on in the *Quantities Table*. This can be done by selecting pay items from the *Pay Item Table* (hold the Shift or Ctrl to select multiple pay items) or Select Edit > Select All.
- 2. Highlight the desired quantities in the *Quantities Table*.

Project Edit View Insert	Tools Help										
B Select All	🕻 🖀 💼 🏠 Phase:	ALL PHASES	~								
Payitem Delete	0	Category	Payitem	Phase	Chain	Net Value	M	Description	Computation Method	Measurement	Computed Va
E en et		root \ 300 Da	30405000	Design	SH52-H (SH5.	12,005.18	Area	30405000	ELEMENT_AREA+161.	101,135.479	12,005
Rename		reet \ 200 Ea	203-00000	DEFAULT P	SH52-H (SH5.,	12,431.50	Ana		a financia di serie a con O	0	12,43
	se Course	10411400 Pa	403-34731	Design	\$H52-H (\$H5	12,085.10	Area	403-34731	ELEMENT AREA- 101.	101,135.470	12,095
	gregate Base Course (Class 5)	10-011-000 Mi	603-01425	Design	SH52-H (SH5.	120	Lin_	603-01425	IELEMENT_LENOTH#1	120	
a Car 2 Punding		rost\000 Mi	603-060-12	Design	SH52-H (SH5		Each	603-060-42	[ELEMENT_COUNT=1	1	
a 203 Excavation and	d Embankment	root \ 000 Mi	803-05042	Design	SH52-H (SH5		Each	603-05042	[ELEMENT_COUNT=1		
203-00000 Un	classified Excavation	root \ 000 Mi	605-00350	Design	SH52-H (SH5	400	Lin	606-00350	IELEMENT_LENGTH#4	400	
400 Pavements 3403 Hot Mix Asphall		met\600 Mi	606-00360	Design	SH52-H (SH5.	400	Un	606.00350	ELEMENT_LENGTHed	400	
		reat1000 Mi	607-32200	Design	SH02-H (SH0	2,435.515	Lin	607-32200	ELEMENT_LENGTH-2	2,435.515	2,430
403-34731 Ho	t Bituminous Pavement (Grading 1	10411000 Mi	007-32200	Design	\$H52-H (\$H5	2,723.970	Lin	007-32200	IELEMENT_LENOTH=2	2,723.970	2.72
E GOO Miscellaneous Co		10-011-000 Mi	627-00005	Design	SH52-H (SH5	10.23	Lin_	827-00005 1	ELEMENT_LENOTHIS	5,755	3
E 3 603 Culverts and S		4		10.							>

- 3. Select **Tools > Reports > Create** to open the *Create Report* window.
- 4. Select the desired **Report Style** from the pull down menu. The **Style** name describes the type of information to be contained in the report.

5. *Key in* the directory path and filename for the **Report File Name**. The 'search' button can be used to select the directory path and filename if desired.

Some report styles use the **Starting Page Number** to automatically number the pages of the report. If this field is active, the desired page number can be keyed in.

6. The three buttons at the bottom of the window determine how the information will be stored. Select **Append** to add the data to an existing file.

*Note:* This button is not available if the report type is PDF.

7. Select **Create** to create a new file or overwrite an existing file. **Cancel** closes the Create Report window without processing any data. No report is created.

Create Report						
Active Phase: No Phase Selected						
Report Style: Trns*prt PES Worksheet ( 💌						
Repost Type: CSV						
Report File Name: NnRoads\12345_Trnsport.csv 🛛 🕰						
Starting Page Number: 1						
Append	Create	Cancel				

# Workflow IR 12 - Exporting Fieldbook Files

This document guides you through saving survey fieldbook information to separate MicroStation files for ease of referencing and level control.

# **Exporting a Fieldbook File**

# Creating a new file

- 1. From the MicroStation pull-down menu select **File > New**. The **New** dialog will appear.
- 2. *Navigate* to the project directory folder **ROW_Survey\Drawings***Reference_Files.*
- 3. At the bottom of the dialog box verify that the seed file is set to *3D-Seed_CDOT.dgn*.

	Reference_F	163	- 🕝 🦻 📂 🛄-		8	*	
æ	Name	*	Date modified	Туре	Size		
	# 12345ROW	Model.dgn	11/20/2007 7:49 AM	MicroStation V8 X	37 KB		
ecent Places	🖊 12345SURV	Contour100.dgn	11/26/2007 2:35 PM	MicroStation V8 X	5,015 KB		
	🖊 12345SURV_	Model.dgn	11/20/2007 7:49 AM	MicroStation V8 X	36 KB		
	🖊 12345SURV_	Topo_Scale100.dgn	6/10/2010 8:57 AM	MicroStation V8 X	1,242 KB		
Desktop	🖊 12345SURV	Topo20.dgn	4/7/2010 8:42 AM	MicroStation V8 X	1,212 KB		
ee a	🕌 12345SURV_	Topo40.dgn	4/7/2010 8:42 AM	MicroStation V8 X	1,216 KB		
1000 A	🖊 12345SURV_	Topo50.dgn	4/7/2010 8:42 AM	MicroStation V8 X	32 KB		
Libraries	12345SURV	Topo100.dgn	6/10/2010 8:32 AM	MicroStation V8 X	1,241 KB		
	🖊 12345SURV_	Topo200.dgn	4/7/2010 8:42 AM	MicroStation V8 X	1,231 KB		
	🖊 12345SURV_	Topo400.dgn	4/7/2010 8:43 AM	MicroStation V8 X	1,233 KB		
Computer	🕌 12345SURV_	Topo500.dgn	4/7/2010 8:43 AM	MicroStation V8 X	1,235 KB		
<u> </u>	🖊 12345SURV_	TopoCodes100.dgn	11/26/2007 1:45 PM	MicroStation V8 X	737 KB		
	🕌 12345SURV_	TopoElevations100.dgn	11/26/2007 1:46 PM	MicroStation V8 X	750 KB		
Network	-	TopoNames100.dgn	11/26/2007 1:46 PM	MicroStation V8 X	699 KB		
		TopoNotes100.dgn	11/26/2007 1:46 PM	MicroStation V8 X	131 KB		
	•	TopoSymbols100.dgn	11/26/2007 1:46 PM	MicroStation V8 X	570 KB		
	K JERRY_Elber	t.dgn	11/20/2007 7:50 AM	MicroStation V8 X	1,327 KB		
	File name:	12345SURV_Topo100Scale01.dgn 🗸					
	Save as type:	MicroStation DGN Files (*.dgn)					

- **Note:** If **3D-Seed_CDOT.dgn** is not the seed file specifieid, **<D> Select** button and chose navigate to **C:\Program Files\Workspace-CDOT\Standards-Global\MicroStation\seed** and select **3D-**Seed_CDOT.dgn from the Select a Seed File dialog box.
- 4. Key in the name of the file to be created in the Files filed: 12345SURV_Topo100Scale01.dgn
- 5. **<D>** OK in the New dialog. The New dialog will close and the file **12345SURV_Topo100scale01.dgn** will open.
- 6. Disable the view display of dynamic survey graphics shown on the screen. Toggle off the View

Planimetrics icon 💆 or any other symbols, names, codes, etc. that may be enabled, using the toggles in the **View Survey Data** toolbar.

- 7. *Verify* the correct fieldbook is active. The active fieldbook is indicated by a red box around the fieldbook icon in the InRoads workspace pane.
- 8. To modify the scale as it relates to cells, text, and linestyles select **Tools > Survey Options**. The **Survey Options** dialog will appear.
- 9. On the *General* tab verify the Scales for *Cell*, *Text*, and *Line* are set as shown below.
- 10. Verify the check box labeled Segregate Text by Feature Level is checked on.

🔛 Survey	Options	;			×	
General	Units	Symbology	Corrections	Observation Standa	rd Deviation	
Chord H	eight:	0.010000				
Point Se	ed:	1			Help	
Figure S	eed:	1				
Cell Scal	e:	100.00				
Text Sca	ale:	100.00	Field	book Audit Trail File N	Name:	
Line Sca	ile:	100.00				
File Op	tions olve Cod	la Errom		ave Computed Coord	instea	
	Code Er			dd/Edit Audit Trail	il Idico	
				ng Alpha Codes on Im	nort	
View C	ptions – omatic R	efresh	V S	egregate Text by Syn	nbology Level	
Auto	omatic U	pdate of Surfa	ice		-	
Planim	etric Sett	inge				
		Operations	V A	ttach Default Tags		
🔲 Use	Symbols	3	<b>V</b> A	ttach Attribute Tags		
🔽 Use	Cells					
Incl	ude Cust	om Operation	s, Symbols an	d Cells in Single Cell		
	OK Preferences Cancel					

- **Note:** Segregate Text by Feature Level, if checked on, will save the symbols, point names, codes, notes, errors, and elevations to the same level as the survey feature.
- 11. **<D> OK.** The **Survey Options** dialog will close.

 Once the settings have been verified or changed, write the survey data to graphics. From the InRoads menu select Survey > View Survey Data > Write Survey Data to Graphic. The Write Survey Data to Graphics dialog will open.

🐂 Write Su	rvey Data to	Grap	p	
Include:				Apply
	Planimetrics			
- *.	Symbols			Filter
□ ^{.1} .2	Names		Ξ	Close
- ·A.B	Codes			
	Elevations			Help
	Errors		-	
•	III	P.		Select All
Planarize				
Elevatio	on: O	.0000	0	
Curve Stroki	ng Mode: 🛛	lorizo	ntal	and Vertical 👻

- *Note:* If dynamic graphics were toggled on, those same components would be toggled on in the Write Survey Data to Graphics dialog.
- 13. Check the **Select All** check box.

🐂 Write S	urvey Data to	Gra	p					
Include:				Apply				
	Planimetrics							
✓ *.	Symbols			Filter				
✓ ¹ .2	Names		Ш	Close				
P R B	Codes							
V 🖗	Elevations			Help				
A	Errors		-					
•	III	•		Select All				
Planariz	Planarize							
Elevation: 0.0000								
Curve Strol	Curve Stroking Mode: Horizontal and Vertical 💌							

- 14. Set Curve Stroking Mode to *Horizontal Only*.
- 15. **<D> Apply**. The graphics will be created in the design file.
- 16. **<D> Close**. The Survey fieldbook data has been written to the design file.

17. Verify all dynamic View Survey Data icons are toggled off.



- 18. Fit the view of the contents of the design file within MicroStation.
- 19. Review the results to verify the data has been written to the design file and are level stratified.
- 20. From the CDOT Menu pull-down select Add On's > Stratify Survey. The Stratify Survey dialog will appear.

Stratify Survey	/ Data	X				
Parameters —						
JPC: 12345	Scale: 100 Sheet Number: 01					
Existing Files -		_				
Append	C Overwrite All C Overwrite None	:				
Process						
🔽 Adjust Plani	metrics					
🔽 Symbols	12345SURV_TopoSymbols100Scale01.dgn					
🔽 Names	12345SURV_TopoNames100Scale01.dgn					
Codes	12345SURV_TopoCodes100Scale01.dgn					
Elevations	12345SURV_TopoElevations100Scale01.dgn					
Errors	123455URV_TopoErrors100Scale01.dgn					
🔽 Notes	123455URV_TopoNotes100Scale01.dgn					
🗖 Network	12345SURV_TopoErrors100Scale01.dgn					
Contours File Name: 123455URV_TopoContour1005cale2_10.dgn						
	T Attach					
OK Cancel						

#### Note:

- Under *Existing Files*, the *Append* option will add or merge the new data into an existing file. A new file will be created if the file does not already exist.
- Under *Existing Files*, the *Overwrite All* option will create a new file, deleting any previously existing file.
- Under *Existing Files*, the *Overwrite None* option will disable the processing option for a file if the file already exists.

- The *Process* option *Adjust Planimetrics* will resize the planimetrics text (if necessary) and convert the grouped text strings to view independent cells in order to allow for viewing this text in any 3D view.
- 21. Verify the *JPC*, *Scale*, and *Sheet Number* entries are correct. Altering any of those values will automatically alter the output file names. If the Attach check box in the Contours section is grayed out, the contour file does not exist. You may edit the name specified in the *File Name* field to enter the name of an existing contour file.
- 22. **<D> OK** button to start the process.
- 23. As the data is being moved to the appropriate reference file a **Processing Status** dialog provides an update on the progress. You may **<D> Cancel** at any time to stop the processing, if necessary.

Processing	Status	X
Planimetrics Symbols Names Codes Elevations Errors Notes Network	Completed (60 elements processed) Completed (1703 elements processed) <i>working</i>	
Contours	Cancel	

24. When completed, a *Processing Completed* message is displayed. **<D> OK** to exit the program.



25. The fieldbook data has now been stratified into separate reference files. The planimetrics will be in the master design file with all of the symbols, names, codes, etc., attached as reference files. To view these attachments select **File > Reference** from the MicroStation pull-down menu.

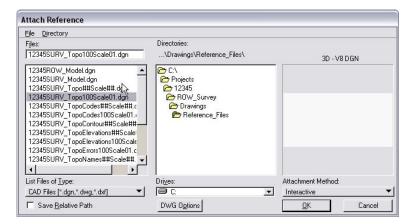
Tools Settings												
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Slot	File Name	Model	Description	Logical	Presentation	•	2	R.				
1	12345SURV_TopoSymbols100Scale01.dgn	CDOT Default	Fieldbook Data	100ScaleSymbols	Wireframe	$\checkmark$	$\checkmark$	$\checkmark$				
2	12345SURV_TopoNames100Scale01.dgn	CDOT Default	Fieldbook Data	100ScaleNames	Wireframe	$\checkmark$	$\checkmark$	$\checkmark$				
3	12345SURV_TopoCodes100Scale01.dgn	CDOT Default	Fieldbook Data	100ScaleCodes	Wireframe	$\checkmark$	$\checkmark$	$\checkmark$				
4	12345SURV_TopoElevations100Scale01.dgr	n CDOT Default	Fieldbook Data	100ScaleElevations	Wireframe	$\checkmark$	$\checkmark$	$\checkmark$				
5	12345SURV_TopoErrors100Scale01.dgn	CDOT Default	Fieldbook Data	100ScaleErrors	Wireframe	$\checkmark$	$\checkmark$	$\checkmark$				
6	12345SURV_TopoNotes100Scale01.dgn	CDOT Default	Fieldbook Data	100ScaleNotes	Wireframe	$\checkmark$	$\checkmark$	$\checkmark$				
Scale 1.000000 : 1.000000 Rotation X 0''0'' Y 0''0'' Z 0''0''												

# **Roadway Design referencing Survey Topo files**

- 1. By using nested references, the designers can attach one Survey Topo file and have all the additional references attach as well.
- 2. From the MicroStation pull-down menu select File > Reference. The References dialog will appear.

References (0 of 0 unique, 0	displayed)				X
Tools Settings					
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Slot File Name	Model	Description	Logical	Presentation	
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Scale R	otation X	Z Z			
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3. From the References pull down menu select Tools > Attach. The Attach Reference dialog will appear.



- 4. Set the directory to C:\Projects\12345\ROW_Survey\Drawings\Reference_Files
- 5. Select the file *12345SURV_Topo100Scale01.dgn* and <D> OK. The Reference Attachment Settings dialog will appear.
- 6. From the Nested Attachments drop down list, select *Live Nesting* and set the Depth to 1.

Reference Attach	ment Settings for 12345SURV_Topo100Scale01.dgn				
<u>Fi</u> le Name:	12345SURV_Topo100Scale01.dgn				
Full Path:	\Reference_Files\12345SURV_Topo100Scale01.dgn				
<u>M</u> odel:	CDOT Default				
Logical Name:					
Description:	Global Origin aligned with Master File				
Orientation:					
View	Description				
Coincident	Aligned with Master File				
Coincident - \	World Global Origin aligned with Master File				
Standard View					
Saved Views					
Named Fence	es (none)				
Detail	Scale: 1"=100' 🔹				
Sc <u>al</u> e (Master	r:Ref): 1.000000 : 1.000000				
Named 0	Grou <u>p</u> ; 🔄 👻				
Rev	vision:				
	Le <u>v</u> el:				
Nested Attachr	ments: Live Nesting   Depth: 1				
Display Ove	nides: Allow				
Ne <u>w</u> Level Di	isplay: Use MS_REF_NEWLEVELDH				
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Drawing Title —					
Create					
1	Name: Drawing				
l	<u>O</u> K Cancel				

7. **<D> OK**. The Survey Topo file will attach along with the fieldbook nested attachments.

🛣 References (7 of 7 unique, 7 displayed)		
Tools Settings		1
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- Marcale Names, 12345SURV_TopoNames100Scale01.dgn		
- MarcaleCodes, 12345SURV_TopoCodes100Scale01.dgn	•	) I
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100ScaleNotes, 12345SURV_TopoNotes100Scale01.dgn	<b>■ ↓ ↓ ☆ ☆ ☆ ☆ ↓ ↓</b>	e Nesting ▼ <u>D</u> epth: 1

# Workflow IR 13 - Editing Feature Styles for Display in Cross Sections

This document guides you through the process of setting a feature style to display in cross sections. Displaying a feature in cross sections allows the designer to see the relative position of the features and to annotate individual features.

**Note:** The changes made using this workflow occur in the XIN file. If you wish to save these changes past the current login session, the XIN file must be saved to a different location. Use the Save As option and store the file in the project directory.

In this example, we wish to display the T_Edge of Parking Lot features in the cross sections to see if our toe of slope encroaches into the parking lot.

# **Workflow Outline**

**Opening Style Manager** - Style Manager is the interface used to edit the xin file, where the feature style definitions are stored.

- Commands Used: **Tools > Style Manager** Used to display the Style Manager dialog box.
- Edit Style And alternate method for displaying the Style Manager dialog box. This button is found on the Update Cross Section > Crossing Features leaf of the Cross Section dialog box.

**Selecting a Style to Edit** - Within the Style Manager dialog box, there are some items that can make locating the desired Style easier to find. This step is skipped when the Edit Style button is selected from the Cross Section dialog box.

- Commands Used: Show Styles with Properties > Include Surface This option is used to remove any non-surface feature styles from the Features list.
- **Edit** (button) Used to display the Edit Style dialog box. This is where feature style data is modified.
- **Surface Features** This is the leaf of the Edit Style dialog box where the first changes are made.

**Edifing the Style** - Changing the Style's display settings allows the feature to be displayed in the cross section set. Editing the Named Symbology allows the user to determine how that feature is displayed.

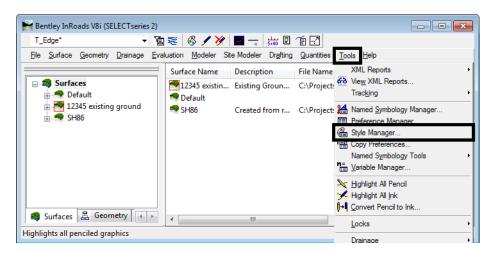
- **Make Style Settings Changes** Use the toggles to turn on the Cross Section Display. This sets the style so that the feature can be displayed.
- Make Symbology Settings Changes These determine how the feature will look when displayed in the cross section set. These changes are made to the Named Symbology attached to the Feature Style.
  - Commands Used: **Surface Feature > Symbology** This is the leaf of the Edit Style dialog box that provides access to the Named Symbology editor.
  - **Edit the Symbology** Select the Symbology type to edit (either Default Point or Cross Section Point). Make changes in the Point Symbology dialog box.

# **Opening the Style Manager and Selecting a Style to Edit**

The display settings for features is accessed through the *Style Manager*. There are various ways to open Style Manager, depending on which dialog boxes are open. Here, opening the Style Manager from the InRoads main dialog box and from the Cross Sections dialog box is described.

### **Opening the Style Manager from the Main InRoads Dialog Box**

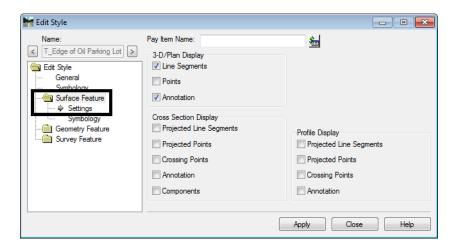
1. From the InRoads main menu, select **Tools > Style Manager**. This displays the *Style Manager* dialog box.



- 2. In the *Style Manager* dialog box Show *Styles with Properties* area, toggle on **Include Surface**. This filters out all styles that are not surface styles, reducing the number of items in the style list to search through.
- 3. In the styles list at the bottom of the dialog box, highlight the desired style (in this example **T_Edge of Oil Parking Lot**)
- 4. **<D>** the **Edit** button to display the *Edit Style* dialog box. You can also **<D> <D>** on the style in the list to open the dialog box.

🐂 Style Manager				, • •
Show Stules with Properties  I Include Surface I Include Geometry Point Include Geometry Line Include Geometry Arc Include Geometry Spiral Include Survey	Surface Properties Display Plan Display Cross Section Display Profile Pay Item Survey Properties Custom Operations	Geometry Tabling Point Tabling Une Tabling Arc Tabling Spiral Tabling Attributes		Close New Edit Copy opy Settings Delete Rename Help
Preference File: C:\Workspace\V	Description		Numeric Code	Pay Ite 🔺
T Edge of Oil	Edge of Oil	1	310	
T_Edge of Oil Parking Lot	Edge of Oil Parking	. 1	314	
I_Edge of Parking Lot>Gravel	Edge of Parking Lo		334	
T_Edge of Water>Canals>Conc	Edge of Water-Can	. 1	813	
T_Edge of Water>Canals>Dirt	Edge of Water-Can	. 1	812	
T_Edge of Water>Other	Edge of Water-Oth	1	818	
T_Edge of Water>Ponds Lakes	Edge of Water-Pon	1	817	
T_Edge of Water>Rivers	Edge of Water-Riv	1	816	
T_Edge of Water>Streams	Edge of Water-Stre	1	815	

5. In the *Edit Style* dialog box, expand the **Surface Feature** folder.



This takes us to the point where the style will be edited.

#### **Opening Style Manager from the Cross Sections Dialog Box**

Usually, you will discover that a particular feature is not set up for display in cross sections or profiles when you are using the Update Cross Sections or the Update Profile commands. Because of this, InRoads has provided access to the Style Manager directly from the Cross Sections and Update Profile dialog boxes.

In this example, the Cross Sections dialog box is used.

- 1. In the *Cross Sections* dialog box, expand the **Update Cross Section** folder and select **Crossing Features**.
- 2. In the *Surfaces* area, highlight the surface that has the features to be displayed (in this example **12345 Existing Ground** is used).
- 3. In the *Feature* area, highlight the desired feature (in this example **T_Edge of Parking Lot** is used).
- 4. Notice that the feature is grayed out. This indicates that the feature cannot be displayed in cross section.

5. **<D>** the **Edit Style** button. This displays the *Edit Style* dialog box.

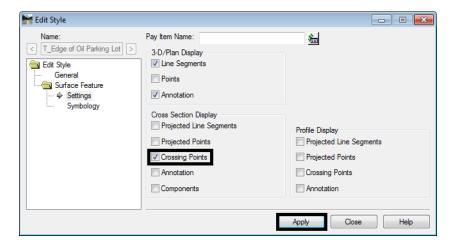
K Cross Sections			- • 💌
File			
Cross Section Set: SH 86   Create Cross Section  Create Cross Section  Update Cross Section  Contrait  Update Cross Section  Contrait  Contraits  Contrai	Surface: Name Default 12345 existing ground	260+43.16 Description Existing Ground from multi	
Consonants     Consing Features     Frojected Features     Storm and Sanitary     End-Area Volumes	SH86 Feature:	Created from roadway de	+
	Name T_Edge of Parking Lot T_Edge of Parking Lot>12 T_Edge of Water>Rivers T_Edge of Water>Rivers T_Edge of Water>Rivers T_Edge of Water>Rivers T_Edge of Water>Rivers T_Edge of Water>Rivers T	Style T_Edge of Oil Parking L T_Edge of Oil Parking L T_Edge of Water>River T_Edge of Water>River T_Edge of Water>River T_Edge of Water>River	<u> </u>
	(	Apply Preferences)	Edit Style Filter Close Help

This method takes you directly to the Surface Feature folder of the Edit Style dialog box.

## **Editing the Style**

Two settings are required for the feature to be displayed; the display option must be toggled on and the Named Symbology must be set up.

- 1. In the *Edit Style* dialog box, toggle on the desired display option (in this example **Crossing Points** from the *Cross Section Display* area is used).
- 2. **<D>** the **Apply** button. This saves the setting to the XIN file.



This allows the feature to be displayed in the cross section but does not setup the symbology for its display. The steps below describe how to set up the symbology.

- 3. Highlight the **Symbology** in the *Edit Style* explorer.
- 4. **<D>** the **Edit** button in the *Symbology* area of the dialog box. This displays the *Edit Named Symbology* dialog box.

🕌 Edit Style			- • -
Name:       Image: Contract of Oil Parking Lot       Image:	Symbology Name:	T_Edge of Oil Parking Lot       New       Edit         Apply   Close	e Help

In the *Edit Named Symbology* dialog box, highlight Cross Section Point from the Symbology list and
 Edit. This displays the Point Symbology dialog box.

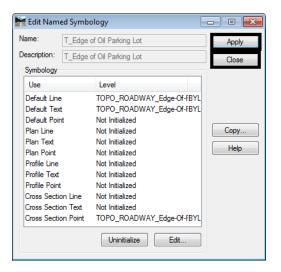
Name:	T_Edge	of Oil Parking Lot	Apply
Description:	T_Edge	of Oil Parking Lot	Close
Symbology			
Use		Level	
Default Line		TOPO_ROADWAY_Edge-Of-FBYL	
Default Text		TOPO_ROADWAY_Edge-Of-FBYL	
Default Poin	t	Not Initialized	
Plan Line		Not Initialized	Copy
Plan Text		Not Initialized	
Plan Point		Not Initialized	Help
Profile Line		Not Initialized	
Profile Text		Not Initialized	
Profile Point		Not Initialized	
Cross Section	n Line	Not Initialized	
Cross Section	n Text	Not Initialized	
Cross Sectio	n Point	Not Initialized	
		Uninitialize Edit	

- 6. In the **Point Symbology** dialog box, toggle on the desired Display option (in this example **Symbol Display** is used).
- 7. Select the desired **Symbol** or **Cell** used for the feature display (in this example the **Plus Sign** is used).
- 8. Select the desired Level for the feature (in this example TOPO_ROADWAY-Edge-Of-Parking-Lot was used)
- 9. Set the *Color* and *Weight* to **By Level**.
- 10. Set the desired *Height* and *Width* for the symbol.

11. **<D>** the **OK** button to accept the changes. This dismisses the **Point Symbology** dialog box.

🐂 Point Sy	mbology			[	- • <b>x</b>
	Symbol	_		Cell	ОК
Display: Level: Color:	Plus Sign				Cancel Help
Weight: Font:	(1)ByLevel		Display:		<b>v</b>
Font: Character:	+		X Scale:	ALG_COGO_Points 1.0000	
Height:	0.10	Ē	Y Scale:	1.0000	
Width: Retation (a) Angle F (b) Absolut Angle:	0.10 Relative to Object e Angle 0^00'00''		Z Scale: Rotation Angle I Absolut Angle:		

12. In the *Edit Named Symbology* dialog box, **<D> Apply** then **<D> Close**.



13. In the *Edit Style* dialog box, **<D> Apply** then **<D> Close**.

🕌 Edit Style			- • •
Name:  T_Edge of OI Parking Lot  Edit Style  General  Symbology  Surface Feature  Settings  Symbology  Geometry Feature  Survey Feature  Survey Feature	Symbology Name:	T_Edge of Oil Parking Lot	
		Apply Close	Help

This completes the changes required in the XIN file. The features can now be added to the cross sections using the Update Cross Section command.

**Note:** This change will be available only until the next login on your computer. If you wish to save the change for future use, **Save As** the *CDOT_Civil.xin* file to your project directory.

# Workflow IR 14 - Using InRoads Sight Visibility Tools

This document guides you through the use of the InRoads Sight Visibility Tools. There are two sight visibility tools available, Roadway Visibility and Surface Visibility. The Roadway Visibility tool analyzes sight distances along a roadway. The Surface Visibility tool evaluates the visibility from a given point on a surface.

# The Roadway Visibility Tool

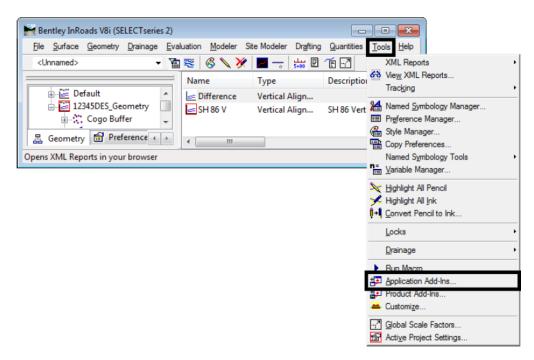
This tool is used to check sight distances along an alignment. The Roadway Visibility tool draws a line the length of the specified sight distance between two points of the alignment, at the specified elevation above the selected surface. It then checks the line against the surface to determine if it passes through the surface to reach its destination point.

Before using this tool, you will need an alignment and a surface created by merging the design surface to the existing surface. For help creating the merged surface, refer to CDOT Workflow Creating Combined Surfaces. The steps below describe Roadway Visibility tool's set-up and function.

## Adding the Sight Visibility Tools to the Menu

By default, the sight visibility tools are not available on the InRoads menu bar. To add them to the menu, follow the steps below.

1. Select **Tools > Application Add-Ins** from the InRoads main menu. This displays the *Application Add-Ins* dialog box.



2. From the Application Add-Ins dialog box Available list, toggle on the Sight Visibility Add-In.

3. **<D> OK** to accept the change and dismiss the *Application Add-Ins* dialog box.

· III	OK Cancel Help
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The *Sight Visibility* tools are added to the *Evaluation* menu.

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<u>File</u> <u>Surface</u> <u>Geometry</u> <u>Drainage</u>	Evaluation Modeler Site Mod	deler Dr <u>a</u> fting	<u>Q</u> uantities <u>T</u> o	ols <u>H</u> elp
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Default	Volumes	-	cferree	12/28/20
12345DES_Geometry	Hydrology and Hydraulics	•	cferree	12/28/20
Cogo Buffer	Surface Area			
🖁 Geometry 🔂 Preference 4	Sight Visibility	🔸 🦶 Roadw	vay Visibility	- F.
Displays sight lines based on user-sp	ecified criteria	* Surfac	e Visibility	at

### Using the Roadway Visibility Tool

1. From the InRoads main menu, select Evaluation > Sight Visibility > Roadway Visibility. This displays the *Roadway Visibility* dialog box.

Hentley InRoads V8i (SELECTserie	s 2)			
<u>File</u> <u>Surface</u> <u>Geometry</u> <u>Drainage</u>	Evaluation Modeler Site Mo	deler Dr <u>a</u> fting	<u>Q</u> uantities <u>T</u> o	ols <u>H</u> elp
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Displays sight lines based on user-sp	ecified criteria	* Surfac	e Visibility	

- 2. In the *Roadway Visibility* dialog box, select the **General** leaf.
- 3. In the *Surfaces* list, select the merged surface.
  - **Note:** If two or more surfaces are selected, InRoads will use the highest surface to base eye height and object height from. This could result in inaccurate readings in areas of cut.
- 4. Using the Horizontal Alignment drop down menu, select the desired alignment.
- 5. Key in the desired **Start Station** and **Stop Station** in their respective fields.
- 6. If the alignment runs in the opposite direction as the flow of traffic, **<D>** the **Reverse** button. This will make the command check the sight distance in the same direction as the flow of traffic.
- 7. In the **Interval** field, key in the desired value.
- 8. In the *Sight Distance* field, key in the desired value. See Chapter 3 Elements of Design of the *CDOT Roadway Design Guide 2005* for information on computing sight distances and sight distance look up tables.
- 9. In the *Relaxed Distance* field, key in the desired value. This is the minimum allowable distance. It can be the same value as used in the Sight Distance field.
- 10. Toggle on **Create XML Report** to create a textual copy of the sight distance data.

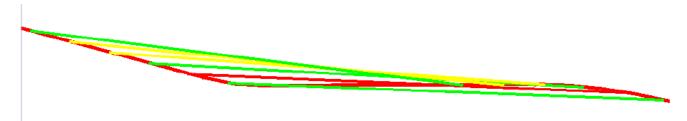
🐂 Roadway Visibility				×
Roadway Visibility	Surfaces:			
	Name	De	scription	
Positions Sight Line	Default		-	
	Sight Distance3			
	Horizontal Alignment:	Sight LT Tum	<b>→</b> +	
	Start Station:	0+00.00	+	3
	Stop Station:	28+69.17	-	
	Interval:	10.00		
	Sight Distance:	250.00		
	Relaxed Distance:	225.00		
	Create XML Repo	t		
	Apply Pre	ferences)	Close Help	

- 11. Select the **Position** leaf.
- 12. Set the **Offset** value in the *Eye Position* area so that it will be in the center of the driving lane to the inside of the curve.
- 13. Set the **Offset** value for the *Object Position* area so that it will be in the center of the driving lane to the inside of the curve.
  - **Note:** On 4 lane roads the eye and object position offset will have to change depending on the direction of the curve. This may require a different run of the command for each curve.

14. **<D>** the **Apply** button to execute the command.

🐂 Roadway Visibility		×
Roadway Visibility General Positions Sight Line	Eye Postion From:  Active Alignment  Surface: Default  Feature:  Offset:  Eye Height:  3.50	
	Object Position         From: <ul> <li>Active Alignment</li> <li>Surface:</li> <li>Default</li> <li>Feature:</li> <li>♥ offset:</li> <li>G00</li> <li>Object Height:</li> <li>2.00</li> </ul>	
	Apply Preferences Close Help	

A sample of the results are shown below:



- A green line meets or exceeds the *Sight Distance*.
- A yellow line meets or exceeds the *Relaxed Distance*.
- A red line does not meet either the *Sight Distance* or the *Relaxed Distance*.

Below is an example of the report created by the *Roadway Visibility* command:

Surface(s):	sd			
Alignment Name:	SH 86			
Start Station:	223+00.00		Sight Distance:	2135.00
Stop Station:	234+00.00		Relaxed Distance:	2000.00
Interval:				
Eye Position:	From Alignment		Object Position:	From Alignment
Eye Height:	3.50		Object Height:	2.00
Eye Offset:	2.00		Object Offset:	2.00
Input Grid Factor:	1.00000000		Note: All units in this rep	ort are in fect unless specified otherwise.
	Station	Offset	Elevation	
Eye Position:	223+00.00	2.00	6630.73	
Object Position:	244+52.27	2.00	6573.72	
Obstruction:	No Obstruction			
Sight Distance:	3362.72			
Eye Position:	225+00.00	2.00	6628.83	
Object Position:	246+51.23	2.00	6562.02	
Obstruction:	245+89.44	-4.42	6563.96	
Sight Distance:	2072.87			
Eye Position:	227+00.00	2.00	6625.96	
Object Position:	248+48.84	2.00	6549.15	
Obstruction:	247+84.92	-2.68	6551.46	
Sight Distance:	2070.92			
Eye Position:	229+00.00	2.00	6622,13	
Object Position:	250+45.00	2.00	6538.58	
Obstruction:	No Obstruction			
Sight Distance:	Unlimited			
Eye Position:	231+00.00	2.00	6617.39	
Object Position:	252+41.23	2.00	6536.78	
Obstruction:	239+30.96	-19.86	6586.20	
Sight Distance:	826.02			
Eye Position:	233+00.00	2.00	6611.72	
Object Position:	254+40.08	2.00	6542.31	
Obstruction:	No Obstruction			
Sight Distance:	2171.21			

The entries in the report correspond to a line drawn in MicroStation.

### **Using the Surface Visibility Tool**

The Surface Visibility tool determines the visibility from a given point. There are three modes for this tool; Surface Points, Surface Regions, and Line of Sight. The Surface Points mode indicates what triangle vertices can be seen from the observation point. The Surface Regions mode draws lines radially from the observation point showing where sight is clear or blocked. The Line of Sight mode shows whether sight is clear or blocked between two points.

The steps below describe how to use the Surface Visibility tool.

1. From the InRoads main menu, select **Evaluation > Sight Visibility > Surface Visibility**. This displays the *Surface Visibility* dialog box.

<u>P</u> rofile <u>C</u> ross Section <u>V</u> olumes	Ste Mod	بيلي 5+00	tive		<u>H</u> elp
_ Cross Section Volumes		Ac	tive	Features	
 Volumes		+			
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Hydrology and Hydr	aulics	•	0	0	
Surface Area		_	768	1	!
- Sight Visibility		• 🌭 F	o loadway Visib	oliity	
* ⁺ Random Fea.		∦ s	urface Visibil		•
	Sight Visbilty	Sight Visbilty	Sight Visbilty	Surface Area 768 Sight Visbility • & Roadway Visit • Random Fee •	Surface Area 768 1 Sight Visbility Sight Visbility Kandom Fee Kurface Visibility

- 2. In the Surface Visibility dialog box General leaf, select the desired Surface to be evaluated.
- 3. Select the desired **Mode** using the drop down menu.
- 4. Toggle on or off **Drape Surface** as desired. If **Drape Surface** is on, the base **Elevation** for the **Eye Position** is set to that of the **Surface** at the specified location.
- 5. Set the **Northing** and **Easting** (and **Elevation** if *Drape Surface* is not used) for the *Eye Position*. This can be done by key in or by using the locator button.
- 6. Key in the desired value for the **Eye Height**. This is the distance above the *Elevation* for the actual eye position.

🐂 Surface Visibility			
Surface Meibility	Surface:	Sight Distance3 🔹	
-  General	Mode:	Surface Points 🔹 🔻	
Surface Regions	Eye Position		
Line of Sight	Northing:	1556206.47	<b>+</b>
	Easting:	3279661.74	
	Elevation:	6623.31	+
	Drape Surf		
	Eye Height:	3.50	
	Apply	Preferences Clos	e Help

#### **Surface Points Settings**

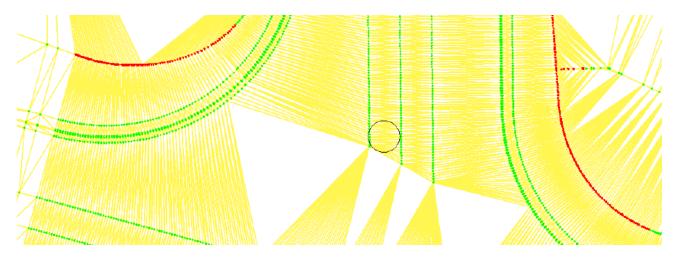
These settings are only used when the Mode is set to Surface Points on the General Leaf.

- 1. **<D>** the **Surface Points** leaf from the dialog box explorer pane.
- 2. Toggle on or off the **Object Height** as desired. If toggled on, key in the desired value. This is an elevation adjustment above the surface at the target location and represents the height of an object sitting on the surface at that location.

3. Toggle on or off the **Sight Radius** as desired. If toggled on, key in the desired value. This is the distance from the *Eye Position* that data is collected. If toggled off, the entire surface is evaluated.

Surface Visibility	Object Height: 2	.00	
·····   General  ····   General  ····   General  ····   General  ····	Sight Radius: 3	05.00	
Suitace Regions Line of Sight			
	Symbology:		
	Symbology: Object	Name	

4. **<D>** the **Apply** button to execute the command. The data is displayed in the MicroStation view. An example of the data is displayed below.



The green dots represent locations that can be seen from the *Eye Position*. Red dots represent locations that cannot be seen from the *Eye Position*. The locations evaluated are the triangle vertices of the selected surface that are within the *Sight Radius*.

#### Surface Region Settings

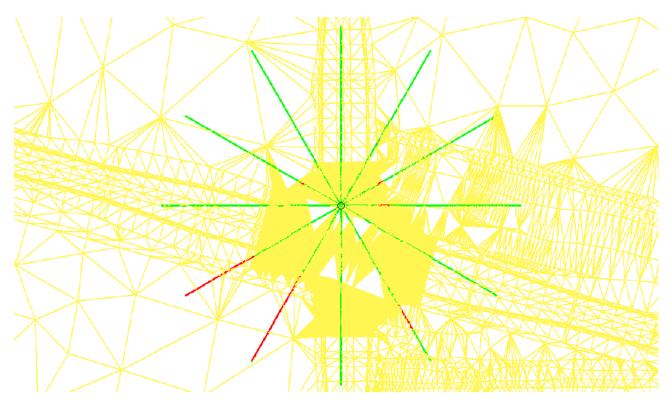
These settings are only used when the Mode is set to Surface Regions on the General Leaf.

- 1. **<D>** the **Surface Regions** leaf from the dialog box explorer pane.
- 2. In the *Method* area, select either **Radial Angle Interval** or **Number of Radials**. The *Radial Angle Interval* option places data lines radiating from the Eye Position in a circle at the specified angle interval. the *Number of Radials* option places data lines radiating from the Eye Position in a circle at angle intervals equal to 360/Number of Radials value. In each case, the first radial is
- 3. Toggle on or off the **Object Height** as desired. If toggled on, key in the desired value. This is an elevation adjustment above the surface at the target location and represents the height of an object sitting on the surface at that location. In each case, the first radial is placed at the MicroStation 0 angle (horizontally to the right from the *Eye Position* in a *Top* view).

4. Toggle on or off the **Sight Radius** as desired. If toggled on, key in the desired value. This is the distance from the *Eye Position* that data is collected. If toggled off, the entire surface is evaluated.

Surface Visibility	Method:	-	
Surface Visibility General Surface Points 9 Surface Regions	<ul> <li>Radial Angle Interval:</li> <li>Number of Radials:</li> </ul>	30^00'00''	
	☑ Object Height:	2.00	
	✓ Sight Radius:	305.00	
	Symbology:		
	Symbology: Object	Name	
		Name	

5. **<D>** the **Apply** button to execute the command. The data is displayed in the MicroStation view. An example of the data is displayed below.



The green lines represent locations that can be seen from the *Eye Position*. Red lines represent locations that cannot be seen from the *Eye Position*. The locations evaluated are within the *Sight Radius*.

#### Line of Sight Settings

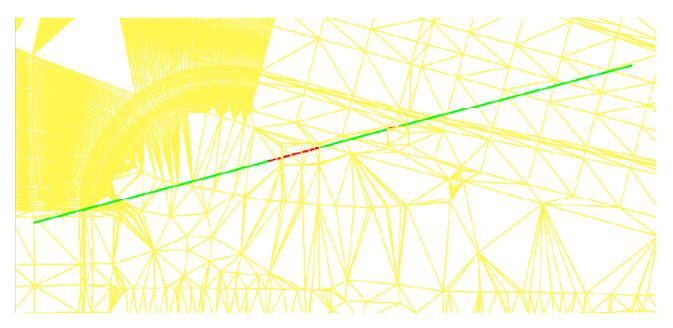
These settings are only used when the *Mode* is set to *Line of Sight* on the *General* Leaf.

1. **<D>** the **Line of Sight** leaf from the dialog box explorer pane.

- 2. Toggle on or off **Drape Surface** as desired. If **Drape Surface** is on, the base **Elevation** for the **Object Position** is set to that of the **Surface** (on the **General** leaf) at the specified location.
- 3. Set the **Northing** and **Easting** (and **Elevation** if *Drape Surface* is not used) for the *Object Position*. This can be done by key in or by using the locator button.
- 4. 4. Key in the desired value for the **Object Height**. This is the distance above the *Elevation* for the actual object position.

Surface Visibility	Object Postio	<b>-</b>
General	Northing:	1556074.38
Surface Points	Easting:	3279963.63
···· 🕸 Line of Sight	Elevation:	6619.14 +
	Object Height: Symbology:	2.00
	Object	Name
	Above Ground Below Ground	
	Apply	Preferences Close Help

5. **<D>** the **Apply** button to execute the command. The data is displayed in the MicroStation view. An example of the data is displayed below.



The green lines represent locations that are above the surface. Red lines represent locations that are below the surface.

#### Appendix

Enter all workflow document history information in a document control sheet as part of the appendix which would include what version the workflow was updated to and the date of the update