Labs for ROW Geometry

Colorado Department of Transportation

CADD and Engineering Innovation Updated September 29, 2009 Version XM



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Software Versions

The software products referred to in this publication are furnished under a license and may only be used in accordance with the terms of such license. This document intended for use with the following software versions:

MicroStation® version 08.09.04.88 InRoads® version 08.09.02.16 0209 – Version 04.00 CDOT Configuration

Document Conventions

There are several conventions that are used throughout this document to indicate actions to be taken or to highlight important information. The conventions are as follows:

ltem	Meaning
View Perimeter	a command name or a file that you are to select
Tools > Options	a command path that you are to select – usually from the pull-down menus
Document Name	the name of a document that is not hyperlinked
Emphasis	style used when referring to important word or phrases
<u>Hyperlink</u>	style used when you have a direct link to another document on the web
Key in	entering data with the keyboard
Quote	style used to indicate an external source quotation
<i>Note:</i> text	information about a command or process that you should pay particular attention to
1. Numbered Steps	actions that you are to perform as part of the lab activities
<d> or Data</d>	press the data button on the mouse
< R > or Reset	press the reset button on the mouse
<t> or Tentative</t>	press the tentative button on the mouse

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LAB 1 - Getting Started in ROW Geometry and Plans

This lab demonstrates starting InRoads and InRoads Survey. If you are new user to InRoads it is recommended to check the setup to verify the correct standard resources are being used.

Chapter Objectives:

- To launch the applications InRoads and InRoads Survey
- To be able to set Project Defaults for working with the ROW Survey group

Lab 1.1 - Opening InRoads and Launching InRoads Survey

- 1. There are three main methods to Start InRoads: choose one of the followoing methods
 - Choose Start > All Programs > Bentley > InRoads Group XM > InRoads. MicroStation will open allowing you to choose the design file; once the design file opens InRoads will start
 - Choose the Desktop icon for InRoads if one is available on your machine. MicroStation will open allowing you to choose the design file; once the design file opens InRoads will start
 - If you already have MicroStation open, you can choose the InRoads icon from the MicroStation main toolbar
- 2. In the MicroStation Manager dialog box, go to the Workspace group section and change the User field to **CDOT USER**, the Project field to **12345** and the Interface field to **CDOT**.

S MicroStation M	lanager - C:\Proj	jects\12345\ROW_	Survey\Drawing	js\Reference	Files\		×
Look in:	Reference_Fi	iles	-	G 🤌 🖡	۶ 🛄 ד	- "L 🔁 💽	3D - V8 DGN
Network	Name [123455R0W- 123455URV- 123455URV- 123455URV- 123455URV- 123455URV- 123455URV- 123455URV- 123455URV- 123455URV- 123455URV- 123455URV- 123455URV- 123455URV- 123455URV- 123455URV-	Date modified Model.dgn	in ign ign ign ign icolo01.dgn icolo01.dgn icolo01.dgn icolo01.dgn	Size	•	Open Cancel Options	User: CDOT User Project: 12345 Interface: CDOT

This workspace setup should load the correct MicroStation environment (including toolbars) when the selected MicroStation file is opened.

3. Navigate to the ROW_Survey\Drawings\Reference Files directator and **<D>** the filename *12345ROW_Model.dgn*

4. **<D> Open** to open the file.

📕 MicroStation I	Manager - C:\Pro	ojects\12345\ROW_Surv	ey\Drawing	s\Reference	e_Fi	iles∖					×
Look in:	Reference_	Files	•	G 🦻	Þ	•	Ë 🖸	i 🕭		3D - V8 DGN	
Recent Places	🕺 12345SURV	- ,	pe	Size				H			/
CDOT CDOT	 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 	_Topo100Scale01.dgn _Topo200Scale01.dgn _Topo400Scale01.dgn _Topo500Scale01.dgn _Topo##Scale##.dgn _TopoCodes100Scale01	-								
Network	File name:	12345ROW_Model.dg MicroStation DGN File	In		•		Open Cancel Options		User: Project: Interface:		

- **Note:** InRoads was used to enter the CAD file. Using InRoads vs. InRoads Survey allows access to the full range of geometry commands available. By itself, InRoads Survey does provide somewhat limited geometry functions. By enabling InRoads initially, the full range of geometry functions is available to the user. Additionally, the functions of InRoads Survey are also required because a fieldbook will be used to export survey data to a geometry project. This data will serve as a foundation for establishing existing property and land lines. Once the electronic fieldbook has been exported, InRoads Survey will no longer be necessary.
- 5. Verify InRoads and InRoads Survey are both operating.

Bentley InRoads XM Edition	
File Surface Geometry Drainage Surv	ey <u>E</u> valuation <u>M</u> odeler Dr <u>a</u> fting <u>T</u> ools <u>H</u> elp
<unnamed> 🔻 🚡</unnamed>	😹 🚳 📏 🏏 📕 🚽 😹
	Book Name
E Survey Data	Book 1
Book 1	
Corridors 🛕 Survey	
Toggles the Feature Filter Lock	H.

Note: The title bar for the InRoads interface is labeled: Bentley InRoads XM Edition denoting that InRoads is running. Additionally the functions of InRoads Survey are apparent in the menu and workspace bars.

 If Either InRoads or InRoads Survey needs to be enabled select Tools > Product Add-Ins, and enable the appropriate application by selecting the application and <D> OK.

Product Add-Ins		—
Available: Bentley InRoads Bridge XM Edition Bentley InRoads Site XM Edition Bentley InRoads Storm & Sanitary XM Edition Bentley InRoads Survey XM Edition Bentley Rall Track XM Edition	*	OK Cancel Help
Description Bentley InRoads Survey enables users to transfer fieldbooks to the MicroStation or AutoCAD enviro data editing capabilities.		

Note: From this point forward, unless specifically instructed to use MicroStation commands, all references to the selection of icons, tools, or menu pull-downs, refer to the InRoads interface.

Lab 1.2 - Project Defaults

Introduction

Defined default locations for both general InRoads resource files and project specific data files make it easier to conform to graphics standards and assist in navigating to the correct project directories when loading or saving data files.

Setting project defaults

1. From the pull down menu select File > Project Defaults.

The CDOT environment is configured to read MicroStation variables defined when the project creation utility is run. These variables are automatically read when MicroStation is launched. Selecting the appropriate 'Project' in the MicroStation Manager dialog identifies the specific project folder referred to by the variable \$(MS_DEF).

2. Select CDOT ROW_Survey Discipline from the drop-down Configuration Name: list.

3. **<D> Apply** and then **<D> Close**.

Set Project Defaults		
oninguration Name.	CDOT ROW_Survey Discipline	Apply
Default Preferences		Close
		New
Preferences (* xin):	\$(CDOT_PREF)\CDOT_Civil.xin	Copy
Turnouts (*.txt):		Rename
Drainage Structures (*.dat):		Delete
Rainfall Data (*.idf):		Browse
Bridge Sections (*.txt):		Import
Drafting Notes (*.dft):	\$(CDOT_WKSP)Standards-Global\InRoads\Notes\CDOT-Notes.df	
Pay Items (*.mdb):	\$(MS_DEF)	Export
		Help
Default Directory Paths ProjectWise Directory:		
Project Default Directory:	\$(MS_DEF)\ROW_Survey\	
Report Directory:	\$(MS_DEF)ROW_Survey\InRoads\Reports\	
Projects (*.rwk):	\$(MS_DEF)ROW_Survey\lnRoads\	
Surfaces (*.dtm):	\$(MS_DEF)ROW_Survey\InRoads\DTM\	
Geometry Projects (*.alg):	\$(MS_DEF)ROW_Survey\InRoads\Geometry\	
Template Libraries (*.itl):		
Roadway Design (*.ird):	\$(MS_DEF)	
Survey Data (*.fwd):	\$(MS_DEF)ROW_Survey\InRoads\Field_Books\	
Drainage (*.sdb):	\$(MS_DEF)	
Style Sheet (*xsl):	C:\Program Files\Workspace-CDOT\Standards-Global\InRoads\XML Sty	le Sheets
Quantity Manager (*.mdb):	\$(MS_DEF)	
Default Grid Factor	Export	
Grid Factor: 1.0000	Active Only	

Note: Choosing the appropriate discipline from the Configuration Name selection list will modify directory paths as configured by CDOT. If necessary, <D> the Import button and select the file: C:\Projects\12345\Project_Configuration\CDOT_Disciplines.reg to populate the Configuration Name drop-down list.

LAB 2 - Working with Survey Data

This lab demonstrates working with survey data as a foundation for our initial geometry. Exporting the survey field book to an InRoads geometry project will generate alignments along linear items and Cogo points at all survey shot locations.

Chapter Objectives:

- Load existing completed survey data
- Filter survey data to select only points and alignments that will be needed
- Exporting filtered survey data to a Geometry Project as cogo points and horizontal and vertical alignments

Lab 2.1 - Load Project Data

The goal of this exercise is to export observations from an InRoads Survey fieldbook to a Geometry Project creating Cogo points and alignments.

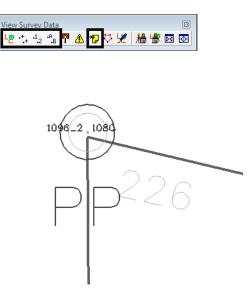
The fieldbook for this project, 12345SURV_Fieldbook.fwd contains control monuments, found monuments, and general topography observations. While this is all valid information, it is desirable to work with a subset of the survey information such as pavement centerlines, control lines, or other specific entities by excluding terrain strings and other topographic information that does not relate to the development of ROW geometry. Working with a subset of the information increases efficiency by working with a smaller data set and freeing-up additional resources for other operations. Exporting a portion of a survey fieldbook can be accomplished by using Survey Feature Filters when creating the InRoads geometry project.

- 1. From the pull down menu select **File > Open** the Open dialog appears.
- 2. Select the fieldbook file C:\Projects\12345\ROW_Survey\InRoads\Field_Books\12345SURV_Fieldbook.fwd.
- <D> Open button then <D> the Cancel button the file will be opened in InRoads Survey and the *Open* dialog will close.

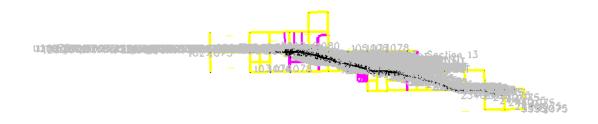
🙀 Open										X
Look in:	Field_Books			•	0	ø	ø	•		
Recent Places	12345SURV_)ate modif Fieldbook.fwo Fieldbook_Bri	d	Size						
Desktop										
CDOT User										
Computer										
Network	File name: Files of type:		′_Fieldbook.fwd s (*.rwk;*.dtm;*.alı	g;*.itl;*.	ird;*.s	sdb;*.	▼ f ▼		Ope Cano Help	;el

Once the fieldbook has loaded, InRoads will automatically fit the extents of the fieldbook to the MicroStation screen.

4. From the pull down menu or View Survey Data toolbar toggle on Survey > View Survey Data > Planametrics | Point Names | Symbols | Codes | Notes.



5. Use the MicroStation **Fit View** command to get an indication of the survey information contained in the fieldbook.



- 6. Take a few minutes to zoom in and navigate around the MicroStation screen to investigate the survey data displayed as it relates to the project layout.
- **Note:** Take notice of the various survey control, ROW and property monuments. Pavement shots, and general topography shots are seen representing terrain breaks, signs, culvert ends, and other features. It is desirable to filter unrelated topography information from our electronic fieldbook prior to exporting it to the right of way geometry project.

Lab 2.2 - Filtering the Survey Data

The goal is to write only the information important to establishing ownership and right of way parcels to a geometry project. The use of Survey feature filters will assist in sorting the data. When a Survey feature filter is activated, the displayed contents of the electronic fieldbook will update along with the associated graphics display. The dynamic graphics display can be used as a preview of the data being written to graphics, a DTM, or to the geometry project.

A survey feature filter affects commands for:

- Electronic fieldbook data
- Survey data to surface
- Survey data to geometry
- Survey data to graphics
- Viewing of dynamic survey data
- 1. Use MicroStation view commands to display any portion of the project area. This display can be used as a preview of our Fieldbook filter.
- 2. From the pull down menu select **Survey > Fieldbook Data** the *Fieldbook Data* dialog will appear.

Station Name Northing Easting Elevation Code Status Image: CORD 33 GAP 27_33	🗧 Fieldbook 🛙	Data - 12345	SURV_Field	book					X
Other Name Nothing Lasting Levalur Code Status	🔀 🔝 🖺	<u>-₩</u> + [Duplicates	Only		-		Help	
GAP 27_33 < Ⅲ Chainage:	Station Name	Northi	ing Eastin	ng Eleva	ation C	ode	Status	-	+
✓ III ► Chainage: ► 1078 ► ► Dobservations: ■ ► ► ► Point Name Northing Easting Elevation Code Status He ▲ III 106 1558562.83282329.66505.88 1078 FA IIII IIII FA IIIII IIIIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	CO RD 33								
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2070 1555976.43281511.36574.93 1075 F 105 1558527.83279643.16585.79 1077 FAN 2050 1555913.33280349.76608.33 1075 F 108 1555884.03279671.76623.76 1078 FA 2140 1555292.73285275.56476.81 1075 F	Observations:		Easting			Statu	us H	Hc 📤	+
105 1558527.83279643.16585.79 1077 FAN 2050 1555913.33280349.76608.33 1075 F 108 1555884.03279671.76623.76 1078 FA 2140 1555592.73285275.56476.81 1075 F	Observations:	Northing		Elevation	Code		us H	Ho ^	+
2050 1555913.33280349.76608.33 1075 F 108 1555884.03279671.76623.76 1078 FA 2140 1555292.73285275.56476.81 1075 F	Observations: Point Name	Northing 1558562.8	.3282329.6	Elevation .6505.88	Code 1078	FA	us H	Hc ^	+
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	Doservations: Point Name 106 107 2070	Northing 1558562.8 1555920.9 1555976.4 1558527.8	.3282329.6 .3282335.4 .3281511.3 .3279643.1	Elevation .6505.88 .6545.91 .6574.93 .6585.79	Code 1078 1078 1075 1077	FA FA F FAN	us H	Hc ^	<u>+</u>
	Deservations: Point Name 106 107 2070 105	Northing 1558562.8 1555920.9 1555976.4 1558527.8 1555913.3	3282329.6. 3282335.4. 3281511.3. 3279643.1. 3280349.7.	Elevation .6505.88 .6545.91 .6574.93 .6585.79 .6608.33	Code 1078 1078 1075 1077 1075	FA FA F FAN F	us H	+c ^	-
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3. From the Fieldbook Data dialog **<D>** on the **Survey Style Filter** icon the Survey Style Filter dialog will appear.

🗑 Fieldbook 🛙	Data - 12345	SURV_Field	book				
2 🎦 🗄	₩ + [Duplicates	Only		-	He	elp
Stations:							
Station Name	Northi	ing Eastin	ng Eleva	tion Co	ode St	atus	<u>+</u>
CO RD 33							
GAP 27_33							-
•						÷.	
Chainage: 🔣 Observations:	< 1078		▼ >	×			
Observations:		Fasting			Charles	11-	▲ +
Observations: Point Name	Northing	Easting	Elevation	Code		Ho	<u>+</u>
Observations: Point Name	Northing 1558562.8	.3282329.6	Elevation 6505.88	Code 1078	FA	Ho	<u>+</u>
Observations: Point Name	Northing 1558562.8 1555920.9	-	Elevation .6505.88 .6545.91	Code 1078 1078		Ho	<u>+</u>
Observations: Point Name 106 107	Northing 1558562.8 1555920.9 1555976.4	.3282329.6 .3282335.4	Elevation .6505.88 .6545.91 .6574.93	Code 1078 1078 1075	FA FA	Hc	<u>+</u>
Observations: Point Name 106 107 2070	Northing 1558562.8 1555920.9 1555976.4 1558527.8	.3282329.6 .3282335.4 .3281511.3	Elevation .6505.88 .6545.91 .6574.93 .6585.79	Code 1078 1078 1075 1075	FA FA F	Hc	<u>+</u>
Observations: Point Name 106 107 2070 105	Northing 1558562.8 1555920.9 1555976.4 1558527.8 1555913.3	.3282329.6 .3282335.4 .3281511.3 .3279643.1	Elevation .6505.88 .6545.91 .6574.93 .6585.79 .6608.33	Code 1078 1078 1075 1075 1077 1075	FA FA F FAN	Hc	<u>+</u>
Observations: Point Name 106 107 2070 105 2050	Northing 1558562.8 1555920.9 1555976.4 1558527.8 1555913.3 1555884.0	.3282329.6 .3282335.4 .3281511.3 .3279643.1 .3280349.7	Elevation .6505.88 .6545.91 .6574.93 .6585.79 .6608.33 .6623.76	Code 1078 1078 1075 1077 1075 1075 1078	FA FA F FAN F	Hc	<u>+</u>

Create the Roadway Centerlines survey feature filter

1. In the Survey Style Filter dialog, **<D> Save As**

Filter Name:	ОК
Start With: All None	Cancel
Build Selection	Save
Properties: Description	Save As
Value:	Delete
Mode: Include C Exclude	Values
Add Rule Replace Rule	Help
Rules:	
Include All Codes	Move Up
	Move Down
	Delete Rule
	Clear All

2. In the Save Filter As dialog, enter Roadway Centerlines

🐂 Save Filter As	23
Name:	ОК
Roadway Centerlines	Cancel
	Help

3. **<D> OK** button the *Save Filter As* dialog will close.

- 4. Toggle None for the *Start With* option.
- 5. From the *Properties* drop down menu select Numeric Code.
- 6. In the *Value* field enter a value of *1313*.
- 7. Toggle **Include** for the *Mode* option.
- 8. **<D>** the **Add Rule** button the rule will be added to the list.

Survey S	Style Filter		- • •
Filter Name:	Roadway Cen	terlines 🔹	ОК
Start With:	o Ai	None	Cancel
Build Sele	ction		Save
	Numeric Code	•	Save As
Value:	1313		Delete
Mode:	Include	© Exclude	Values
	Add Rule	Replace Rule	Help
Rules:			
Exclude All	Codes meric Code = 10	313	Move Up
			Move Down
			Delete Rule
			Clear All

- 9. Back in the *Value* field enter a value of **1316**. Keep the rest of the settings the same.
- 10. **<D>** the **Add Rule** button the rule will be added to the list.

Market Survey Style Filter	
Filter Name: Roadway Centerlines 🔹	ОК
Start With: O All O None	Cancel
Build Selection	Save
Properties: Numeric Code	Save As
Value: 1316	Delete
Mode: Include Exclude	Values
Add Rule Replace Rule	Help
Rules:	
Exclude All Codes Include Numeric Code = 1313	Move Up
Include Numeric Code = 1316	Move Down
	Delete Rule
	Clear All
	1.

11. Continue this process to add the following Rules:

♦ 1317-1326, 1332, and 1335

Survey Style Filter	
Filter Name: Roadway Centerlines	ОК
Start With: O All O None	Cancel
Build Selection	Save
Properties: Numeric Code	Save As
Value: 1335	Delete
Mode: Include Exclude	Values
Add Rule Replace Rule	Help
Rules:	
Exclude All Codes Include Numeric Code = 1313	Move Up
Include Numeric Code = 1316 Include Numeric Code = 1317-1326	Move Down
Include Numeric Code = 1332 Include Numeric Code = 1335	Delete Rule
	Clear All

12. From the *Survey Style Filter* dialog <D> Save then <D> the OK button the dialog will close and the new filter will be saved.

Filter Name: Roadway Centerlines Start With: All Build Selection Properties: Numeric Code	OK Cancel Save Save As
Build Selection	Save
Proportion:	
Properties: Numeric Code	Save As
Value: 1335	Delete
Mode: Include Exclude	Values
Add Rule Replace Rule	Help
Rules:	
Exclude All Codes Include Numeric Code = 1313	Move Up
Include Numeric Code = 1316 Include Numeric Code = 1317-1326	Move Down
Include Numeric Code = 1332 Include Numeric Code = 1335	Delete Rule
	Clear All

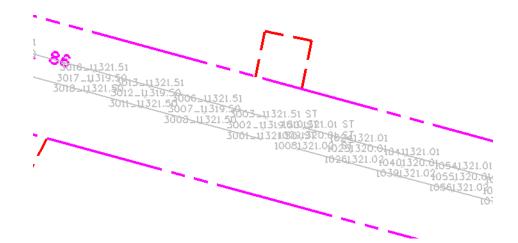
13. From the InRoads Locks toolbar, Toggle ON the Feature Filter Lock



14. Open the *Fieldbook Data* dialog if it is not already opened. The Fieldbook Data will update to display only the data that passes the survey style filter.

📲 Fieldbook L	Data - 1234	550KV_HE						
<u> 7 </u>	*	Duplicate	es Only		-	H	Help	
Stations:								
Station Name	North	ning Eas	ting Ele	vation	Code	Status		ŧ
CO RD 33								
GAP 27_33								
	111						•	
							,	
		2		সস			,	
		2	•	> >			,	
Chainage: K Observations:	< [1321.:					Status		+
Chainage: K Observations: Point Name	C 1321.	Easting	Elevation	n Cod		Status		+
Chainage: K Observations: Point Name 1008	Northing 1556661.7	Easting	Elevation 66632.56	n Cod 1321	.02 ST	Status F F		+
Chainage: K Observations: Point Name	Northing 1556661.7 1556672.6	Easting	Elevatior 66632.56 36632.81	n Cod 1321 1320		F		+
Chainage: 💽 Observations: Point Name 1008 1009	Northing 1556661.7 1556672.6 1556684.0	Easting 3277686. 3277690.	Elevatior 66632.56 36632.81 66632.64	n Cod 1321 1320	.02 ST .01 ST .01 ST	F		+
Chainage: K Observations: Point Name 1008 1009 1010	Northing 1556661.7 1556672.6 1556684.0 1556669.8	Easting 3277686. 3277690. 3277692.	Elevation 66632.56 36632.61 66632.64 06632.56	n Cod 1321 1320 1321	.02 ST .01 ST .01 ST .01 ST .01	F		+
Chainage: Observations: Point Name 1008 1009 1010 1024	Northing 1556661.7 1556672.6 1556684.0 1556658.7	Easting 3277686. 3277690. 3277692. 3277745.	Elevatior 66632.56 36632.81 66632.64 06632.56 16632.70	n Cod 1321 1320 1321 1321	.02 ST .01 ST .01 ST .01 ST .01	F		+

15. View the MicroStation graphics displayed. The display graphics reflect the current contents of the fieldbook.



Note: The graphics automatically refresh by default, Automatic Refresh is toggled on under Tools > Survey Options. If it is not toggled on the graphics can be regenerated manuals from the InRoads pull down menu Survey > Regenerate Graphics.

Create the Right of Way survey feature filter.

When a fieldbook is exported to graphics, geometry, or a DTM, only the survey shots that pass the filter will be exported. In this case, additional information is desired for the development of right-of-way. Reopen the *Survey Style Filter* dialog from the pull down menu select Survey > Survey Style Filter.

🚰 Survey Style Filter	- • •
Filter Name: Roadway Centerlines	ОК
Start With: O All O None	Cancel
Build Selection	Save
Properties: Numeric Code	Save As
Value: 1335	Delete
Mode: Include Exclude	Values
Add Rule Replace Rule	Help
Rules:	
Exclude All Codes Include Numeric Code = 1313	Move Up
Include Numeric Code = 1316 Include Numeric Code = 1317-1326	Move Down
Include Numeric Code = 1332 Include Numeric Code = 1335	Delete Rule
	Clear All

- 2. From the Survey Style Filter dialog make sure the Roadway Centerlines filter is selected.
- 3. In the *Survey Style Filter* dialog, <D> the Save As button the *Save Filter As* dialog will appear.
- 4. In the Save Filter As dialog, enter Right of Way.

🖌 Save Filter As	23
Name:	ОК
Right of Way	Cancel
	Help

- 5. **<D>** the **OK** button the dialog will close and Right of Way will be the active Survey Style Filter.
- 6. Toggle **None** for the *Start With* option.
- 7. From the *Properties* drop down menu select Alpha Code.
- 8. In the *Value* field enter a value of *5??*.
- **Note:** The "??" in the key-in value is used as a wild card value when searching for data. The value of "5??" will return the range of codes 500-599.
- 9. Toggle **Include** for the *Mode* option.

	Style Filter		
Filter Name	ERight of Way		▼ OK
Start With:	o Ali	None	Cancel
Build Sel	ection		Save
Properties	3: Alpha Code		Save As.
Value:	5??		Delete
Mode:	Include	Exclude	Values
	Add Rule	Replace Rule	Help
Rules:			
	Il Codes		Move Up
210104007	marker Cardan 11	110	1.040.04
Include N Include N	umeric Code = 1 umeric Code = 1	316	Move Dov
Include N Include N Include N Include N	umeric Code = 1 umeric Code = 1 umeric Code = 1	316 317-1326 332	Move Dov
Include N Include N Include N Include N Include N	umeric Code = 1 umeric Code = 1	316 317-1326 332	

10. **<D>** the **Add Rule** button the rule will be added to the list.

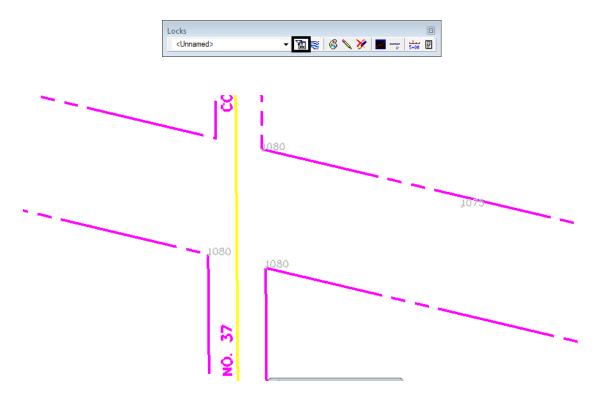
- 11. Back in the *Value* field enter a value of *10??* Keep the rest of the settings the same.
- 12. **<D>** the **Add Rule** button the rule will be added to the list.

🕌 Survey Style Filter		
Filter Name: Right of Way		• OK
Start With: 🔘 All	None	Cancel
Build Selection		Save
Properties: Alpha Code		Save As
Value: 10??		Delete
Mode: Include 	Exclude	Values
Add Rule	Replace Rule	Help
Rules:		
Exclude All Codes Include Numeric Code = 13	12	Move Up
Include Numeric Code = 13 Include Numeric Code = 13 Include Numeric Code = 13	16	Move Down
Include Numeric Code = 13 Include Numeric Code = 13 Include Numeric Code = 13	32	Delete Rule
Include Alpha Code = 5?? Include Alpha Code = 5??		Clear All
molde replie code = for:		
		/

13. From the *Survey Style Filter* dialog <D> Save then <D> the OK button the dialog will close and the new filter will be saved.

Start With: O All O None	OK Cancel
Build Selection	Save
Properties: Alpha Code	ave As
	Delete
Mode: Include V V V	/alues
Add Rule Replace Rule	Help
Rules:	
Exclude All Codes Include Numeric Code = 1313	love Up
Include Numeric Code = 1316 Include Numeric Code = 1317-1326	ve Down
Include Numeric Code - 1222	lete Rule
Include Alpha Code = 522	Clear All

14. The *Feature Filter Lock* should still be toggled **ON**. The MicroStation display updates to display only the survey codes that pass the active filter.



Note: The filter Right of Way includes codes for both property information and roadway centerline information. Now that a Survey Style Filter is active, it will be applied when exporting survey data to geometry.

Lab 2.3 - Exporting a Filtered InRoads Survey Fieldbook to Geometry

When exporting a Fieldbook to graphics, a DTM, or to a geometry project, only the items active in the Fieldbook are exported. Using a Survey Feature filter allows control of which survey data gets exported.

- 1. From the pull down menu select **Survey > Fieldbook Data** the Fieldbook Data dialog will appear.
- 2. From the Fieldbook Data dialog select the Survey Style Filter icon.

Fieldbook l	Dala - 12545	Sour-Inclui			_		
2 👔 🗉 💏	**	Duplicates	Only		-	Help	_
Stations:							_
Station Name	Northi	ing Eastin	ig Eleva	ation (Code S	Status 🔺	+
CO RD 33							
GAP 27_33						-	
•						•	
Chainage: 🛛 🕹 Observations:	< 1078		• >				_
Observations:		Easting			Status	Lla A]-#
Observations: Point Name	Northing	Easting	Elevation	Code	Status	Hc ^	-
Dbservations: Point Name 106	Northing 1558562.8	3282329.6	Elevation .6505.88	Code 1078	FA	Hc ^	4
Dbservations: Point Name 106 107	Northing 1558562.8 1555920.9	.3282329.6 .3282335.4	Elevation .6505.88 .6545.91	Code 1078 1078	FA FA	Hc ^	+
Dbservations: Point Name 106	Northing 1558562.8 1555920.9 1555976.4	3282329.6	Elevation .6505.88 .6545.91 .6574.93	Code 1078	FA	Hc ^	-+
Dobservations: Point Name 106 107 2070	Northing 1558562.8 1555920.9 1555976.4 1558527.8	.3282329.6. .3282335.4. .3281511.3.	Elevation .6505.88 .6545.91 .6574.93 .6585.79	Code 1078 1078 1075	FA FA F	Hc A	-+
Point Name 106 107 2070 105	Northing 1558562.8 1555920.9 1555976.4 1558527.8 1555913.3	.3282329.6 .3282335.4 .3281511.3 .3279643.1	Elevation .6505.88 .6545.91 .6574.93 .6585.79 .6608.33	Code 1078 1078 1075 1077	FA FA F FAN	Hc	-#
Deservations: Point Name 106 107 2070 105 2050	Northing 1558562.8 1555920.9 1555976.4 1558527.8 1555913.3 1555884.0	.3282329.6. .3282335.4. .3281511.3. .3279643.1. .3280349.7.	Elevation .6505.88 .6545.91 .6574.93 .6585.79 .6608.33 .6623.76	Code 1078 1078 1075 1077 1075	FA FA F FAN F	Hc A	+
20bservations: Point Name 106 107 2070 105 2050 108	Northing 1558562.8 1555920.9 1555976.4 1558527.8 1555913.3 1555884.0 1555292.7	3282329.6. .3282335.4. .3281511.3. .3279643.1. .3280349.7. .3279671.7.	Elevation .6505.88 .6545.91 .6574.93 .6585.79 .6608.33 .6623.76 .6476.81	Code 1078 1078 1075 1077 1075 1078	FA FA FAN F FAN F	Hc A	-

- 3. From the Survey Style Filter dialog select the filter name Right of Way
- 4. **<D>** the **OK** button. The Right of Way filter will be active and the Survey Style Filter dialog will close.

Filter Name: Right of Way	OK Cancel
Start With: 🔿 All 💿 None	Carrel
	Lancel
Build Selection	Save
Properties: Alpha Code 🔹	Save As
Value: 10??	Delete
Mode: Include Exclude	Values
Add Rule Replace Rule	Help
Rules:	
Exclude All Codes Include Numeric Code = 1313	Move Up
Include Numeric Code = 1316 Include Numeric Code = 1317-1326	Move Down
Include Numeric Code = 1332 Include Numeric Code = 1335	Delete Rule
Include Alpha Code = 5?? Include Alpha Code = 5??	Clear All

- 5. From the Locks toolbar toggle **ON** the InRoads **Feature Filter lock**.
- 6. From the pull down menu select **Survey > Survey Data to Geometry**. The Survey Data to Geometry dialog will appear.
- In the *Project Name* field key-in the Geometry Project Name *12345_ROW*. A new Geometry Project will be created by that name.
- 8. From the *Description* drop down menu select Use Style Description.
- 9. From the *Curve Stroking* drop down menu select Horizontal and Vertical.
- 10. From the *Duplicate Names* section select the radio button Rename.

🕌 Survey Data to	Geometry	8
Project Name:	12345_ROW -	Apply
Description:	Use Style Description 🔹	Close
Curve Stroking:	Horizontal and Vertical 🔹	Filter
Duplicate Names:	Replace	Preferences
Empty Project	Rename	Help

11. **<D>** the **Filter** button the Survey Style Filter dialog will appear. Review the filters rules prior to exporting.

🕌 Survey Data to	Geometry		83
Project Name:	12345_ROW	•	Apply
Description:	Use Style Description	•	Close
Curve Stroking:	Horizontal and Vertical	•	Filter
Duplicate Names:	Replace		Preferences
Empty Project	Rename		Help

- 12. **<D> OK** to close the *Survey Style Filter* dialog as it was used for review and is not required to be open.
- 13. **<D>** Apply on the *Survey Data to Geometry* dialog. The geometry project is created, the cogo points are created, and horizontal and vertical alignments are generated.

🕌 Survey Data to	Geometry	X
Project Name:	12345_ROW -	Apply
Description:	Use Style Description 🔹	Close
Curve Stroking:	Horizontal and Vertical -	Filter
Duplicate Names:	Replace	Preferences
Empty Project	Rename	Help

File Surface Geometry Drain	lage S <u>u</u> n	vey <u>E</u> valuation <u>M</u> o	odeler Dr <u>a</u> fting <u>T</u> o	ols <u>H</u> elp	
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Lૄ + 1 ₂ A _B ₽ ▲ ₽				1	
r		Name	Туре	Description	Ву
Geometry Projects	<u> </u>	1316	Vertical Align		cd
	E				
12345_ROW					
⊕					
1318					
1318					
1319	-				
	€ 4 →				

14. Examine InRoads Explorer to verify geometry data was created.

15. The survey fieldbook is no longer needed, go to the *Survey Worspace* tab and <R> 12345SURV_Fieldbook and choose Close from the fly-out list. This will remove it from memory, saving the file should not be necessary.

🚔 Bentley InRoads XM E	dition			
<u>File Surface Geometry</u>	<u>D</u> rainage S <u>u</u> n	vey <u>E</u> valuation <u>M</u> o	deler Dr <u>a</u> fting <u>T</u> oo	ols <u>H</u> elp
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L∰ + 12 A B 🕅 🧴	🛚 🕫 🏹 🖌	牆 🗟 🐼		
		Station Name	Northing	Easting Eleva
🖃 🤷 Survey Data		🗼 CO RD 33		
Book 1		Found mon		
12345SUDV	Save	GAP 27_33		
- t co	Save As			
	Save As			
	Import			
	Export			
	Set Active			
Corridors	Edit			
	Close			4
Updates the view		_		

16. From the InRoads Locks toolbar toggle OFF the InRoads Feature Filter lock.

Locks	
<unnamed></unnamed>	- 🚡 😵 🗞 🏏 🖬 📼

Lab 2.4 - Saving a Geometry Project

InRoads is Memory based, not Disk based. The file(s) seen in the InRoads Workspace pane are copies from the disk drive and reside in the computer's memory. Any changes to these files (or creation of new data files) require saving back to the disk drive.

1. From the Geometry Workspace Pane <R> on the Geometry Project 12345_ROW and select Save As from the fly-out menu the Save As dialog will appear.

- 2. Select the drop-down list for the Active: field and select 12345_ROW from the list.
- 3. Verify the same name is populating the *File Name: 12345_ROW*.

Note: By default it should be saved to the folder: C:\Projects\12345\ROW_Survey\InRoads\Geometry\ as this was the path for geometry files defined in the Project Defaults configuration file.

4. **<D>** on the *Save in: Geometry* to verify the folder location.

Save As					8
Save in:	Geometry			- 🕝 🤌 📂	
ea	Name	Date modified	Туре	Size	
Recent Places	12345_DE	SIGN.alg V_ROW.alg			
Desktop		V_SummitBP.alg V_Fieldbook.alg			
CDOT User					
Computer					
Network	File name: Save as type:	12345_ROW.alg Geometry Project	-	•	Save
	Active:	12345_ROW		-	Help Options

5. After the correct folder location is identified, <D> Save then <D> the Cancel buttons.

Save in:	Geometry			- 0	1 10		
(Ang	Name	Date modified	Туре	Size			
Recent Places	12345RO	SIGN.alg M_ROW.alg M_SummitBP.alg W_Fieldbook.alg					
Network	File name:	12345_ROW.al	g		•		Save
	Save as type:	Geometry Project	cts (*.alg)		•		Cancel
							Help
	Active:					. 2	10.045

When the Geometry Project is saved to the hard drive it takes on an extension of .alg

- The directory folder for geometry already contains four geometry projects. 12345_DESIGN.alg contains design centerline information and will be used to facilitate development of the right of way plans.
- The Geometry Styles associated with the exported fieldbook are derived from the Survey Feature Style definition at the time geometry is exported from InRoads Survey.
- Geometry styles can be assigned (or reassigned) to alignments in the Geometry > Copy Geometry dialog. No equivalent command exists for Cogo Points. However, a Geometry Style can be assigned to alignments or Cogo points when using the horizontal annotation command to view geometry information.

LAB 3 - Geometry Projects

This lab demonstrates opening and viewing Geometry Projects in MicroStation. Geometry data such as a horizontal alignment will be copied from one Geometry Project to another.

Chapter Objectives:

- Open an existing Geometry Project
- View the data stored in the Geometry Project such as the horizontal alignments and Cogo points
- Managing and copying Geometry Project data between files

Lab 3.1 - Opening and Viewing Geometry Projects

- Open the MicroStation design file C:\Projects\12345\ROW_Survey\Drawings\Reference_Files\12345ROW_Model.dgn
- Open the Geometry Project C:\Projects\12345\ROW_Survey\InRoads\Geometry\12345_ROW.alg that was created in the earlier lab.
- 3. From the MicroStation pull down menu select **Utilities > Saved Views** the Saved Views dialog will appear.

Kaved Views	- • •
°, r × 7; ≥	Mew: 1 -
Name	Description
Geometry Verify	
ROW Reference	Reference Information
Apply Options	
Window: Aspect R	
Camera Position	dlio 👻
View Attributes	✓ Levels
Clip Volume	<u>R</u> eference Settings
Gose	Apply

From the *Saved Views* dialog select the saved view name *Geometry Verify* then <D> the Apply button. This will make it easier to verify the geometry project information by turning off all the ROW_* levels.

Saved Views	
🏷 🚰 🗙 🕄 🌮	<u>Vi</u> ew: 1
Name	Description
Geometry Verify	
ROW Reference	Reference Information
•	• III
Apply Options	
Window: Aspect R	atio 💌
Camera Position	
View Attributes	Levels
Clip V <u>ol</u> ume	Reference Settings
Gose	Apply

5. **<D> Close** to dismiss the *Saved View* dialog box.

Note: When we need to see the ROW information in later steps, we will recall it using a different Saved View named **ROW Reference**.

6. From the InRoads pull down menu select **Geometry > View Geometry > Horizontal Annotation** the View Horizontal Annotation dialog will appear.

Iain Tabling Styles Apply Style Active Overwrite Horizontal Alignment: ALG_EXISTING Help Cogo Points: Default Include: Inc			
Assigned Active Overwrite Horizontal Alignment: ALG_EXISTING Cogo Points: Default Hoizontal Alignments Include: Selected: Name Descri Style Cogo Points Include: Selected: Name Descri Style Display As Complex Linestring Display Points On-Alignment Event Points On-Alignment Station Equations Plements Plements Cogo Points Duplicates Duplicates Duplicates Planarize	ain Tabling Style	S	
Horizontal Alignment: ALG_EXISTING Cogo Points: Default Horizontal Alignments Include: Include: + Selected: Selected: Name Descri Style Selected: Display As Complex Linestring Annotate Ø Points Ø Points Ø On-Alignment Event Points Ø On-Alignment Station Equations Ø Bements Dual Dimensions Ø Bements Ø Un Alignment Planarize Planarize		Active Overwrite	
Horizontal Alignments Include: Cogo Points Include: Selected: Selected: Name Descri Style Selected: Display Name Display Points Points Points On-Alignment Event Points Off-Alignment Station Equations Perments Duplicates Chords Subtangents Planarize Planarize	Horizontal Alignment:	ALG_EXISTING	Help
Include: Selected: Selected: Selected: Selected: Selected: Selected: Selected: Name Descri Style Selected: Selected: Name Descri Style Selected: Selected: Selected: Name Descri Style Selected: Selected: Selected: Name Descri Style Selected: Selected	Cogo Points:	Default	-
Selected: Name Descri Style Display As Complex Linestring Display Points Points Points Points Points Points Points Points Points Points Points Duplicates Parate Planarize Selected: Name Descri Style Parate Points Point			
Name Descri Style Name Descri Style V Display As Complex Linestring Display Points V On-Alignment Event Points V Off-Alignment Station Equations V Bements Dual Dimensions Radials Tangents Dual Dimensions V Try Altemate Styles Extend Beyond Element Planarize Planarize Planarize		<u> </u>	<u> </u>
Image: Second state of the second s			
Points Points On-Alignment Event Points Off-Alignment Station Equations Off-Alignments Duplicates Bements Dual Dimensions Radials Tangents Chords Subtangents Planarize			
Off-Alignment Station Equations Off-Alignment Station Equations Bements Radials Tangents Chords Subtangents Planarize	✓ Display As Completing	ex Linestring	
Image: Bernerts Dual Dimensions Image: Bernerts Tangents Image: Bernerts Try Alternate Styles Image: Chords Subtangents Image: Planarize	Display	ax Linestring	
Radials Tangents Chords Subtangents Planarize	Display Points		Points
Chords Subtangents Extend Beyond Element Planarize	Display Points On-Alignment	Event Points	Points
Planaize	Display Points On-Alignment Off-Alignment	Event Points	Points Elements Duplicates
	Display Points On-Alignment Off-Alignment Elements	Event Points	 Points Elements Duplicates Dual Dimensions
	Display Points On-Alignment Off-Alignment Eements Radials	Event Points Station Equations	 Points Elements Duplicates Dual Dimensions Try Altemate Styles
	Display Points On-Alignment Off-Alignment Eements Radials Chords	Event Points Station Equations	 Points Elements Duplicates Dual Dimensions Try Altemate Styles

7. Select the *Main* tab in the *View Horizontal Annotation* dialog.

8. In the *Include* field for *Horizontal Alignments* key-in an asterisk *(wild-card) then *Tab* key to identify all horizontal alignments.

Image: Styles Apply Style Image: Styles Image: Styles </th <th>verwrite</th> <th>Titer</th>	verwrite	Titer
Horizontal Alignments Include:	Inclu	de:
1316 TrcT_Traffic Double Y 1318 TrcT_Traffic Single Sk 1319 TrcT_Traffic No Pass 1320 TrcT_Traffic No Pass 1221 TrcT_Traffic Single Sk 1221 TrcT_Traffic Single Sk 1221 TrcT_Traffic Single Sk 1221 TrcT_Traffic No Pass 1221 TrcT_Traffic Single Sk 1221 TrcT_Traffic No Pass 1221 TrcT_Traffic No Pass 1221 TrcT_Traffic No Pass 1221 TrcT_Traffic No Pass 1221 TrcT_TotTraffic No Pass		
Display V Points		Annotate
On-Alignment 📃 Event Points		Elements
Off-Alignment Station Equa	tions	Duplicates
Elements		Dual Dimensions
Radials Tangents		Try Alternate Styles

9. **<D>** the **Preferences** button at the bottom of the dialog the Preferences dialog will appear.

View Horizontal Annotation	
Main Tabling Styles Apply Style Image: Comparison of the style o	Filter
Include: Inclu	o Points ide:
Name I Style Name 1316 TrzT_Traffic Double Y Image: Style Name 1318 TraT_Traffic Single Sk Sk 1319 TraT_Traffic No Pass Sk 1320 TraT_Traffic No Pass Sk 1211 TraT_Traffic Single Sk Sk ✓ Image: Sk Sk ✓ Display As Complex Linestring	me Descri Style
Display Points On-Alignment Event Points Off-Alignment Station Equations	Annotate Points Cements Duplicates
Elements Radials Chords Subtangents	Dual Dimensions Try Alternate Styles Extend Beyond Element
Planarize Apply Interactive Prefe	rences Close

- 10. Select the preference name CDOT.
- 11. **<D>** the **Load** then **<D>** the **Close** buttons. The Preferences dialog will close and the default CDOT preference will be loaded.

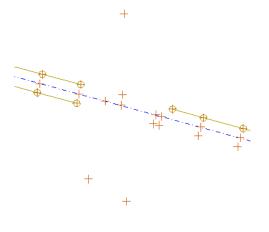
Preferences	X
Name:	Close
Default	Load
	Save
	Save As
	Delete
	Help
Active Preference: CDOT	

- 12. In the Apply Style section of the Main tab select the Active radio button.
- 13. From the *Horizontal Alignment* drop down list select ALG_Existing.
- 14. In the Annotate section of the Main tab uncheck Elements.
- 15. **<D>** the **Apply** button the selected horizontal alignments and alignment points will be displayed in the MicroStation view.

- 16. In the *Include* field for *Cogo Points* key-in an asterisk *(wild-card) then *Tab* key to identify all horizontal alignments.
- 17. **<D>** the **Apply** button the selected horizontal alignments, alignment points will be displayed in the MicroStation view.

View Horizontal Annotation Main Tabling Styles	
0	Filter
Horizontal Alignment: ALG_EXISTING Cogo Points: Default	• •
Horizontal Alignments Include:	Cogo Points Include: •
Selected:	Selected:
Name Style 1316 TrcT_Traffic Double Y 1318 TrcT_Traffic Single Sk 1319 TrcT_Traffic No Pass 1320 TrcT_Traffic No Pass 1231 TrcT_Traffic Single Sk 1232 TrcT_Traffic Single Sk 1231 TrcT_Traffic Single Sk 1232 TrcT_Traffic Single Sk 1231 TrcT_Traffic Single Sk 1232 TrcT_Traffic Single Sk 1233 TrcT_Traffic Single Sk 1234 TrcT_Traffic Single Sk	Name Descri Style 100 Section CT_Secti 102 Quarter ST_Quart 103 Quarter ST_Quart 104 Quarter ST_Quart 105 Contine CT_Secti 106 Section CT_Secti
Display	Annotate
V Points	Points
On-Alignment Event Points	Elements
Off-Alignment Station Equati	ions Duplicates
Elements	Dual Dimensions
Radials Tangents	Try Alternate Styles
Chords Subtangents	Extend Beyond Element
Planarize	
Apply Interactive	Preferences Close

18. Use MicroStation view commands to zoom into the graphics to review the display of alignments and Cogo points.



Lab 3.2 - Copying Geometry data

The current geometry project contains only information exported from the fieldbook. Another geometry project, 12345_DESIGN contains the design centerline alignment and is needed for development of right of way for this project.

The design section has developed a horizontal alignment representing the construction reference line for this project. Multiple geometry projects can be loaded into memory simultaneously and be accessed as needed. However, it is much easier (and sometimes necessary) to have the appropriate geometry information contained in a single geometry project. To that end, copy the design reference line from the geometry project 12345_DESIGN to the geometry project 12345_ROW. In order to copy geometry from one project to another, they must both be loaded into memory.

1. From the menu pull down select File > Open the Open dialog will appear.

🙀 Open						X
Look in:	📔 Geometry		+	G 🤌	ح 😢 对	
Recent Places Desktop	12345_DESIG	alg ROW.alg SummitBP.alg	Size			
Computer						
Network	File name: Files of type:	12345_DESIGN.alg	n;*.alg;*.itl;*.	ird;*.sdb;*	▼ f ▼	Open Cancel Help

Path to the file and folder
 C:\Projects\12345\ROW_Survey\InRoads\Geometry\12345_DESIGN.alg

3. **<D>** the **Open** the **<D>** the **Cancel** buttons. The file will be loaded into memory and the dialog will be dismissed.

Dpen 🔤							23
Look in:	Geometry			•	G 🦻	📂 🛄	•
æ.	Name	Date modif	Туре	Size			
2	12345_DE	SIGN.alg					
Recent Places	12345_RC	W.alg					
	12345RO	W_ROW.alg					
Dealthean	12345RO	W_SummitBP.alg	3				
Desktop	12345SUF	RV_Fieldbook.alg					
CDOT CDOT							
Computer							
2	File name:	12345 DESI	GN alg			•	Open
Network		_					
	Files of type:	InRoads File	s (*.rwk;*.dtr	n;".alg;".itl;"	Ind; sdb;	1 -	Cancel
L							Help

There is a single horizontal alignment needed from the 12345_DESIGN geometry project. It is named C_Centerline

4. From the pull down menu select **Geometry** > **Copy Geometry** the Copy Geometry dialog will appear.

ojects Horizontals	Verticals Cogo Points	
From Geometry Project:	12345_DESIGN	Apply
		Help
Name	Description	
12345_DESIGN Default 12345_ROW		
To Geometry Project:	12345_DESIGN	
	12345_DESIGN SH 86 Design geometry	

- 5. In the Copy Geometry dialog select the Horizontals tab.
- 6. In the *From* section select the *Geometry Project:* 12345_DESIGN.
- 7. In the list of horizontals select the name **C_Centerline**.

Geometry Project:	12345_DESI	GN	•	Apply
				Help
Name C_Centerline	Description Reference Line	Style ALG_PRO	+	
1				
Include All Childre	en			
✓ Include All Childr To	en			
	en 12345_ROW	,	-	
То	12345_ROW		•	
To Geometry Project:	12345_ROW	,	•	
To Geometry Project: Horizontal Alignment	12345_ROW C_Centerline		•	
To Geometry Project:	12345_ROW		•	

8. In the *To* section, set the *Geometry Project:* 12345_ROW.

9. **<D>** the **Apply** then **<D>** the **Close** buttons. The horizontal alignment will be copied and the dialog will be dismissed.

From	Verticals Cogo F			Apply
Geometry Project:	12345_DESIG	N	•	
				Help
Name	Description	Style	+	J
C_Centerline R	Reference Line	ALG_PRO		
Include All Children	1			
To Geometry Project:	12345_ROW		•	
То			•	
To Geometry Project:	12345_ROW		•	

Note: The dialog is divided into 2 sections. The top half of the dialog being the geometry project being copied from, with the lower half being the geometry project being copied to. Alignments being copied can be assigned a new name, description, or style during the copy process.

- 10. From the Geometry Workspace pane <**R**> the Geometry Project *12345_DESIGN* and select **Close** from the fly out list. InRoads may ask to save the file select no.
 - **Note:** The geometry project 12345_ROW should be the active geometry project. By default any geometry viewing or creation commands operate on the active geometry project. The active geometry project is indicated by a red box next to the name. Deleting the active project leaves InRoads in the state of no active project being defined.
- 11. From the Geometry Workspace pane <**R**> on the Geometry Project name *12345_ROW* and select **Set Active** from the fly-out menu.
- 12. Expand the display tree of active Geometry Project by selecting the plus sign.
- 13. **<R>** the Horizontal Alignment *C_Centerline* and select **Set Active** from the fly out list.

For orientation purposes, display the graphics and stationing for alignment *C_Centerline*

- 14. From the pull down menu select Geometry > View Geometry > Active Horizontal
- 15. From the pull down menu select Geometry > View Geometry > Stationing
 - **Note:** The global scale factor and selected preference influence the display of geometry and stationing.

LAB 4 - Creating Cogo Points

This lab demonstrates creating cogo points a number of different ways. The Cogo points will then be displayed in the MicroStation view.

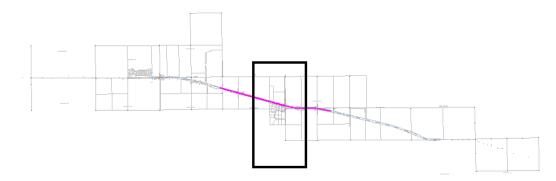
Chapter Objectives:

- Creating Cogo points graphically
- Creating Cogo points by coordinate input
- Writing geometry vertices to the Cogo buffer
- Geometry Snaps review only
- Cogo point intersection commands
- Create alignments with Cogo Points
- Create parallel and offset alignments
- Create parcels

Lab 4.1 - Cogo point creation by graphic input

Prior to generating the proposed right-of-way geometry, the public land survey lines (section lines), existing right-of way, and existing parcels will be developed. Additionally the reference line alignment vertices will be sent to the Cogo buffer.

- Open the MicroStation design file C:\Projects\12345\ROW_Survey\Drawings\Reference_Files\12345ROW_Model.dgn
- Open the Geometry Project C:\Projects\12345\ROW_Survey\InRoads\Geometry\12345_ROW.alg that was created in the earlier lab.
- 3. Use the MicroStation Fit command to view the extents of the project.
- 4. From the pull down menu select **Utilities > Saved Views** the Saved Views dialog will appear.
- 5. Highlight the view named *ROW Reference* and <D> Apply. This exercise will be working in the Summit Business Park area outlined above.



6. Use the MicroStation Window command to zoom into this area.



- Note: Cogo point 105 was created by the fieldbook export. The locations marked as 117 & 120 are required to establish section lines that are necessary for the development of right of way. These 2 Cogo points will be created in the following exercises.
- 7. Use MicroStation to Window into the location for point 117.

THE M 14 CORNER SECTION TA. TOS, BOAM

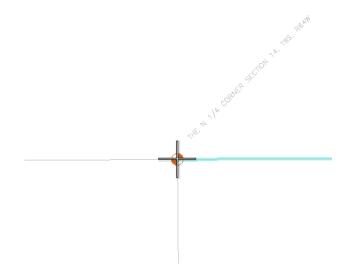
8. From the pull down menu select **Geometry > Cogo Points > New** the New Cogo Point dialog will appear.

🐂 New Cogo Point		[
Define By:	Northing/Easting -		Apply
Name:			Close
Northing:	0.00		Help
Easting:	0.00	÷	Пор
Elevation:	0.00		
Horizontal Alignment:	C_Centerline -		
Station:	0+00.00		
Offset:	0.00	-ф-	
Elevation:	0.00		
Description:			
Style:	Default 🔹		

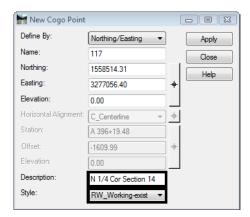
- 9. In the *Name* field key-in **117**.
- <D> the Northing Easting Elevation Target button to interactively define the coordinates. The New Cogo Point dialog will temporarly minimize to allow for more of the MicroStation view to be available.

🕌 New Cogo Point			
Define By:	Northing/Easting -		Apply
Name:	117		Close
Northing:	0.00		Help
Easting:	0.00	+	
Elevation:	0.00		
Horizontal Alignment:	C_Centerline -	÷	
Station:	0+00.00		
Offset:	0.00	+	
Elevation:	0.00		
Description:			
Style:	Default 🔹		

11. <T> then <D> to the CAD graphics at the section corner. The New Cogo Point dialog will reappear with the coordinates applied.



- 12. In the *Description* field key-in *N* 1/4 Cor Section 14.
- 13. From the Style drop down list select the RW_Working-exist.



 <D> Apply then <D> the Close buttons. The Cogo point is created and displayed to the MicroStation screen.

🕌 New Cogo Point		[
Define By:	Northing/Easting -		Apply
Name:	117		Close
Northing:	1558514.31		Help
Easting:	3277056.40	÷	Tiop
Elevation:	0.00		
Horizontal Alignment:	C_Centerline -	ф-	
Station:	A 396+19.48		
Offset:	-1609.99	-	
Elevation:	0.00		
Description:	N 1/4 Cor Section 14		
Style:	RW_Working-exist 🔻		

If Report lock is ON, a Results dialog opens.

<unnamed></unnamed>	- 🚡 🛒 🚳 🔪 🏏	
Results		
Create Cogo Point 117		15585 Close
		Save As.
		Append.
		Display
		Print
< III		Help

15. **<D>** the **Close** button in the Results dialog.

Lab 4.2 - Cogo point creation by coordinate input

In the New Cogo Point dialog, define Cogo point 120 which is located south of Summit Business Park

1. In the Name field key-in 120.

Note: When entering multiple Cogo points the Name field automatically increments.

- 2. From another source, the SE Corner of Section 14 (future point 120) has been determined as having the coordinate values of:
 - North = 1,553,239.97
 - ◆ East = *3,279,699.86*
- 3. In the *Description* field key-in *SE Cor Section 14*

4. From the Style drop down list select RW_Working-exist

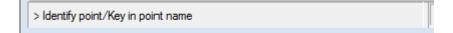
🕌 New Cogo Point		[
Define By:	Northing/Easting -		Apply
Name:	120	1	Close
Northing:	1553239.97		Help
Easting:	3279699.86	+	
Elevation:	0.00		
Horizontal Alignment:	C_Centerline -	ф-	
Station:	B 434+44.66		
Offset:	2787.36	-ф-	
Elevation:	0.00		
Description:	SE Cor Section 14		
Style:	RW_Working-exist 🔻		

5. **<D> Apply** then **<D>** the **Close** buttons. The Cogo point is created and displayed to the MicroStation screen.

Define By:	Northing/Easting	•		Apply
Name:	120			Close
Northing:	1553239.97		1	Help
Easting:	3279699.86	-	⊧	Tiop
Elevation:	0.00			
Horizontal Alignment:	C_Centerline -	-	⊧	
Station:	B 434+44.66		1	
Offset:	2787.36	-	⊨	
Elevation:	0.00	ī.		
Description:	SE Cor Section 14			
Style:	RW_Working-exist -	n.		

Lab 4.3 - Centering a MicroStation View on a Cogo Point

1. From the pull down menu select **Geometry > Cogo Points > Center Point** the Micro-Station status bar prompts you to *Identify point/Key in point name*.



2. In the MicroStation Key-in window, key-in 120 <Enter>

🙀 Key-in			Σ	3
120	-	₽	Q	•

- 3. If more then one view is opened you are prompted to Select a View.
- 4. **<D>** in any MicroStation **View** the MicroStation view is repositioned to center the specified Cogo point.

Note: The above command will not change the display volume of the MicroStation screen. You may be required to zoom in or out to achieve desirable results.

5. Continue to **Center** other cogo points *105* and *117*.

LAB 5 - Alignment to Cogo Buffer

This lab demonstrates alignment cogo point naming can be defined by the user or assigned by InRoads using a user specified seed name. While the overall alignment must be assigned a unique name, the vertices (PI's, PC's, PT's, etc) of said alignments can exist in three states, as: cogo points, named points, or unnamed points.

Chapter Objectives:

- Create cogo points from a horizontal alignment
- Review cogo points stored in the Cogo Buffer
- Open the MicroStation design file C:\Projects\12345\ROW_Survey\Drawings\Reference_Files\12345ROW_Model.dgn
- Open the Geometry Project
 C:\Projects\12345\ROW_Survey\InRoads\Geometry\12345ROW.alg
 that was created in
 the earlier lab.
- 3. From the Geometry Workspace pane <**R**> on the Geometry Project name *12345_ROW* and select **Set Active** from the fly-out menu.
- 4. Expand the display tree of active Geometry Project by selecting the plus sign.
- 5. **<R>** the Horizontal Alignment *C_Centerline* and select **Set Active** from the fly out list.
- 6. From the pull down menu select **Geometry > Review Horizontal** the Review Horizontal Alignment dialog will appear with *C_Centerline* as the active alignment.

Geometry Project:	12345_ROW	•	Mode	Alignment 🔿 Eleme	ant	Close
Horizontal Alignment:	C_Centerline	•	Curve Sets		51 IL	Save As.
	Project Name Description		ROA			Append
Horizontal Al	lignment Name Description	C_Cente				Display
	Style	ALG_PRO) STATION	NORTHING		Print
Element: Lir	an	~				Help
	POB (PC (2	314+56.59 331+59.51	1558452.21 1558469.14		
	gent Direction Fangent Lengtl		₹ 89^25'49" E 1702.92	1556469.14		Select
		10	1,02.72		S	First
Element: Circ	PC (PI (}	331+59.51 334+74.30	1558469.14 1558472.27	1	< Previou
	CC (PT ()	337+86.58	1555604.28 1558406.98	S	Next >
	Radius	s : .	2865.00		-	Last

As they relate to the Cogo buffer, InRoads reserves geometry point names. These are reserved as Cogo point ID's in the event the named geometry points are written to the Cogo buffer. If the alignment containing the named geometry points is written to the Cogo buffer, the naming between geometry points and cogo points is synchronized.

Note: The information in parenthesis shows the identifier of the vertices either as Cogo points or as named or unnamed geometry points. In this case, the alignment *C_Centerline* was created as *unnamed* geometry points.

The assignment of geometry names at time of creation (or editing) is controlled by: **Tools > Options [Geometry]** tab.

Options				
Tolerances	Factors Abb	reviations	Rail	Sight Distance
Precision	General	Units and	Format	Geometry
Plotting Heig	ht:	0.00		Help
Seed Alignme	ent Name:	1		
Seed Point N	lame:	1		
Curve Defin	nition			
Horizontal:			Always C	onfim
Vertical:	Arc	•		
	Parabolic	•		
Measure:	Along Arc	Along C	hord	
-	Curve Length:	100.00		
Unit Station	Length:	100.00		
Define Trans	itions By:	Length	0	Constant
Spiral Definiti	on:	Clothoid		•
ICS Coordina	ate Sequence:	Northing/E	Easting	•
Vertical Angle	e Reference:	Zenith		•
Angular Mod	e:	Bearings		•
Point Names	During Edits:	Do Not As	sign	•
Default Ac	cess Modes		-	-
Horizontal A		ad-Only	Read-W	rite
Cogo Buffe	-			
Cogo Burre	I.		•	
	Apply Pre	ferences	C	ose

Write the vertices for alignment C_Centerline to the Cogo buffer. Doing so will facilitate the generation of additional geometry for the development of the project.

7. Select Geometry > Horizontal Curve Sets > Events the Horizontal Events dialog opens.

	rizontal Ev	/ents		_		
© Ne	·		Locate By Name: Northing: Easting:	0.00	+	Apply Close Help
Se De Sty	eed Name: escription: yle: Defau dd Vertical npute Elev		Station Start: 314+56.5 Stop: C 560+9 Vertical Alignment	1.01	• 0.00 • 0.00 \$ecc 0.00	nd:
	Station	Offset	Northing	Easting	Elevation	Style
				Edit	Delete	Report

- 8. <D> the radio button for Alignment Point to Cogo
 - **Note:** The seed name field only applies to unnamed geometry points. If names are already assigned to the alignment, the assigned names will be used regardless of input into the Seed Name field. The active alignment C_Centerline does not have geometry point names assigned so input here is desired. If no seed name is defined here, the next available Cogo point number would be used and incrementally increased.

Reviewing the Cogo buffer indicates that the range of number from 121-1007 are unused. For simplicity, set point number 200 as the initial Cogo point ID to assign to the alignment vertices (more on reviewing the Cogo buffer in the following lab).

- 9. Key-in *200* as the Seed Name
- 10. Key-in *Design Ref line* in the Description field
- 11. Select ALG_PRO as the geometry style to assign to the new Cogo points

enne	е Ву:	Single Point						Apply
Add			Locate By	/			. [Close
OS	itation and	Offset	Name:					
O N	lorthing and	Easting	Northing:	0.00		+		Help
🔘 Cogo Point		Easting:	0.00					
o A	Vignment Po	pint to Cogo						
S	eed Name:	200	Station			Offse	ets	
D	escription:	Design Ref line	Start		1.51	First:		1.00
Style: ALG_PRO -			314+56.59 +		0.00			
			Stop: C 560+9	1.01	+	Secc	192	4
A	dd Vertical	Event Points	C 300+3	1.01		0.00		
]Co Ever		ation from Active	Vertical Alignmer	nt				
М	Station	Offset	Northing	Easting	Elev	ation	Style	
				Edit	F	lete		eport

12. **<D> Apply** then **<D>** the **Close** buttons the points will be added to the cogo buffer and the dialog will be dismissed.

13. In the Geometry Workspace pane review the Cogo Buffer to verify the results by <D> on the *Cogo Buffer* then reviewing the *Feedback pane*.

File Surface Geometry Drainage Su	rvey <u>E</u> valuation <u>M</u>	odeler Dr <u>a</u> fting <u>T</u> o	ols <u>H</u> elp	
<unnamed></unnamed>	I 😹 🚳 🔪 🏏	 5+00 E	^	
	Name	Description	Style	
Cogo Buffer	200	Design Ref line	ALG_PRO	٦
	201	Design Ref line	ALG_PRO	
	202	Design Ref line	ALG_PRO	
3878_1	203	Design Ref line	ALG_PRO	
1095_2	204	Design Ref line	ALG_PRO	
1097_2	205	Design Ref line	ALG_PRO	
1096_2	206	Design Ref line	ALG_PRO	
	207	Design Ref line	ALG_PRO	
🖁 Geometry 🔊 Preference 🕢 🕨	▲ []		4	

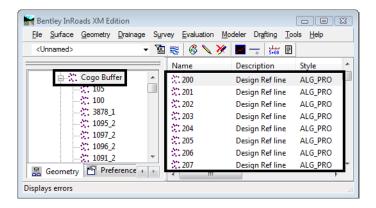
14. <R> on the Geometry Project name 12345_ROW from the pop up menu <D> Save

LAB 6 - Reviewing Cogo Points

This lab demonstrates that Cogo points can be reviewed in the InRoads feedback pane and then exported to a text file.

Chapter Objectives:

- Review Cogo points in the feedback pane of the InRoads interface
- Save Cogo points stored in the Geometry Project to a simple text file
- 1. **Open** the MicroStation design file C:\Projects\12345\ROW_Survey\Drawings\Reference_Files\12345ROW_Model.dgn
- Open the Geometry Project C:\Projects\12345\ROW_Survey\InRoads\Geometry\12345_ROW.alg that was created in the earlier lab.
- 3. From the Geometry Workspace pane <**R**> on the Geometry Project name *12345_ROW* and select **Set Active** from the fly-out menu.
- 4. In the Geometry Workspace pane review the Cogo Buffer to verify the results by <D> on the *Cogo Buffer* then reviewing the *Feedback pane*.



- **Note:** Cogo points can be assigned either numbers or names. When alpha characters are used, names are case sensitive; RL_10 is not the same point as rl_10.
- 5. **<D>** on the *column* headers **Name** | **Northing** to sort the cogo points in ascending and descending order.
- 6. **<D> hold and drag** a column header to reorder the columns.

7. From the pull down menu select **Geometry > Review Geometry Points** the Review Geometry Points dialog will appear.

👬 Review Geor	metry Points		
Mode: 🔘 Aligni	ment: C_Centerline	Ŧ	Apply
All Po	ints		Close
Point			
Name:	100	+	Report
Description:	Section Corner		Help
Style:	T_Section Comer -]	
Northing:	1558457.41	2	
Easting:	3269295.23		
Elevation:	6654.37		
Synchronize	Shared Point Elevations		
Shared Points			
Point Type	Alignment		
COGO			
First	< Previous Next	>	Last

8. In the *Name* field key-in *200* then the *Tab* key the dialog will display the cogo point information.

🕌 Review Geor	metry Points		
Mode: 🔘 Alignr	nent: C_Centerline	-	Apply
Al Po	ints		Close
Point			Report
Name:	200	+	
Description:	Design Ref line		Help
Style:	ALG_PRO -		
Northing:	1558452.21		
Easting:	3268628.62		
Elevation:	0.00		
Synchronize	Shared Point Elevations		
Shared Points			
Point Type	Alignment		
COGO			
]
First	< Previous Next	>	Last

- **Note:** This dialog can be used to evaluate individual Cogo points (or named geometry points) by navigating with the provided buttons.
- 9. **<D>** the **Next** | **Previous** | **First** | **Last** buttons to navigate the cogo points stored in the cogo buffer.

Report Result	s		-	Close
POINT NAME	NORTHING	EASTING	F	Save As
100	1558457.41	3269295.23	-	Append
102	1558430.90	3266629.98		Append
103	1555770.83	3266639.57	1	Display
104	1555781.53	3269304.03		Dispidy
105	1558527.87	3279643.18		D
106	1558562.81	3282329.69		Print
107	1555920.99	3282335.45		C
108	1555884.03	3279671.70	-	Help

10. **<D>** the **Report** button the Results dialog will appear with all the cogo points listed.

- **Note:** This Results dialog will list both Cogo points and named geometry points (named alignment vertices not stored as Cogo points). This is signified by the name of the command used to generate this report Review Geometry Points, not Cogo points. Named geometry points are not written to the Cogo buffer automatically. However they are reserved.
- 11. **<D>** the **Save As** button the Save As dialog will appear.
- 12. Path to the folder *InRoads**Geometry*
- 13. Key-in the file name *GeoPoints.txt*
- 14. **<D>** the **Save** button the file will be stored and the dialog will be dismissed.
- 15. **<R>** on the Geometry Project name **12345_ROW** from the pop up menu **<D> Save**

LAB 7 - Geometry Snaps

This lab demonstrates InRoads geometry snaps to allow the user added functions to ensure geometry point locations and direction criteria are selected at defined geometry locations. In this lab the geometry inverse command is used for illustration. Geometry snaps can be applied when creating alignments, using traverse commands or almost any geometry related command. Using geometry snaps will ensure specific locations are selected.

InRoads geometry snaps are analogous to MicroStation snaps such as the keypoint snap. When enabled, the software only allows selection at specific locations.

Chapter Objectives:

- Use both No Snap and Point Snap from the Locks toolbar
- Use the Inverse Direction tool on Cogo points
- Open the MicroStation design file C:\Projects\12345\ROW_Survey\Drawings\Reference_Files\12345ROW_Model.dgn
- Open the Geometry Project
 C:\Projects\12345\ROW_Survey\InRoads\Geometry\12345_ROW.alg that was created in the earlier lab.
- 3. From the Geometry Workspace pane <**R**> on the Geometry Project name *12345_ROW* and select **Set Active** from the fly-out menu.
- 4. Make sure the locks toolbar is open from the pull down menu select **Tools > Locks > Toolbar** dock the toolbar into the InRoads interface.

Locks	
<unnamed></unnamed>	- 🛯 📚 🚳 🔪 🏏 🔳 😓 🐜 🗉

5. **<D>** on the **Element Snap Lock** icon in the InRoads Locks toolbar.



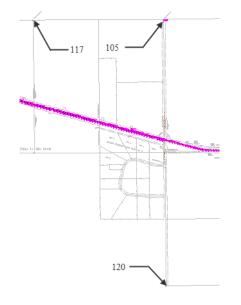
- 6. **<D>** on the **Element Snap Lock** icon a second time to cycle through the three geometry snap modes:
 - No Snap Element snap off
 - Point snap locks to Cogo points or alignment vertices
 - Element snap select tangents for direction definition

7. Window the MicroStation view as shown below.



- **Note:** To explore the Element Point snap use the inverse command to report distance and direction between cursor locations.
- 8. Set the *Element Snap Lock* OFF
- 9. From the pull down menu select **Geometry > Utilities > Inverse Direction** the Inverse Direction dialog will appear.
- 10. **<D>** the **Inverse** tab the **<D>** the **Interactive** button. After selecting the Interactive button you are prompted in the MicroStation status bar to Identify Initial Point/Key in Initial Point.

Invers	e Directi	on		
Inverse	Radial	Tangent Offset	Annotate	
Point:	-			Interactive
				Reset
				Help
		Preferences	Close	



11. **<D>** near Cogo point **117** and then **<D>** near Cogo point **105**.

Dynamic graphics will appear and both the MicroStation and InRoads command fields will report the results. A question mark indicates that a specific Cogo point has not been selected. In this case, the bearing and distance readout reflects the values between the data <D> points given. Not between defined geometry points.

> Identify next point/Key in next point ?to ? N 89^26'16'' E 2615.54

- 12. Toggle ON the Geometry Point Snap Lock to select defined geometry.
- 13. From the pull down menu select **Geometry > Utilities > Inverse Direction** the Inverse Direction dialog will appear.
- 14. **<D>** the **Inverse** tab the **<D>** the **Interactive** button. After selecting the Interactive button you are prompted to Identify Initial Point/Key in Initial Point.

🖬 Inve	erse Directi	on		
Invers	e Radial	Tangent Offset	Annotate	
Point	:			Interactive
				Reset
				Help
		D(Class	
		Preferences	Close	

15. **<D>** near Cogo Point **117** and then **<D>** near Cogo point **105**. InRoads reports the bearing and distance between points 117 and 105.

> Identify next point/Key in next point 117 to 105 N 89^41'59'' E 2586.82

- 16. Move the cursor around the MicroStation view. Note how the cursor 'snaps' between specific geometry vertices.
- 17. Toggle Geometry Snap Lock OFF.

Note: Geometry snaps, if enabled, operate whether the related graphics are visible or not.

After initializing the Inverse Direction command, point numbers can also be keyed into the Inverse Direction tab Point key-in field.

- 18. From the pull down menu select **Geometry > Utilities > Inverse Direction** the Inverse Direction dialog will appear.
- 19. $\langle D \rangle$ the **Inverse** tab.
- 20. In the Point field key-in **117** then **Tab** key.
- 21. In the Point field key-in **120** then **Tab** key the results dialog will appear with the distance and direction displayed.

Inverse 117	Direction		15585	Close
120	S 26^37'11" E	5899.71	15532	Save As.
120			10002	Append
				<u>D</u> isplay
				<u>P</u> rint
				<u>H</u> elp
۰ III			•	

Note: The geometry snap element will be covered in following exercises.

22. <R> on the Geometry Project name 12345_ROW from the pop up menu <D> Save

LAB 8 - Cogo Point by Traverse

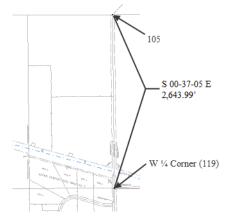
This lab demonstrates the use of the Traverse command to establish the West ¹/₄ corner from point 105. Development of the right of way for the project requires the establishment of the West ¹/₄ corner for Section 13 which lies South of the project reference line near the Northeast corner of the Summit Business Park development.

Chapter Objectives:

- Create Cogo points using direction and bearings key-ins
- Open the MicroStation design file C:\Projects\12345\ROW_Survey\Drawings\Reference_Files\12345ROW_Model.dgn
- Open the Geometry Project C:\Projects\12345\ROW_Survey\InRoads\Geometry\12345_ROW.alg that was created in the earlier lab.
- 3. From the Geometry Workspace pane <**R**> on the Geometry Project name *12345_ROW* and select **Set Active** from the fly-out menu.

The West $\frac{1}{4}$ corner has been determined to lie south of the NW corner of section 13 (Cogo point 105) at:

- ◆ S 00-37-05 E
- ◆ 2,643.99 feet



4. From the pull down menu select **Geometry** > **Traverse** the Traverse dialog will appear.

🐂 Traverse						• ×
Method: 💿 An	igle 🔘 Direction	Curve 🔘	Insert Point Mode			Apply
Backsight			To Cogo Buffer			Close
Point:		+	Before Alignment	nt		Liose
Oirection:	N 0^00'00" E	+	O After Alignment			Undo
	-		Radial			Help
Occupied Point	t		0.111			
Name:			Course			
Northing:	0.00	-	Angle	•	0^00'00''	 +
Easting:	0.00		Horizontal Distance	e 🔻	0.00	+
Elevation:	0.00		Radius	-	0.00	+
Instrument Ht.:	0.00		Radius	-	0.00	+
E			Zenith Angle	-	90^00'00''	+
Foresight Point	1		Rod Height:		0.00	
Description:		_	Offset:		0.00	+
Style:	Default	-		Clos	e Traverse	
			l			

- 5. From the *Method* radio button select Direction.
- 6. From the Insert Point Mode radio button select To Cogo Buffer
- 7. In the *Occupied Point* section of the dialog key-in the *Name:* **105** then **Tab** key. The coordinates for point 105 will display.
- 8. In the *Course* section of the dialog key-in the *Direction:* **SO 37 05 E**
- 9. In the *Course* section of the dialog key-in the *Horizontal Distance: 2643.99*
- 10. In the Foresight Point section of the dialog key-in the Name: 119
- 11. In the Foresight Point section of the dialog key-in the Description: W 1/4 Cor Sec 13
- 12. In the *Foresight Point* section of the dialog select the *Style* RW_Working-exist from the drop down list.

Traverse					- • •
Method: 🔘 Ar	ngle Oirection	Curve	Insert Point Mode		Apply
Backsight			To Cogo Buffer		Close
Operation Point:			Before Alignment		
O Direction:	N 0^00'00'' E	- ф -	After Alignment		Undo
			Radial		Help
Occupied Poin	nt	_			
Name:	105		Course		
Northing:	1558527.87	•	Direction -	S 0^37'05" E	+
Easting:	3279643.18] *	Horizontal Distance 🔻	2643.99	+
Elevation:	6585.79		Radius	0.00	+
Instrument Ht.:	0.00		Radius	0.00	+
			Vertical Distance 🔹	0.00	+
-Foresight Point Name:	119		Rod Height:	0.00	
Description:	W 1/4 Cor Sec 13	-	Offset:	0.00	+
Style:				-	
,	RW_Working-exist	<u> </u>	Lic	se Traverse	

- 13. **<D>** the **Apply** button the point 119 will be created and become the occupied point. The foresight point will automatically increment to the next available number.
 - **Note:** If point 119 would have already existed, the next available point number would be used and 119 would not have been overwritten.

From the newly created point 119, traverse to the east establishing point 121 on the South right-of-way line of S.H. No. 86. Said point lying at N $89^12'18''$ E, a distance of 30' (RW width) + 660.53' (ROW length).

- 14. From the *Method* radio button select Direction.
- 15. From the Insert Point Mode radio button select To Cogo Buffer
- 16. Verify the *Occupied Point* is the *Name: 119*.
- 17. In the Course section of the dialog key-in the Direction: N 89 12 18 E
- 18. In the *Course* section of the dialog key-in the *Horizontal Distance: 30*
- 19. Verify the *Foresight Point* is the *Name: 121*
- 20. In the Foresight Point section of the dialog key-in the Description: South ROW point
- 21. In the *Foresight Point* section of the dialog select the *Style* RW_Working-exist from the drop down list.

Method: Angle Direction Curve Insert Point Mode To Cogo Buffer Before Alignment Before Alignment After Alignment Radial Occupied Point Name: 119 Radial Northing: 1555884.03 Bevation: 6595.79 Instrument Ht: 0.00 No Foresight Point 0.00 Radius 0.00 Foresight Point 0.00 Radius 0.00	
Backsight 0 Point: 105 + O Direction: N 0^00'00'' E + O After Alignment Occupied Point - Radial Occupied Point - Course Name: 119 - Northing: 1555884.03 + Easting: 3279671.70 + Elevation: 6585.79 - Instrument Ht: 0.00 - Foresight Point - 0.00	Apply
Direction: N 0^00000" E After Alignment Radial Course Direction • N 89^12/18" E Besting: 3279671.70 Elevation: 6585.79 Instrument HL: 0.00 Radius • 0.00 Radius • 0.00 Vertical Distance • 0.00 Vertical Distance • 0.00 	Close
Occupied Point Radial Name: 119 Northing: 1555884.03 Easting: 3279671.70 Elevation: 6585.79 Instrument HL: 0.00 Foresight Point 0.00	
Occupied Point Course Northing: 1555884.03 Easting: 3279671.70 Elevation: 6585.79 Instrument Ht: 0.00 Foresight Point 0.00	Undo
Name: 119 Northing: 1555884.03 Easting: 3279671.70 Elevation: 6585.79 Instrument Ht: 0.00 Radius 0.00 Vertical Distance 0.00	Help
Easting: 3279671.70 Elevation: 6585.79 Instrument Ht: 0.00 Foresight Point 0.00	
Easting: 3279671.70 Instrument Distance 30.00 Elevation: 6585.79 Instrument Ht: 0.00 Radius 0.00 Foresight Point Vertical Distance 0.00 0.00 Instrument Ht: 0.00	+
Instrument Ht.: 0.00 Foresight Point 0.00	+
Foresight Point	+
Foresight Point	- ф -
Foresignt Point	+
Name: 121 Rod Height: 0.00	
Description: South ROW point Offset: 0.00	+
Style: RW_Working-exist Close Traverse	_

- 22. **<D>** the **Apply** button the point 121 will be created and become the occupied point.
 - **Note:** Notice the previous foresight point has become the occupied point. Also note math operations can be used in the input fields. Once you [tab] from the field, the math operation computes. Experiment using +, -, *, /
- 23. Close traverse dialog box.
- 24. **<R>** on the Geometry Project name **12345_ROW** from the pop up menu **<D> Save**.

LAB 9 - Horizontal Alignments from Cogo Points

This lab will expand on previous training to create alignments by chaining Cogo points together. This methodology, commonly referred to as the "PI Method" and will utilize the *Geometry* > *Horizontal Curve Set* tools.

Chapter Objectives:

- Become more familiar with the Geometry Point Snap Lock
- Create an alignment using Cogo points

Lab 9.1 - Generate Alignment using Cogo points

- Open the MicroStation design file C:\Projects\12345\ROW_Survey\Drawings\Reference_Files\12345ROW_Model.dgn
- Open the Geometry Project
 C:\Projects\12345\ROW_Survey\InRoads\Geometry\12345_ROW.alg that was created in the earlier lab.
- 3. From the Geometry Workspace pane <**R**> on the Geometry Project name *12345_ROW* and select **Set Active** from the fly-out menu.

Connect the 3 Cogo points 120, 119, and 105 established along the west line of Section 13 to form an alignment that represents the center line of County Road 303. Once established, this alignment can be used for establishing the right of way limits for said road.

4. Set the MicroStation View to show the subject area.



5. **<D>** Geometry Point Snap Lock ON.

6. From the pull down menu select

Geometry > Utilities > Create/Edit Alignment by Cogo Points. A warning message may appear which indicates that the active alignment may have illegal (unassigned) point names.



Recall that the alignment C_Centerline was created with unnamed geometry points (you can verify this with Geometry > Review Horizontal). In a previous exercise the alignment points were written to the Cogo buffer. Doing so created Cogo points for the alignment vertices but did not associate the created Cogo points back to the alignment. You are presented with two options:

- Selecting *No*: The identified alignment continues to exist using unnamed geometry points, which is OK and the Create/Edit Alignment by Cogo Points dialog will open.
- Selecting *Yes*: InRoads will associate the Cogo points created back to the alignment vertices. Either solution is OK, ultimately it is at your discretion which to choose.
- 7. **<D>** the **Yes** button the *Create/Edit Alignment by Cogo Points* dialog opens.

Create/E	dit Alignment by Cogo Points	
Name:	C_Centerline 👻 🔶	Apply
Description:	Reference Line	Close
Style:	ALG_PRO -	Help
Alignment De	efinition:	
212 C213L	102R 203 204 C205R 206 207 208 2 214 215 216 C217R 218 219 C220 5 C226R 227 228 <u>C229R</u> 230 231 <u>C</u>	R 221 222
		· ·
Graphical I	nput	Clear
	Start Stop	
Center Po	pint Left Point Ce	nter Point Right
	Curve Midpoint Spiral F	1

Note: The alignment C_Centerline is defined as having Cogo point numbers assigned at its vertices. The letter C indicates the Cogo point identified is the Center of a curve. The letters R or L indicate the curve direction (Right or Left).

- 8. In the Name field key-in West Line of Sec 13 and then the Tab key. The dialog will clear and allow the creation of a new alignment
- 9. In the Description field key-in CL CR 303and then the Tab key.
- 10. From the Style drop down list select RW_Sec-Line_ex

M Create/I	dit Alignment by Cogo F	Points	
Name:	West Line of Sec 13	+ +	Apply
Description:	CL CR 303		Close
Style:	RW_Sec-Line_ex	→	Help
Alignment D	efinition:		Thep
			*
		ſ	Clear
Graphical Center P	Start	Stop Cent Spiral PI	er Point Right

Note: In this instance CL CR stands for Center Line of County Road 303. Do not confuse the L and R used in the description with the L and R used to indicate the curve direction, as described on the previous page.

Name:	West Line of Sec 13	• +	Apply	
Description:	CL CR 303		Close	-
Style:	RW_Sec-Line_ex	•	Help	-
Alignment De	efinition:			_
				^
				*
			Clear	•
Graphical I	nput		Clear	
Graphical I	nput Start	Stop	Clear	-
Graphical I	Start		Clear	ht

11. **<D>** the **Start** button the dialog will collapse and you are prompted to Identify Point.

- 12. **<D>** near the points on the screen starting on the south end. Continue to graphically select points to define the alignment. Graphics will display showing the alignment location. By default, the alignment will pass through the points nearest the data point without the geometry point snap enabled.
- 13. **<R>** when finished selecting points graphically, the *Create/Edit Alignment by Cogo Points* dialog will redisplay.

14. **<D>** Stop button the *Create/Edit Alignment by Cogo Points* dialog will show the selected points in the Alignment Definition.

🕍 Create/I	Edit Alignment by Cogo Pe	oints	
Name:	West Line of Sec 13	• •	Apply
Description:	CL CR 303		Close
Style:	RW_Sec-Line_ex	•	Help
Alignment D	efinition:		
120 1855	105		
			-
			Clear
Graphical	Input		
	Start	Stop	
Center P	oint Left Point	Cer	nter Point Right
	Curve Midpoint	Spiral P	I

Note: Cogo points can be deleted, inserted, cleared, or edited directly in the Alignment definition section of the Create/Edit Alignment by Cogo Points dialog. If desired, the entire definition can be input through the use of the keyboard.

If any points were selected by mistake, they can be edited. Using the cursor and keyboard, simply replace the accidental input(s).

	PLAC D			83
	dit Alignment by Cogo Poi			23
Name:	West Line of Sec 13	+	Apply	
Description:	CL CR 303		Close	
Style:	RW_Sec-Line_ex	•	Help	
Alianment De	efinition:		nop	
120 119 1	05			*
			Clear	÷
-Graphical I	nput			
	Start	Stop		
Center Po	pint Left Point		nter Point Rig	ht
Conterin			itor i offici nug	p n.

15. In the *Alignment Definition* area key-in **119** for the second point.

16. **<D> Apply** the horizontal alignment is created and displayed.

Note:

- Alignments are directionally based. If the above workflow was followed, the created alignment runs South to North. This becomes important when offsetting the alignment to either the left or right (left is input as a negative number)
- Alignment direction can be ascertained by: reviewing the alignment, by tracking, or by displaying stationing
- Alignment direction can be 'reversed' by using the Geometry > Transpose command
- Alignments created by chaining Cogo points can be edited using the Geometry > Horizontal Curve Set tools
- 17. <R> on the Geometry Project name 12345_ROW from the pop up menu <D> Save

LAB 10 - Cogo Intersection Commands

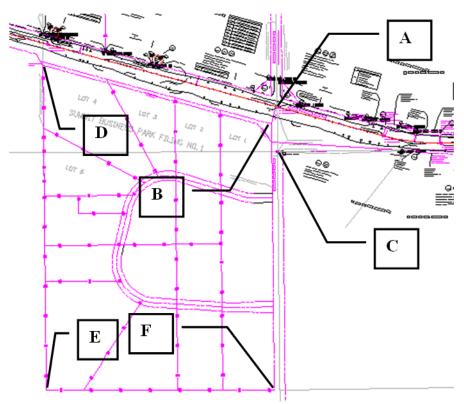
Development of right of way information can be facilitated using Cogo intersection commands. These Cogo points can then in-turn be used to define alignments (parcels). While this is a potential workflow, it is not necessary to first create Cogo points. It is simply one solution to establish required geometry information.

Chapter Objectives:

- Create Cogo points through various Intersection Commands
- Generate Alignments from Cogo Points

In order, create Cogo points for:

- A) The intersection of the design reference line and the west line of section 13, "*Lab* 10.1 Alignment-Alignment Intersection"
- B) The NE corner of Summit Business Park, "Lab 10.2 Alignment Alignment Intersection using Offsets"
- C) A right of way point on the east side of County Road 303, "Lab 10.3 Direction Alignment Intersection"
- D) The NW corner of Summit Business Park, "Lab 10.4 Station & Offset"
- E) The SW corner of Summit business Park, "Lab 10.5 Traversing"
- ♦ F) The SE corner of Summit business Park, "Lab 10.6 Direction Direction Intersection"



Lab 10.1 - Alignment-Alignment Intersection

Grouping Cogo point numbers together is desired. All Cogo points for these exercises are to start with point number 300 and automatically increment. Establish a Cogo point at the intersection of the project reference line with the west line of section 13. Two alignments exist representing these features: *C_Centerline & West Line Sec 13*

- 1. Select Tools > Options > [Geometry]
 - Input a *Seed Point Name* of *300*
- 2. **<D> Apply**
- 3. **<D> Close**

Tolerances	Factors	Abbreviations	Rail	Sight Distance
Precision	Genera	Units a	nd Format	Geometry
Plotting Heigh	nt:	0.00		Help
Seed Alignme	ent Name:	1		
Seed Point N	ame:	300		
Curve Defin	nition			
Horizontal:			Always Co	onfirm
Vertical:	Arc	•		
	Parabolic	•		
Measure:	Along A		Chord	
Degree of C		100.00		
Unit Station	Length:	100.00		
Define Transi	tions By:	Lengt	h ⊚C	onstant
Spiral Definiti	on:	Clothoid		•
ICS Coordina	ate Sequence	e: Northing	/Easting	-
Vertical Angle	e Reference	Zenith		•
Angular Mode	e:	Bearings		•
Point Names	During Edits	Do Not	Assign -	•
Default Acc	cess Modes		100 M 1000	
Understal	l'anna da c	Read-Only	10000	ite
Horizontal A		0	۲	
Cogo Buffer		O	۲	

4. Select Geometry > Locate > Intersection

The Intersection dialog opens. The *Type* selection list defines typical Cogo intersection commands.

5. Select *Type:* Alignment/Alignment

intersect	ion		-	- • 🔀
Туре:	Alignment/A	lignment 🔻		Apply
Alignment Name: Offset:	1 Default 0.00	•	+ +	Close Help
Alignment Name: Offset:	2 Default 0.00	•	+	

6. Complete the dialog as shown below.

🔚 Intersect	ion	
Type:	Aignment/Alignment	 Apply
Alignment Name:	C_Centerline	- + Close
Offset:	0.00	+ Help
Alignment 2 Name: Offset:	West Line of Sec 13 0.00	▼ <u>+</u>
Extend to	Intersection Inter	rsect All Alignments

- **Note:** In addition to selecting the alignments to intersect, offsets can be defined. A negative sign (-) indicates an offset to the left.
- 7. **<D> Apply -** a results dialog opens if report lock is enabled.

8. Key-in a *Description*, and choose a *Style* as shown.

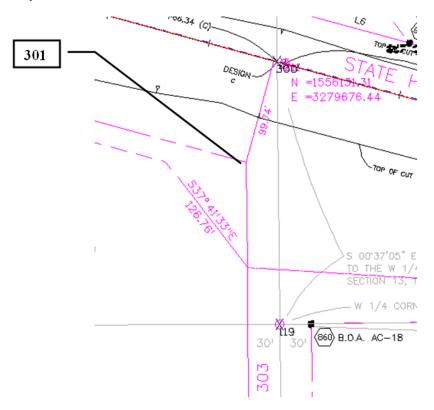
🕌 Locate Res	ults	[- • •
Seed Name:	300		Accept
Description:	PL & West Line Sec 13		Reject
Style:	RW_Workir	ng-exist 🔻	Cancel
Elevation:	0.00		Help
Northing		Easting	
1556133.34	1	3279669.0)1

- **Note:** If it is possible for the intersection command to provide another solution, selecting the Reject button will display the alternative results. Results are shown numerically in the dialog and dynamically on in the MicroStation screen.
- 9. **<D> Accept -** the new Cogo point is created at the intersection.



Lab 10.2 - Alignment - Alignment Intersection using Offsets

Use the intersection command to establish point 301 at the intersection of the south right of way of S.H. 86 and the west right of way of CR 303.



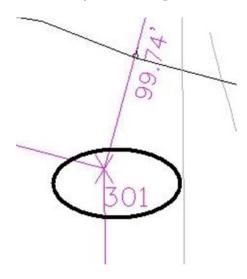
- 1. Select Geometry > Locate > Intersection
- 2. Complete the dialog as shown.

ype:	Alignment/Alignment -	Apply
Alignment		Close
Name:	West Line of Sec 13 🔻	
Offset:	99.74	Help
Alignment Name: Offset:		►
Name:	West Line of Sec 13 🔻	⊾

- **Note:** Notice the negative offset defined for Alignment 2. The alignment representing the west line of section 13 runs south to north. A negative offset indicates a distance to the left.
- 3. **<D> Apply**
- 4. In the Location Results dialog, Key-in:
 - ◆ Seed Name: 301
 - Description: Existing RW @ CR 303
 - Style: RW_ROW-Line_Exist

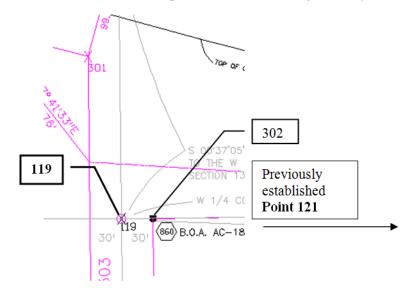
Seed <u>N</u> ame:	301		Accept
Description:	Existing RW @ CR 303		Reject
<u>Style:</u>			Cancel
Elevation:	0.00		Help
Northing		Easting	
1556037 86		3279640 04	1

5. **<D> Accept** - to create point 301.



Lab 10.3 - Direction - Alignment Intersection

Use the intersection command to establish point 302 on the east right of way of county road 303.



1. Geometry > Locate > Intersection

- 2. Complete the dialog as shown below:
 - Type: Direction/Alignment
 - Name: 119 (origin point)
 - *Direction: a 119 121* (computes the bearing from point 119 to 121)
 - Alignment: West Line of Section 13
 - *Offset: 30.00* (to the right positive)

pe:	Direction/Alignment	-	Apply
Direction			Close
lame:	119		
Northing:	1555884.03	+	Help
Easting:	3279671.70		
Direction:	a 119 121	+	
Offset:	0.00	+	
Alignment			
Name:	West Line of Sec 13	• +	
Offset:	30.00	+	

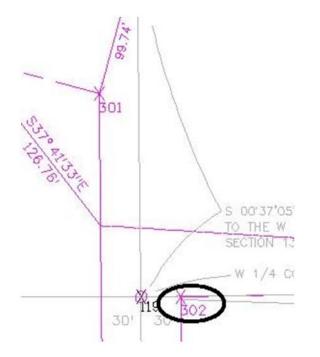
3. **<D> Apply**

The Locate Results dialog appears.

4. Seed name should reflect 302, if not, key it and a description in, and select a style.

Seed Name:	302		Accept
Description:	Existing RW @ CR 303		Reject
Style:	RW_ROW-	Line_ex 🔻	Cancel
Elevation:	0.00		Help
Northing		Easting	
1555884 4	E	3279701 70	۱

5. **<D> Accept -** to create cogo point 302.

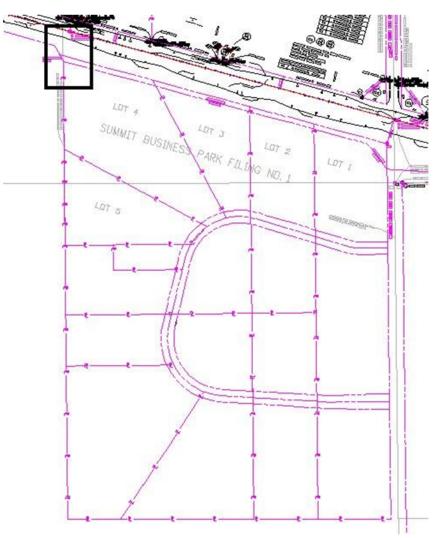


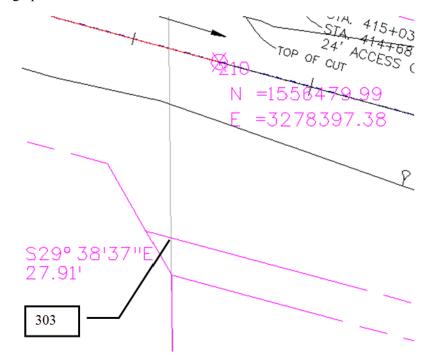
The limits of the adjacent subdivision, Summit Business Park, will be established. We had previously defined the NE corner of the plat at Cogo point 301.

- Establishing the plat boundaries will be done in the following order:
- Establish the NW corner by Station and offset
- Establish the SW corner by bearing & distance
- Establish the SE corner by intersection
- Create an alignment representing the subdivision boundary

Lab 10.4 - Station & Offset

Use MicroStation to view the NW corner of the subdivision





Establish a Cogo point at the NW corner of the subdivision.

A Cogo point is necessary at station A 414+48.30, 100.09' RT

The stationing for establishing point 303 is relative to the reference line C_Centerline. The letter 'A' indicates this location falls within a station equation range.

1. Set **C_Centerline** as the *active* horizontal alignment.

Bentley InRoads XM Edition	12 😴 🚳 🕯	× =			X
<u>File</u> <u>Surface</u> <u>Geometry</u> <u>Drainage</u>	Evaluation Mod	leler Drafting	<u>T</u> ools <u>H</u> elp		
🗠 🗛 🖷 🛍 🔂 🔣 📾 🔛					
	Name	Туре	Description	By Whom	l
E Geometry Projects	A				
🗄 崖 Default					
12345 DESIGN					
C_Centerline					
West Line of Sec 13	=				
🕀 🔆 Cogo Buffer					
🖌 13216					
13215	-				
🖁 Geometry 🔊 Preference 🕢	<u> </u>	III			•
hanges the snap mode to Element/P	-t-+/Maria				

2. Select Geometry > Horizontal Curve Set > Events

The Horizontal Events dialog is multi-functional; it provides the ability to enter:

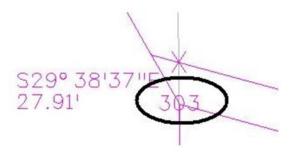
- Event points relative to a horizontal alignment
- Generates points in the Cogo buffer
- Generates Cogo Points based on alignment vertices

- 3. In the Add As section: radio button on Cogo Point
- 4. Set Define By to: Single Station
 - Single Station defines a location by station, offset definition
 - Single Point defines locations by coordinate values
 - Multiple Stations defines locations at a specified intervals and offsets
- 5. Key-in a Seed Name: 303
- 6. Enter a *Description* and select a *Style* as shown.
- 7. Key-in *Station: A 414+48.30*
- 8. Key-in Offset 100.09
- 9. **<D> Apply -** to create the Cogo point.

© N © C	tation and (orthing and ogo Point		Station: Offset:	A 414+48. 100.09	30 +	Help
D Si	tyle: <u>RW</u> dd Vertical mpute Eleva	303 NW Cor SBP Property-Esmnt Event Points ation from Active	Station Start: 314+56 Stop: C 560+5)1.01	+ 0ffse First Secc + 0.00	
M	Station	Offset	Northing	Easting	Elevation	Style

10. **<D> Close** to close the Horizontal Events dialog.

The cogo point is created.



Alternative Solution

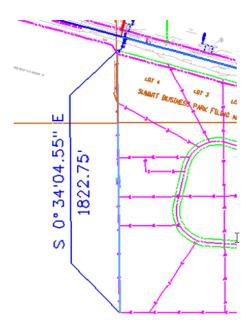
1. Select Geometry > Cogo Points > New

The Define By field can be toggled between Northing/Easting and Station/Offset.

🖌 New Cogo Point		- 1	- 0 🛃
Define By:	Station/Offset -]	Apply
Name:	303		Close
Northing:	1558514.31		Help
Easting:	3277056.40) - ф -	
Elevation:	0.00		
Horizontal Alignment:	C_Centerline -	+	
Station:	A 414+48.30		
Offset:	100.09	+	
Elevation:	0.00		
Description:	NW Cor S BP		
Style:	RW ROW-Line ex -	1	

Lab 10.5 - Traversing

Create a Cogo point to establish the SW corner of Summit Business Park by bearing and distance. The corner lies S 0° 34' 04.55" E, 1822.75 feet south of the NW corner of the plat.

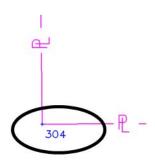


1. Select Geometry > Traverse

2. *Input* the data values as shown below.

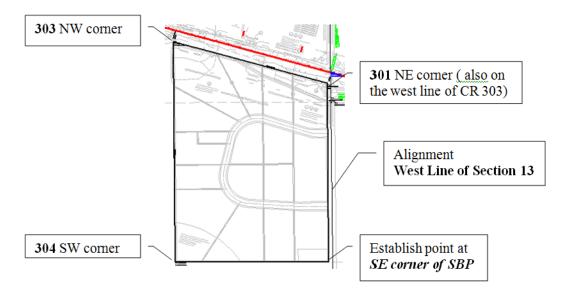
Aethod: 🔘 A	ngle 💿 Direction 🔘 Cur	rve	Insert Point Mode To Cogo Buffer		∖ pply
Backsight		-	_		lose
Point:	302	ф	Before Alignment		
Direction:	N 0^00'00'' E		After Alignment		Jndo
Occupied Poir			Radial		Help
Name:	303		Course		
Northing:	1556383.43	+	Direction -	S 0^34'05" E	-#
Easting:	3278371.05	*	Horizontal Distance 🔻	1822.75	-+
Elevation:	0.00		Radius 👻	0.00	-
Instrument Ht.:	0.00		Radius	0.00	-
Foresight Poin			Vertical Distance 🔹	0.00	-
Name:	304		Rod Height:	0.00	
Description:	SW Com S BP		Offset:	0.00	-
Style:	RW_ROW-Line_ex -			se Traverse	

3. **<D> Apply -** to create a Cogo point at the Southwest corner of the plat.



Lab 10.6 - Direction - Direction Intersection

Three of the four corners for the plat Summit Business Park are created. Only the SE corner remains. Establish the SE corner by intersection.



Criteria for establishing the SE corner:

- The south line of the plat bears N 89 55 40.5 E
- The east line of the plat is parallel to the west line of Section 13
- 1. Select Geometry > Locate > Intersection
- 2. Set Type: Direction/Direction

Direction 1

- Name: 304
- Direction: Key-in N 89 55 40.5 E

Note: The selection button on the dialog can be used to populate the Name (coordinate) fields. To select Cogo points the point snap must be toggled on. X. Turn this lock off after use.

ype:	Direction/Direction	•	Apply
Direction 1	·		Close
Name:	304		
Northing:	1554560.77	+	Help
Easting:	3278389.12		
Direction:	N 89^55'41" E	+	
Offset:	0.00	+	
Direction 2	,		
Name:	301		
Northing:	1556037.86	I I	
Northing.	1006037.86	+	
Easting:	3279640.04	#	
-		+	

Direction 2

- Name: 301
- *Direction:* Key-in *S O 36 36.66 E* (SE or NW will both work)
- Note: The Angular Precision set by Tools > Options > [Precision] affects the display of Direction input fields throughout *InRoads*. CDOT Preferences set the Angular Precision to 0, therefore an input of N 0 36 36.66 W will be reformatted by *InRoads* as N 0 36 37 W. The actual input will be used in the calculation.

f Intersect	ion		- •
Туре:	Direction/Direction	•	Apply
Direction 1			Close
Name:	304		
Northing:	1554560.77	+	Help
Easting:	3278389.12		
Direction:	N 89^55'41" E	÷	
Offset:	0.00	+	
D			
Direction 2		1 1	
Name:	301		
		+	
Name:	301	+	
Name: Northing:	301 1556037.86	+	

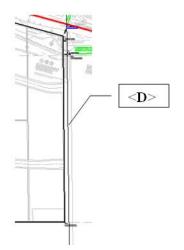
Note: The selection button on the dialog can be used to populate the Direction field.

The required direction is parallel to the west line of section 13

To use the selection button for direction definition:

Name:	301	
Northing:	1556037.86	+
Easting:	3279640.04	
irection:	N 0^36'37" E	+
Offset:	0.00	+

- Toggle on the Element lock \asymp
- **<D>** on the selection button
- <D> on the west line of the SW ¹/₄ of Section 13



The direction of the identified geometry line populates the dialog.

🗑 Intersect	ion		- 0 🛃
Туре:	Direction/Direction	•	Apply
Direction 1			Close
Name:	304		Close
Northing:	1554560.77	+	Help
Easting:	3278389.12		
Direction:	N 89^55'41" E	+	
Offset:	0.00	+	
Direction 2			
Name:	301		
Northing:	1556037.86	+	
Easting:	3279640.04		
Discourse	N 0^36'37" E	+	
Direction:			

1. Make sure both offsets are set to zero

2. **<D> Apply**

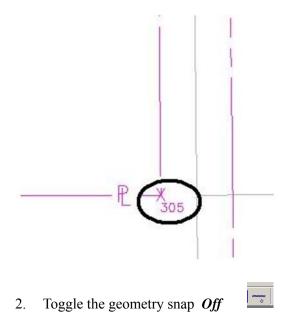
The Locate Results dialog appears.

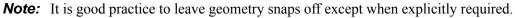
Enter:

- Seed Name: 305
- Description: SE Cor SBP @ CR 303
- Style: RW_ROW-Line_ex

Seed Name:	305		Accept
Description:	SE Cor SBP @ CR 303 RW_ROW-Line_ex		Reject
Style:			Cancel
Elevation:	0.00		Help
Northing		Easting	
1554562.36		3279655.75	

1. **<D> Accept -** to create the final Cogo point at the Southeast corner of the plat.





LAB 11 - Creating a Closed Alignment

Chapter Objectives:

- Create Cogo points through various Intersection Commands
- Generate Alignments from Cogo Points

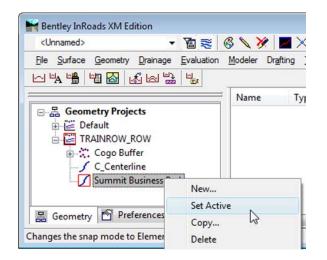
The plat of Summit Business Park has the 4 corners defined by Cogo points. Creating a closed alignment using the PI Method to represent the boundary of the plat will facilitate right of way creation.

Create a new horizontal alignment named Summit Business Park.

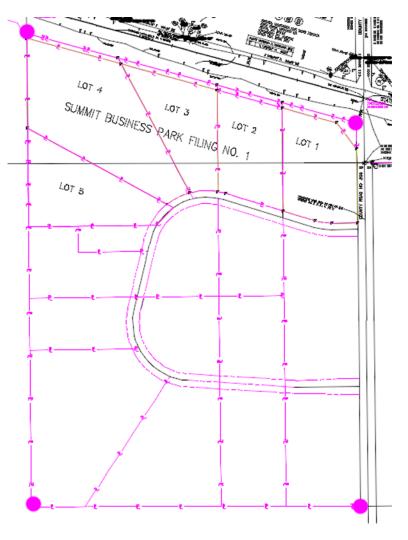
- 1. Select File > New > [Geometry]
- 2. Type: Horizontal Alignment
- 3. Name: Summit Business Park
- 4. Description: SW of int. of RL & CR 303
- 5. Style: RW_Property-Bndry-Line_ex
- 6. Curve Definition: Arc
- 7. **<D> Apply**

ame:	Horizontal Alignment	
escription:	Summit Business Pa SW of int. of RL & C	нер
tyle:	ALG_EXISTING	-
urve Definition:	Arc	•
Name	Description	Style
Centerline	Reference Line	ALG_PRO

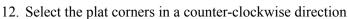
8. Set the active horizontal alignment: Summit Business Park



- 9. Select Geometry > Horizontal Curve Set > Add PI
- 10. You are Prompted to: Identify Alignment End



11. Toggle *On* the geometry Point snap



- 13. **<D>** near the *SW* corner of the plat (defines the POB)
- 14. **<D>** near the *SE* corner of the plat
- 15. **<D>** near the *NE* corner of the plat
- 16. **<D>** near the *NW* corner of the Plat
- 17. **<D>** near the *SW* corner of the plat (defines the POE)
- 18. <R> to cancel point selection, <R> to terminate the command
- 19. Toggle *Off* the geometry point snap
- 20. Select Geometry > Review Horizontal to verify the contents of the alignment.

🚰 Review Horizontal Alignment		
Geometry Project: 12345_ROW ▼ Horizontal Alignment: Summit Business Pai ▼ ▲	Alignment 💿 Element	Close Save As
Project Name: 12345_ROW Description: Horizontal Alignment Name: Summit Business Park Description: SW of Int. RL & CR 30 Style: RW_Property-Bndry-Lin STATION	3 .e_ex NORTHING EASTING	Append Display Print
Element: Linear POB PI PI Tangent Length: 0+00.00 0+00.00 0+00.00 12+66.63 N 89^55'41" E 1266.63	1554560.77 3278389.12 1554562.36 3279655.75	
Element: Linear PI () 12+66.63 PI () 27+42.21 Tangent Direction: N 0^36'37" W Tangent Length: 1475.58	1554562.36 3279655.75 1556037.86 3279640.04	< Previous Next >
Element: Linear PI () 27+42.21 PI () 40+57.41 Tangent Direction: N 74^45'59" W Tangent Length: 1315.20	1556037.86 3279640.04 1556383.43 3278371.05	
Element: Linear 40+57.41 POE) 58+80.16 Tangent Direction: S 0^34'05" E Tangent Length: 1822.75	1556383.43 3278371.05 1554560.77 3278389.12	
Area: 2087810.46 sq.feet 47.9295 acres]	
< <u> </u>		•

Note: Notice the lack of point names (or Cogo numbers) in the parentheses. Also note the parcel area information is displayed.

olerances	Factors Ab	breviations Rail	
Precision	General	Units and Form	Geometry
Plotting Heigh	ht:	0.00	Help
Seed Alignme	ent Name:	1	
Seed Point N	lame:	300	
Curve Defin	nition		
		Alway	ys Confirm
Horizontal:	Arc	•	
Vertical:	Parabolic	•	
Measure:	Along Arc	O Along Chord	
Degree of C	Curve Length:	100.00	
Unit Station	Length:	100.00	
Define Trans	itions By:	Length	Constant
Spiral Definiti	on:	Clothoid	•
ICS Coordina	ate Sequence:	Northing/Eastin	g -
Vertical Angle	e Reference:	Zenith	•
Angular Mode	e:	Bearings	•
Point Names	During Edits:	Do Not Assign	-
Default Acc	cess Modes	Do Not Assign	
	F	RecAssign	
Horizontal A	Nignments:	0	۲
Cogo Buffer	r:	0	0

The population of the name/number field is contingent on the settings under **Tools** > **Options** > **[Geometry]** at time of geometry creation.

Geometry Verification

As seen above, the Cogo points selected to define the alignment are not necessarily a part of the definition of the alignment. To rectify this, 2 possible solutions exist. Firstly, the Create/Edit Alignment by Cogo Points command could have been used to generate the alignment initially. Secondly, this same command can be used to assign and verify the alignment.

1. Select Geometry > Utilities > Create/Edit Alignment by Cogo Points



2. **<D>Yes**

Name:	Summit Busi	ness Par	· ·	+	Apply	
Description:	SW of Int. F	RL & CR 3	03		Close	
Style:	RW_Proper	ty-Bndry-	line_€ `	•	Help	-
Alignment De	efinition:					_
Graphical I	nput Star	t		Stop	Clear	
Graphical I	Star	t Po			Clear	ght

The alignment is associated with the selected Cogo Points.

- 3. Edit points as necessary.
- 4. **<D> Apply** verify results by reviewing the alignment.

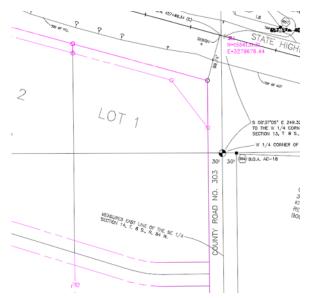
Review Horizontal Alignment	
Geometry Project: 12345_ROW Mode Curve Sets Alignment Ement	Close
Horizontal Alignment: Summit Business Par V	Save As
Project Name: 12345_ROW Description:	Append
Horizontal Alignment Name: Summit Business Park Description: SW of Int. RL & CR 303	Display
Style: RW_Property-Bndry-Line_ex STATION NORTHING EASTING	Print
Element: Linear	Help
POB (304) 0+00.00 1554560.77 3278389.12 PI (305) 12+66.63 1554562.36 3279655.75 Tangent Direction: N 89^55'41" E	Select
Tangent Direction: N 89^55'41" E Tangent Length: 1266.63	First
Element: Linear PI (305) 12+66.63 1554562.36 3279655.75	< Previous
PI (301) 27+42.21 1556037.86 3279640.04 Tangent Direction: N 0^36'37" W	Next >
Tangent Length: 1475.58	Last

LAB 12 - Parcel Creation by Deed

Lot number 1 lies at the Northeast corner of the Summit Business Park plat. Right of way acquisition will occur along the northerly limits of the plat. A parcel needs to be created from the deed information for lot 1.

Chapter Objectives:

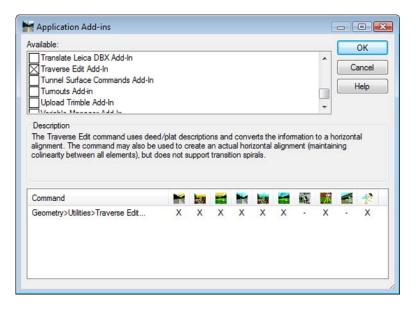
- Create a closed parcel
- Use Traverse Edit Add-In application



To create the parcel (closed alignment) for lot 1, the InRoads command **Geometry** > **Traverse** could be used. Another solution is to use the Traverse Edit command. Traverse Edit is another Application ADD-In command and must be enabled. In addition to allowing traversing, the traverse edit command reports on parcel closure and provides adjustment commands.

- 1. Using *InRoads*, select: Tools > Application ADD-Ins...
- 2. Toggle On the Traverse Edit Add-in

3. **<D>OK**



- **Note:** Before using the Traverse Edit command, create an alignment to store Lot number 1.
- 4. File > New > [Geometry], Select the Geometry tab and input:
- 5. Type: Horizontal Alignment
- 6. Name: Summit BP Lot 1
- 7. Description: Lot 1 of Summit Business Park
- 8. Style: RW_Property-Bndry-Line_ex

9. **<D> Apply**

	Horizontal Alignmen	nt 🔻 Apply	
Name:	Summit BP Lot 1	Help	
Description:	Lot 1 of Summit Business P;		
Style:	RW_Property-Bndr	y-Lin ▼	
Curve Definition:	Arc	•	
	Description	Style	
Name		0.,	
Name 13215	1 months and the track of the	gALG_EXISTING	
	Traffic Control Sin		
13215	Traffic Control Sin Traffic Control Sin	ngALG_EXISTING	
13215 13216	Traffic Control Sin Traffic Control Sin Traffic Control Sin	ngALG_EXISTING ngALG_EXISTING	

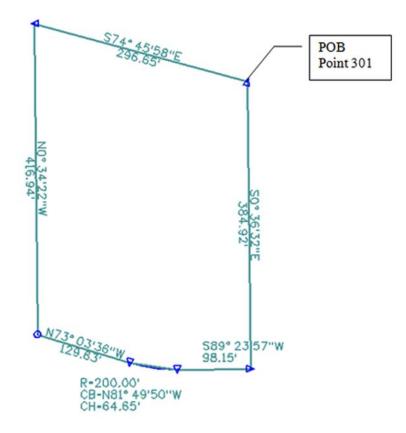
- 10. Select **Geometry > Utilities > Traverse Edit** to open the Traverse Edit dialog box.
- 11. Set the fields for the *Geometry Project* and *Horizontal Alignment*.
- 12. Key-in : *301* for the *Starting Point* (Cogo point 301 is located at the NE corner of lot 1).

🕌 Traverse Edit			- • •
Geometry Project: 12345_ROW	Closure Results Northing Error:	0.00	Apply
Horizontal Alignment:	Easting Error:	0.00	Cancel
Summit BP Lot 1 🔹 🔶	Closing Direction	: N 0^00'00" E	Adjustments
Starting Point	Closing Distance	e: 0.00	Map Check
Name: 301	Closed Area:	0.00	Report
Northing: 1556037.86 +	Perimeter:	0.00	Help
Easting: 3279640.04	Precision:	0.00	
Traverse			
Type Direction [Distance F	ladius	Length ^
•	III		=
Maintain Tangency			
Add Before Add	After Edit.	. Delet	e

13. Lot 1 is described as:

Commencing at the West ¹/₄ corner of Section 13, Township 8 South., Range 64 West. Thence along said section line N 0-37-05 W, 154.14 feet. Thence departing from said section line S 89-22-55 W, 30.00 feet to the westerly right-of-way line of County Road 33 and the Point of Beginning.

- 1. Thence S 0-36-32 E, to the northerly right of way line of Summit Business Park Road, 384.92 feet.
- 2. Thence along said right of way line, S 89-23-57 W, 98.15 to a point of curvature.
- 3. Thence N 81-49-50 W, 64.65 feet along the chord of said curve, having a 200.00' radius to the right.
- 4. Thence N 73-03-36"W, 129.63 feet. Thence departing from Summit Business Park Road, N 0-34-22 W to the southerly right of way line of S.H. 86, 416.94 feet.
- 5. Thence along said right of way line, S 74-45-58 E, 296.65 to the point of beginning.



- 14. **<D>** the **Add After** button on the Traverse Edit dialog.
- 15. Set Type: Linear

16. Input the **Direction** and **Distance** for the first course as shown.

Type:	Linear	-	Apply
Linear Direction:	S 0^36'32" E	+1	Cancel
Distance:	384.92	+	Help
Circular F	arameter	Valu	e
Chord Dire	ection 💌	N 0^00'00'' 8	÷
Radius	-	0.00	+
Length	_	0.00	-

17. **<D> Apply -** the course is added to the alignment.

	Direction	Distance	Radius	Length	^
Linear	S 0^36'32" E	384.92			E
					-

18. *Input* the second Course.

ype:	Linear	-	Apply
Linear Direction:	S 89^23'57" W +		Cancel
Distance:	98.15	+	Help
Circular F	Parameter	Value	9
Chord Dire	ection 💌	N 0^00'00" E	+
Radius	-	0.00	+
Length	+	0.00	+

19. **<D> Apply -** the second course is added to the alignment.

Туре	Direction	Distance	Radius	Length
Linear	S 0^36'32" E	384.92		
Linear	S 89^23'57" W	98.15		

20. *Input* the third course – change *Type:* Circular

ype:	Circular 🔹		Apply	
Linear			Cancel	
Direction:	S 89^23'57" W	-ф-	Cancer	
Distance:	0.00	+	Help	
Circular F	arameter	Valu	e	
		N 81^49'50"	w +	
Chord Dire	ection 🔹			
Chord Dire Radius	ection	200.00	+	

eometry P 12345_RO			Closure Re Northing E	Constant of the second s		Apply
lorizontal A			Easting Em			Cancel
Summit BP		• +	Closing Dir	ection: N 22^45'2	29" E	Adjustments
Starting P	oint		Closing Dis	tance: 408.55		Map Check.
Name:			Closed Are	a: 31783.00		Report
Northing:	1556037.86	+	Perimeter:	548.00		Help
Easting:	3279640.04		Precision:	1.34		Ticip
Traverse Type	Direction	Dis	tance	Radius	Length	
Linear Linear	S 0^36'32" E S 89^23'57" W	384 98.1				
Circular	N 81^49'50" W	64.6	65	200.00	64.93	
Mainta	ain Tangency Add Before	Add A	fter	Edit	Delete	

21. **<D> Apply -** the third course is added to the alignment.

Note: As courses are entered, the parent dialog displays closure results.

22. *Input* the fourth course and **<D> Apply**

ype:	Linear	•	Apply
Linear Direction:	N 73^03'36" W	+	Cancel
Distance:	129.63	+	Help
Circular F	Parameter	Valu	le
Chord Dire	ection *	N 0^00'00" I	E
Radius	-	0.00	+
Length		0.00	-#-

23. *Input* the fifth course and **<D> Apply**

ype:	Linear	•	Apply
Linear Direction:		- 1	Cancel
	N 0^34'22" W	+	Help
Distance:	416.94	<u>+</u>	
Circular			
F	Parameter	Value	
Chord Dire	ection 💌	N 0^00'00" E	-+
L		0.00	+
Radius	Y	13. The second	

24. *Input* the sixth and final course and **<D> Apply**

Type:	Linear	-	Apply
Linear Direction:	S 74^45'58" W	+	Cancel
Distance:	0.00	+	Help
Circular F	Parameter	Valu	e
Chord Dire	ection 💌	N 0^00'00" E	÷
Radius	-	0.00	<u></u> +
Length		0.00	-#-

eometry P		•	Closure Result Northing Error:	123553		Apply	
orizontal A	lignment:	_	Easting Error:	0.00		Cancel	
Summit BP Lot 1 🔹 🔸		+	Closing Direction	on: N 75^09'	D7" E	Adjustments	
Starting P	oint		Closing Distan	ce: 0.01	N	lap Check.	
Name:			Closed Area:	117621.1	8	Report	
Northing:	1556037.86	+	Perimeter:	1391.22		Help	
Easting:	3279640.04		Precision:	289118.4	6	Help	
Traverse							
Туре	Direction	Dis	tance	Radius	Length	*	
Circular	N 81^49'50" W	64.6	5 3	200.00	64.93		
Linear	N 73^03'36" W	129	.63				
Linear	N 0^34'22" W	416	.94			E	
Linear	S 74^45'58" E	296	.65			-	
•			III			F	
Maint:	ain Tangency						
I THOM IL	air rangency						
				t			

25. Review Closure Results in the parent dialog.

- 26. **<D> Apply** to create the alignment.
 - **Note:** The Report button on the dialog can be used to summarize the alignment. The report can be written to a text file.

The Adjustments button on the Traverse Edit dialog is dithered. If the alignment contains circular elements, adjustments are not enabled.

Challenge Lab:

- Edit the record containing the curve by **<D>** on it and selecting **Edit**
- Change the record type to Linear

• Input the chord Direction and an incorrect chord distance, **<D> Apply**

ype:	Linear	-	Apply
Linear Direction:	N 81^49'50" W	+	Cancel
Distance:	64.37	+	Help
Circular F	Parameter	Valu	e
Chord Dir	ection *	N 81^49'50"	W
Radius	-	200.00	+
Length		64.93	

- Close the *Edit Element* dialog
- ◆ <D> on the *Adjustments* button

Unadj. Direction Unadj. Di Adj. Direction Adj. Dista Latitude Departure Deta Nor Delta Easting 5 0^36'32" E 384.92 S 0^35'50" E 384.91 -384.89 4.01 0.01 -0.08 5 89^223'57" W 98.15 S 89^224'03" W 98.17 -1.03 -98.16 0.01 -0.10	D .
5 89^23'57" W 98.15 S 89^24'03" W 98.17 -1.03 -98.16 0.01 -0.10	Report
	Help
V 81^49'50" W 64.37 N 81^49'50" W 64.38 9.15 -63.73 0.02 -0.11	
173^03'36" W 129.63 N 73^03'43" W 129.66 37.77 -124.03 0.02 -0.14	
V 0^34'22" W 416.94 N 0^35'04" W 416.95 416.93 -4.25 0.03 -0.22	
74^45'58" E 296.65 S 74^45'53" E 296.59 -77.94 286.17 0.04 -0.28	

Select the appropriate Method

<D> OK to apply the selected adjustment

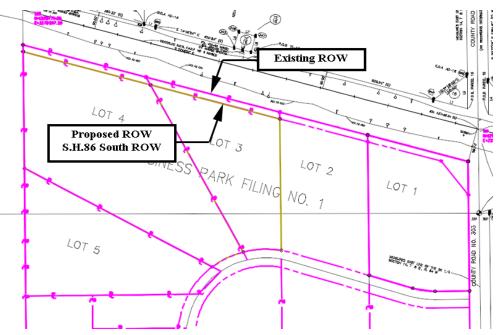
Note: The columns for Unadjusted and Adjusted values. As the various radio buttons for method are selected, the adjusted values update providing a preview of potential solutions.

LAB 13 - Right of Way Parcels

InRoads has a utility to create additional parcels (closed alignments) from existing parcels and crossing alignments. As illustrated below, lots 1-4 have been created and the proposed right of way indicates required right of way acquisition along the northerly limits of the lots.

Chapter Objectives:

• Create a closed alignment from existing alignments



The command used for this exercise is another application ADD-In and is added to the **Geometry > Utilities** menu. The **Create Right-of-Way** menu item is a subset of the Lot Creation application.

Geometry Drainage Evaluation	Mod	leler Dr <u>a</u> fting <u>T</u> oo	ols <u>H</u> elp		
View <u>G</u> eometry <u>Fit</u> Alignment	,	Proj Descripti	on	File Name	
Horizontal Curve <u>S</u> et V <u>e</u> rtical Curve Set	, ,	treate/ <u>E</u> dit Ali	gnment by	Cogo Points	
Hori <u>z</u> ontal Element Vertical Ele <u>m</u> ent	, ,	 ℬ Traverse Edit ℬ Join ℱ Irim Alignment 			
Superelevation	•				
Lot Layout	•	🕺 Partial Delete /	Alignment		
Review Horizontal		Multicenter Cu			
Review Geometry Points			f- <u>W</u> ay		
Cogo <u>P</u> oints <u>L</u> ocate		Parallel Horizon Parallel Vertical	-		

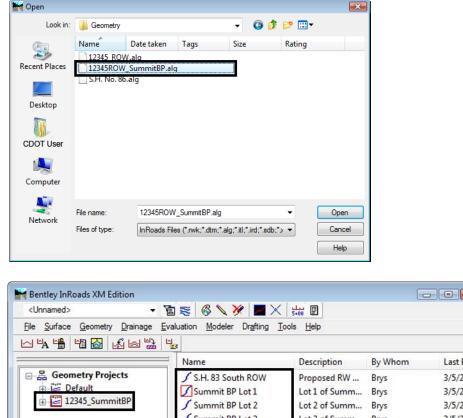
If you do not see the Create Right-of-Way option, go to Tools > Applications Add-Ins and activate Lot Layout Add-In.

vailable:										ОК	-
Import Versine Add-In										UK	_
Light Bail Manufacturing Add-In									C	ancel	
Lot Layout Add-In										-	
iviuluple Honzontal Element Regressi	on Analy	SIS Add	d-in							Help	
Multiple Vertical Element Regression	Analysis	Add-Ir	n					-			
NI C TI- AJJ I-								•			
Description											
The Lot Layout Add-In provides comma	inds for t	he crei	ation a	nd ma	nipulat	ion of	lots, se	etback	s and		
The Lot Layout Add-In provides comma rights-of-way.	inds for t	he crei	ation a	ind ma	nipulat	ion of	lots, se	etback	s and	*	
The Lot Layout Add-In provides comma rights-of-way. Command				ind ma	andre .	ion of	lots, se	etback	s and	*	× 111
The Lot Layout Add-In provides comma	M						lots, se	etback	s and	*	, m
The Lot Layout Add-In provides comma rights-of-way. Command Geometry>Lot Layout>Create Lots	×	×	×	×		×	lots, se	etback	s and	* • •	· [III]
The Lot Layout Add-In provides commany rights-of-way. Command Geometry>Lot Layout>Create Lots Geometry>Lot Layout>Insert Point Geometry>Lot Layout>Move Point	××××		× × ×	× × ×	ka - -		N - -	etback	s and	*	·
The Lot Layout Add-In provides comma rights-of-way. Command Geometry>Lot Layout>Create Lots Geometry>Lot Layout>Insert Point	× × ×		X X X X	× × × ×	- - -		R - - -	etback	s and	*	

Parcels have been created for Lots 1-4 and stored in the Geometry Project **12345_SummitBP**. Load this geometry project from the folder:

C:\Projects\12345\ROW Survey\InRoads\Geometry

1. File > Open – Open the Geometry folder noted above.



2. Load the 12345_SummitBP.alg file.

Last Re * 3/5/20 3/5/20 3/5/20 Summit BP Lot 3 Lot 3 of Summ... Brys 3/5/20 Summit BP Lot 4 Lot 4 of Summ... Brys 3/5/20 = Summit Business Park SW int of RL & ... Brys 3/5/20 3 🖁 Geometry 🔊 Preference 4 > 4 III III III CI CD 202 **Toggles the Report Lock**

3. Select Geometry > Utilities > Create Right-of-Way

Dialog Settings:

- Alignment (selected) Original parcels impacted by ROW acquisition ٠
- *Cogo Points* If enabled, will create Cogo points at the intersection of the proposed ٠ right of way and existing lot lines
- **Right of Way** If enabled, creates parcels representing the acquisition area ٠
- **Remainder** If enabled, creates parcels representing the remainder of the selected lots ٠

- Create Right-of-Way Cogo Points Alignment: Apply Create Cogo Points + Close Seed Name: SBP_pRW_01 Selected: Filter. Name Descr... Style Description: SBP_Sec-Line_pro Help Style: RW_Sec-Line_pro -Right-of-Way Remainder Create Right-of-Way Alignment Create Remainder Alignment Name:
 From Original
 Specify Name:
 From Original
 Specify Suffix: Suffix: Prefix: Prefix: Description: Description: Style: Style: ALG_EXISTING ALG_EXISTING • •
- 4. Complete the *Cogo Points* section as shown.

5. Complete the *Right-of-Way* section as shown.

Nignment:	Cogo Points	Deinte		Apply
Selected:	Create Cogo Seed Name:			Close
Name Descr Style	Description:	SBP_pRW_01 SBP_Sec-Line		Filter
	Style:	RW_Sec-Line		Help
Right-of-Way Create Right-of-Way Alignment Name: From Original Prefix: Suffix:	specify	emainder Create Remain Name: @ Fror Prefix:		opecify
Description: RW_acquisi		Description: Syle:	RW_Property	v-Bndry- ▼

6. Complete the *Remainder* section as shown.

Alignment:		Cogo Points	o Points	Apply
elected:		Seed Name	501_DITW_01	Close
Name Descr.	Style	Description Style:	SBP_Sec-Line	
Right-of-Way Create Right-o Name: Fro Prefix:	m Original	nent	Remainder Create Remain Name: From Prefix:	
Description: Style:	RW_acc	quisition operty-Bndry- 💌	Description: Style:	Parcel Remainder RW_Property-Bndry·

7. **<D>** on the *Filter* button.

Vignment:	Cogo Points	Points	Apply
elected:	Seed Name	RW_01م_SBP	
Name Descr Style	Description: Style:	SBP_Sec-Line	Help
Right-of-Way Create Right-of-Way Align Name: From Original Prefix: St		Remainder Create Remaind Name: © Fron Prefix:	
Description: RW_ac	quisition	Description:	Parcel Remainder
Style: RW_Pr	operty-Bndry- 💌	Style:	RW_Property-Bndry-

- 8. Under the Available column, select Summit BP Lot 1-4.
- 9. **<D>** the **Add** button.

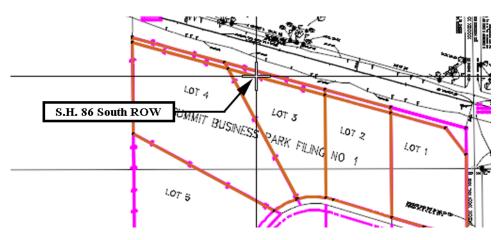
10. <D> OK

Name:	Include	ed 🔻	•				ОК
Description:	Include	ed 💌	•				Cancel
Style:	Include	ed 💌	•				Preferences.
Fence Mode:	Ignore	*					Help
Available:					Selected:		пер
Name		Description	Style ^	Add ->	Name	Description	Style
S.H. 83 South	ROW	Proposed RW at	CRW_	<- Remove			
Summit BP Lo	t 1	Lot 1 of Summit I	BuRW_				
Summit BP Lo	120	Lot 2 of Summit I	A CONTRACTOR OF THE OWNER OF THE	<- Swap ->			
	t 3			All			
Summit BP Lo	1000		BuRW				
Summit BP Lo	Carl Street Street	Lot 4 of Summit					
	ess Park	SW int of RL & C CL CR 303		None			
SUMME BP LO	120	Lot 3 of Summit I	BuRW				

11. The parcels are added to the list.

Alignment:	Cogo Points	Cogo Points Create Cogo Points	
Selected:			Close
Name [Descr ^ Descriptio	ne: SBP_pRW_01	Filter
Summit BP Lot 1 Lo	ot 1 of I + Style:	RW_Sec-Line	Help
	Vay Alignment Original O Specify Suffix: Aquire	Remainder Create Remaine Name: From Prefix:	der Alignment n Original () Specify Suffix: Rem
Prefix:	/ Man o		Tion .

12. **<D> Apply -** you are prompted to identify the Right of Way Alignment.



13. <D> on the alignment S.H. 86 South ROW - parcel previews will highlight

14. **<D>** inside any acquisition parcel to define which side of the identified alignment the acquisition parcels lay - the parcels and Cogo points are then created

<unnamed></unnamed>	•)E =	S 🚳 🔪	💓 📕 🗡	5+00		
ile <u>S</u> urface <u>G</u> eometry	y <u>D</u> rainage <u>E</u> valua	tion <u>M</u> odele	r Drafting	Tools <u>H</u> elp		
🖌 🗠 🗠 🗠						
			Name	Туре	Description	By Whom
Vest Lir	ne of Sec 13	*				
Summit	BP Lot 1Aquire					
-/ Summit	BP Lot 2Aquire					
Summit	BP Lot 3Aquire					
Summit	BP Lot 4Aquire	E				
Summit	BP Lot 1Rem					
Summit	BP Lot 2Rem					
Summit	BP Lot 3Rem					
Summit	BP Lot 4Rem	-				
	eferences 🗔 Dra					

LAB 14 - Annotation of Closed Parcels

Parcel information can be annotated in the MicroStation drawing using InRoads geometry commands.

Chapter Objectives:

• Annotate traverse information

The InRoads command used for this exercise is located on the **Geometry** > **View Geometry** menu.

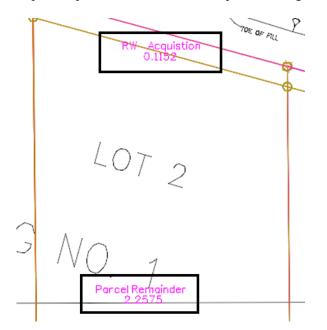
- 1. Select Geometry > View Geometry > Closed Areas
- 2. **<D>** the **Preferences** button.
- 3. Load the settings for proposed parcels.

Name:	Close
CDOT CDOT Property-Existing CDOT Property-Proposed	Load
Default	Save
	Save As
	Delete
	Help

4. Define the acquisition parcels for annotation (use the filter).

- View Closed Areas - • • Alignment: + Apply Selected: Close . Name Description Style Filter. Summit BP Lot 1 Acquir... RW Acquistio... ALG_EX ≡ Summit BP Lot 2 Acquir... RW Acquistio... ALG_EX Preferences. Summit BP Lot 3 Acquir... RW Acquistio... ALG_EX -Help 4 III . Annotate Dual Prefix Dual Suffix Prefix Suffix Name: Description: Area: Acres/Hectares: Perimeter: Dual Dimension: Symbology: Object Name BYL Text
- 5. Toggle *On* the desired information in the *Annotate* section, *<D> Apply*

6. Repeat steps 2-5 for the Remainder parcels using the Property-Existing Preference.



7. Toggle on *all* the Annotate radio buttons, **<D> Apply -** the graphics refresh.

```
Summit BP Lot 4Rem
Parcelremainder
209096.61 Sq. Ft. (19425.79 Sq. M.)
4.8002 Acres (1.9426 Hectares)
1995.10 FT. (608.11 M.)
```

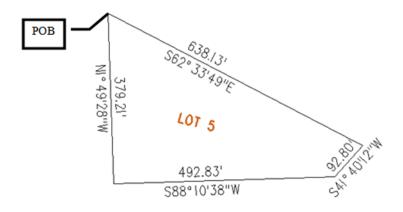
Note:

- Annotation will only be applied to alignments that are closed. Parcels that have closure errors are ignored
- There are saved preferences in the **View Closed Area** dialog for existing vs. proposed annotation
- The number of decimal places carried out in the annotation is controlled by Tools > Options on the *Precision* tab
- Selecting the **Dual Dimension** radio button will annotate in both square feet and square meters

		s and Format	Geometry
Northing/Easting:	0.12	•	Help
Elevation:	0.12	-	
Angular:	0	•	
Aspect:	0.12	•	
Slope:	0.12	•	
Linear:	0.12	•	
Station:	0.12	-	
Acres/Hectares:	0.1234	•	
Area Units:	0.1234	•	
Cubic Units:	0.1234	•	
Scale:	0.1234	-	

Challenge Exercise – Transforming a parcel

Use the **TravEdit** command to generate a parcel (alignment) for lot 5 of Summit Business Park. The graphic below shows the required courses to create said parcel. Once created, use the **Transform** command to move and rotate the parcel so that the NE line of Lot 5 coincides with the SW line of Lot 4.



Create a Horizontal Alignment to store Lot 5.

1. Select File > New > [Geometry] - Horizontal Alignment

Гуре:	Horizonta	al Alignment 🔹	Apply
Name:	Summit B	P Lot 5	Help
Description:	Lot 5 of S	SUmmit Business P	
Style:	RW_Pro	perty-Bndry-Lin 👻	
Curve Definition:	Arc	RW_Property-Bn	dry-Line_pro
			7 -1
Name		Description	Style
	ow	Description Proposed RW at	Style
S.H. 83 South R	w		Style CALG_E)
S.H. 83 South RO Summit BP Lot 1	w	Proposed RW at	Style C ALG_E) P RW_Prc
Name S.H. 83 South R Summit BP Lot 1 Summit BP Lot 2 Summit BP Lot 3	w	Proposed RW at Summit Business	Style C ALG_D P RW_Pr u RW_OV

2. Select Geometry > Utilities > Traverse Edit

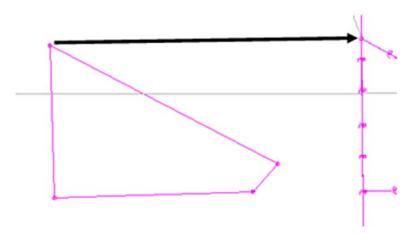
Assume a starting location (this may be based on a call-out, existing geometry point, or an assumed location).

Key-in a Starting Point of: - DO NOT INPUT COMMAS N = 1,556,000.00 E = 3,277,600.00

eometry P 12345_Sur		•	Closure Results Northing Error:	0.00	Apply
orizontal A	-		Easting Error:	0.00	Cancel
Summit BP Lot 5		• +	Closing Direction:	N 0^00'00" E	Adjustments
Starting P	oint		Closing Distance:	0.00	Map Check
Name:			Closed Area:	0.0000	Report
Northing:	1556000.00	+	Perimeter:	0.00	Help
Easting:	3277600.00		Precision:	0.00	
Traverse					
Туре	Direction	Dis	tance Ra	dius	Length
Mainta	ain Tangency				

Enter clockwise courses beginning with the NW corner of Lot 5.

- Select Add After and input: *S 62-33-49 E, 638.13 S 41-40-12 W, 92.80 S 88-10-38 W, 492.83 N 01-49-28 W, 379.21*
- 4. **<D> Apply** to create the parcel once all courses have been entered and verified by reviewing the closure results.



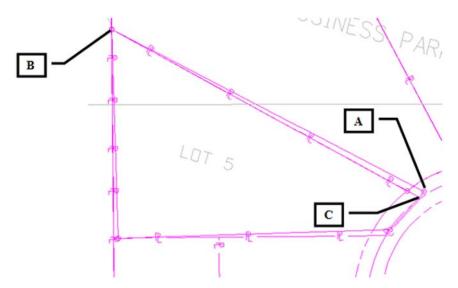
The parcel is created to the west of the true location. It also has a slight rotation.

Use the **Transform** command to relocate and rotate the parcel. Do so in 2 steps. First move the parcel, and then rotate it to align with Lot 4.

5. Select Geometry > Utilities > Transform

Points/Alig	oments				
Include: @		Selected:			Apply
-	Alignments	Name	Des	scrip Style	Close
Transform:		Summit BP	Lot 5 Lot	5 of S ALG_E	Filter
Summit BP	Lot 5 🔶 🔶				Undo
Transfor	m Entire Project	•	III	•	Least Square
lethod:	Custom	•			Preferences
Rotation					Help
Mode:	By Angle	•	Scale		
Angle:	0^00'00''	-\$-	Horizon	tal: 1.0000	
			Vertical	1.0000	
Original Poi	nt		Destina	tion Point	
Name:			Name:		
Northing:	1556000.00		Northing	1556017.24	
Easting:	3277600.00		Easting	3278374.80)
Elevation:	0.00		Elevatio	n: 0.00	

- 6. *Identify* the Alignment to transform
- 7. Identify the coordinate values for both the Original & Destination Points
- 8. **<D> Apply**



The parcel is relocated but a rotation is evident.

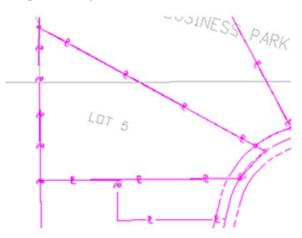
Continuing to use the transform dialog.

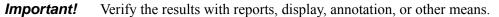
- 9. Set the Original Point and Destination Point to the same value (the point to rotate about)
- 10. *Identify* the *value of rotation required* by key-in or by using the selection icon to graphically pick points A, B, & C shown above to define the rotation angle.

 Points/Alig Points 	nments	Selected			Appl	y
 Alignme 		Summit BP	Lot 5		Close	в
Transform:	ints		Filter			
Summit BF	Lot 5 🔶 🔶	1			Und	
Transfo	rm Entire Project				Least Squ	ares
Method:	Custom	•			Help	,
Rotation Mode:	By Angle	•	- Scale			
Angle:	1^14'59.66''	+	Horizontal	1.0000		1
			Vertical:	1.0000		
Original Po	int	Ŧ	– Destinatio	n Point		
Name:			Name:			
Northing:	1556017.24	+	Northing:	1556017.2	24	+
Easting:	3278374.79		Easting:	3278374.3	79	+
Elevation:	6699.18		Elevation:	6699.18		

11. <D> Apply

The parcel (alignment) is transformed.





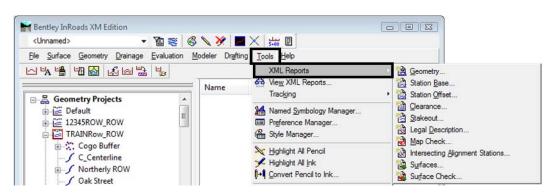
Note: Relocating and rotating the parcel could have been accomplished in a single operation if so desired

LAB 15 - Parcel Descriptions

The InRoads Report Browser allows the user to view reports using a reporting utility based on the eXtensible Markup Language or more commonly referred to as XML. Like the HTML language used for web development, XML reporting is based on tags and attributes which delineate elements of data. Formatting of XML data is accomplished through the use of XSL, or style sheets and displays in a web browser page.

Chapter Objectives:

- Create a parcel legal description
- 1. Select the **Tools > XML Reports** menu item to check the available menu items.



- 2. Select Legal Description
- 3. **<D>** the *Filter* button and add *Summit BP Lot 1* as a *selected* alignment.

Name:	Included	•	•				ОК
Description:	Included	•	•				Cancel
Style:	Included	•	•				Preferences
ence Mode:	Ignore	*					
Available:					Selected:		Help
Name		Description		Add ->	Name	Description	Style
		Reference L					uRW_OWN_Pr
Northerly ROV Oak Street ROW Limits S ROW Limits S	outh 2 outh 3		R A R R	<- Remove			
Northerly ROV Oak Street ROW Limits S ROW Limits S S.H. 83 South	outh 2 outh 3 n ROW	Proposed R1	R R R WatCA	<- Swap ->			
Northerly ROV Oak Street ROW Limits S ROW Limits S S.H. 83 South Summit BP Lot	outh 2 outh 3 n ROW t 1		R R R W at CA ness PR	<- Swap -> All			
Northerly ROV Oak Street ROW Limits S ROW Limits S S.H. 83 South Summit BP Lot Summit BP Lot	outh 2 outh 3 n ROW t 1 t 2	Proposed R1 Summit Busin	R R ≣ W at CA iness PR mmit BuR	<- Swap -> All			
Northerly ROV Oak Street ROW Limits S ROW Limits S S.H. 83 South Summit BP Lot Summit BP Lot Summit BP Lot Summit BP Lot	iouth 2 iouth 3 h ROW t 1 t 2 t 3 t 5	Proposed R\ Summit Busin Lot 2 of Sum	R R R Wat CA iness PR mmit BuR mmit BuR	<- Swap -> All			
C_Centerline Northerly ROV Oak Street ROW Limits S ROW Limits S S.H. 83 South Summit BP Lol Summit BP Lol Summit BP Lol Summit BP Lol Summit BP Lol	iouth 2 iouth 3 n ROW t 1 t 2 t 3 t 5 t 1 Acquire	Proposed R\ Summit Busin Lot 2 of Sum Lot 3 of Sum Lot 3 of Sum RW Acquisti	R R R W at CA mess PR mmit BUR mmit BUR mmit BUA ion A	<- Swap -> All			

- 4. **<D>OK**.
- 5. **<D>** Closed Alignments.

- 6. **<D> Apply**.
- In the Bentley InRoads Report Browser, select File > Save As and enter C:\Projects\12345\ROW_Survey\InRoads\Reports\SBP Lot 1.xml
- 8. **<D> Save**

An XML file and a report is created with format and display from an InRoads default style sheet.

C:\Workspace\Workspace-CDOT_XM\Standards-Global\InRoads\XI		~~
Bridge	Property Description	
Cant CDOT Clearance	Report Created: 9/14/2009 Time: 3:26pm	
DataCollection	Project: TRAINRow ROW	
Evaluation	Description: training class	
Geometry ICS Images	File Name: C:\Suvey Training Material\Part2\12345 \ROW_Suvey\InRoads\Geometry\TRAINRow_ROW.alg	
IntersectingAlignmentStations LegalDescription	Last pcallahan 9/14/2009 3:08:32 PM Revised:	
HorizontalAignmentLegalDescription xsl HorizontalAignmentLegalDescriptionReference xsl HorizontalAignmentLegalDescriptionReferenceASCII xsl A) HorizontalAignmentLegalDescriptionReferenceASCII xsl A) ParcelLayoutFromReference xsl	Input Grid 1.00000000 Note: All units in this report are in feet unless specifies otherwise	
PropertyDescription xsl PropertyDescriptionExtended xsl	Alignment Name: Summit BP Lot 1	
PropertyDescriptionExtended2xsl PropertyDescriptionLongNames.xsl	Alignment Description: Summit Business Park Lot 1	
A) Rojt/OWayTakes.sl UphRailMandacturing MapCheck Obsolete RoadwayDesign Schemas	Beginning at a point thence S 0°36'33" E a distance of 384 94 feet thence S 89°23'56" W a distance of 98.12 feet thence N 81°49'43" W a distance of 64.63 feet thence N 73°03'21" W a distance of 129.79 feet thence N 0° 34'21" W a distance of 416.91 feet thence S 74°46'11" E a distance of 296.74 feet and the POINT OF BEGINNING.	

- 9. **<D>** on the various report styles (*.xsl) displayed in the left panel and notice the change to the format and contents of the displayed report.
- 10. In the Report display, select **Tools > Format Options**

Format Options						
	Mode		Precisi	on	Format	Close
Northing/Easting:			0.12	•		
Elevation:			0.12	-		Help
Angular:	Degrees	•	0	•	ddd^mm'ss.s" 💌] 🔲 Include Angular Suffix
Slope:			0.123	•	50% -]
Use Alternate Slope if	Slope Exceeds:		0.000%			
Alternate Slope:			0	-	2.0:1 -]
Linear:			0.12	•		
Station:			0.12	-	\$\$+\$\$.\$\$ *]
Acres/Hectares:			0.1234	•		
Area Units:			0.1	•		
Cubic Units:			0.1	-	Convert to Cut	pic Yards
Direction:	Bearings	•	0	•	ddd^mm'ss.s" 💌]
Face:	Right Face	-				
Vertical Observation:	Zenith	-				

11. **<D> Acres/Hectares:** Set to 5 decimal places - the report updates.

```
The above described parcel contains = 2.69878 acres (117559.0 sq. ft.)
```

- 12. *Change* any of the fields in the *Format Options* dialog and notice the report interactively updates.
- 13. In the **Report** display, select **File > Save As**...

Save As:

Path: C:\Projects\12345\ROW_Survey\InRoads\Reports File Name: SBP Lot 1.xml

14. <D> Save

Save in:	Reports			▼ ← (1 🕂 📰	
œ.	Name	Date modif	Туре	Size	Tags	
Recent Places Desktop CDOT User CODT User Computer	SBP Lots	1-4.xml				
	File name:	SBP Lot 1.xr	nl		•	Save
		17				
	Save as type:	XML File (*x	ml)		•	Cancel

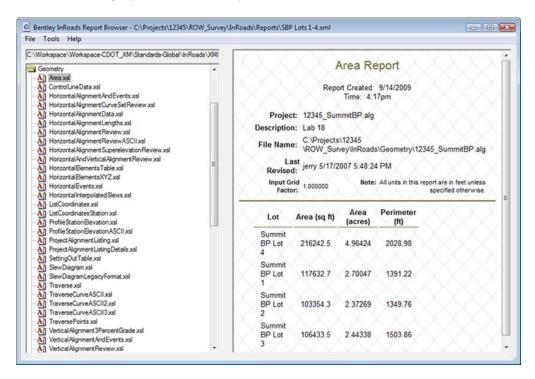
Reports can also be recalled for reformatting, etc.

- 15. Select **File > Open** from the report browser.
- 16. Open the SBP Lots 1-4.xml file from the folder:

Open Open						
Look in:	Reports			• • •	•	
Ca.	Name	Date modif	Туре	Size	Tags	
Recent Places	SBP Lot 1.	xml				
	SBP Lots 1	L-4.xml				
Desktop						
The second secon						
CDOT_User						
Computer						
Network						
Network	File name:	SBP Lots 1-4	lumi		-	Open
		-				
	Files of type:	XML Data (*	xml)		_	Cancel
						Help

C:\Projects\12345\ROW_Survey\InRoads\Reports

17. **<D>** on the category *Geometry* and style sheet *Area.xsl*



Note: Lot areas and perimeter distances are reported.

Program Files\Workspace-CDOT\Stand							
Bridge		List C	oordinate	es Repor	t		
Clearance Custom DataCollection	$\langle X \rangle \rangle$	Rep	ort Created: Time: 9:53				
Geometry	Project	: 12345_Sum	mitBP.alg				
ControlLineData.xsl	Description	: Lab 18					
HorizontalAlignmentAndEvents. HorizontalAlignmentCurveSetRe HorizontalAlignmentReview.xsl	File Name	File Name: C:\Projects\12345 \ROW_Survey\InRoads\Geometry\12345_SummitBP.alg					
HorizontalAlignmentHeview.xsi HorizontalAndVerticalAlignmentI HorizontalFlementsXYZ xsi	La Revised		07 5:48:24 P	м			
ListCoordinates.xsl ListCoordinates.xsl ListCoordinates5tation.xsl ProjectAlignmentListing.xsl	Input Gr Facto		Note:	All units in this	report are in feet unles specified otherwise		
SettingOutTable.xsl	Alignment Nar	ne: Summit B	P Lot 4	XX,	XXX		
SuperelevationAlignment.xsl	Point Name Typ	e Northing	Easting	Elevation	Style		
YerticalAlignmentAndEvents.xsl VerticalAlignmentReview.xsl Images	PO	B 1556287.88	3278721.92	0.00	RW_OWN_Prop- Line_exist		
LegalDescription	XXXX.	1555768 38	3278999 07	0 00	RW OWN Prop-		

18. In the category *Geometry*, access style sheet *List Coordinates*

The report is redisplayed to display alignment coordinates.

- 19. While viewing the xml report, **<R>** on the screen a fly-out menu appears.
- 20. <D> on Export to Microsoft Excel

Workspace\Workspace-CDOT_XM\Standards-Global\InRoads\XI	M 🔽		\neg	$\sim \sim \sim$	$\sim\sim\sim\sim$	\sim
Geometry	. 14	Back	ates	s Repor	tへ へへ	
A: Area xsl		Forward		$\langle \times \rangle$		
A] ControlLineData xsl	12		d: 9/1	4/2009		
A Horizontal Alignment And Events xsl	K	Save Background As	8:06pn	n X X		
A Horizontal Alignment Curve Set Review xsl	h Di	Set as Background				
Horizontal Alignment Data xsl		Copy Background				
Horizontal Alignment Lengths xsl		copy background				
Horizontal Alignment Review xsl	<u>и</u>	Select All				
A Horizontal Alignment Review ASCII xsl		Paste	Aateria	I\Part2\1234	5 ^ / /	
Horizontal Alignment Superelevation Review xsl	1	Paste	ads\Ge	eometry\123	45ROW_SummitE	BP.a
A Horizontal And Vertical Alignment Review xsl	KI	Create Shortcut		$\langle \times \rangle$		
A Horizontal Elements Table xsl			8:05:	16 PM		
Horizontal Elements XYZ xsl		Add to Favorites		Note: All units in this report are in fe		\sim
HorizontalEvents xsl		View Source	Not	te: All units in	this report are in feet specified othe	
A Horizontal Interpolated Slews xsl	1				specified office	
A: ListCoordinates.xsl		Encoding			$\sim \sim \sim \sim$	
A ListCoordinatesStation xsl						
A ProfileStationElevation.xsl	KI	Print				
A ProfileStationElevationASCII.xsl	- 13	Print Preview	ting	Elevation	Style	
• A Project Alignment Listing xsl		Refresh				
• A] ProjectAlignmentListingDetails xsl	N	Kerresn			RW Property-	
SettingOut Table xsl		Append to Existing PDF	40.04	0.00	Bndry-Line ex	
SlewDiagram.xsl						
SlewDiagramLegacyFormat xsl	1	Convert to Adobe PDF	44.13	0.00	RW_Property-	
A: Traverse xsl	KI	Customize Menu	1 1 1 V		Bndry-Line_ex	
A: TraverseCurveASCII.xsl		Export to Microsoft Excel			RW Property-	
A: TraverseCurveASCII2.xsl			45.98	0.00	Bndry-Line ex	
AT TraverseCurveASCII3.xsl		Fill Forms			Dirary-Line_ex	
A Traverse Points xsl	1	RoboForm Toolbar	13.23	0.00		
A: VerticalAlignment3PercentGrade xsl		Save Forms			DW Proporty	
A: Vertical Alignment And Events xsl A: Vertical Alignment Review xsl		Save Forms	42.03	0.00	RW_Property-	

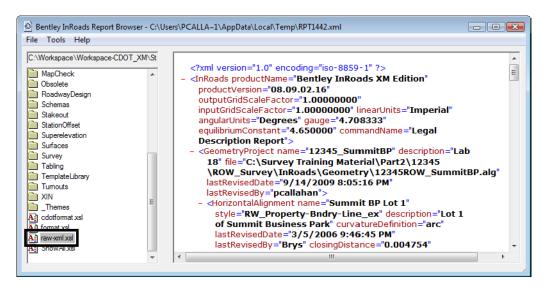
	А	В	С	D	E	F	G
1	Point	Type	Northing	Easting	Elevation	Style	ſ
2	Name						
3		POB	1556037.86	3279640.04	0	RW_Property-Bndry-Line_ex	
4		PI	1555652.96	3279644.13	0	RW_Property-Bndry-Line_ex	
5		PC	1555651.93	3279545.98	0	RW_Property-Bndry-Line_ex	
6		PI	1555651.28	3279513.23	0		
7		CC	1555851.89	3279542.03	0	RW_Property-Bndry-Line_ex	
8		PT	1555661.12	3279481.99	0	RW_Property-Bndry-Line_ex	
9		PI	1555698.89	3279357.98	0	RW_Property-Bndry-Line_ex	
10		PI	1556115.81	3279353.81	0	RW_Property-Bndry-Line_ex	
11		POE	1556037.86	3279640.04	0	RW_Property-Bndry-Line_ex	
12		Sheet	t1 Sheet2	Sheet3	-		

Excel will launch a New Web Query. Check on the coordiantes section and import the results.

Note: The output to Excel will only contain data from individual alignments based on the location in the xml report the fly-out menu was activated.

To view the source information the xml report was generated from:

21. In the Report browser, select Raw-xml.xsl in the left panel



What you see are the xml tags and attributes which define the report contents. Formatting of this data for display is accomplished through the use of xsl, or style sheets. Style sheets can be developed by the user for customized reports or formats.

Other formats:

In the category DataCollection access style sheet ListCoordinatesSDR32InternationalFoot

C:Workspace Workspace CDOT_XM/Standards-Global/ A) HorizontalEmentsSDR33Metric.xsl A) HorizontalEmentsSDR33Metric.xsl A) HorizontalOffAlignmentPoints.xsl A) HorizontalOffAlignmentPoints.xsl A) HorizontalOffAlignmentPoints.xsl A) HorizontalOffAlignmentPoints.xsl A) HorizontalOffAlignmentPoints.xsl A) HorizontalOffAlignmentPoints.xsl A) ListCoordinatesGeodimeterFormat.xsl A) ListCoordinatesLeica8.xsl A) ListCoordinatesSDR33InternationalFoot.xsl A) ListCoordinatesSDR33Usteric.xsl A) ListCoordinatesSDR33Usteric.xsl A) ListCoordinatesSDR33Usteric.xsl A) ListCoordinatesSDR33Usteric.xsl A) ListCoordinatesSDR33Usteric.xsl A) ListCoordinatesSDR33Usteric.xsl A) ListCoordinatesSDR33Usteric.xsl A) SimpleListCoordinates.xsl A) StakeoutSDR20.xsl A) StakeoutSDR20.xsl A) StakeoutSDR33.xsl A) Stak	e Tools Help				
	A: Horizontal Elements SDR33Metric xsl A: Horizontal Elements SDR33US SurveyFoot xsl HorizontalOff Alignment Points xsl HorizontalOff Alignment Points xsl HorizontalOff Alignment Points xsl ListCoordinatesGeodimeterFormat xsl ListCoordinatesLeica 16 xsl ListCoordinatesSDR33InternationalFoot xsl ListCoordinatesSDR33USSurveyFoot xsl ListCoordinatesSDR33USSurveyFoot xsl ListCoordinatesSDR33USSurveyFoot xsl ListCoordinatesSDR33USSurveyFoot xsl SimpleListCoordinates xsl StakeoutSDR20 xsl StakeoutSDR33 xsl StakeoutSDR33 xsl StationEquationsLeica 16 xsl	00NMSDR3: 06NM1.00 13NM9/14, 13NMProj: 13TS14-SI 08KI 08KI 08KI 08KI 08KI 08KI 08KI	000000000000 /2009 Point Listing for S ect Name: 12345_SummitBP EP-2009 15566037.85534 1555652.95901 1555651.92954 1555651.89053 1555661.11653 1555698.88708 1556115.80624	DR33 4003279640.03934400 7003279644.12952200 4003279545.98172800 5003279542.03178200 0003279481.98780800 3003279357.98247600 2003279353.81380500	4

Experiment with other style sheets such as HorizontalElementsSDR33 as well as other style sheets in the Geometry category.

LAB 16 - Importing Cogo Points

Chapter Objectives:

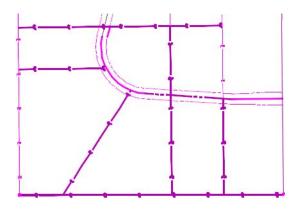
- Inport Cogo Points from graphics
- Import Cogo Points from ASCII
- Import Cogo Points from ICS

Lab 16.1 - Importing Cogo Points from Graphics

Graphic elements can be imported to generate geometry. Some of the valid element types are: lines, linestrings, cells, text, shapes, etc. Refer to the InRoads help topic Import Geometry

To import Cogo points from a graphics file;

1. Identify graphics using a selection set or a MicroStation fence



rom Graphics	ICS Ve	ertical from Surface		
Type:	Cogo Point	ts	-	Apply
Geometry				
Name:	SBP Lot Li	nes 700		
Description:	Cogo Point	s from line segments		
Style:	RW_Prope	erty-Bndry-Line_ex	- C	Help
Horizontal Cu	rve Definition	n: Arc	*	
Vertical Curv	e Definition:	Parabolic	v	
Use Fence	Resc	olve Gaps and Nontang	encies	
	nts 🔲 No D	uplicate Logo Points		
Join Elemer		dded to Single Alignme	nt	
Join Elemer	Elements A		nt	
Join Elemer All Selected	i Elements A s		nt	
Join Elemer All Selected Attribute Tag	d Elements A s Data		nt 👻	
Join Elemen All Selected Attribute Tag	d Elements A s Data	dded to Single Alignme	nt *	

2. Select File > Import > Geometry > [From Graphics] Type - Cogo Points

- 3. **<D> Apply**
- 4. Verify the results

<unnamed></unnamed>	T	🧝 🚳 🔪 🏏 📕 🗡	ي يل و 5+00 ق	
<u>File Surface Geometry Drainage</u>	<u>E</u> valu	ation <u>M</u> odeler Dr <u>a</u> fting	<u>T</u> ools <u>H</u> elp	
년 백a 배출 1 태월 🛃 🗠 🔛				
	=	Name	Description	Style
⊟ ☐ Geometry Projects	*	:: 3878_1	Property Pin	T_Property Pi
12345_SummitBP		SBP Lot Lines 700	Cogo Points from line segments	RW_Property
Default		SBP Lot Lines 701	Cogo Points from line segments	RW_Property
TRAINRow_ROW		SBP Lot Lines 702	Cogo Points from line segments	RW_Property
📄 🔛 12345_ROW		SBP Lot Lines 703	Cogo Points from line segments	RW_Property
Cogo Buffer		SBP Lot Lines 704	Cogo Points from line segments	RW_Property
		SBP Lot Lines 705	Cogo Points from line segments	RW_Property
3878_1		SBP Lot Lines 706	Cogo Points from line segments	RW_Property
1095 2		SBP Lot Lines 707	Cogo Points from line segments	RW_Property
1097_2		SBP Lot Lines 708	Cogo Points from line segments	RW_Property
1096_2		SBP Lot Lines 709	Cogo Points from line segments	RW_Property
1091_2	-	SBP Lot Lines 710	Cogo Points from line segments	RW_Property
Reometry Preferences	•	SBP Lot Lines 711	Cogo Points from line segments	RW_Property

Lab 16.2 - Importing Cogo Point from ICS

From the CDOT manual: Roadway Design Using InRoads – Importing Geometry from text files

Text files may be imported from several formats, the easiest of which to create is an *.ics* file. (Interactive Coordinate geometry Subsystem) This file type was first used with a product of the same name many years ago, but is still in use with InRoads today. It is basically a list of cogo commands along with the input for those commands.

If you have a text file of coordinates, you can create an .ics file by adding a **Store** command at the top and formatting the file similar to the one shown below.

📃 Untitle	ed - Notepa	d			X
File Edi	it Format	View	Help		
	Examp]	e.ics	file		ŕ
	Coordi	nates	of retai	ning wal	:
TORE					
	1	934	399.33	1836109.02	
	2 3 4 5 6		234.94	1836247.39	
	3		234.94	1836247.39	
	4	934	143.68	1836320.34	
	5	932	352.65	1833973.84	
	6	934	050.02	183686.24	
•					F

1. Choose File > Import > Geometry > [ICS]

2. Browse to find the file then choose Apply.

Import Geometry		
From Graphics ICS	Vertical from Surface	
File Name:		Apply
C:\\TRAINInRoads\	Miscellaneous\r_tum01.i	Browse
		Preview
		Help

The cogo points will be added to the active geometry project. You may then use **Geometry** > **Utilities** > **Create/Edit Alignment** to join the points, forming an Alignment and **Geometry** > **Horizontal Curve Sets** > **Define Curves** to add curves to the alignment. You can also accomplish these same tasks within the .ics file. See the Bentley Help topic *Alpha Cogo*

LAB 17 - Geometry Options

Chapter Objectives:

• Setup project parametes

Project geometry parameters are defined by the user.

1. Select Tools > Options > [Geometry]

Tolerances	Factors	Abbr	eviations	Rail	Sight Distance
Precision	Gener	al	Units an	d Format	Geometry
Plotting Height:			0.00		Help
Seed Alignm	ent Name:		1		
Seed Point N	lame:		1		
Curve Defi	nition				
				Always Co	onfim
Horizontal:	Arc				
Vertical:	Paraboli	c	•		
Measure:	Along	Arc	Along (Chord	
Degree of (Curve Leng	th:	100.00		
Unit Station	Length:		100.00		
Define Trans	itions By:		Length	00	onstant
Spiral Definit	ion:		Clothoid		•
ICS Coordin	ate Sequer	nce:	Northing/	Easting	•
Vertical Angle	e Referenc	e:	Zenith		•
Angular Mod	e:		Bearings	•	
Point Names	During Ed	its:	Do Not A	•	
Default Ac	cess Mode	-		10 P	
Hadaantal	Alternation		ad-Only	Read-W	rite
Horizontal /			0	0	
Cogo Buffe	r:		0	۲	

Geometry Defaults

- Plotting Height default elevation assigned to geometry points
- Seed Alignment Name initial name assigned to alignments
- Seed Point Name initial Cogo point name or alignment vertices name
- Curve Definition arc, chord, length of curve definitions
- Angular Mode Bearings or Azimuth settings
- Point Names During Edits horizontal alignment vertices
- Do not assign creates *unnamed* points

- Assign creates sequential alignment vertices names based on the seed point name
- **Note:** Alignment vertices defined with alphanumeric characters are not entered into the Cogo buffer by default. The Horizontal Event Point command can be used to send alignment key points to the Cogo buffer.
- 2. <D> Units and Format

olerances	Factors		iations		Sight Distance
Precision	Gener	al	Units and F	ormat	Geometry
Units					Help
Linear:	Imperia	ı	•		Trop
Angular:	Degree	s	•		
Format					
Station:	SS+SS.S	s	•		
Angular:	ddd^m	m'ss.s"	•		
Slope:	50%		•		
Aspect:	ddd.dd	d	•		

InRoads does not recognize or use the unit definition associated with the host MicroStation file. The units defined under the *units and format* tab define the units of measure for InRoads data. For commands that utilize distance or area parameters, InRoads looks to the settings in this dialog to determine if the distance or area defined is imperial or metric units.

- Units Linear Imperial or Metric
- Units Angular Degrees, Grads, or Radians
- Format Angular Degrees, Minutes, Seconds or Decimal Degrees

3. <D> Precision

Precision	tors Abbreviation General Unit	s and Format	Sight Distan Geometry
Northing/Easting:		•	Help
Elevation:	0.12	•	
Angular:	0	•	
Aspect:	0.12	•	
Slope:	0.12	•	
Linear:	0.12	•	
Station:	0.12	-	
Acres/Hectares:	0.1234	•	
Area Units:	0.1234	•	
Cubic Units:	0.1234	•	
Scale:	0.1234	•	

The *precision* tab defines the number of decimal places displayed in dialogs. It also defines the number of decimal places displayed when posting information to the MicroStation screen or when writing data to an ASCII file.

Note: The settings in the precision tab only effect display settings. It does not define computational parameters.

LAB 18 - Horizontal Regression Analysis

Regression analysis can be used to facilitate the development of horizontal alignments by creating a 'best-fit' alignment through defined points.

Chapter Objectives:

• Setup horizontal regression analysis project parametes

Regression analysis setup.

- 1. Create a horizontal alignment to store the results in.
- 2. Select **Tools > Application Add-ins** to enable the command.

Main Application Add-ins		- • •
Available:		OK
I ot Lavout Add-In		
Multiple Horizontal Element Regression Analysis Add-In		Cancel
		Help
Named Symbology Tools Add-In		nop
Place Cell/Block Add-In	*	
Description		
The Multiple Horizontal Element Regression Analysis Add-In provides commands for creation and editing with the inclusion of regression by least squares analysis.	horizont	al alignment

3. Select Geometry > Horizontal Regression > Add Regression Point The Add Horizontal Regression Points dialog will appear.

🔣 Add Horizontal R	egression Points	- • • 🗙
Main Advanced		
Source: Points		Filter
Alignn	nents	Help
Include:		
Selected:		<u>+</u>
Name	Description	Style
First Point:	Ŧ	-
Second Point:	Ŧ	- ф -
Apply	Preferences	. Close

4. **<D>** in the *Include* field so the **Filter** button becomes activated.

🔛 Add Horizontal	Regression Points	- 0 🔀
Main Advanced]	
Source: O Poin	ts	Filter
O Align	ments	Help
Include:		+
Name	Description	Style
First Point:	• •	+ +
Apply	Preferences	. Close

5. **<D>** the **Filter** button. The *Geometry Selection Filter* dialog will appear.

🔣 Geometr	y Selection Filter						— ×
Name:	Included	•					ОК
Description:	Included	•					Cancel
Style:	Included	•					Preferences
Fence Mode	Ignore	-					
Available:					Selected:		Help
Name	Description	Style	-	Add ->	Name	Description	Style
105	Section Comer	T_Section Cor		<- Remove			
100	Section Corner	T_Section Cor					
3878_1	Property Pin	T_Property Pin		<- Swap ->			
1095_2	Property Pin	T_Property Pin					
1097_2	Property Pin	T_Property Pin		All			
1096 2	Property Pin	T_Property Pin		None			
1091_2	Property Pin	T_Property Pin					
109 2	Property Pin	T Pronetty Pir	-				
4			•				

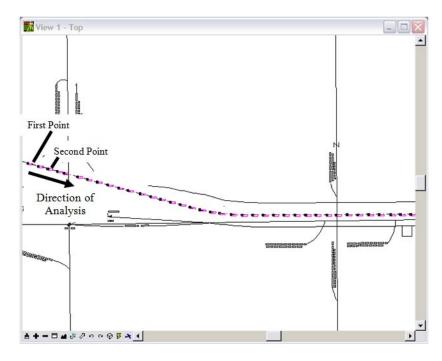
6. Create a selection of centerline points to be used for analysis.

Name:	Included 🔹					ОК
Description:		•				Cancel
Style:	Included -	•				Preferences
Fence Mode:	Ignore 👻					
Available:				Selected:		Help
Name	Description	Styl ^	Add ->	Name	Description	Style
3112_1	Traffic Control No Pass Left Y	T_T	<- Remove	1833	Traffic Control Dou	T_Traffic Doub
3117_1	Traffic Control No Pass Left Y	T_Ti	< nonove	2015	Traffic Control Dou	T_Traffic Doub
3122_1	Traffic Control No Pass Left Y	т_т 💷	<- Swap ->	2290	Traffic Control Dou	T_Traffic Doub
1169	Traffic Control No Pass Right	T_Ti		2302	Traffic Control Dou	T_Traffic Doub
1184	Traffic Control No Pass Right	T_Ti	All	2319	Traffic Control Dou	T_Traffic Doub
1199	Traffic Control No Pass Right	T_Ti	None	2397	Traffic Control Dou	T_Traffic Doub
1274	Traffic Control No Pass Right	T_Ti		2418	Traffic Control Dou	T_Traffic Doub
1293	Traffic Control No Page Bight	тт, Т		2433	Traffic Control Dou	T Traffic Doub

7. **<D>** the **OK** button in the *Geometry Selection Filter* dialog.

📓 Add Horizonta	Regression Points	- • •
Main Advance	d	
Source: () Poi	ints	Filter
🔘 Alig	gnments	Help
Include:		
		+ -
Selected:		
Name	Description	Style ^
1833	Traffic Control Dou	T_Traffic Doubl
2015	Traffic Control Dou	T_Traffic Doubl
2290	Traffic Control Dou	T_Traffic Doubl
2302	Traffic Control Dou	T_Traffic Doubl
2319	Traffic Control Dou	T_Traffic Doubl
7207	Troffic Control Dou	T. Teoffia Daubl
First Point:	1833 👻	+
Second Point:	2015 -	+
6	_	
Арріу	Preferences	Close

8. **<D>** the **Apply** button. The dialog will minimize allowing you to graphically define the first and second points to define initial course for evaluation.



- 9. <D> the first point in the MicroStation view and <D> second point in the view to define the *direction of the analysis*. The *Add Horizontal Regression Points* dialog will reappear.
- 10. $\langle D \rangle$ the Close button.

11. Select Geometry > Horizontal Regression > Edit/Review Regression Points. The Edit / Review Horizontal Regression Points dialog will appear.

Points:									Close
Name	Northing	Easting	Style	Include	Status	Offset	Weight	*	Denet
1833	1556121.36	3279713.82	T_Traffic Do	. No	Normal	0.00	0.01	Ξ	Report
2015	1556108.45	3279761.23	T_Traffic Do	No	Normal	0.00	0.01		Help
2290	1556095.39	3279809.65	T_Traffic Do	No	Normal	0.00	0.01		
2302	1556080.40	3279863.71	T_Traffic Do	No	Normal	0.00	0.01		
2319	1556065.68	3279917.82	T_Traffic Do	No	Normal	0.00	0.01		
2397	1556053.00	3279964.70	T_Traffic Do	No	Normal	0.00	0.01		
2418	1556036.79	3280024.69	T_Traffic Do	No	Normal	0.00	0.01		
2433	1556022.37	3280076.78	T_Traffic Do	No	Normal	0.00	0.01	-	
٠	4550000 50		T T (m n	••		0.00	• •	-	

12. Refine the selection of points to be used for analysis by using the Ctrl and Shift keys or using the Select button to define a selection area.

oints:									Close
Name	Northing	Easting	Style	Include	Status	Offset	Weight	*	Report
1833	1556121.36	3279713.82	T_Traffic Do	No	Normal	0.00	0.01	Ξ	Report
2015	1556108.45	3279761.23	T_Traffic Do	No	Normal	0.00	0.01		Help
2290	1556095.39	3279809.65	T_Traffic Do	No	Normal	0.00	0.01		
2302	1556080.40	3279863.71	T_Traffic Do	No	Normal	0.00	0.01		
2319	1556065.68	3279917.82	T_Traffic Do	No	Normal	0.00	0.01		
2397	1556053.00	3279964.70	T_Traffic Do	No	Normal	0.00	0.01		
2418	1556036.79	3280024.69	T_Traffic Do	No	Normal	0.00	0.01		
2433	1556022.37	3280076.78	T_Traffic Do	No	Normal	0.00	0.01	-	
¥ [*******			••	•••••	0.00	0.01		

- 13. **<D>** the **Edit** button. The **Edit Horizontal Regression Point** dialog will appear.
- 14. **<D>** the radio button **Yes** to **Include in Analysis**.

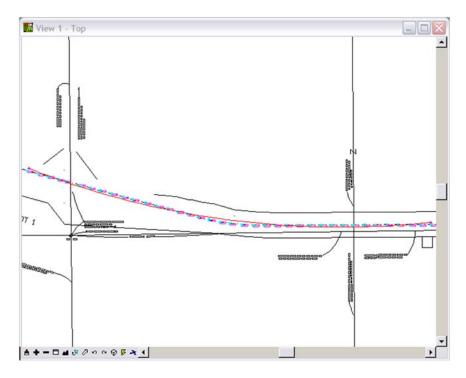
🔣 Edit Horizontal	Regressio	on Point	- • •
Include in Analysis:	Yes	No	Apply
Status:	Fixed	•	Close
	Norma	l -	Help
	Ignore	d	
Offset:	0.00		+
Weight:	0.01		
First <	Previous	Next >	Last

- 15. <D> the Apply then Close buttons. Leave the Edit / Review Horizontal Regression Points open for further edits.
- 16. Select Geometry > Horizontal Regression > Single Element Regression Analysis The Single Horizontal Element dialog will appear.

17. Select Element Type: Linear or Circle

🔛 Single Horizontal Eleme 🗌	- • •
Element Type	Compute
	Close
Save Order Before Selected Element	Save
After Selected Element	Report
Last Element	Help
Results	
Least Squares Error:	
Standard Deviation:	
Maximum Offset:	

18. **<D> Compute** to view the results in the MicroStation view.



- 19. **<D> Save** to create the alignment element.
- 20. **<D>** the **Report** button to view a summary.

Kesults			
2015 2290 2302 2418 2433 2454 2479 2525 2545	0+00.00 0+49.02 0+99.13 1+55.26 2+11.41 2+60.05 3+22.29 3+76.38 4+26.14 4+76.53 5+28.53 5+77.06 6+28.04	$\begin{array}{c} 2.73 \\ -0.35 \\ -2.93 \\ -4.60 \\ -5.68 \\ -5.99 \\ -5.45 \\ -3.78 \\ -2.04 \\ 0.45 \\ 3.66 \\ 7.34 \\ 11.32 \\ 13.71 \end{array}$	Close Save As Append E Display Print Help

21. Review the results.

🥵 Review Horizontal Alignment			
Geometry Project: 12345_ROW -	Mode		Close
Horizontal Alignment: Regression Alignmer	C Curve Sets	Alignment C Element	Save As
Project Name: 12		^	Append
	86 ROW geometry gression Alignment		Display
Style: DE	FAULT 0000		Print
	STATION	NORTHING	Help
Element: Circular			
PC ()	0+00.00	1556200.84	
	9+85.49	1555840.65	Select
PT ()	19+32.74	1555946.16	First
Radius:	4014.65		
Delta:	27^35'00" Le	ft	< Previous
Degree of Curvature(Arc):	1^25'38"		1
Length:	1932.74		Next>
Tangent :	985.48	~	
Chord ·	1914 13		Last

LAB 19 - Creating files and placing cells

Regression analysis can be used to facilitate the development of horizontal alignments by creating a 'best-fit' alignment through defined points.

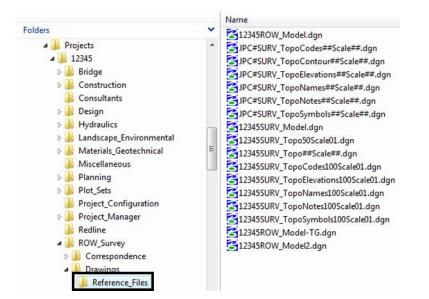
Chapter Objectives:

- Open MicroStation Title Sheet using CDOT CDOT User workspace
- Place RLS Stamp at correct scale for Title Sheet

Standard sheets for Survey and ROW plans were copied into the project directory for use in training. Prior to beginning, use *Windows Explorer* or *My Computer* to review the training directory contents.

 Projects Tabs 12345 Bridge Construction Consultants Design Hydraulics Hydraulics Landscape_Environmental Materials_Geotechnical Miscellaneous Planning Plot_Sets Project_Configuration Project_Manager Redline ROW_Survey RoW_Survey Lasts 	
 Projects Tabs 12345 Bridge Construction Consultants Design Hydraulics Hydraulics Landscape_Environmental Materials_Geotechnical Materials_Geotechnical Miscellaneous Planning Plot_Sets Project_Configuration Project_Manager Redline ROW_Survey Correspondence Tabs Tabs<	nce_Files
Bridge \$12345R0 Construction \$12345R0 Consultants \$12345R0 Design \$12345R0 Hydraulics \$12345R0 Landscape_Environmental \$12345R0 Materials_Geotechnical \$12345R0 Miscellaneous \$12345R0 Planning \$12345R0 Plot_Sets \$12345R0 Project_Configuration \$12345R0 Project_Manager \$12345SU Redline \$12345SU ROW_Survey \$12345SU Correspondence \$12345SU	ROW Cnty-24x18 ##.dan
	COW_Cnty-24x18_##.dgn COW_Cnty-24x36_##.dgn COW_Mon##.dgn COW_Ownership##.dgn COW_Plan##.dgn COW_TabProp01.dgn COW_TabProp02.dgn COW_TabProp03.dgn COW_TabProp04.dgn COW_TabProp04.dgn COW_TabProp##.dgn COW_TitleSht.dgn SURV_MonRcrd##.dgn SURV_PlanPCD##.dgn SURV_PlanPCD##.dgn SURV_TitlePCD##.dgn

Navigate to C:\Projects\12345\ROW_Survey\Drawings



C:\Projects\12345\ROW_Survey\Drawings\Reference_Files

MicroStation Operation

There are three easy methods to Start MicroStation

- Choose Start > All Programs > Bentley > MicroStation V8 XM > MicroStation V8 XM Edition and MicroStation will start and allow you to choose the design file, once the design file opens InRoads can be loaded as needed.
- Choose the Desktop icon for MicroStation if one is available on your machine. MicroStation will start and display the MicroStation Manager interface.
- If Windows Explorer is open, <D> <D> on a *.dgn file will launch MicroStation.

Use one of the above methods to start MicroStation.



1. In the MicroStation Manager dialog box, go to the *Workspace* group section and change the User field to *CDOT USER*, the Project field to *12345* and the Interface field to *CDOT*.

Look in:	12345			- 🗿 🦻 📂 🖽-	ື 🔁 🙆			
CA.	Name		Size	Date modified				_
2	📕 Bridge			9/10/2009 7:24 AM				
cent Places	📙 Constructio	on		9/10/2009 7:24 AM				
	🌙 Consultant	s		9/2/2009 10:29 AM				
2	🍌 Design			9/10/2009 7:24 AM				
Desktop	Hydraulics			9/10/2009 7:24 AM	E			
500	🗼 Landscape	Environme		9/10/2009 7:24 AM				
601	Materials_0	Geotechnical		9/10/2009 7:24 AM				
DOT User	Miscellane	ous		9/10/2009 7:24 AM				
	🗼 Planning			9/10/2009 7:24 AM		1		
	Plot_Sets			9/10/2009 7:24 AM				
Computer	-	nfiguration		9/10/2009 7:24 AM				
-	Project_Ma	inager		9/10/2009 7:24 AM				
<u>.</u>	🍌 Redline			9/2/2009 10:29 AM				
Network	ROW_Surve	ey		9/10/2009 7:24 AM	-			_
	File name:			•	Open	User:	CDOT User	
	Files of type:	All Files (".")	(•	Cancel	Project:	12345	
		Open as	read-only		Options	Interface:	CDOT	_

This workspace setup should load the correct MicroStation environment (including toolbars) when the selected MicroStation file is opened.

- 2. Navigate to the folder ROW_Survey\Drawings
- 3. **<D>** on file *12345ROW_TitleSht.dgn*
- 4. **<D> OK** in the *MicroStation Manager* dialog box to open the file.

Look in:	Drawings		•	G 🤌	ح 🔁 📂	Ĉ	3	*		3D - V8 DGN	
æ	Name	^	Date modif	ied	Туре		Siz ^				_
2. July 1	12345ROW	_Plan##.dgn	1/18/2008	3:15	MicroStation	D					
ecent Places	12345ROW	_TabProp01.dgn	1/18/2008	8:15	MicroStation	D					٩.
	12345ROW	_TabProp02.dgn	1/18/2008	3:15	MicroStation	D					
	12345ROW	_TabProp03.dgn	1/18/2008	3:15	MicroStation	D					
Desktop	12345ROW	_TabProp04.dgn	1/18/2008	3:15	MicroStation	D					
100	12345ROW	_TabProp##.dgn	1/18/2008	3:15	MicroStation	D					
	12345ROW	_TitleSht.dgn	1/18/2008	3:15	MicroStation	D					
CDOT_User	12345SURV	_MonRcrd##.dgn	1/18/2008	3:15	MicroStation	D	=				
	12345SURV	_PlanLSCD##.dgn	1/18/2008	3:15	MicroStation	D	-	1			
	12345SURV_PlanPCD##.dgn 12345SURV_TitleLSCD##.dgn 12345SURV_TitlePCD##.dgn		1/18/2008	8:15	MicroStation	D					
Computer			1/18/2008	8:15	MicroStation	D					
			1/18/2008	8:15	MicroStation	D					
							-				
Network	•	"	1				F.				
	File name:	12345ROW_TitleSh	nt.dgn		•	Oper	n		User: (CDOT User	
	Files of type:	All Files (*.*)			•	Cano	el	P	roject: (12345	
		Open as read-onl	v			Option		late.	nface:	CDOT	_

Sel leaves 2 10 2 2 10 2 2 10 2 10 10	
DEPARTMENT OF TRANSPORTATIO STATE OF COLORADO FEDERAL AID PROJECT SO, XXXXXXXX 2222222222 COUNTY	DN BOTH DN BOTH DN
ł	

Your graphics window should appear as shown.

Note: The file names and directory structure used in this course are based on current information. As the CDOT configuration develops and directory structure and file naming conventions are standardized, these may change.

The default Model scale for CDOT plan sheets is 1:100. For sheets that are text based such as title sheets, and tabulation sheets, the Model scale is set to 1:1. Using the annotation scale lock synchronizes both graphics and text placed in the drawing. For drawings at other scales, the model properties will require modification. See the instructor if additional information is required.

Insert the Region, Designer information in the upper-left corner of the sheet.

5. The *CDOT Menu* should open by default when MicroStation is launched. If for any reason the *CDOT Menu* is not open, you can open it from the Main Tool frame.



6. From the CDOT Menu <D> on Group Display>Select All.

🤐 (CDOT Menu			
CDO	OT Groups CDOT Tools Options	Help		
	Drafting Bridge Construction	isting	Proposed	?
$ \mathbf{x} \leq \mathbf{x} \leq \mathbf{x} \leq \mathbf{x} $	Design Geometry Hydraulics Landscape Environmental Materials Geotechnical ROW Survey Traffic ITS Utilities	der er RE usions vork	Clip Boundary Clip Boundary Match Line Utility Revision Cloud Border (Plan 11"x17") Border (Plan 8.5"x11") Lar Border (PnP 11"x17") Border (Profile 11"x17")	
	Select All Deselect All Settings	pols	☆ Border (Title 11"x8.5") Por ☆ Border (Typical Section 11 ☆ Border Limits (11"x17") <	

- 7. Select ROW Survey in Group Display
- 8. Set the *Status* to **Proposed**
- 9. Select Borders PLS

10. Select the Survey Supervisor Kevin Williams

CDOT Groups CDOT Tools	Options Help	
Drafting Bridge Construction	Status © Existing © Proposed	?
Design Geometry Hydraulics Landscape Environmental	ROW Survey	
	Border PLS Border PLS	
Utilities	Easement	
	Government (PLSS) Kevin Williams Kevin Williams	
	Miscellaneous Miscellaneous Mark Guerrero Patricia Dickerson	
	Pattern	
	Property Ownership	

 In the Active Settings dialog box set Active Scale to 1.00 and Active Angle to 0.00

Active Settin	ngs			
Active Scale:	1.00	Apply		
Active Angle:	0.00	Close		

- 12. <D> Apply
- 13. <D> Close
- 14. *Place* the **cell** at the upper-left corner of the sheet as shown



Challenge Exercises

• Verify the coordinates at the lower left corner of the sheet (tentative snap). Should be at 0,0,0

	Cell: SHEFT ROW-Plan	-Sheet \ Shape, Level: SHE		
되 문 🍳 🖬 작 🗳 3	. 🗷 🛍 🗊 🍖 🎗 🖓			
	0.000, 0.000 KeyPt		🕎 📆 🚽	کم 🚺 لم DRAFT_WT-0

- Determine the length and height of sheet (measure tools or AccuDraw). Should be 11 x 17
- Investigate the levels the graphics are on (level display, element information, or pop-up information)

LAB 20 - Editing Text

Chapter Objectives:

- Edit existing text
- Add additional text

Formatting has been defined for standard sheets. Text fields indicated with an 'X' indicates the user needs to input project or sheet specific information.

1. *Window* into the top center of the title sheet.

	STATE OF COLORADO
	RIGHT OF WAY PLAN OF PROPOSED
	FEDERAL AID PROJECT NO. XXXXXXXXX STATE HIGHWAY NO. XXX
	ZZZZZZZZZ COUNTY
-	RIGHT OF WAY PROJECT CODE NO. XXXXX

2. Select the Edit Text command.



- 3. **<D>** on the FEDERAL AID PROJECT NO. XXXXXXXX text string.
- 4. In the Text Editor dialog box, correct the project identifier text and change to *STA 086A 039* as shown.



5. **<D>** on the MicroStation screen to execute the edit.

DEPARTMENT OF TRANSPORTATION STATE OF COLORADO

RIGHT OF WAY PLAN OF PROPOSED FEDERAL AID PROJECT NO. STA 086A - 039 STATE HIGHWAY NO. XXX ZZZZZZZZZ COUNTY RIGHT OF WAY PROJECT CODE NO. XXXXX

6. Optional – complete edits to the other project identification text.

Challenge Exercises

• Add another line of text that matches both the text and symbology of the existing text

DEPARTMENT OF TRANSPORTATION STATE OF COLORADO RIGHT OF WAY PLAN OF PROPOSED FEDERAL AID PROJECT NO. STA 086A - 039 STATE HIGHWAY NO. 86 ELBERT COUNTY CONSTRUCTION PROJECT CODE NO. 14072 M.P. 18.10 TO 21.00 RIGHT OF WAY

• Complete the upper right-hand corner of the sheet as shown

Right c	of Way Plai	าร
Tit	le Sheet	
Project Number: STA 086	6A-039	
Project Location: State H	lighway No. 86 (orridor PE
Project Location: County	Rd. 25 & 27 &	33
Project Code: Last Mod. Date	Subset Sheets	Sheet No.
12345 07-26-09	1 of 1	RW 1.01

• Use the Edit Text command to complete the scale bar



PROJECT LOCATION MAP

LAB 21 - Vicinity Map - Vector

Vicinity maps can be referenced to the title sheet. These maps can be in the form of vector files (CADD elements) or raster files (images).

The CDOT standard procedure is to use county maps that have been translated from GIS information, these maps can be found on the shared drive at: \\public\CADD County Maps\. The county of interest should be copied to your project location drawings folder and can be attached as a reference file to the Title Map. The local map can be edited as desired without affecting the original.

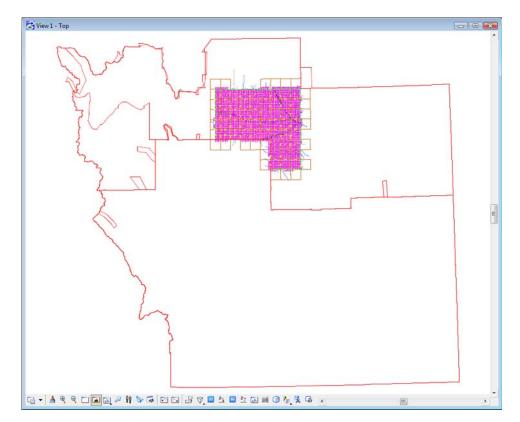
Chapter Objectives:

- Reference CADD County Map into Title Sheet
- Trim Vicinity Map reference file

For training purposes, a vicinity map has been stored in the *References* folder.

Review the vicinity map.

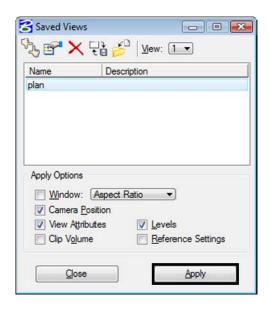
 Open the MicroStation file Elbert.dgn this file is located in: C:\Projects\12345\Design\Drawings\Reference_Files



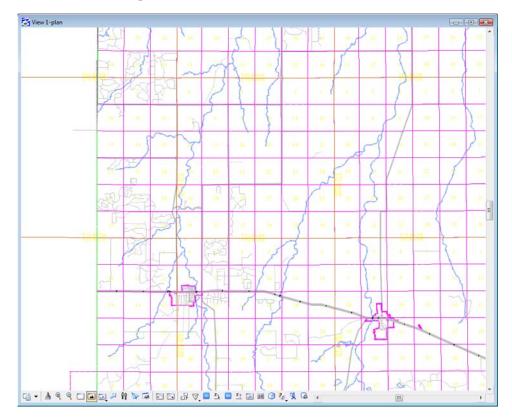
This file contains a Saved View to assist in attaching it as a reference file.

- 2. Select **Utilities > Saved Views** from the MicroStation pull-down menu.
- 3. **<D>** on the saved view by the name of *plan*

4. **<D> Apply**



The MicroStation view updates to the limits of the saved view. <D> Close.



5. Use other MicroStation view commands to investigate the contents of the drawing.

Open the MicroStation Level Display dialog to investigate level stratification by choosing, Settings > Level > Display. Note all information resides on GIS_* levels.

Level Display			
Name	Logical	Used 🔻	-
GIS_Bridges			
GIS_Cities			
GIS_County-Lines			
GIS_Milepoints		•	
GIS_ROADS-Local			
GIS_ROADS-Major			
GIS_ROADS-Ramps-Frontage			

6. Turn level displays on and off to verify data stratification, then Close the Level Display dialog.

Attaching a vicinity map as a reference file

Attach the vicinity file as a reference file to the title sheet. Once attached, move, scale, and constrain the display limits.

Reopen the title sheet: 12345ROW_TitleSht.dgn. Once open:

- 1. Select File > Reference from the MicroStation menu bar.
- 2. In the References dialog box, select Tools > Attach

⇒ (+ D (⁺ 1)	9 70 Å P O	💥 <u>H</u> ilite Mode:	Boundaries	•
Model	Description		Logical	Preser
				÷
	Orientation	Rotation		+
	Orientation	Rotation		+
	Model			Image: Second

- 3. **<D>** the file *Elbert.dgn* from the*Design\Drawings\Reference_Files* directory.
- 4. **<D> Open**

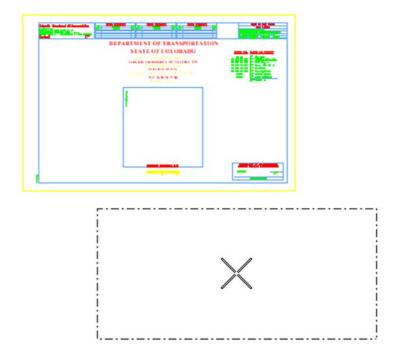
S								
Attach Refere	nce - C:\Projects\1	2345\Design\Drawi	ings\Reference	Files	5/			•
Look in:	Reference_Fil	es	-	0	🤌 📂 🛄 🗸		<u>S</u> 🖲	3D - V8 DGN
œ	Name	^	Date taken		Tags	Size	Rating	
Recent Places Desktop CDOT_User	Elbert.dgn					1,355 K	B ☆☆	Attachment Method
Computer								Interactive
Network								
	•		m				F.	
	File name:	Elbert.dgn				•	Open	
	Files of type:	CAD Files (*.dgn;*.d	lwg:*.dxf)			•	Cancel	
	•	Save Relative Pa	ath				Options	

- 5. Key-in the Logical Name: *Vicinity*
- 6. Key-in the Description: GIS locator map for title sheet
- Select the *Saved View > plan > Top* option in the *Orientation* section of the dialog box.
- 8. GIS maps have been designed to be inserted at a scale factor of 1:*5280* (Master : Reference). Enter that value for the Scale option.

9. **<D>OK**

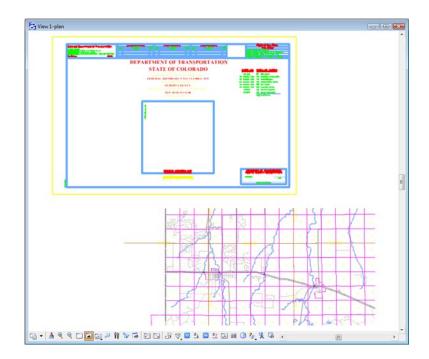
😤 Reference Attachme	ent Settings for Elbert.dgn	83
<u>Fi</u> le Name: Elber Full Path:\12 <u>M</u> odel: CDO	2345\Design\Drawings\Reference_Files\Elbert.dgn	•
Logical Name: Vicini Description: GIS k	ty ocator map for title sheet	
Orientation:		
View	Description	
Coincident	Aligned with Master File	-mi
Coincident - World	Global Origin aligned with Master File	=
Standard Views		
Saved Views		
🗆 plan Top		
Bottom		- 11
Left		-
Toggles:	▣ਡ 📢 🕒 🛄 📆 🍌 🐓 🏢 🔊 🖓 🗹	
Scale (Master:Ref)	1.000000 : 5280.000000	
Named Group;		
Revision:	· · · · · · · · · · · · · · · · · · ·	
Clip Boundary Element:	Copy To Master	
Le <u>v</u> el:	· · · · · · · · · · · · · · · · · · ·	
Nested Attachments:	No Nesting Depth: 1	
Display Overrides:	Allow	
Ne <u>w</u> Level Display:		
Global LineStyle Scale:	Master	
	OK Cancel	

In the MicroStation view window, the limits of the saved view dynamically display relative to the location of the cursor.



- 10. **<D>** in the MicroStation view window area to attach and display the contents of the reference file.

11. Select the MicroStation *Fit* command.

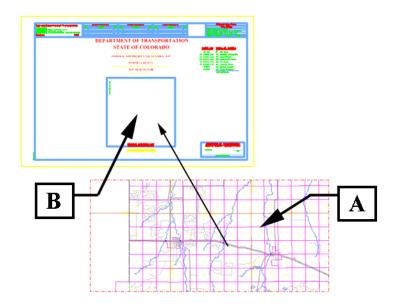


Move the reference file to align with the title sheet.

12. Select **Tools > Move** in the **References** dialog.

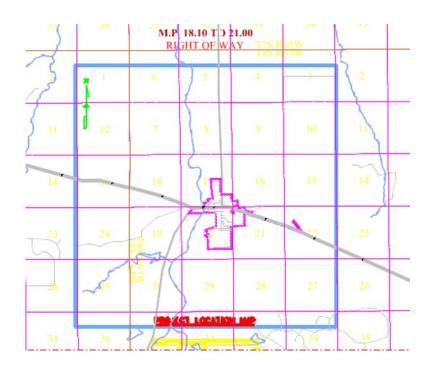
Tools Settings					
Attach	🚽 🗇 🌮 🚰	' 🔛 🐔 📅 🗊 🗯) 🗙 <u>H</u> ilite Mode	Boundaries	•
<u>D</u> etach Detach All	Model	Description		Logical	Present
R <u>e</u> load Reload All	CDOT default	GIS locator map for title s	sheet	Vicinity	Wirefran
Exchange					
					,
- E <u>x</u> change		Orientation Top	Rotation 0*	°0'0"	•
E <u>x</u> change Open in New Session <u>M</u> ove		Orientation Top	Rotation 0°	0'0"	•
Exchange Open in New Session	: 5280.000000	Z -178956.997]

13. **<D>** at point **A** and then **<D>** at point **B** to move the attached reference file.



Execute additional move commands to reposition the reference file as necessary.

- 14. **<R>** to exit the Move References command.
- 15. Zoom into the *Project Location Map* area of the Title Sheet.

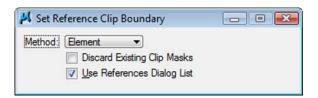


Constrain the display limits of the reference file (clip boundary)

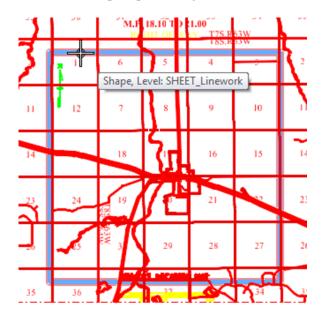
16. Select **Tools > Clip Boundary** from the Reference File dialog.

😤 References (1 of 1 unique,	1 displayed)	- • 💌
<u>T</u> ools <u>S</u> ettings <u>A</u> ttach Detach	🖘 🏟 🔁 🎦 🏠 🛃 🔁 🛱 📰 🔘 🗙 Hilte Mode:	Boundaries 👻
- De <u>t</u> ach All R <u>e</u> load Reload A <u>ll</u> E <u>x</u> change	Model Description CDOT default GIS locator map for title sheet	Logical F Vicinity V
Open in New Session Move Copy Scale Rotate Merge Into Master Make Direct Attachment	III III : 5280.000000 Orientation Top Rotation 0°0″ Y -181659.497 Z -178956.970 IIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	
Mirror <u>H</u> orizontal Mirror <u>V</u> ertical Clip <u>B</u> oundary		
Clip Boundary Clip Mas <u>k</u> Delete Clip Clip <u>F</u> ront Cli <u>p</u> Back		

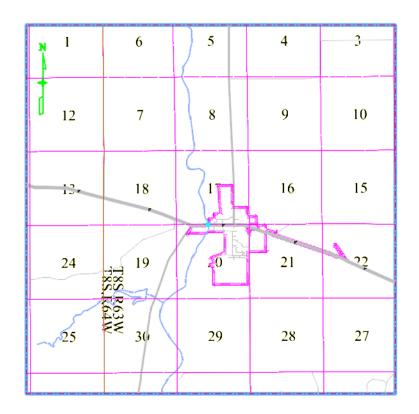
17. In the *Tool Settings* dialog. Set method to Element



18. **<D>** on the shape representing the limits of the location map display.



19. **<D>** a second time (anywhere on the screen) to accept the displayed solution.



20. Use the MicroStation command *Modify Element* command to resize the shape identified to define the clip boundary.

Modify							
🛃 🖄 💥 ,	$/\times$	ンキキ	‡9	∋ *]*	Ť	\searrow

The reference file clip boundary will reconfigure with the shape modifications.

Note: The exercise just completed used an existing MicroStation shape to define reference file clipping boundaries. The same process can be followed by using a MicroStation Fence to define (and redefine) the reference file clip boundary.

Challenge Exercises:

- Move the shape used to define the reference file limits. What happens to the graphics limits displayed?
- Use the References dialog to move the vicinity map after it has been clipped.
- Delete the shape used to define the reference file limits. What happens? (select undo, to restore the shape)
- Turn levels on and off for the reference file attachment
- Constrain the reference file display using a fence block
- Try using a circular fence to define the clipping limits
- Define a clip mask within the reference file limits

• Modify elements in the file Elbert.dgn, what happens to the graphics displayed in the vicinity map?

LAB 22 - Locator Map – Raster Reference File

Chapter Objectives:

- Reference locator map into Title Sheet
- Trim locator map reference file

Attach a raster reference file for the locator map. Once attached, move, scale, and constrain the display limits.

In the CADD file for the title sheet:

1. Remove the reference file (Elbert.dgn) from the previous exercise by selecting **Tools** > **Detach** from the References dialog box.

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	DEPARTMENT OF TRANSPORTATIO STATE OF COLORADO REGIT OF WAY PLAN OF PROPOSED FEDERAL AD PROJECT SOL STA 086A - 839 STATE HIGHWAY NO. 86 ELERT COURTY CONSTRUCTION PROJECT CODE NO. 14072 MR. 1840 TO 200 REGITTOF WAY	Image: Section and
	ł	

- 2. Select File > Raster Manager from the MicroStation menu bar.
- 3. Select **File > Attach** in the Raster Manager dialog.

e <u>E</u> dit <u>View</u> Attach		-	🖬 🕈 Á 🍃	🛃 🔯 🕩		
<u>D</u> etach Detach All R <u>e</u> load			Geo Priority	Model	Display Gami Print Gamma Stati	
Sa <u>v</u> e As						
Import	•					

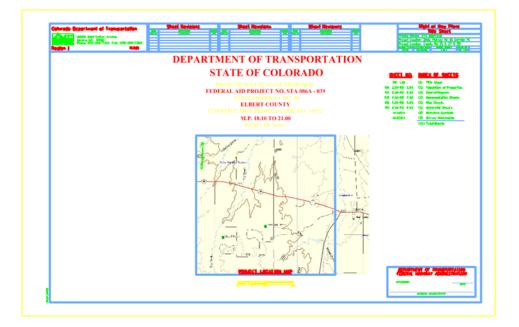
- 4. Browse to the ... *ROW_Survey Drawings Reference_File* folder and select the file Raster locator map.jpg
- 5. *Key-in* the Logical Name *Locator*

- 6. *Key-in* the Description *Raster location map*
- 7. <D> OK

Look in:	Beference_Fil	les		- 🗿 🏚 🔛		S 💽 🚯
Cecent Places	Name Faster locato		Date taken	Tags	Size 114 KB	Preview Attachment
Computer Vetwork	< File name: Files of type:	raster locato	100000	•	Open Cancel	NE-ELAST
	Attachement Sett View: Logical Name: Description:	tings:	578	V Place Inte	ractiv <mark>e</mark> ly ter Files Read-Only	

8. As in the previous lab, **<D>** to define the lower left and upper right corners that define the desired limits for the reference file.

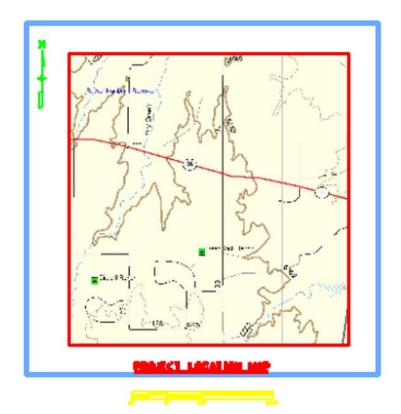
The raster reference file is attached to the title sheet



9. In the Raster Manager dialog, select Edit > Clip



10. Follow the MicroStation prompts to *define* the clip of the raster so it appears approximately as shown.



LAB 23 - Annotation

Chapter Objectives:

• Annotate using the Place Note command

Annotate the locator map using the MicroStation place note command. First select the correct symbology using the CDOT Menu.

- 1. Activate the **Drafting** Group Display.
- 2. **<D>** Text button in Drafting area.
- 3. Set the <u>Title</u> Text Type (button labeled **T** in *Drafting* area).
- 4. Set the Justification to *Left Top*
- 5. Select .14" 100% Place Note as shown.

CDOT Groups CDOT Tools			
Bridge Construction	Status O Existing	Proposed	?
Design Geometry Hydraulics Landscape Environmental	Drafting	S T M AII	
Materials Geotechnical	Border	Justification:	
Traffic ITS	Border RE	Left Top	•
Utilities	Dimensions	A .10" 80% Title A .10" 80% Title Mono	Â
4 III >	Linework	▲ 10" 100% Place Note ▲ 10" 100% Title	
	Patteming	A .10" 100% Title Mono A .14" 80% Title	E
	Symbols	A .14" 80% Title Mono	-1
	Text		

The correct settings and symbology are now set and the MicroStation Place Note command should automatically execute with the correct Text Style specified in the Place Note dialog.

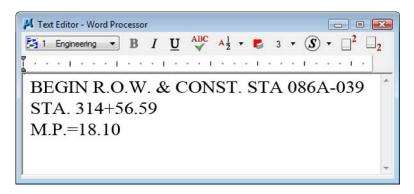
6. Select the Dimension Style CDOT 1

📕 Place Note	- • 💌	
	×A A	
<u>T</u> ext Style:	🖙 .14" ENG-100 🔻 🥄 💩	
Dimension Style:	🗂 CDOT 1 🚽 🥄 🎝	
Text Rotation:	Horizontal 💌	
T <u>ex</u> t Frame:	None	
Height:	0.140	
Width:	0.140	Expands or
📝 Ap	oply <u>changes to all text</u>	contracts the dialog
	ଟ	and dating
	0	

7. **Expand** the Place Note dialog and note the available options. Make sure the options selected match those shown below.

ዞ Place Note	- 8 🐱
	✓ ^A A
Text Style	: 🔝 .14" ENG-100 🔻 🥄 🌗
Dimension Style	: 🗂 CDOT 1 🛛 🔻 🥄 🎝
Text Rotation	: Horizontal 🔻
T <u>ex</u> t Frame	None
Height	0.140
<u>Wi</u> dth	: 0.140
	Apply <u>changes to all text</u>
<u>L</u> ocation	: Manual
Leader Type	: Line 🔻
Start At	: Terminator 💌
Horizontal Attachment	: Auto 💌
	n-line Leader
	Association

8. **Key-in** the required text as shown.



9. *Follow the MicroStation prompts* to place the leader line and text (the first <D> will define the location of the arrow).

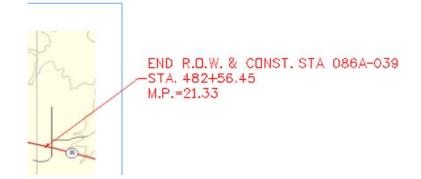


Repeat for the end of project information.

10. Key-in the required text as shown.

📕 Text Editor - Word Processor	×
I Engineering ▼ B I \underline{U} \checkmark $A_{\frac{1}{2}}$ ▼ B 3 ▼ \underline{S} ▼ $\underline{-}^2$	2
Ta selecel sealese teacherstanele	
END R.O.W. & CONST. STA 086A-039	~
STA. 482+56.45	
M.P.=21.33	
	Ψ.

Follow the MicroStation prompts to place the leader line and text



11. Select File > Save Settings

Challenge Exercises:

- Insert a scale bar cell and/or north arrow (General.cel)
- Input a basis of bearing note
- Replace the information in the top-left corner of the sheet (ROW.cel)



LAB 24 - Land Survey Control Diagram Plan Sheet

Chapter Objectives:

• Import XML data into a MicroStation file

In this sheet, coordinate information will be input in a tabular format.

Return to the MicroStation manager dialog.

1. Select File > Close (if MicroStation is currently open).

Look in:	Drawings		- 3	🗊 🔛 💷 🕈	ື 🗋 🚰	٠	3D - V8 DGN
œ.	Name	*	Date modified	Туре	Size	•	
Recent Places		_Cnty-24x18_##.dgn _Cnty-24x36_##.dgn	1/18/2008 8:15 1/18/2008 8:15		-		-
	12345ROW	/_Mon##.dgn /_Ownership##.dgn	1/18/2008 8:15 1/18/2008 8:15		-		
Desktop	12345ROW	_Plan##.dgn _TabProp01.dgn	1/18/2008 8:15 1/18/2008 8:15				
USL-	12345ROW	_TabProp02.dgn	1/18/2008 8:15		-		
CDOT_User	12345ROW	/_TabProp03.dgn /_TabProp04.dgn	1/18/2008 8:15 1/18/2008 8:15	MicroStation D			
Computer	12345ROW	/_TabProp##.dgn /_TitleSht.dgn	1/18/2008 8:15 9/25/2009 8:17				
-		/_MonRcrd##.dgn / PlanLSCD##.dgn	1/18/2008 8:15 1/18/2008 8:15				
Network	12345SURV	/_PlanPCD##.dgn /_TitleLSCD##.dgn /_TitlePCD##.dgn	1/18/2008 8:15 1/18/2008 8:15 1/18/2008 8:15	MicroStation D	-		
	•		ш		+		
	File name:	12345SURV_PlanLS	CD##.dgn	-	Open	User:	CDOT User
	Files of type:	iles of type: All Files (*.*)		•		Project:	12345
		Open as read-only			Options	Interface:	CDOT .

- 2. **<D>** the filename *12345SURV_PlanLSCD##.dgn*
- 3. Select File > Save As from the MicroStation Manger dialog.
- 4. Key-in 12345SURV_PlanLSCD3B.dgn

5. **<D> Save**

📕 Save As - C:\P	rojects\12345\ROV	/_Survey\Drawings\	1						E	
Save in:)) Drawings		•	G 💋	i 📂 🛄	•				
Recent Places		nty-24x18_##.dgn on##.dgn wnership##.dgn an##.dgn ibProp01.dgn ibProp02.dgn ibProp03.dgn ibProp04.dgn ibProp04.dgn ibProp#.dgn	Date modif 123455UR 123455UR 123455UR 123455UR	/_PlanL9 /_PlanP9 /_TitleL9	CD##.dgn SCD##.dgn		>>			
Network	File name: Save as type:	12345SURV_PlanLS			•	Cance Option	el			

- 6. **Zoom/Window** into the upper-right corner of the sheet.
- 7. Edit the text as shown using Edit Text command.

La	nd Survey	y Control[Diagram				
Plan Sheet							
Project Nu	nber: STA 086	SA-039					
Project Lo	ation: SH 86	CORRIDOR PE					
Project Location: COUNTY RD. 25 & 27 & 33							
Project Code:	Last Mod. Date	Subset Sheets	Sheet No.				
12345	09-25-09	3 of X.XX	3B				

		y Controll on Sheet	Jugium
a last M		A REAL PROPERTY OF A READ REAL PROPERTY OF A REAL P	
-	umber: STA 086		
-	ocation: SH 86		
roject La	ocation: COUNT	Y RD. 25 & 27	& 33
		Subset Sheets	Sheet No.
12345	09-25-09	3 of X.XX	3B

8. Use the MicroStation Fit command to view the entire sheet.

In this sheet, place coordinate information representing a Project Coordinate Summary Table. This coordinate information will be extracted from InRoads using the reporting utility XML.

Using XML to report on Coordinates

Use InRoads and XML reporting to insert a Project Coordinate Summary Table. Report on points 100-120.

<unnamed> -</unnamed>	Ta 📚 🤞 🔪 🎽	* 📕 🗙 🐜 🗉		
<u>File Surface G</u> eometry <u>D</u> rainage	S <u>u</u> rvey <u>E</u> valuation <u>N</u>	<u>A</u> odeler Dr <u>a</u> fting <u>T</u> ools <u>H</u> elp		
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	Name	Description	Style	No
E-B Geometry Projects	100	Section Corner	T_Section Cor	1558
Default	102	Quarter Section Corner	T_Quarter Sect	1558
🖃 崖 12345_ROW	103	Quarter Section Corner	T_Quarter Sect	1555
Cogo Buffer	2.104	Quarter Section Corner	T_Quarter Sect	1555
105	105	Section Corner	T_Section Cor	1558
	106	Quarter Section Corner	T_Quarter Sect	1558
1095_2	107	Quarter Section Corner	T_Quarter Sect	1555
	108	Quarter Section Corner	T_Quarter Sect	1555
😂 Surfaces 🐰 Geometry 🔳	•			•

- 9. If not already running and loaded:
 - Launch InRoads & Load the Geometry Project 12345_ROW.alg from C:\Projects\12345\ROW_Survey\InRoads\Geometry
- 10. Select **Tools > XML Reports** from the InRoads interface.

Horizontal . Include:	Alignments	Cogo Points + Include: 100-120	+ Apply
Selected:		Selected:	Close
Name	Description Style	Name Style	Filter
		100 T_Section C	Comer Preferences
			Section Co
		103 T_Quarter S	
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Include C	ant Alignments	Station	
II (Active	Start: 0+00.00	÷
Include V	ertical Event Points		
laskuda H	lorizontal Event Points	Stop: 0+00.00	- ф-

11. In the XML Reports dialog, **<D>** the Geometry folder and identify Cogo points **100-120**

- 12. **<D> Apply**. The report browser will open to a default report style.
- 13. **<D>** the CDOT Folder.
- 14. **<D>** the **CDOT_ListCoordinates.xsl** style sheet.

ie Tools Help							
:\Workspace\Workspace-CDOT_XM\Standards-Global\InRoads	s/XMI						
Bridge Cant	-				DOT		
CDOT				1	15		
CDOT A-line Description xsl CDOT Ar Rights Easement Description xsl							
A] CDOT Fee Parcel Description xsl			Li	ist Coordin	nates Re	port	
CDOT Permanent Easement Description xs							
A) CDOT Slope Easement Description xsl				Report Creat		9	
A: CDOT Utity Easement Description xsl	Е			Time:	12:32pm		
CDOT_ListCoordinates xsl		Proj	ect: 12345 R	OW			1
A) CDOT_Monumentation_Clearance.xsl A) CDOT_Monumentation_ListCoordinates.xsl		Descript	-	0.00			
Cearance		Descript					
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Images		Com Dalate					
Intersecting Alignment Stations		Cogo Points					
LegalDescription		POINT	NORTH (ft)	EAST (ft)	ELEV (ft)	DESCRIPTION	
UghtRailManufacturing		NAME	NORTH (II)	EAST (II)	ELEV (in)	DESCRIPTION	
MapCheck Obsolete		100	1558457.41	3269295.23	6654.37	Section Corner	
RoadwayDesign		0.00					
Schemas	-	102	1558430.90	3266629.98	6654.37	Quarter Section Corne	er .

15. Select File > Save As

16. Navigate to the 12345\ROW_Survey\InRoads\Reports folder and input the file name 12345_PCST01.xml

Save in:	Reports			• +	🗈 📸 🎫	
C	Name	Date modif	Туре	Size	Tags	
Recent Places	SBP Lot 1					
Computer						
Computer Network	File name:	12345_PCS1	101 <i>x</i> ml		.	Save
	File name: Save as type:	12345_PCST XML File (*x			• •	Save Cance

17. **<D> Save** to save the file.

Excel in MicroStation

Tables can be created in MicroStation by linking information that is contained in an Excel spreadsheet. There are several advantages to using the linked spreadsheet method. Some of these are:

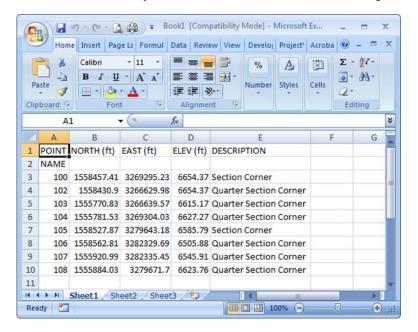
- Text formatting in the spreadsheet is retained by MicroStation
- Graphics (borders, girds, etc) are retained from the Excel file
- Updates to the Excel file are reflected in the MicroStation file

In the Bentley InRoads Report Browser:

- D Bentley InRoads Report Browser C:\Users\PCALLA~1\AppData\Local\Temp\RPT9904.xml - • • File Tools Help C:\Workspace\Workspace-CDOT_XM\Standards-Global\InRoads\XMI CDOT Back CDOT
 COT Aire Description xel
 CDOT Air Rights Easement Description xel
 CDOT Fee Parce Description xel
 CDOT Pemanert Easement Description xel
 CDOT Stope Easement Description xel
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 CDOT DOT Forward Save Background As... Set as Background ates Report Copy Background d: 9/25/2009 2:39pm Select All Paste Clearance Create Shortcut Custom
 DataCollection
 Evaluation D Add to Favorites... View Source eometry\12345_ROW.alg Geometry Encoding ۲ ics 0:21 PM Images IntersectingAlignmentStations Print... Print Preview... LegalDescription Cogo LightRailManufacturing MapCheck Obsolete Refresh P ELEV (ft) DESCRIPTION Append to Existing PDF N RoadwayDesign Convert to Adobe PDF 6654.37 Section Corner Schemas Stakeout StationOffset Customize Menu 6654.37 Quarter Section Corner Export to Microsoft Excel ----RoboForm Toolbar Save Form Properties
- 18. **<R>** on the report in the coordinate list area as shown. A fly out menu will appear.

19. Place the cursor over the corrdinates (the bottom half of report) and select **Export to Microsoft Excel** from the fly-out menu.

Excel should automatically launch if it is installed on the PC being used.



	А	В	С	D	E		
1		PROJECT (UMMARY T	ABLE			
2	POINT NAME	PROJECT COO	RDINATES	ELEV (ft)	DESCRIPTION		
3		NORTH (ft) EAST (ft)			DESCRIPTION		
4	100	1558457.41	3269295.23	6654.37	Section Corner		
5	102	1558430.9	3266629.98	6654.37	Quarter Section Corner		
6	103	1555770.83	3266639.57	6615.17	Quarter Section Corner		
7	104	1555781.53	3269304.03	6627.27	Quarter Section Corner		
8	105	1558527.87	3279643.18	6585.79	Section Corner		
9	106	1558562.81	3282329.69	6505.88	Quarter Section Corner		
10	107	1555920.99	3282335.45	6545.91	Quarter Section Corner		
11	108	1555884.03	3279671.7	6623.76	Quarter Section Corner		
12							

20. Make changes to the data or add formatting.

21. and save the spreadsheet to the ... |ROW_Survey |InRoads |Reports | directory.

Save As						×
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Save as type: Ex	cel 97-2003 Workbook ((*.xls)				•
Authors: CD	OT User	Tag	s: Add a tag			
	Save Thumbnail					
lide Folders			Tools	•	Save	Cancel

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2	POINT NAME	NORTH (ft)	EAST (ft)	ELE	Ch.	Copy
	100	1558457.41	3269295.23	6	3	Paste
	100	1558430.9		6		Paste Special
	102	1555770.83		6		Insert
7	104	1555781.53		6		Delete
	105	1558527.87		6	-	
-	106	1558562.81		6		Clear Contents
-	107	1555920.99		6		Filt <u>e</u> r
	108	1555884.03	3279671.7	6		Sort
12						Insert Comment
A	verage: 1209588		eet3 200 Sum: 38706832.72	2	2	<u>F</u> ormat Cells Pic <u>k</u> From Drop-down List

22. Select the range of information desired in the MicroStation file.

23. **<R>** on the spreadsheet data and select **Copy** from the fly-out menu.

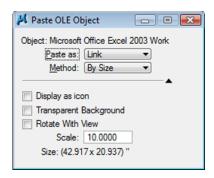
RETURN TO MICROSTATION

24. Select Edit > Paste Special from the MicroStation menu bar.

Raste Special	83
Data Type	
Picture of Microsoft Office Excel 2003 Wc Embedded Microsoft Office Excel 2003 W Linked Microsoft Office Excel 2003 Works	ń.
Text To Design File Rich Text to Design File Linked Text To Design File	-
Paste Cancel	

- 25. <D> the Linked Microsoft Office Excel 2003 Worksheet option.
- 26. <D> Paste
 - **Note:** By choosing linked, updates made to the Excel file can be passed back to the MicroStation file through updating. Selecting embedded does not provide this dynamic ability.

27. In the Paste OLE dialog box, set Paste as to *Link*, Method to *By Size*, and input a Scale of *10*



Note: At this time, we do not fully understand the correlation between the scale and resulting text size. For this example, 10 seemed to produce reasonable results. Once placed, the text height can be measured and the bounding shape of the linked Excel table can be scaled up or down accordingly to achieve required text size.

POINT NAME	PROJECT COO	RDINATES		DECONDENSI	
	NORTH (ft) EAST (ft)		ELEV (ft)	DESCRIPTION	
100	1558457.41	3269295.23	6654.37	Section Corner	
102	1558430.9	3266629.98	6654.37	Quarter Section Corn	
103	1555770.83	3266639.57	6615.17	Quarter Section Corn	
104	1555781.53	3269304.03	6627.27	Quarter Section Corn	
105	1558527.87	3279643.18	6585.79	Section Corner	
106	1558562.81	3282329.69	6505.88	Quarter Section Corn	
107	1555920.99	3282335.45	6545.91	Quarter Section Corn	
108	1555884.03	3279671.7	6623.76	Quarter Section Corn	

Note: Entering a <D><D> on the table in MicroStation will launch the Excel application. If the Excel file is edited (either from MicroStation or outside the CAD application) select Edit > Update Links from the MicroStation menu bar to refresh the linked MicroStation graphics.

PLOT_INFOS

LAB 25 - Tabulation Properties Sheet

Chapter Objectives:

- Edit Microsoft Excel information from within MicroStation In this sheet, information will be updated using Microsoft Excel. Return to the MicroStation manager dialog.
- 1. Select File > Close (if MicroStation is currently open).

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lecent Places	퉬 Tabs						i.
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100	12345ROW	Ownership##.dgn	34	KB			<u> </u>
	12345ROW	Plan##.dgn	34	KB			
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	212345ROW_	TabProp02.dgn	39	KB	1		
	12345ROW	TabProp03.dgn	40	KB			
Computer	12345ROW	TabProp04.dgn	39	KB			
	12345ROW_	TabProp##.dgn	35	KB	-		
Network	File name:	12345ROW_TabProp01.dgn		•	Open		
	Files of type:	CAD Files (*.dgn;*.dwg;*.dxf)		-	Cancel		
		Open as read-only			Options		

2. <D> the filename 12345ROW_TabProp01.dgn

3. **<D> Open**

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- 4. **<D> <D>** anywhere within the grid to open up XLS link in Excel.
  - **Note:** When a linked excel file is opened and modified in Excel a hatched pattern displays in your MicroStation view. This is to indicate that the file is being accessed from an outside program.

	Home	Insert Page Layout	Formulas Data Review	View Developer Pr	ojectWise	Acrobat				0 - 0
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5. Insert data into Excel. (sample data is provided below)

Parcel No: 1 Owner: Dianne M. McNamara & Ronald Eggleston Address: 5937 Highway 86 Elizabeth, CO 80107 Location: SE 1/ 4 Sec 9 Area of Parcel: 20,995 s.f. (0.51 acre) Net Area: 20,995 s.f. (0.51 acre)

6. Save and Exit in Excel; the MicroStation file will update.

			Sheet Re					et Reviei	ons			
		Date movie	Base	<b>m</b>		Date remá	54 Contraction					
		Τ					Area In Square P					
Parcel No.	Omer		Address	Locatio	on.		Area Of Farcel	Existing	Net Area			
1	Dianne N. McNamara & Ronald Eggleton		237 Eighway 55	SE 1/4 S	e 2	:	zo, 995.000		20,995.000			
		<b>E11</b>	mbeth, CO 50107									

7. To update MicroStation without exiting Excel: Save project in Excel, select Edit>Links from the MicroStation pull-down, and in the Links dialog <D> Update Now.

inks				
Links:		Туре	Update	Cancel
C:\Projects	12345\ROW_Survey	Drawin/psk.sabel.1	2345ROManuab Prop	Update Now
				Open Source
				Change Source
				Break Link
Source:	C:\\12345ROW	TabProp.xls!RW	2.01!R3C1:R47C12	
Type:	Microsoft Office Ex	cel 97-2003 Works	sheet	
Update:	Automatic	Ma	anual	

# LAB 26 - Reference Files for Plan Sheets

# Chapter Objectives:

- Create plan sheets referencing in files
- Clipping reference files
- Rotate reference files

Two approaches can be used to assemble plan sheets. In the first part of this chapter the 'manual' method of attaching reference files will be used. This is followed by using the InRoads sheet generation command known as the Plan and Profile Generator.

The contents of the reference files are not important to this process and may not accurately reflect the contents and layout of a final plan sheet.

This lab will relocate the border sheet to align with the design graphics.

# Moving border sheets to align with design information

In the previous chapter graphics were moved to align with the title sheet. This may suffice for information that is not coordinate dependent but is not an acceptable practice in the generation of engineering drawings. The following workflow will result in a product that conforms to CDOT standards.

This first lab uses the 'manual' method for designing a plan set layout and assembling the plan sheets. A following lab will use the InRoads Plan and Profile generator command to 'automate' the process.

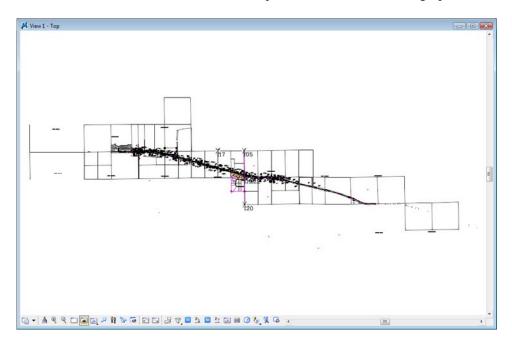
The process for this lab is:

- Define the plan sheet limits, rotation, and size(s)
- Create a sheet file containing a border for each plan sheet
- Attach the appropriate reference files
- Rotate sheets normal to the MicroStation view for ease of use
- Define reference file clip boundaries

📕 MicroStation	Manager - C:\Pro	jects\12345\ROW_Survey\Drawing	js\Referer	nce_Files\				<b>X</b>
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œ	Name	*	Size		-			-
~ <u>~</u>	12345ROW	Model.dgn		697 KB				
Recent Places	<b>12345ROW</b>	Model2.dgn		822 KB				
	12345ROW	Model-TG.dgn		793 KB		E		-
-	212345SURV	_Model.dgn		27 KB	E			
Desktop	212345SURV	_Topo50Scale01.dgn		30 KB				
100	12345SURV	12345SURV_Topo##Scale##.dgn						
	12345SURV	_TopoCodes100Scale01.dgn		737 KB				
CDOT_User	12345SURV	_TopoElevations100Scale01.dgn		750 KB				
	12345SURV	_TopoNames100Scale01.dgn		699 KB		1		
	12345SURV	_TopoNotes100Scale01.dgn		131 KB				
Computer	12345SURV	_TopoSymbols100Scale01.dgn		570 KB				
	SURV_	TopoCodes##Scale##.dgn		27 KB	-			
- <u>-</u>	File name:	12345ROW_Model.dgn		-	Open		User: CDOT User	•
Network	Files of type:	All Files (*.*)		-	Cancel	]	Project: 12345	•
		Open as read-only		(	Options	In	terface: CDOT	•
								н

1. Open the MicroStation file 12345ROW_Model.dgn

2. Select the MicroStation Fit command to expand the view to show all graphics.



 Select Element > Cells to verify the *ROW* cell library is attached. If not, select File > Attach from the Cell Library dialog and attach ROW.cel from the cell library list.

Use Shared Cells	play All Cells In Path	<u>D</u> isplay: Wireframe ▼
Name 🔺	Description	
ROW_XSEC-Temporary-Easement		
ROW_XSEC-Township-Monument-ex		
ROW_XSEC-Utility-Easement-ex	CDOT XSEC Utility Easement Existing	
ROW_XSEC-Utility-Easement-pro	CDOT XSEC Utility Easement Proposed	
ROW_XSEC-Virgin-Access-Ctrl-pro RWPL Cuts	CDOT XSEC Virgin Access Contol Propo: EDWTRAEShaetirkinkisess Contol Propo	1
SHEET ROW-County-recording	County recording information for title shee	· · · ·
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HEET_Region-Dave-Stewart	ROW Sheet Regional Dave Stewart	
HEET_Region-Jack-Messenger	ROW Sheet Regional Jack Messenger	
•	•	
Active Cells		
Placement RWPL Cuts	Point Element	Edit Delete
Terminator NONF	Pattern NONE	Create Share

- 4. **<D><D>** rapidly on the cell name *RWPL Cuts* to identify this as the 'Placement' cell and activate the place cell command.
- 5. In the **Place Active Cell** dialog, set the X and Y scale to **300**, and **Active Angle** to **0**. A Z scale of **1.0** should be used. An X and Y scale of 300 is used because this reflects the scale the survey control diagram sheets will be developed at.

📕 Place Activ	🖊 Place Active Cell						
Active Cell:	RWPL Cuts	٩,					
Active Angle:	0°0'0.00''						
X Scale:	300.000000						
<u>Y</u> Scale:	300.000000						
Z Scale:	1.000000						
		•					

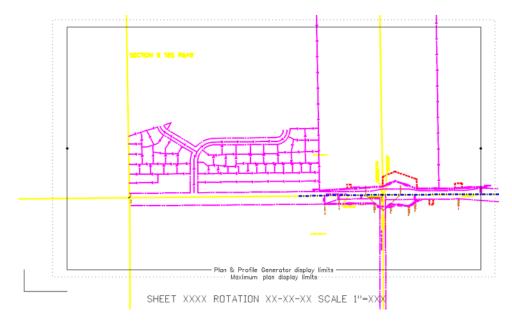


SHEET XXXX ROTATION XX-XX-XX SCALE 1"=XXX

#### About this cell:

This cell was created to facilitate the planning of eventual sheets. 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  $\frac{1}{2}$  inch inside this maximum limit. It also reflects the maximum limits that would be displayed if the sheet was created with the Plan and Profile generator command within InRoads. The 'dots' in the vertical lines represent  $\frac{1}{2}$  of the sheet height and assist in centering planimetrics information on the sheet. All information is written to the MicroStation level **DRAFT_INFO_No-Plot**.

6. **<D>** to place the cell in the MicroStation file, move as necessary. These graphics will define the limits for the plan sheet when referenced back to the border.



The above graphics approximately represent the required limits for the first sheet. Position the sheet limit cell as you see fit.

7. Use the **Edit Text** command to complete the text at the bottom of the sheet. This will assist in managing the sheets as reference files.





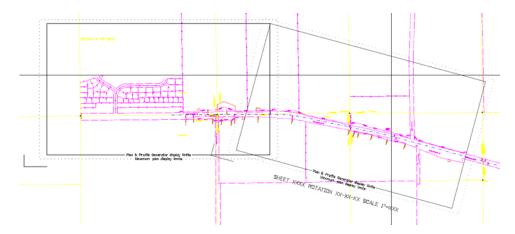
8. **<D>** on the text at the bottom of the layout sheet.

 Replace the appropriate sheet information in the *Text Editor* as follows: *LSCD03C 00-00-00 1"=300'*

H Text	Editor - Wor	rd Pro	cessor	6														. 0	×
<b>1</b>	Engineering	•	B	ΙŪ	ABC	<b>A</b> ¹ / ₂ →	<b>6</b>	6 • (	<u>s</u> -		<b>2</b>								
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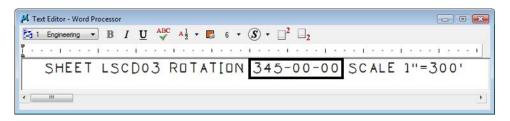
- 10. **<D>** anywhere to accept the change.
- 11. Use the MicroStation **Copy** command to duplicate the graphics for the second sheet.

12. Use the MicroStation **Rotate** command to align the graphics for the second sheet (345 degrees, -15 also works).



*Replace* the appropriate sheet information at the bottom of the copied sheet.

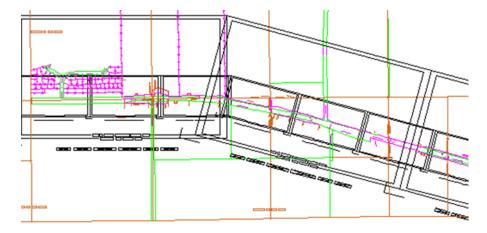
13. In the Text Editor enter: *345-00-00* 



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



Complete a few sheets to understand the concept. It is not the intention of this lab to complete the layout for the entire project.



**Note:** Sheets at other scales could also be laid-out at this time. For instance, Monumentation or right of way plan sheets at a scale of 1"=100'

A major benefit of this workflow is that the eventual limits and orientation of sheets are determined early in the process. These sheet limits can be used to identify proper positioning, size, and rotation of text and tables. This is in addition to acting as a guide for attaching the planimetrics to the border sheets.

# Assembling the plan sheets

15. *Open* the MicroStation file ....ROW_Survey\Drawings\ 12345SURV_PlanLSCD3B.dgn

Look in:	)) Drawings		•	G 🤌 🔋	۶ 🛄 ۶	Ë 🚺	3 🖻	l	3D - V8	DGN
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Recent Places		/_TabProp02.dgn		39 KB						
	12345ROW	/_TabProp03.dgn		40 KB						
	12345ROW_TabProp04.dgn			39 KB						
Desktop	<b>12345ROW</b>	/_TabProp##.dgn		35 KB						
	12345ROW_TitleSht.dgn			79 KB						
	12345SURV_MonRcrd##.dgn			41 KB				<u> </u>		
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	12345SUR	12345SURV_PlanLSCD##.dgn		33 KB						
Computer	12345SUR	/_PlanPCD##.dgn	33 KB							
	212345SUR	/_TitleLSCD##.dgn		34 KB						
	12345SURV	/_TitlePCD##.dgn		34 KB						
Network							*			
	File name:	12345SURV_PlanLSCD3B.dg	'n		•	Open				
	Files of type:	CAD Files (*.dgn;*.dwg;*.dxf)			•	Cancel				
		Open as read-only				Options				

This is a file that you will be using to assemble drawing 4 of this plan subset. This will be accomplished by aligning a cell representing the border with the planimetrics. The current graphics will not be used.

16. *Delete* the border sheet graphics contained in the MicroStation file.

This sheet will be developed at a scale of 1:300. The MicroStation model properties require modification so that the annotation scale matches the plot scale.

17. Open the Models dialog.



18. **<D>** the **Edit Model Properties** icon.

Type 2D/3D N	× 🔗 🛄 🕨	Description
🗊 🗊 c	DOT Default	Master Model

- 19. **<D>** the drop-down list and select *CUSTOM*, then input *300:1*
- 20. Set the *Line Style Scale* to Annotation Scale.

📕 Model Properties		83
<u>N</u> ame:	Design  3D  CDOT Default Master Model	
	CUSTOM - 300.000( : 1.00000	
Line Style Scale:	Annotation Scale	
Cell Properties <u>C</u> an be place <u>C</u> an be place	Update Fields Automatically d as a cell Cell Type: Graphic  d as an annotation cell	
	Cancel	

- 21. **<D> OK**
- 22. **<D> Yes** in the Alert dialog.



- 23. Attach the file used in the geometry training portion of this course from the ...\ROW_Survey\Drawings\Reference_Files folder;
  - ◆ 12345ROW_Model.dgn
- 24. Select File > Reference
- 25. From the **References** menu select **Tools > Attach**

Look in:	Reference_F	les 🗸	G 🤌	⊳ 🛄	<b>S</b> 🖻	3D - V8 DGN
Recent Places Desktop Desktop CDOT_User Computer Computer	Name 12345ROW 12345ROW 12345ROW 12345ROW 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV 12345SURV	^ Model.dgn Model2.dgn Model##.dgn Model-TG.dgn	Size	670 KB 822 KB 698 KB 793 KB 27 KB 30 KB 26 KB 737 KB 750 KB 699 KB 131 KB 570 KB 27 KB 27 KB 27 KB 27 KB 27 KB		Attachment Method
	-	opoNotes##Scale##.dgn opoSymbols##Scale##.dgn 12345ROW_Model.dgn CAD Files (*.dgn;*.dwg;*.dd)	_	27 KB 27 KB	Open Cancel Options	

26. Highlight the file 12345ROW_Model.dgn and **<D> Open**.

The **Reference Attachment Settings** dialog appears for the **12345ROW_Model.dgn** file.

27. Enter a Logical Name and Description as shown.

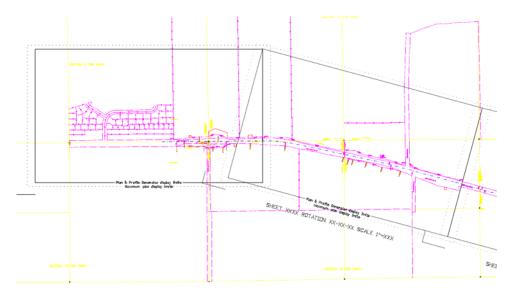
#### 28. **<D> OK**

📕 Reference Attachme	ent Settings for 12345ROW_Model.dgn	23									
_	5ROW_Model.dgn awings\Reference_Files\12345ROW_Model.dgn [ Default										
Logical Name: ROW Description: new l											
Orientation:	Orientation:										
View	Description										
Coincident	Aligned with Master File										
Coincident - World	Global Origin aligned with Master File										
Standard Views     Saved Views											
	Named Fences (none)										
Toggles:	■ * < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × < 10 × <										
Scale (Master:Ref)	1.000000 : 1.000000										
Named Group;	<b></b>										
Revision:	<b>•</b>										
Clip Boundary Element:	Copy To Master										
Le <u>v</u> el:	· · · · · · · · · · · · · · · · · · ·										
Nested Attachments:	No Nesting Depth: 1										
Display Overrides:	Allow										
New Level Display:	Use MS_REF_NEWLEVELDI*										
Global LineStyle Scale:	Master 💌										
	<u>Q</u> K Cancel										

The file is now attached.

🚜 References (1 of 1 unique, 1 displayed)	- • •
Tools Settings	
🗄 🗸 🖄 👷 🐟 🌾 🖗 🍘 🍄 🟠 🐉 🖓 🕮 🖉 🗮	Boundaries 👻
Slot 🏱 File Name Model Description	Logical Pres
1 12345ROW_Model.dgn CDOT Default new ROW intersection	ROW Wir
I 4	
Scale 1.000000 : 1.000000 Orientation Top Rotation 0'0'0	
Offset <u>X</u> -178956.971 <u>Y</u> -178956.971 <u>Z</u> -178956.971	
🛛 🔜 🖎 🤷 🔛 🛒 🌛 < 🏢 🚳 😯 🚇 🔥 No Nesting 🔹 Allow Overrides 🔹 Depth: 1	
New Level Display: Config Variable 💌	

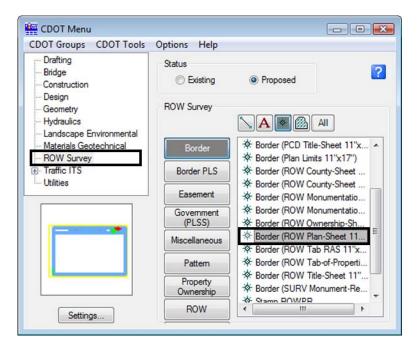
- 29. Close the References dialog.
- 30. Select the MicroStation Fit command.



31. Window or Zoom into the beginning of the project.

Note the graphics placed previously to indicate sheet limits.

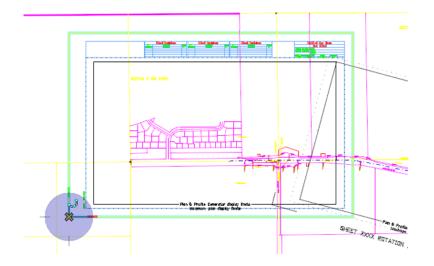
32. Place the *cell* called ROW Plan border **sheet** from the CDOT Menu.



33. <D> Settings to and change the Active Scale to 300 and <D> Apply

🟪 Active Setti	ngs	- • •
Active Scale:	300.00	Apply
Active Angle:	0.00	Close

34. Place the sheet border cell so the lower-left corner coincides with the corner indicated on the sheet limits cell placed previously.



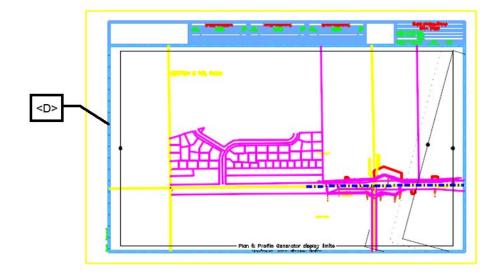
In the Reference dialog, identify the reference file and select Tools > Clip Boundary

Attach	1 to (	🖻 🗗 💕	🚹 🐔 🛱 💾 🔘 🗙	Hilte Mode:	Boundaries	•		
Detach		Model	Description		Logical	Presentation	• 2	*
Detach All Reload	dgn	CDOT Default	new ROW intersection		ROW	Wireframe	11	1
Reload All								
Exchange								
Open in New Session								
Move								
Copy								
<u>S</u> cale								
<u>R</u> otate								
Merge Into Master								
Make Direct Attachment								
Mirror Horizontal								
Mirror Vertical								
Clip Boundary								
an ha h								
Clip Mask								

35. In the Set Reference Clip Boundary dialog, select the *Element* Method.

📕 Set Re	ference Clip Boundary	
Method:	Element	
	Discard Existing Clip Masks	
	V Use References Dialog List	

36. **<D>** on the shape inset  $\frac{1}{2}$  inch from the border.

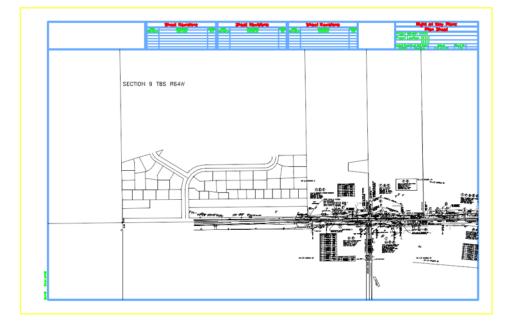


37. **<D>** anywhere to accept the clip.

The plan sheet display limits are now constrained to a desirable limit.

38. *Turn off* level *DRAFT_INFO_No-Plot* in the reference file *12345ROW_Model.dgn* to turn off the sheet lay-outs (Select Settings > Level Display).

📕 Level Display		- • •
1 2 3 4 5 6 7 8 View Display	•	
None) 🛛 Levels 🔹		
⊡ 🔀 12345SURV_PlanLSCD3B.dgn	1	
Name	Logical	Used 🐣
Default		•
DES TEMP InRoads Misc		•
DRAFT_INFO_No-Plot		•
DRAFT_LC-Center_WT-3		•
ROW_EASEMENT_Temporary-Li		
ROW_LINE_Existing		
ROW_LINE_Existing-Calc-Pts		
ROW_LINE_Proposed		
ROW_LINE_Proposed-Text		
ROW_MONUMENT_Section-Lin		
ROW_NO_Plot-proposed		•
ROW_OWNRSHIP_Property-Lin SURV MONUMENT GLO-Lot-Li		•



Make appropriate edits to the title block and add any sheet specific information necessary.

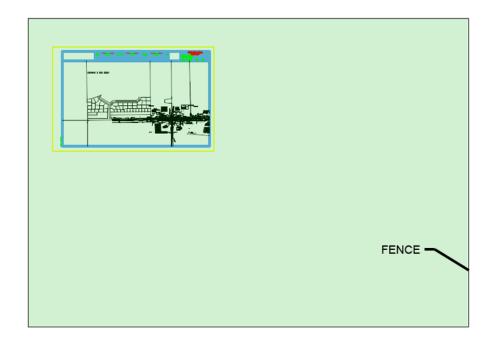
Using the tentative (snap) button <T> to query coordinate values that correctly reflect project coordinates. Additionally an InRoads command, such as tracking, will verify the graphics are coordinately correct.

Once the first sheet is done, the second sheet is much easier. It is easier because the sheet file can be duplicated with the reference files already attached. Moving the border sheet and redefining the clipping boundaries will define subsequent sheets.

Save in:	Drawings		•	0 🦻	•• 🖽 🔁	۲	3D - V8 DGN
(And	Name	*	Siz	e			
2	Reference_	Files					
ecent Places	Tabs						In a second s
-	12345ROW	_Cnty-24x18_##.dgn		32 KB			
·		_Cnty-24x36_##.dgn		33 KB			Champer of
Desktop	312345ROW	_Mon##.dgn		59 KB			
500	312345ROW	Ownership##.dgn		34 KB			
e in	312345ROW	_Plan##.dgn		34 KB			
DOT User	312345ROW	TabProp01.dgn		45 KB			
	312345ROW	TabProp02.dgn		39 KB			
	312345ROW	_TabProp03.dgn		40 KB		E	
Computer	12345ROW	_TabProp04.dgn		39 KB			
	312345ROW	_TabProp##.dgn		35 KB			
	12345ROW	_TitleSht.dgn		79 KB			
Network	12345ROW	SURVPlanSheetLSCD3D.dgn		69 KB			
	312345SURV	_MonRcrd##.dgn		41 KB			
	312345SURV	_PlanLSCD03.dgn		37 KB			
	312345SURV	PlanLSCD3B.dgn		69 KB			
	312345SURV	_PlanLSCD##.dgn		33 KB			
	312345SURV	PlanPCD##.dgn		33 KB			
	312345SURV	PlanSheetLSCD3D.dgn		69 KB			
	12345SURV	_TitleLSCD##.dgn		34 KB		-	
	File name: 12345ROWSURVPlanSheetL		SCD3	100.000	-	Save	
	Save as type:	MicroStation V8 DGN Files (*.	dan)		•	Cancel	

39. Select File > Save as, input name *12345ROWSURVPLIanSheetLSCD3D.dgn* 

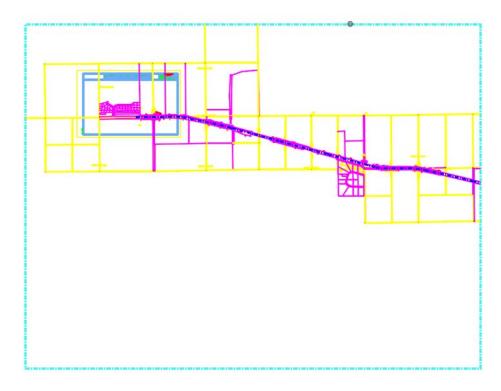
- 40. **<D> Save**.
  - **Note:** The Save As command will automatically save the current drawing to the hard drive, then copy and rename to the specified file name and open the new drawing.
- 41. Place a MicroStation *fence* over an area that would encompass the next sheet in the set.



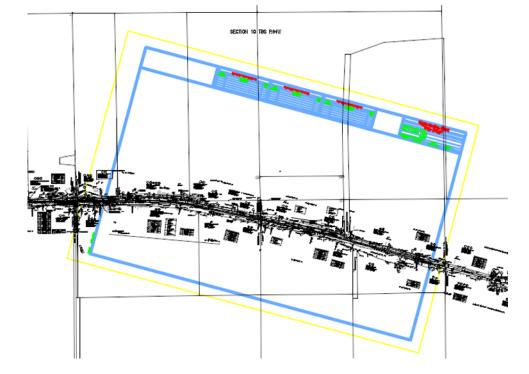
- 42. In the **References** dialog, identify the **12345ROW_Model.dgn** file and Select **Tools** > **Clip Boundary**
- 43. In the Set Reference Clip Boundary dialog, select the Fence Method.

📕 Set Re	ference Clip Boundary	X
Method:	Active Fence	

44. **<D>** on the MicroStation screen to accept the new clip boundary.



45. Turn On the level *DRAFT_INFO_No-Plot* in the reference file *12345ROW_Model.dgn* to turn the sheet lay-outs back on.

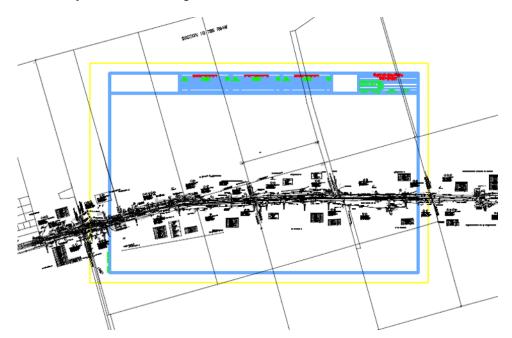


46. Use the MicroStation **Move** command to relocate the border sheet. Also **Rotate** the border sheet to align with the predefined sheet limits.

*Rotate* the MicroStation view so that the sheet is normal to the view.

- 47. Key-in *rv=0,0,15* (rotate view = value) for this 3D file *rv=15* if in a *2D* file.
- 48. **<D>** on the MicroStation screen to initialize the rotation.

**Note:** The above key-ins vary based on the dimension of the MicroStation file, 2D or 3D. When working in a 3D file, the key-in is: rv=0,0,15 (rotate view=x-value, y-value, z-value). Rotation is specified in relative to the Z axis as that is the axis perpendicular to the view. Also, 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.

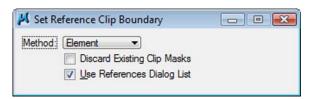


Define a reference clip boundary, as you did earlier.

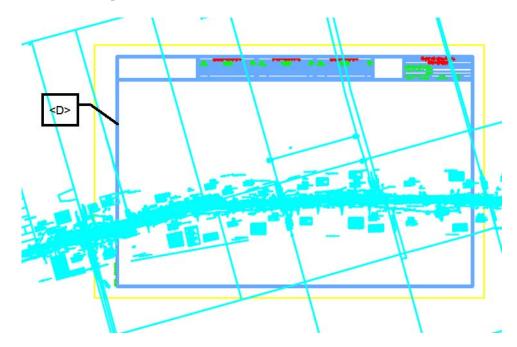
49. In the Reference dialog, identify the reference file and select **Tools > Clip Boundary** 

Attach		🖻 🗗 💕	🔁 🐔 🛱 🚰 🚇	) 🔀 Hilte Mode:	Boundaries	•				
Detach		Model	Description		Logical	Presentation	•	لمه	*	-
Detach All Reload	dgn	CDOT Default	new ROW intersection		ROW	Wireframe	~	1	1	
Reload All										
Exchange										
Open in New Session										
Move										
<u>С</u> ору										
<u>S</u> cale										
<u>R</u> otate										
Merge Into Master										
Make Direct Attachment										
Mirror Horizontal										
Mirror Vertical										
Clip Boundary	1									
Clip Mask	<b></b>									
Delete Clip	1 0000	00		D	0.1				_	
Clip Front	: 1.0000		Orientation Top	Rotation 0°0		_				
Clip Back	<u>Y</u> -178	8956.971	Z -178956.971	• 60 • K	611 7	-> <* 🏢 🗷		Q.		

50. In the Set Reference Clip Boundary dialog, select the *Element* Method.



51. **<D>** on the shape inset  $\frac{1}{2}$  inch from the border.



- 52. **<D>** anywhere to accept the clip.
- 53. *Update* information in the title block of the sheet as necessary.
- 54. Select File > Save Settings

This same procedure can be repeated to complete the remainder of the sheets.

# LAB 27 - Project Specific Plan Sheets

The following exercise will step through creating a full plan view depicting right of way plan sheets (sheet subset 5) at a scale of 1"100". The plan sheets will be centered along the design alignment for the project S.H. 86.

# **Chapter Objectives:**

- Create plan sheets using InRoads Plan and Proflile Generator
- Edit reference clip boundary
- Open the MicroStation file 12345ROW_Model.dgn from the ...\Survey_ROW\Drawings\Reference_Files folder.
  - **Note:** The MicroStation file opened is immaterial and only acts as an interface to InRoads. New plan sheets will be created and the open drawing will not be impacted.
- 2. Load the geometry project 12345_ROW if not already in memory
- 3. Select **Tools > Options** [*Factors*] and set the global scale factors to **100** then **<D>** Close to dismiss the **Options** dialog box.
- 4. **<R>** on the alignment **C_Centerline** and select **Set Active** from the fly-out list.

😽 Bentley InRoads XM E	dition						×
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<u>File Surface G</u> eometry	<u>D</u> rainage <u>E</u> val	uation <u>M</u> odel	er Dr <u>a</u> fting	<u>T</u> ools <u>H</u> elp			
🗠 🗠 🏪	la 🔛 🙀	r .					
		Name	Туре	Description	By Whom	Last Revised	St
	^						
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, same	Emphy						

5. Select **Drafting > Plan and Profile Generator**... from the InRoads interface.

By default, the dialog will populate with the CDOT preferences (100 horiontal scale by 1x vertical exageration Plan & Profile sheet).

- **Note:** Drafting notes is an InRoads Application Add-In. If the Drafting category is not shown in the InRoads menu bar, select Tools > Application Add-Ins and enable Drafting Production Add-In.
- 6. Select the **Preferences** button (at the bottom of the **Plan and Profile Generator** dialog).
- 7. Select the preference named 100 Scale ROW Plan Sheet
- 8. **<D> Load**

9. <D> Close

Name:		Close
100 Scale Full Profile 5x		
100 Scale P&P (1x Vert)		Load
100 Scale P&P (2x Vert)		
100 Scale P&P (5x Vert)	-	Save
100 Scale ROW Plan Sheet		
20 Scale Full Plan Sheet		Save As
200 Scale Double Plan		
200 Scale Double Profile 10x 200 Scale Double Profile 1x		Delete
200 Scale Double Profile IX	-	
		Help

Preferences developed for ROW are:

• 100, 200, and 300 scale full plan view ROW Sheets

## Main Tab

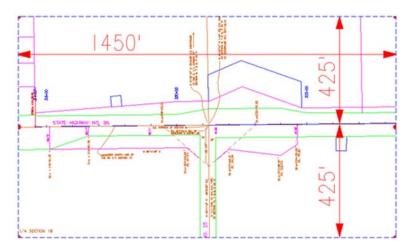
By default, the active horizontal alignment and the begin/end station limts for said alignment will populate the dialog.

Border and	Title	Symbo	ls and Details	Match	Lines	Sheet Index
Main	Plan Cor	ntrols	Profile Contro	ls Shee	t Layout	View Layout
Method Plan Only			Horizontal A	-	+	Edit
<ul> <li>Plan and</li> <li>Profile Or</li> </ul>			Geometry Pr	ojects in this VDF	:	
Plan Views O Use Plan	Views					Help
Use Stati     Profile Views     Use Profil	}				noted,	Unless otherwise all measurements command are in units.
-			Stop:	its 114+56.59 3 450+00 450.00	+ 314	ault 4+56.59 60+91.01
Plan Views:				rofile Views:		Total: 0
In	Name	Start	Stop	Name	Start	Stop
•	III		۱.			

- 10. Load the appropriate *Preference* (if not done in step 6)
- 11. **Select** the appropriate *Horizontal Alignment* (the sheet will be centered on the defined alignment).
- 12. Redefine start and stop station limits to:

- Start: 314+56.59
- Stop: B 450+00.00
  - **Note:** The 'B' in the 'stop' station defined above is required as it indicates the stop station falls within a station-equation range.

*Length* defines the length along the alignment that will fit in a plan view. 1450 feet is the default for a 100 scale 11" x 17" plotted sheet.



# Changing Scale:

A 200 scale plot will display 2,900 feet along the alignment in plan view, a 300 scale plot will display 4,350 feet.

If something other than 100 scale is desired, the user must proportionally change:

- Main tab modify Length
- Plan Controls tab modify Width Left, & Width Right
- View Layout tab modify Scale
- Symbols and Details modify Scale

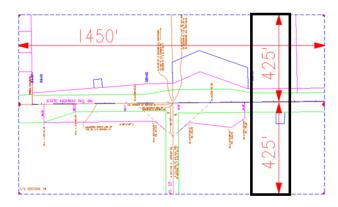
# Plan Controls tab

- 13. Select the **Model Files** button to pick the Drawing files (references) for display in plan view.
- 14. Select the file **12345ROWModel01.dgn** in the Open Model File dialog.

# 15. <D> Open

🙀 Open Model	File			×
Look in:	\mu Reference_Fil	es 🔻	G 🤌 📂 🛄	•
(Pa	Name	*	Size	
	12345ROW_1	/lodel.dgn	671 KB	
Recent Places	212345ROW_1	/lodel2.dgn	795 KB	
	212345ROW_1	/lodel##.dgn	698 KB	
	212345ROW_1	/lodel-TG.dgn	793 KB	E
Desktop	12345SURV_I	Model.dgn	27 KB	
STOR .	12345SURV_	Fopo50Scale01.dgn	30 KB	
	12345SURV_	lopo##Scale##.dgn	26 KB	
CDOT User	12345SURV_	FopoCodes100Scale01.dgn	737 KB	
-	12345SURV_	FopoElevations100Scale01.dgn	750 KB	
	12345SURV_	FopoNames100Scale01.dgn	699 KB	
Computer	12345SURV_	FopoNotes100Scale01.dgn	131 KB	
	12345SURV_	FopoSymbols100Scale01.dgn	570 KB	-
		[		
Network	File name:	12345ROW_Model.dgn	•	Open
	Files of type:	MicroStation Design Files (*.dgn)	•	Cancel
				Help

Border and Title	e Symb	ols and Details	Match Lines	Sheet Index
Main	Plan Controls	Profile Controls	Sheet Layout	View Layout
eed View Name:	STA			Model Files
/idth Left:	-425.00	+		
/idth Right:	425.00	+		
verlap:	0.00	- <b>\$</b> -		Help
oundary Chords:	1			Help
lodel Files:	ular Boundary I5\ROW_Survey\D	rawings\Reference_File	es\123	
lodel Files:		rawings\Reference_File	Þs\123	
lodel Files: C:\Projects\1234	III	rawings\Reference_File		
Iodel Files: C:\Projects\1234	III	rawings\Reference_File		
odel Files: C:\Projects\1234	III	rawings\Reference_File		



Width Left and Width Right define plan view limits perpendicular from the reference line (left is negative).

The **Boundary Chords** setting will create a clipping limit that will fit the extents of the 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 desired limits extend beyond 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 or through the use of the MicroStation references dialog.

#### Model Files & Levels

The Model files selected will be attached as reference files. The attached files will have all 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 references dialog box.

Additionally, the files referenced will have the design file 'Default' model attached. The user should not use any model space other than 'Default'.

#### **Profile Controls tab**

No action required

## Sheet Layout tab

Border and Title			ols and Details		Match Lines		Sheet Index
Main	Plan Con	trols	Profile Controls		Sheet Lay	/out	View Layout
heet Number: 1		Name:	1	_1	Host File Conte	nt	
lost File: .Dr	awings\1	2345RO\	V_Plan01.dgn 🛄	Ш	Single Shee	t Each	
Geed Host File: Sta	ation\See	d\3D-Se	ed_CDOT.dgn		All Sheets in	One	Edit Symbology
Sheet Location				n ì			
Layout along A	Nignment	🔘 La	yout in Grid				Help
Round To Nea		Degree le	•		- Horizontal Space — Left to Left	cing	Right to Left
Profile Shee	et First				Distance:	100	00
First Sheet Locati	on (Mode	l Units)				100.	00
×	C	00.(			Vertical Spacin	g	
Y:	0	00.0	·ψ·		Bottom to B	ottom	Top to Bottom
Sheets per Colum	n: [1				Distance:	100.	00
Clipping Boundary	/			h	Example		
Level:	S	HEET_C	lip-Boundary				
Symbology:	5	SHEET_C	lip-Bounda 🔻				
Unique Level f	or Each :	Sheet		11			_
Level Step:	1						
				<u> </u>			

16. **<D>** the ... button next to **Host File** to identify the path and initial sheet name for the new drawing set. The **Host File** refers to the new MicroStation plan drawings that will be created by this tool. The last number, "1", will be automatically incremented as each new sheet is created. Set to the project directory, i.e.

.....ROW_Survey\Drawings\ 12345ROW_Plan01.dgn

17. **<D>** Save in the Save As dialog.

Save As				×
Save in:	📗 Drawings		- G 🦻 🛛	"
e	Name	*	Size	<u>^</u>
Recent Places	Reference_F Tabs	iles		
	<b>12345ROW</b>	Cnty-24x18_##.dgn	32 KB	=
·	<b>12345ROW</b>	Cnty-24x36_##.dgn	33 KB	
Desktop	<b>12345ROW</b>	Mon##.dgn	59 KB	
100	<b>12345ROW</b>	Ownership##.dgn	34 KB	
	<b>12345ROW</b>	Plan##.dgn	34 KB	
CDOT_User	<b>12345ROW</b>	TabProp01.dgn	45 KB	
	<b>12345ROW</b>	TabProp02.dgn	39 KB	
	<b>312345ROW</b>	TabProp03.dgn	40 KB	
Computer	<b>12345ROW</b>	TabProp04.dgn	39 KB	
-	<b>12345ROW</b>	TabProp##.dgn	35 KB	-
Network	File name:	12345ROW_Plan##.dgn		▼ Save
	Save as type:	MicroStation Design Files (*.dg	n)	▼ Cancel
				Help

18. The **Seed Host File** is the 'prototype' file used to create the Host files and should be set to:

C:\Program Files\Workspace-CDOT\Standards-Global\MicroStation\Seed\3D-Seed_CDOT.dgn

19. Make sure the **Level** and **Symbology** options in the *Clipping Boundary* section display *SHEET_Clip-Boundary*.

#### View Layout tab

This tab sets location (origin) for the plan views relative to the border sheet. No user input is required in this dialog.

Border an	d Title	Symbols	and Details	Match Lines	Sheet Index
Main	Plan Contr	ols	Profile Controls	Sheet Layout	View Layout
Views					
Number:		1			
Distance be	tween Plans:	0.00			
Distance be	tween Profiles:	0.00			
Location (Pa	an an Linita)				Help
Location (Pa	X	Y			
Plan: 1.5	1	5.00			
Profile: 1.7	5	1.75			
icale: 1.0	) =	100.00			

**Note:** The Location of the Plan position is computed from the outside edge of the border sheet in paper (plotted) units.

#### Border and Title tab

The only user input on this tab is to ensure the correct cell is specified for the border sheet. No other user input is required in this dialog unless creating sheets at a scale other than  $1^{"}=100^{"}$ .

Source cell library: C:\Program Files\Workspace-CDOT\Standards-Global\MicroStation\cells\General.cel

Cell Placed:

Main	Plan Contro	Is Profile Controls	Sheet Layout	View Layo
Border and	Title	Symbols and Details	Match Lines	Sheet Index
Border				Browse
Cell		Reference Fi	ile Name:	Diowse
Name:	SHEET_RO	W-PI -	Files\Workspace-CDOT\	
Retain	Cell Levels for E	Sheet Size	B (11 x 17) 🔹	
Same I	evel for Each S	Custom Widt	h: 16.00	Help
0	Level for Each	Custom Heid	ht: 10.50	
Sheet Level:			ata File Name:	
	1			
Level Step:	1		Edit	
Scale:	100.00			
Object Horizontal Start Statio	n	Name	Location in Paper U X: 0.00 Y: 0.00 User Text:	Jnits:
Stop Statio				
Stop Statio Sheet Num Total Shee Scale View Name Rotation	-		Station Format:	•

20. Verify Cell Name: SHEET_ROW-Plan-Sheet

# Symbols and Details tab

No user input is required in this dialog unless modifications to the stored preference are required.

Main	Plan Control	s Profile Controls	Sheet Layout	View Layout
Border and	Title	Symbols and Details	Match Lines	Sheet Index
North Arrow				
Attach				
Cell Name:	SHEET_North	-Arrow 🔻		
Retain Cel	Levels for Each	n Sheet		Help
Use Sheet	Level			Неір
Same Leve	el for Each Shee	t		
Level:	1			
Scale:	100.00			
Location in Pa	aper Units			
X:	15.95			
Y:	8.90			
ProjectWise 1	Title Block			
Attach				
Cell Name:	Advisory-Radio			
	( and ) induced			

The **North Arrow** position set by the **Location in Paper Units** 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.

## Match Lines tab

No user input is required in this dialog. Match lines are not being used for ROW sheets.

🕌 Plan and Profile Gene	erator				- • •
Main Plan	Controls	Profile Controls		Sheet Lavout	View Layout
Border and Title	Symb	bols and Details	M	atch Lines	Sheet Index
Symbology:				Extend	Help
Object	Nan		^	To Clipping B	loundary
Plan Line		ET_Match-Line ET_Match-Line	BYL BYL	Oistance from	n Origin
Plan Stop Station	SHE	ET_Match-Drie	BYI ≡	Distance Left:	-180.00
Plan Prev Sheet				Distance Right:	180.00
Plan Next Sheet			H	Station Format:	
Profile Start Station			H	S+SSS_SS	-
Profile Stop Station					
•	III			Use Sheet Lev	'el
	Apply	Preference	s	Close	

#### **Executing the Plan & Profile Command**

Once the Apply command is executed, the workflow process for this command follows the following sequence:

- Plan view reference limits are established.
- New drawing files are created based on the host file name.
- Each new drawing file has 3 items generated.
  - Plan views
  - Border sheet placed as a cell in each generated drawing
  - North arrow placed on each sheet
- The Plan and Profile dialog (sheet index tab) will populate with sheets created and sheet limits.

#### Sheet Index tab

Nothing is required by the user on this tab prior to executing the PnP command. A summary of sheets created is displayed after successful execution of the command.

21. **<D> Apply**, the routine will run and MicroStation will cycle through the sheets as they are created – be patient and wait for the command to complete.

Main	Plan C	ontrols	Profile Controls	Sheet Layou	rt View Lavout
Borde	er and Title	Symb	ols and Details	Match Lines	Sheet Index
VDF File				New	Open
	Boundary Mode	:   Calcul	ate 💿 Use Existi	ng	Save
Sheet Ind	dex:				Save As
Sheet	Sheet Name		Host File	Sheet Rotation	▲ Help
1	1	C:\Projects	12345\ROW_Surve	y\Dr 89^00'00''	E Create Plot Set.
2	2	C:\Projects	\12345\ROW_Surve	y\Dr 90^00'00''	
3	3	C:\Projects	12345\ROW_Surve	y\Dr 101^00'00''	
4	4	C:\Projects	12345\ROW_Surve	y\Dr 103^00'00''	A
5	5	C:\Projects	12345\ROW_Surve	y\Dr 105^00'00''	-
•			III	P.	None
Sheet Vie	Delete She	et	generate Sheet	Show Sheet	
Sheet	View Ty	pe	View Name	Anchor	X Anchor Y
1	Plan	ST	FA 314+56.59	1.50	5.00

The Sheet Index tab will display a list of sheets created and MicroStation will display the last sheet created.

- 22. Select **Save As** from the Sheet Index tab to store a project specific *View Definition File* (VDF). A VDF file allows sheet definitions to be recalled and modified in subsequent MicroStation/InRoads sessions if necessary.
- 23. Name the file *100 scale ROW plan sheets.vdf*
- 24. **<D> Save**

Save VDF File						
Save in:	)) Drawings		•	G 😰	• 💷 🍤	·
(And	Name	*	Siz	e		
Recent Places	Reference_ Tabs	Files				
Desktop						
CDOT_User						
Computer						
Network	File name:	100 scale ROW plan sheets.vd	ff		•	Save
	Save as type:	VDF Files (*.vdf)			•	Cancel
						Help

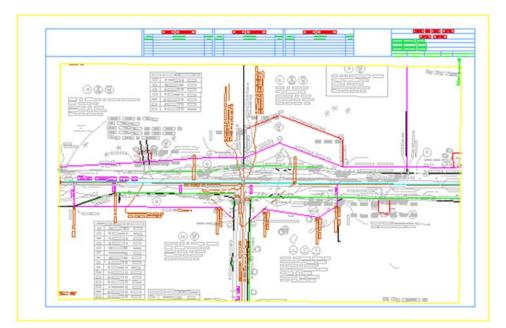
# **Displaying sheets**

By highlighting a specific sheet in the Sheet Index tab and selecting Show Sheet, MicroStation will open the selected drawing.

25. Identify *Sheet 1* and *<D>* Show Sheet

Main	Plan C	ontrols	Profile Controls	Sheet Layout	View Lavout
Borde	er and Title	Symbo	ols and Details	Match Lines	Sheet Index
		ects\12345\F	ROW_Survey\Drawin	gs\101 New	Open
- Show S Clipping	Sheet Boundary Mode	: O Calcula	ate 💿 Use Existi	ng	Save
Sheet Ind	lex:				Save As
Sheet	Sheet Name		Host File	Sheet Rotation ^	Help
1 2	1		12345\ROW_Survey 12345\ROW_Survey		Create Plot Set.
3	3		12345\ROW_Survey		
4	4		12345\ROW_Survey		All
5	5	C:\Projects\	12345\ROW_Surve	/\Dr 105 '00'00'' ▼	None
	Delete She	Reg	enerate Sheet	Show Sheet	
Sheet Vie					
Sheet Vie Sheet	View Ty	pe	View Name	Anchor X	Anchor Y
	View Ty Plan		View Name A 314+56.59	Anchor X 1.50	Anchor Y 5.00

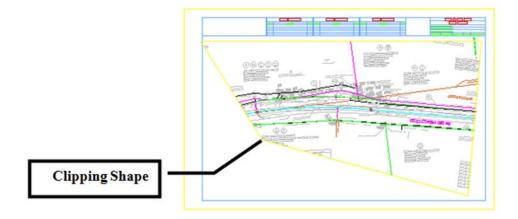
## MicroStation opens the identified sheet



26. Identify *Sheet 2* and *<D>* Show Sheet

27. Use the MicroStation Modify command to adjust the clipping shape to any new location.

28. **<D> Show Sheet** to redefine the clipping limits after modifying the clipping shape.

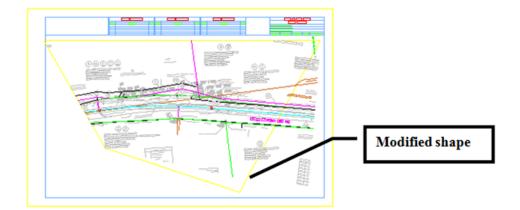


Note: Other modification tools such as insert vertex and delete vertex can be used also.

Modify							
🛃 🖄 💥	$/\times$	)と‡‡	ŧŸ	<b>∋</b> *	]*	Ť	$\overline{}$

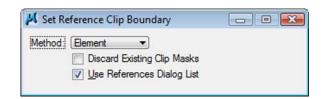
Standard MicroStation References commands can also be applied.

29. Use the MicroStation Modify command to adjust the clipping shape to any new location.

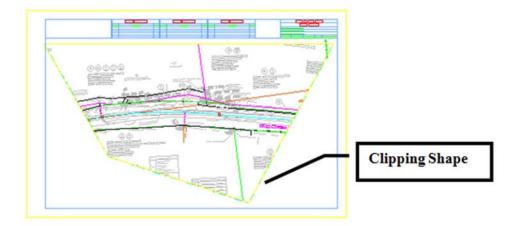


- 30. Select File > References from the MicroStation menu bar.
- 31. *Highlight* the **12345ROW_Model.dgn** file.

32. Select **Tools > Clip Boundary** from the **References** dialog.



- 33. Set the Method to Element
- 34. **<D>** on the modified clipping shape in the MicroStation view.
- 35.  $\langle D \rangle$  to accept the command.



# Notes:

- The clipping boundary is now defined by the identified shape. Using any MicroStation command to modify this shape will automatically update the reference file clipping boundary. This shape is on the level GEN_SHEET_Clip-Boundary. This level is configured as a non-plotting level.
- Deleting the clipping boundary shape will result in the reference file display limits reverting to the initial limits defined by the PnP command.
- Regenerating a sheet from the PnP Sheet Index tab will also cause the sheet to revert to the reference file display limits initially defined by the PnP command.

After the Plan and Profile Generator has been run, each sheet should be reviewed for:

- North Arrow position (move the cell using MicroStation move command)
- Plan view Clipping limits
- Title block information

# Main tab – After running the P&P command

Once the command has been run, the Geometry Project field will populate and the Plan and Profile view limits display.

🗑 Plan and Pro	ofile Generat	or					- 0 🛃
Border and	Title	Symbols	and Details		Match L	ines	Sheet Index
Main	Plan Con	trols	Profile Con	trols	Sheet	Layout	View Layout
Method			Horizontal	Alignmen	ti		Edit
Plan Only			C_Center	ine	-	- <b>\$</b> -	
Plan and	Profile		Geometry	Projects in	n this VDF:		
Profile On	ly		12345_D	ESIGN			
Plan Views							Help
Use Plan	Views						
Ose Static	on Limits						Unless otherwise
Profile Views						for thi	is command are in I units.
0			⊂ Station L	imite			
Ose Static	on Limits		JIGUOTT	JITIILS		De	fault
Sheets Generate	Charata		Start:	314+56	.59		4+56.59
			Stop:	B 450+(	00.00	+ C	560+91.01
-	formation Onl		Length:	1450.00	)	+	
VDF In	formation and	Host Files					
Plan Views:		Te	otal: 0	Profile V	iews:		Total: 0
ln	Name	Start	Stc 🔨	Name		Start	Stop
	314+56.59	314+56.59					
	319+00.00	319+00.00					
		e e camin fill	4				
		Apply	Prefere	nces	Close	•	

Double clicking on a specific Plan View sheet opens an Edit Plan View dialog. Sheet limits can be modified numerically and reference files can be added or removed.

View Name: STA 319+00.00					Apply
Start:	319+00.00	Stop:	333+50.00		Close
Rotation:	90^00'00''	Overlap:	0.00		Model Files.
Vidth Left	-425.00	Width Right:	425.00		< Previous
Force Rectangular Boundary Boundary Chords: 1					
lodel Files:					Next >
C:\Project	s\12345\ROW_Survey\	Drawings\12345	ROW_Plan##2.dgn		Help

Challenge Exercises:

- Modify the last sheet to add 500' to the stop station
- Modify any sheet to change the left and/or right offsets
- Add or subtract from the model file list
- Modify the station limits on the first sheets and 'adjust' adjacent sheet

Index