

INDIANA DEPARTMENT OF TRANSPORTATION



INDOT Production

Surveys

V8 XM Edition

Acknowledgement

This manual and the INDOT Workspace was the combined efforts of many contributors, far too numerous to mention each by name. Just to mention a few, the CADD Team, Planning & Production Applications Section of INDOT, Donald Mohid, Danny Greenberg, Survey Operation Managers, and any of the other users providing help, testing, and feedback.

Many thanks to all for this invaluable help – Scott Robison.

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Updates

This manual has been created with point page numbering allowing updated pages to be inserted while removing out of date documentation.

As updates become available, please replace the existing pages.

Table of Contents

Chapter 1 - CAD Support Help Site	1.1-1
1.1 Accessing CAD Support Help Site.....	1.1-1
1.2 Site Layout & Terms.....	1.2-4
1.3 The Home Page	1.3-8
1.4 The INDOT Intranet.....	1.4-9
1.5 CAD Training Calendar	1.5-10
1.6 The Digital Classroom	1.6-14
1.7 Employee Training Schedule	1.7-18
1.8 The FAQ Page	1.8-20
1.9 Help Requests	1.9-22
1.10 Training Database.....	1.10-24
Chapter 2 - MXRoadmax MicroStation.....	1.10-1
2.1 Licensing Changes of Bentley XM products.....	2.1-1
2.2 What's New in MX XM.....	2.2-1
2.2.1 Release Notes	2.2-1
2.3 Keeping MX Up to Date	2.3-2
2.3.1 Update MX Files	2.3-2
2.3.2 Files Updated from the Network	2.3-3
2.4 Getting Started	2.4-4
2.5 Menu Customization.....	2.5-8
2.5.1 Initial customization	2.5-8
2.5.2 Switching between MX Menus and MicroStation (CAD menu)	2.5-10
2.5.3 MX/CAD Focus.....	2.5-11
2.5.4 User Preferences	2.5-13
2.5.5 Right Click / Reset – Right Press and hold operations	2.5-15
2.6 CAD Menus and Toolbars.....	2.6-17
2.6.1 Menu Layout	2.6-17
2.6.2 Task Navigation.....	2.6-17
2.6.3 Positional keyboard Mapping	2.6-21
2.6.4 Dialog Focus.....	2.6-22
2.6.5 View toolbar	2.6-23
2.6.6 Mouse Operations.....	2.6-24
2.6.7 Missing buttons and Toolbars.....	2.6-25
2.6.8 Button Bar	2.6-25
2.6.9 Save Settings	2.6-25
2.7 Seed Files.....	2.7-26
2.8 Running Input Files	2.8-27

2.9	Creating Survey Base Drawings	2.9-30
2.10	Rotate Drawings 3D	2.10-31
2.11	Shading Triangulation Surfaces	2.11-36
2.12	Ending your MX Session	2.12-38
2.13	Closing MX manually	2.13-38
Chapter 3 - Route Plat Sheet Creation.....		2.13-1
3.1	The Route Plat MicroStation File.....	3.1-1
3.2	What's New in MicroStation XM	3.2-2
3.2.1	Tasks.....	3.2-3
3.2.2	Design History	3.2-5
3.2.3	INDOT – INFO	3.2-8
3.2.4	MicroStation Models	3.2-8
3.2.5	Annotation Scale.....	3.2-9
3.3	Contents of the Template Route Plat dgn File.....	3.3-13
3.4	Creating Reference Boxes	3.4-14
3.5	Creating Reference Point Coordinate Table	3.5-30
3.6	Creating Route Plat Sheets.....	3.6-33
3.7	Adding DGN Files to the Route Plat	3.7-36
3.8	Adding Ref. Boxes to Route Plat.....	3.8-41
3.9	Adding a Coordinate Table to the Route Plat	3.9-46
3.10	Creating Section Corner Cards	3.10-50
Chapter 4 - Plotting		3.10-1
4.1	Plotting in MicroStation XM Using Print/Plot.....	4.1-1
4.2	Plotting to a PDF file in MicroStation XM Using Print/Plot.....	4.2-4
4.3	Plotting Configuration.....	4.3-7
4.3.1	Printer/Plotter locations:	4.3-7
4.4	Adding Printers and Plotters	4.4-8
4.4.1	Print/Plot Drivers	4.4-8
Chapter 5 - ProjectWise and the Survey Workspace.....		4.4-1
5.1	Creating a New Survey Project.....	5.1-1
5.2	Adding a Completed Project to ProjectWise.....	5.2-5
5.2.1	Starting ProjectWise	5.2-5
5.2.2	Accessing the INDOT Datasource.....	5.2-6
5.2.3	INDOT Folder Structure.....	5.2-8
5.2.4	Importing the Project into ProjectWise.....	5.2-10
5.3	Pick-Up Surveys and ProjectWise.....	5.3-14

5.3.1	Exporting the Existing Project from ProjectWise.....	5.3-14
5.3.2	Importing the Completed Pick-Up Project into ProjectWise.....	5.3-17
5.4	Reference Scanning.....	5.4-17
Appendices.....		I
Appendix A - INDOT Survey Project Lifecycle In ProjectWise.....		1
Appendix B - Naming Conventions		1
B.1	Model Names	1
B.2	General practices	2
B.3	Model Names and Style Set Association.....	3
B.4	Input Files Names.....	4
B.5	MicroStation Drawing Names.....	5
Appendix C - Drawtopo.inp		1
C.1	Drawtopo input file	1
Appendix D - Triangle.inp.....		1
D.1	Triangulation Input File	1
Appendix E - Sections.inp		1
E.1	Cross Sections Input File.....	1
Appendix F - create_survey_base_drawings.inp.....		1
F.1	Create Survey Base Drawings Input File.....	1
Appendix G - Level Libraries		1
Appendix H - MicroStation Libraries		1
H.1	DGN Library	1
H.2	Text Styles	1
H.3	Dimension Styles and Settings.....	2
H.4	Models.....	4
H.5	Attaching references	10
H.6	Levels and Level Filters	18
H.7	Design File Settings	20
H.8	Structure of a V8 Design File.....	26
H.9	Cell Libraries.....	27
Appendix I - Sheet use		1
I.1	INDOT Border / Sheet Models.....	1
I.2	Sheet Name and Sheet Description.....	2
Appendix J - Scale Chart.....		1



Chapter 1 -CAD Support Help Site

1.1 Accessing CAD Support Help Site

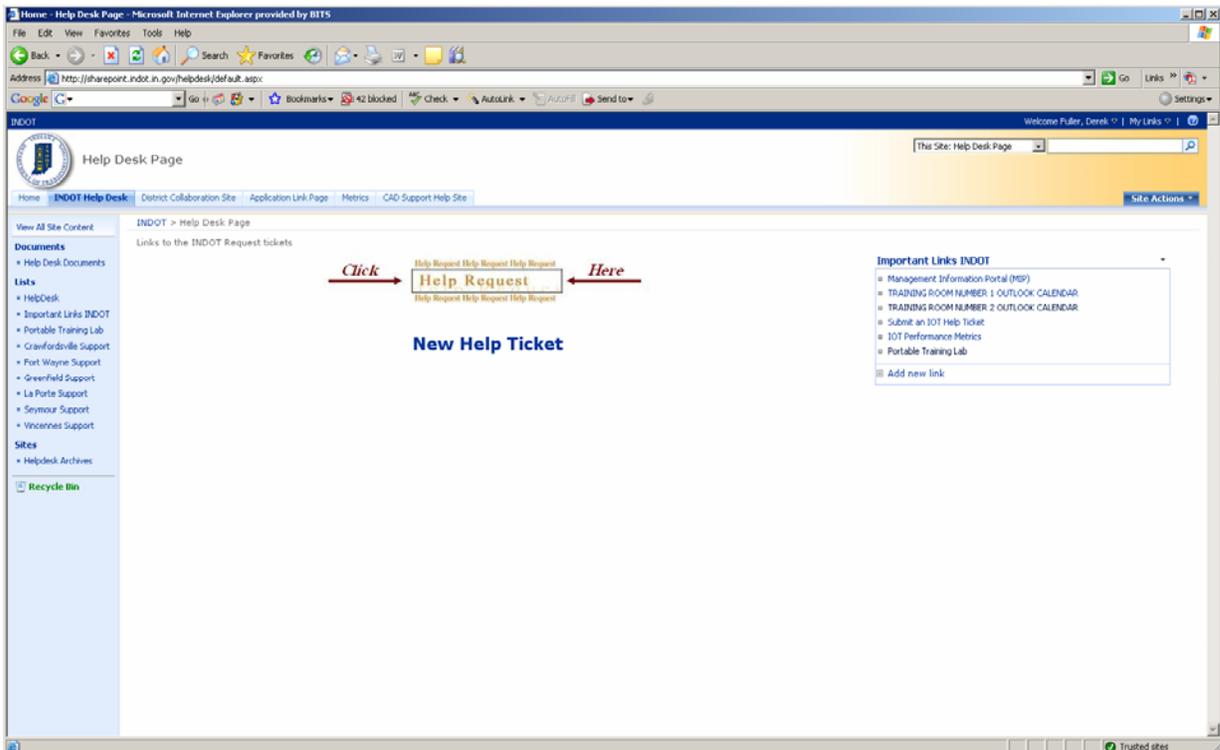
The purpose of this section is to provide a navigational tour of the CAD Support Help Site. On the typical desktop there are many different ways to access the CAD Support Help Site. The following instructions go through two of the most common methods:



The first way to access the Help Site is by clicking on the CAD Support Help Site icon on your desktop. This will take you directly to the CAD Support Help Site.



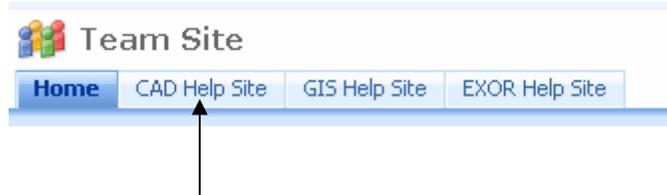
The second way to access the Help Site is by clicking on the INDOT Application Support icon on your desktop. This will take you to the start page of the Help Desk Page. It is from here that you navigate to the CAD Support Help Site.



First navigate to the Team Site page by clicking on the **CAD Support Help Site** tab, located along the top left of the start page.



Second navigate to the CAD Support Help Site by clicking on either the CAD Help Site tab, located along the top left of the Team Site page.



Click Image Below for CAD Support Help Site



Or by clicking on the Indiana CAD graphic icon in the middle of the page.

You will be directed to the *CAD Support Help Site*

Team Site > CAD Support Help Site
Welcome Fuller, Derek ▾

CAD Support Help Site
This Site ▾

Home
INDOT Intranet
CAD Training Calendar
Employee Training Schedule
FAQ Page
Help Requests

View All Site Content

Sites

- Portable Training Lab

Links

- Training Database
- Active CAD Tickets

Discussions

- Team Discussion

New Help Ticket

Click → [Help Request](#) ← Here

Announcements-Events and Happenings

Title	Modified
Distance Learning BLN PO Code: INDOT	4/2/2008 9:22 AM
New FAQ Documents for XM	3/18/2008 1:49 PM
XM Home use license is available for those that have attended XM Training.	3/4/2008 1:32 PM
XM Release has begun	3/4/2008 1:31 PM
Bentley Learning Network	9/14/2007 11:47 AM
List of Recommended BLN Courses for INDOT employees	8/23/2007 11:44 AM
Remember to Compress Files!!!!	6/4/2007 9:25 AM

CAD Contacts-Do not contact directly until a Help Desk Ticket has been filled out first!!!

First Name	Last Name	Job Title	Business Phone	E-mail Address	Area of concern
Greg	Carrie	CAD Specialist / Analyst	234-0179	gcarrie@indot.in.gov	Help Desk-MicroStation-Project Wise-Workspace-Sharepoint
Lora	Crall	CAD Systems Analyst	233-8583	lcrall@indot.in.gov	Help Desk-MicroStation-Workspace-Project Wise
Derek	Fuller	Survey Application Developer	233-3016	dfuller@indot.in.gov	Help Desk, Survey, MicroStation, Workspace
Jason	Kuhn	CAD Specialist/ Analyst	234-2485	jkuhn@indot.in.gov	Help Desk-MicroStation-MX-Workspace-Project Wise-Sharepoint
Scott	Robison	CAD Supervisor	232-5179	srobison@indot.in.gov	All CAD related inquiries!!!

FAQ Page

Type	Name	Modified By
📁	LEAP Manuals	Kuhn, Jason
📁	CAD News Letters	Robison, Scott
📁	XM Workspace FAQ's	Kuhn, Jason
📁	CAD Section SLA	Robison, Scott
📁	Workspace Training Documentation	Robison, Scott
📁	BLN (online training) Information and Recommended Courses	Robison, Scott
📁	CAD Support SharePoint Site	Carrie, Gregory
📁	Digital Signature FAQ's	Carrie, Gregory
📁	MX V8 2004 FAQ's	Robison, Scott
📁	MicroStation V8 2004 Plotting-Printing FAQ's	Robison, Scott
📁	MicroStation V8 2004 FAQ's	Robison, Scott

CAD Training Calendar

14 15 16

Training Calendar

Important Links

- ACEC of Indiana!
- ASCE American Society of Civil Engineers!
- Bentley Learning Network (BLN)!
- Bentley Tech Notes and FAQ Page!
- Consultant link to INDOT CAD Workspace!
- EKOR Support Page!
- GIS Support Page!
- JOT Responsibilities Page!
- JOT Customer Service Desk!
- MicroStation 2004 Project Creator!(Standards)
- MicroStation 2004 Project Creator!(Standards)
- MicroStation Map Insert Page!
- Real-time traffic information!
- PeopleSoft!
- Web Mail!

Training Database

Student Name	Class	Instructor	Class Date	Section	Manager Name 1
Derek Fuller	MicroStation XM Update	Chris Martin	11/7/2007	BIT5	Robison, Scott
Derek Fuller	ProjectWise V8 XM Edition User	Chris Martin	11/9/2007	BIT5	Robison, Scott
Fuller, Derek	MX Update to XM	Chris Martin	1/16/2008	BIT5	Robison, Scott

1.2 Site Layout & Terms

To help you better follow this document, we will first discuss some terms that will be used to describe the layout of the CAD Support Help Site.

The screenshot shows the CAD Support Help Site interface. Callout 4 points to the top navigation bar. Callout 1 points to the 'New Help Ticket' section. Callout 2 points to the 'Training Database' table. Callout 3 points to the 'Quick Launch' sidebar menu.

Callout 4: Top Link Bar
 Home | INDOT Intranet | CAD Training Calendar | Employee Training Schedule | FAQ Page | Help Requests

Callout 1: New Help Ticket
 Click → Help Request ← Here

Callout 2: Training Database

Student Name	Class	Instructor	Class Date	Section	Manager Name
Derek Fuller	MicroStation XM Update	Chris Matlin	11/7/2007	BITS	Robison, Scott
Derek Fuller	ProjectWise V8 XM Edition User	Chris Matlin	11/9/2007	BITS	Robison, Scott
Fuller, Derek	MX Update to XM	Chris Matlin	1/16/2008	BITS	Robison, Scott

Callout 3: Quick Launch

- Sites
 - Portable Training Lab
- Links
 - Training Database
 - Active CAD Tickets
- Discussions
 - Team Discussion

Callout 1: Main Body
 Announcements-Events and Happenings
 Title | Modified
 Distance Learning BLN PO Code: INDOT | 4/2/2008 9:22 AM
 New FAQ Documents for XM | 3/18/2008 1:49 PM
 XM Home use license is available for those that have attended XM Training. | 3/4/2008 1:32 PM
 XM Release has begun | 3/4/2008 1:31 PM
 Bentley Learning Network | 9/14/2007 11:47 AM
 List of Recommended BLN Courses for INDOT employees | 8/23/2007 11:44 AM
 Remember to Compress Files!!!! | 6/11/2007 9:25 AM

CAD Contacts-Do not contact directly until a Help Desk Ticket has been filled out first!!!!

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FAQ Page

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Folder	BLN (online training) Information and Recommended Courses	Robison, Scott
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Folder	Digital Signature FAQ's	Carrie, Gregory
Folder	MX V8 2004 FAQ's	Robison, Scott
Folder	MicroStation V8 2004 Plotting-Printing FAQ's	Robison, Scott
Folder	MicroStation V8 2004 FAQ's	Robison, Scott

Callout 2: Training Database
 CAD Training Calendar
 Training Calendar
 Important Links
 ACEC of Indiana!
 ASCE American Society of Civil Engineers!
 Bentley Learning Network (BLN)
 Bentley Tech Notes and FAQ Page!
 Consultant link to INDOT CAD Workspace!
 EXOR Support Page!
 GIS Support Page!
 IOT Responsibilities Page!
 IOT Customer Service Desk!
 MicroStation 2004 Project Creator
 MicroStation 2004 Project Creator (Standards)
 MicroStation Map Insert Page!
 Real-time traffic information!
 PeopleSoft!
 Web Mail!

1. The **Main Body** of the site is the largest area of the document.
2. The **Right Side** of the document is actually part of the body, but will contain additional information.
3. The **Quick Launch** area is located to the left of the main body and will contain links to other sections of each area. (Training Database, Team Discussion)
4. The **Top Link Bar** will be used to navigate to each area of the CAD Support Help Site.

The **Main Body** of the home page consists of four parts.

- A direct link to the **INDOT Help Desk**, which will be discussed later in this chapter.



- A listing of Announcements – Events and happenings which describes any newsworthy changes or additions within the CAD Support Help Site, or the CAD Support Group.

Announcements-Events and Happenings

Title	Modified
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List of Recommended BLN Courses for INDOT employees	8/23/2007 11:44 AM
Remember to Compress Files!!!!	6/4/2007 9:25 AM

- A listing of the CAD Contacts within the CAD Support Group.

NOTE: PLEASE DO NO CONTACT THE CAD SUPPORT GROUP DIRECTLY UNTIL A HELP DESK TICKET HAS BEEN FILLED OUT!

CAD Contacts-Do not contact directly until a Help Desk Ticket has been filled out first!!!

First Name	Last Name	Job Title	Business Phone	E-mail Address	Area of concern
Greg	Carrie	CAD Specialist / Analyst	234-0179	gcarrie@indot.in.gov	Help Desk-MicroStation-Project Wise-Workspace-Sharepoint
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Scott	Robison	CAD Supervisor	232-5179	srobison@indot.in.gov	All CAD related inquiries!!!

- A quick link listing of the FAQ document folders is located below the CAD Contacts as shown below:

FAQ Page

Type	Name	Modified By
Folder	LEAP Manuals	Kuhn, Jason
Folder	CAD News Letters	Robison, Scott
Folder	XM Workspace FAQ's	Kuhn, Jason
Folder	CAD Section SLA	Robison, Scott
Folder	Workspace Training Documentation	Robison, Scott
Folder	BLN (online training) Information and Recommended Courses	Robison, Scott
Folder	CAD Support SharePoint Site	Carrie, Gregory
Folder	Digital Signature FAQ's	Carrie, Gregory
Folder	MX V8 2004 FAQ's	Robison, Scott
Folder	MicroStation V8 2004 Plotting-Printing FAQ's	Robison, Scott
Folder	MicroStation V8 2004 FAQ's	Robison, Scott

The **Right Side** of the home page consists of three parts.

- A direct link to the **CAD Training Calendar**, which will be discussed later in this chapter.



- A list of **Important Links** which will open new pages while allowing you to stay on the CAD Support Help Site.

Important Links

[ACEC of Indiana!](#)
[ASCE American Society of Civil Engineers!](#)
[Bentley Learning Network \(BLN\)!](#)
[Bentley Tech Notes and FAQ Page!](#)
[Consultant link to INDOT CAD Workspace!](#)
[EXOR Support Page!](#)
[GIS Support Page!](#)
[IOT Responsibilities Page!](#)
[IOT Customer Service Desk!](#)
[MicroStation 2004 Project Creator!](#)
[MicroStation 2004 Project Creator!\(Standards\)](#)
[MicroStation Map Insert Page!](#)
[Real-time traffic information!](#)
[PeopleSoft!](#)
[Web Mail!](#)

- A user specific list of our **Training Database**, will be displayed in the lower right corner with all CAD related classes you have taken while at INDOT. (Updated monthly) This will also be covered in section 1.10.

Training Database

Actions ▾					
Student Name	Class	Instructor	Class Date	Section	Manager Name 1
Derek Fuller	MicroStation XM Update	Chris Martin	11/7/2007	BITS	Robison, Scott
Derek Fuller	ProjectWise V8 XM Edition User	Chris Martin	11/9/2007	BITS	Robison, Scott
Fuller, Derek	MX Update to XM	Chris Martin	1/16/2008	BITS	Robison, Scott

1.3 The Home Page

The **Home Tab** (Top Link Bar) will return you to the main page whenever selected.



Team Site > CAD Support Help Site Welcome Fuller, Derek

CAD Support Help Site This Site

Home | INDOT Intranet | CAD Training Calendar | Employee Training Schedule | FAQ Page | Help Requests

View All Site Content

Sites

- Portable Training Lab

Links

- Training Database
- Active CAD Tickets

Discussions

- Team Discussion

Click → **Help Request** ← Here

New Help Ticket



CAD Training Calendar



Important Links

- ACEC of Indiana
- ASCE American Society of Civil Engineers!
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	Remember to Compress Files!!!!	6/4/2007 9:25 AM

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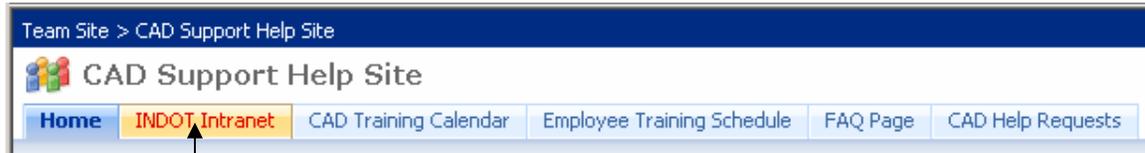
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Folder	Digital Signature FAQ's	Carrie, Gregory
Folder	MX V8 2004 FAQ's	Robison, Scott
Folder	MicroStation V8 2004 Plotting-Printing FAQ's	Robison, Scott
Folder	MicroStation V8 2004 FAQ's	Robison, Scott

1.4 The INDOT Intranet

The **INDOT Intranet** Tab (Top Link Bar) will take you to the INDOT Intranet home page.



Indiana Department Of Transportation INTRANET

Contact Webmaster | Help | Reports | Training

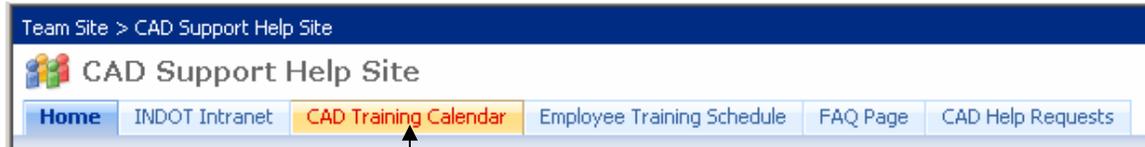
Search

Public Web Sites

Site	Link (click to visit)
Indiana public web site:	www.in.gov
INDOT public web site:	www.in.gov/indot
INDOT Public Business Sites	
Consultants:	www.in.gov/indot/6813.htm
Contractors:	www.in.gov/indot/7147.htm
Letting Information:	www.in.gov/dot/div/contracts/letting/index.html
Standards & Specifications:	www.in.gov/dot/div/contracts/standards/
Permits:	www.in.gov/indot/6799.htm
Other Business:	www.in.gov/indot/6790.htm

1.5 CAD Training Calendar

The **CAD Training Calendar** (Top Link Bar) will take you to a Calendar listing of all INDOT CAD events, including Training Classes.



CAD Support Help Site > Employee Training Schedule > Courses

Courses

Use this list to keep track of upcoming training courses.

New | Actions | View: **Calendar**

October, 2008

Expand All | Collapse All | 1 Day | 7 Week | 31 Month

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28	29	30	1	2	3	4
5	6	XM- Project Wise Workspace Training (Survey)		9	10	11
12	13	14	XM- Project Wise Workspace Training (Survey)		17	18
19	20	21	22	23	24	25
26	XM- Project Wise Workspace Training (Survey)(ON Location)		29	30	31	1

The information contained in the Quick Launch portion of this site will be discussed in the “Employee Training Schedule” portion of this chapter.

6	7	8	9	10
XM- Project Wise Workspace Training (Survey)				

Each event listed on the calendar is linked to a class information page consisting of the following.

- Course Title
- Course Description, which includes a link to the Digital Classroom assigned to the class.
- Instructor (If multiple instructors are scheduled, then the main instructor)
- Location (Physical location, where the class will be conducted)
- Available Seats (The number of remaining seats available for that class)
- The start and end times of that class.
- My Registration Button. (used when registering for class listed)
- Course Registration List. (Will show who has registered for the class.)

Team Site > CAD Support Help Site

Employee Training Schedule

Home | INDOT Intranet | CAD Training Calendar | Employee Training Schedule | FAQ Page | Help Requests

CAD Support Help Site > Employee Training Schedule > Courses > XM- Project Wise Workspace Training (Survey)

Courses: XM- Project Wise Workspace Training (Survey)

My Registration | Close

New Item | Edit Item | Workflows | Alert Me | Export Event

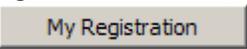
Course Title	XM- Project Wise Workspace Training (Survey)
Course Description	
Instructor	Martin, Chris
Location	TR#2
Available Seats	16
Start Time	10/6/2008 8:00 AM
End Time	10/8/2008 5:00 PM
Course Materials	None provided (instructors, upload here)

Created at 11/9/2007 11:23 AM by Robison, Scott
 Last modified at 4/28/2008 10:06 AM by Robison, Scott

My Registration | Close

Course Registration List

Nobody has registered for this course.

To register for a class, first determine if there are seats available, and then click one of the  buttons located above and below the course description.

This will take you to the Course Registration page which gives you the following information.

- Whether you have or have not previously registered for the class
- Attendee (your name)
- Course Title
- Start Time
- End Time

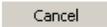
Team Site > CAD Support Help Site

 Employee Training Schedule

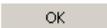
Home | INDOT Intranet | CAD Training Calendar | Employee Training Schedule | FAQ Page | Help Requests

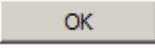
CAD Support Help Site > Employee Training Schedule > Registrations > New Item

Course Registration

You are not registered to attend this course. Press OK to register.  

Attendee	Fuller, Derek
Course Title	XM- Project Wise Workspace Training (Survey)
Start Time	10/6/2008 8:00 AM
End Time	10/8/2008 5:00 PM

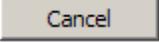
 

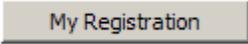
To complete registration for the class, click either of the  buttons located above and below the registration information. You will then be returned to the Class Information page and your name should appear in the Course Registration list.

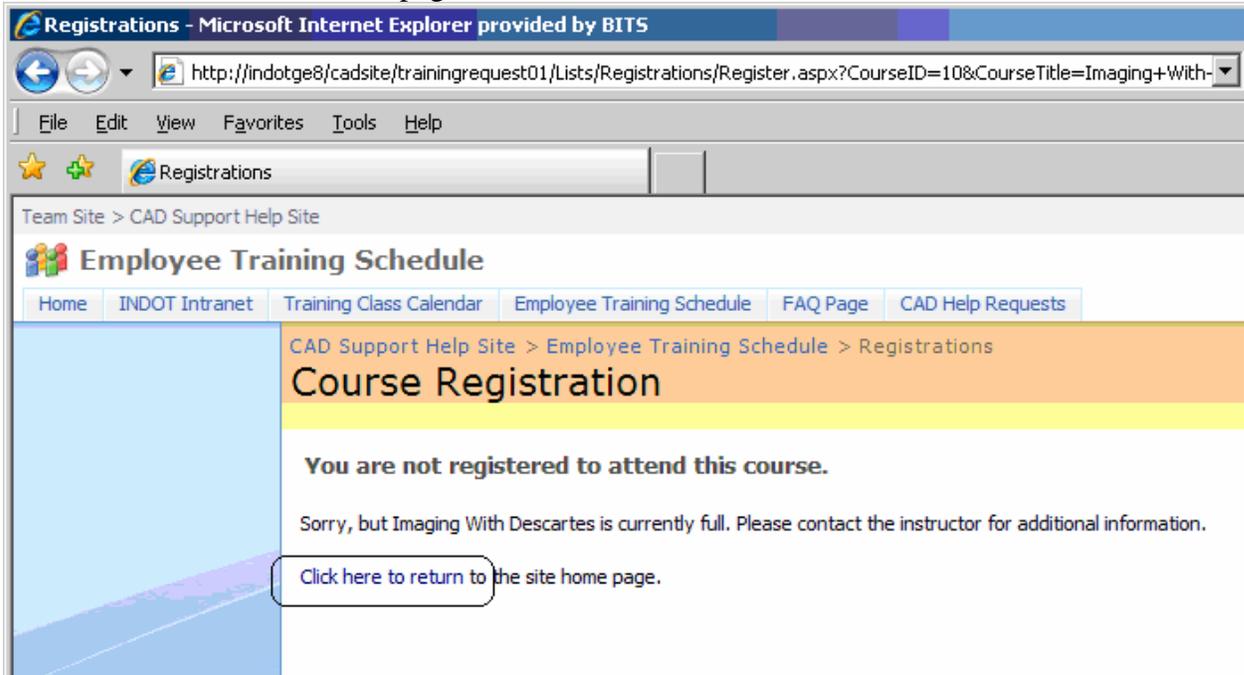
Upon successful registration for the course, you will receive a confirmation via email from Sharepoint@iot.in.gov telling you that you have successfully registered.

PLEASE DO NOT RESPOND TO ANY EMAIL FROM THIS ADDRESS.

If you decide that you do not yet want to register for this class, click either of the

 buttons located above and below the registration information. You will then be returned to the Class Information page and your name should not appear in the Course Registration list.

If the course is full when you click on the  button, you will be taken to a “Class is full” notification page.



Clicking on the text that says **Click here to return** will direct you to the Training Requests area which will be covered later in this document.

1.6 **The Digital Classroom**

If you wish to view a more detailed description of the class listed, click on the link to the Digital Classroom, which is located in the **Course Description** area on the class information page.

Course Title	Unified Workspace Rollout
Course Description	<p>Click the Link Below to visit the Digital Classroom</p> <p>http://indotge8/cadsite/UWR_FEB19-23/default.aspx?PageView=Shared</p>
Instructor	Robison, Scott (INDOT)
Location	Training Room 2
Available Seats	0
Start Time	2/19/2007 8:00 AM
End Time	2/23/2007 5:00 PM

The Digital Classroom is laid out as follows.

The main body of the Digital Classroom contains.

Class Location, Day(s) and Time

A link to the data sets for that class

Student and Instructor Surveys (*Not to be completed until AFTER completion of the class*)

The right side of the Digital Classroom contains.

A list of all instructors scheduled for that class.

A daily agenda for that class.

The Quick Launch Bar provides the following links to additional portions of the Digital Classroom.

Course Syllabus

Student Information

Home - Unified Workspace Rollout July 16-20 - Microsoft Internet Explorer provided by BITS

Address: http://indotge8/cadsite/UWR_JULY16-20/default.aspx

Team Site > CAD Support Help Site > Unified Workspace Rollout July 16-20

Welcome Carrie, Gregory

Unified Workspace Rollout July 16-20

Unified Workspace Digital Classroom | CAD Support Home Page | Site Actions

View All Site Content

Links

- Course Syllabus
- Recycle Bin

This 5 day class was created to train the current user on our Custom CAD workspace environment. It consists of 3 Classes from the Bentley Institute and 2 written and developed by our INDOT staff.

Class Location and Time

Training Room #2
8th Floor of ICN
8:30am-5:00pm
Mon-Fri

Unified Workspace Data Sets

- Chapter 4 Training Files
- MX 2004 Update
- Digital Interplot Training files
- MicroStation V8 2004 Update

[Add new link](#)

Student Survey

Survey Name:	Student Survey
Survey Description:	
Time Created:	5/14/2007 8:22 AM
Number of Responses:	0

[Respond to this Survey](#)

Instructor Survey of Students

Survey Name:	Instructor Survey of Students
Survey Description:	
Time Created:	5/14/2007 8:22 AM
Number of Responses:	0

[Respond to this Survey](#)

Instructors

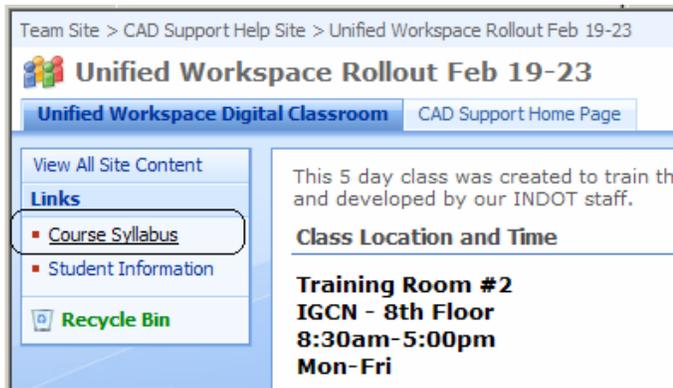
- Instructors
- Carrie, Gregory
- Egler-Kellems, Lisa
- Martin, Chris
- Robison, Scott

Unified Workspace Rollout - Agenda

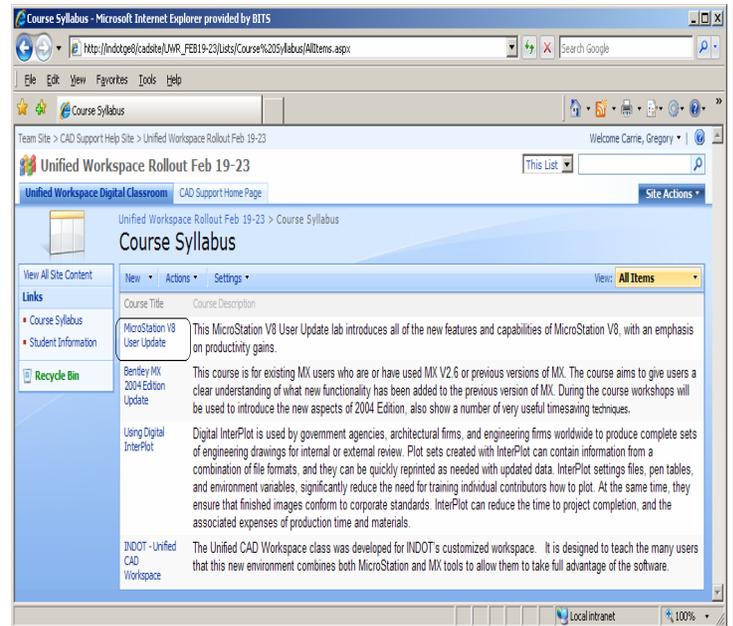
Day	Topics
Monday	MicroStation V8 2004 User Update
Tuesday	INDOT Unified Workspace Using Digital Interplot
Wednesday	Bentley MX - 2004 Edition - Update Training
Thursday	MX in MicroStation (Sheet Layout)
Friday	MX in MicroStation (Sheet Layout)

Done | Local intranet

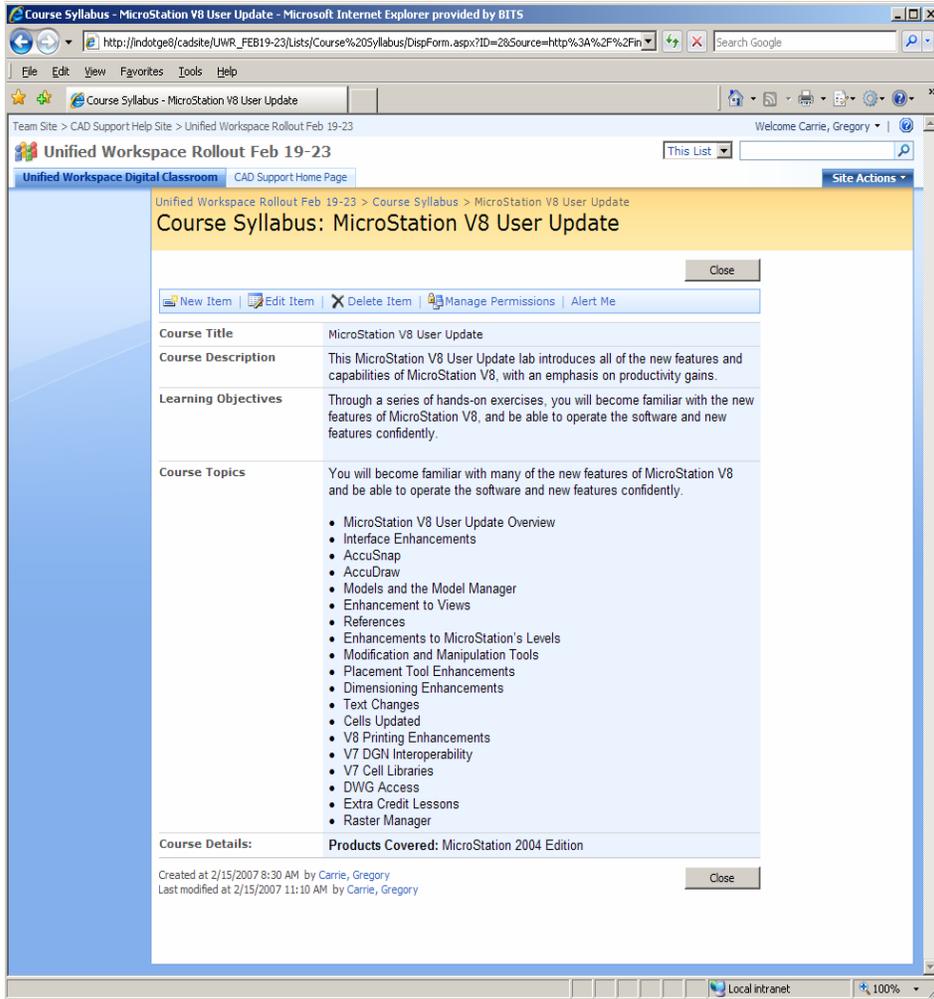




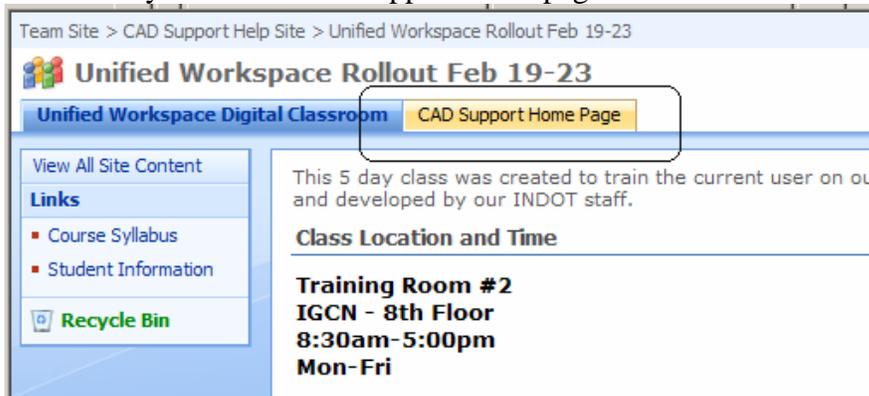
The **Course Syllabus** link, located in the Quick Launch Bar takes you to a detailed look at the class listed.



If the class covers more than one topic (See Unified Workspace Rollout) the course description will be provided, but you will have to click on the **Course Title** to view the complete syllabus. (See next page for illustration)

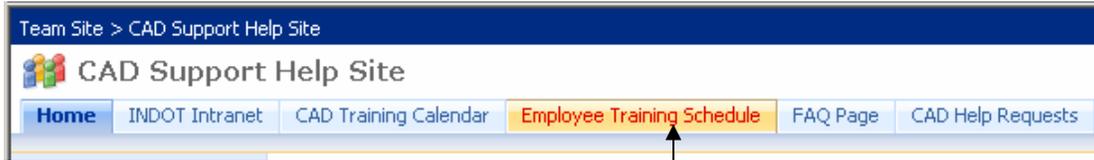


From within the Digital Classroom, the **CAD Support Home Page** tab (Top Link Bar) will return you to the CAD Support home page.

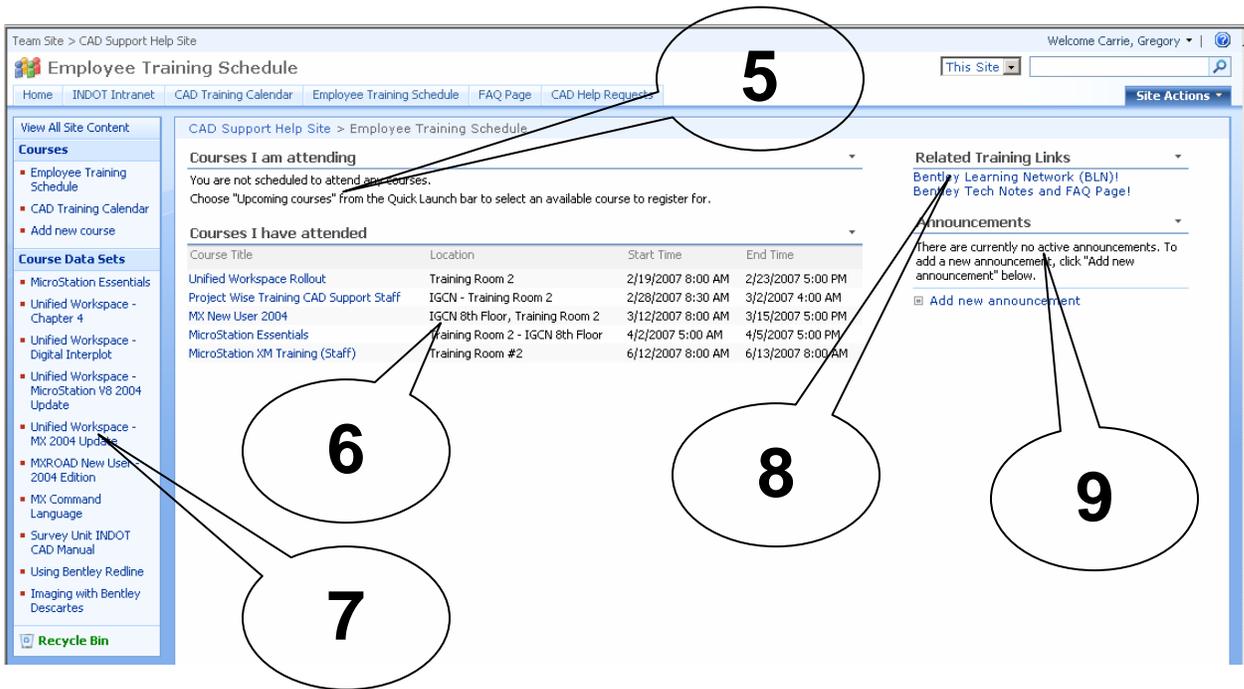


1.7 Employee Training Schedule

The **Employee Training Schedule** Tab (Top Link Bar) will take you to the Employee Training Schedule area.



This area is specific to the user and can be used as a base to track any classes that he or she is scheduled to take or has taken in the past. This area can also be used to quickly navigate to the Training Class Calendar.



- 5. **Courses I am attending:** This area will automatically track all of your upcoming training classes. As long as you are viewing the site while logged into the DOT domain as yourself, this should show only the classes that you have signed up for.

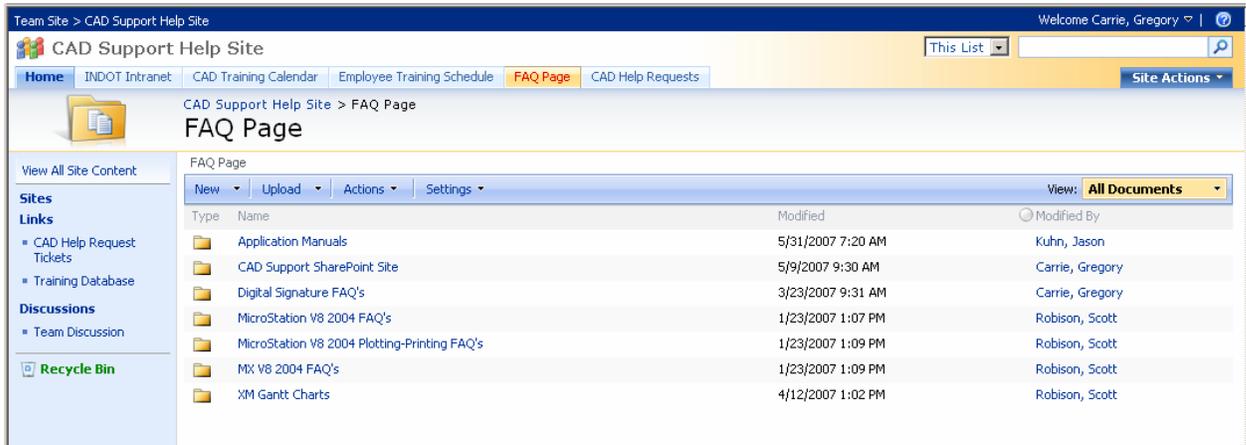
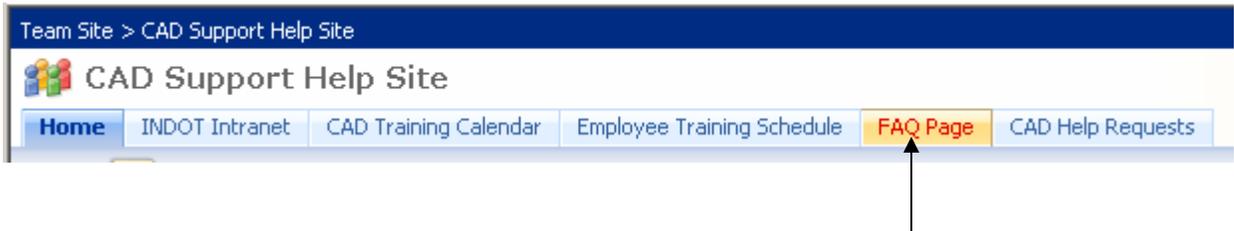
6. **Courses I have attended:** This area will automatically track all of the training classes that you have attended. As long as you are viewing the site while logged into the DOT domain as yourself, this should show only the classes that you have signed up for.
7. **Course Data Sets:** Located in the Quick Launch Bar, will take you to all data sets associated with any training class given by the Bentley or the INDOT CAD Support Group. These are stored on an INDOT server as executable files. You simply double left mouse click on the file to store the file on your local machine.
8. **Related Training Links:** Contains a list of direct links to the BLN and Bentley's Tech Notes and FAQ Page
9. **Announcements:** Contains any announcements pertaining to the employee's training needs

The **CAD Training Calendar** link, located in the Quick Launch Bar, takes you to the Training Class Calendar, which has been discussed previously in this document.

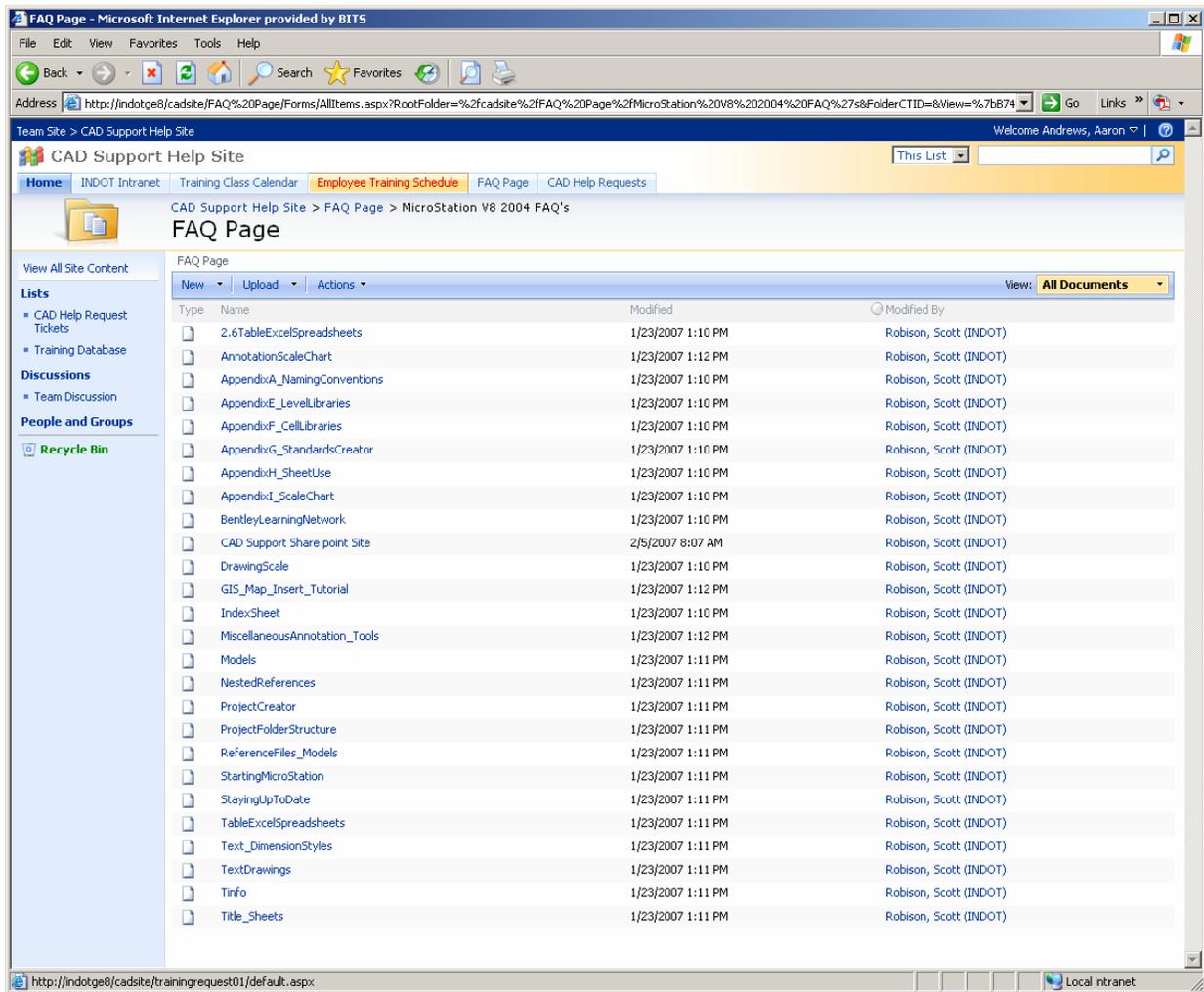


1.8 The FAQ Page

The **FAQ Tab** (Top Link Bar) will take you to the Frequently Asked Questions Page.



Once a category is selected the user will be taken to a page with .pdf documents containing information about that topic.



1.9 Help Requests

The **Help Requests** Tab will take you to a New Help Ticket form.



There is also a Help Request button on the Home page that will take you to the New Help Ticket form.



This is the form you will be presented with when selecting the new ticket link. The information this form requests is needed to aid the Application Support Staff in contacting you and providing an answer in a timely fashion.

A screenshot of the 'New Help Ticket' form. The form is titled 'New Help Ticket' and has 'OK' and 'Cancel' buttons at the top right. It contains several fields with labels and instructions: 'LAN Login ID *' with a text box and a note 'Please enter the user name that you enter to logon to your PC.'; 'Phone Number *' with a text box and a note 'Please enter your phone number in XXX-XXX-XXXX format.'; 'Location *' with a dropdown menu showing 'Central Office'; 'Room Number *' with a text box; 'Division/Company *' with a text box and a note 'INDOT Users: Please enter your agency division. Non-INDOT users: Please enter the name of your company.'; 'Computer Name' with a text box and a note 'How to find: Right-click on the "My Computer" icon on the desktop of your PC and select the "Properties" item. On the displayed System Properties window, select the "Computer Name" tab, and copy the information next to "Full Computer Name:" and paste in this field.'; 'Application/Services' with a dropdown menu showing 'CAD'; 'Issue Type' with a dropdown menu showing 'Installation Request'; 'File Path' with a text box and a note 'Only complete if your issue is contained in a file residing in an accessible location on the network.'; and 'Description of Problem *' with a large text area. There are 'OK' and 'Cancel' buttons at the bottom right.

A brief explanation of the fields:

LAN Login ID: Enter your LAN userID (See note directly below the logon box for further instructions on the ID required) or enter your full name in the following format: Smith, Joe. If you enter your full name it must be entered just as it is in the address book in Outlook. You can click on the address book and search for your name. If the user as keyed is not found, the field will not accept the input and signify this by underlining the field in red.

Phone Number: This field is for the entry of your phone number.

Location: This field is for the entry of your office location. (District/Central Office/Other)

Room Number: This field is for the entry of your location in the event on-site support is required.

Division/Company: Enter your agency/district/sub/unit. Non-INDOT users: Please enter the name of your company

Computer Name: This field is for the entry of your computer name. (See note directly below the computer name box for further instructions on how to gather this information)

Application/Service: This field is for the entry of the Application/Service that you require assistance with.

Issue Type: This field is for the entry of the type of issue you are having, such as software installs and application issues.

File Path: This field is for the entry of the path to the file you require assistance with if applicable.

Description of Problem: This field is for the entry of any relevant details as to what your issue may be.

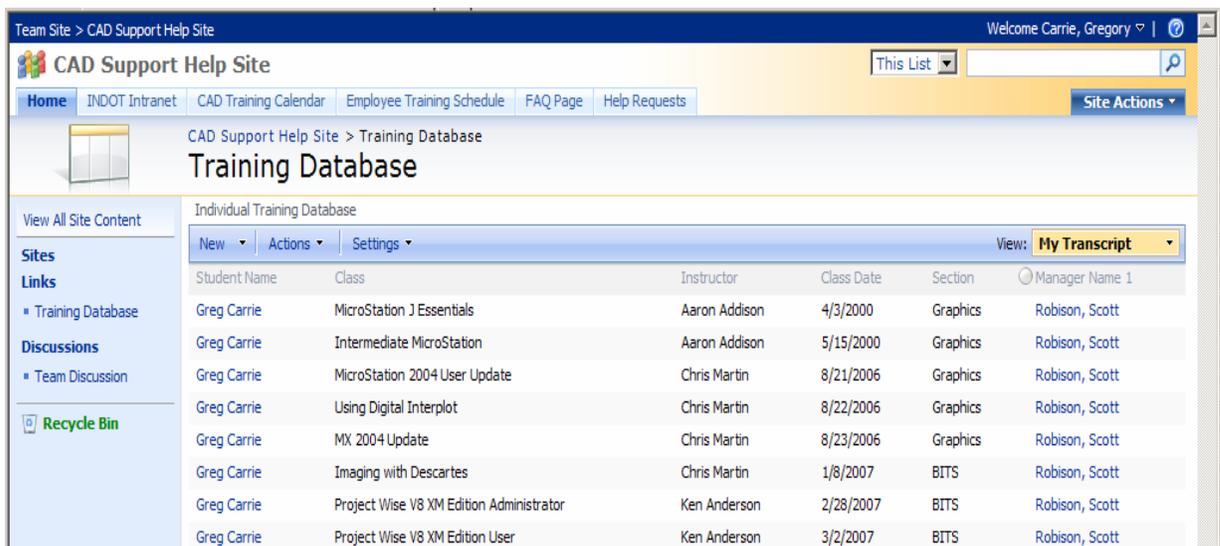
As is noted on the form, many of these fields are required to assist the support staff in contacting you, and providing a complete picture of the issue. The more information that you provide us, will better enable the support staff to resolve your issue in a timely fashion.

Upon completion of the form, select the OK button and your ticket will be submitted. Once you have submitted the help request you will receive an e-mail confirmation, from the helpdesk, that a ticket has been submitted and a member of the application support staff will be contacting you. During the process of working on your ticket, you will be notified of various status changes, and be able to view the status of your ticket via e-mails sent, updating you on status changes.

1.10 Training Database



The **Training Database** link on the left side of the **Home** Page will provide each user a list of all CAD classes they have taken while at INDOT.



Chapter 2 -MXRoadmax MicroStation

2.1 **Licensing Changes of Bentley XM products**

Licensed applications no longer require constant connections to Select License Server. This is to ensure users that they are not denied from using their applications. The applications do need to connect once per 30 days. This means the application only needs to run once per thirty days connected to the network to maintain the license. Every time a connection is seen, users automatically get 30 more days before the next connection is necessary. Users no longer need to explicitly check out a license. Users also have the added benefit of having access to be able to run more simultaneous instances of an application than they currently own.

2.2 **What's New in MX XM**

2.2.1 Release Notes

MX in Windows has been replaced by MX Stand-alone. This MX version includes a totally self-contained, high quality CAD functionality. This stand-alone version of MX uses Bentley PowerDraft for its CAD engine. PowerDraft is a near fully functioning version of MicroStation without some advanced features.

MX now uses native CAD functionality for Pan, Zoom, and other functions previously available from the MX Zoom toolbar. Also, it uses native CAD functionality for Views and multiple Viewports. These functionalities are now provided by tools within the MicroStation environment.

The Model Navigator is a new tool used to review wireframe and rendered surfaces; and dynamically manipulate the relationship of the camera and the model being viewed.

The MX Online Help has updated Linemode and Reference sections which now include information from the MX Command Language Reference. These documents have also been reorganized to be more task oriented. Included in these documents are the help documents for MXRENEW, MXURBAN, MXRAIL and MXSITE; along with Getting Started and tutorials for MXROAD.

Macrosymbols displayed by MX as Cells can now be unlocked to manipulate the individual cells (scale/rotate etc).

Due to the expansion of the modelfile at this release, any modelfile created using the XM Edition cannot be opened with an earlier version of the product. To open an XM Edition

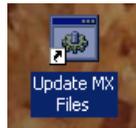
model with an earlier version of the product export the model information in GENIO format and then re-import this into the older version

The previously listed items are from the Release Notes of this version of MX. For complete details of the changes in this version, please refer to the Release Notes documentation that is found within the online help.

2.3 Keeping MX Up to Date

2.3.1 Update MX Files

There is a batch file named *Update MX Files.bat*, which must be run prior to using MXROADMAX MicroStation. This batch file updates all local files required by MX. The network versions of these files are the most up to date and will be copied locally. Browse to *X:\INDOT Extras XM* and select the *Update MX Files*. Also, a shortcut to this file will be placed upon the desktop.



It will run a script that updates the files. Upon completion the script will alert the user that the files have been copied, and will dismiss itself after a few seconds.

On occasion an email will be sent out notifying the users to run this batch file. Upon receipt of the email all users that have made changes to any of the files that are about to be updated can rename and move them to a location on the network in their project folder.

A screenshot of a Windows command prompt window titled "Update MX Files". The window has a black background with white text. The text reads: "Please wait while updated MX data files are copied to your PC.", "195 File(s) copied", "5 File(s) copied", "1 File(s) copied", and "Macro and style files have been copied from the network drive to your local MX directory for the XM Edition of MX and MicroStation. Have a nice day".

```
Update MX Files
Please wait while updated MX data files are copied to your PC.
195 File(s) copied
5 File(s) copied
1 File(s) copied
-
Macro and style files have been copied from the network drive to
your local MX directory for the XM Edition of MX and MicroStation.
Have a nice day
.
```

In addition to update information sent via email, users can optionally run this macro weekly to ensure you have the latest versions of all required files.

2.3.2 Files Updated from the Network

The following is a summary of all the files which are copied locally via the batch executable from various network locations as shown below grouped by location:

- **MX Macro Lines, MX Macro Symbols, and MX Command Macros**
Metric: X:\INDOT Extras XM\mfw\US_Macros\ to C:\Program Files\Bentley\MX\mfw\US_macros\

Imperial: X:\INDOT Extras XM\mfw\us_imperial_macros\ to C:\Program Files\Bentley\MX\mfw\us_imperial_macros\
- **MX Feature & Style Sets, MX Page Setup Files, MXDRAW annotation Tip Files, MX Masking tables, MX drawing input files, MicroStation Border Drawings for MX created sheets**
Metric: X:\INDOT Extras XM\mfw\US_Styles\ to C:\Program Files\Bentley\MX\mfw\US_styles\

Imperial: X:\INDOT Extras XM\mfw\US_imperial_styles\ to C:\Program Files\Bentley\MX\mfw\us_imperial_styles\
- **MicroStation Seed files for MX created drawings, and MX INDOT Cell library**
X:\INDOT Extras XM\mfw\MfM\Seed \ to C:\Program Files\Bentley\MX\mfw\mfm\Seed\
- **MX .dat files** which control the behavior and mapping of symbology from MX to MicroStation for: MX font to MicroStation font, MX macrolines to MicroStation linestyles, MX macrosymbols to MicroStation Cells, and MX pen width to MicroStation line weight.
Metric: X:\INDOT Extras XM\mfw\MfM\Data\ to C:\Program Files\Bentley\MX\mfw\mfm\Data\

Imperial: X:\INDOT Extras XM\mfw\MfM\Imperial_Data\ to C:\Program Files\Bentley\MX\mfw\mfm\imperial_data\
- **Defmods.txt** (the model to Feature set & Style set association file) and the **MX Color Palette**
X:\INDOT Extras XM\mfw\US_sys\ to C:\Program Files\Bentley\MX\mfw\US_sys\

2.4 Getting Started



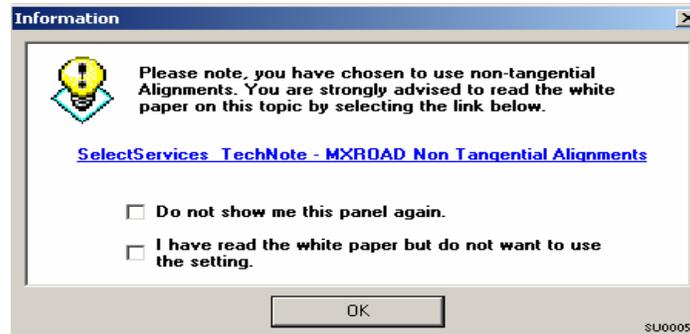
First you will need to start MX XM by double clicking on the MXROAD Suite MicroStation icon on your desktop. This will take you to the Start Up screen for MX.



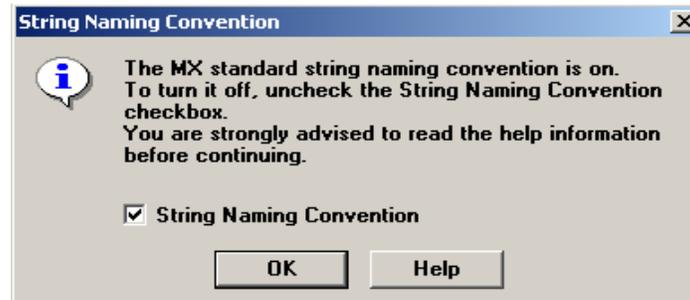
For a new project, select the *New Project* button, key-in the *Project Name*, browse to the appropriate folder location, and select the *desired system for the unit of measure*, then select *OK*.

For an existing project, select the *Open Project* button, then browse to the appropriate folder location and select the desired *Project Name*, then select *OK*.

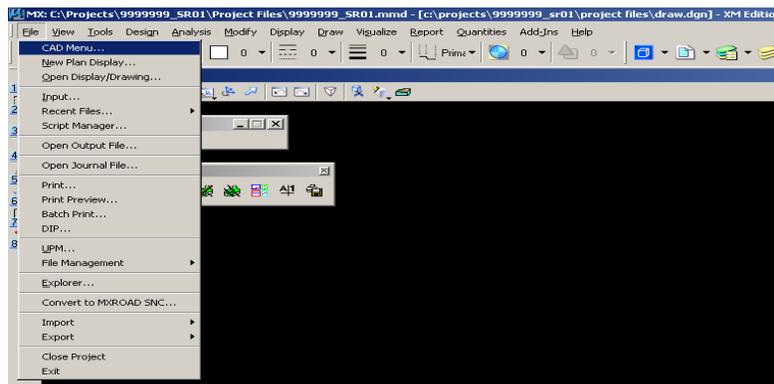
The Non-tangential Alignments Information box will pop-up. You can check the appropriate box if you do not want to see the panel again or you decide not to use Non-tangential Alignments, otherwise select **OK**.



Next the String Naming Convention Information box will pop-up. Make sure the **String Naming Convention** box is checked, and select **OK**.



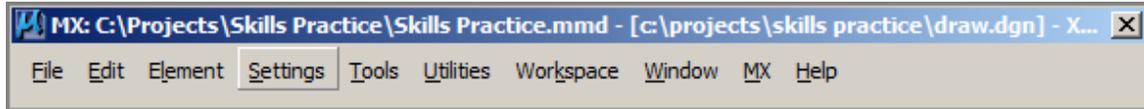
At this point MXROADMAX MicroStation will open/start the desired project. Typically the draw.dgn file will be the default CAD file. You can create a new display file by selecting **File->New Plan Display** at the top left. Or you can open an existing display file by selecting **File->Open Display/Drawing** at the top left.



The MX Menus:



The MicroStation / PowerDraft Menus:



To change between the two menu systems you will need to select the applicable item in the above menus. For the purposes of this manual, it is assumed that the MX menu is the active menu at all times.

MX menu to MicroStation menu procedure:

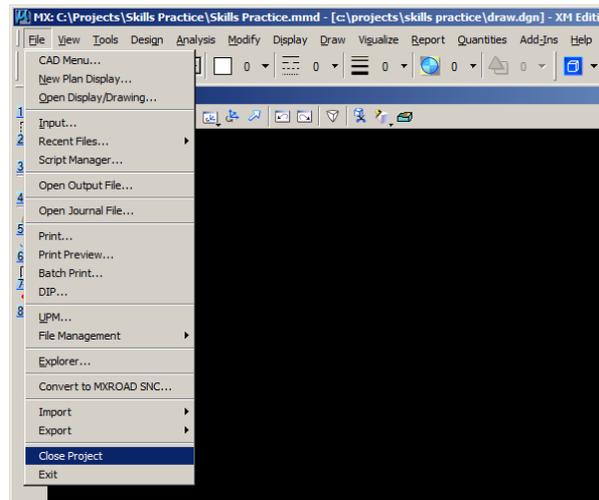
With the MX menu active, select **File -> CAD Menu**.

MicroStation menu to MX menu procedure:

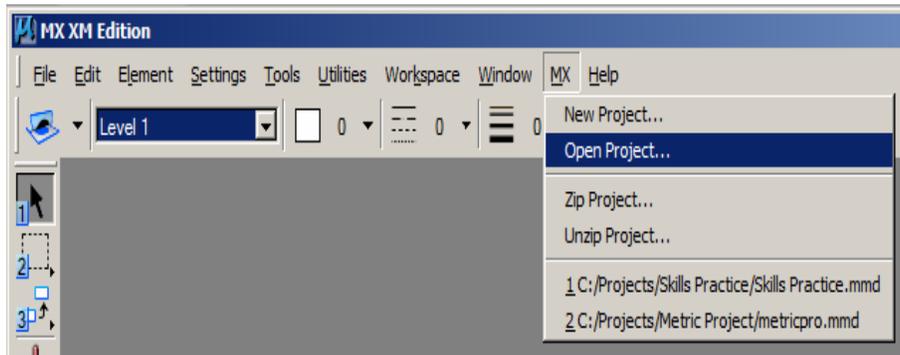
With the MicroStation menu active, select **MX -> MX menu**.

As with the prior releases of MX, the full functionality of the MX menu is embedded within the MX dropdown option when the MicroStation menu is active.

Note: The MX in MicroStation project can be closed, other projects can be opened, or the user has the option to return to the same project by: **File -> Close Project**



MicroStation stays open, and you can then open a MX project again by choosing **MX -> Open Project**.



Excercise 2.4.1 : Create a new MX Project

1. Start **MXROAD Suite MicroStation**.
2. If the *Tip of the Day* pops up **left click** on **Ok**.
3. Navigate to the appropriate location. (**C:\Projects\Training\Project Files**)
4. Type in a Project Name. (**9999999_SRXX**) where **XX** is your student number
5. Make sure the **Default Project Settings** are **US_Imperial**. Then **left click** on **Ok**.
Below is an example for Student_01.



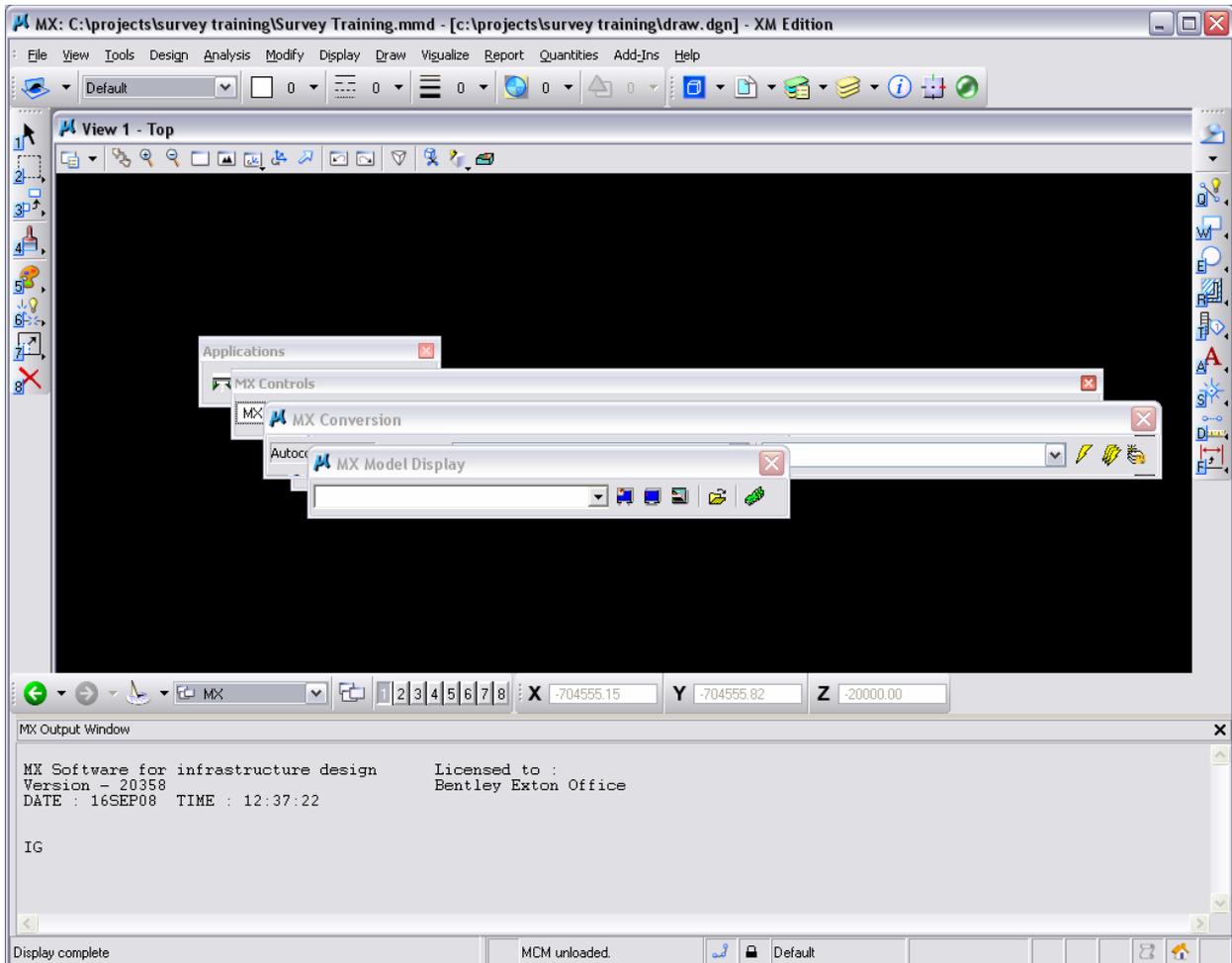
6. *Left click* on *Ok* in the *Information* panel.
7. *Left click* on *Yes* in the *Create Project* panel.
8. *Left click* on *Ok* in the *String Naming Convention* panel.

2.5 Menu Customization

2.5.1 Initial customization

Toolbar placement

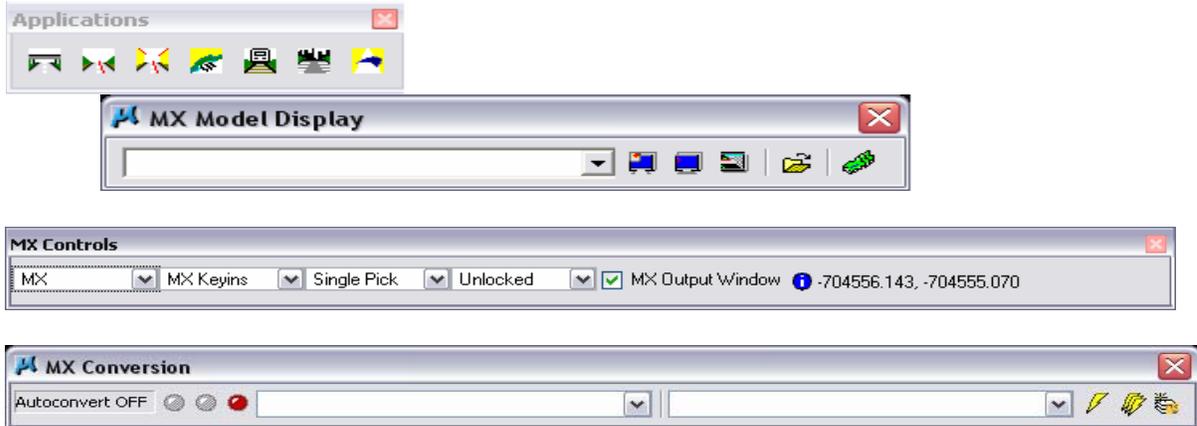
Additional Menu Structure / Toolbars appear when you first enter MX in MicroStation. Several default toolbars appear which can be positioned as desired. All of these tool bars are now Dock able!



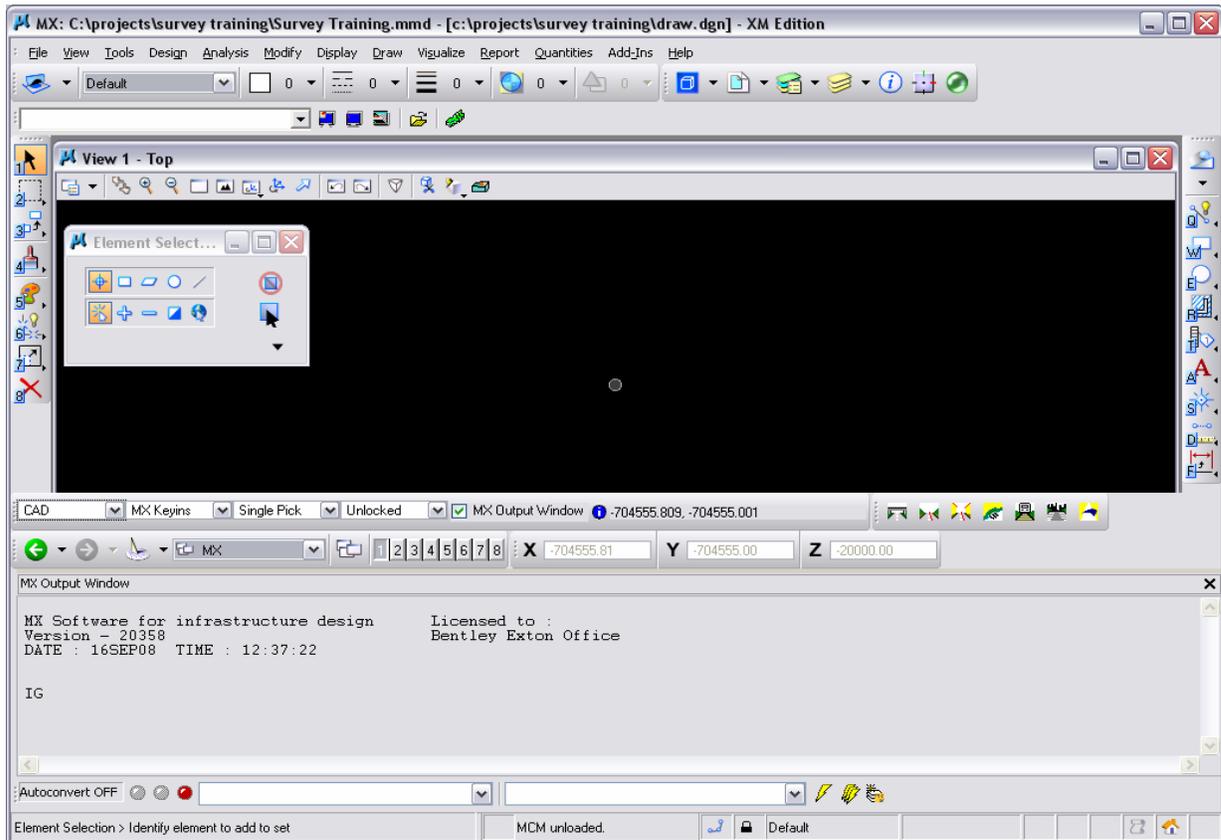
Changes made to the location of toolbars are recorded in each user's user preference file. The preferences are unique to each specific application, (i.e. changes made in MX in MicroStation, do not appear in MicroStation).

Position toolbars as needed:

Toolbars are as follows



A sample arrangement could look like the following:

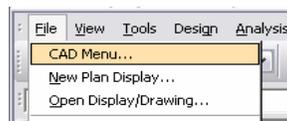


2.5.2 Switching between MX Menus and MicroStation (CAD menu)

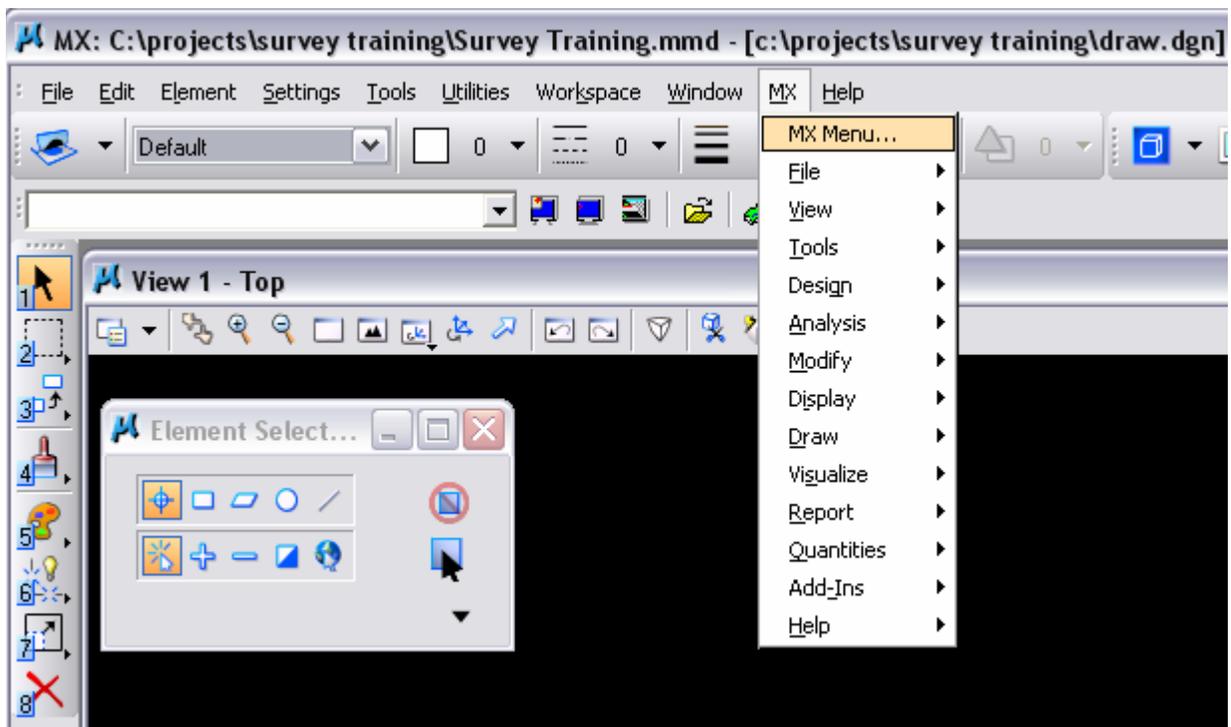
The default arrangement for menus is to have the MX menus across the top of the Application window.



Access to Cad Menus is achieved by selecting **File -> Cad Menu**



Selecting CAD Menu will change the top application options to the following



2.5.3 MX/CAD Focus

With the movement of MX into a MicroStation/PowerDraft based CAD engine, the importance of MX/CAD focus has new meaning. The focus is controlled in this toolbar:



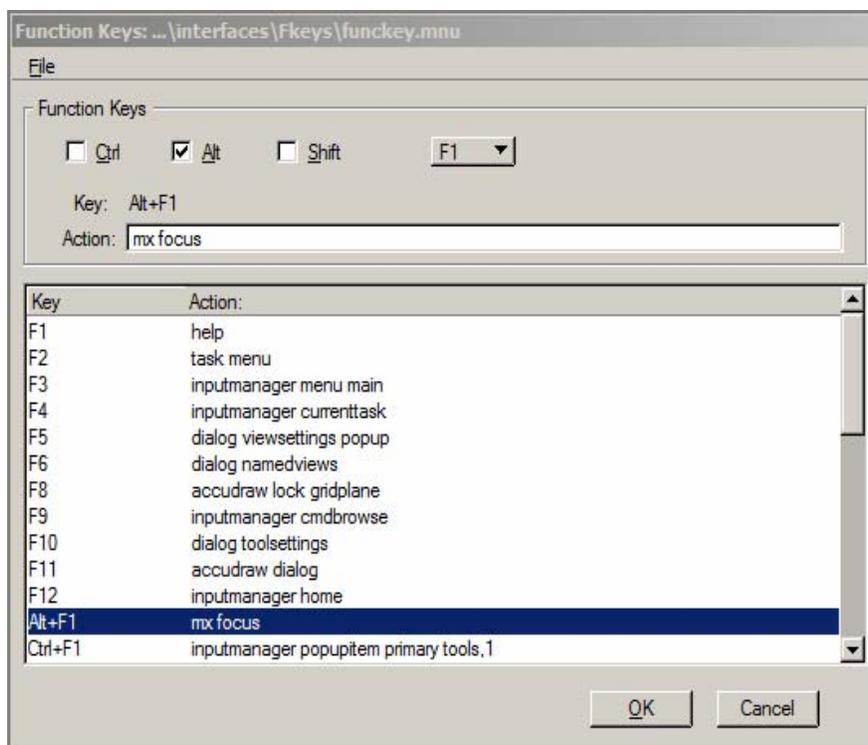
Many shortcut keys and options are controlled by similar combinations in both MX and MicroStation. In order to differentiate between the two functionalities, the MX Controls toolbar has the MX/CAD Focus option in the leftmost drop down.

When performing MicroStation native functions such as referencing, or a save settings (via Ctrl+F shortcut combination) you will need to set the value for this option to CAD, this will allow the full array of function to be available for these items. Selecting MS buttons will change focus to Cad. Generally the same can be said for selection of MX buttons changing focus to MX. MX functions such as running an input file (via Ctrl+I shortcut combination) will require this to be set to MX in order to function. Some MX

commands such as invoking either of the Quick Alignment options will automatically cause the focus to change back to MX.

This is also important when viewing tooltips for various graphic elements. When set to CAD, the item will show its MicroStation native tooltip which includes object type, description and level name. With it set to MX, the tooltip will be the MX standard tooltip which presents information such model name, string name, bearing, etc.

As a suggestion, it's recommended that you setup a MicroStation hotkey combination in order to quickly switch your Focus on the fly. In order to setup this functionality go to the following menu option **CAD Menu -> Workspace -> Function Keys** and create a shortcut key combination as illustrated. The command you will want to append to your combination is "mx focus".



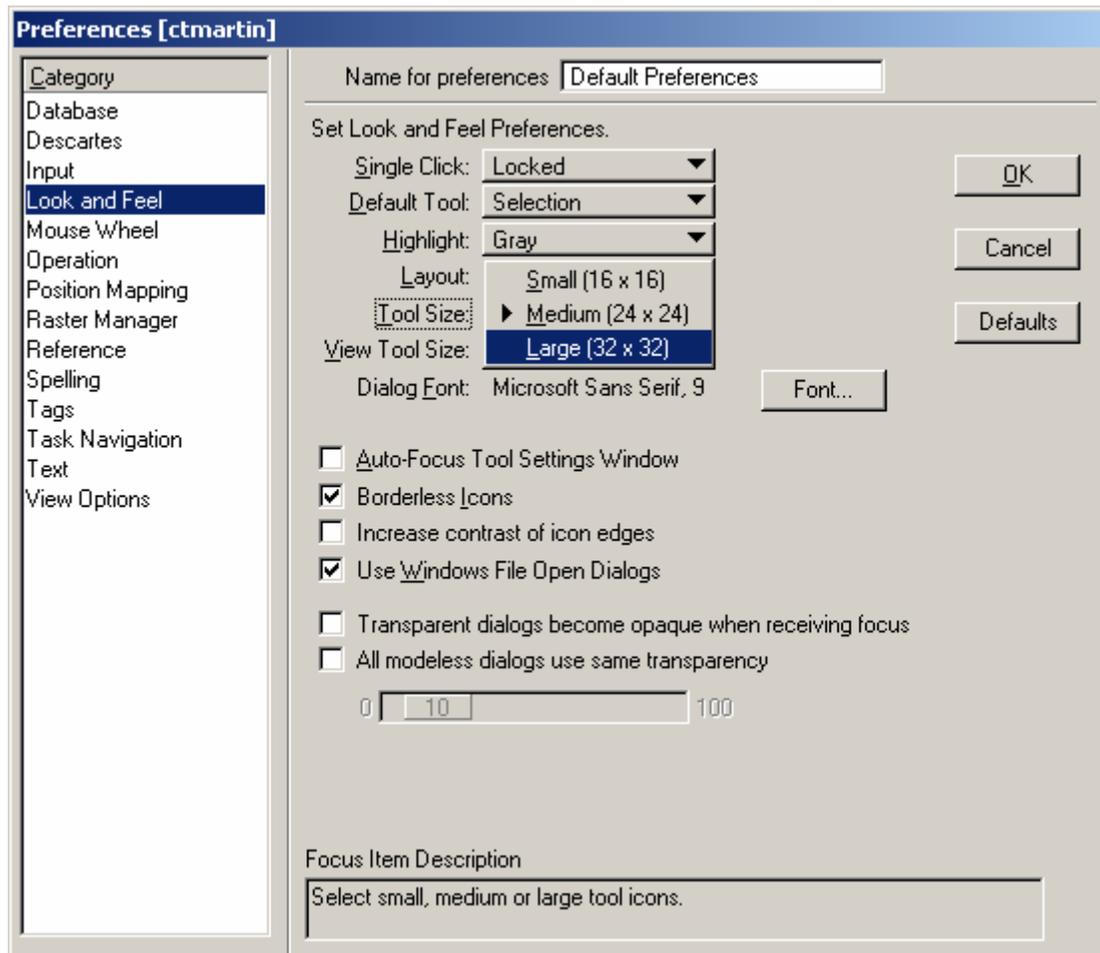
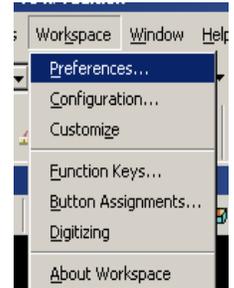
This will allow you to quickly swap focus without having to select the focus dropdown while performing other functions.

It is suggested to use a Function combination that is not already used for other commands, such as the one shown in the illustration above.

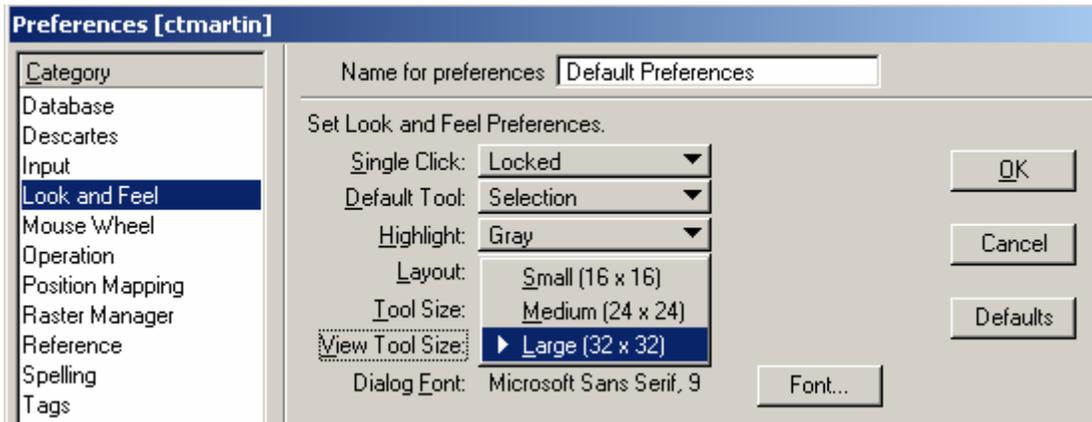
2.5.4 User Preferences

Changes to the general appearance of MX in MicroStation are controlled from *Workspace -> Preferences*.

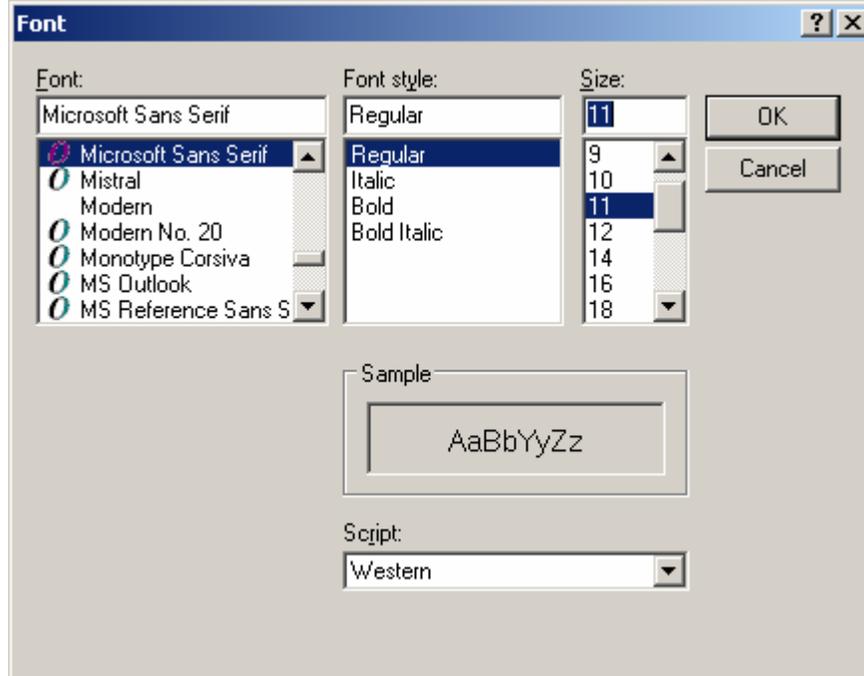
By selecting the look and feel category of Preferences, users may customize the visual aspects of the application. For example: Tool sizes can be adjusted, making icons more visible.



View tool size may also be adjusted



Default Fonts can also be adjusted...(default is size 9)

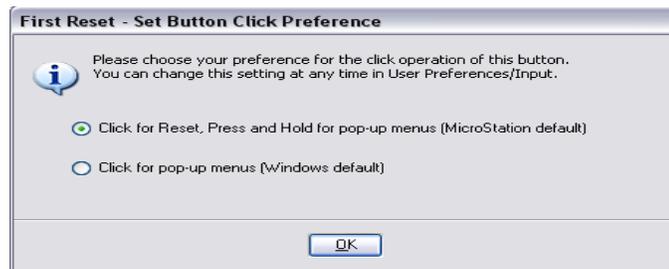


Numerous Other Adjustments can be made as well. Experiment with

1. Borderless Icons
2. Increase contrast of icon edges

2.5.5 Right Click / Reset – Right Press and hold operations

The First time a User Right clicks in MicroStation they will be presented with options about how they would like MicroStation to behave.



We suggest selecting the *(MicroStation Default)*

Similar to most Microsoft windows applications, where right clicking gives users options, MicroStation has been enhanced to provide this functionality.

Numerous options are available by **pressing and holding the Rt mouse button**. The options that display are dependent on the elements that the cursor is over at the time the command is invoked.

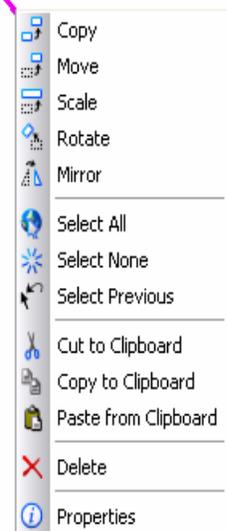
The idea is to give users access to commands without navigating to docked toolbars.

Operations normally accessible from the *manipulate toolbar* are available (ie. Copy, move, etc.)

Rt clicking also gives access to *selection options* (*select all, select none, and select previous*).

Cut, copy, and paste to clipboard would be useful to access the windows copy paste functionality in CAD.

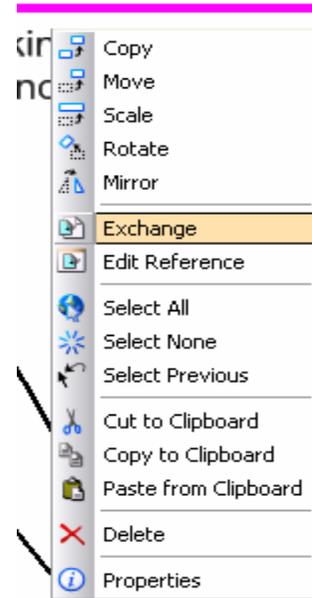
Delete is available as well as *Element Properties*.



When **Rt press hold** is performed over *Reference files*,

By selecting *Exchange* the application will leave the current file and will open the associated reference file.

When the *Edit Reference* is selected, a second MicroStation session will be opened allowing the associated reference file to be edited.



2.6 CAD Menus and Toolbars

2.6.1 Menu Layout

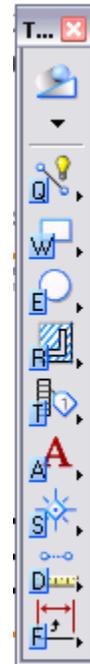
Previously, the main tool frame, located in the upper left had two columns of icons. These have been separated into two distinct areas. The Main tool box, shown below, includes tools for selection, modification, etc, but not related to creation. Creation tools are located elsewhere.

Main Tool
Box



Notice the small numbers in the lower left corner of each icon. These are known as Positional Aids

Task
Navigation



Task Navigation toolbar is including all of the tools related to creation (ie. Lines, blocks, text, dimensions, etc.).

2.6.2 Task Navigation

Task Navigation is simply a logical grouping of tools. Rather than having numerous toolbars in various locations, a task is a collection of the tools you need all on one toolbar for a given task.

Task Navigation can be displayed horizontally as well as the default vertical. As with other tool bars in MicroStation, tools can be stretched and reoriented. The default placement for this toolbar is on the right side of the MicroStation window displayed vertically.

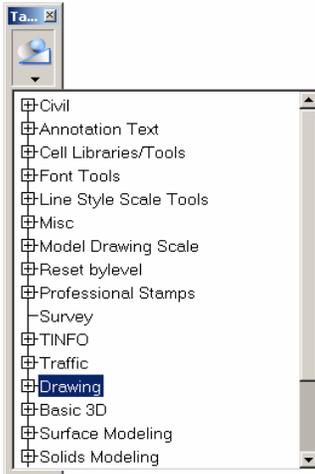
Note: Tasks icons have Letters in the lower left corner.



The **task list icon** allows users to select the appropriate task.



The default tasks are *drawing* and *drawing composition*. Since some tasks require the same tools, tasks can include some of the same tools.

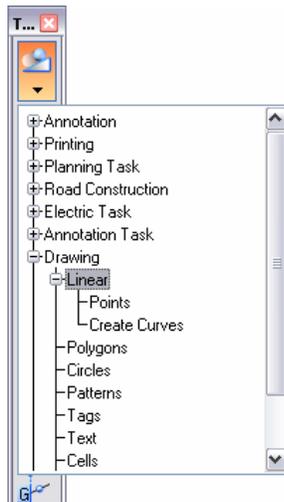


<PgUp> : will go to the next task in the task list

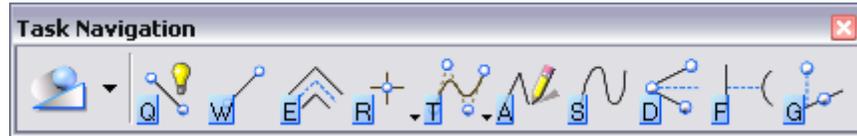
<PgDown> : will go to the previous task in the task list

The task list can be expanded where the plus symbols exist.

Certain tasks are subs to other tasks as illustrated below.

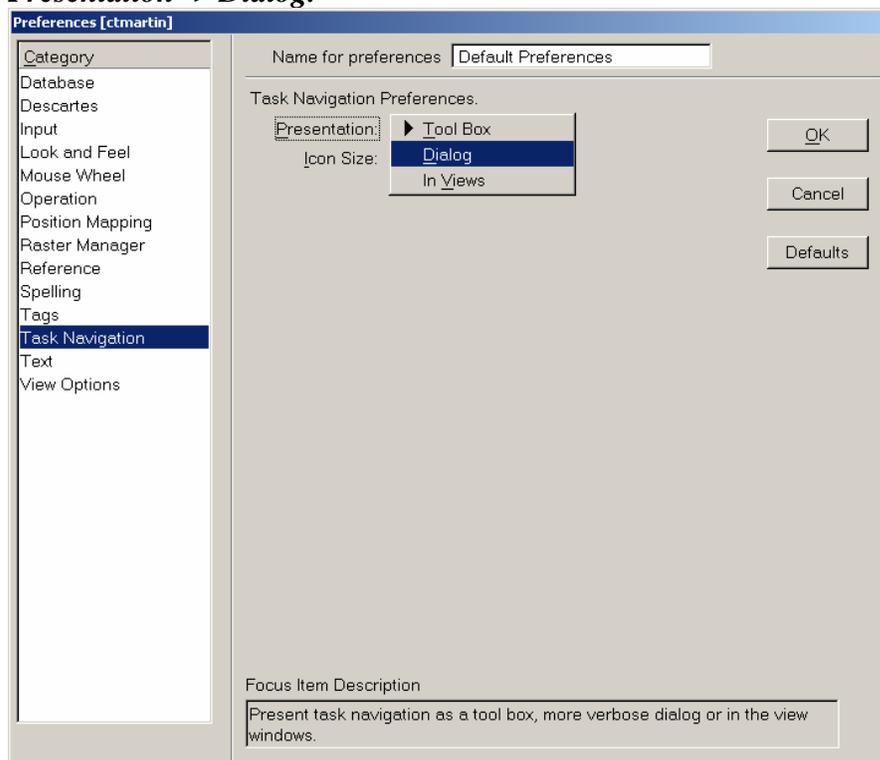


The resulting toolbar would look as follows.

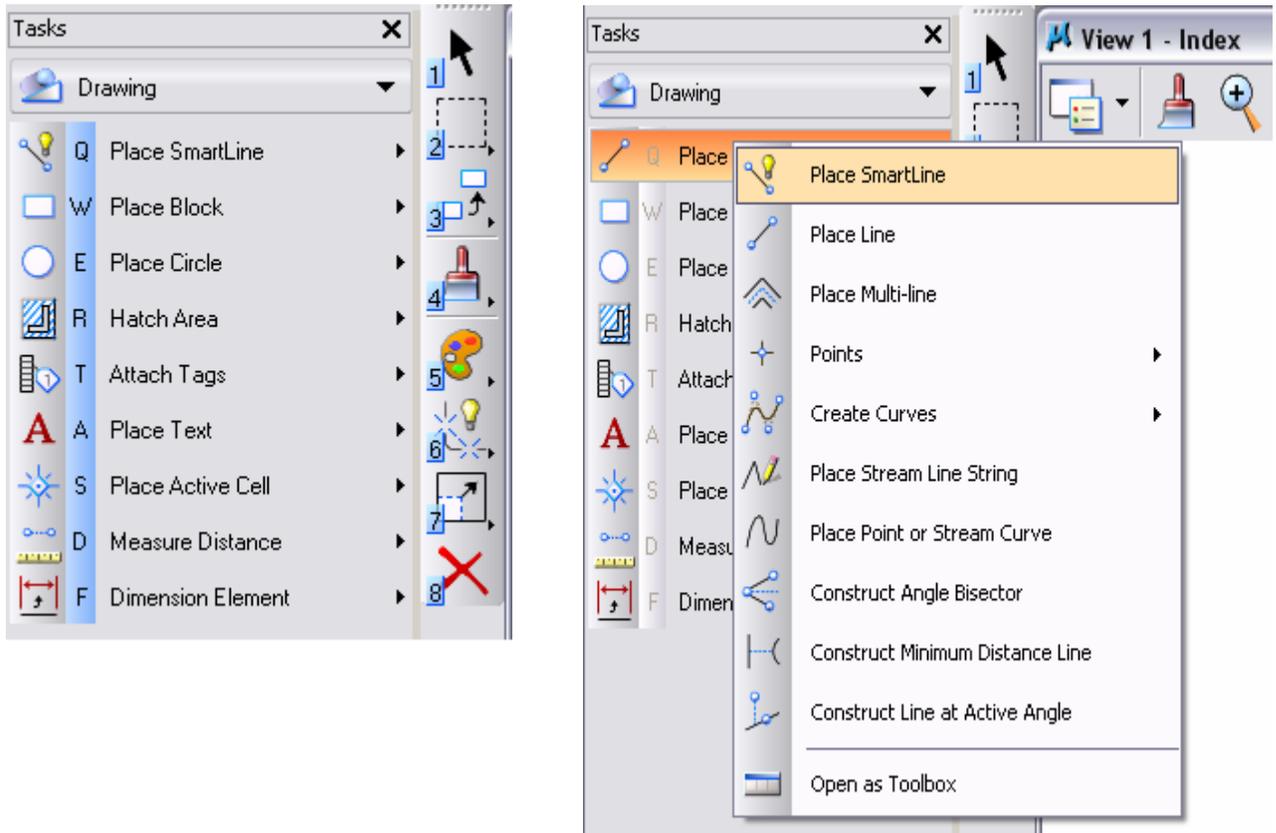


Hint: Simplification of Tasks can be achieved by changing how tasks are displayed in the user preferences. Users who are new to MicroStation and or PowerDraft may not know what an icon is indicating. This modified view shows the icons in conjunction with text describing the tools.

To implement this change, users should select from the Cad menu. **Workspace -> Preferences -> Category -> Task Navigation -> Task Navigation Preferences - Presentation -> Dialog.**



Resulting Task Navigation dialog,



Sub items can select when the *expand arrow* exists.

Open as toolbox allows users to work as with previous versions of MicroStation.

2.6.3 Positional keyboard Mapping

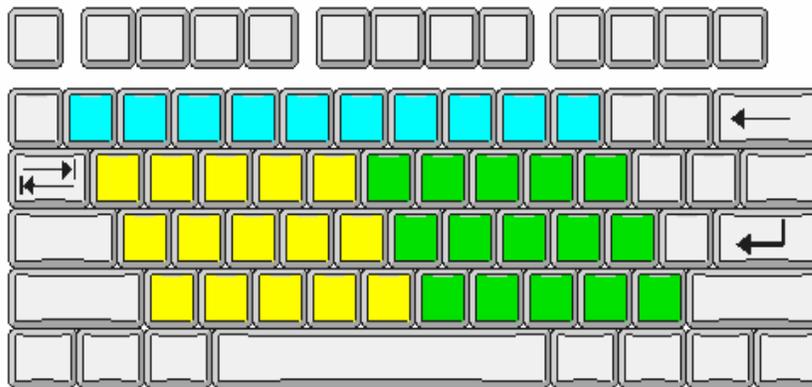
Positional mapping allows users to access commands by selecting the items from the Keyboard. The keyboard is divided into zones to group access to commands.



Position Mapping

Positional keyboard navigation is a technique to map user-defined zones of the keyboard to logical collections of interface items. This technique lets you use the keyboard to select tools, open dialogs, and change settings.

-  These Keys are mapped to the Main toolbar.
-  These keys are mapped to the task toolbar.
-  These keys are mapped to tool settings.



2.6.4 Dialog Focus

MicroStation manages the inputs from users for positional mapping by managing the focus (or part of MicroStation you are currently interacting with) Feedback is provided to the user on the MS status bar in the lower right. Focus is indicated with the following icons:



Home focus, tool settings window, Key-in, AccuDraw

When at home focus the keyboard key selected corresponds to the tool selected. Home focus also allows tools to be changed. To return to home focus Press **Esc**
When placing an element, focus may move to tool settings (as settings are changed), to AccuDraw (as precision input is provided) during placement, and then to home.

Access Tools in the Main Toolbox with Positional mapping.

With focus at home, pressing a number will access the main tool box. For Example selecting 3 will open a menu at the current cursor location listing the manipulate tools. Pressing a second number, let say 1 will access copy. Remember Esc returns dialog focus to home.

Some examples of the sequence would be

Esc -> 3 ->3	Scale
Esc -> 7 ->1	Modify element
Esc -> 4 ->4	Window Area

Access Tools in Task Navigation with Positional mapping.

With focus at home, pressing a letter will access the task toolbox. For Example selecting Q will open a menu at the current cursor location listing the tools. Pressing a second entry, let say 2 will access Place line. Remember Esc returns dialog focus to home.

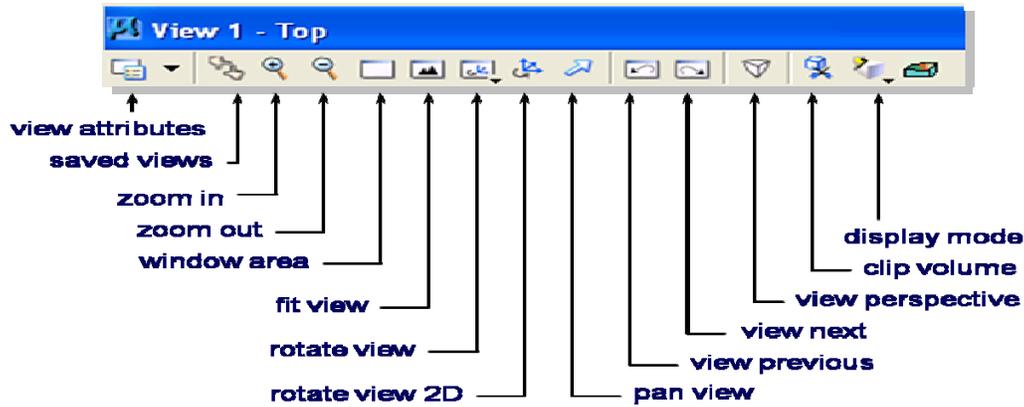
Some examples of the sequence would be

Esc -> Q ->1	Place Smart line
Esc -> A ->1	Place Text
Esc -> D ->5	Measure Area

Tips: <space> Switches focus to AccuDraw

2.6.5 View toolbar

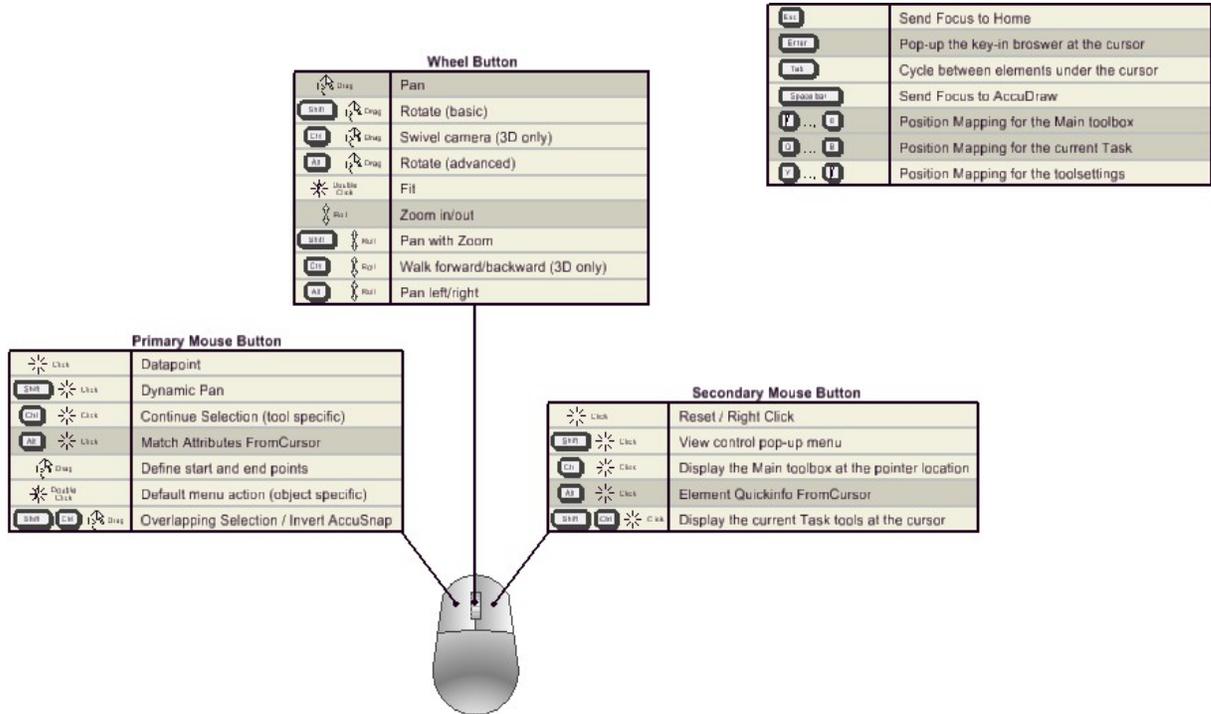
The view toolbar has been repositioned at the top left of the View window. The default view toolbar for 3D drawings has the following icons.



1. View Attributes. Used to select, control and change the type of elements and graphic attributes in the information displayed in the view.
2. Saved Views. Used to name, save, delete, import, apply and recall saved views. Saving a view allows you to quickly recall a view with specific attribute settings.
3. Zoom In. Increase the magnification of a view.
4. Zoom Out. Decrease the magnification of a view.
5. Window Area. Use to magnify an area of the display, in the selected view.
6. Fit View. Used to fit the entire display in a view. Further specific options are available:
7. View Rotation. Used to rotate the display in a view. Select from Top View or one of the other nine variations of rotation available from the fly-out tool bar.
8. Rotate View 2D. Use to rotate or maneuver a display in a progressive and dynamic way, within a view.
9. Pan view. Used to move (pan) the display without changing the view magnification. Move the display under the cursor by holding the left mouse button down and moving the cursor around the screen.
10. View Previous. Cancels the last view control operation and returns you to the previous view.
11. View Next. Applies the last undone view control operation.
12. Clip Volume. Clips a view so no elements outside a defined boundary are visible.
13. View Attributes. Used to select, control and change the type of elements and graphic attributes in the information displayed in the view.
14. Change View Perspective. Change the perspective angle of a 3D view.
15. Model Navigator. This tool allows you to review a wireframe or rendered surface and dynamically manipulate the relationship of the camera and the model being viewed.

2.6.6 Mouse Operations

Mouse functionality has been slightly modified and enhanced. The graphic below illustrates current default setting. Changes to defaults are discouraged.



Changes to note: Tentative snapping requires a simultaneous left and right mouse click.

Additions: Double middle click (wheel) performs Fit View

Press and hold middle is pan



Shift Lt is Dynamic pan

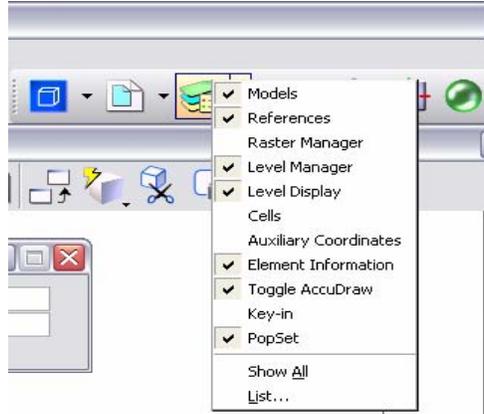


Roll wheel forward and back is zoom in and out

2.6.7 Missing buttons and Toolbars

Right Click to customize the menu Icons displayed

Rt click on nearly every menu allows the user to select which icons are included.



Select by **left clicking** on items to add or remove items. Only items with checks will be displayed.

The *standard toolbar*



Have you been looking for this toolbar? It is off by default.

To active it select **CAD Menu -> Tools -> Standard**

2.6.8 Button Bar

Using the Button Bar to constantly monitor or change snaps will help users to properly utilize CAD snaps at all times. This is especially beneficial when used in conjunction with AccuSnap. **CAD Menu -> Settings Snaps -> Button Bar**



2.6.9 Save Settings

Retaining changes to Menus

Changes made to customize toolbar layouts and other Menu changes can be retained from one user session to the next by Saving Settings

Access save setting from the **CAD menu -> File -> Save Settings**

Alternately, **CTRL -> F**

2.7 Seed Files

When you create a project in MX XM most of the seed files will be automatically set-up. Take a few minutes to verify they were properly set-up as follows:

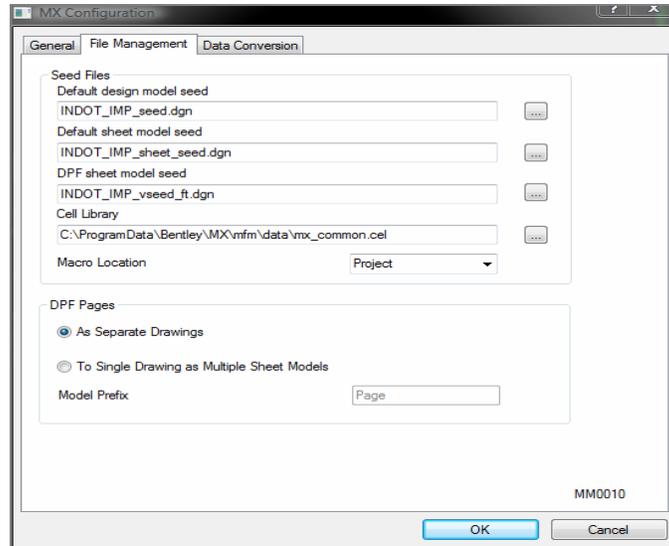
Make certain you have the **correct seed files**, which for **DPW** creation at INDOT using Imperial units are **INDOT_IMP_seed.dgn** which you will notice has a black background, and the seed to be used for the creation of **DPF**s is **INDOT_IMP_vseed_ft.dgn** which has a white background to represent a sheet.

The metric seeds to be used are **INDOT_MET_seed.dgn** which you will notice has a black background for the **DPW** creation and **INDOT_MET_vseed_m.dgn** which has a white background to represent a sheet for the **DPF**s.

A new addition to the seed file selection is Default Sheet Model seed, which are used as the default seed for new .dgn files for drawing pages. The files needed are **INDOT_IMP_sheet_seed.dgn** and **INDOT_MET_sheet_seed.dgn** respectively.

Use of any other seed files is likely to lead to unpredictable results. Previously selecting the .cel library file was important; however this is no longer relevant.

You can check the seed file at any stage in MX in MicroStation by using:
View -> Configuration and clicking on the **File Management** tab.

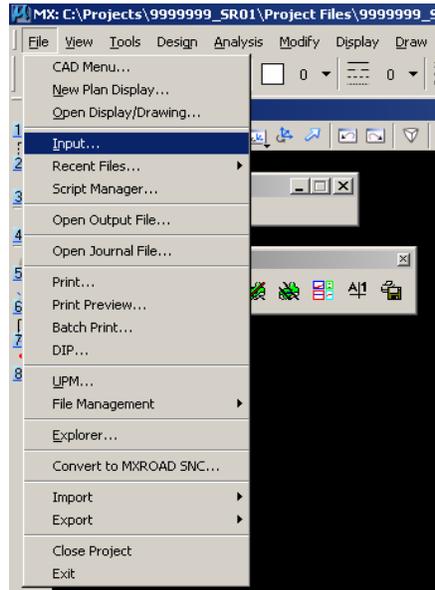


Click **OK** to accept.

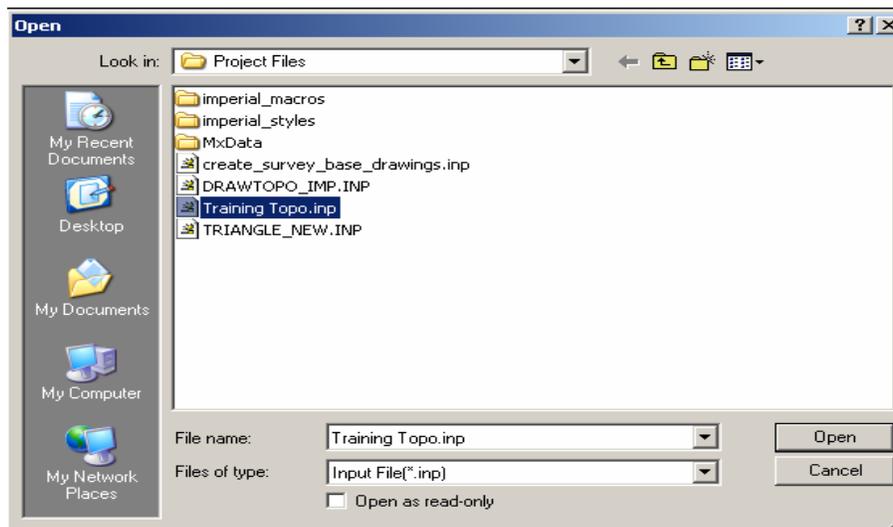
2.8 Running Input Files

Running an Input File is virtually the same as in the 2004 version of MX. The main difference is that you will be using MicroStation to modify any final drawings.

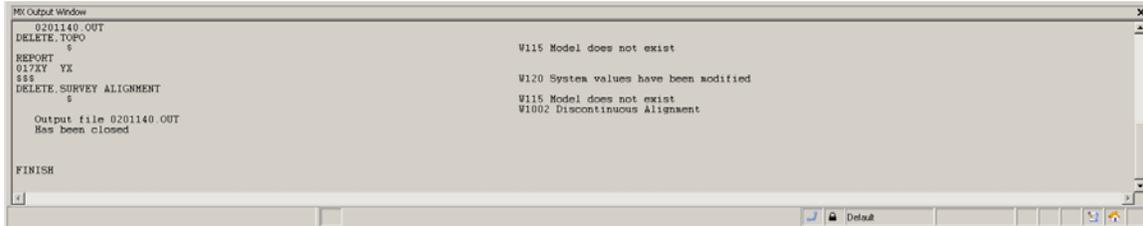
To process an input file select **File -> Input** the top left of the MX MicroStation Display.



Then navigate to and select the desired input file and click on the **Open** button.

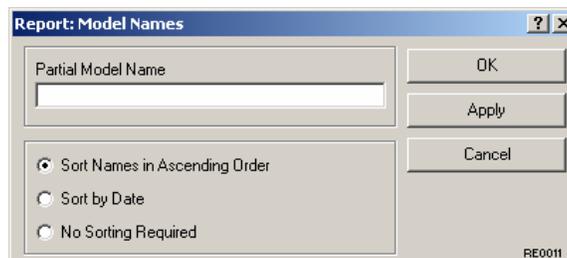


Once the input file is processed, a finish statement will be displayed in the MX Output Window.



Excercise 2.8.1 : Running Topo & Corner Input Files

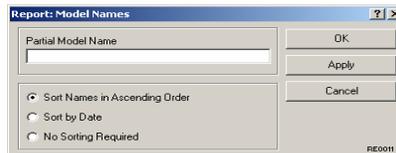
1. Select **File -> Input** from the MX File menu in the upper left.
2. Navigate to the Training project folder on your computer. It is located in the following location: **C:\Projects\Training\Project Files**.
3. Choose the **Training Topo.inp** file from the list.
4. Click on the **Open** button.
5. Verify that the finish statement is displayed at the bottom of the MX Output Window.
6. Select **Report -> Standard Reports -> Model Names** from the upper right of the MX display.
7. Click the **OK** button at the Report:Model Names pop-up menu to display all model names.



8. Review the list of Model Names in the MX Output Window to ensure that the Models **Topo**, and **Survey Alignment** were created.
9. Repeat steps 1 thru 8 for the **Training Corner.inp** file. Make sure that the Model **Corner** has been added.

Excercise 2.8.2 : Running Triangulation Input File

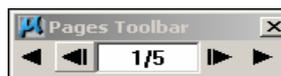
1. Select **File -> Input** from the MX File menu in the upper left.
2. Navigate to the Training project folder on your computer. It is located in the following location: **C:\Projects\Training\Project Files**.
3. Choose the **TRIANGLE_NEW.inp** file from the list. (See Appendix D for an ascii print-out of the input file)
4. Click on the **Open** button.
5. Verify that the finish statement is displayed at the bottom of the MX Output Window.
6. Select **Report->Standard Reports>Model Names** from the upper right of the MX display.
7. Click the **OK** button at the Report:Model Names menu to display all model names.



8. Review the list of Model Names in the **MX Output Window** to ensure that the Models **EXCONT**, and **TOPOTRIA** were added.

Excercise 2.8.3 : Running Cross Section Input File

1. Select **File -> Input** from the MX File menu in the upper left.
2. Navigate to the Training project folder on your computer. It is located in the following location: **C:\Projects\Training\Project Files**.
3. Choose the **Sections.inp** file from the list. (See Appendix E for an ascii print-out of the input file)
4. Click on the **Open** button.
5. When the input file is complete you can page through the Cross Sections using the **Pages Toolbar**. Note that there is a dgn file created for each page of Cross Sections. The MC02 alignment used in the exercise created 5 pages so there will be 5 dgn files.



2.9 **Creating Survey Base Drawings**

Once the topo, corner, and triangulation input files have been processed, you are ready to create the survey base drawings. In order to create the base drawings, an input file will be processed that creates the drawings automatically at the desired scales. The base drawings created are:

- Survey Alignment.dgn
- Survey Section Corner.dgn
- Survey Contours.dgn
- Survey Topography.dgn
- Survey Triangulation.dgn
- Survey RP Topography.dgn
- Survey RoutePlat All.dgn

Excercise 2.9.1 : Running Create Survey Base Drawings Input File

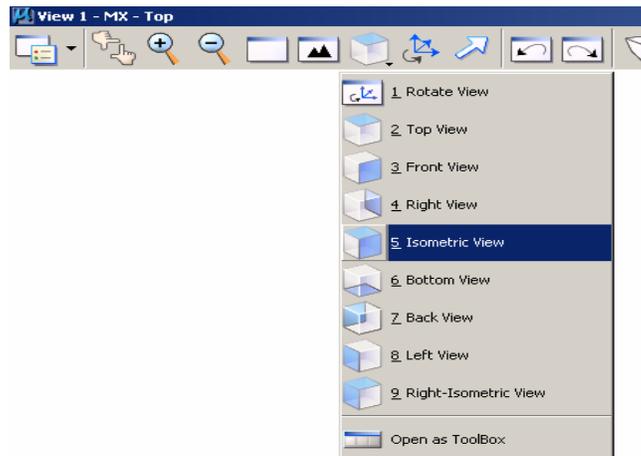
1. Select **File -> Input** from the MX File menu in the upper left.
2. Navigate to the Training project folder on your computer. It is located in the following location: *C:\Projects\Training\Project Files*.
3. Choose the ***create_survey_base_drawings.inp*** file from the list. (See Appendix F for an ascii print-out of the input file)
4. Click on the ***Open*** button.
5. Verify that the finish statement is displayed at the bottom of the MX Output Window.
6. Use the ***Open Display\Drawing*** option from the MX File menu in the upper left to open each of the new files listed above and look at their contents.
7. When you are done looking at the files open the ***Survey with references.dgn*** located at *C:\Projects\Training\Project Files*.

Note: The size of the cells in the *Survey Routeplat All*, *Survey rp topography*, *survey section corner*, and *survey topography* dgn files will need to be scaled up using the annotation scale tool in MicroStation. This will be covered in Chapter 3 of this manual. This will be the case for any drawings created using a style set in MX XM.

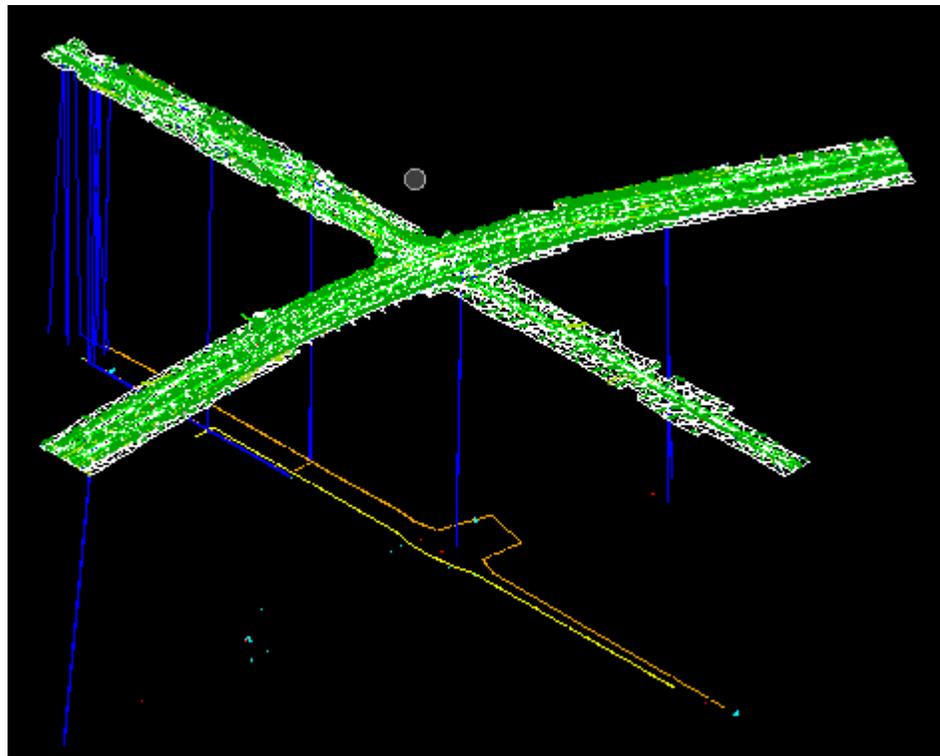
2.10 Rotate Drawings 3D

The View toolbar (located in the upper left of the view window) gives us access to rotate 3D drawings to any one of 9 predefined Views.

Isometric Views and Right Isometric View are the most useful to rotate quickly to a 3D orientation. Option number 1 – Rotate View allows dynamic view rotation.

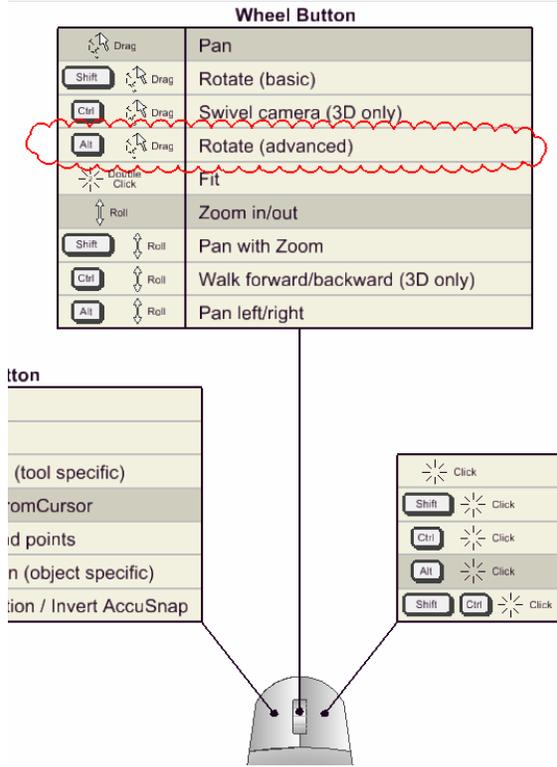


Results will be similar to below.



Note: Alternately access to 3D rotation can be obtained from mouse functions. This involves the Alt-Middle dynamic rotation. This is also the same as Option 1 Rotate View - dynamically

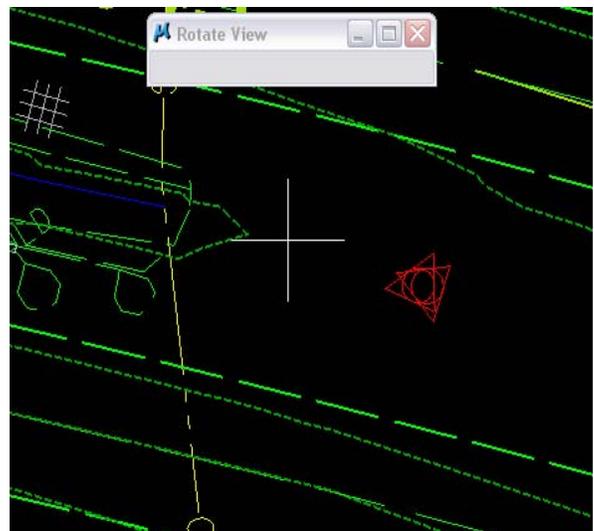
Alt & Middle click

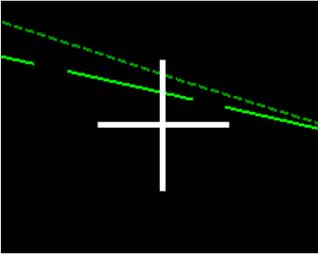


The Drawing View will have a crosshair placed in the drawing. This is automatically placed at the center of the graphical elements in the drawings.

Any subsequent rotation will be about this point unless you dictate otherwise. “This is rarely the desired location.”

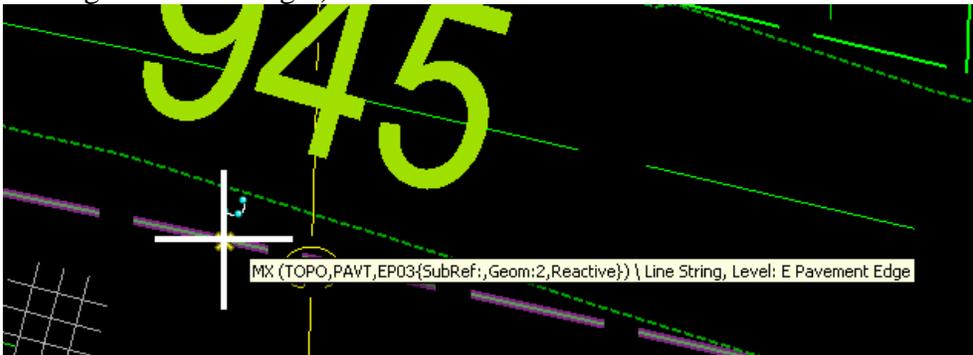
The rotation origin can be modified by tentatively snapping to the desired location (left right chord) or by graphically dragging the cursor to a new location. When the cursor is moved over the crosshairs they become highlighted as shown.



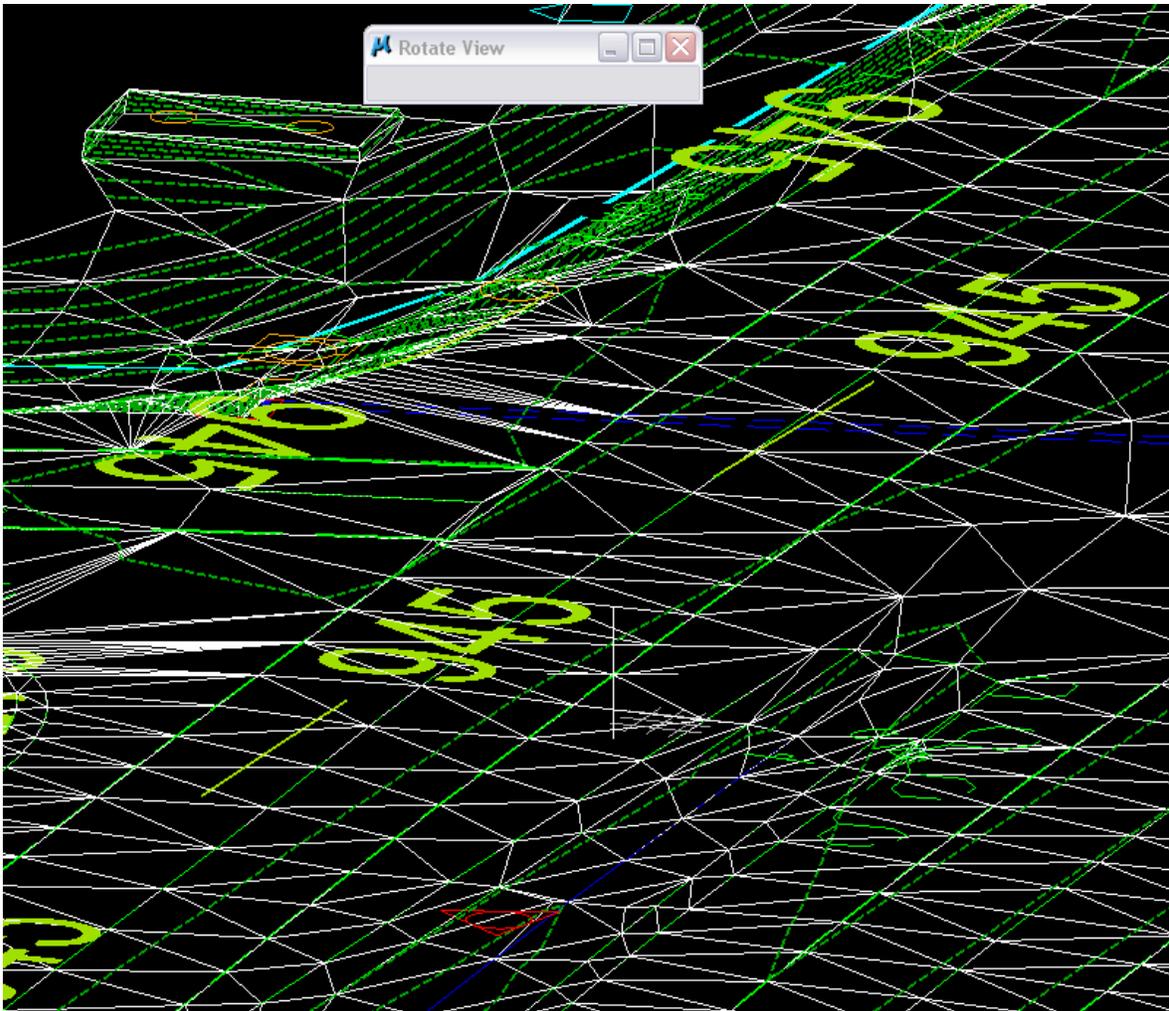


Press and hold the left mouse to graphically drag to a new rotation origin. AccuSnap is particularly useful in this operation. When the left button is released, so is the cursor at the new location.

Subsequent **left mouse dragging** will dynamically rotate the drawing (make sure you are no longer over the origin).



Results of left drag with triangulation displayed as reference.

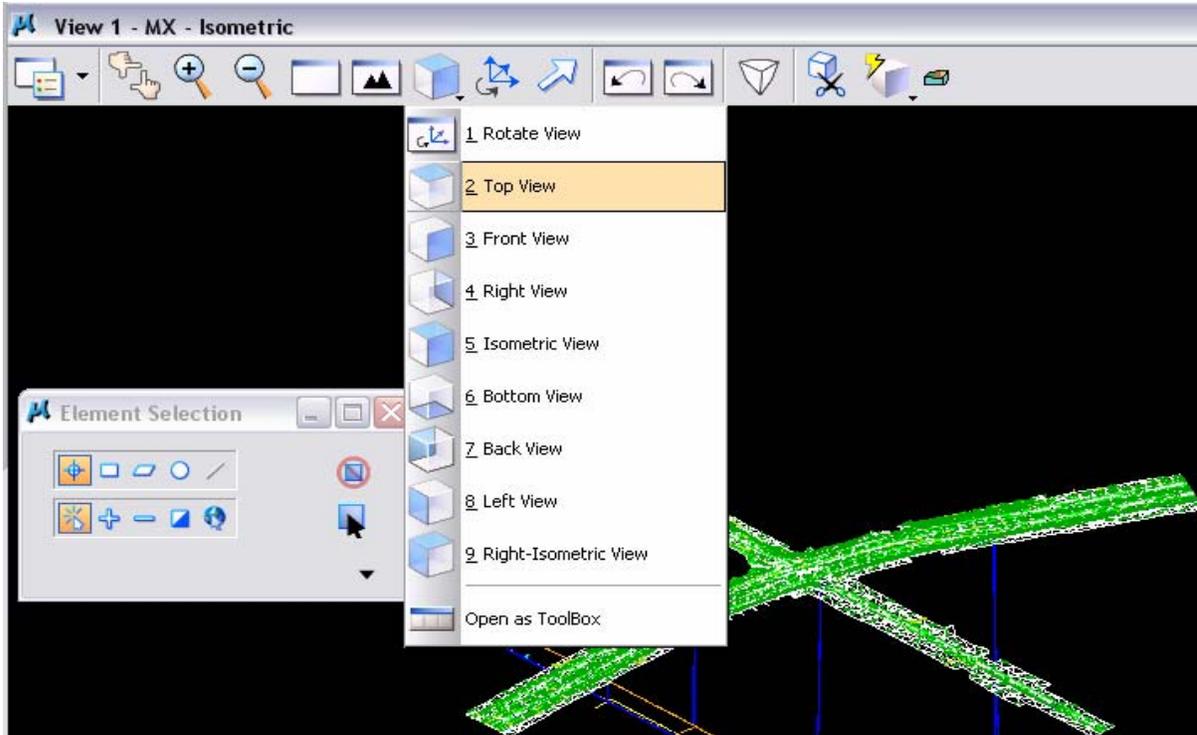


Note: Subsequent panning and additional Dynamic rotation will change the perspective, allowing us to see any portion of the project from any angle

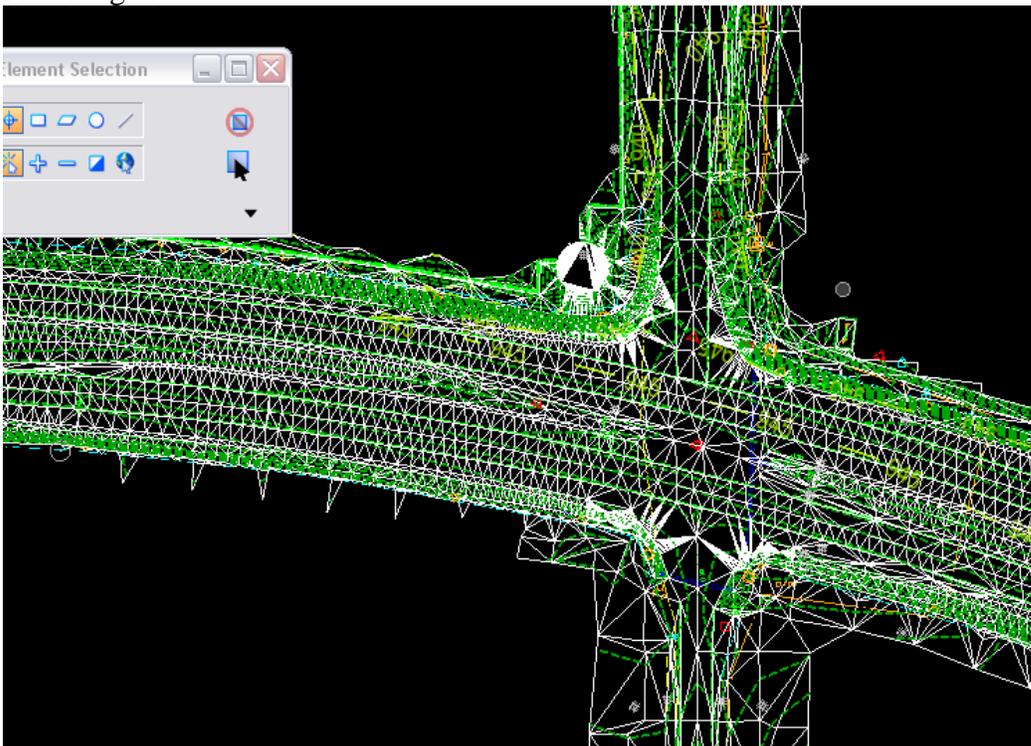
Returning to Plan View

In CAD the normal Plan View as we are accustomed to describing it, is referred to as Top View.

Simply select the icon to the right of Fit view.

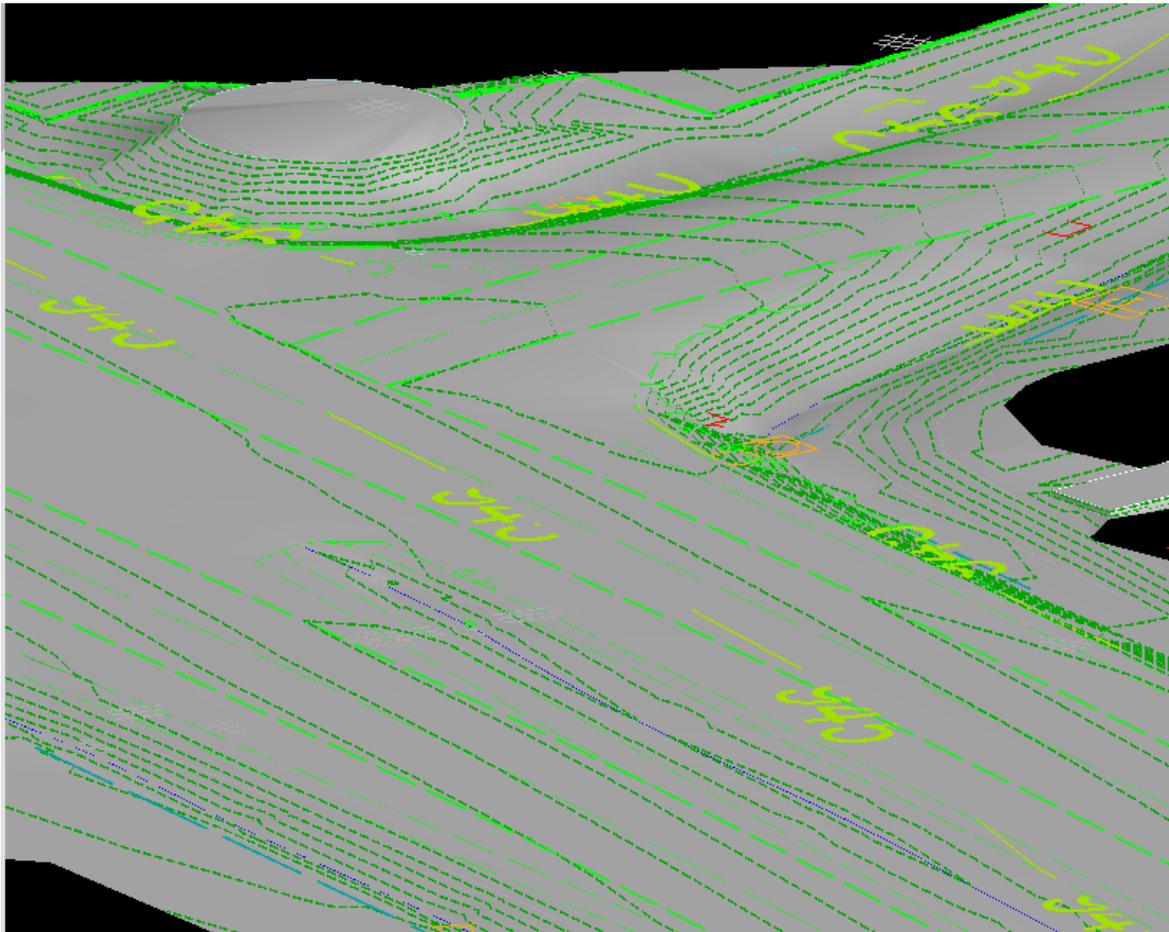
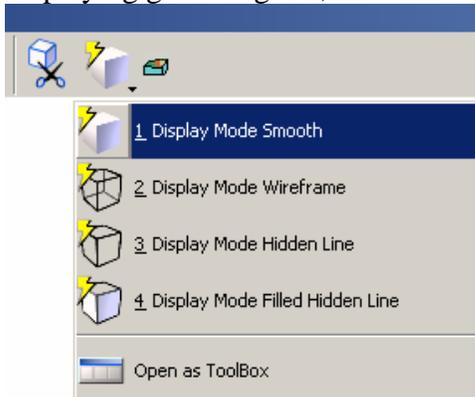


Resulting view

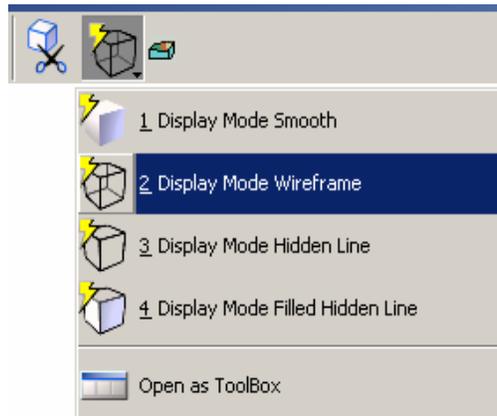


2.11 Shading Triangulation Surfaces

In order to fill in triangulation surfaces we will simply select *Display Mode Smooth*. This will give us the same functionality as MX in Windows. Additional Rendering functions (such as material assignments) are available. Material assignments provides for displaying grass as grass, etc.



To return to Non Shade views we will select *Display Mode WireFrame*

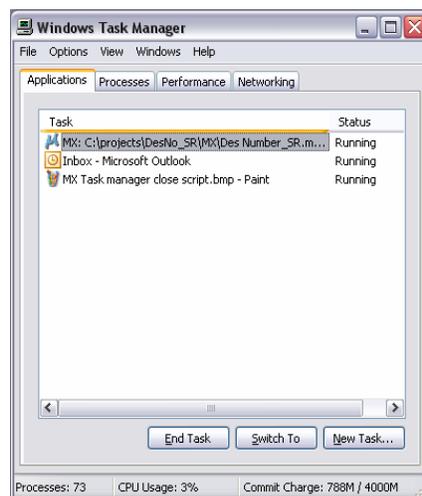


2.12 Ending your MX Session

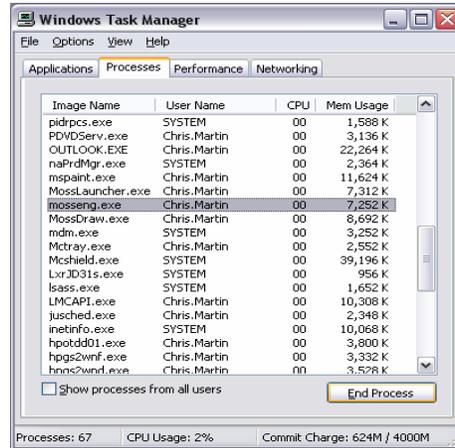
When finished working with MX, it's recommended that you first close your project by selecting **File -> Close Project**, followed up by exiting MXROADMAX MicroStation by selecting **File -> Exit**. If you choose to exit by selecting **File -> Exit** without first closing the project you may encounter a Bentley Software error report. Cancel out of the error report and any other messages that follow.

2.13 Closing MX manually

If MX stops functioning, you will need to stop the session manually. You may do this via the following steps. When MX freezes up, the first thing to do is bring up the Windows task manager by clicking the right mouse button on the Windows Taskbar and selecting Task Manager with a left mouse click.



The first item to stop will be the MX option highlighted in the Applications Tab. To do this, left click on the MX option to select it, then left click on the End Task button.



The second item to be stopped is the Mosseng.exe on the processes tab; this will halt the MX engine and stop any additional MX functions that do not stop properly. Select the moss application by left clicking on it, then left click on the End Process button.

Chapter 3 -Route Plat Sheet Creation

Now that the survey base drawings are complete you will need to create the Route Plat. For the route plat creation in this class we will use MicroStation XM. Note that the Route Plat creation steps in this section may be in a different order than you are accustomed too. If you prefer to change the order on projects in your office that's fine but please follow the steps outlined herein for the training session as it will make things easier for everyone.



The easiest way to open a dgn file in MicroStation XM is using the MicroStation V8 XM Edition icon on your desktop. Double left click on the icon and then navigate to the desired dgn file location to select and open the file.

Note:

Another easy way to open the dgn file is to have the Windows Explorer open and navigate to the folder containing the dgn file you want to open. Then left click on the filename and drag it onto the MicroStation V8 XM Edition icon on your desktop. This will automatically open the selected file in a MicroStation session.

Note:

If you double left click on the dgn file in the Windows Explorer to open it the default will be to open the file using MicroStation Powerdraft v8 XM. This is a slightly toned down version of MicroStation v8 XM with the only notable difference being advanced 3D rendering. However it will not open with the same customized toolbar settings as MicroStation v8 XM.

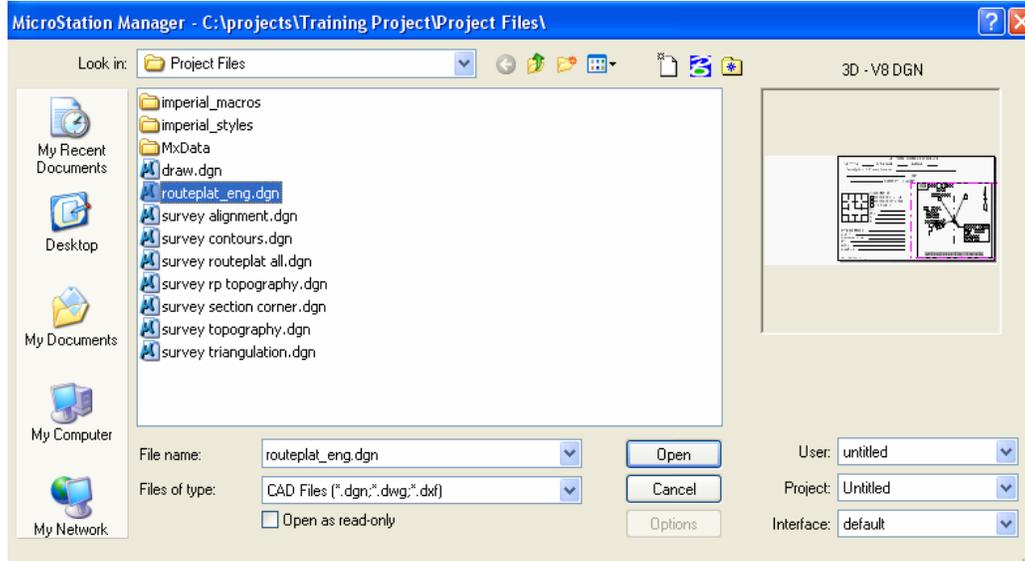
3.1 The Route Plat MicroStation File

The template route plat dgn file, routeplat_eng.dgn or routeplat_met.dgn, is stored in the Project Files directory of your project folder.

Open the dgn file by first **double left clicking** on the *MicroStation V8 XM Edition icon* on your desktop. When the *ProjectWise Log in* prompt appears, left click on **Cancel**.



Navigate to the location of your routeplat_eng.dgn file. (*C:\projects\Trainings\Project Files\routeplat_eng.dgn*) **Left click** on the file name to select it and then **left click** on **Open**.

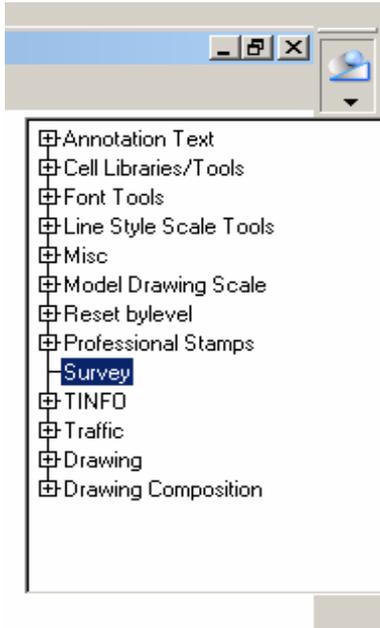


3.2 What's New in MicroStation XM

Once you open the dgn file, you will notice the MicroStation XM display looks very similar to that of MicroStation v8 2004. There are some differences in the functionality, and this section goes through those that apply to the survey workspace.

3.2.1 Tasks

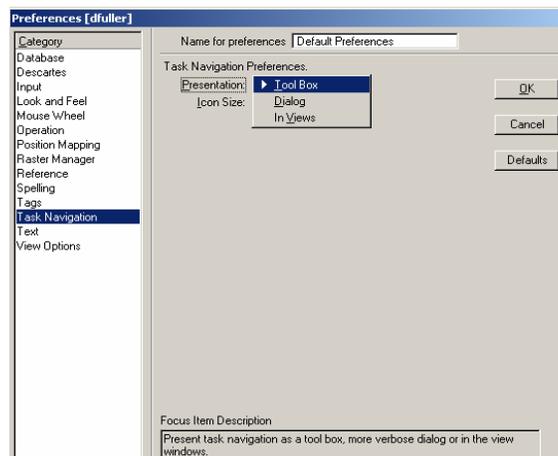
The most obvious change within MicroStation is the location of the INDOT tools which have been migrated from the INDOT pull down to the Task Navigation tool box which is new to MicroStation V8 XM.



All of the options above the “Drawing” option are INDOT’s customized tools. The following are two Tasks that will be useful to the survey workspace, and their associated functions.

- ❖ Professional Stamps
 - Professional Stamps
- ❖ Survey
 - Place Line
 - Survey Cells
 - Place Text
 - Place Note

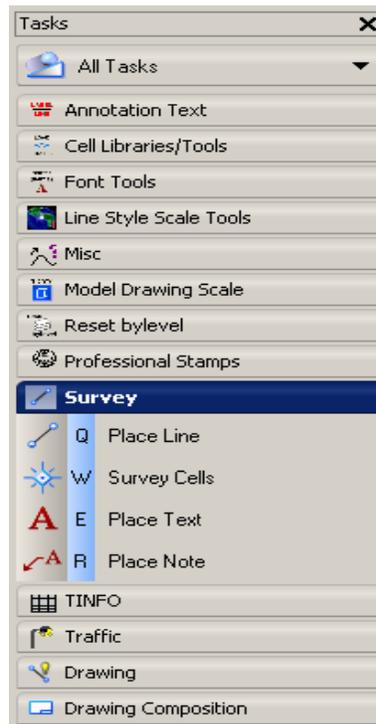
The Task Navigator can be set-up as a tool box or a dialog. To change between the modes select **Workspace->Preferences->Task Navigation** and set the Presentation to either Tool Box or Dialog.



If you choose the tool box mode, the Task Navigator will be located on the right edge of the display.

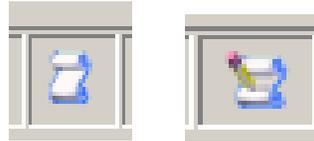


If you choose the dialog mode, the Task Navigator will be located on the left edge of the display. The dialog gives a description of the task in addition to the icon.



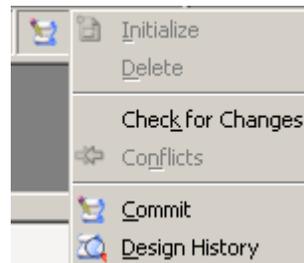
3.2.2 Design History

A new icon in the right portion of the status bar indicates if a file has design history. Design history allows the user to commit their changes and add comments as to the changes made to the drawing file. It also is a log of who has opened the file. The template survey route plat dgn file will have design history initialized. If there are uncommitted changes, a pencil is superimposed on the icon's scroll.

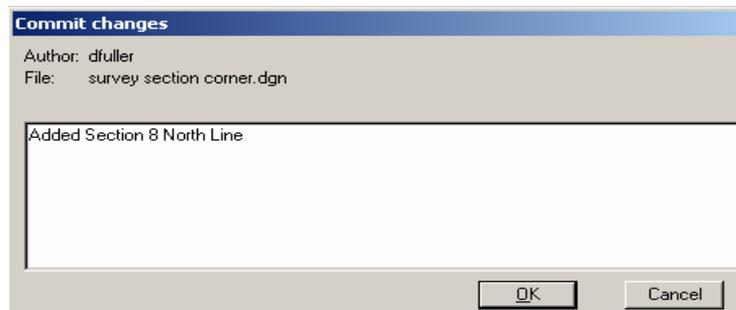


MicroStation automatically stores any changes to the dgn file, but design history allows the user to revert back to a previously committed state of the drawing. For this reason it is recommended that the user periodically commit their changes to design history, at a minimum the end of each day is recommended. The following steps go through the procedure.

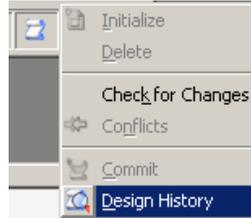
1. **Left click** on the design history scroll and pencil.



2. **Left click on Commit.**
3. **Type a comment** into the Commit Changes Dialog box. The comment should describe the changes you made to the dgn.



4. **Left click on OK.** Your changes and comment will be added to the design history.
5. To view the design history of a file, **Left click on the scroll.**
6. **Left click on Design History**



7. The Design History dialog box will appear. It contains a listing of all the committed changes.

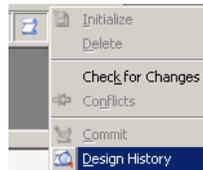
Revision	File	Date	Author	Description	Tags
1.6	survey ...	2008/09/04 10:17	dfuller	Added Section 8 North Line	
1.5	survey ...	2008/08/18 14:06	dfuller		
1.4	survey ...	2008/08/18 14:00	dfuller		
1.3	survey ...	2008/08/18 14:00	dfuller		
1.2	survey ...	2008/01/25 14:07	stjkuhn		
1.1	survey ...	2008/01/25 14:07	stjkuhn	Design History Initialized	

Note:

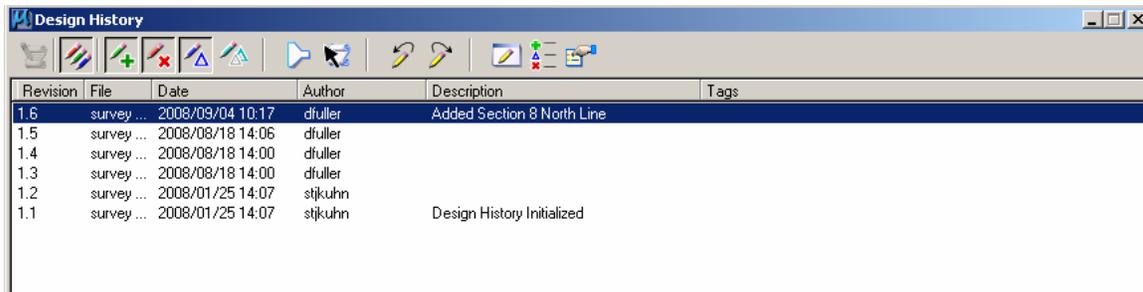
Each time you exit MicroStation it commits the changes to design history but there are no comments. Without the comments it would be difficult to revert back to the desired modified point.

The following steps go through the procedure of reverting back to a previous modification point of the drawing.

1. **Left click on the scroll.**
2. **Left click on Design History.**



- Left Click on one of the committed changes to select it. In the drawing display, the changes are highlighted. Items that were added are green, those deleted are red, and items that were modified are blue.



Revision	File	Date	Author	Description	Tags
1.6	survey ...	2008/09/04 10:17	dfuller	Added Section 8 North Line	
1.5	survey ...	2008/08/18 14:06	dfuller		
1.4	survey ...	2008/08/18 14:00	dfuller		
1.3	survey ...	2008/08/18 14:00	dfuller		
1.2	survey ...	2008/01/25 14:07	stjkuhn		
1.1	survey ...	2008/01/25 14:07	stjkuhn	Design History Initialized	

- If you would like to undo the changes made by that commitment, Left click on the ***Undo selected historic changes*** tab.



Note:

In order to make the ***Undo selected historic changes*** tab active you will need to ***left click*** on the ***Show elements that were modified*** tab first.

- If for some reason you need the changes back you can Left Click on the committed change to select it, then Left click on the ***Redo selected historic changes*** tab.

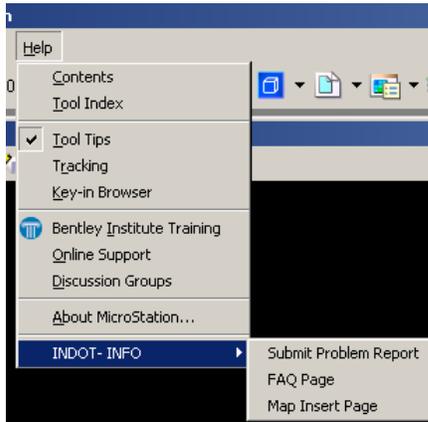


Note:

In order to make the ***Redo selected historic changes*** tab active you will need to ***left click*** on the ***Show elements that were modified*** tab first.

3.2.3 INDOT – INFO

Although the INDOT pull-down menu has been replaced by task based tools, there are three information based menu items that are of interest to users of the INDOT Workspace. Those three items are located in an **INDOT – INFO** menu option that is located under the MicroStation Help Menu pull-down.



Submit Problem Report: Opens an Internet Explorer window with the CAD Support Help Site active.

FAQ Page: Opens an Internet Explorer Window with the FAQ section of the CAD Support Help Site active.

Map Insert Page: Opens an Internet Explorer Window with the GIS MicroStation Map Insert page active.

3.2.4 MicroStation Models

A Model gives you the ability to store multiple independent sets of design data within the same file (INDOT detail). Before V8, all geometry placed in the design file occupied essentially the same design cube, which is why the user had to clip what they referenced in.

A DGN file is composed of models. When you draw or place elements with MicroStation tools, the elements are added to the active model. A model can be either 2D or 3D, and is stored as a discrete object within the DGN file. There are two categories of models: design or sheet. Two subcategories exist for each allowing for “from seed” options as explained below. The user then has the option of creating 4 different types of models.

Model Types

The following definitions and information is paraphrased from Bentley course documentation on models for clarity.

Design models

Design Models consist of design geometry, usually at full scale and in the working units associated with the project. Design models and can be either 2D or 3D. A design model can also be used as a reference or placed as a cell. In MicroStation, you can create an unlimited number of design models in a DGN file.

For example: one Model could hold the plan view of a Bridge deck and a second model could hold the section view of a Bridge deck. This allows each of these views to be referenced in at a different scale on the sheet model.

Design from Seed gives you the option to select a seed file that has different model properties than in the current MicroStation drawing. In all other respects, it is the same as a normal design model. An example of this would be different working units. These models cannot be placed as cells.

Sheet models

The **Sheet Model** is more closely associated with creating traditional paper drawings. Instead of redrawing the model's geometry for each view, you attach views of the design geometry for each view. These views of the design geometry are attached as references. They can also be placed as a cell if desired. Sheet Models are most commonly used for composing finished and annotated drawings. MicroStation allows you to create an unlimited number of sheet models per DGN file. You may rotate sheet model views, but only about the Z axis. Sheet views are planar to the view. This mimics the 2D nature of printed output.

The **Sheet from Seed** type model is created from a selected seed file. This model uses the seed model's attributes, and it includes any references attached to the seed model. The option to place a model as a cell is not available.

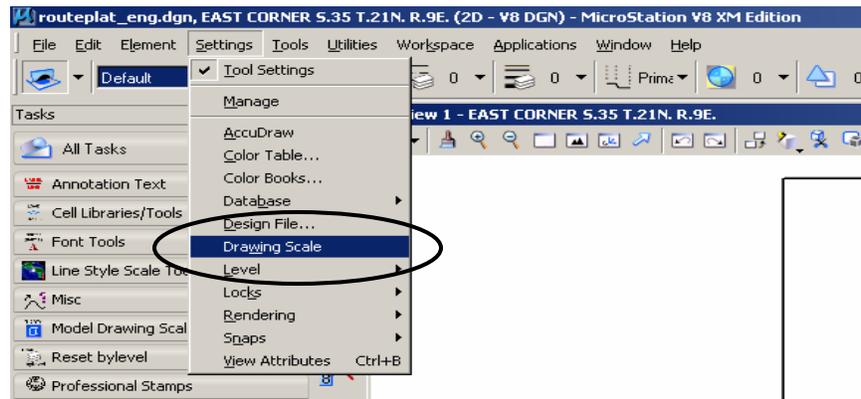
When you first create a DGN file, it has a default design model ready to place elements. When you open the Models dialog box, the default model has the name Default, with the Description as Master Model. You can use this model and, if necessary, change its name and description as desired.

Models can be self-referenced into the sheet without having to clip the elements. They can be selected in the Attach Reference Settings box and a scale can be applied as well. Models can be imported into other drawings too, which means that the detail only has to be created one time and scaled as needed.

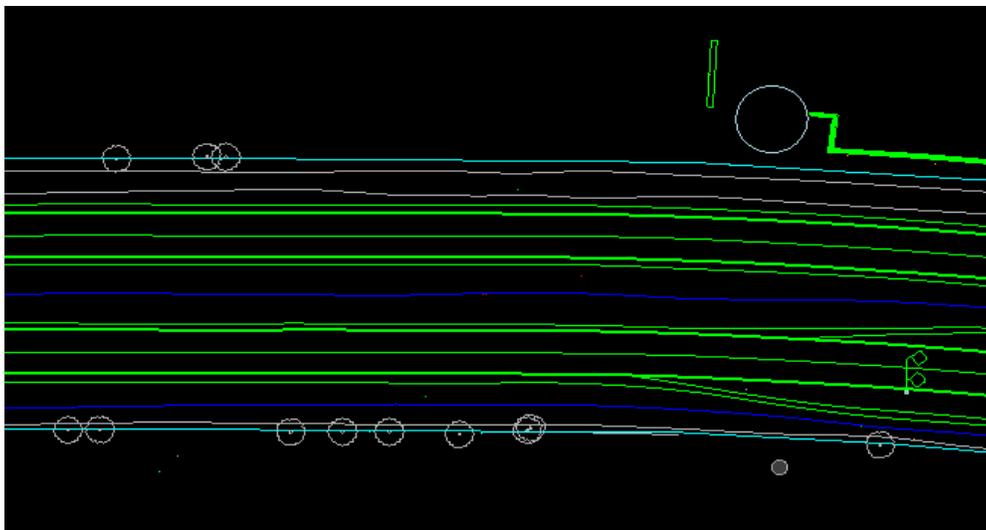
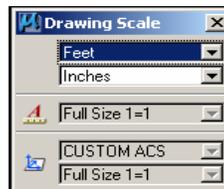
3.2.5 Annotation Scale

In XM MicroStation, cell sizes can be changed globally within a drawing. The tool that allows this to be accomplished is called Annotation Scale. In the INDOT XM workspace, the MX style sets are designed to utilize the annotation scale function. For this reason the first time you open a drawing created using a style set the drawing scale will have to be set-up. The following steps go through the initialization.

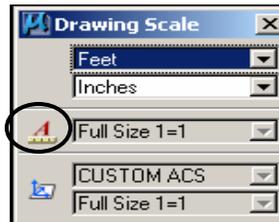
1. To open the *Drawing Scale* tool box select *Settings -> Drawing Scale* from the MicroStation menu.



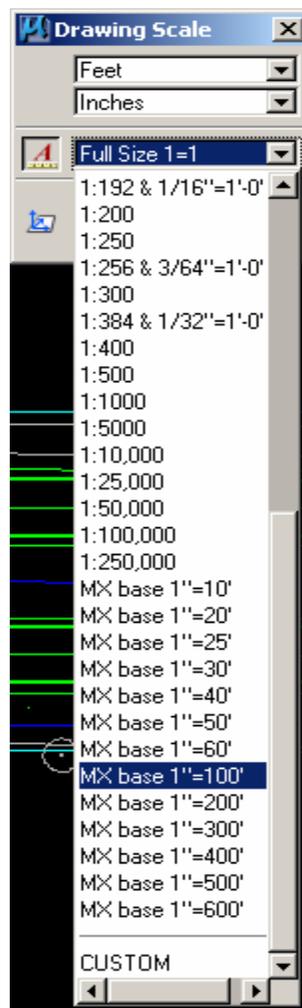
2. The *Drawing Scale* tool box will contain the default settings for the drawing file. Verify that the unit settings are correct for the job you are working on, either English (feet, inches), or Metric (meters, and millimeters). As long as the proper seed files have been verified the units should be correct as well. With the default Drawing Scale settings many of the cells will appear as dots such as in the example below.



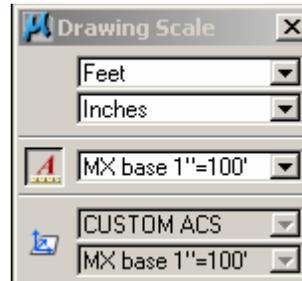
3. **Left click** on the *Annotation Scale* button to enable it.



4. **Left click** on the *Scale* pull down and scroll to the desired scale and **left click** on it to choose it.



5. When the *Alert* box pops up left click on *Yes* to propagate the annotation scale.
6. Once the drawing updates, the *Drawing Scale* settings will be updated and the cells and linestyle scales will also be updated in the drawing as in the example below.



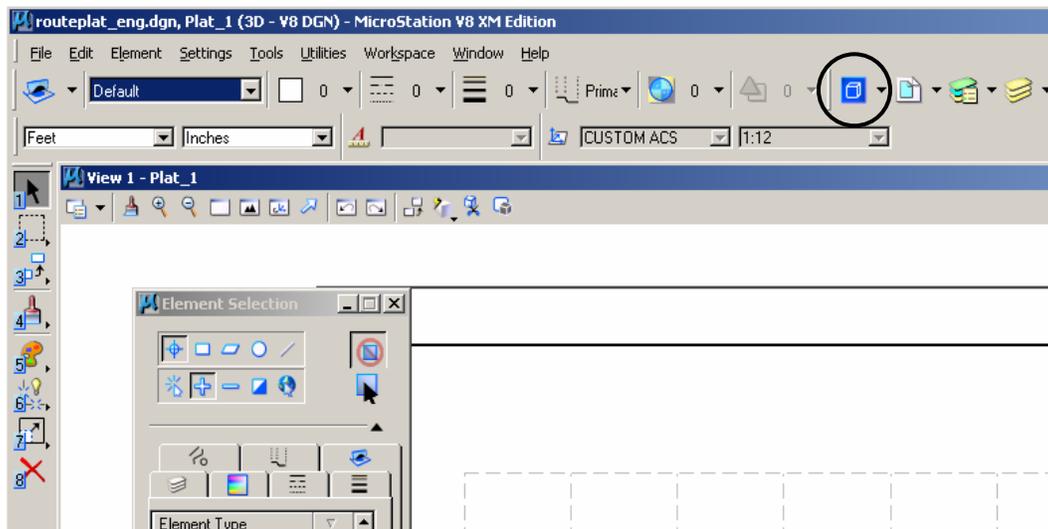
7. Be sure to *Save Settings* with a **Ctrl + F**, or **File -> Save Settings**.

Excercise 3.2.1 : Set the Annotation Scale on the Base Drawings

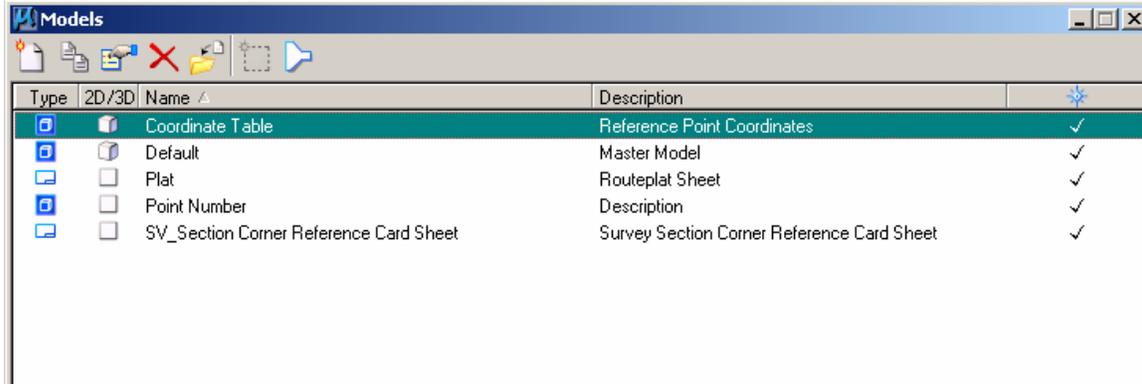
1. Open the MicroStation file *survey alignment.dgn* located at *C:\Projects\Training\Project Files*
2. Enable Annotation Scaling, and set the scale to either *MX base 1"=200'*, or *1"=200'* which ever is available.
3. Be sure to save settings on the file before exiting with *Ctrl+F* or *File->Save Settings*.
4. Repeat the procedure and set the scale to either *MX base 1"=200'*, or *1"=200'* for the following drawings located at *C:\Projects\Training\Project Files*
 - *survey routeplat all.dgn*
 - *survey rp topography.dgn*
 - *survey section corner.dgn*
 - *survey topography.dgn*

3.3 Contents of the Template Route Plat dgn File

The template route plat dgn file contains four MicroStation models. Open the models dialog box by left clicking on the **Models** icon from the primary toolbar, or by choosing **File -> Models**.



This will open the **Models** dialog box which displays the five default route plat models.



The four default models and their contents are as follows:

Coordinate Table: This is the template Reference Point Coordinate Table model

Default: This is the default MicroStation model

Plat: This is the template route plat sheet model

Point Number: This is the template reference box model

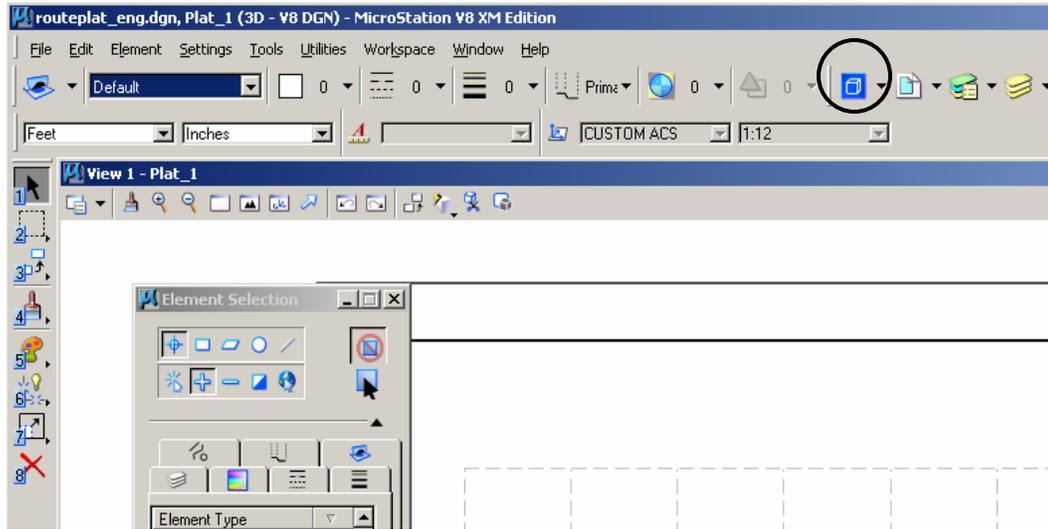
SV_Section Corner Reference Card Sheet: This is the template Section Corner Reference Card Model

3.4 **Creating Reference Boxes**

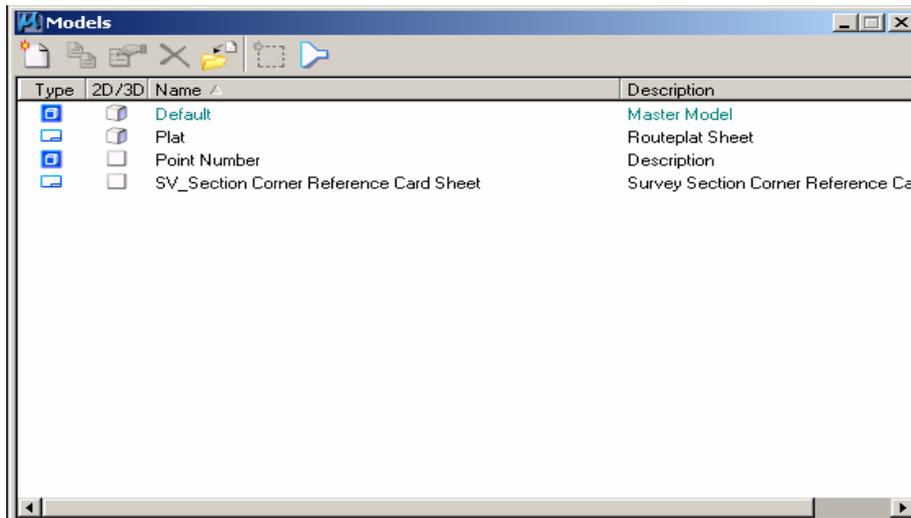
The following steps go through the process of creating a model containing the control point reference box for use in either the Route Plat Sheet or the Section Reference Card.

1. Open the **MicroStation Route Plat File**. (routeplat_eng.dgn)

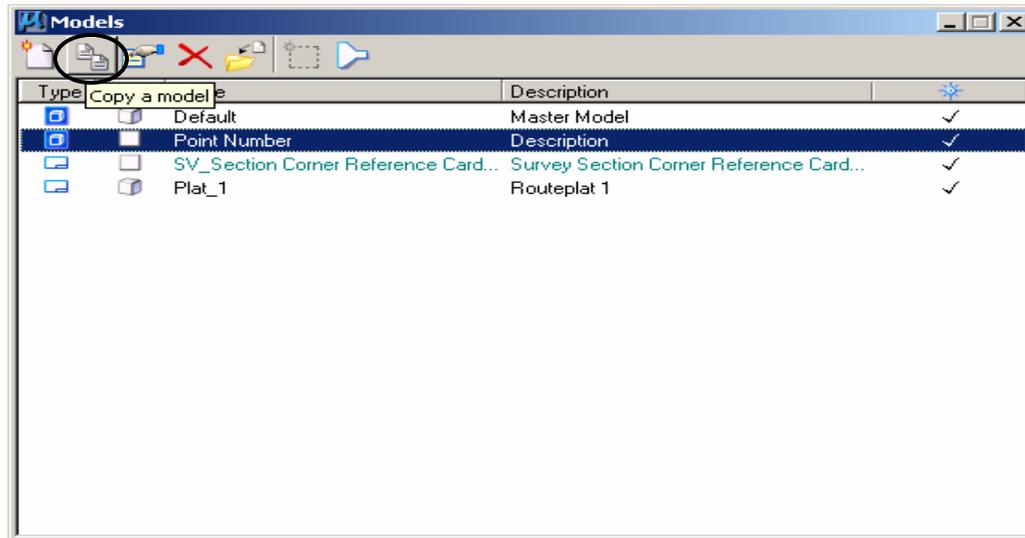
2. Click on the **Models** dialog box icon to open it.



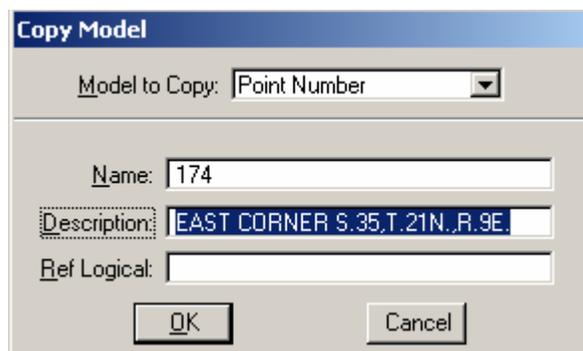
3. Double left Click on the Model named **Point Number** to open it. Once selected the model name will be highlighted green.



4. Select the Copy a Model tab at the top of the Models dialog box.

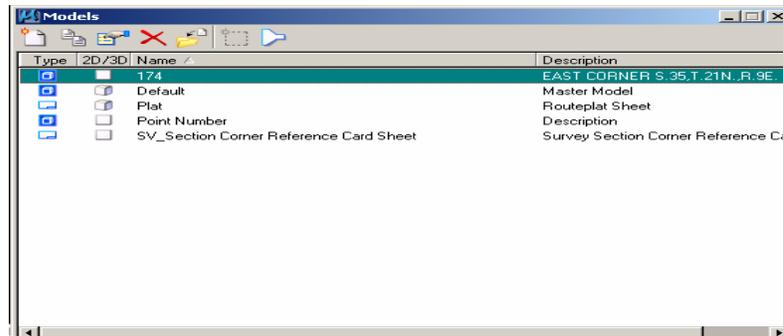


5. Change the name to the desired Point Number. (*174*)
6. Change the description to desired Point Description. (*EAST CORNER S.35,T.21N.,R.9E.*)

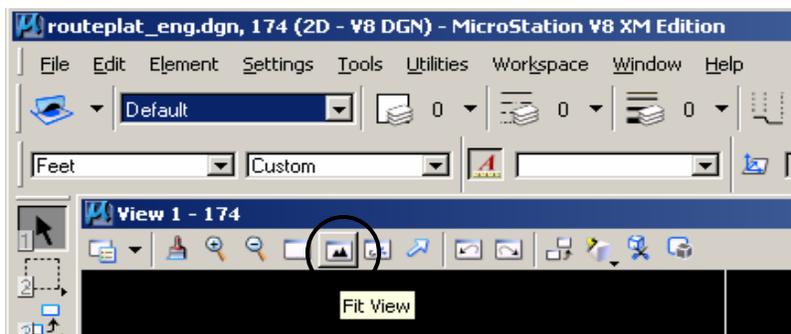


7. Select **OK** and a new Model called "174" will be created.

8. If not automatically opened, open the “174” Model by double clicking on it in the Models Dialog box.

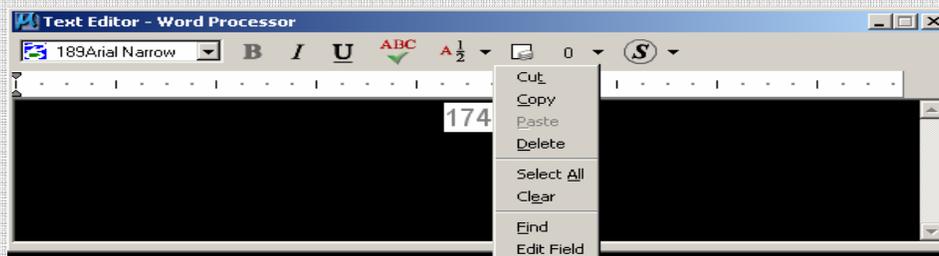


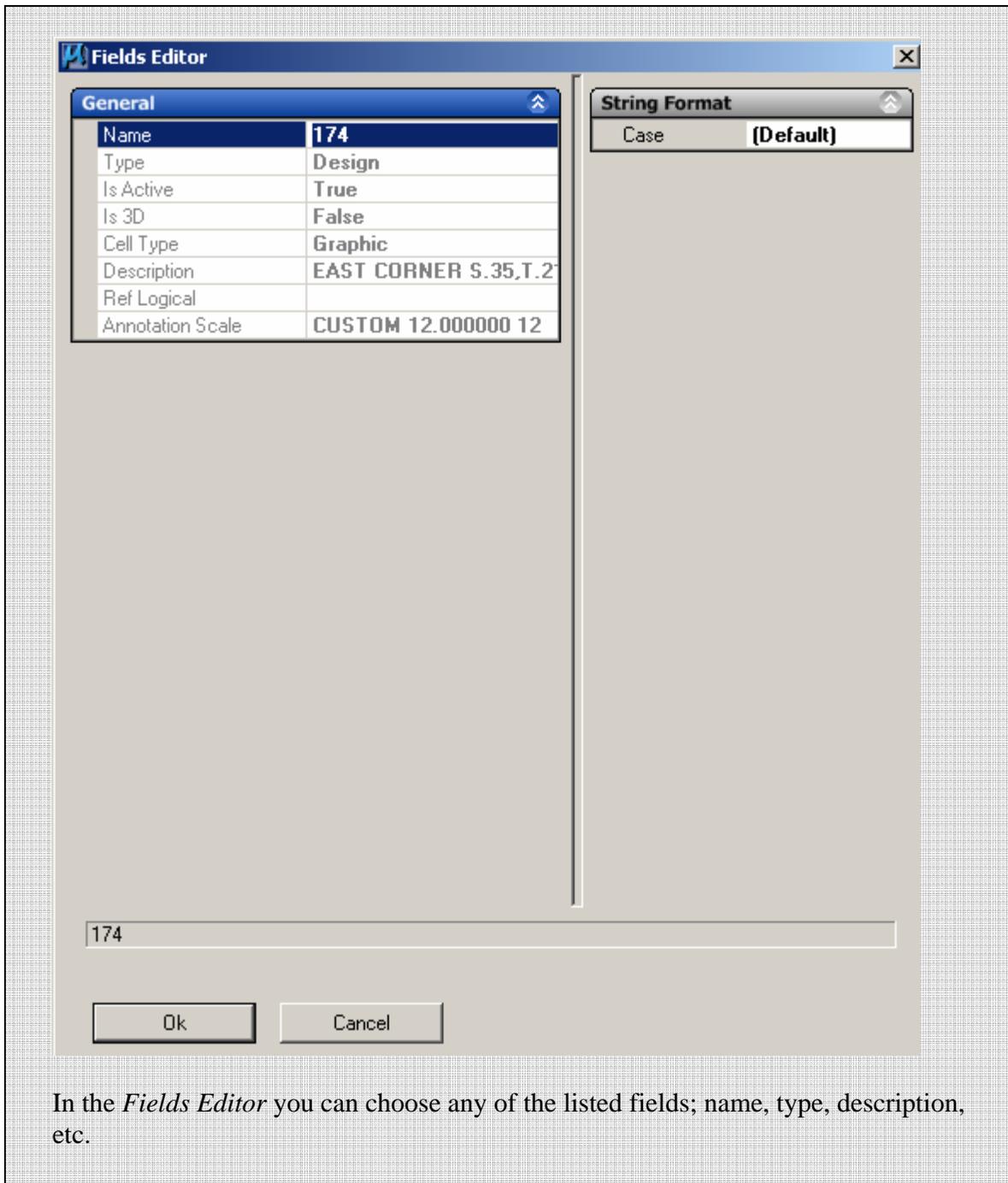
9. Zoom to the extents by either *double clicking the mouse wheel* or using the *zoom controls* in the upper left corner of the display.



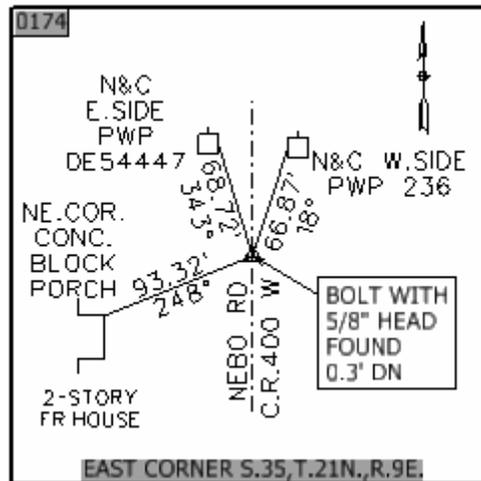
10. Look at the newly created reference box, taking note of the automatically annotated point number and description.

Note: *Text Fields* have been utilized to automatically fill in the text for these labels. If you *double left* click on the text, '174' for example, it will bring up the text editor. Then you can *right click* on the text in the text editor which will give more options, *left click* on *Edit Field* to open the *Fields Editor*.

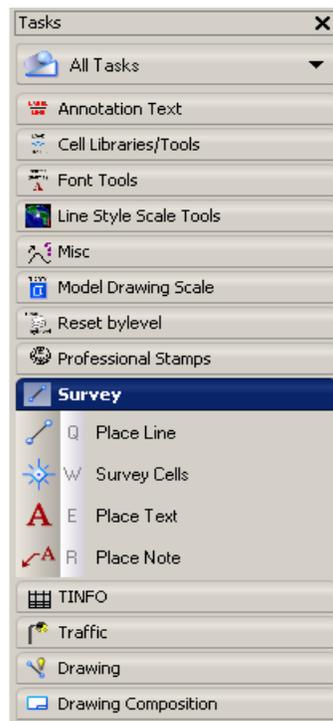




11. Now lets create the line work, text, etc. for control point 174 as shown below.



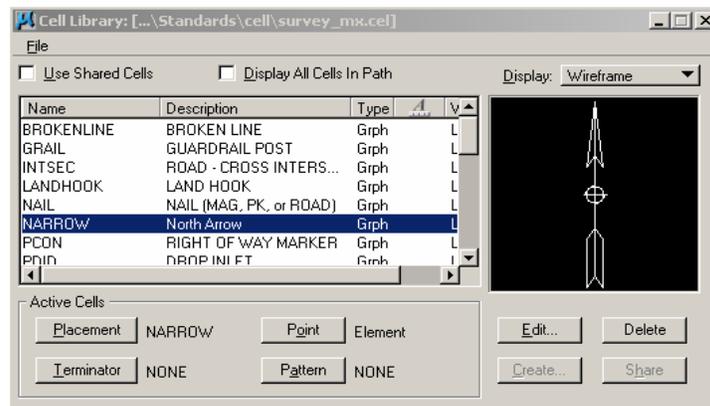
12. First make sure your task navigator is set to *dialog* and the *Survey Taskbar* is selected.



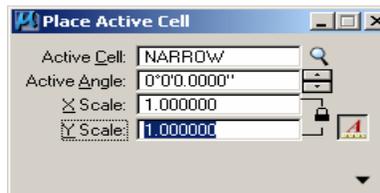
13. Add the north arrow cell by selecting the *Survey Cells* tab in the *Task Navigator*, or press *Escape and then W*.



then once the *Cell Library* dialog box appears scroll down to the North Arrow cell, *NARROW*, and double click on it.



In the *Place Active Cell* dialog box the default scale is 1.000 which is appropriate for the reference box size. Place the cell by moving the mouse pointer to the appropriate location and then clicking the left mouse button.



Note:

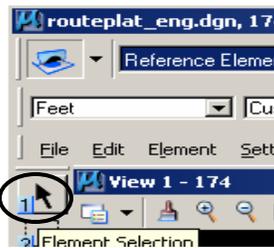
You can use the mouse wheel to zoom in and out. Pressing the mouse wheel and moving the mouse pointer will allow you to pan your view. You can also use the zoom controls in the upper left corner of the display.



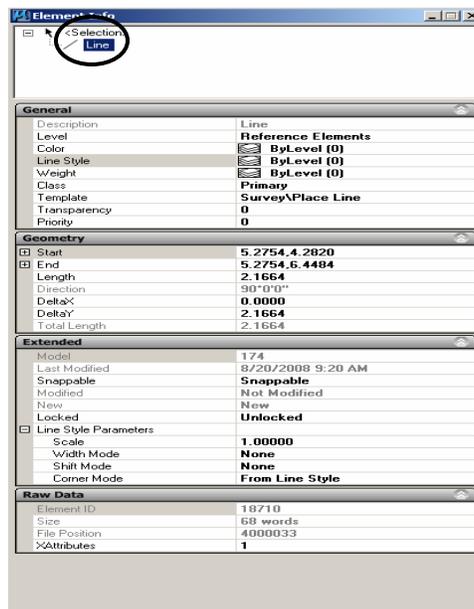
14. Repeat step thirteen, and insert the traverse station cell (*PSSA*) and the power pole cells (*PPWP*). When your done with these cells close the Cell Library dialog box by clicking on the X in the upper right corner of the dialog box.
15. Next place the line representing the road centerline. Start by selecting the *Place Line* tab on the Task Navigator, or press *Escape and then Q*.



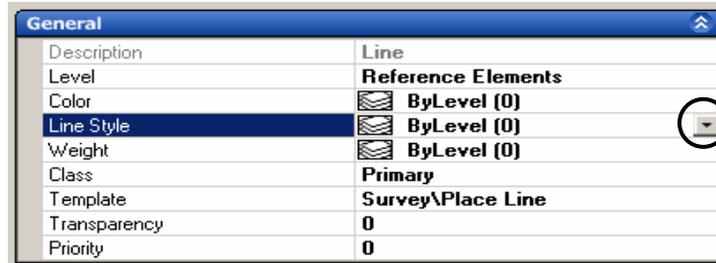
Then left click in the starting and ending locations to draw the line. Since the default line style is a solid line, lets change it to a centerline line style. Click on the *element selection* tab, or hit *Escape and then I*



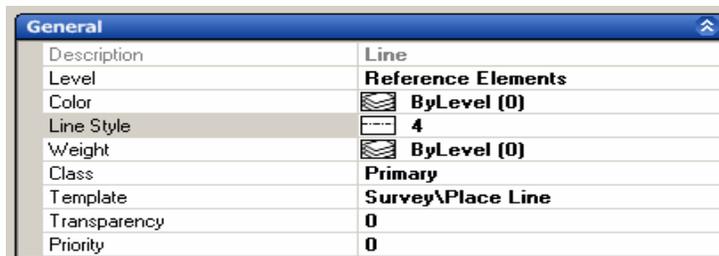
Right click on the line and hold the right mouse button down while selecting the *Properties* tab, then *double left click* on line in the upper portion of the Element Info dialog box.



With the line Information displayed, left click in the right portion of the **Line Style** row. Left click on the selection tab and browse to the **centerline style (4)** and choose it.

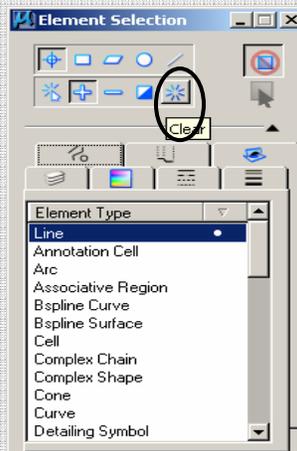


The Information box will update to show the new linestyle.

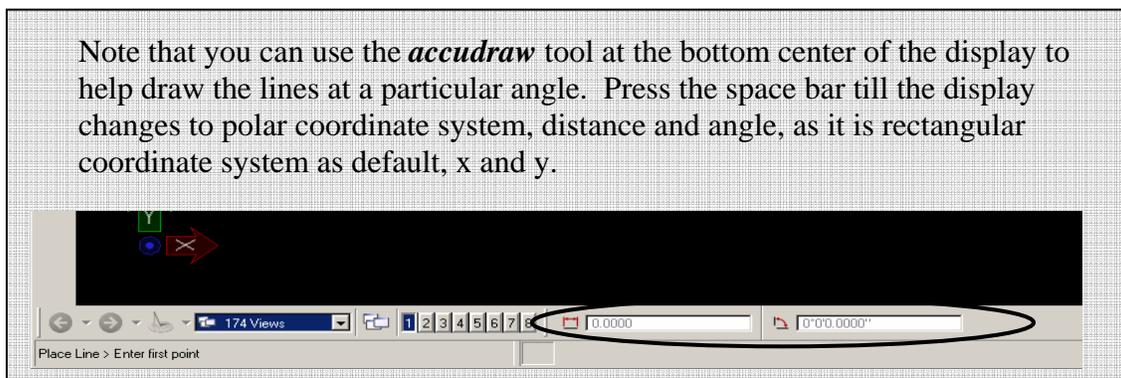


Close the Element Info box and left click in the display to deselect the line. The line should appear with a centerline linestyle.

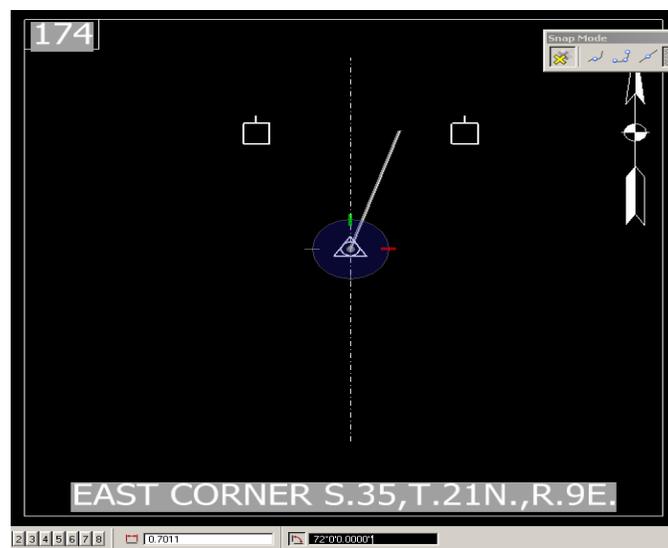
Note that if you have trouble clearing out the element selection you can use the **clear selection** button on the element selection dialog box.



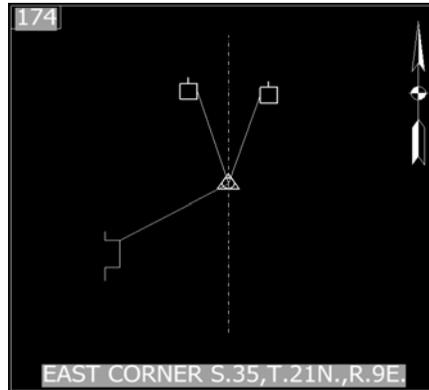
16. Now lets move the PSSA cell so it is centered on the newly drawn centerline. Start by using the *element selection* tool to select the PSSA. Then press the right mouse button and select Move. Change the snap mode to center circle and click the right and left mouse buttons simultaneously near the circle portion of the PSSA. This will select the move point to be the center of the PSSA. Left click with the tentative snap to the center and move the PSSA towards the centerline. The Accudraw feature will automatically choose the midpoint of the line which is appropriate. When the pointer is near that location press the left mouse button and the PSSA will be moved. Left click again to deselect the PSSA.
17. Next draw the lines for the dimension ties and the house/porch outline. Then move the PPWP cells to the correct locations.



Select the line start point and move towards the ending point. Press tab to get to the angle prompt, then you can type in the desired angle and hit enter, move the pointer along the bearing to the appropriate distance and left click to end the line.



Once the lines are drawn, you may need to move the cells for the features to the appropriate location. At this point your reference box should look similar to the one below.



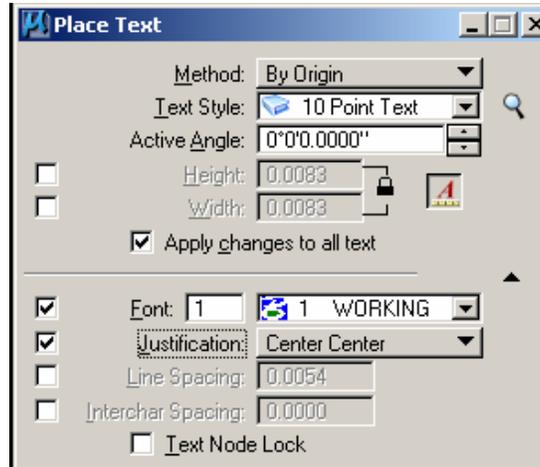
18. Add the text labels to the Reference Box. Start by selecting the **Place Text** tab from the Task Navigator, or hit **Escape then E**.



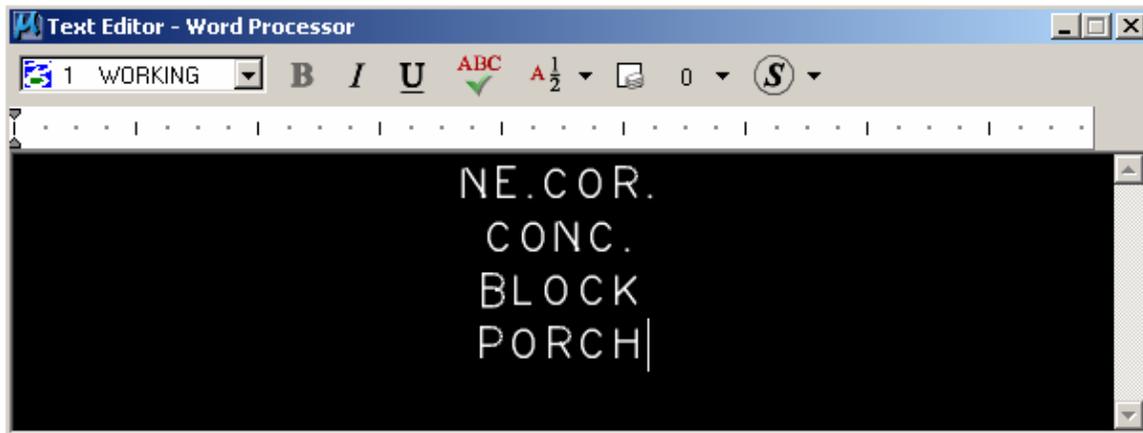
Expand the **Place Text** dialog box by clicking on the **arrow**.



Make sure that the settings are appropriate, typically the defaults should be correct. Change the Font to ***1 WORKING*** if not already, this is a stick font and plots better when reduced.

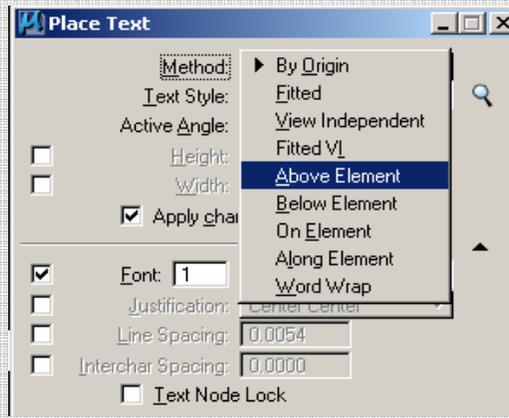


Type one of the *text labels* in the Word Processor.



Once you have typed the text, move the mouse pointer to the desired location and press the left mouse button. Then click the right mouse button and type in the next text label, and insert it as above. Repeat until the labels are all completed, except the description of the monument type.

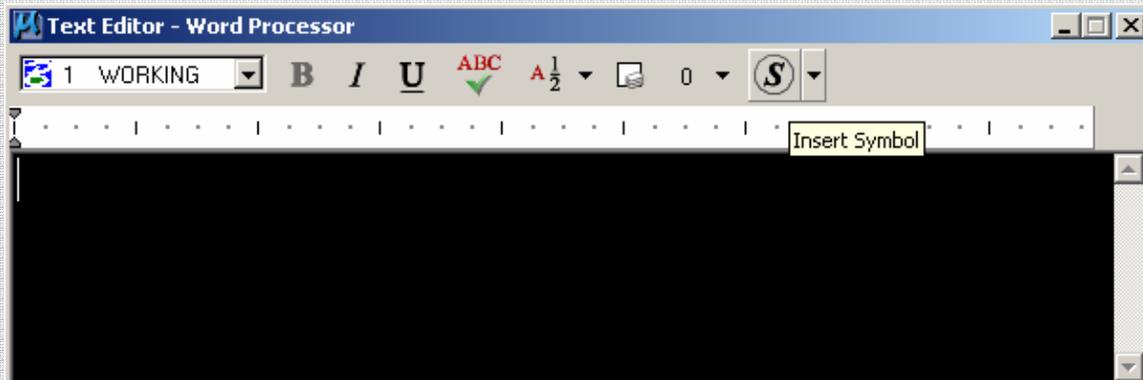
Note: For the road name and dimension labels you can change the method in the Place Text dialog box to Above Element. Then you can type the text in the Word Processor and left click on the desired line to place the text above it, finally move the text to straddle the line.



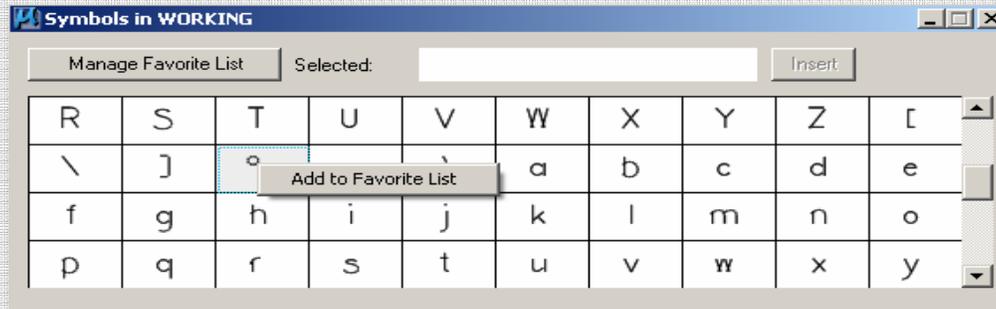
Note: If you are using font 1 WORKING, the degree symbol can be typed by holding down the ALT key and then pressing 9 then 4 on the number pad.

Note: You can store symbol characters as favorites, which will make them easier to find, as follows:

1. **Left click** on the *Insert Symbol* tab in the *Text Editor* dialog box..



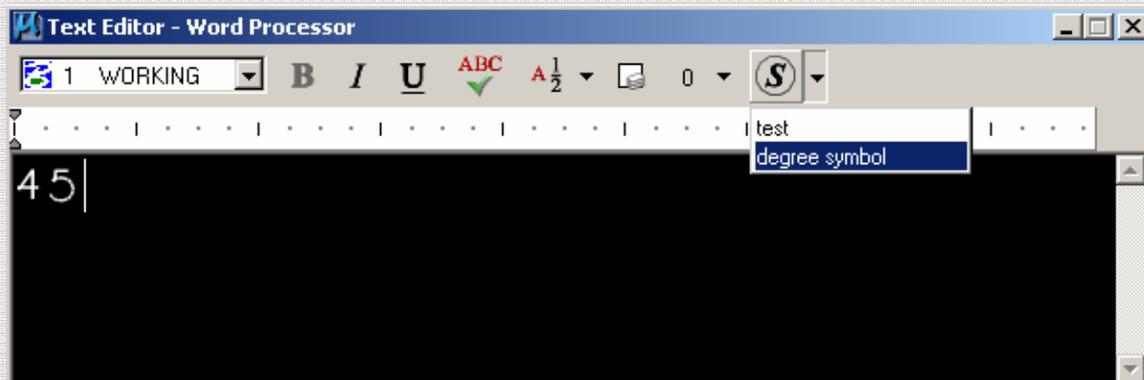
2. Find the desired symbol in the list and **right click**. Then **left click** on *Add to Favorite List*.



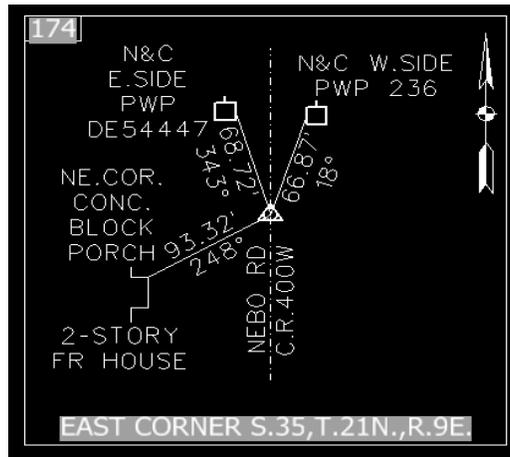
3. At the *Add character to favorite list* type in a name for the symbol and then **left click** on *Add*.



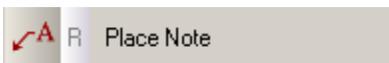
4. **Close** the *Symbols* dialog box.
5. Next time you need the symbol in the *Text Editor* **left click** on the *Arrow* next to the *Insert Symbol* tab and then **left click** on the *name of the symbol*.



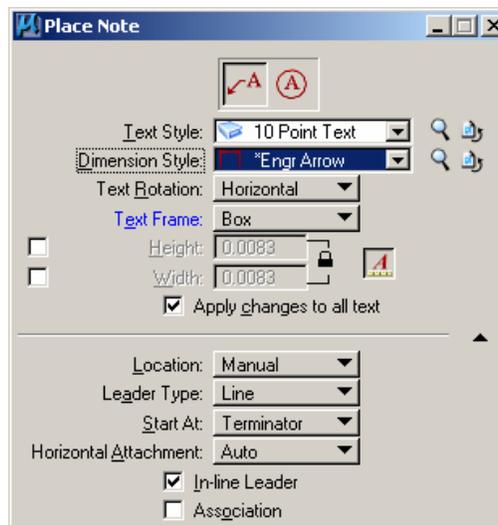
At this point your reference box should look similar to the one below.



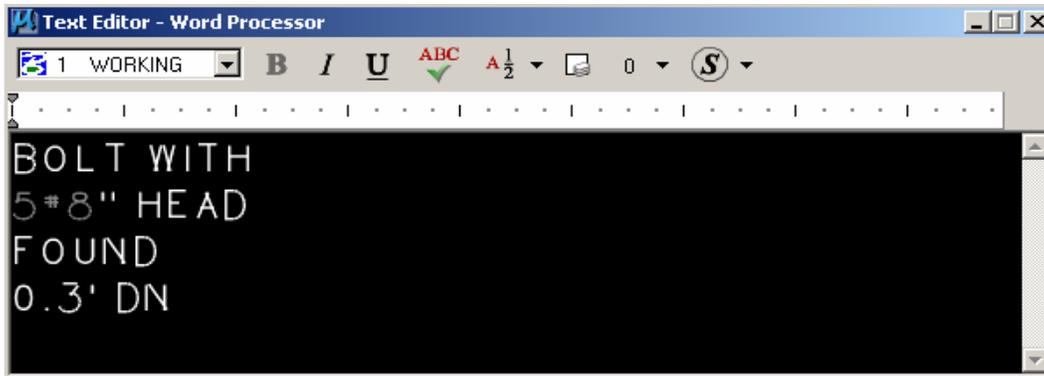
19. The final step is to add the description for the monument type. Start by selecting the **Place Note** tab from the Task Navigator, or hit **Escape then R**.



Expand the Place Note dialog box and make sure the settings are correct. Check to see that the Text Frame is a Box.

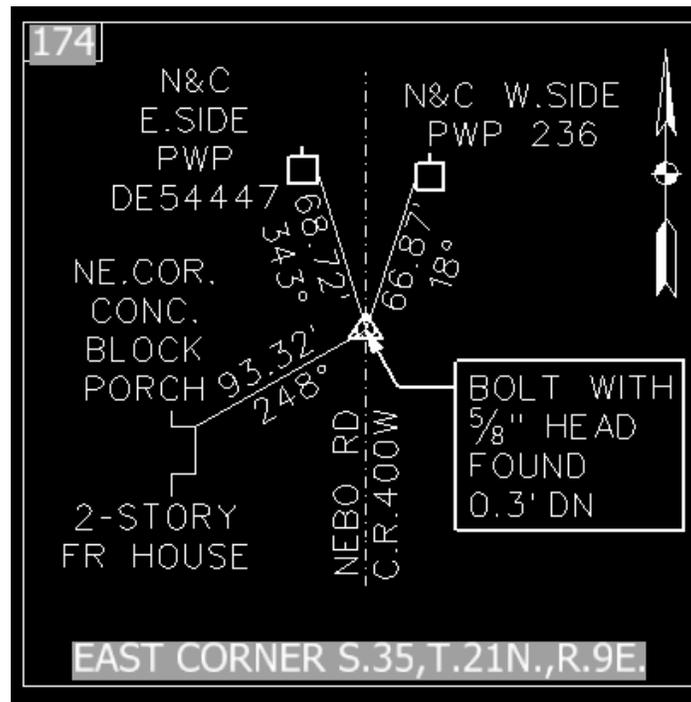


Type the text for the note in the Word Processor, and make sure the font is ***I WORKING***, this is a stick font and plots better when reduced.



Once you have typed the text, move the mouse pointer to the desired location for the start of the leader and press the *left mouse button*, move to the angle location and click the *left mouse button* again, then right click to end the insertion. When you are done *close* the Word Processor dialog box.

At this point you are finished creating the reference box for point 174 and it should look similar to the one below.



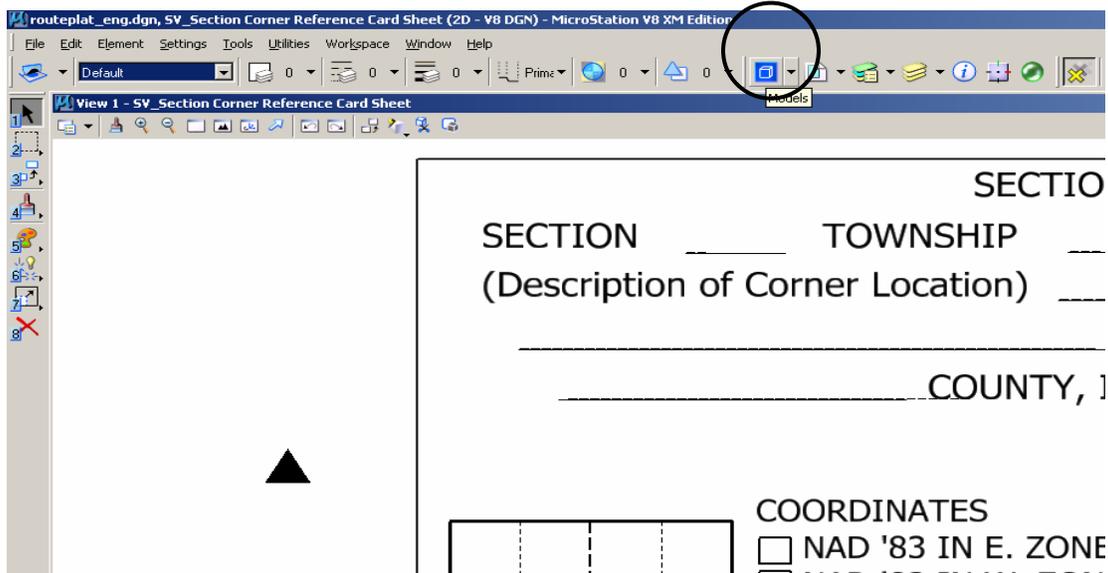
20. You will need to create a reference box model for each control point that will be shown in a reference box. Then add the graphics to complete the reference box for each point.

3.5 **Creating Reference Point Coordinate Table**

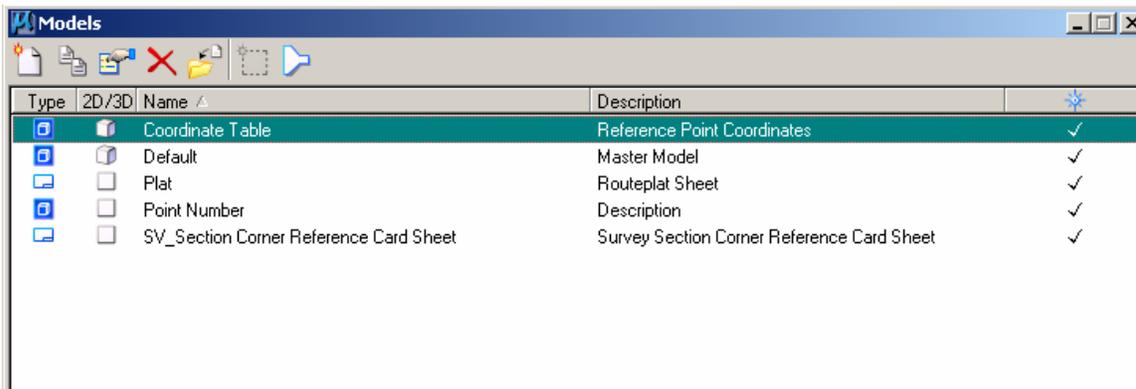
Since the coordinates for the Reference Points are no longer contained in the Reference Box a Coordinate Table you will need to create a coordinate table. It is recommended to create one overall coordinate table for the Route Plat. The following steps go through the process of creating a Coordinate Table.

1. Open the MicroStation Route Plat File. (routeplat_eng.dgn)

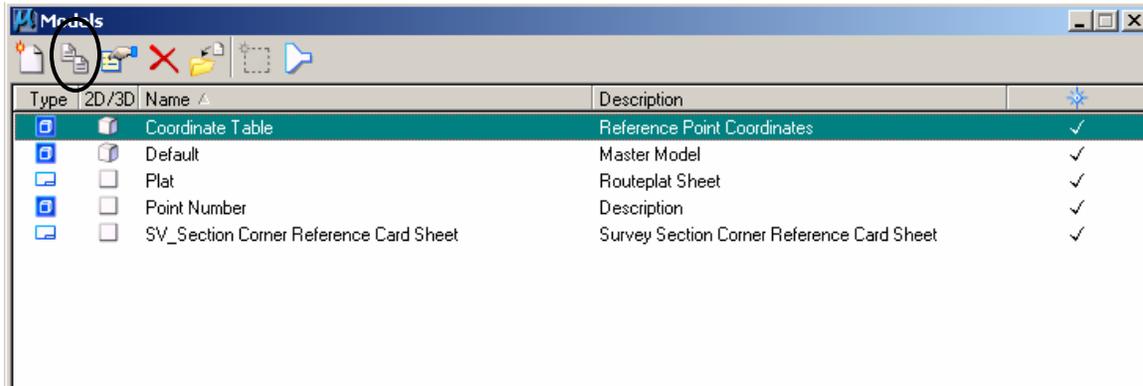
2. Click on the *Models* dialog box to open it.



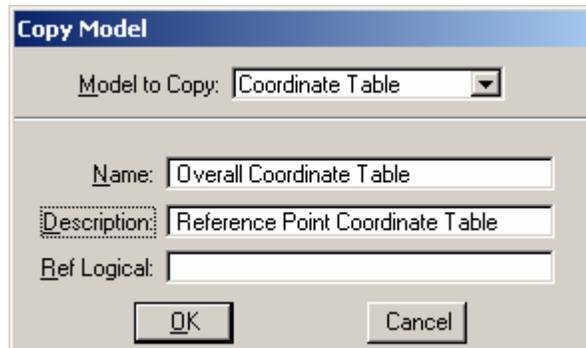
3. Click on the route coordinate table model (*Coordinate Table*) to select it.



4. Select the *Copy a Model* tab at the top of the Models Dialog Box.



5. Change the name to the desired Plat name. (*Overall Coordinate Table*)
6. Change the description to the desired. (*Reference Point Coordinate Table*)



7. Select **OK** and a new Model will be created.
8. If not automatically opened, open the *Overall Coordinate Table* model by double clicking on it in the Models dialog box.
9. Select the text to edit it by double left clicking on it. Then use the Text Editor to modify the text as necessary.

Excercise 3.5.1 : Create a new Coordinate Table and Add Point 174

5. Open the MicroStation file routeplat_eng.dgn located at
C:\Projects\Training Project Sample Route Plat\Project Files\
6. Follow steps 2 through 8 from the previous section, Creating Reference Point
Coordinate Tables, to create a new coordinate table.
7. Edit the text for the first point in the coordinate table to contain the information
for Point 174.

Point Name: 174

Northing: 13,221.0790

Easting: 85,296.1035

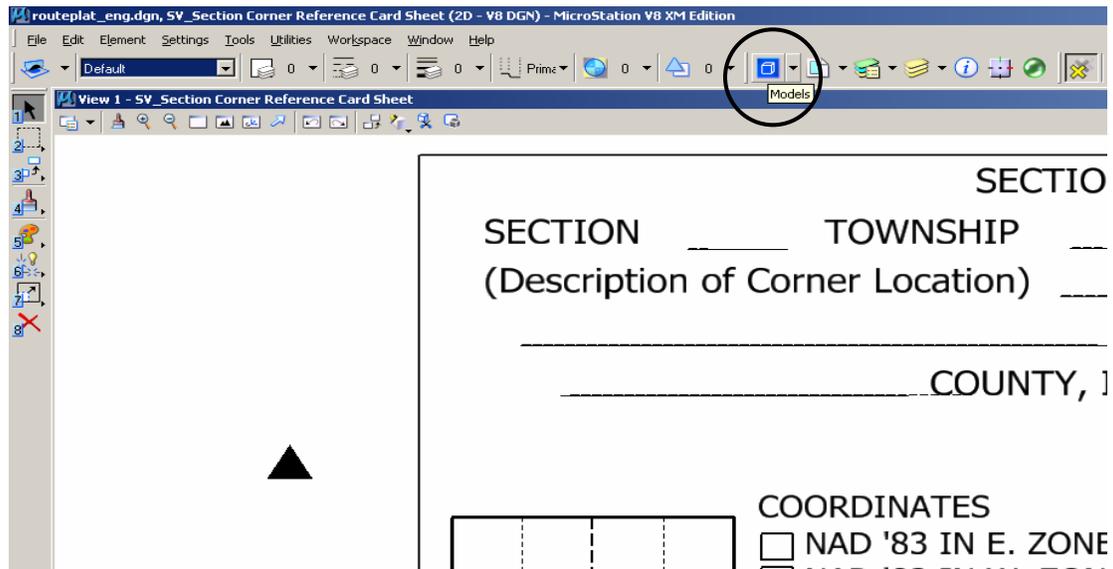
Line: N.A.

3.6 **Creating Route Plat Sheets**

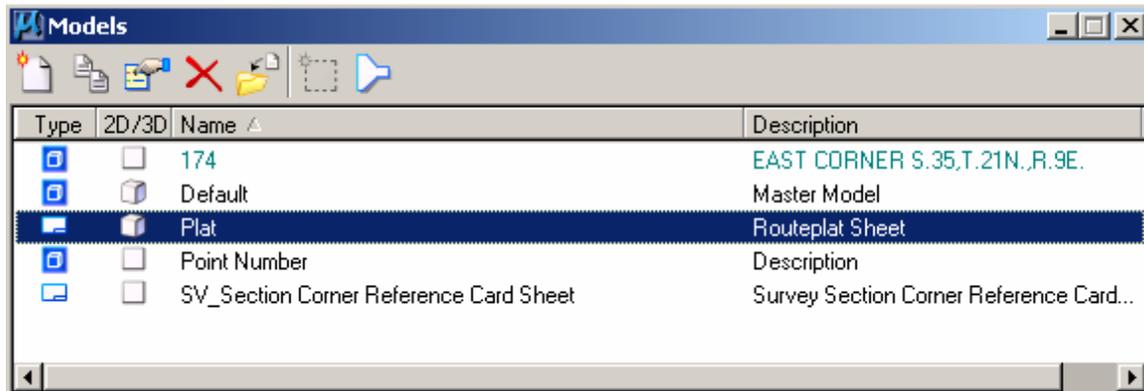
Each sheet of your Route Plat will need a model. The following steps go through the process of creating additional Route Plat sheets.

1. Open the MicroStation Route Plat File. (routeplat_eng.dgn)

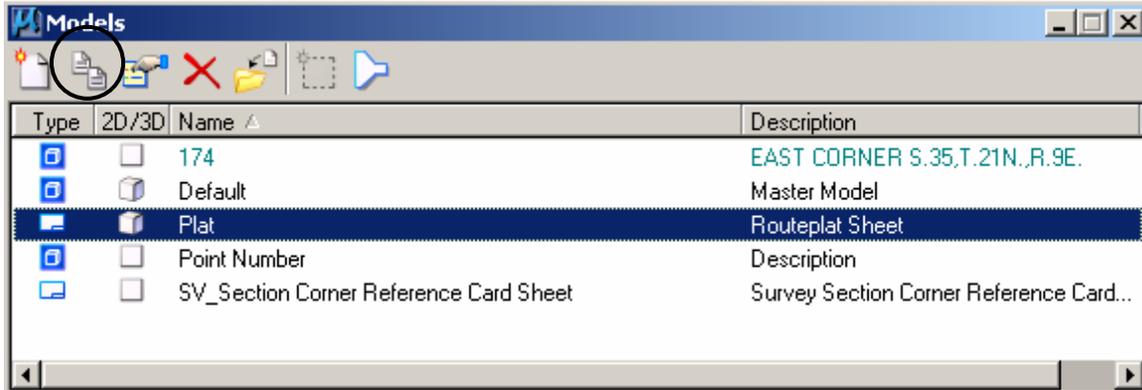
- Click on the **Models** dialog box to open it.



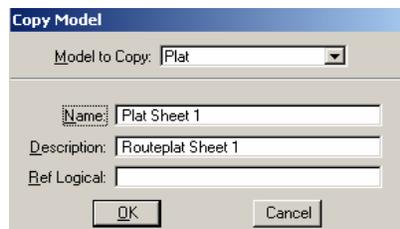
- Click on the route plat model (**Plat**) to select it.



4. Select the *Copy a Model* tab at the top of the Models Dialog Box.

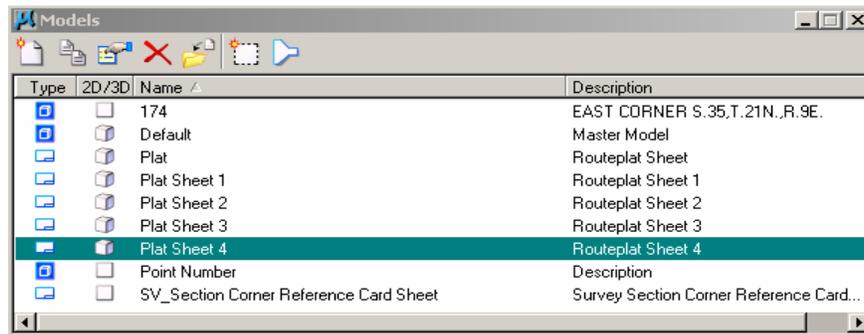


5. Change the name to the desired Plat name. (*Plat Sheet 1*)
6. Change the description to the desired. (*Routeplat Sheet 1*)



7. Select *OK* and a new Model will be created.
8. If not automatically opened, open the *Plat Sheet 1* Model by double clicking on it in the Models dialog box.
9. Repeat the copy process for each plat sheet necessary.

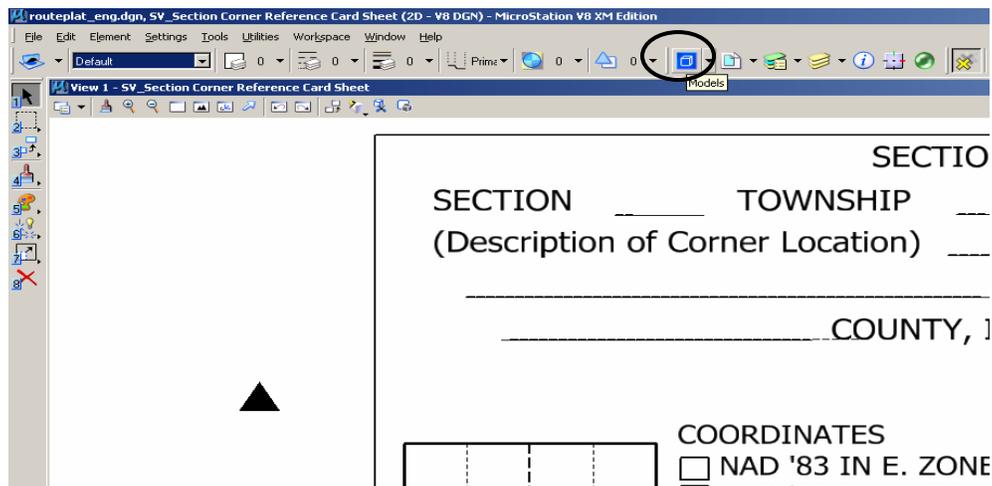
10. When complete, you should have a model for each **Route Plat Sheet**.



3.7 Adding DGN Files to the Route Plat

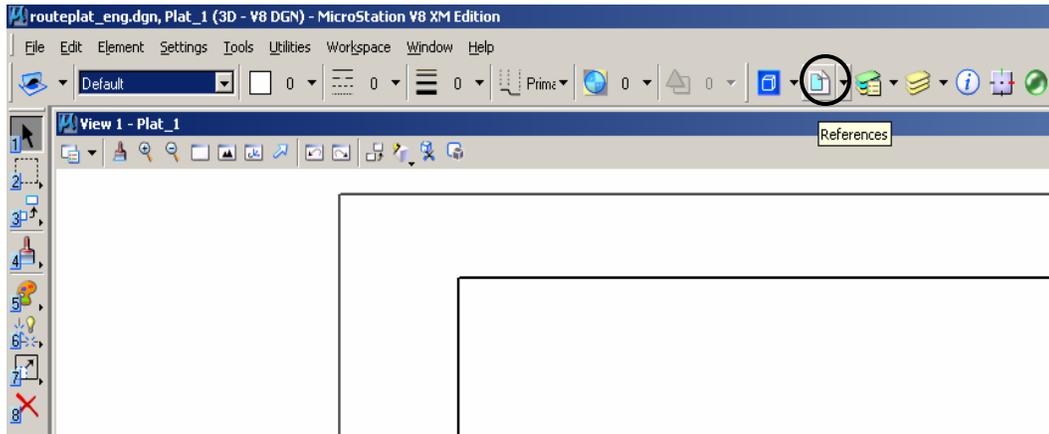
The following steps go through the process of adding the topography and other necessary dgn files as references to the Route Plat Sheet.

1. Open the MicroStation Route Plat File. (routeplat_eng.dgn)
2. Click on the **Models** dialog box to open it.

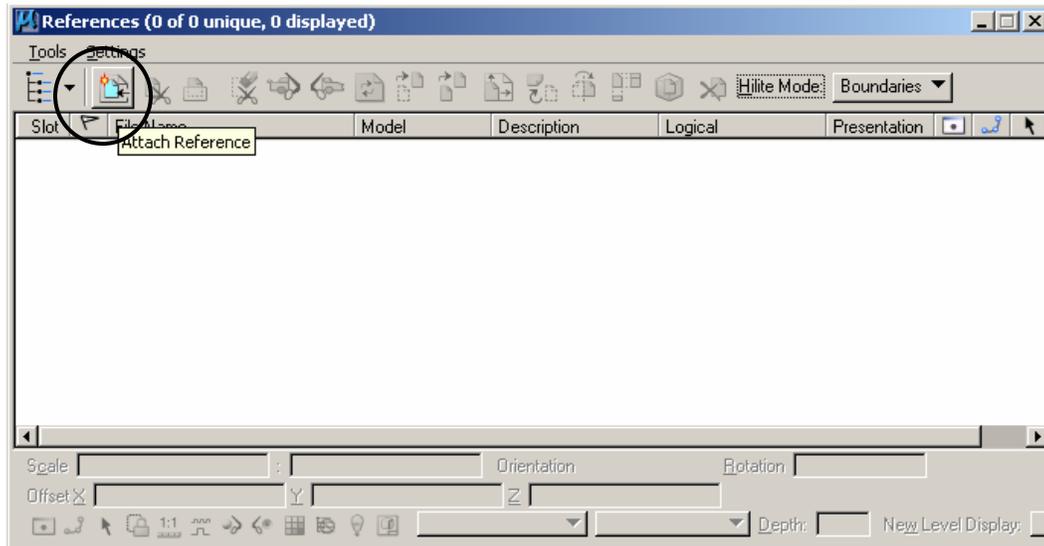


3. Double Click on the desired route plat model (**Plat Sheet 1**) to open it.
4. Using the zoom tools, or by double clicking the mouse wheel, **zoom extents**. The template Plat Sheet contains the Route Plat Basesheet and a grid that is gray scale.

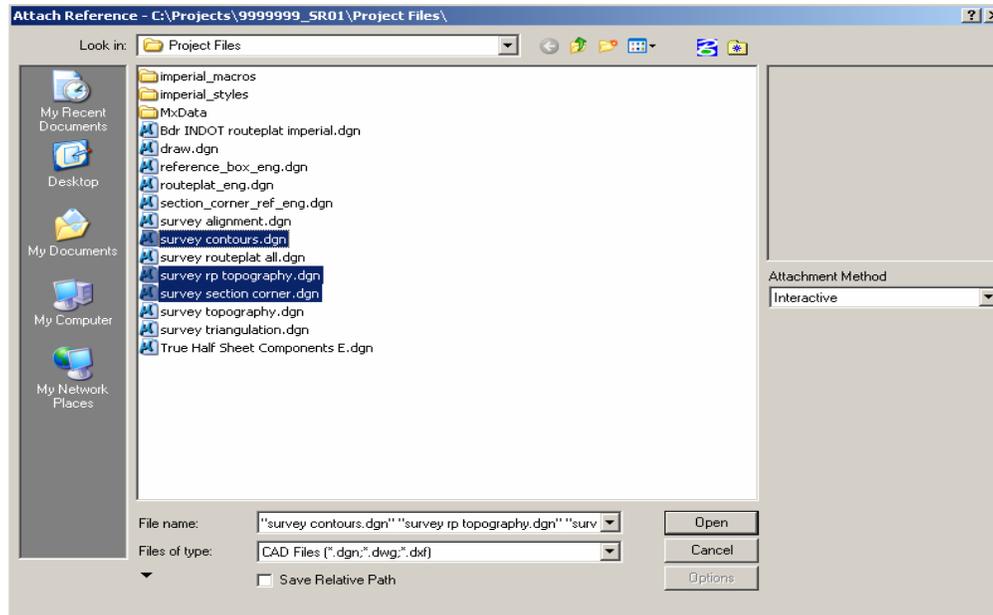
5. Select the *References* tool box.



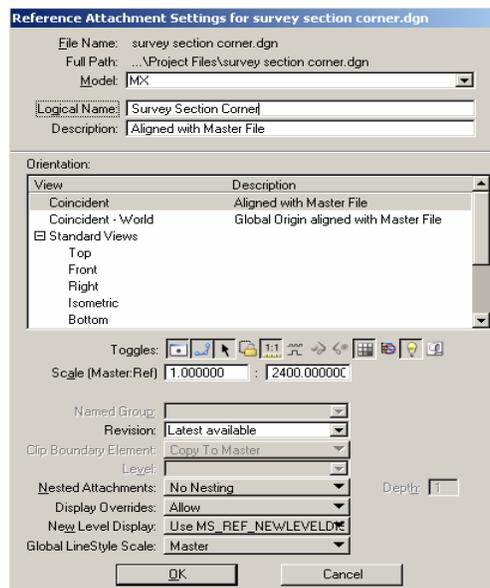
6. Click on *Attach Reference*.



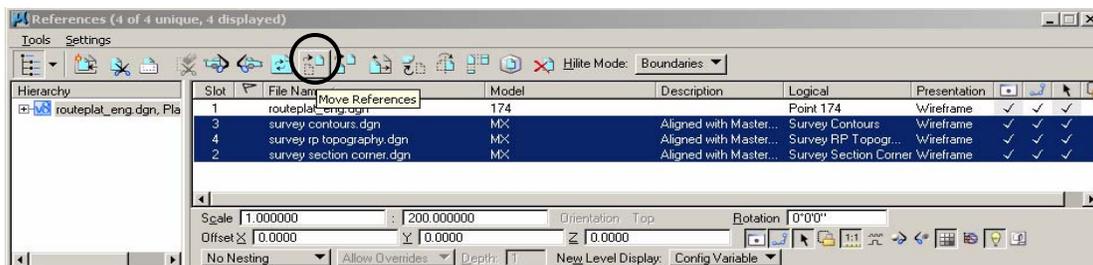
7. **Select the files** you would like to reference into the route plat sheet. You can hold down the Ctrl key and select multiple files. Then click **Open**.



8. In the Reference Attachment Setting dialog box verify that the file name is correct, then type in a **Logical Name** for the file being attached, select **Coincident** under the View, and change the scale to the desired sheet scale (200 scale is shown below). Because the drawings are now 1:1 scale, you need to multiple the desired scale be 12 to get the appropriate scale for the reference file. Click **OK** and the reference will be added to the drawing in the location of its coordinate system. If you selected multiple files to attach, the dialog box will reappear for the next file. Repeat until all files are attached.

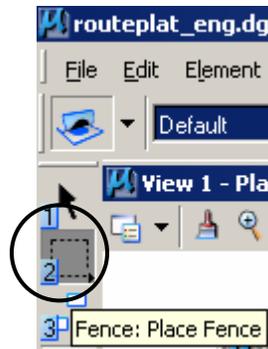


9. Most likely the attached reference files will not be located on the basesheet where you want them. You will have to move them. Start by zooming extents, then in the References dialog box, choose all the attached reference filenames you want to move, and select the **Move References** tab.

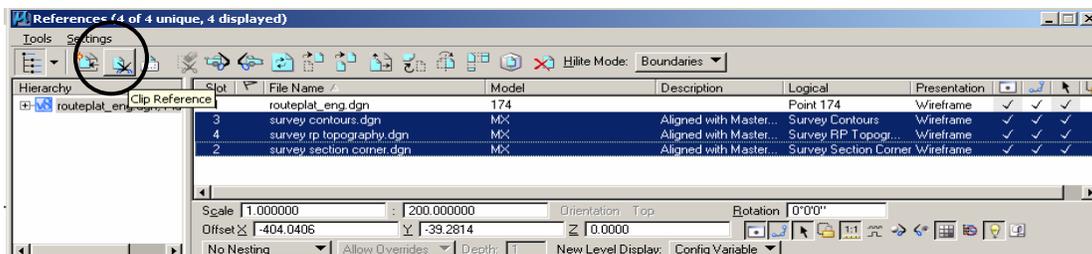


Left click at the location in the drawing you want to move the files from and then left click at the location in the drawing you want to move the files to. This will move all the selected files to the new location.

10. Be sure to save settings by hitting **Ctrl and F**, or selecting **File -> Save Settings**. This will ensure that the changes you made to the reference files will be saved for next time.
11. If you want to clip the reference the easiest way is to use a fence. Select the **Fence** tool, or **Escape then 2 then 1**.



Left Click at the desired four corners of the area to be clipped. Once the fence is placed, select the files to be clipped in the Reference dialog box, and select **Clip Reference**.



In the **Set Reference Clip Boundary** dialog box make sure the method is **Active Fence** and left click in the display.



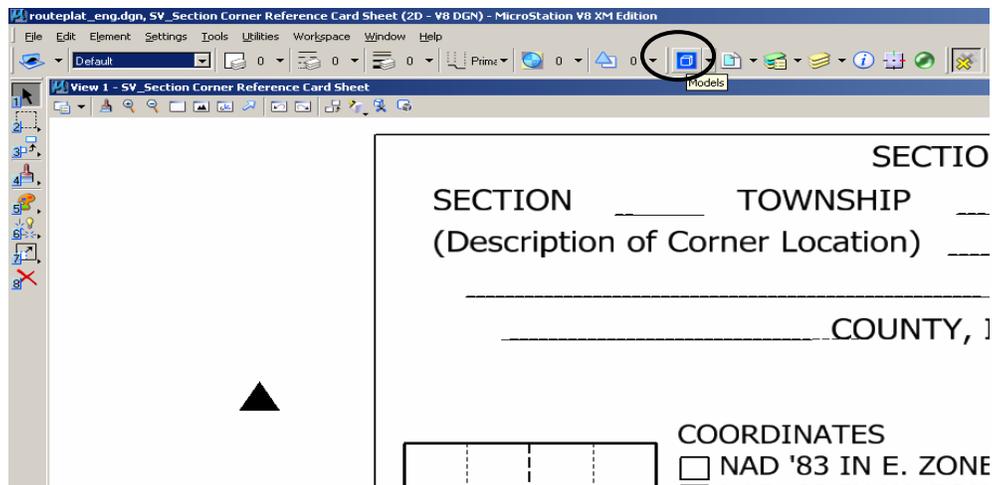
Note: You could draw a polygon and change its Class to Construction. Then by changing the Fence Type to Element you can create the fence by selecting the polygon. This would give you a way of recreating the same clip area for additionally attached reference files.

12. Be sure to save settings by hitting **Ctrl and F**, or selecting **File -> Save Settings**. This will ensure that the changes you made to the reference files will be saved for next time.

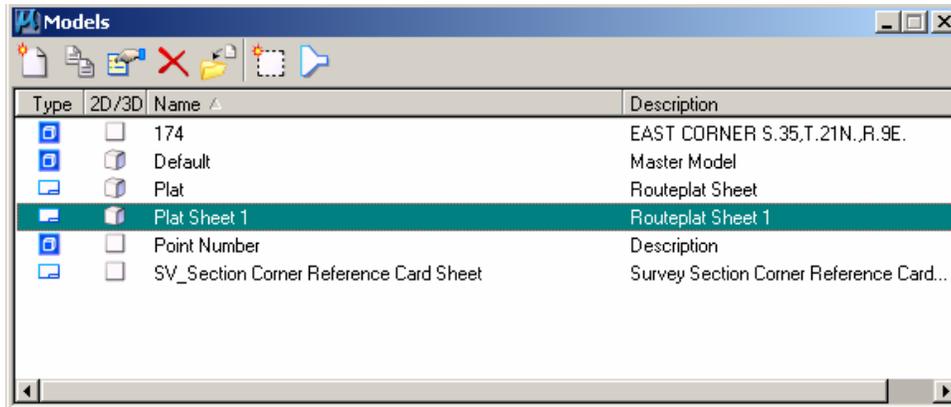
3.8 Adding Ref. Boxes to Route Plat

The following steps go through the process of adding the control point reference box models to the Route Plat Sheet.

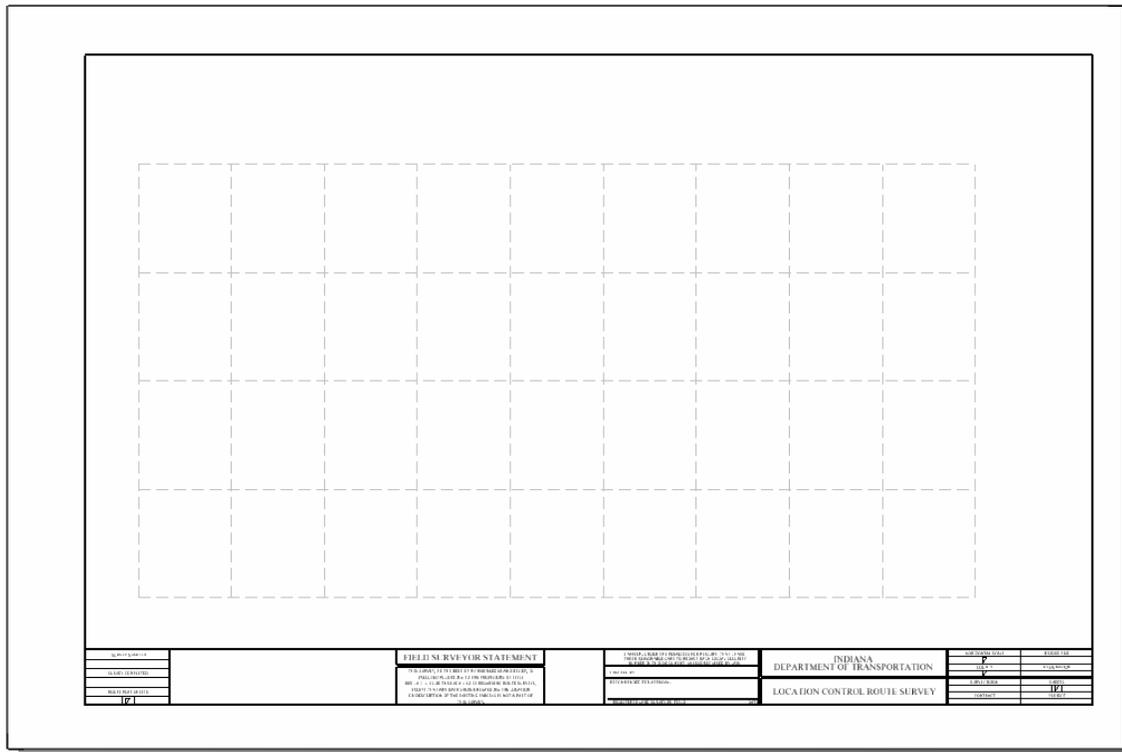
1. Open the MicroStation Route Plat File. (routeplat_eng.dgn)
2. Click on the **Models** dialog box to open it.



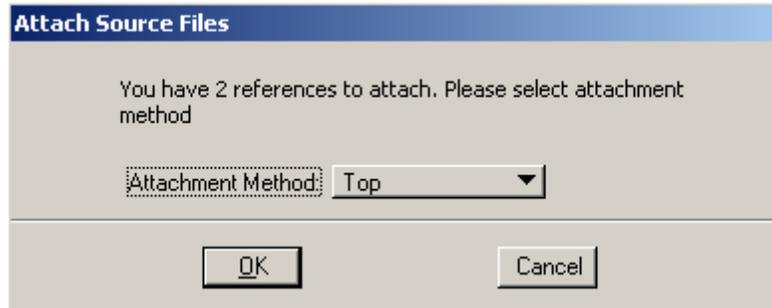
3. Double Click on the plat model (*Plat Sheet 1*) to open it.



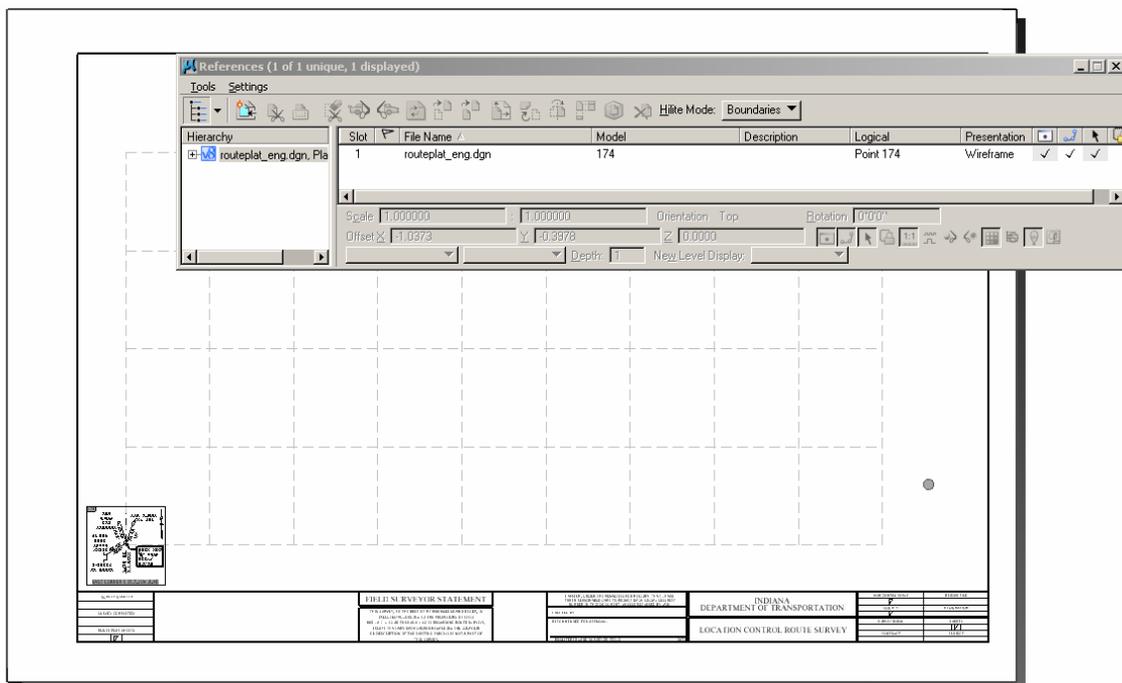
4. Using the zoom tools, or by double clicking the mouse wheel, *zoom extents*. The template Plat Sheet contains the Route Plat Basesheet and a grid that is gray scale.



9. When the **Attach Source Files** dialog box appears, change the Attachment Method to **Top**, and click **Ok**.

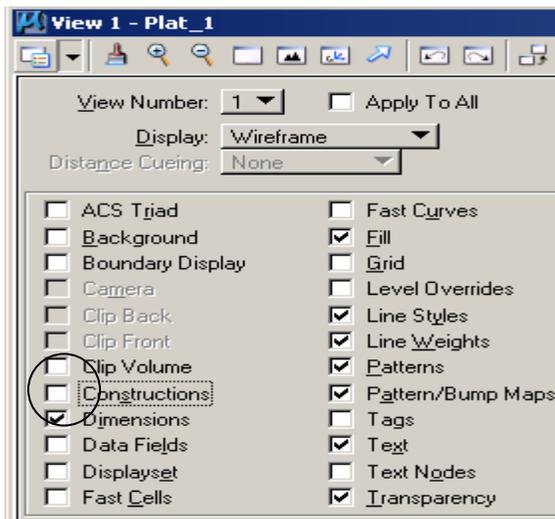
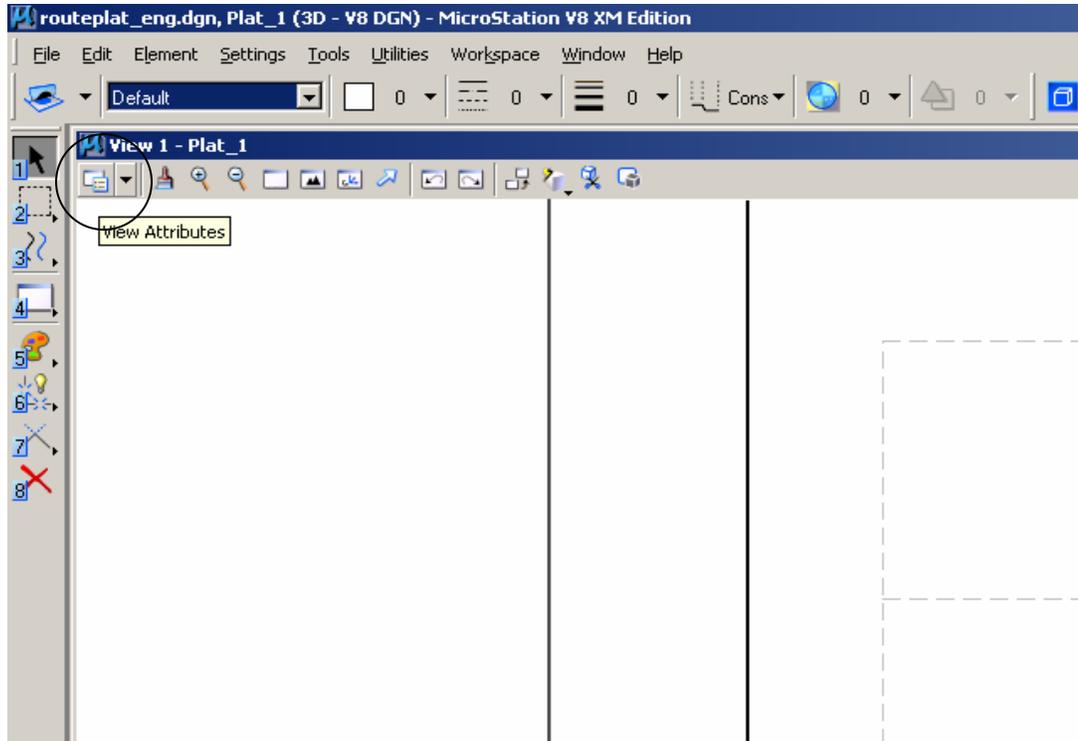


10. Using the mouse pointer, navigate to the desired insertion point and click the **left mouse button**. The gray grid was created to give a symmetric placement of the boxes.



11. Repeat the placement process for each control point reference box you want to add to the Route Plat Sheet.
12. When complete, you should have a reference file attached for each control point reference box.

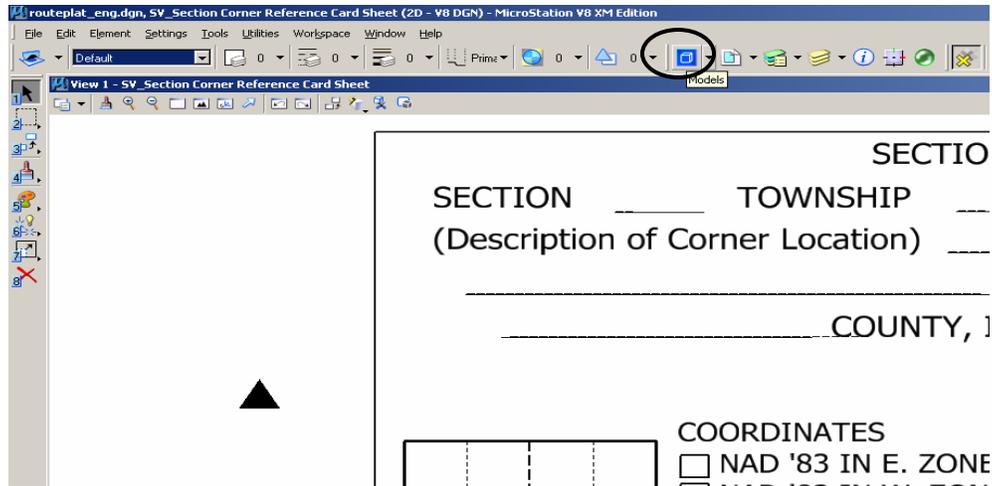
- In order to turn off the grey grid/insertion lines, select the **View Attributes** toolbox in the upper left corner of the view frame, and uncheck the **constructions checkbox**. Then hit **Ctrl+F** to save settings for future use.



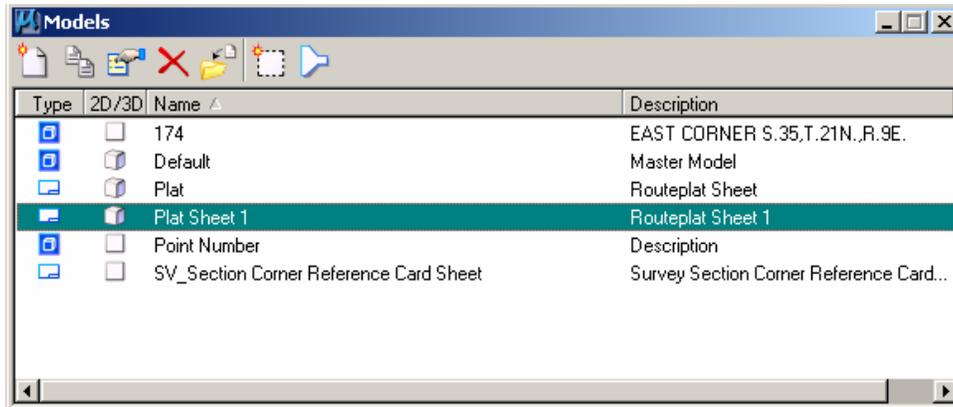
3.9 Adding a Coordinate Table to the Route Plat

The following steps go through the process of adding a Coordinate Table to the Route Plat Sheet.

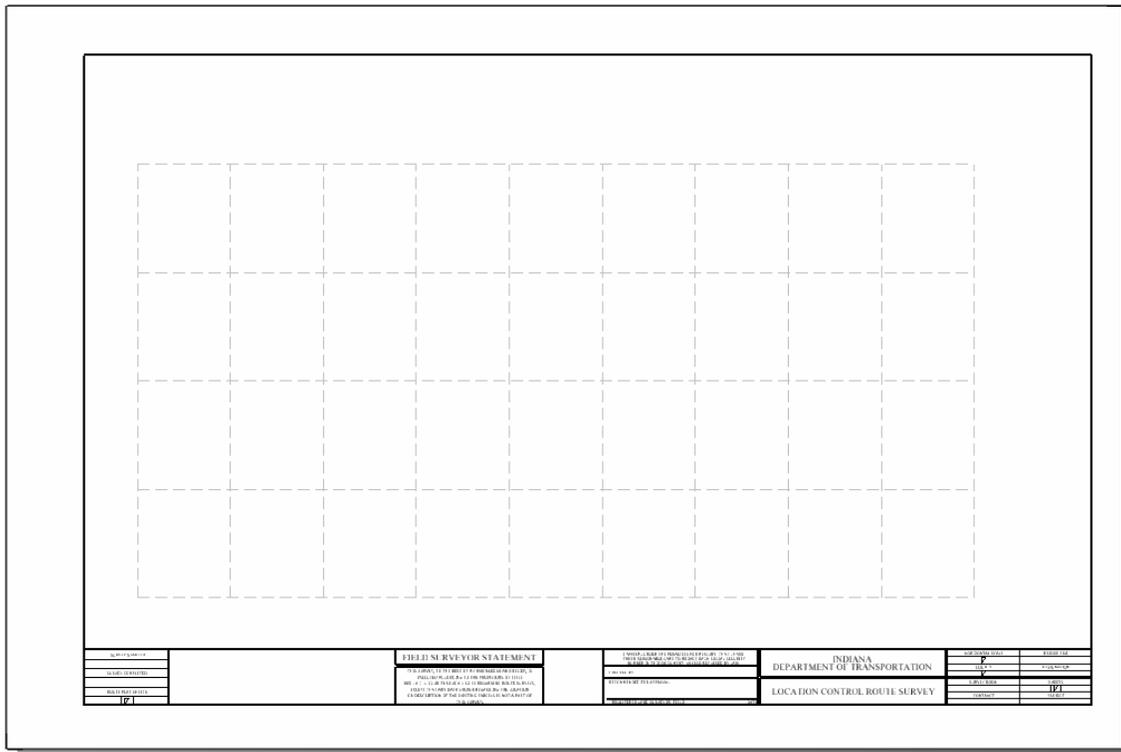
1. Open the MicroStation Route Plat File. (routeplat_eng.dgn)
2. Click on the *Models* dialog box to open it.



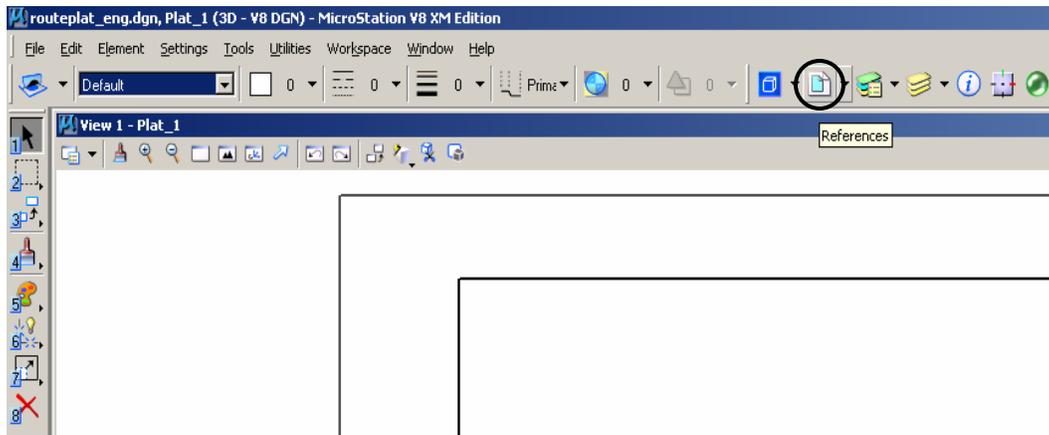
3. Double Click on the plat model (*Plat Sheet 1*) to open it.



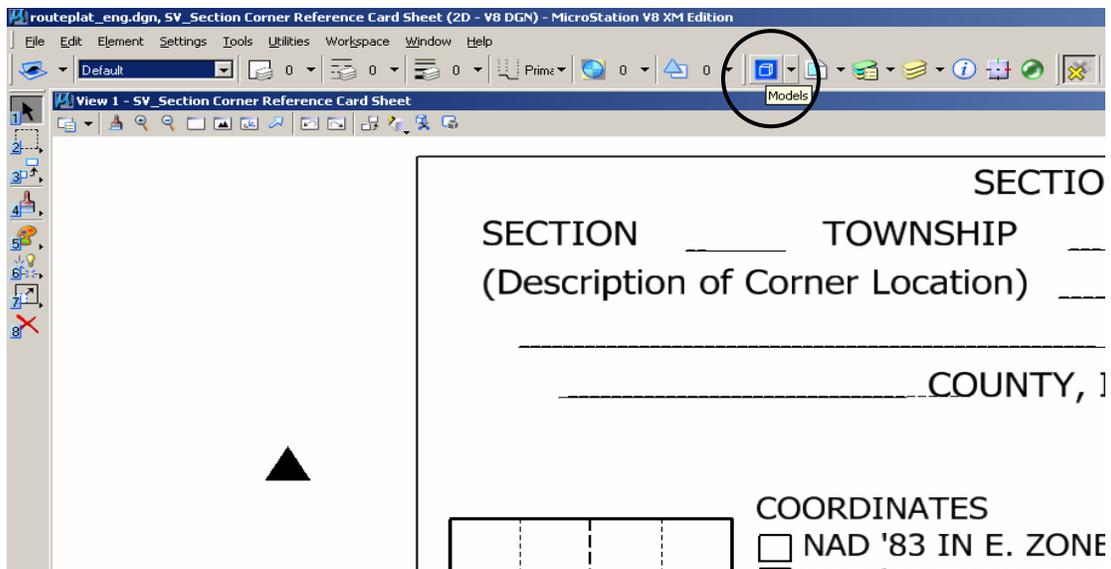
4. Using the zoom tools, or by double clicking the mouse wheel, *zoom extents*. The template Plat Sheet contains the Route Plat Basesheet and a grid that is gray scale.



5. Select the **References** dialog box.

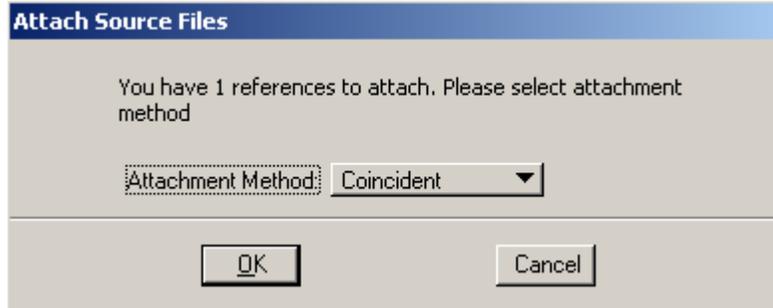


6. If not already opened, click on the **Models** dialog box to open it.



7. In the **Models** dialog box, select the *Overall Coordinate Table* model by left clicking on it.
8. Hold down the left mouse button and drag and drop the selected model name into the **References** dialog box.

9. When the **Attach Source Files** dialog box appears, change the Attachment Method to **Coincident**, and click **Ok**.

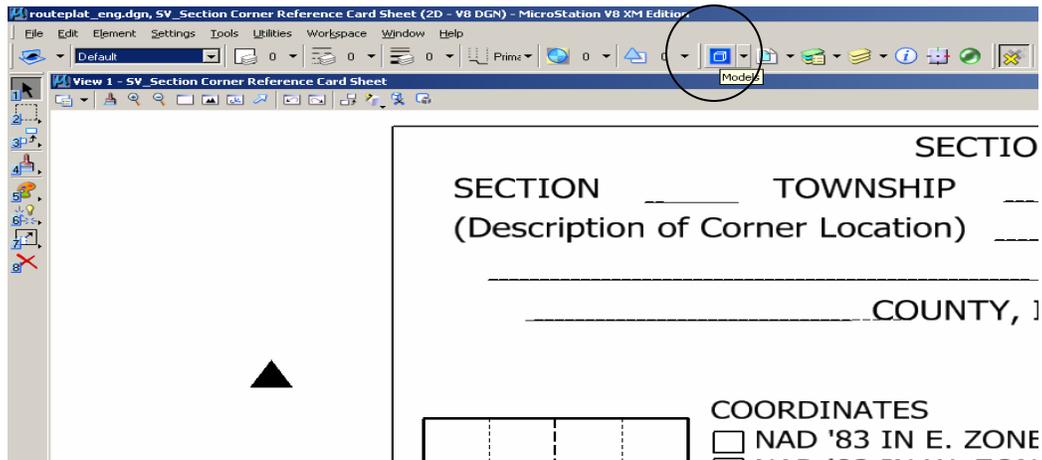


10. The Overall Coordinate Table will be added to your Route Plat Sheet. You can change its location by selecting the **Move References** icon and then left clicking on the location you want to move it from and finally left clicking on the location you want to move it to.

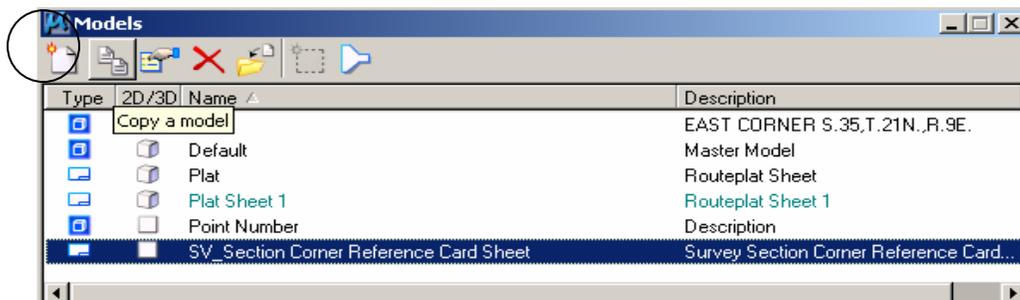
3.10 **Creating Section Corner Cards**

The following steps go through the process of creating a new Section Corner Card and adding the reference box to the Section Corner Card.

1. Open the MicroStation Route Plat File. (routeplat_eng.dgn)
2. Left Click on the *Models* dialog box to open it.



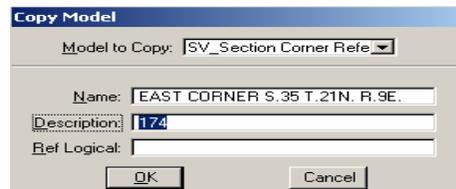
3. Left Click on the section corner card model (*SV_Section Corner Reference Card Sheet*) to select it.
4. Select *Copy a Model* tab at the top of the Models Dialog Box.



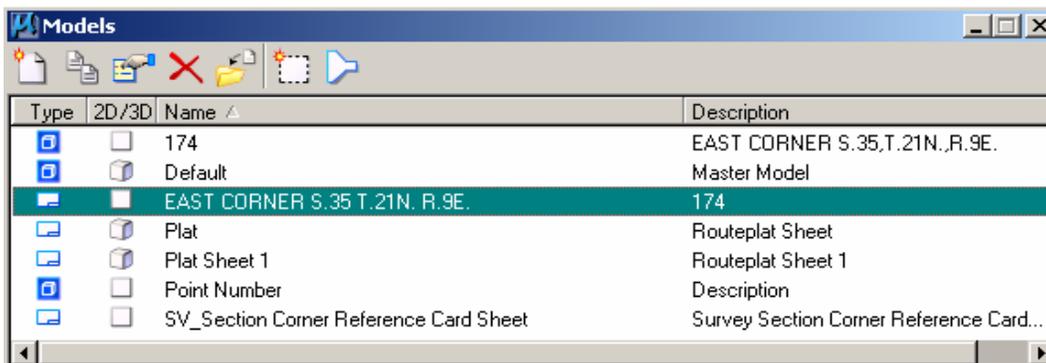
5. Change the name to the desired monument name. (***EAST CORNER S.35 T.21N. R.9E.***)

Note that comma's are not permitted.

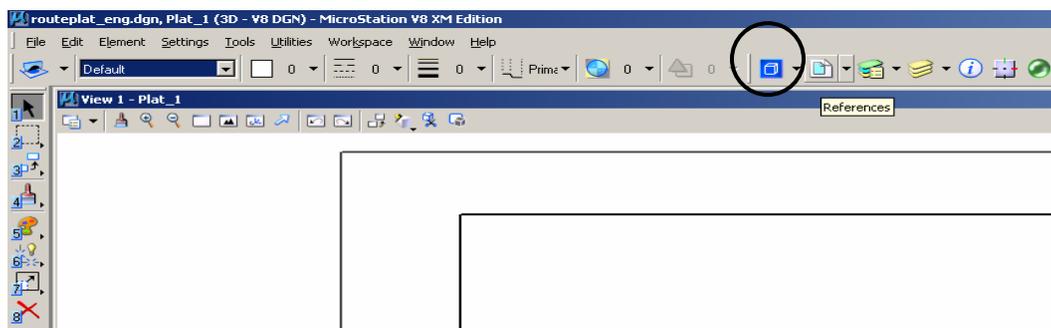
6. Change the description to desired. (***174***)



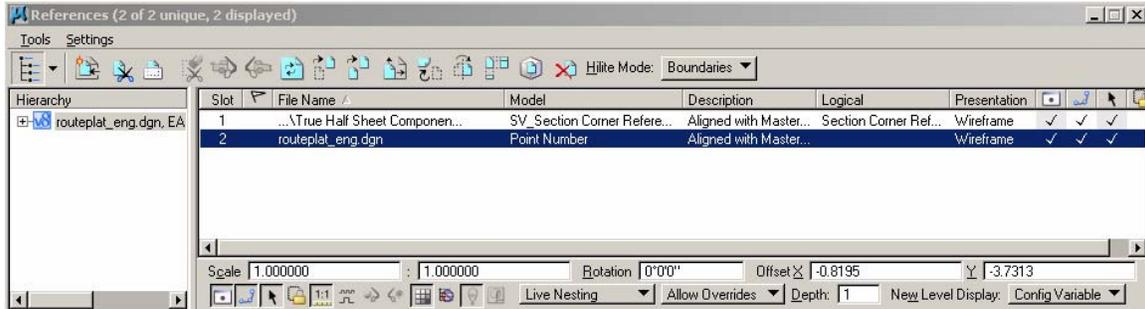
7. Select ***OK*** and a new Model will be created.



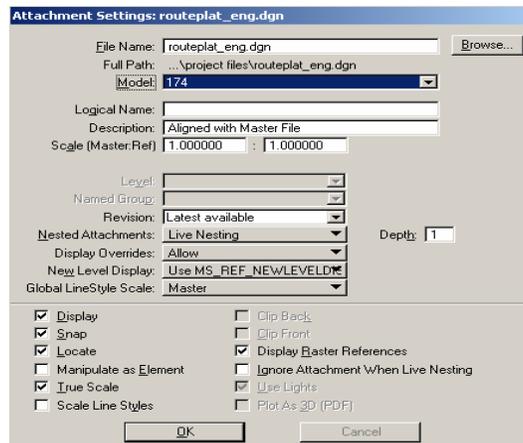
8. If not automatically opened, open the “***EAST CORNER S.35 T.21N. R.9E.***” Model by double clicking on it in the Models dialog box.
9. Now lets add the reference box, select the ***references*** toolbox.



10. In the **References** dialog box double Click on **routeplat_eng.dgn** file to select it.

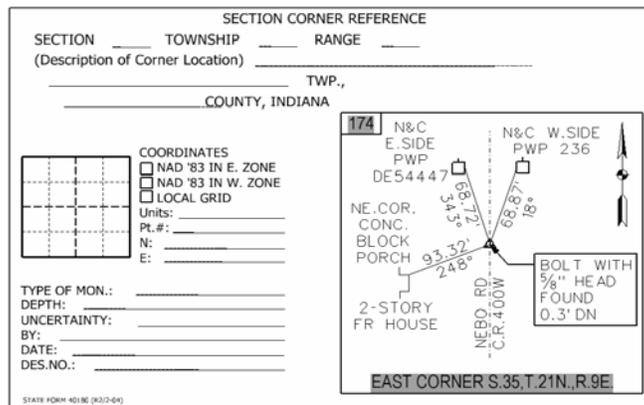


11. In the Attachment Settings dialog box, select the **Model** pull down menu and choose the desired reference box model.(174).



12. Click **Ok**.

13. The Reference Box for **Point 174** will be automatically inserted into the Section Corner Card.



14. Be sure to save settings by hitting ***Ctrl and F***, or selecting ***File -> Save Settings***. This will ensure that the changes you made to the reference files will be saved for next time.
15. You will need to fill-in the rest of the Section Card information.
16. Repeat the procedure for each section corner card necessary.
17. When complete, you should have a section card model for each section card.

Exercise 3.10.1 : Open Completed Route Plat and Check it out

1. Open the MicroStation file routeplat_eng.dgn located at
C:\Projects\Training Project Sample Route Plat\Project Files\
2. Open the Models dialog box and note the existing models for each reference box and plat sheet.
3. Open the Model entitled Plat Sheet 2.
4. Zoom around the Route Plat to view what the finished product would look like.
5. Open the Model entitled Plat Sheet 3.
6. Zoom around the Route Plat to view what the finished product would look like.

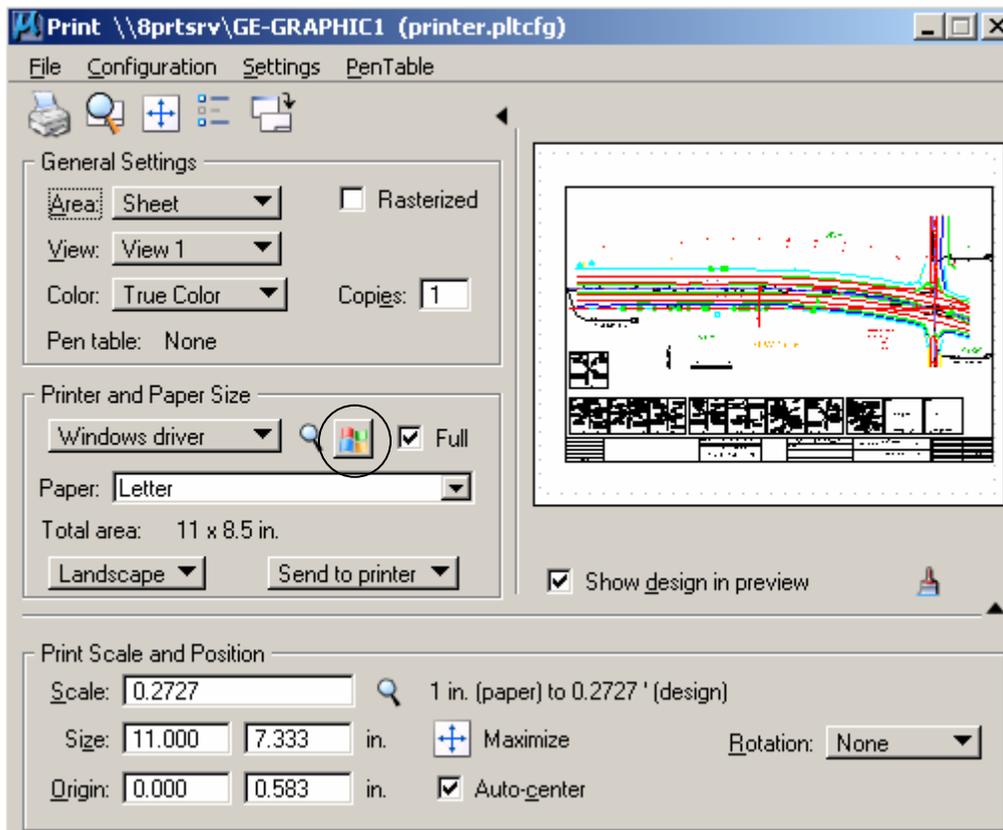


Chapter 4 -Plotting

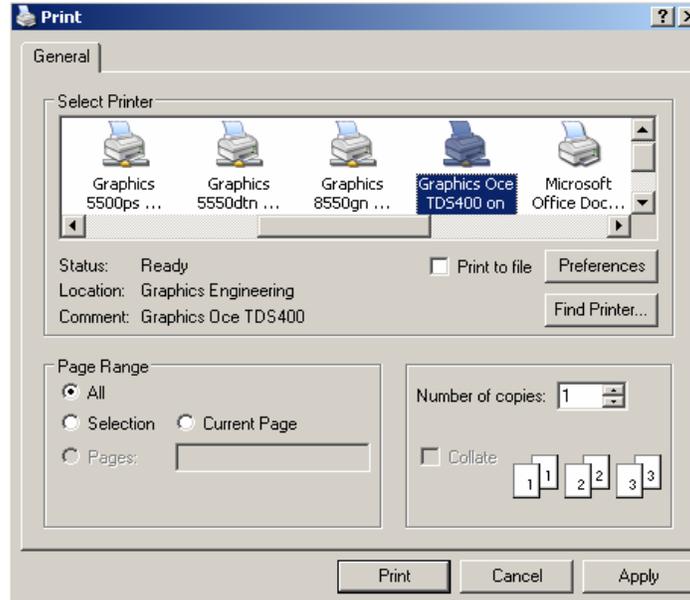
Plotting in the XM workspace for surveys will be accomplished using Print/Plot in MicroStation, in the same manner as the 2004 v8 workspace. All of the plotting configuration and settings files reside on the “X” drive for those using a computer on the network and on the “C” drive for those not connected to the network..

4.1 Plotting in MicroStation XM Using Print/Plot

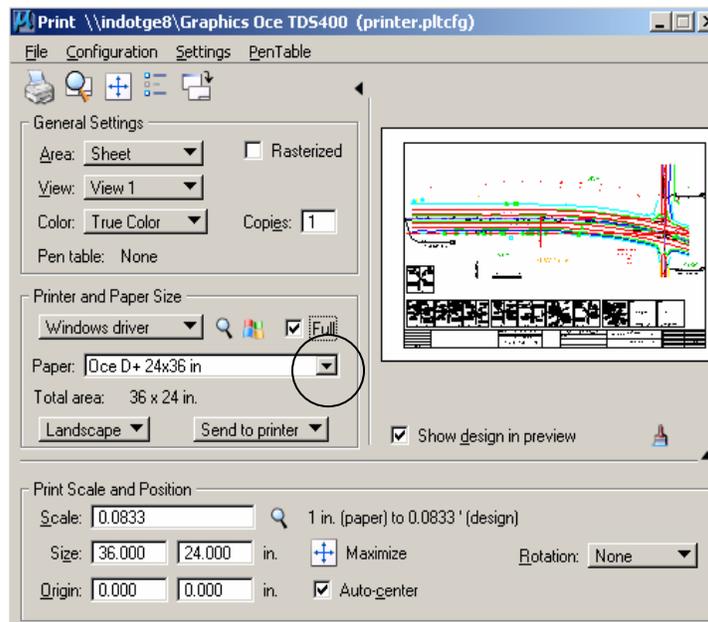
1. Open the MicroStation file containing the sheet you would like to plot. (*routeplat_eng.dgn*)
2. Select **File->Print**, or type **Ctrl+P** to open the Print/Plot dialog box.
3. Left click on the **Configure Windows Printer** button and select the desired plotter.



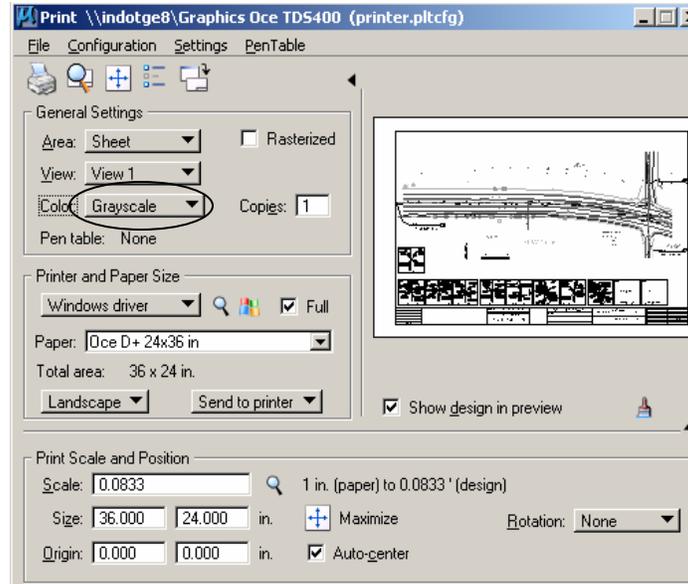
Scroll through the available printers and plotters to find the desired plotter. Once you have selected it, select **Print**. This will return you to the Print/Plot dialog box, it will not send a plot.



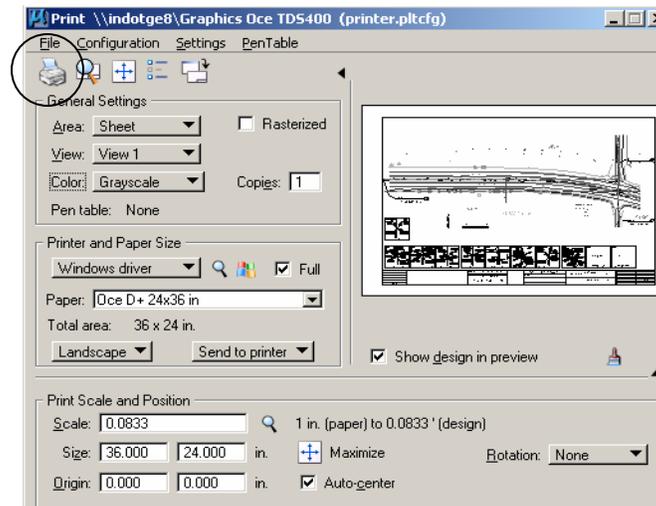
- Next select the arrow to the right of the **Paper Size** scroll and choose the appropriate paper size.



5. If the plot area is not covering the entire preview display uncheck the **Full** checkbox and then re-check it.
6. Change the color to **Grayscale**, unless you want a color plot.

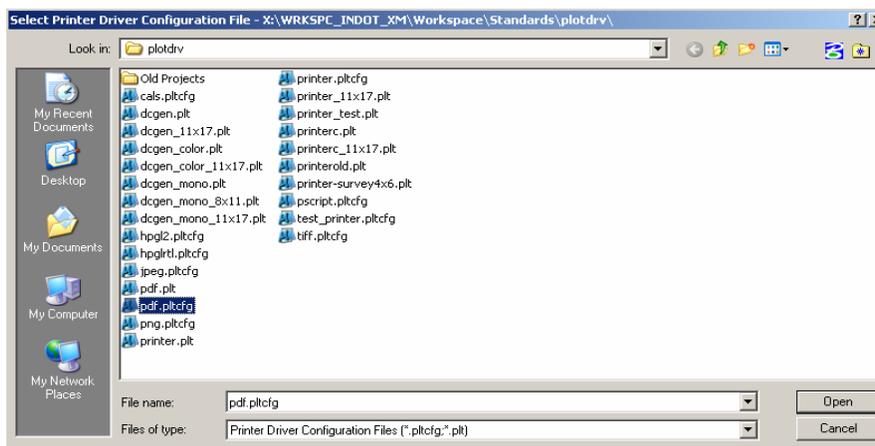
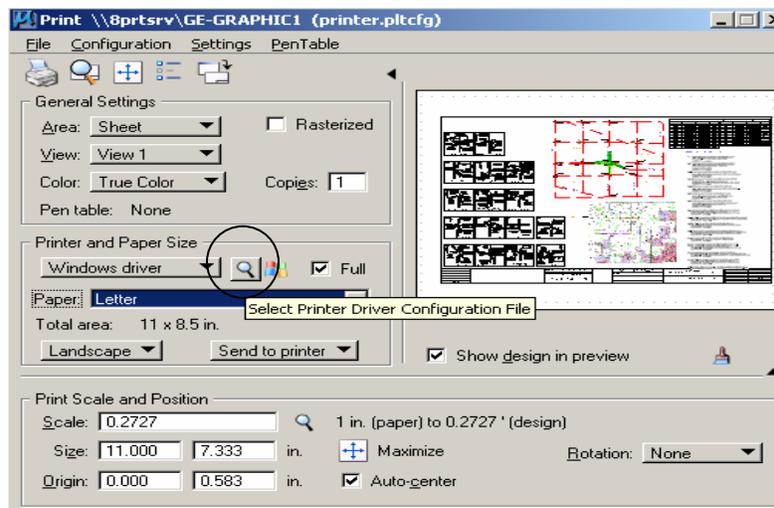


7. Verify that the **Print Scale** and **Size** seem to be reasonable.
8. Select **File->Print**, or click on the printer icon on the dialog box to send the plot/print.

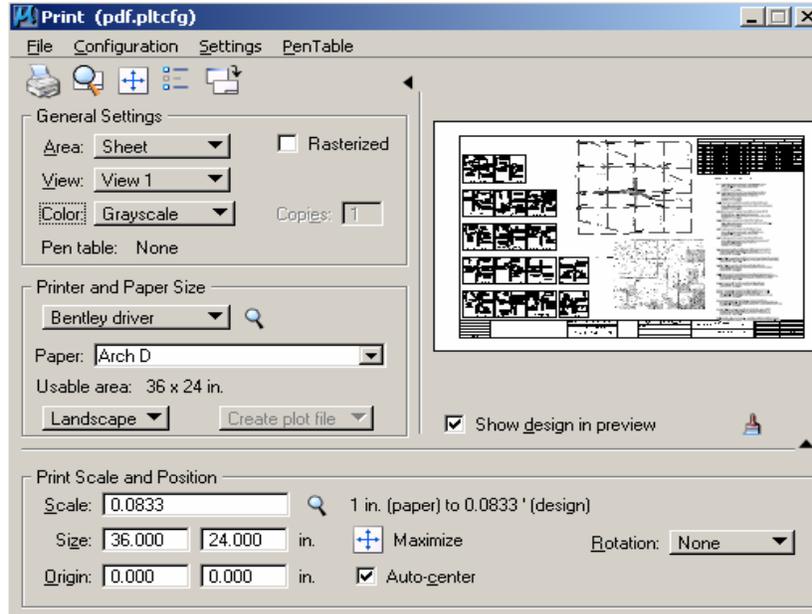


4.2 Plotting to a PDF file in MicroStation XM Using Print/Plot

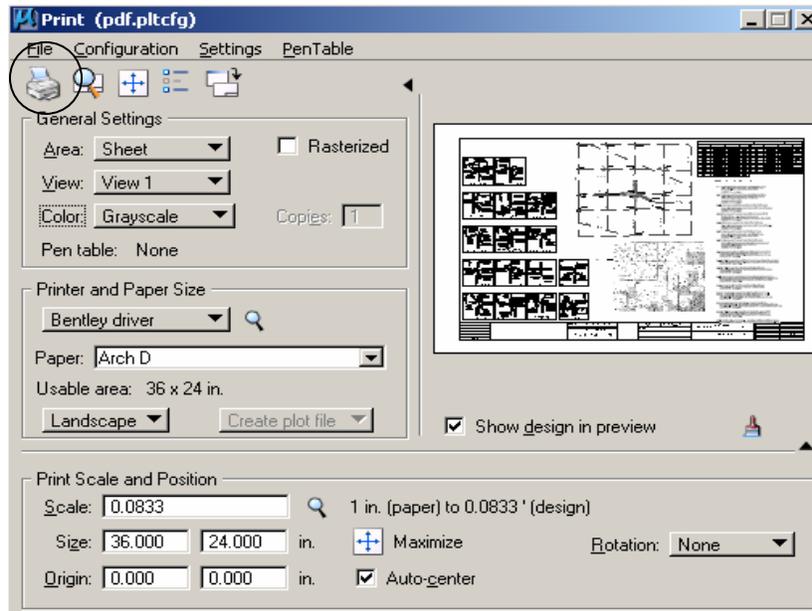
1. Open the MicroStation file containing the sheet you would like to plot. (*routeplat_eng.dgn*)
2. Select **File->Print**, or type **Ctrl+P** to open the Print/Plot dialog box.
3. Left click on the **Select Printer Driver Configuration File** button and select the desired configuration file,
X:\WRKSPC_INDOT_XM\Workspace\Standards\plotdrv\pdf.pltcfg or
C:\WRKSPC_INDOT_XM\Workspace\Standards\plotdrv\pdf.pltcfg



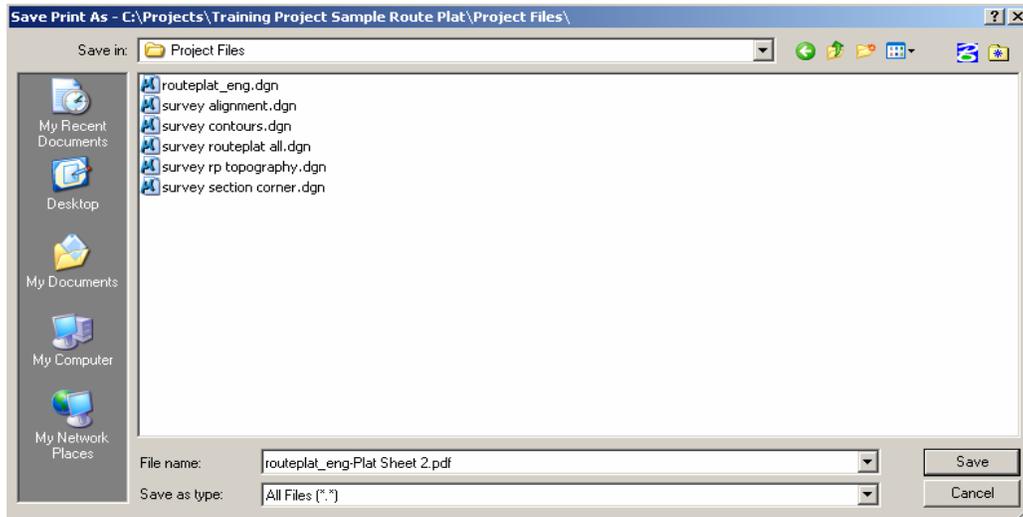
4. Check to make sure the *paper size* is *Arch D*, the *scale* is *0.0833*, and the *color* is set to *Grayscale* unless you want a color plot.



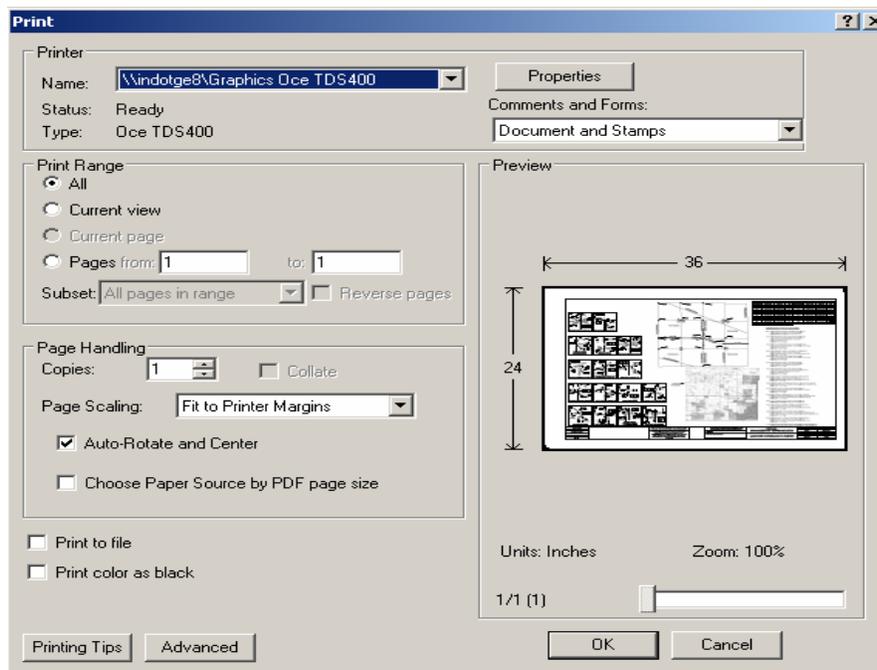
5. Select **File->Print**, or click on the printer icon on the dialog box to send the plot/print.



6. Navigate to the desired storage location and input the appropriate filename for the pdf. Then left click on the **Save** button.



7. **Double left click** on the pdf filename in Windows Explorer to open it in Adobe Acrobat. Then select **File->Print** option to plot the sheet. Choose an appropriate **Printer/Plotter** and **left click** on **Ok** to print the sheet.



4.3 **Plotting Configuration**

4.3.1 Printer/Plotter locations:

Printer/Plotter Model	Location	Print Server Name/Description
Oce TDS 400 (B/W)	6 th Fl. Center (N. of main aisle)	<i>INDOTGE8 6C</i> OceTDS400
Oce TDS 400 (B/W)	6 th Fl. Center (N. of main aisle)	<i>INDOTGE8 6E</i> OceTDS400
HP 5000 (Color)	6 th Fl. Center (N. of main aisle)	<i>INDOTGE8 6E</i> 5000ps
HP 5000 (Color)	6 th Fl. West (SW corner)	<i>INDOTGE8 6W</i> 5000ps
HP 5000 (Color)	9 th Fl. West End	<i>INDOTGE8 9W</i> 5000ps
Oce TDS 600 (B/W)	Laporte District	<i>INDOTGE8 LA</i> OceTDS600
Oce TDS 600 (B/W)	Ft. Wayne District	<i>INDOTGE8 FW</i> OceTDS600
Oce TDS 600 (B/W)	Crawfordsville District	<i>INDOTGE8 CR</i> OceTDS600
Oce TDS 600 (B/W)	Greenfield District	<i>INDOTGE8 GR</i> OceTDS600
Oce TDS 600 (B/W)	Seymour District	<i>INDOTGE8 SY</i> OceTDS600
Oce TDS 600 (B/W)	Vincennes District	<i>INDOTGE8 VN</i> OceTDS600
Oce TDS 600 (B/W)	Materials & Test	<i>INDOTGE8 MT</i> OceTDS600

Note: Any printers not listed in the preceding table can be added from

<Floor no.>PRTSRV Example: 6PRTSRV (6th Floor)

This list does not include any printers that may have been added per request. Please contact your CAD Team representative or the CAD Support Staff via a Help Desk Ticket and we will assist you in locating what printers have been setup for your sections.

4.4 Adding Printers and Plotters

Open Windows Explorer and type \\INDOTGE8 or \\<Floor no.>PRTSRV in the address bar. A list of available printers and plotters will be displayed. Double click on the printer or plotter desired and it will then be available for use.

Note: Printers and plotters can still be added by the Add Printer Wizard, more details can be found on the CAD/GIS FAQ page.

4.4.1 Print/Plot Drivers

/Plot Driver

printer.tbl	2D and 3D Full Size Sheets
printerc.tbl	2D and 3D Full Size Sheets in Color
printer_8x11.tbl	2D and 3D 8 x 11 Size Sheets
printer_11x17.tbl	2D and 3D 11 x 17 Size Sheets
printerc_11x17.tbl	2D and 3D 11 x 17 Size Sheets in Color
printer-survey4x6.tbl	4 x 6 Survey Field Book Information
dcgen.tbl	2D and 3D Full Size Sheets with an Image
dcgen_color.tbl	2D and 3D Full Size Sheets with an Image in Color
dcgen_mono.tbl	2D and 3D Full Size Sheets with an Image in B/W (Linestyles 0,1 slightly thicker)
dcgen_color_11x17.tbl	2D and 3D 11 x 17 Size Sheets with an Image in Color
dcgen_mono_11x17.tbl	2D and 3D 11 x 17 Size Sheets with an Image in B/W
colour-fill-oc.tbl	2D and 3D Sheets with an Image for Public Hearings
pdf.tbl	2D and 3D Sheets for PDF format

These files are located at: *X:\WRKSPC_INDOT_XM\Workspace\Standards\plotdrv.*

Be sure to only use these drivers and not the ones located on your C:/ drive.

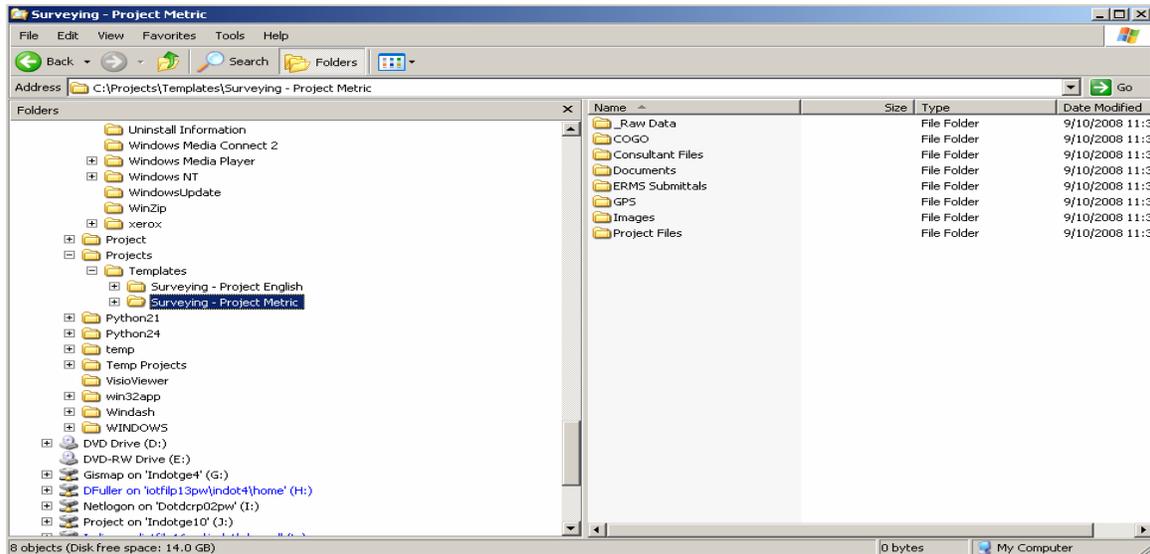
Chapter 5 -ProjectWise and the Survey Workspace

5.1 **Creating a New Survey Project**

As of the release of the 2008 version of the INDOT Workspace, ProjectWise will be the tool used to manage a project throughout its lifecycle. This chapter goes through the process of creating a new project and then adding it to the ProjectWise database once the project is completed.

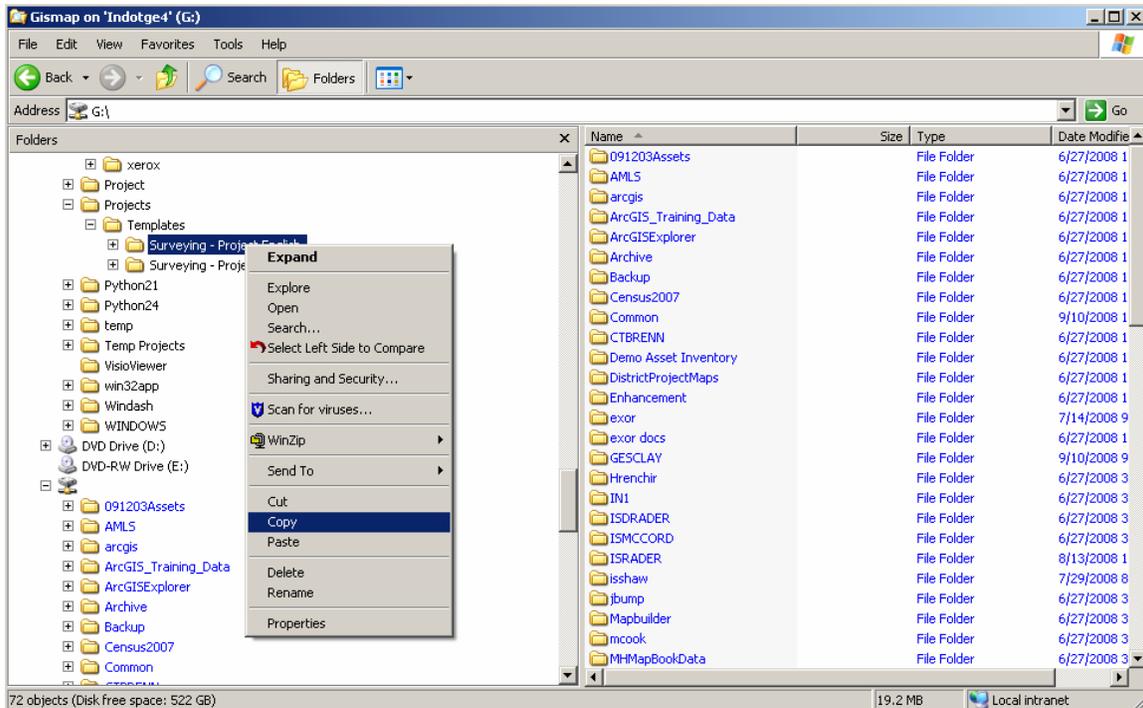
The procedure for creating a new Survey Project will be completed outside of ProjectWise, and involve the use of existing template projects. These template projects are located in the *C:\Projects\Templates* directory on your computer. The following steps go through the process of creating a new project.

1. Using the Windows Explorer navigate to the directory: *C:\Projects\Templates*



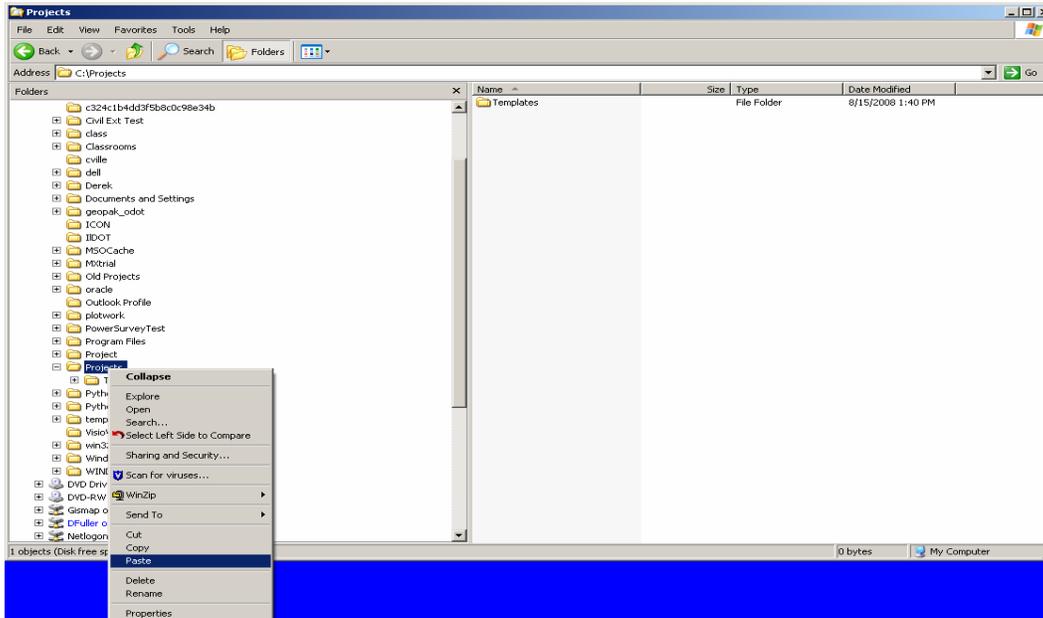
Note: There are two template project folder structures. The first is for those projects using English Units (Surveying – Project English). The second is for those projects using Metric Units (Surveying – Project Metric).

2. Right Click on the desired project type and select *Copy*.

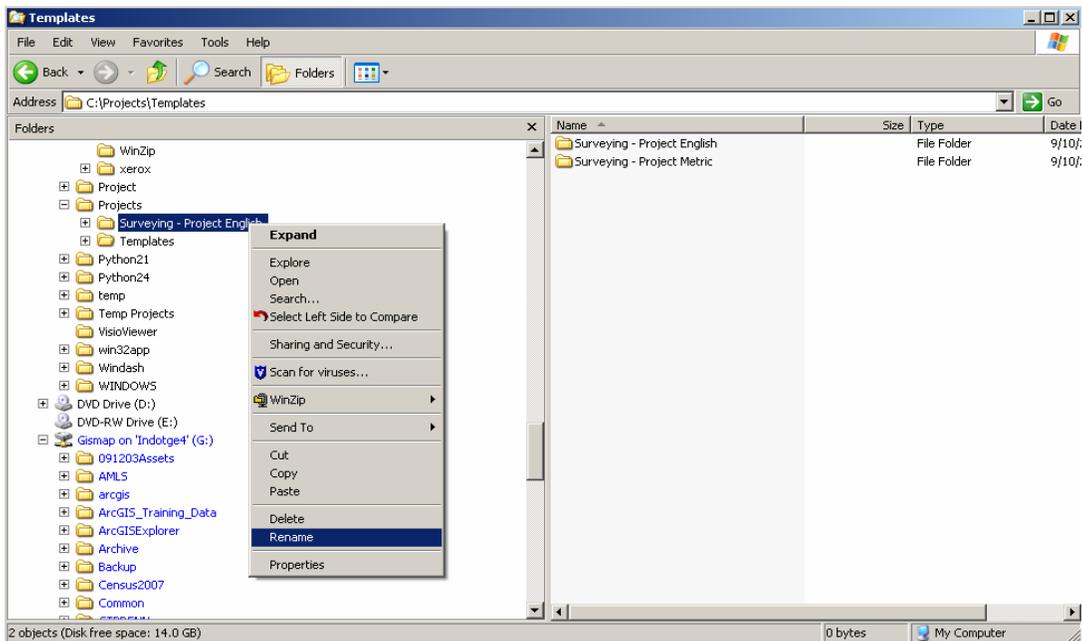


3. Navigate to the directory: *C:\Projects*

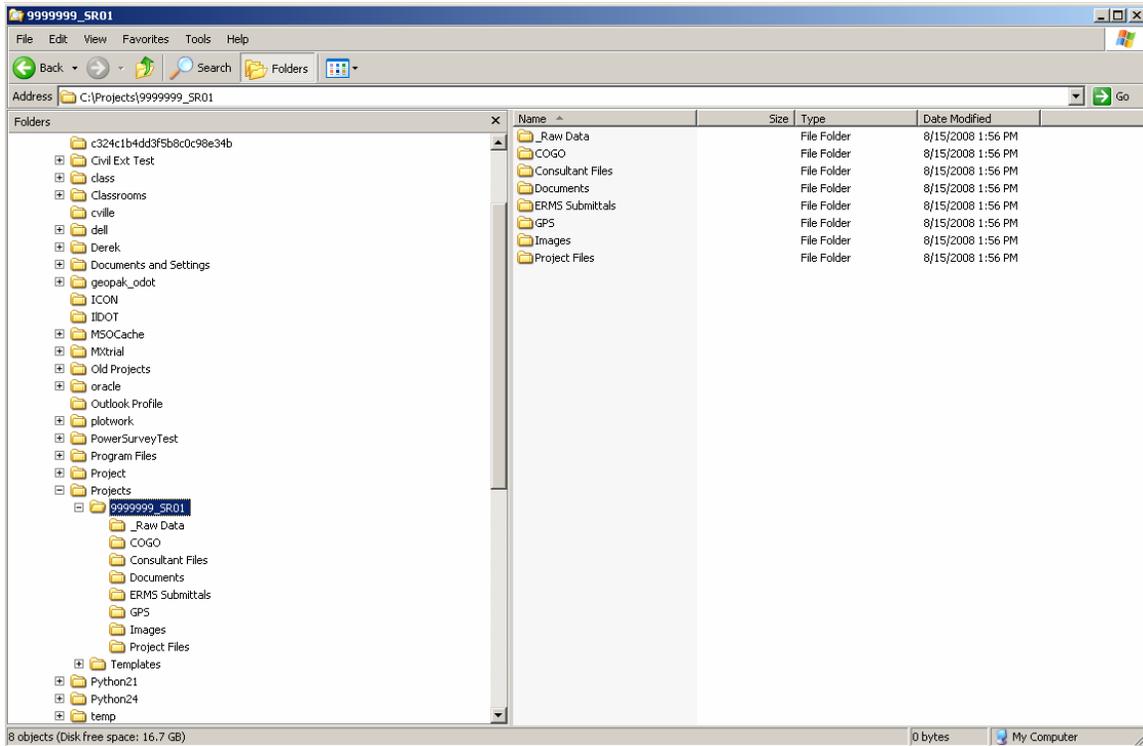
4. Right Click on the folder titled Projects and select **Paste**.



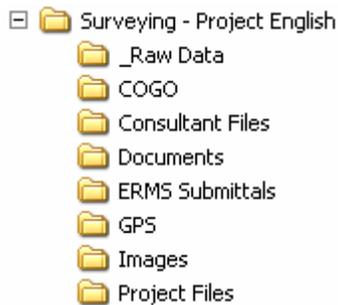
5. Right Click on the newly created folder (Surveying – Project English) and select **Rename**.



6. Change the name of the folder to your desired project name (9999999_SR01)



7. Once you rename the folder, your new project is created. Shown below is the Surveying – Project English folder and its contents. The metric template project has the same structure, except it contains metric seed files for the template dgn files.



Note that the template dgn files including those for the Route Plat are stored in the Project Files folder.

5.2 Adding a Completed Project to ProjectWise

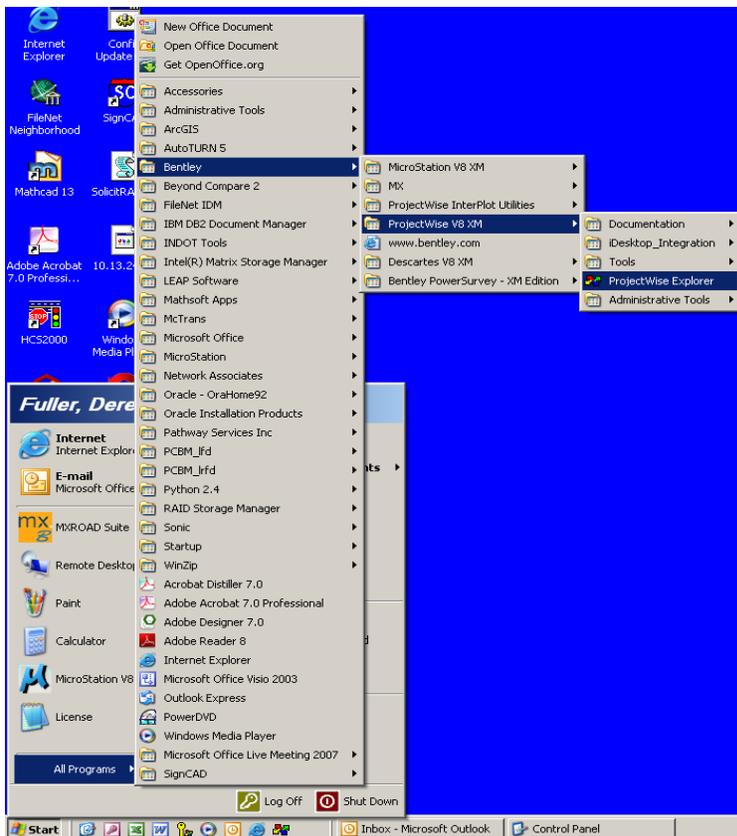
The following section goes through the procedure for adding a completed Survey Project to the ProjectWise datasource.

5.2.1 Starting ProjectWise

The following are the two most typical ways to start the ProjectWise software.

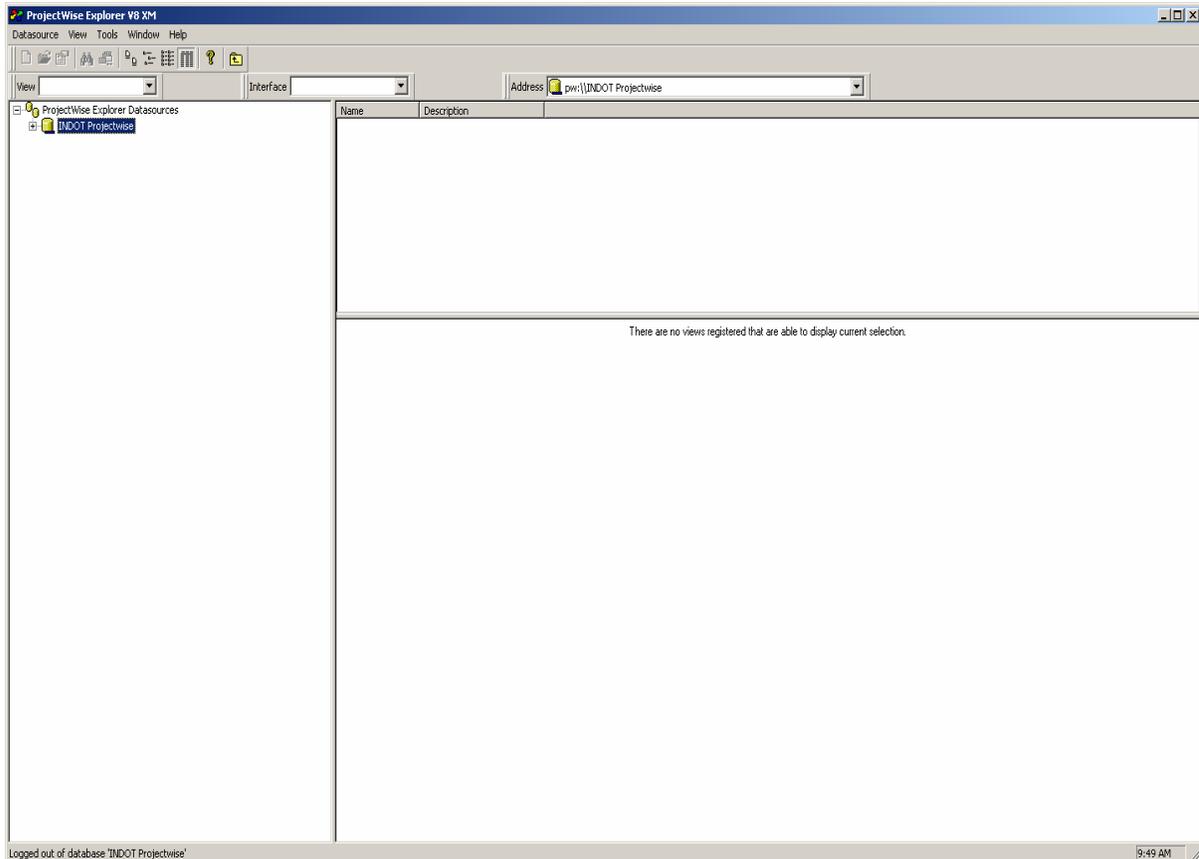


The first way is to double click on the *ProjectWise Explorer* icon on your desktop. This will take you to the main screen of the ProjectWise Explorer.



The second way is through the Windows Start Menu. Click on *Start*, select *All Programs*, select *Bentley*, select *ProjectWise V8 XM*, and click on *ProjectWise Explorer*. This will take you to the main screen of the ProjectWise Explorer.

After the ProjectWise Explorer has been started you will see the main screen.



5.2.2 Accessing the INDOT Datasource

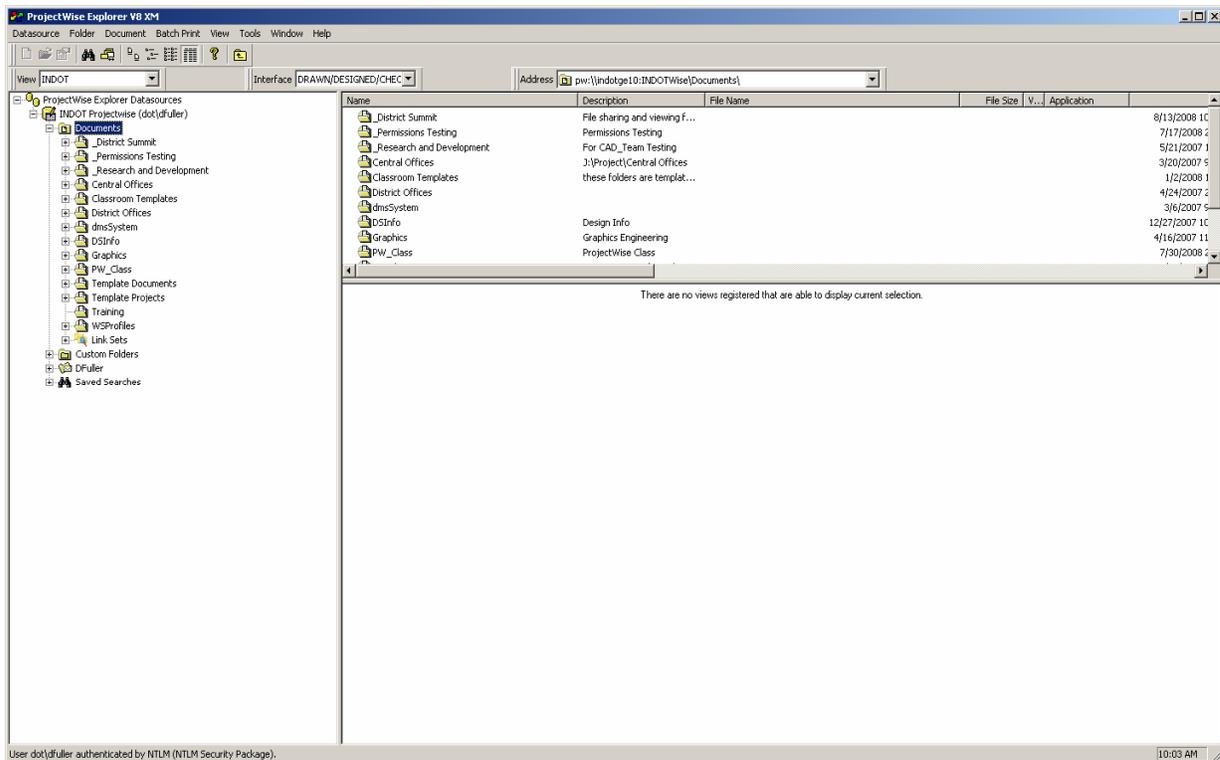
Once you are at the main screen of the ProjectWise Explorer, you will need to login to INDOT ProjectWise.

As long as you are logged onto the computer with your INDOT credentials all you need to do is double click on the icon titled *INDOT ProjectWise*. This will expand the Database Tree so you can access your project files.

If you are not logged onto the computer with your INDOT credentials or someone else is logged onto the computer, you will need to right click on the icon titled **INDOT ProjectWise**. Then select the **Log in as** option. The log in menu will pop-up. Fill in the necessary information; making sure the datasource is as below, type 'dot\' before your user name, and enter your INDOT login password.



After successfully logging in you will have access to the data stored in INDOT ProjectWise.

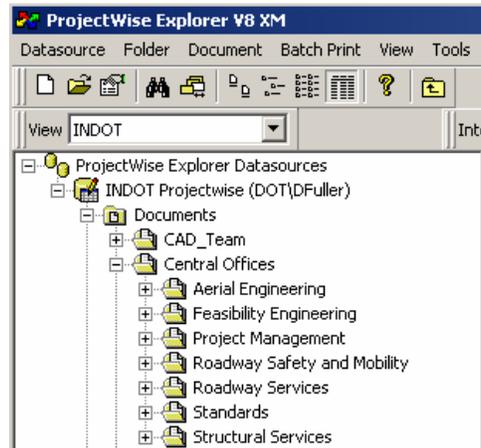


Click on the plus symbol next to the appropriate folder to expand it. In this manner you can navigate to the desired project folder or data file.

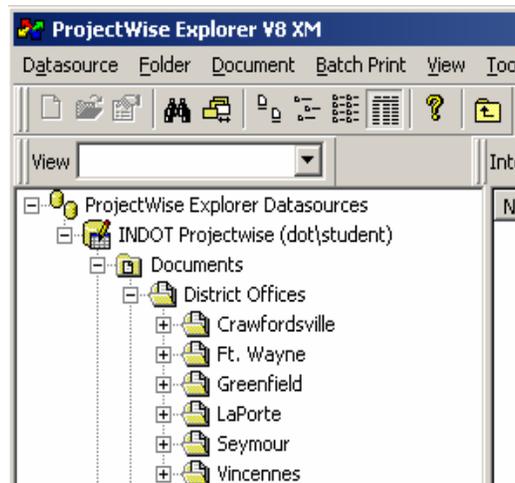
5.2.3 INDOT Folder Structure

All projects reside under *Documents* in the data source tree within the ProjectWise Explorer. Each section that utilizes the CAD workspace will have a separate folder in this area.

Survey projects completed by aerial engineering will reside under the folder labeled *Central Offices > Aerial Engineering > Surveying or Photogrammetry*.

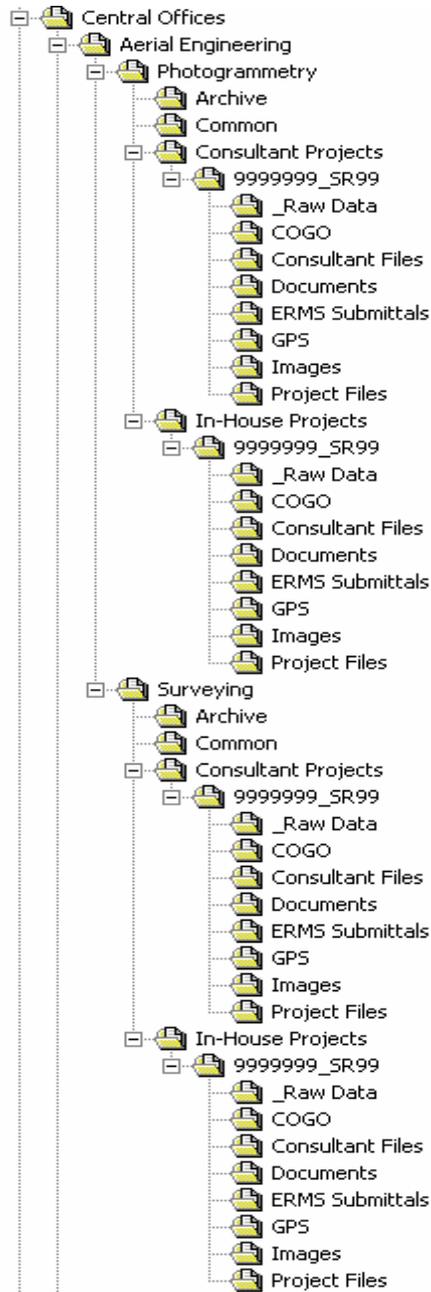


Survey projects completed by District Offices will reside under the folder labeled *District Offices > (Name of District) > Surveying*.



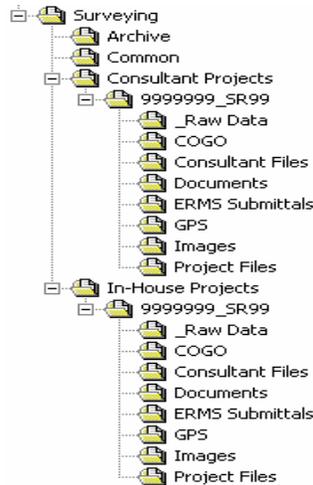
Central Office – Aerial Engineering Folder Structure

Aerial Engineering



District Offices - Surveying Folder Structure

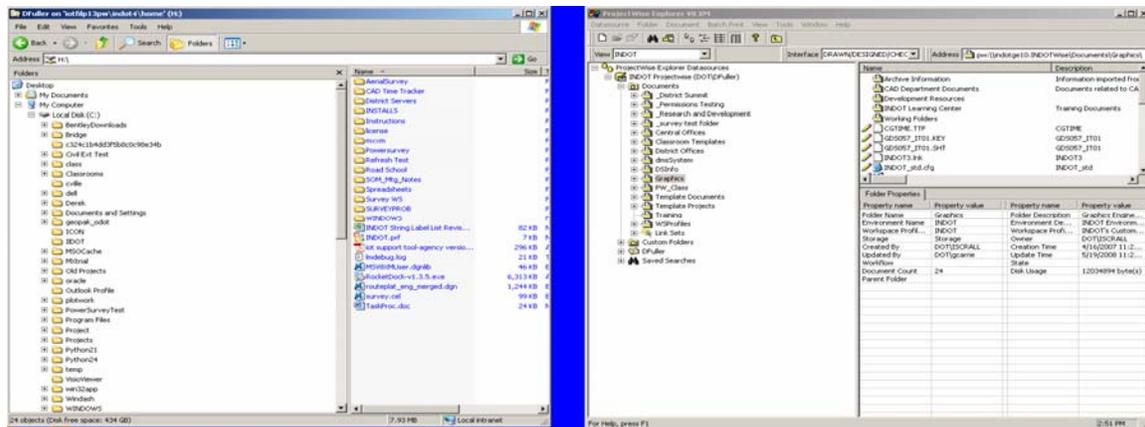
Surveying



5.2.4 Importing the Project into ProjectWise

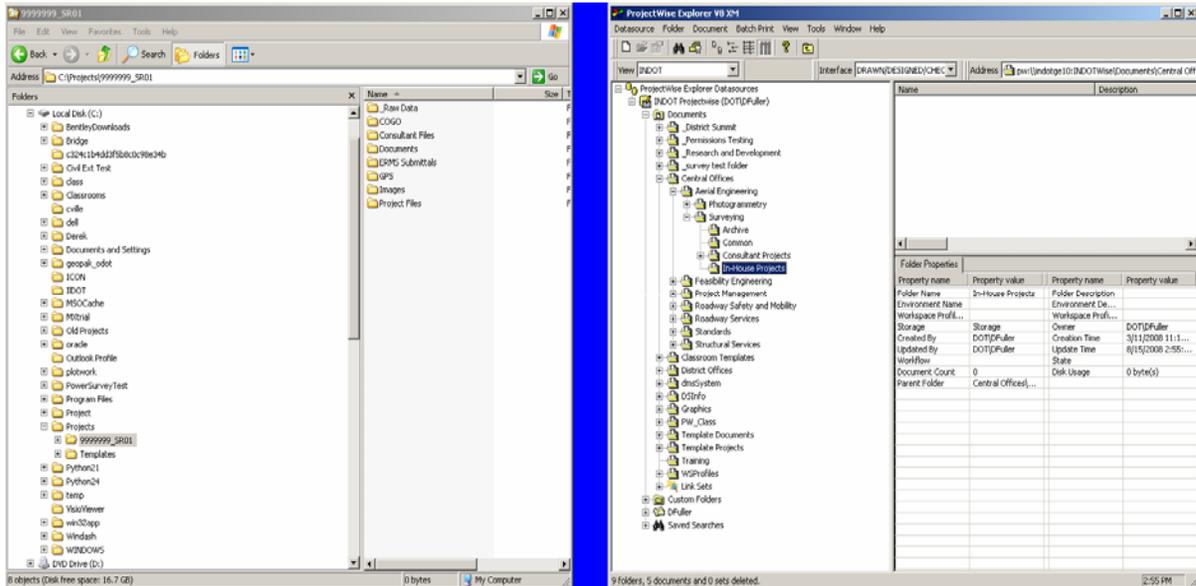
In order to import the completed project into ProjectWise you will **drag and drop** the folder from your local drive into the ProjectWise datasource. The following steps will take you through the process

1. On your desktop, split the display with **Windows Explorer** on one half and the **ProjectWise Explorer** on the other as shown below.



2. In the **Windows Explorer** navigate to the location of the completed survey project (**C:\Projects\9999999_SR01**).

- In the **ProjectWise Explorer** navigate to the location where you want to add the completed survey project
(*Documents > Central Offices > Aerial Engineering > Surveying > In-House Projects*).



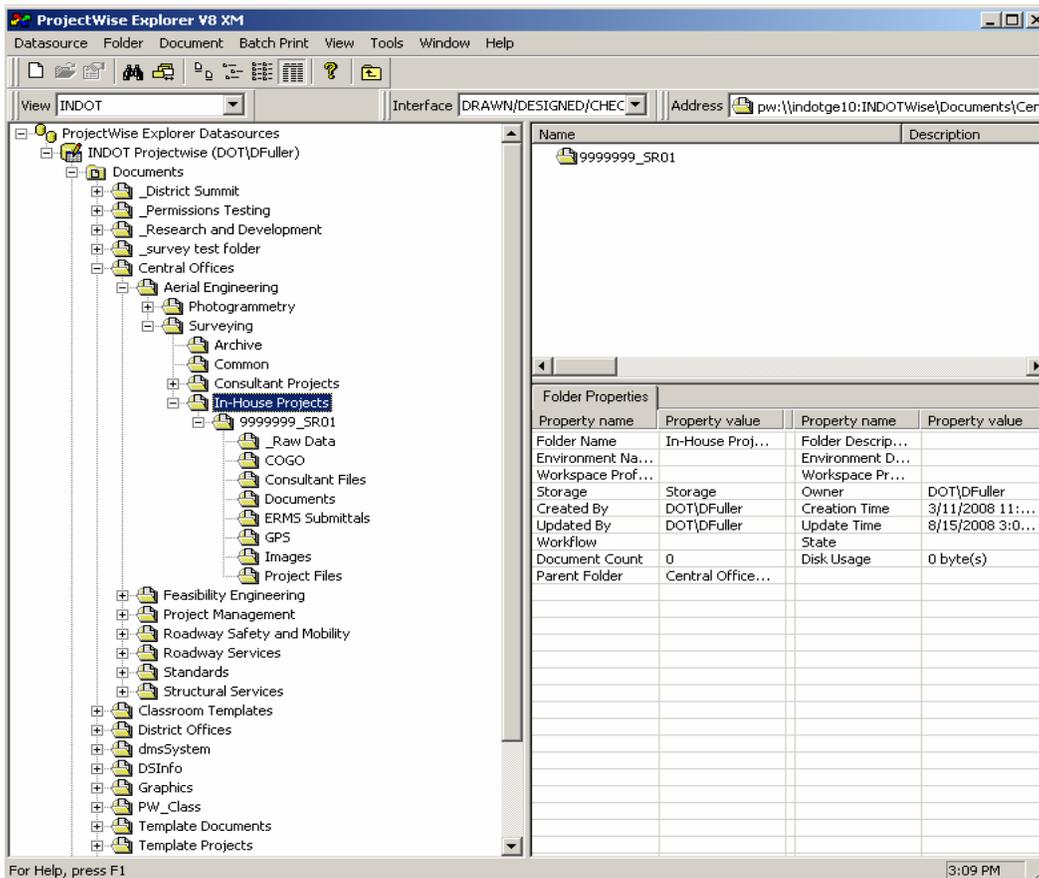
- Complete the folder **drag and drop** by left clicking on the main project folder and holding the mouse button down in the **Windows Explorer**, then while still holding the left mouse button down, drag the mouse pointer over the desired location in the **ProjectWise Explorer** and let up on the mouse button.
- At the Import Directories pop-up menu select to **Include Subdirectories** and leave the other settings as is.



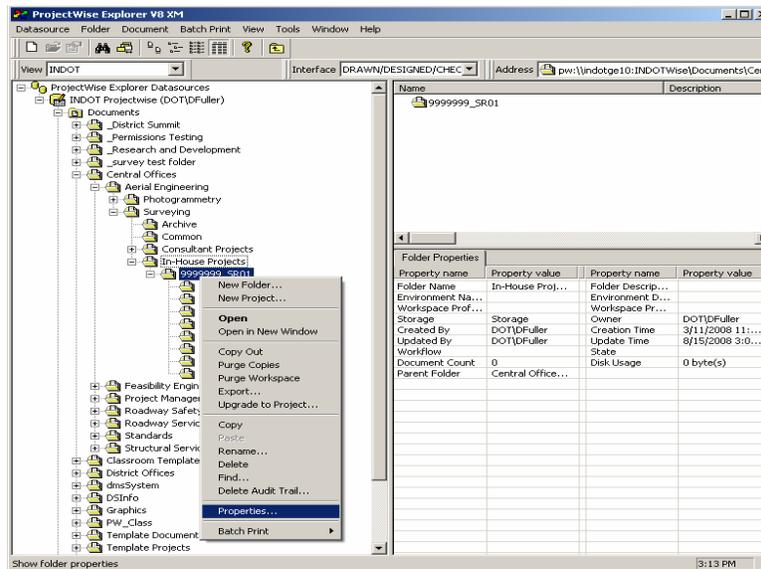
- Before creating the new folder in ProjectWise verify the storage location is correct by making sure the Parent Folder shown in the Import Directories menu is the desired location.



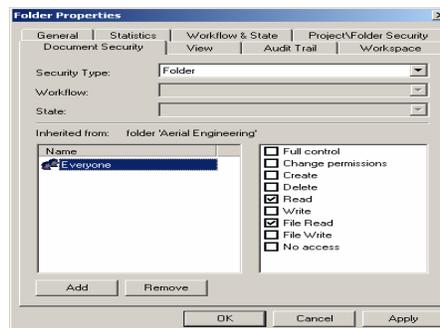
- Click **OK** and the project folder will be created in ProjectWise. Refresh the display by hitting **F5**, then verify that the folder appears.



8. The new folder will have the same security settings as the folder it was added to. For the survey storage locations in ProjectWise all non-survey users will have read access only.
9. Verify the security setting on your project by **right clicking on the main folder of the project** and selecting **properties**.



10. In the Properties menu select the **Document Security** tab. The settings will be similar to those shown below with the exception of the list of names. Your project may have additional users, but all should have only read access except for you and others in your survey section that you want to have write access to the data. If additional groups need read access to the folder submit a Help Ticket when the need arises and CAD Support will make the necessary changes.



- In the Properties menu select the **Project\Folder Security** tab. The settings will be similar to those shown below with the exception of the list of names. Your project may have additional users, but all should have only read access except for you and others in your survey section that you want to have write access to the data. If additional groups need read access to the folder submit a Help Ticket when the need arises and CAD Support will make the necessary changes.



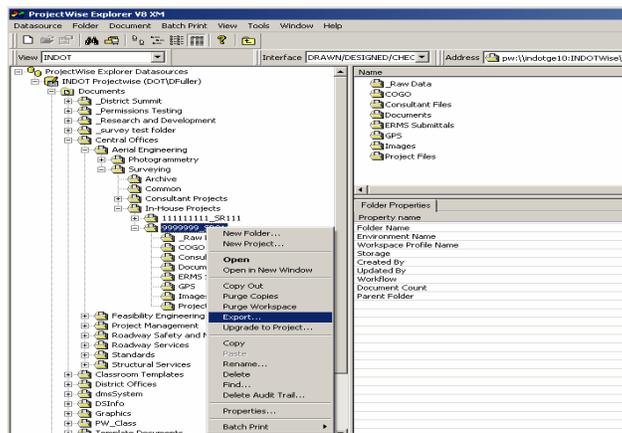
5.3 Pick-Up Surveys and ProjectWise

The following section goes through the procedure for adding pick-up survey data to a completed project that is stored in the ProjectWise datasource. By following the procedures outlined in this section the original project folder will be kept as is, and a new “pick-up” subfolder will be added to it upon completion.

5.3.1 Exporting the Existing Project from ProjectWise

In order to create the Pick-Up project folder you will need to Export the existing project folder from ProjectWise as follows:

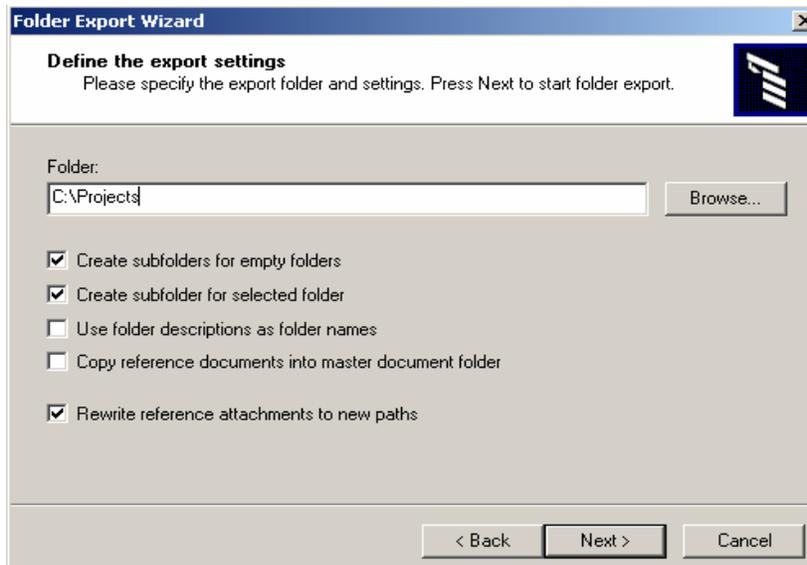
- In the **ProjectWise Explorer** right click on the main folder of the existing project you need for the pick-up, and select **Export**.



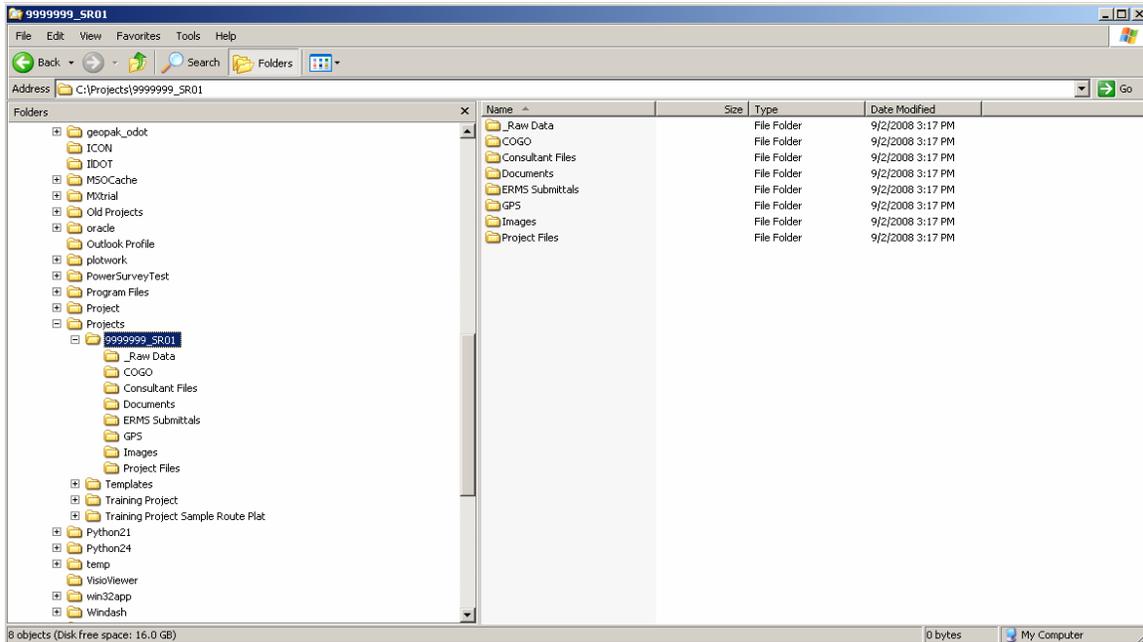
2. When the Folder Export Wizard menu appears, select **Send to Folder – Creates unmanaged local copies**, and then click **Next**.



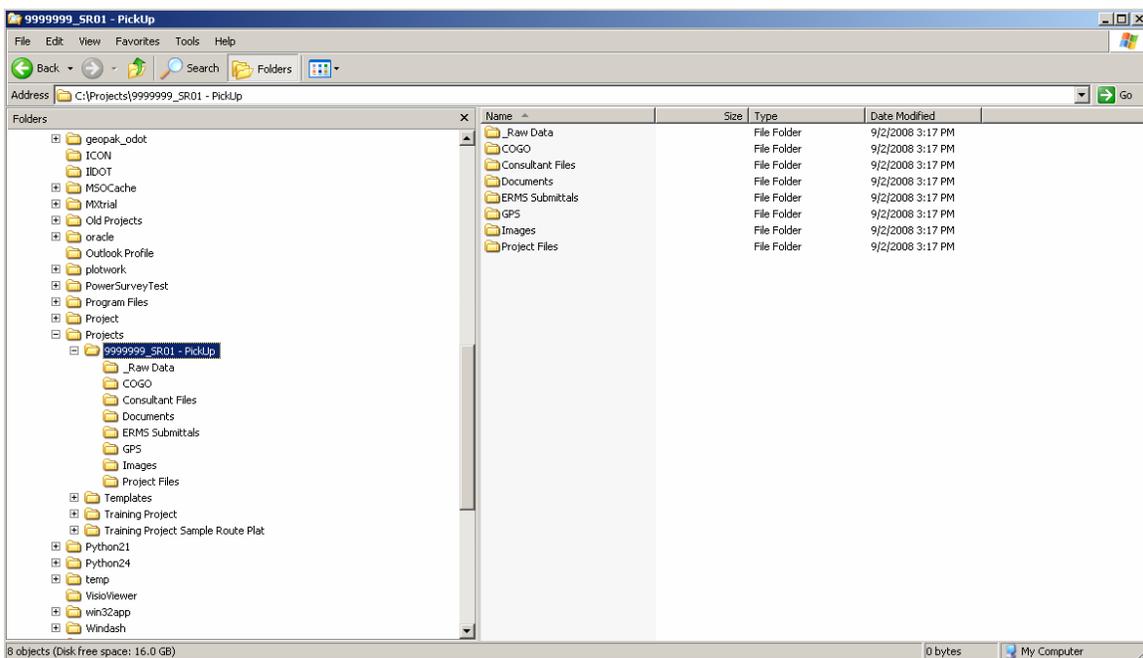
3. Then you need to specify the destination for the folder to be exported. Use the Browse tab to select the appropriate folder, **C:\Projects**. Verify that the boxes are checked as below, and then click **Next**.



4. Open the Windows Explorer and navigate to the exported folder.

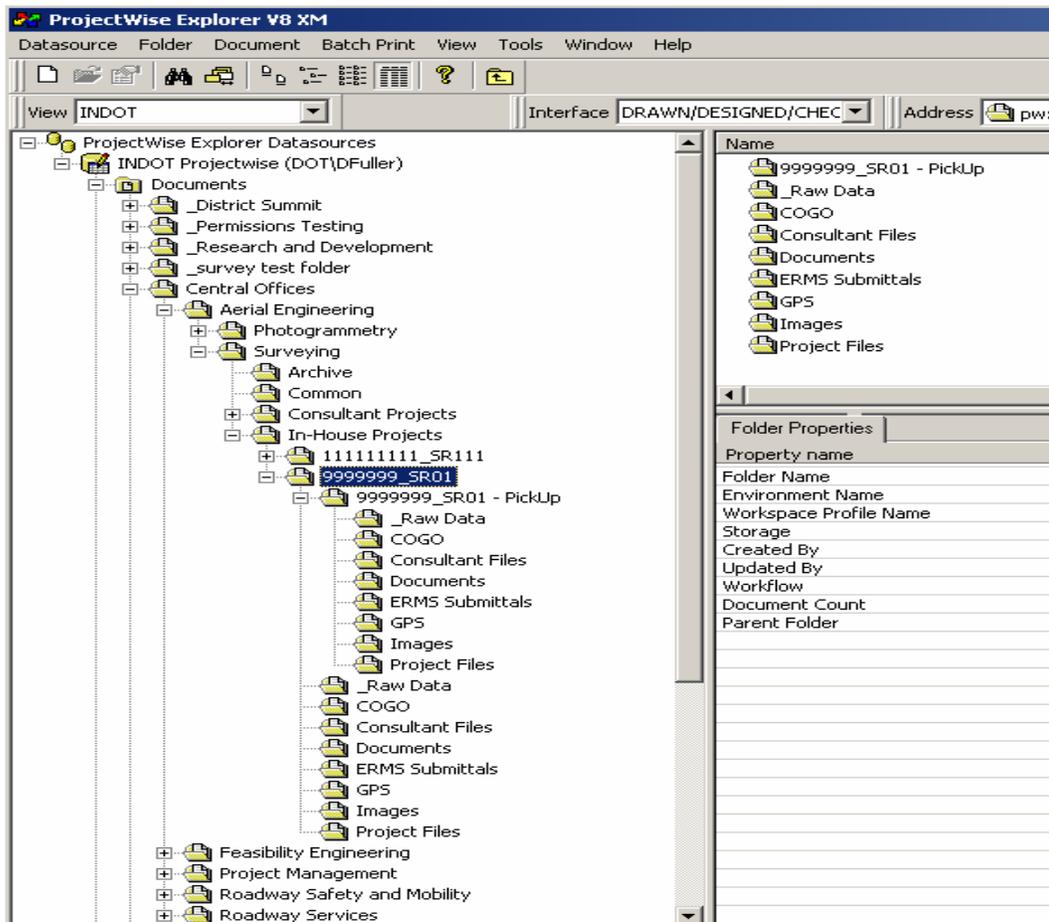


5. Right Click on the main folder and select **Rename**. Then change the folder name as desired, an example would be adding ' – PickUp' to the original Project folder name.



5.3.2 Importing the Completed Pick-Up Project into ProjectWise

Once you are finished with the Pick-Up project you will need to import it as a subfolder into the original survey Project folder in ProjectWise. Follow the same procedures as those outlined in *Chapter 5.2.4 Importing the Project into ProjectWise* of this document. Make sure to Import the Pick-Up project folder as a sub-folder of the original Project Folder in ProjectWise, see below.

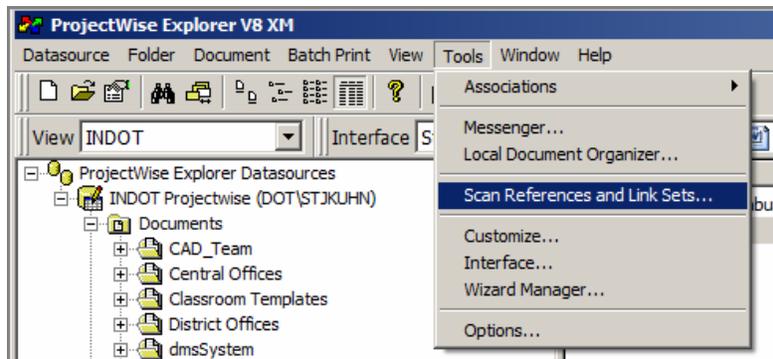


5.4 Reference Scanning

With MicroStation XM you can attach and modify references as you have in prior versions of MicroStation. However, when you import those files into the ProjectWise datasource, ProjectWise has no knowledge of your reference attachments and the locations of your files. Upon re-importing these files into ProjectWise, you will need to

rebuild your reference attachments for use. References will be red in the Reference dialog. Exceptions to this issue are references in the same dgn file (i.e. Self references).

As with the export process, ProjectWise also has tools available to rebuild your reference attachments once files have been brought into the datasource. This tool can be found in ProjectWise Explorer, under the **Tools Menu -> Scan References and Link Sets** as illustrated in the following screenshot.



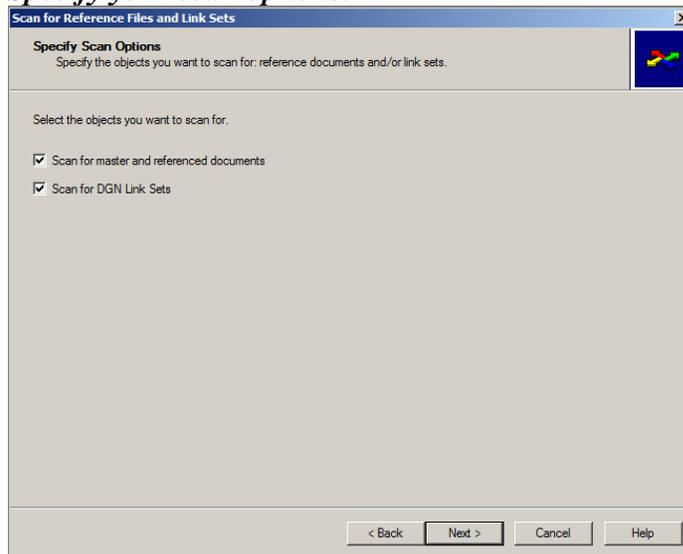
The function of this tool is to rebuild any reference attachments that may have been created or modified outside of the ProjectWise environment. While there are a large number of options and features that are available for use with this tool, we will be looking at the basic functions required to rebuild references for your MX data, with a brief highlight of the additional options.

It is recommended that you only perform a reference scan upon having imported the project into ProjectWise at its completion.

To perform a reference scan of your Survey Project folder:

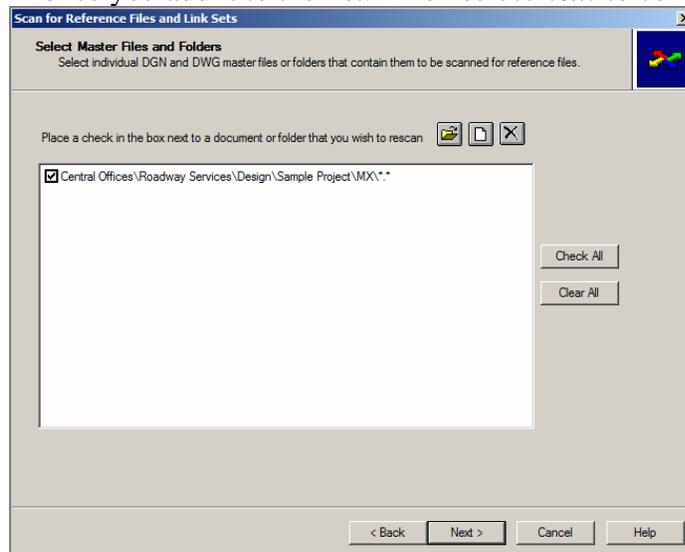
1. Start the Scan References and Link Sets Wizard **PW->Tools->Scan References and Link Sets**.
2. The first panel is information regarding the usage of the tool, select **next** to continue to the next panel.

3. *Specify your scan options:*



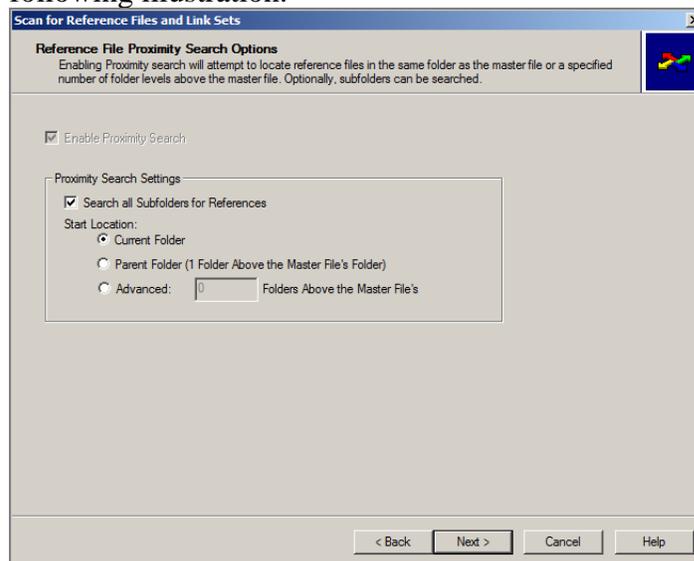
You may leave these options as shown, as they will rebuild any references you may have defined, select *next* to continue to the next panel.

4. Next, you will need to *select the folder for the project that you'd like have the references rescanned on*. Browse to and select the folder of your project that contains the dgn files, for most Survey projects this will be the Project Files folder. Be sure to check the box next to the folder once you add it to the list. Then select *next* to continue to the next panel.



You may define multiple folders and locations in this step, however it is not recommended, as files with the same naming conventions may in-advertently be attached incorrectly.

5. You may skip configuring settings on the Master Folder Settings panel, select *next* to continue to the next panel.
6. Priority Search: This panel is used when you have multiple folder locations that you are scanning. For the purposes of this project, we will not be using this, however, with this settings panel, you may set the order you'd like folders to be scanned. The value of this is that when multiple locations are scanned, and have the same file name in each location, ProjectWise will use the reference from the first location it finds in the priority search. In order to progress beyond this panel, you either need to define priority locations, *or disable the priority search setting*. **Left click on the *Enable Priority Search* check box to uncheck it.** Then select *next* to continue to the next panel.
7. Proximity Search: This setting is enabled by default, and is not able to be disabled. This panel has a handful of settings described below the following illustration.



In this panel, you may set the depth, of folders that you'd like to scan beneath or above your current scan location. In most instances, you will only need to have your start location at your current folder and enable ***Search all Subfolders for References enabled***. This will contain your reference scan to the location which you've defined and any subfolders beneath it. Select *Next* to proceed

8. On the Next Panel you may define the location for a log file if so needed. This will show the status of your reference scan, and what references have been repaired or not modified. Browse to the desired folder *C:\Temp* and type in a filename, *scanrefs.log*, and **Left click on Save**. Then select *next* to continue to the next panel.

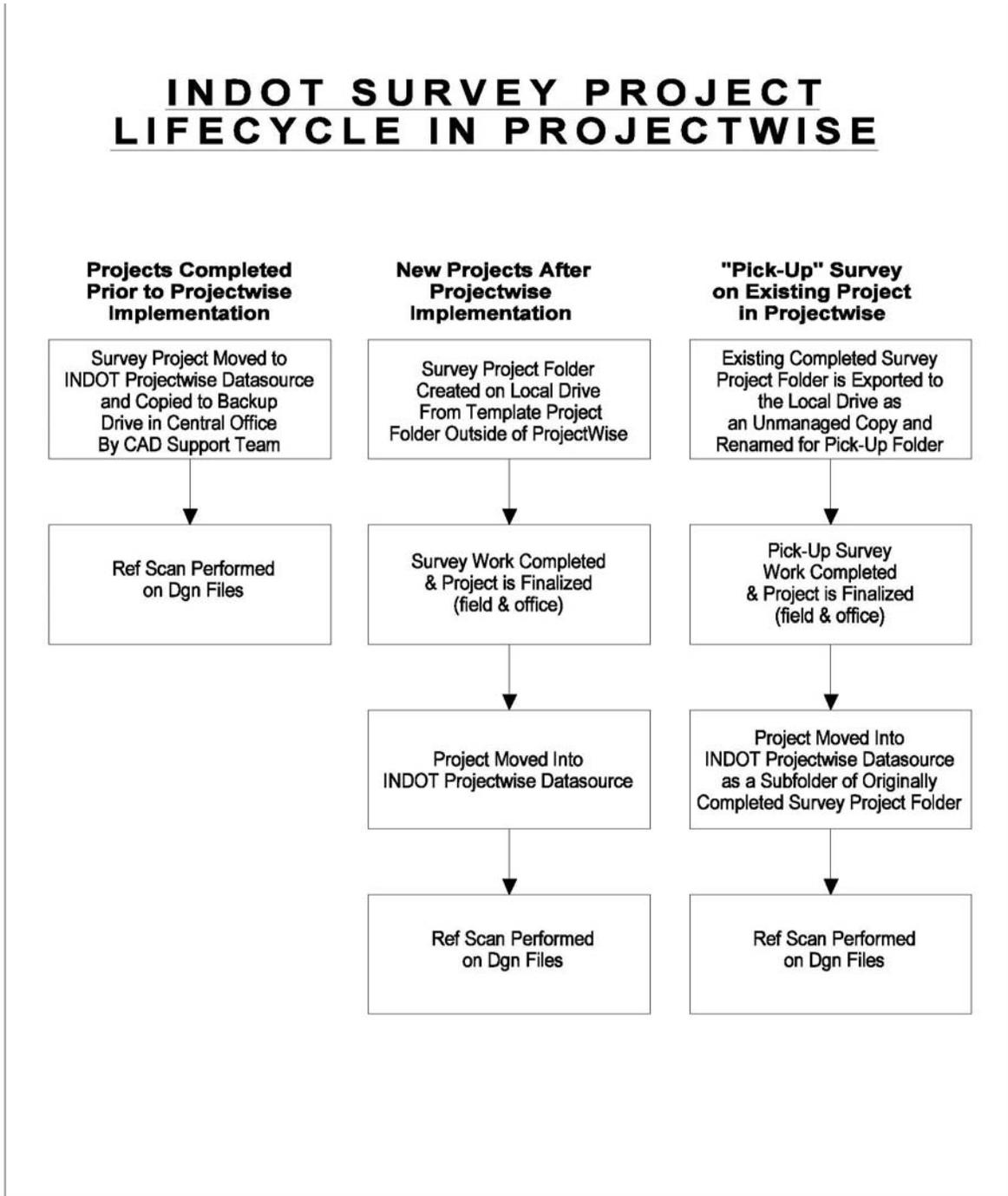
9. The final panel is purely information prior to running the reference scan. At this time, you may select ***Finish*** to begin the reference scan utility. Once completed the scanrefs.log file will be opened and you can review it.
10. Close the log file and open one of the dgn files to ensure the references were properly re-attached.
11. When you done looking at the file close MicroStation. At the Check in prompt select free. This will release the file without saving any changes.

If you have any issues with Ref Scan file a Help Ticket.

During the use of this tool, ProjectWise temporarily checks out each file in the scanned location in order to view and rebuild the references. Once complete, it checks the files back in and makes them available for usage. Depending on the quantity of files in the location, the usage of this utility may take a substantial amount of time.

Appendices

Appendix A - *INDOT Survey Project Lifecycle In ProjectWise*



Appendix B - Naming Conventions

It is unlikely that we can stress enough the importance of using standard naming conventions. It is sufficient to say however that good naming can eliminate numerous common problems.

Note: Throughout Appendix B, mcac is used to indicate a generic alignment

B.1 Model Names

Uniform model naming is necessary to insure consistency between users and to allow for continuity when projects are passed from one designer to another, or when multiple designers work on the same project. Model naming is also important to insure consistent Cad Standards. Uniform model naming insures models are associated with proper style sets. The correct style set association will insure that strings are drawn appropriately and are placed on the correct levels. The following list is compiled based on historically used models at INDOT and the automatic associations MX will assume based on model names (prefixes used for model names).

Model Name	Contents
Des	Proposed design Strings
Des mcac	Proposed design Strings for line mcac
Des Alignments	Proposed Alignments
Des Culvert	Box & Three Sided Culverts Structures
Des Pipes	Drainage Culverts Structures
Des Drive	Drives (if separated from other design strings)
Des Subgrade mcac	Subgrade model for line mcac
Des TEMP RUNAROUND	Temporary Runaround Strings
Underdrain mcac	Underdrains
Hydraulic Surface mcac	Ditches
Sections mcac	Cross Sections for line mcac
Survey alignment	Alignments Created by Survey Unit
Volumes mcac	Volumes calculated along mcac
Topo	Existing Topography information from Survey (provided by the Survey Unit)
Topotria	Triangulated Topo model
Excont	Existing Contours (provided by the Survey Unit)
Prcont	Proposed Contour Models
Merge mcac	Model containing design strings from mcac and topo strings outside the limits of the design

Des Section Alignments	Alignments model with same Alignments as Des Alignments but only containing points where cross sections are to be cut.
Alternate Naming, Used for larger more complex projects	
Des Roads	Contains Proposed Design strings for all alignments
Des Final	Contains all proposed design strings with all gaps and editing completed
Merge Roads	Model containing design strings from all alignments and topo strings outside the limits of the design
Merge Final	Model containing design strings from all alignments and topo strings outside the limits of the design

Note: Not every project will need every type of suggested model nor is the user restricted to only create the models listed above. Many additional temporary models can be created while using the GUI.

B.2 General practices

If triangulating any of the above models, add “tria” to the end of the model name. When creating proposed contours of any of the above models, add “Prcont” to the beginning of the model name. If merging models, add “Merge” to the beginning of the model name.

B.3 Model Names and Style Set Association

It is desirable to use the above listed recommended model names in order to get the correct Plan Style Set / Feature Set associated with the correct model names. The Plan Style Set / Feature Set Controls how elements are displayed in both standalone MX and MX in MicroStation. The most important part of this is insuring that elements are placed on the appropriate levels. It is important for users to check Model Defaults for any models used, especially those not using standard names. A list of Model Names to Styles Sets equivalents is provided below based on the **prefix** of the Model name.

Model Name Prefix	Plan Style Set / Feature Sets
Des	INDOT Design.pss
Underdrain	INDOT Design.pss
Hydraulic Surface	INDOT Design.pss
Sections	INDOT Cross Sections.pss
Survey alignment	INDOT Survey Alignment.pss
Topo	INDOT DTopo.pss
Topo (as Survey sees this)	INDOT STopo.pss
Topotria	MFW Triangulation.pss
Excont	INDOT Existing Contours.pss
Prcont	INDOT Proposed Contours.pss
Merge	INDOT Merged Model.pss
ISO	MFW Isopachyte Triangulation.pts
Prof	MFW Profile.pss
Terr	MFW Simple Survey.pss
BOUN	MFW Boundary.pss
VOL	MFW Results.pss
Corner	INDOT Corner.pss

B.4 Input Files Names

Name	Description
Drawtopo.inp	Draws the surveyed topographical locations and contour surface
Drawtopo_w-o_CONT.inp	Draws the surveyed topographical locations without displaying the contour surface
XSect.inp	cuts and draws up cross sections along a master alignment, used to check triangulation model
Findcorrupt.inp	Searches for corrupt discontinuities and creates a DXF file
Corrupt.inp	Searches for corrupt discontinuities and creates a DXF file
Triangle.inp	Will create a triangulation of the topo model and creates topotria
Des number.inp ex. 0000000.inp	Will create the topo model
Create_survey_base_drawings.inp	Creates the standard drawings necessary for surveys
Sections.inp	Draws typical cross sections for surveys
Survey_alignment.inp	Draws survey alignment and annotates it

Note: **Template input files typically used by surveys are included in the Project Files folder of the template project. All other input files are to be stored on the J:\Project drive (Unless you are using Arenium)** even if working on MX locally. MX remembers the path used, therefore, user will only need to browse to the J: drive location for input files once.

As with model naming not every project will need every type of suggested input file nor is the user restricted to only create the input file listed above however, the users should use these guidelines to the benefit of all.

B.5 MicroStation Drawing Names

Note: Please abbreviate .dgn names as needed using the INDOT standard abbreviations ie. Sht – Sheet, MOT - Maintenance of Traffic, **n** is used to denote the drawing number for drawings with multiple sheet numbers 001, 002, 003, etc.

Standard 2D Drawings (Non MX created)		
Drawing Names	Descriptions	Examples
Sht Title	Title sheet	Sht Title.dgn
Sht Index	Index sheet (non-bridge)	Sht Index.dgn
Sht Typical n	Typical section details	Sht Typical.dgn Sht Typical 01.dgn Sht Typical 02.dgn Sht Typical n.dgn
Sht Approach Det	Bridge approach details	Sht Approach Det.dgn
Sht Plat1 n	Survey Route plat	Sht Plat1.dgn Sht Plat1 01.dgn Sht Plat1 02.dgn Sht Plat1 n.dgn
Sht Plat3 n	Survey Route plat with aerial photography included	Sht Plat3.dgn Sht Plat3 01.dgn Sht Plat3 02.dgn Sht Plat3 n.dgn
Sht Superelevation	Superelevation diagrams	Sht Superelevation
Sht MOT n	Maintenance of traffic details	Sht MOT.dgn Sht MOT 01.dgn Sht MOT 02.dgn Sht MOT n.dgn
Sht Channel Change	Channel relocation details	Sht Channel Change.dgn
Sht Retaining Wall	Retaining wall details	Sht Retaining Wall
Sht General Plan	Bridge general plan	Sht General Plan.dgn
Sht Borings n	Soil boring diagrams	Sht Borings.dgn Sht Borings 01.dgn Sht Borings 02.dgn Sht Borings n.dgn
Sht Bent n	Bridge end bent details	Sht Bent 1.dgn Sht Bent 2.dgn Sht Bent 1 & 2.dgn

Sht Bent Misc	Miscellaneous bridge end bent details	Sht Bent Misc.dgn
Sht Pier n	Bridge pier details	Sht Pier 1.dgn Sht Pier 01.dgn Sht Pier 02.dgn
Sht Pier Misc	Miscellaneous bridge pier details	Sht Pier Misc.dgn
Sht Structural Steel Det	Bridge structural steel details	Sht Structural Steel Det
Sht Beam n	Bridge beam details	Sht Beam.dgn Sht Beam 01.dgn Sht Beam 02.dgn Sht Beam n.dgn
Sht Superstructure n	Bridge superstructure details	Sht Superstructure.dgn Sht Superstructure 01.dgn Sht Superstructure 02.dgn Sht Superstructure n.dgn
Sht Misc Superstructure Det	Miscellaneous bridge superstructure detail	Sht Misc Superstructure Det.dgn
Sht Railing	Bridge railing details	Sht Railing.dgn
Sht Approach Slab	Bridge approach slab details	Sht Approach Slab.dgn
Sht Framing Plan	Bridge framing plan	Sht Framing Plan.dgn
Sht Coping Offsets	Bridge coping offsets details	Sht Coping Offsets.dgn
Sht Layout	Signals Layout Sketch	Sht Layout.dgn
Sht Existing Sign Plan	Existing Signs plan	Sht Existing Sign Plan.dgn
Sht Proposed Sign Plan	Proposed Signs plan	Sht Proposed Sign Plan.dgn
Sht RMA Sign Layout	RMA's	Sht RMA Layout.dgn
Sht Panel Sign Layout	Panel Signs	Sht Panel Sign Layout.dgn
Sht Sign Cross Section	Various Sign Cross Sections	Sht Sign Cross Section.dgn
Sht Guard Rail Detail	Guard Rail Sign Detail	Sht Guard Rail Detail.dgn
Sht Panel Sign/Summary Post	Panel Sign post Table	Sht Panel Sign/Summary Post.dgn
Sht Sign/Summary Post	Sheet Sign Post Table	Sht Sign/Summary Post.dgn
Sht Light Plan	Lighting Plan Sheet	Sht Light Plan.dgn
Sht Light Data	Highway Light Data Sheet	Sht Light Data.dgn
Section Corner Pt	Section Corner Point	Section Corner Pt 0001-0299.dgn
Survey Control Pt	Survey Centerline Point	Survey Control Point 0500-0699.dgn
Section Plat Sheet	Section Plat Sheet (8.5" x 11")	Section Plat Sheet 01.dgn

Route Survey Plat	Location Control Route Survey Plat	Route Survey Plat 01.dgn
Survey Alignment Book	Survey Alignment for Field Book	Survey Alignment Book 01.dgn
Present Structure Tie	Present Structure Tie In (Top View)	Present Structure Tie 01.dgn
Present Structure Ord	Present Structure Ordinance (Inlet)	Present Structure Ord 01.dgn
Survey Alignment Book	Survey Alignment for Field Book	Survey Alignment Book 01.dgn
Present Structure Tie	Present Structure Tie In (Top View)	Present Structure Tie 01.dgn
Present Structure Ord	Present Structure Ordinance (Inlet)	Present Structure Ord 01.dgn

Standard Base Drawings (MX & MXDRAW created)		
Drawing Names / Logical Names	Descriptions / Reference Descriptions	Examples
Survey Alignment	Survey Centerline	Survey Alignment.dgn
Survey Section Corner	US Government Section Corners	Survey Section Corner.dgn
Survey Contours	Survey Existing Contours	Survey Contours.dgn
Survey Topography	Survey Existing Topography	Survey Topography.dgn
Survey Triangulation	Existing Triangulation	Survey Triangulation.dgn
Explan scale	Design Existing Topography	Explan 50.dgn Explan 100.dgn
Excont scale	Survey Existing Contours	Excont 50.dgn Excont 100.dgn
Prplan scale	Proposed Design Strings	Prplan 50.dgn Prplan 100.dgn
Prcont scale	Proposed Contours	Prcont 50.dgn Prcont 100.dgn
RW Existing scale	Existing Right of Way	RW Existing 50.dgn RW Existing 100.dgn
Annotate Alignment mcac scale	Proposed Alignment Annotation	Annotate alignment mcac 50.dgn Annotate alignment mcac 100.dgn
Annotate Survey Alignment mcac scale	Survey Alignment Annotation	Annotate survey alignment mcac 50.dgn

Annotate station offset mcac scale	Annotation of Survey points with station and offset	Annotate station offset mcac 50.dgn
Annotate survey points mcac scale	Annotation of Survey points	Annotate survey points mcac 50.dgn

Standard Sheet Drawings (MX & MXDRAW created)		
Drawing Names	Descriptions	Examples
Planprofile mcac scale n	Plan & profiles drawings	Planprofile mcac 50 001.dgn Planprofile mcac 50 002.dgn Planprofile mcac 50 n.dgn
Layout mcac scale n	Bridge layout sheet	Layout mcac 50 001.dgn Layout mcac 50 002.dgn Layout mcac 50 n.dgn
Const det mcac scale n	Construction details drawings	Const det mcac 50 001.dgn Const det mcac 50 002.dgn Const det mcac 50 n.dgn
Pvmt Markings scale n	Pavement marking details	Pvmt Markings 50.dgn Pvmt Markings 50 01.dgn Pvmt Markings 50 02.dgn Pvmt Markings 50 n.dgn
Runaround mcac scale n	Temporary Runaround plan profile drawings.	Runaround mcac 50 001.dgn Runaround mcac 50 002.dgn Runaround mcac 50 n.dgn
TEC det mcac scale n	Temporary Erosion Control details	TEC det mcac 50 01.dgn TEC det mcac 50 02.dgn TEC det mcac 50 n.dgn
Intersection Det scale n	Intersection details	Intersection det 50 n.dgn

For Sheets created by MXDRAW modify the names of sheet drawings created and avoid the use of the default naming convention set by MXDRAW.

For all of the above MX & MXDRAW created sheets, the alignment name, scale, & sheet number indicates which alignment, scale, & sheet number is reflected. Following this convention will allow easy differentiation between alignments and also allow the correct .pcf to be selected.

Cross Section Drawings (MX Input File & MX in MicroStation created)		
Drawing Names	Descriptions	Examples
Sectionsmcac n	Cross sections drawings	Sectionsmcac_dr_001.dgn Sectionsmcac_dr_002.dgn Sectionsmcac_dr_003.dgn Sectionsmcac_dr_n.dgn
Sht sect text mcac n	Cross section text drawings used to add text to cross sections without modifying the original drawing	Sht sect text mcac_dr_001.dgn Sht sect text mcac_dr_002.dgn Sht sect text mcac_dr_003.dgn Sht sect text mcac_dr_n.dgn

For each cross section drawing created, the sheet used to plot and edit is the text drawing. For example: Sht text sectionsmcac n. This drawing would have a border frame drawing referenced into it and a Sectionsmcac drawing referenced into it. By preserving text in text drawings, users are prevented from losing annotation text if new cross section drawings (Sectionsmcac) are created. These composite text drawings also allow drive profiles to be added easily added through the use of reference files. Variations on the cross section drawing names Sectionsmcac can be used if needed (ie. Sectionsmcac Ph1).

Border Frame Drawings (used with drawings originating from MX Input File & MX in MicroStation)

In this version of MX, all of the borders have been moved into Bdr INDOT All.dgn except for the xsec borders. A listing of all the borders in this file is located below.

Type	2D/3D	Name	Description	
		Default	Master Model	✓
	<input type="checkbox"/>	Components - Border	MX border - true half size - components	✓
	<input type="checkbox"/>	Bdr letter portrait dual plan	MX letter border portrait - dual plan	✓
	<input type="checkbox"/>	Bdr letter portrait	MX letter border portrait	✓
	<input type="checkbox"/>	Bdr letter lanscape dual plan	MX letter border lanscape - dual plan	✓
	<input type="checkbox"/>	Bdr letter lanscape	MX letter border lanscape	✓
	<input type="checkbox"/>	Bdr INDOT xsect	MX Xsect border - true half size	✓
	<input type="checkbox"/>	Bdr INDOT Route Plat	MX Location Control Route Survey border - true half s...	✓
	<input type="checkbox"/>	Bdr INDOT Plan Profile Metric large plan	MX Plan Profile border large plan- true half size	✓
	<input type="checkbox"/>	Bdr INDOT Plan Profile Metric	MX Plan Profile border - true half size	✓
	<input checked="" type="checkbox"/>	Bdr INDOT Plan Profile Imperial large plan	MX Plan Profile border large plan - true half size	✓
	<input type="checkbox"/>	Bdr INDOT Plan Profile Imperial	MX Plan Profile border - true half size	✓
	<input type="checkbox"/>	Bdr INDOT letter Profile Metric	MX letter sized Profile sheet	✓
	<input type="checkbox"/>	Bdr INDOT letter Profile Imperial	MX letter sized Profile sheet	✓
	<input type="checkbox"/>	Bdr INDOT letter Plan	MX letter sized Detail sheet	✓
	<input type="checkbox"/>	Bdr INDOT Layout Metric large plan	MX Bridge Layout border large plan - true half size	✓
	<input type="checkbox"/>	Bdr INDOT Layout Metric	MX Bridge Layout Metric	✓
	<input type="checkbox"/>	Bdr INDOT Layout Imperial large plan	MX Bridge Layout border large plan- true half size	✓
	<input type="checkbox"/>	Bdr INDOT Layout Imperial	MX Bridge Layout border - true half size	✓
	<input type="checkbox"/>	Bdr INDOT Full Page Profile Metric	MX Full Profile Border - true half size	✓
	<input type="checkbox"/>	Bdr INDOT Full Page Profile Imperial	MX Full Profile border - true half size	✓
	<input type="checkbox"/>	Bdr INDOT Full Page Dual Profile Metric	MX Full Profile Border - true half size (2 views)	✓
	<input type="checkbox"/>	Bdr INDOT Full Page Dual Profile Imperial	MX Full Profile border - true half size (2 views)	✓
	<input type="checkbox"/>	Bdr INDOT Details 3	MX Details border - true half size (3 views)	✓
	<input type="checkbox"/>	Bdr INDOT Details 2	MX Details border - true half size (2 views)	✓
	<input type="checkbox"/>	Bdr INDOT Details 1	MX Details border - true half size (1 view)	✓

Appendix C - *Drawtopo.inp*

C.1 Drawtopo input file

To amend any variables for existing cross sections, use the **PFE Editor** to open the file *Drawtopo.inp*

The contents of this file are:

```
MOSS - STANDARD SURVEY DRAWING INPUT FILE
```

```
NEWDPF, TOPO.DPW
```

```
DRAW, TOPO
```

```
017DMS DMS
```

```
018IMP
```

```
019
```

```
019, , 4=-1
```

```
900, PLANDRAW
```

```
FD= ' ', SL=400, SW=400, SC=100, TC=YELL, TR=TRUN, LC=BLUE, LA=NOLA, GR=NOGR
```

```
808, , U 0 , , 10.50, 2, 0.7, 0.25, , , 0.25
```

```
*** STRING COLORS USED ***
```

```
NOTE : DL STRING ALREADY DEFINED ABOVE, CURRENT LINE COLOR = BLUE
```

```
805, BLUE
```

```
825, DL
```

```
825, IS
```

```
825, SL
```

```
825, SY
```

```
825, SM
```

```
825, UD
```

```
825, UW
```

```
825, WA
```

```
825, WE
```

```
825, WF
```

```
805, CYAN
```

```
825, BOUN
```

```
825, DC
```

```
825, DF
```

```
825, DP
```

```
805, GREE
```

```
825, BA
```

825,BC
825,BD
825,BE
825,BF
825,BG
825,BH
825,BM
825,BN
825,BP
825,BR
825,BS
825,BT
825,BW
825,BZ
825,CB
825,CE
825,CG
825,CM
825,CP
825,CS
825,DS
825,EC
825,EG
825,EL
825,EM
825,ES
825,FB
825,FC
825,FE
825,FF
825,FI
825,FM
825,FO
825,FP
825,FR
825,FS
825,FV
825,FW
825,GA
825,GD
825,HD
825,HE
825,HR
825,LE
825,LC
825,LF
825,LS
825,NG
825,OB
825,OC
825,OD

825 ,OM
825 ,OR
825 ,OS
825 ,OT
825 ,RA
825 ,RB
825 ,RD
825 ,RO
825 ,RP
825 ,RS
825 ,RX
825 ,RW
825 ,SC
825 ,SK
825 ,SD
825 ,SP
825 ,SW
825 ,TC
825 ,TB
825 ,TD
825 ,TH
825 ,TS
825 ,UC
825 ,UR
825 ,UX
825 ,UZ
825 ,WG
825 ,WL
825 ,WW

805 ,ORAN
825 ,RC
825 ,ST
825 ,UT

805 ,RED
825 ,AA
825 ,AI
825 ,AS
825 ,CO
825 ,CD
825 ,DR
825 ,EP
825 ,ET
825 ,M
825 ,RR
825 ,SG
825 ,TA
825 ,UE
825 ,US
825 ,Z

805,YELL
 825,CT
 825,GP
 825,GI
 825,OH
 825,UG
 825,UH
 825,UP
 825,UV

*** MACRO SYMBOLS USED ***

805,BLUE
 861,PCBD,TRIA,GRMH,0.15,,,0.15,,,0.0
 861,PCIS,SQUA,REMH,0.15,,,0.15,,,0.0
 861,PCRB,SQUA,REMH,0.15,,,0.15,,,0.0
 861,PCST,TOPC,STNG,0.05,,,0.05,,,0.0
 861,PDID,TRIA,GRMH,0.15,,,0.15,,,0.0
 863,PHPT,1,,0.06,10=0
 861,PHYD,FIRE,HYDR,0.15,,,0.06,,,0.0
 861,PMHD,ROUN,DMHL,0.12,,,0.07,,,0.0
 861,PMHO,ROUN,DMHL,0.12,,,0.07,,,0.0
 861,PMHW,ROUN,DMHL,0.12,,,0.07,,,0.0
 863,PPON,3,,0.06,10=0
 863,PSHD,1,,0.06,10=0
 861,PSWP,ROUN,DWCR,0.12,,,0.07,,,0.0
 861,PVAC,ROUN,DWCR,0.12,,,0.07,,,0.0
 863,PVBX,0,,0.06,10=0
 861,PWAM,WATE,RMTR,0.15,,,0.07,,,0.0
 863,PVBX,0,,0.06,10=0
 863,PWAR,1,,0.06,10=0
 863,PWEL,10,,0.06,10=0
 863,PWGT,10,,0.06,10=0
 863,PWLP,10,,0.06,10=0
 861,PWSO,STOP,VALV,0.12,,,0.07,,,0.0
 863,PWTR,4,,0.06,10=0

805,GREE
 861,PBTH,TELE,CBOX,0.15,,,0.15,,,0.0
 863,PBUS,11,,0.05,10=0
 861,PCCT,SQMH,NOID,0.15,,,0.15,,,0.0
 861,PDEL,DELN,POST,0.09,,,0.05,,,0.0
 863,PEDC,0,,0.06,10=0
 863,PGLT,0,,0.06,10=0
 863,PGPT,0,,0.06,10=0
 863,PGRS,3,,0.07,10=0
 863,PGUY,8,,0.05,10=0
 863,PHHL,0,,0.06,10=0
 863,PJNT,0,,0.06,10=0
 863,PLIT,1,,0.06,10=0

```

863,PLPT,1,,0.06,10=0
863,PLTD,1,,0.06,10=0
863,PLTJ,1,,0.06,10=0
863,PMAP,1,,0.06,10=0
861,PMHC,ROUN,DMHL,0.12,,,0.07,,,0.0
861,PMHI,ROUN,DMHL,0.12,,,0.07,,,0.0
861,PPBX,ROUN,DMHL,0.12,,,0.07,,,0.0
863,PPOL,0,,0.06,10=0
863,PPSN,11,,0.06,10=0
863,PPST,11,,0.06,10=0
863,PPWP,0,,0.06,10=0
863,PSAT,0,,0.06,10=0
863,PSGL,7,,0.06,10=0
863,PSGN,7,,0.06,10=0
863,PSLD,0,,0.06,10=0
863,PSND,7,,0.06,10=0
863,PSTP,10,,0.06,10=0
861,PTCS,CONI,FERS,0.10,,,0.05,,,0.0
861,PTDS,TREE,SYMB,0.10,,,0.05,,,0.0
863,PTEL,6,,0.06,10=0
863,PTER,5,,0.06,10=0
863,PTFP,11,,0.06,10=0
863,PTGP,5,,0.06,10=0
863,PTOW,5,,0.06,10=0
863,PTSP,5,,0.06,10=0
863,PTUB,5,,0.06,10=0
863,PTVR,5,,0.06,10=0
863,PWED,3,,0.06,10=0
863,PWOD,3,,0.06,10=0

805,ORAN
861,PANC,GUYA,NCHR,0.05,,,0.05,,,0.0
863,PASE,3,,0.07,10=0
863,PASP,3,,0.07,10=0
861,PBMK,OSTR,GSTN,0.04,,,0.04,,,0.0
861,PCAN,PRST,LCAN,0.09,,,0.05,,,0.0
863,PCCP,0,,0.06,10=0
863,PCCR,0,,0.06,10=0
861,PCON,OSTR,GSTN,0.04,,,0.04,,,0.0
863,PCRS,3,,0.07,10=0
863,PCRT,3,,0.07,10=0
863,PDRT,3,,0.06,10=0
863,PEDT,0,,0.06,10=0
863,PELV,3,,0.05,10=0
863,PFEL,9,,0.06,10=0
863,PFLP,1,,0.06,10=0
863,PFOM,3,,0.06,10=0
863,PGBD,9,,0.06,10=0
863,PGMW,1,,0.06,10=0
861,PGPS,OSTR,GSTN,0.04,,,0.04,,,0.0
861,PHUB,OSTR,GSTN,0.04,,,0.04,,,0.0

```

```

861,PIDT,OSTR,GSTN,0.04,,,0.04,,,0.0
861,PIFC,OSTR,GSTN,0.04,,,0.04,,,0.0
863,PMAT,3,,0.05,10=0
861,PMAG,2,,0.06,10=0
863,PMBX,9,,0.06,10=0
861,PMHT,ROUN,DMHL,0.12,,,0.07,,,0.0
861,PMON,OSTR,GSTN,0.04,,,0.04,,,0.0
863,PMUL,3,,0.06,10=0
861,PNGS,OSTR,GSTN,0.04,,,0.04,,,0.0
861,PRDN,2,,0.06,10=0
861,PRSL,ROUN,DTCR,0.12,,,0.07,,,0.0
861,PRSN,ROUN,DTCR,0.12,,,0.07,,,0.0
861,PSBD,ROUN,DTCR,0.12,,,0.07,,,0.0
861,PSLM,ROUN,DTCR,0.12,,,0.07,,,0.0
861,PSTK,ROUN,DTCR,0.12,,,0.07,,,0.0
863,PSTN,3,,0.06,10=0
861,PSTO,OSTR,GSTN,0.04,,,0.04,,,0.0
861,PTLM,ROUN,DTCR,0.12,,,0.07,,,0.0
861,PTXT,ROUN,DTCR,0.12,,,0.07,,,0.0
861,PUSC,OSTR,GSTN,0.04,,,0.04,,,0.0
861,PUSG,OSTR,GSTN,0.04,,,0.04,,,0.0

805,RED
861,PBRP,BRAS,SPLG,0.09,,,0.06,,,0.0
861,PBSP,BOAT,SPIK,0.09,,,0.05,,,0.0
863,PCCE,0,,0.06,10=0
863,PDRH,0,,0.06,10=0
863,PEDE,0,,0.06,10=0
863,PELB,0,,0.06,10=0
861,PELM,ROUN,DMHL,0.10,,,0.06,,,0.0
863,PELR,0,,0.06,10=0
863,PGRV,3,,0.07,10=0
863,PGVT,1,,0.06,10=0
863,PIP0,2,,0.06,10=0
863,PIP2,2,,0.06,10=0
863,PIP3,2,,0.06,10=0
863,PIP4,2,,0.06,10=0
863,PIP6,2,,0.06,10=0
863,PIP8,2,,0.06,10=0
863,PMBD,16,,0.04,10=900000
863,PMBM,16,,0.04,10=900000
861,PMHE,ROUN,DMHL,0.12,,,0.07,,,0.0
861,PMHS,ROUN,DMHL,0.12,,,0.07,,,0.0
863,POWN,12,,0.05,10=0
863,PPIN,2,,0.06,10=0
863,PPKN,2,,0.06,10=0
863,PRE0,2,,0.06,10=0
863,PRE2,2,,0.06,10=0
863,PRE3,2,,0.06,10=0
863,PRE4,2,,0.06,10=0
863,PRE5,2,,0.06,10=0

```

863,PRE6,2,,0.06,10=0
 863,PRE7,2,,0.06,10=0
 863,PRE8,2,,0.06,10=0
 863,PROC,3,,0.06,10=0
 863,PRRS,2,,0.06,10=0
 863,PZZZ,8,,0.05,10=0

805,YELL
 863,PACU,0,,0.06,10=0
 863,PCEL,3,,0.07,10=0
 863,PEDG,0,,0.06,10=0
 861,PGAM,ROUN,DGCR,0.09,,,0.06,,,0.0
 861,PGFC,ROUN,DGCR,0.09,,,0.06,,,0.0
 861,PGSO,ROUN,DGCR,0.09,,,0.06,,,0.0
 861,PGWL,ROUN,DGCR,0.09,,,0.06,,,0.0
 861,PGWS,ROUN,DGCR,0.09,,,0.06,,,0.0
 861,PMHG,ROUN,DMHL,0.12,,,0.07,,,0.0
 861,PPSO,ROUN,DGCR,0.12,,,0.07,,,0.0
 861,PPVT,ROUN,DGCR,0.12,,,0.07,,,0.0

805ORAN
 808 N 0 0.046 3.000 0.750 0.000
 806,50
 825PSSADETA

805,GREY
 863,PBRK,11,,0.05,10=0
 808 N 01 0.015 0.000 0.750 0.000
 806BLAC
 869PNUM 4.000 0.005
 450000
 805BLAC
 019
 019,P,4=-1
 863 3 0.030
 450000
 808 N 01 0.05 0.000 0.750 0.000
 869,4=-1,7=-0.2
 999

DRAW,CROSS

801OVER
 805ORAN
 825,T

999

MOSS

DRAW, EXCONT

801OVER

805GREY

825D

805PINK

808	N 01	0.050	0.000	0.750	0.000
-----	------	-------	-------	-------	-------

806BLAC

8250	CONP	15.000			-1.000
------	------	--------	--	--	--------

999

DISPLAY

FINISH

Appendix D - *Triangle.inp*

D.1 Triangulation Input File

To amend any variables for existing cross sections, use the **PFE Editor** to open the file *Triangle.inp*

The contents of this file are:

THIS FILE IS TO BE USED TO CREATE THE TRIANGULATION MODEL (TOPOTRIA) AND THE SURFACE MODEL (EXCONT). IT WILL ALSO CREATE THE TRIANGULATION ERROR FILE (TRIANGLE.ERR) TO BE CHECKED FOR STRING CROSSING ERRORS. ALSO, PLEASE NOTE NEAR THE BOTTOM OF THIS FILE AS TO THE EXISTANCE OF A BOUNDARY STRING. READ THE NOTES AS TO WHICH LINES ARE TO BE USED FOR YOUR PARTICULAR SITUATION.

Note: This input file is used by the survey department staff. It requires some knowledge of what we do and what is to be used for triangulation. Use this file at your own risk. It is not guaranteed to be free from errors or omissions.

 ***** THE FOLLOWING LINE OPENS THE TRIANGLE.ERR FILE AND *****
 ***** ECHOES THE OUTPUT TO THE SCREEN AS WELL*****

SUBS
 SYSDEL, TRIANGLE.ERR
 999
 OUTPUT, TRIANGLE.ERR, TERM

MOSS
 DELETE, EXCONT
 CREATE, EXCONT

DELETE, TOPOTRIA
 CREATE, TOPOTRIA

COMPRESSMODELFILE

 THE FOLLOWING LINES CREATE THE TRIANGLES FOR THE GROUND MODEL AND
 MASK OUT STRINGS NOT TO BE USED FOR THE TRIANGLES

TRIANGLE, TOPO, TOPO
 TRIANGLE, TOPOTRIA

019
019,A,4=-1
019,BA,4=1
 019,BC,4=1
019,BC,4=-1
019,BE,4=-1
019,BF,4=-1
019,BG,4=-1
019,BH,4=-1
 019,BM,4=-1
019,BN,4=-1
 019,BOUN,4=-1
019,BP,4=-1
019,BR,4=-1
019,BS,4=-1
 019,BT,4=-1
019,BW,4=1

019,CM,4=-1

019,CP,4=-1

019,DR,4=-1
019,DS,4=-1

019,ET,4=-1

019,FC04,4=1
019,FC06,4=1
019,F,4=2
 019,FB,4=-1
 019,FC,4=-1
 019,FV,4=-1
 019,FE,4=-1
 019,FF,4=-1
 019,FI,4=-1
 019,FM,4=-1
 019,FO,4=-1
 019,FP,4=-1
 019,FR,4=-1
 019,FS,4=-1
 019,FW,4=-1

019,GA,4=-1
019,GD,4=-1
 019,GI,4=-1
019,GL,4=-1
019,GP,4=-1
019,GR,4=-1

019,HD01,4=1
019,HD,4=-1
019,HE,4=-1

019,LC,4=-1
019,LS,4=1

019,M,4=-1

 019,NG,4=1

019,OR,4=2

019,PELV,4=1
019,PBRK,4=1
 019,PMAT,4=1
019,PCEL,4=-1
019,P,4=-1
 019,PANC,4=-1
 019,PASE,4=-1
 019,PBMK,4=-1
 019,PBRP,4=-1
 019,PBSP,4=-1
 019,PBTH,4=-1
 019,PBUS,4=-1
 019,PCAN,4=-1
 019,PCBD,4=-1
 019,PCCT,4=-1
 019,PCEL,4=-1
 019,PCIS,4=-1
 019,PCON,4=-1
 019,PCRB,4=-1
 019,PCST,4=-1
 019,PDID,4=-1
 019,PDRH,4=-1
 019,PEDC,4=-1
 019,PEDE,4=-1
 019,PEDG,4=-1
 019,PEDT,4=-1
 019,PELM,4=-1
 019,PELR,4=-1
 019,PFEL,4=-1
 019,PFLP,4=-1
 019,PFOM,4=-1
 019,PGBD,4=-1
 019,PGAM,4=-1
 019,PGFC,4=-1
 019,PGLT,4=-1
 019,PGMW,4=-1
 019,PGPT,4=-1

019,PGSO,4--1
019,PGUY,4--1
019,PGWL,4--1
019,PGWS,4--1
019,PHHL,4--1
019,PHYD,4--1
019,PJNT,4--1
019,PLIT,4--1
019,PLPT,4--1
019,PLTD,4--1
019,PLTJ,4--1
019,PIP2,4--1
019,PIP3,4--1
019,PIP4,4--1
019,PIP6,4--1
019,PIP7,4--1
019,PIP8,4--1
019,PIP0,4--1
019,PMAP,4--1
019,PMAT,4--1
019,PMBX,4--1
019,PMBD,4--1
019,PMBM,4--1
019,PMHC,4--1
019,PMHD,4--1
019,PMHE,4--1
019,PMHG,4--1
019,PMHO,4--1
019,PMHS,4--1
019,PMHT,4--1
019,PMHW,4--1
019,POWN,4--1
019,PPBX,4--1
019,PPOL,4--1
019,PPSO,4--1
019,PPST,4--1
019,PPWP,4--1
019,PPVT,4--1
019,PRE2,4--1
019,PRE3,4--1
019,PRE4,4--1
019,PRE5,4--1
019,PRE6,4--1
019,PRE7,4--1
019,PRE8,4--1
019,PRE0,4--1
019,PRSL,4--1
019,PRSN,4--1
019,PSAT,4--1
019,PSBD,4--1
019,PSGL,4--1

019,PSGN,4--1
019,PSLM,4--1
019,PSND,4--1
019,PSSA,4--1
019,PSSC,4--1
019,PSST,4--1
019,PSTK,4--1
019,PSTP,4--1
019,PSWP,4--1
019,PTCS,4--1
019,PTDS,4--1
019,PTEL,4--1
019,PTGP,4--1
019,PTER,4--1
019,PTLM,4--1
019,PTOW,4--1
019,PTSP,4--1
019,PTUB,4--1
019,PTVR,4--1
019,PTXT,4--1
019,PTVR,4--1
019,PVAC,4--1
019,PWAM,4--1
019,PWEL,4--1
019,PWGT,4--1
019,PWSO,4--1
019,PWTR,4--1

019,RA,4--1
019,RP,4=2
019,RR,4--1
019,RB,4--1
010,RW,4=1

019,SC,4--1
019,SG,4--1
019,SD,4--1
019,ST,4--1
019,SW,4--1
019,SM,4--1
019,SP37,4=1
019,SP,4--1

019,TC,4=2
019,TD,4=2
019,TF,4--1
019,TH,4--1

019,U,4--1
019,UC,4--1

```
019,UD,4=-1
019,UE,4=-1
019,UG,4=-1
019,UP,4=-1
019,UR,4=-1
019,US,4=-1
019,UT,4=-1
019,UW,4=-1
019,UX,4=-1
```

```
019,WE,4=1
019,WL14,4=1
019,WL15,4=1
019,W,4=2
    019,WA,4=-1
    019,WF,4=1
    019,WL,4=-1
```

```
-----
*** USE THE FOLLOWING LINE IF THERE IS NO BOUNDARY STRING *****
-----
```

```
960,,,TRIA
```

```
-----
***** USE THE FOLLOWING LINE IF THERE IS A BOUNDARY STRING *****
-----
```

```
960,BNDR,,TRIA
```

```
-----
** USE THE FOLLOWING LINE IF THERE IS NO BOUNDARY STRING **
-----
```

```
961,,TRIA,TRIA,10=1
```

```
-----
***** USE THE FOLLOWING LINE IF THERE IS A BOUNDARY STRING *****
-----
```

```
961,BNDR,TRIA,TRIA,10=1
```

```
999
```

```
-----
THE FOLLOWING LINE CLOSES THE OUTPUT FILE TRIANGLE.ERR
-----
```

```
OUTPUT
```

MOSS

MAJOR OPTION SURFACE IS USED TO CREATE THE CONTOUR STRINGS

SURFACE, TOPOTRIA, TOPO
SURFACE, EXCONT

***** USE THE FOLLOWING LINE FOR JOBS DONE IN ENGLISH *****
***** The following line determines the interval for *****
***** the secondary contour interval. *****

970,TRIA,,,0.5

***** USE THE FOLLOWING LINE FOR JOBS DONE IN METRIC *****
***** The following line determines the interval for *****
***** the secondary contour interval. *****

970,TRIA,,,0.2

999

FINISH

Appendix E - *Sections.inp*

E.1 Cross Sections Input File

To amend any variables for existing cross sections, use the **PFE Editor** to open the file *Sections.inp*

The contents of this file are:

```
mx

moss

delete,CROSS
create,CROSS

section,topotria,survey alignment
section,CROSS
178,mc00,tria,t,10,,, -50,,,50
999

newdpw,CROSS

draw,CROSS,survey alignment
900,sect
cs=t,rs=mc00,lgt=nogr
999

display

FINISH
```


Appendix F - *create_survey_base_drawings.inp*

F.1 Create Survey Base Drawings Input File

To amend any variables for existing cross sections, use the **PFE Editor** to open the file `create_survey_base_drawings.inp`. Note the default scale is 200.

The contents of this file are:

```

MX
  create_survey_base_drawings.inp
  *****
  survey alignment
  create new plan display / cad drawing to contain the Survey
  Alignment elements
NEWD,Survey Alignment.dpw
  specify model to draw
DRAW,SURVEY ALIGNMENT
  define coordinate relationship ... select drawing scale
803,PLAN,,,,,200.
  draw with style set specified in following 001 option
850,,,,,1.
001,PublicStyles\INDOT Survey Alignment.pss
999
  updates display
DISPLAY
  *****
  corner
  create new plan display / cad drawing to contain the Corner elements
NEWD,Survey Section Corner.dpw
  specify model to draw
DRAW,CORNER
  define coordinate relationship ... select drawing scale
803,PLAN,,,,,200.
  draw with style set specified in following 001 option
850,,,,,1.
001PublicStyles\indot corner.pss
999
  updates display
DISPLAY
  *****
  EXCONT
  create new plan display / cad drawing to contain the EXCONT elements
NEWD,Survey Contours.dpw
  specify model to draw
DRAW,EXCONT
  define coordinate relationship ... select drawing scale
803,PLAN,,,,,200.

```

```

    draw with style set specified in following 001 option
850,,,,,1.
001,PublicStyles\indot existing contours.pss
999
    updates display
DISPLAY
*****
    TOPO
    create new plan display / cad drawing to contain the TOPO elements
NEWD,Survey Topography.dpw
    specify model to draw
DRAW,TOPO
    define coordinate relationship ... select drawing scale
803,PLAN,,,,,200.
    draw with style set specified in following 001 option
850,,,,,1.
001,PublicStyles\indot dtopo.pss
999
    updates display
DISPLAY
*****
    TOPOTRIA
    create new plan display / cad drawing to contain the TOPOTRIA
elements
NEWD,Survey Triangulation.dpw
    specify model to draw
DRAW,TOPOTRIA
    define coordinate relationship ... select drawing scale
803,PLAN,,,,,200.
    draw with style set specified in following 001 option
850,TRIA
001,PublicStyles\mfw triangulation.pts
999
    updates display
DISPLAY
*****
    RP TOPO
    create new plan display / cad drawing to contain the RP TOPO
elements
NEWD,Survey RP Topography.dpw
    specify model to draw
DRAW,TOPO
    define coordinate relationship ... select drawing scale typically 1
to 200 for
    the Route Plat sheet
803,PLAN,,,,,200.
    draw with style set specified in following 001 option
850,,,,,1.
001,PublicStyles\INDOT RPTopo.pss
999
    updates display

```

```

DISPLAY
  To keep the elements in separate MicroStation drawings place
  the finish to the left
  fini

*****
Survey RoutePlat All
- contains all the model information from TOPO, CORNER, SURVEY
ALIGNMENT
  etc. required to make the Route Plat drawings

  create new plan display / cad drawing to contain the RP TOPO
  elements
  NEWD,Survey RoutePlat All.dpw

  specify model to draw
  DRAW,TOPO
  define coordinate relationship ... select drawing scale typically 1
  to 200, or 1 to 100 for
  the Route Plat sheet
  803,PLAN,,,,,200.
  draw with style set specified in following 001 option
  850,,,,1.
  001,PublicStyles\INDOT RPTopo.pss
  999

  add corners model
  specify model to draw
  DRAW,CORNER
  801,OVERFREE
  850,,,,1.
  001,PublicStyles\indot corner.pss
  999

  add survey alignments model
  specify model to draw
  DRAW,SURVEY ALIGNMENT
  801,OVERFREE
  draw with style set specified in following 001 option
  850,,,,1.
  001,PublicStyles\INDOT Survey Alignment.pss
  999

  add whatever other models necessary

  updates display
  DISPLAY
  finish

```


Appendix G - *Level Libraries*

Please see the CAD FAQ Page for the most up to date information.

Appendix H - *MicroStation Libraries*

H.1 DGN Library

A DGN library is a DGN file used to store:

- Text styles
- Dimension styles
- Levels (Filters)
- Models

These are shared within the workgroup as standards. A DGN library is sometimes referred to as a DGN lib (pronounced with a long 'i'). The recommended file extension for this file is *.dgnlib. Cells/Models, dimension styles, levels, and text styles are created in a DGN library using MicroStation tools, the same way they are created in a DGN file. Appendix E shows the various levels for each of the dgnlibs created for INDOT based on a project type (i.e. imperial or metric units). By selecting the correct seed file and INDOT workspace UCF (User) the appropriate dgnlib will be used. It is a way for us to easily define and use CAD Standards for text, dimensions, levels, naming etc.

The indot_cad.dgnlib is located at...

X:\WRKSPC_INDOT_XM\Workspace\Standards\dgnlib\indot_cad.dgnlib (read only)

H.2 Text Styles

What is a Text Style?

MicroStation supports text styles and provides an interface for constructing text using available system fonts and a wide variety of text attributes. A text style comprises a group of text attributes, such as font type, width, height, and color. Text styles enable you to place text within a model in a consistent and automated manner.

The following fonts are supported natively in MicroStation:

Traditional MicroStation fonts

TrueType fonts

AutoCAD Shape fonts (.shx)

Tip1. Fonts are not embedded in the DGN file.

Tip2. If a specific font is not found on the system, MicroStation substitutes font #127, Fast Font.

Tip3. If a Text Style changes in a Text Style library, Text Styles placed in DGN files prior to the change are not automatically updated in the DGN files. To update a DGN file to reflect the changes in the Text Style library, use the dgnlib update text styles from the text styles dialog.

INDOT Text Styles

Text styles at INDOT have been changed in this new workspace to be more in line with their size and use rather than related to the section of INDOT as in previous workspaces. You will notice that the Text Styles are now using True Type fonts and only a few Bentley fonts. This gives us more flexibility with Bold and Italics settings. The Bentley fonts will be used whenever special characters are needed. The following tables will show you the settings for each Text Style.

(See **Appendix H** for Text Style – Sheet Use chart)
This will give guidance for use of text styles

Text Style Table

Text Style	Font	Height	Width
5 Point Text	Tahoma	0.0042	0.0042
6 Point Text	Tahoma	0.005	0.005
6 Point Text (Special Characters)	Arial	0.005	0.005
7 Point Text	Tahoma	0.0058	0.0058
9 Point Text	Tahoma	0.0075	0.0075
10 Point Text	Tahoma	0.0083	0.0083
10 Point Text (Survey Text)	Arial Narrow	0.0083	0.0083
10 Point Text (Existing Elevations)	Monotype Corsiva	0.0083	0.0067
12 Point Text	Tahoma	0.01	0.01
12 Point Text (Special Characters)	Arial	0.01	0.01
14 Point Text	Tahoma	0.0117	0.0117
14 Point Text (Property Owners)	Bookman Old Style	0.0117	0.0117
18 Point Text	Tahoma	0.015	0.015
30 Point Text	Tahoma	0.025	0.025

(Values in the above chart are representative of a 1 to 1 scale)

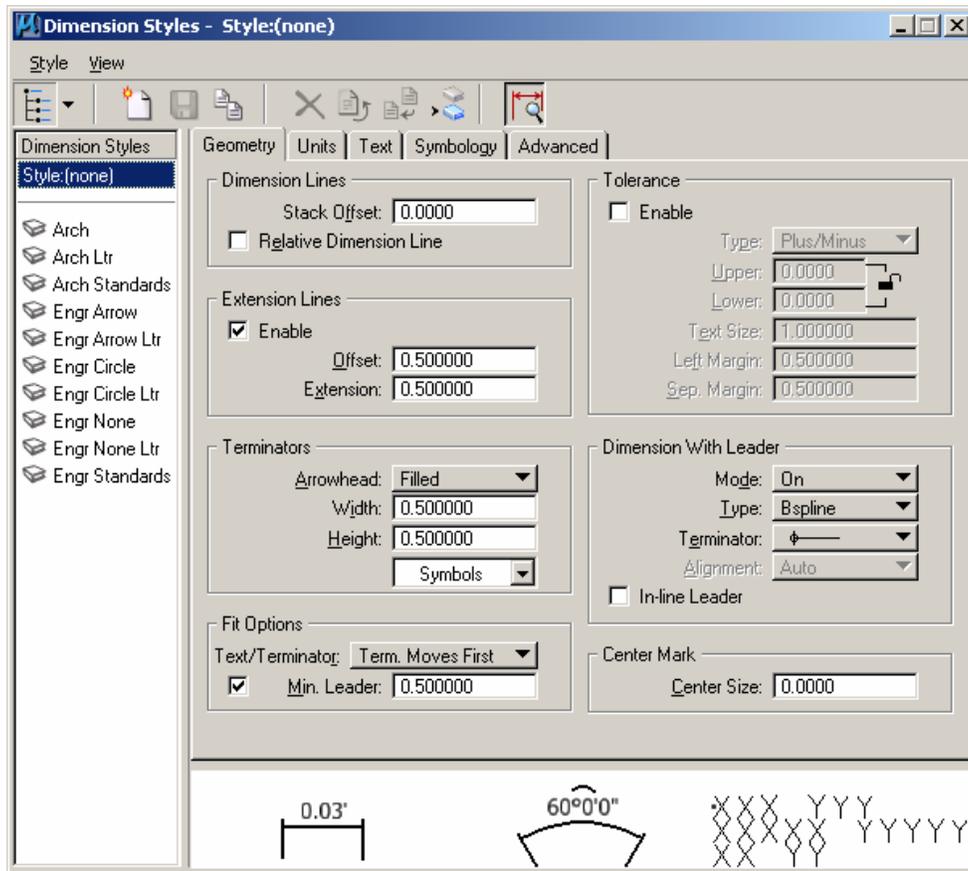
H.3 Dimension Styles and Settings

MicroStation dimension styles allow you to save dimension settings by name. This allows for greater unity between groups of dimensions in the file, as several different styles can be used for various models or portions of a model. Dimension styles are managed through the Dimension Styles Settings dialog box.

INDOT Dimension Styles

As with Text Styles we have made significant changes to our Dimension Styles at INDOT. The first change you will notice is the Dimension Styles Settings dialog box is different. It gives the users more options and breaks the settings down into categories like Geometry, Units, and Text. There is also a preview window at the bottom allowing you to preview the style prior to using it. We have combined all of the old V8 Dimension Styles into 10 new styles (4 for full size sheets, 4 for letter size sheets and 2 for standard size sheets). These Dimension Styles relate to the size of text and are linked to the appropriate Text Style. The following tables will show you the settings for each Dimension Style.

(See **Appendix H** for Dimension Style – Sheet Use chart)
 This will give guidance for use of dimension styles



Dimension Style Table

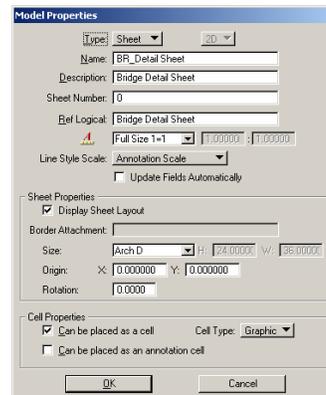
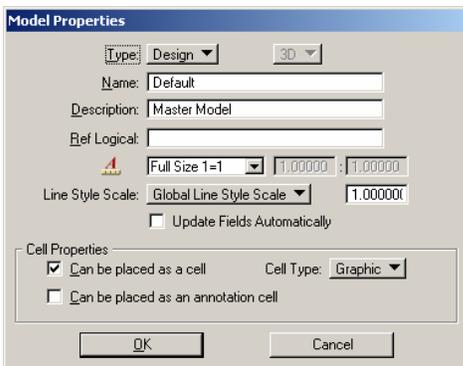
Dimension Style	Text	Terminator	Unit Label Format
Arch	12 Point Text (Special Characters)	Arrow	Master Unit-Sub Unit
Arch Ltr	6 Point Text (Special Characters)	Arrow	Master Unit-Sub Unit
Arch Standards	9 Point Text	Arrow	Master Unit-Sub Unit
Engr Arrow	12 Point Text	Arrow	Master Unit
Engr Arrow Ltr	6 Point Text	Arrow	Master Unit
Engr Circle	12 Point Text	Circle	Master Unit
Engr Circle Ltr	6 Point Text	Circle	Master Unit
Engr None	12 Point Text	None	Master Unit
Engr None Ltr	6 Point Text	None	Master Unit
Engr Standards	9 Point Text	Arrow	Master Unit

H.4 Models

A Model gives you the ability to store multiple independent sets of design data within the same file. (For additional information on models, see **Section 2.4.1 -2.4.3** or chapter 6 of the V8 Update manual)

(See **Appendix H** for Model – Sheet Use chart and proper model names)

Model Properties



Model Properties dialog box for Design (left) and Sheet (right)

Type

Sets the model's type (Design or Sheet) and dimensionality (2D or 3D).

Name

Sets the model's name.

Description

Sets the model's description.

Ref Logical

Sets the Reference Logical name for the model. The logical name identifies the model when the DGN file is attached to another file as a reference (see the Reference Attachment Setting dialog box).

Annotation Scale

The Annotation Scale icon displays the status of the Annotation Scale lock: on or off. When placing text, the lock must be on to ensure that text is placed at the defined scale.

The option menu sets the scale for text and dimensioning in the model. You can select from a list of common scales, or select CUSTOM and input your own scale in the fields immediately to the right. You can also define custom scales the Scales.def file stored in the "..\Workspace\System\data" directory.

Display Sheet Layout

(Sheet Model only) If on, a sheet element will display in the new sheet model.

Size

(Sheet Models only) Sets the sheet size. Standard sheet sizes are available from the drop-down menu, or you can select Custom and input your own size values in the H and W fields. The H and W fields are disabled when a standard sheet size is chosen.

You can also define custom sizes in the scales.def file stored in the "..\Workspace\System\data" directory.

Origin

(Sheet Models only) Sets the origin of the sheet.

Rotation

(Sheet Models only) Sets the rotation angle of the sheet, measured in degrees counter-clockwise from the x-axis (horizontal).

Can be placed as a cell

If on, it is possible to place the model as a cell. (Should be checked by default)

Cell Type

Sets the cell type (Graphic or Point). This option menu is enabled only if Can be placed as a cell is on.

OK

Accepts the changes and closes the dialog box.

Cancel

Closes the dialog box without making any changes.

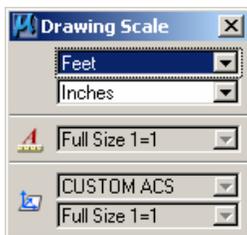
Drawing Scale

The Drawing Scale window is used to adjust drawing scale settings. These settings are particularly relevant to the process of creating sheet models for drawing production.

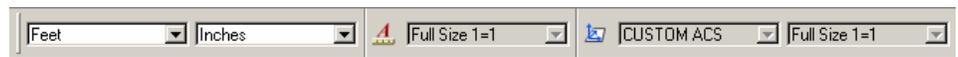
To open the Drawing Scale window: *INDOT>Common Tools>Model Drawing Scale*

Drawing Scale window

The Drawing Scale window is a dockable window that contains controls for viewing and/or modifying working units, the annotation scale factor, and the Annotation Scale Lock.



**Undocked Drawing
Scale Window**



Docked Drawing Scale Window

The units that display in the Master Units and Sub Units option menus can be customized by editing the file "units.def". The scale factors that display in the annotation scale option menu can be customized by editing the file "scales.def" (do not attempt to edit this file).

The selection of controls displayed in the Drawing Scale window can be customized by right-clicking in the window. The technique is the same as that for showing and hiding tools in tool boxes.

Master Units (option menu)

Sets the Master Units component of working units.

Sub Units (option menu)

Sets the Sub Units component of working units.

Annotation Scale (option menu)

Sets the annotation scale factor.

Annotation Scale (Icon)

Sets the Annotation Scale Lock. When this lock is on, the annotation scale is applied to any text that is placed in the model.

Scaling Definitions

The following charts represent the scales defined in the scales.def file.

The scales in this chart are to be used on metric sheets or imperial sheets (straight ratio) as well as metric base drawings when setting the annotation scale.

Scale Name	Scale Factor	Usage
Full Size 1=1	1:1	
1:2 & 6"=1'-0"	2:1	
1:2.5	2.5:1	
1:4 & 3"=1'-0"	4:1	
1:5	5:1	
1:8 & 1/2"=1'-0"	8:1	
1:10	10:1	
1:16 & 3/4"=1'-0"	16:1	
1:20	20:1	
1:24 & 1/2"=1'-0"	24:1	
1:25	25:1	
1:30	30:1	
1:32 & 3/8"=1'-0"	32:1	
1:40	40:1	
1:48 & 1/4"=1'-0"	48:1	
1:50	50:1	
1:60	60:1	
1:64 & 3/16"=1'-0"	64:1	
1:96 & 1/8"=1'-0"	96:1	
1:100	100:1	1:100 and All MX Created Metric Sheets
1:128 & 3/32"=1'-0"	128:1	
1:192 & 1/16"=1'-0"	192:1	
1:200	200:1	
1:250	250:1	
1:256 & 3/64"=1'-0"	256:1	
1:300	300:1	
1:384 & 1/32"=1'-0"	384:1	
1:400	400:1	
1:500	500:1	
1:1000	1000:1	
1:5000	5000:1	
1:10,000	10000:1	
1:25,000	25000:1	
1:50,000	50000:1	
1:100,000	100000:1	
1:250,000	250000:1	

The scales in this chart are to be used on MX Created imperial sheets as well as MX imperial base drawings when setting the annotation scale.

Scale Name	Scale Factor	Usage
MX Sheet 1"=1'-0"	12:1	All MX Created Imperial Sheets
MX base 1"=10'	120:1	MX base drawing 1"=10'
MX base 1"=20'	240:1	MX base drawing 1"=20'
MX base 1"=25'	300:1	MX base drawing 1"=25'
MX base 1"=30'	360:1	MX base drawing 1"=30'
MX base 1"=40'	480:1	MX base drawing 1"=40'
MX base 1"=50'	600:1	MX base drawing 1"=50'
MX base 1"=60'	720:1	MX base drawing 1"=60'
MX base 1"=100'	1200:1	MX base drawing 1"=100'
MX base 1"=200'	2400:1	MX base drawing 1"=200'
MX base 1"=300'	3600:1	MX base drawing 1"=300'
MX base 1"=400'	4800:1	MX base drawing 1"=400'
MX base 1"=500'	6000:1	MX base drawing 1"=500'
MX base 1"=600'	7200:1	MX base drawing 1"=600'

Reference Files and Models

With the emphasis of the use of Models at INDOT it is very important to understand how they are used and can be referenced within a dgn (self referencing) and to another dgn and back (Cyclical referencing).

Using References

Elements in a reference display as though they were in the active model. Although you cannot manipulate the elements in a reference, you can snap to them and even copy them into the active model.

The most common usage of references is in the creation of design compositions. Design compositions are used by engineers and other technical professionals to communicate through the visual content of their designs.

To create a **design composition** using MicroStation, you build a design model consisting of a working collection of references used in the performance of particular engineering tasks. For example, you may attach as references a collection of survey points as a guide for placement of additional geometry. Reference attachments in a design composition are usually coincident.

- It is sometimes convenient to refer to one part of a model while drawing in another area by attaching the active model to itself.
- You can attach a redline file created using Bentley Redline to your model for reviewing purposes.

Another common usage of references is in the creation of drawings for publication. This task is called drawing composition. Whereas a design composition is typically contained in a design model, a drawing is composed in a sheet model.

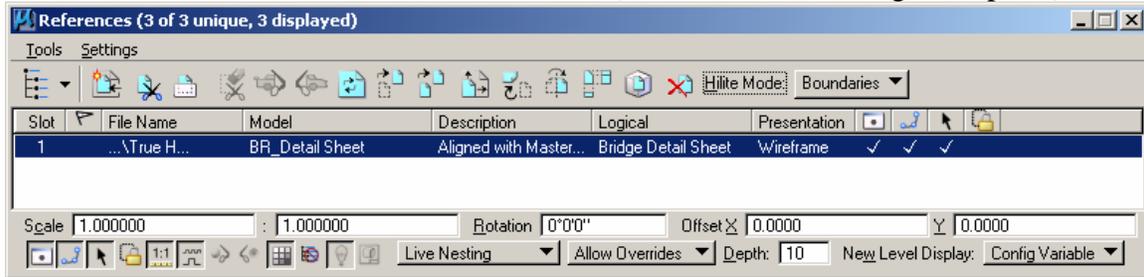
- For more information about models, see section 2.4.1

H.5 Attaching references

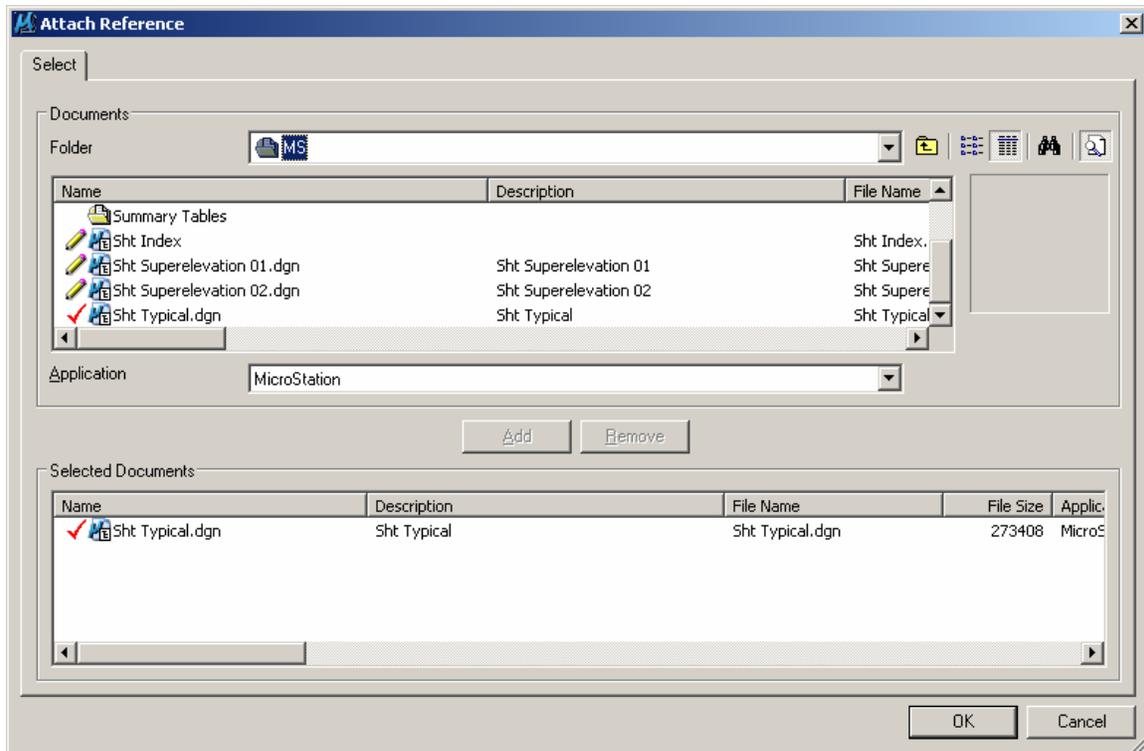
The most common way to attach a reference is to attach it coincidentally, which means that the coordinates of the referenced model's design plane and optionally its Global Origin are aligned with those of the active model, without any rotation, scaling, or offset.

To attach a reference coincidentally

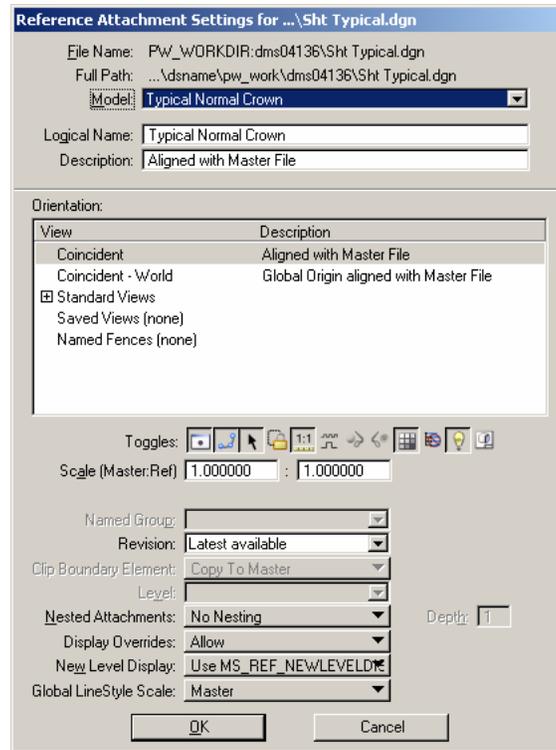
1. From the File menu, choose Reference. (The References dialog box opens.)



2. From the dialog box's Tools menu, choose Attach. Or In the Reference dialog box, right-click in the list box and choose Attach from the pull down menu. (The Attach Reference dialog box opens.)



3. Select the DGN file that contains the model to attach as a reference and click ADD and then click OK. (The Attach Reference Settings dialog box opens.)



4. (Optional) From the Model option menu, choose the model to attach.
The default is the reference's master model.
5. (Optional) *(unless the selected model is already attached)* In the Logical Name field, key in a brief name for the attachment.
6. (Optional) In the dialog box's Description field, key in a description of the model.
7. To align the reference with the active model with regard to both Global Origin and design plane coordinates, select Coincident - World in the Orientation list box. This option is available only when referencing a model in a DGN file.
Or
To align the reference with regard to design plane coordinates only, select Coincident in the Orientation list box.
8. (Optional) In the Scale (Master:Ref) fields, define the ratio of the active model's Master Units to the referenced model's Master Units. For example:

To set	Left	Right
One active model master unit per referenced model master unit (the default).	1	1
Five active model master units per referenced model master unit.	5	1

9. (Optional) (DWG workmode only.) Set the level for the reference to be attached.

Since the same model can be attached many times, give the references logical names and descriptions that help you remember which reference is which.

For further discussion on using reference manager please refer to Chapter 8 of the *Bentley Institute Course Guide, MicroStation V8 XM Edition User*.

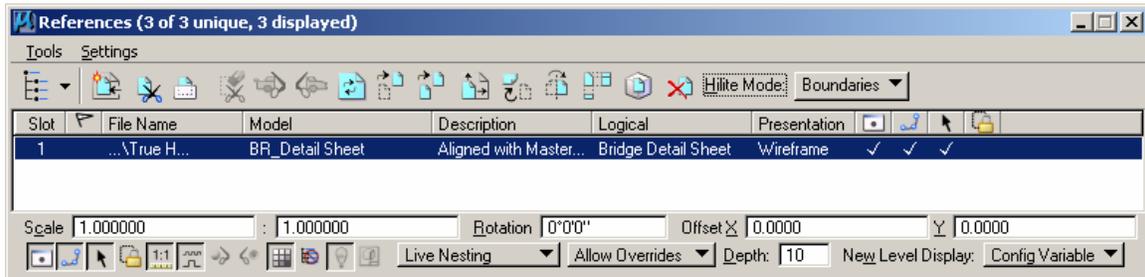
Since the same model can be attached many times, give the references logical names and descriptions that help you remember which reference is which.

Working with nested references

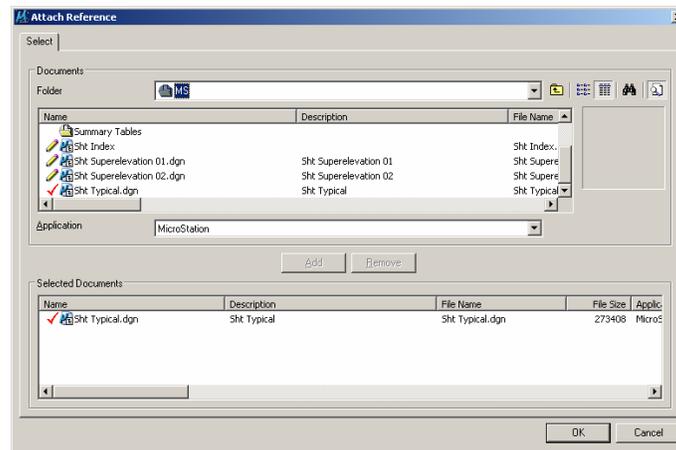
When a MicroStation design file used as a reference has its own attachments, they become nested references. The links between these files can be maintained through many levels (depths) of nesting, so that if you open only one file, you can view the contents of many files. The individual references can be updated, and the changes will be shown in the master (or parent) file. When you attach a parent reference to your model and turn on live nesting, you can also control how many levels of nested references are attached to the model.

To attach a reference with live nesting

1. In the Primary tool box, click the References icon. (The Reference dialog box opens.)



2. In the dialog box's tool bar, select the Attach Reference tool. (The Attach Reference dialog box opens.)



3. Select the DGN file that contains the model to attach as a reference, and click OK. (The Attach References Settings dialog box opens.)
4. From the Nested Attachments options menu, choose Live Nesting.
5. The Nested Attachments options are only available when the selected model has reference attachments. When the Live Nesting option is on, the hierarchical structure of any nested references are maintained when attaching the parent reference to a model. In MicroStation, a nested attachment is displayed only if the child reference does not have its Ignore Attachment When Live Nesting setting turned on (in the Attachment Settings dialog box), and the parent reference has Live Nesting enabled.
6. In the Nest Depth field, enter a high value (for example, 10).

Set the depth setting to a high number to include even the most deeply nested references.. Although the nested attachments will display in the view window, you will see only the parent reference in the References dialog box's list box.

Nested Attachments

Determines if referenced models attached to reference models (and, so on) are recognized when a model is attached to the active model.

- No Nesting — Models attached to the attached model are not recognized in the active model.
- Live Nesting — Models attached to the attached model are recognized in the active model.
- Copy Attachments — Models attached to the attached model copied into the active model.

When working in a DWG or DXF file, live nesting is always on, and there is no limit to nest depth. Therefore the Nested Attachments and Depth items are disabled. To control the display of nested attachments, use the Ignore Attachment When Live Nesting setting (on the Attachment Settings dialog box).

Nest Depth

Sets the number of levels of referenced models that are recognized. Models can have their own referenced models, which, in turn, can have more referenced models, and so on.

If Depth is set to 0, only the model is attached to the master model; referenced models in the referenced model are ignored.

MicroStation V8 includes the ability for live nesting of reference files. Essentially this means that referencing a file causes its children (and potentially their children) to be automatically referenced as well.

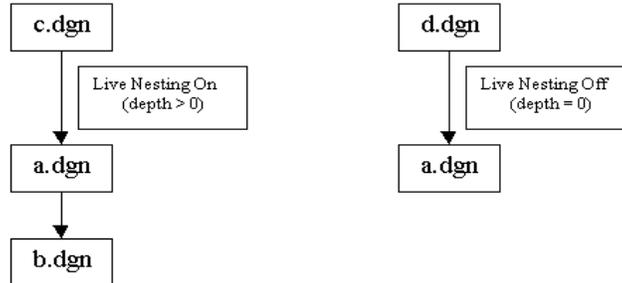
MicroStation allows two separate settings that control whether live nesting occurs. The first setting controls whether an attachment is displayed as a nested file. This setting is controlled through the "Ignore Attachment When Live Nesting" checkbox on the attachment settings dialog.

The second setting is subtly different than the "Ignore/Overlay" setting discussed above. This setting controls whether children of a reference file are displayed at all and if they are displayed, the depth to which the children are nested.

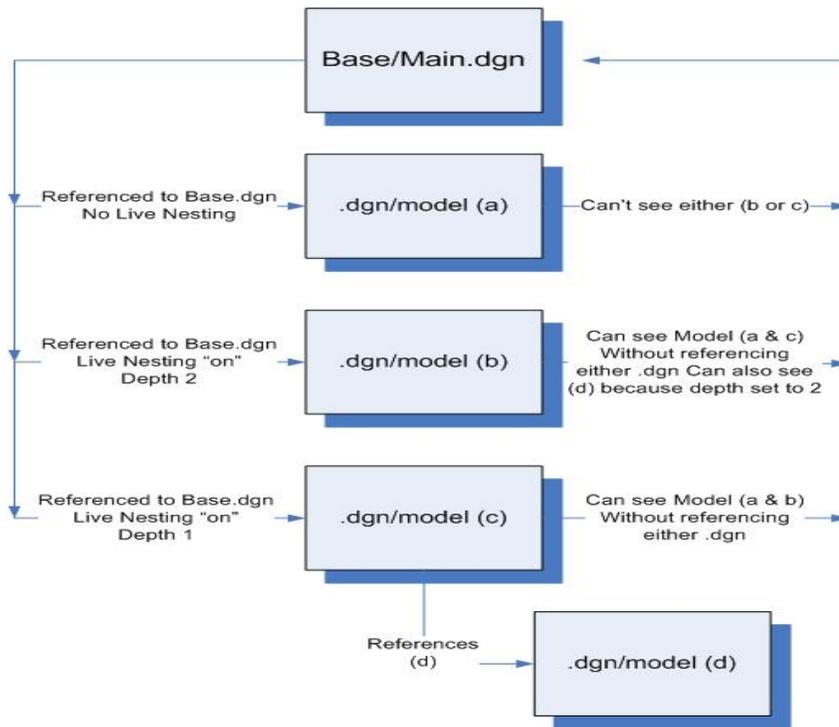
The difference is that the parent attachment controls whether the children are displayed rather than the children themselves controlling their nested display. In MicroStation, a nested attachment is displayed only if the child does not have its "Ignore When Live Nesting" setting on AND the parent has live nesting enabled.

At a quick glance it would seem that it would be possible to simulate MicroStation's parental control of nest depth by creating Overlays whenever a parent attachment disables live nesting. Unfortunately this is not possible. Consider the example below.

A MicroStation design file, a.dgn has a single reference, b.dgn that is attached as a standard attachment (not an overlay). In MicroStation it is possible to attach a.dgn as a reference and include the display of b.dgn (as in c.dgn) or to disable the display of children by turning off live nesting (as in d.dgn).



Circular References



H.6 Levels and Level Filters

Levels

In the new unified workspace environment we have taken and combined the levels from all previous workspaces to eliminate redundancy and establish consistency throughout the agency. The total number of levels is now well over 400. Due to the large number of levels, we have developed filters to make it easier for each user to display only the levels needed for their section/job.

Level Filters

Filters are a useful way to group associated levels for the purposes of viewing or not viewing as a group. For example, you might have a DGN file with several hundred levels. Within these levels could be filters for different disciplines such as Bridge and Traffic. Within Bridge there might be levels for E Bridge, P Alignments, P Culvert etc. You could easily define a filter called Bridge that would show only levels that would be associated with Bridge work.

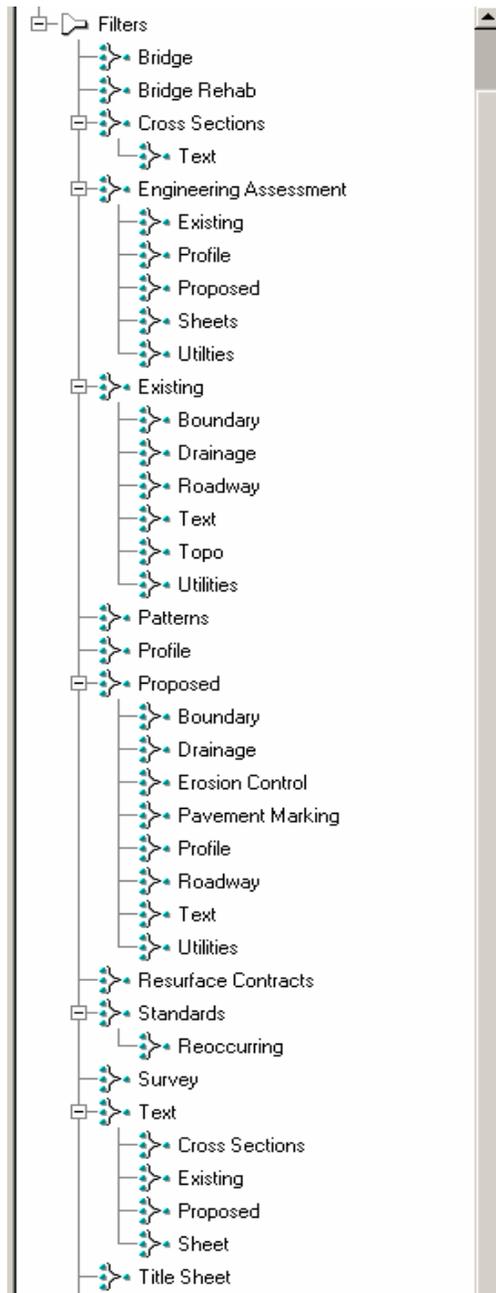
Filters can be named, saved, and recalled as needed or defined on-the-fly for immediate one-time viewing using the Filter Row in the Level Manager dialog box. Filters can be turned on or off using the Level Display dialog box. Filters can be used to turn on or off levels across a model and all of its attached models.

Levels can be filtered by a number of attributes such as filename, color, style, line weight, and level groups, to name a few.

Here at INDOT we have defined filters for Bridge, Bridge Rehab, Standards, Survey, Traffic, and others and they are available for use in each of the seed files you will be shown in section 1.7 but they are stored and defined in the dgnlib.

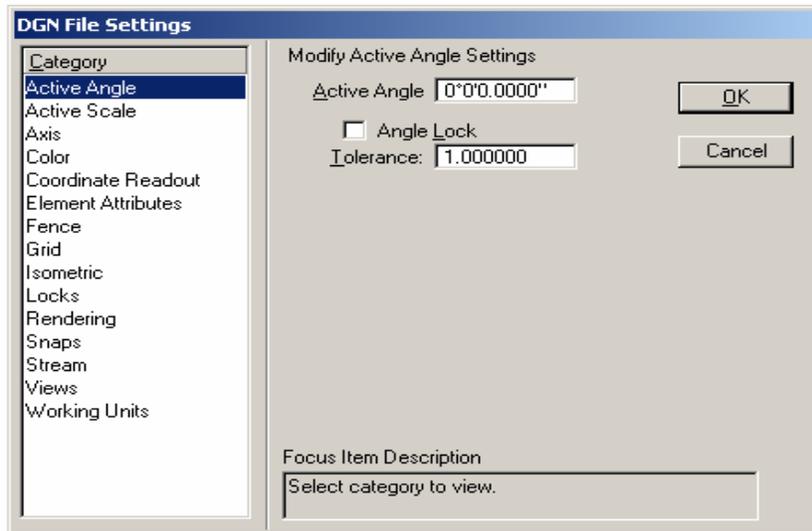
To display the levels that are defined in a filter select the Active Level filter button from the Attributes toolbar and select the filter of choice. This will display those levels only and turn off all other levels in the dgn. Note that the levels will not actually be turned on or off, but the ability to view them in the Level Display will be dictated by the filter selected.

See the following figure for a list of the available filters and sub filters.



H.7 Design File Settings

Under Settings> Design File you will see the following screen



Active Angle

Sets the Active Angle — the angle, in degrees, used with tools that require an angle specification, including the Place Line, the Place Active Cell, the Place Text, the Rotate, and the Construct Array.

Active Scale

Consists of controls that are used to set the active scale factors and to toggle Scale Lock.

Axis

Consists of controls that are also available in the Locks dialog box. (Settings menu > Locks > Full).

Axis Lock: If on, each data point is forced to lie at an angle (or multiples of that angle) from the previous data point. The angle is specified by the (Axis) Increment relative to the (Axis) Start Angle.

Color

Consists of controls that are used to modify the color settings in the elements and the dynamic X pointer.

Coordinate Readout

Consists of controls that are used to set the format and accuracy with which coordinates, distances, and angles are displayed in the Status Bar, dialog boxes, and the Tool Settings window.

Element Attributes

Color, line style, line weight, class, level, and fill.

Fence

Consists only of a control used to set the fence selection mode.

Grid

Consists of controls that are used to set Grid Lock and the grid's spacing and configuration.

Grid Lock

If on, each data point is forced to lie on the grid.

Isometric

If on, each data point is forced to lie on the Isometric Plane.

Locks

Consists of controls that are also available in the Locks dialog box.

Text Node Lock: If on, newly placed text is attached to empty text nodes, and you cannot place text if there aren't any empty text nodes.

Level Lock: If on, you can select elements only on the Active Level; you cannot manipulate elements that are not on the Active Level.

Graphic Group: If on, any manipulation performed on one member of a graphic group is automatically performed on all members.

If off, the member elements of a graphic group can be manipulated individually.

Boresite: (3D only) If on, you can select or snap to elements at any depth in the view cube.

If off, you can select (with a data point) only those elements that are at or very near the Active Depth. Still you can snap to elements at any depth.

ACS Plane: (3D only) If on, each data point is forced to lie on the Active ACS's xy plane ($z=0$). Still you can snap to elements at any depth.

The Active ACS is set in the Auxiliary Coordinates System dialog box, which is opened by choosing Auxiliary Coordinates from the Utilities menu.

Rendering

To edit rendering attributes.

Snaps

Consists of controls that are also available in the Locks dialog box.

Association:

If on, an association point is created each time an element is snapped to: Dimensioning tools, the Place Multi-line tool, the Place Active Cell tool or Use Shared Cell.

ACS Plane Snap:

(3D only) If on, and AccuDraw is active, the first snap point is forced to lie on the Active ACS's xy plane ($z=0$).

Depth Lock:

(3D Only) If on, each tentative point is projected along the view z-axis at the Active Depth.

Stream

Consists of controls that are used to set how data points are sampled while using the Place Stream Line String tool and the Place Point or Stream Curve tool.

Stream Delta:

Sets the minimum distance, in working units, between sampled points (vertices in the stream line string or curve).

When the distance between the pointer's location and the previously sampled point exceeds the Active Stream Delta, the point is sampled and the Tolerance, Stream Angle, and Stream Area are applied to see if a data point should be recorded.

Stream Tol(erance):

Sets the maximum distance, in working units, between recorded data points. The distance from the most recently recorded data point is checked for each sampled point. If that distance exceeds the active stream Tolerance, the sampled point is recorded as a data point.

Views

To edit Pixel width and Height in the corresponding view.

Working Units

The units in which the current dgn is working in.

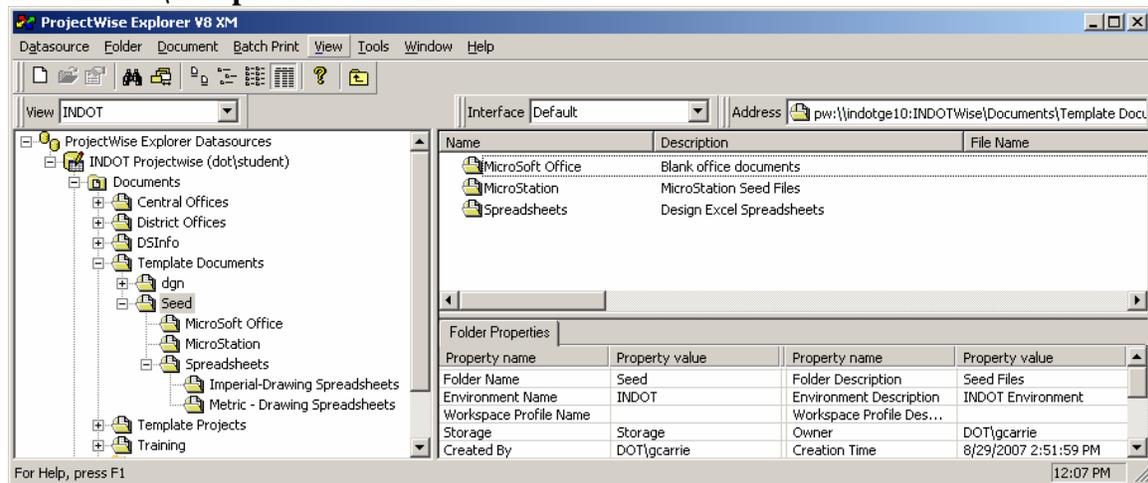
Seed Files – (Template Documents)

The following paragraph is quoted from the *Bentley Institute Course Guide* titled **ProjectWise V8 XM Edition User**.

“A ProjectWise template is the same as a Microsoft template, or a seed file in MicroStation. It is a file that is copied to create a new document. You can use a document stored in ProjectWise or document that resides outside ProjectWise as a template.”

All template documents are stored in ProjectWise Explorer, in the Template Documents folder. Each set of seed files (Template Documents) resides within a sub folder describing their specific use. (Example: MicroStation files are stored in the MicroStation folder).

Documents\Template Documents



MicroStation Seed Files (Template Documents.)

Documents\Template Documents\MicroStation\

There are only two seed (Template Documents) that will be used on a regular basis.

INDOT_Imperial_seed.dgn for imperial projects.

INDOT_Metric_seed.dgn for metric projects.

Occasionally transeed.dgn will be needed for AutoCad files.

Microsoft Office Seed Files (Template Documents)

When creating a new office document within ProjectWise Explorer, you will need to select the associated template document.

EXCEPTION!!! - When creating data tables to be linked into MicroStation use those in the folder labeled *Spreadsheets* (discussed next).

Documents\Template Documents\Microsoft Office\

Access.mdb = Microsoft Access

Excel.xls = Microsoft Excel

MSPROJECT.mpp = Microsoft project

PowerPoint.ppt = Microsoft PowerPoint

Publisher.pub = Microsoft Publisher

Visio.vsd = Microsoft Visio

Word.doc = Microsoft word

Data Tables (Microsoft Excel Spreadsheets)

To be used in conjunction with MicroStation. Separate folders have been created for spreadsheets containing both imperial and metric units.

Documents\Template Documents\Spreadsheets\Imperial-Drawing Spreadsheets\

Documents\Template Documents\Spreadsheets\Metric-Drawing Spreadsheets\

TB_APPROACH_ms.xls = Approach Table

TB_BRIDGE_SUMMARY_ms.xls = Bridge Summary Table

TB_DITCHES_ms.xls = Paved Side Ditch, Riprap ditch and Sodding Summary Table

TB_EROSION_ms.xls = Temporary Erosion Control Table

TB_PIPEMATERIAL_ms.xls = Pipe Materials Table

TB_ROAD_SUMMARY_ms.xls = Road Summary Table

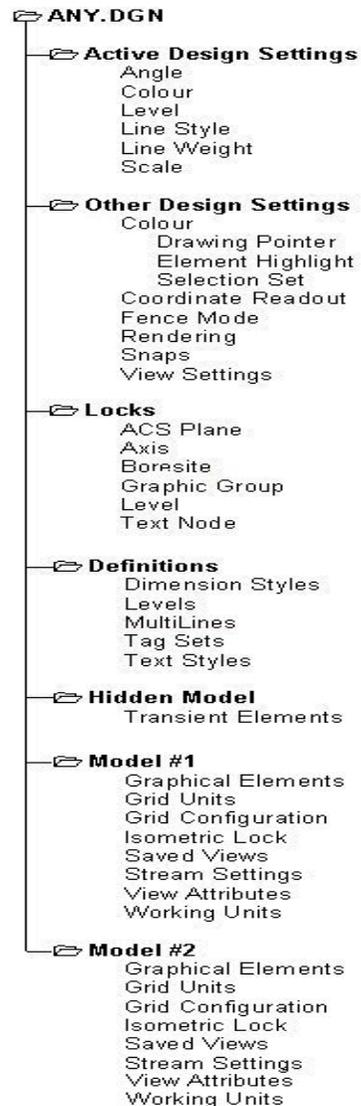
TB_SIGN_SUMMARY_ms.xls = Sheet Sign and Post Summary Table

TB_STRUCTUREDATA_ms.xls = Structure Data Table

TB_UNDERDRAIN_ms.xls = Underdrain Table

H.8 Structure of a V8 Design File

We've had a number of requests from users for a chart that kind of shows the "structure of a design file" for an understanding of which settings are stored globally and which are stored with the model. The following image is only intended for learning purposes and is **not** a technical representation of the design file structure.



H.9 Cell Libraries

X:\WRKSPC_INDOT_XM\Workspace\Standards\cell\...

County.cel – All counties displayed as a “pop out” for the project location on title sheets.
All district “area” maps that can be used for title sheets.

Pe_ls_stamps.cel – All Professional Engineers & Licensed Surveyors stamps.

Details_eng.cel – Drawings for the detail sheets.

Lighting.cel – Photometry templates.

Patterns.cel – Area material patterns.

Pavement_markings.cel – Traffic pavement markings.

Signs_eng.cel – Road signs.

Symbols_eng.cel – Various symbols for all groups.

Table_legend_notes_eng.cel – Notes used for legends, tables, etc.

Details_met.cel – Drawings for the detail sheets.

Signs_met.cel – Road signs.

Symbols_met.cel – Various symbols for all groups.

Table_legend_notes_met.cel – Notes used for legends, tables, etc.

Note: “Thumbnails” of each cell can be found on the CAD/GIS FAQ Page.



Appendix I - Sheet use

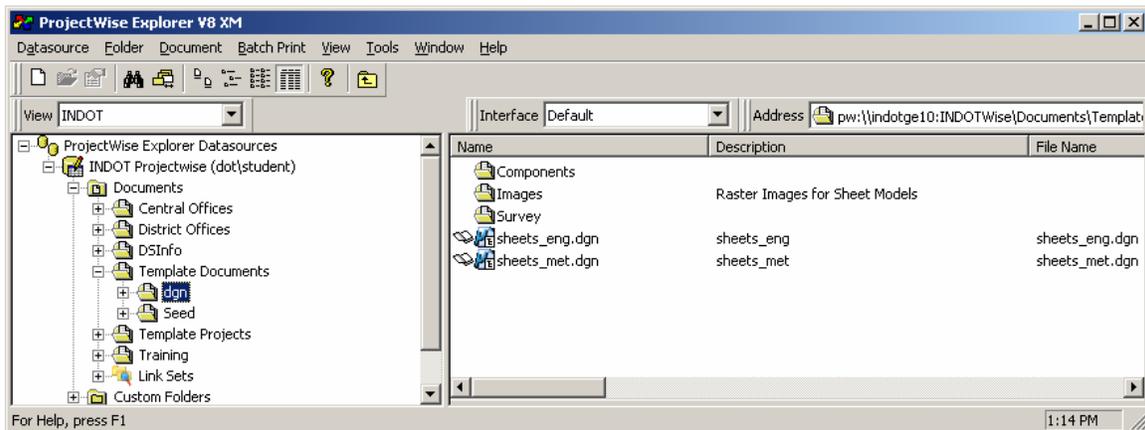
I.1 INDOT Border / Sheet Models

A series of Sheet Models have been provided for use within the INDOT Workspace. These Sheet Models are to be imported into your DGN file within your project. For a brief description of how to use this functionality see Chapter 3 of this document. These Sheet Models are stored within a DGN file located in the ProjectWise Environment at the location listed below.

Documents\Template Documents\dgn

Sheets_eng.dgn = For use with imperial projects.

Sheets_met.dgn = For use with metric projects.



I.2 Sheet Name and Sheet Description

Name	Description
BR_Detail Sheet	Bridge Detail Sheet
BR_Ltr. Detail Sheet	8.5 x 11 Bridge Detail Sheet
BR_Ltr. Title Sheet	8.5 x 11 Bridge Title Sheet
BR_Quantities Sheet	Bridge Summary of Quantities Sheet
BR_Title Sheet	Bridge Title Sheet
BR_Title Sheet Rehab	Bridge Rehab Title Sheet
BR_Title Sheet ROW	Bridge ROW Title Sheet
Default	Master Model
FE_Prelim Drawing Sheet	FE_Prelim Drawing Sheet
LG_Highway Data Sheet	Lighting Highway Data Sheet
LG_Index Sheet	Lighting Index Sheet
PL_Layout Sheet	Planning Layout Sheet
PL_Ltr. Detail Sheet	8.5 x 11 Planning Detail Sheet
RD_Detail Sheet	Road Detail Sheet
RD_Index Sheet ROW Off	Road Index Sheet ROW Off
RD_Index Sheet ROW On	Road Index Sheet ROW On
RD_Ltr. Approach Details Sheet 01	8.5 x 11 Road Private and Commercial Drives Sheet
RD_Ltr. Approach Details Sheet 02	8.5 x 11 Road Combination Mail Box and Drive Sheet
RD_Ltr. Cover Sheet Contract Info	8.5 x 11 Road Contract Info Cover Sheet
RD_Ltr. Cover Sheet Proposal	8.5 x 11 Road Proposal Cover Sheet
RD_Ltr. Detail	8.5 x 11 Blank Detail Sheet
RD_Ltr. Detour Sheet Route	8.5 x 11 Road Official Detour Route Sheet
RD_Ltr. Detour Sheet Signing	8.5 x 11 Road Recommended Detour Signing Sheet
RD_Ltr. INDOT Detail Landscape	8.5 x 11 Road Detail Landscape
RD_Ltr. Landscape Detail	8.5 x 11 Road Detail Border Landscape
RD_Ltr. Resurface Feathering Sheet	8.5 x 11 Road Resurface Feathering Sheet
RD_Ltr. Strip Map Sheet	8.5 x 11 Road Strip Map Sheet
RD_Ltr. Structure Detail Sheet Circ...	8.5 x 11 Road Circular Structure Installation Sheet
RD_Ltr. Structure Detail Sheet Ellipt...	8.5 x 11 Road Elliptical Structure Installation Sheet
RD_Ltr. Title Sheet	8.5 x 11 Road Title Sheet
RD_Pavement Marking Sheet	Road Pavement Marking Sheet
RD_Pipe Material Sheet	Road Pipe Material Sheet
RD_Plat Sheet	Road Plat Sheet
RD_Soil Boring Sheet	Road Soil Boring Sheet
RD_Summary Sheet	Road Summary Sheet
RD_Title Sheet	Road Title Sheet
RD_Title Sheet ROW	Road ROW Title Sheet
RSM_Prelim Drawing Sheet	RSM_Prelim Drawing Sheet
SG_Detail Sheet EIT	Signals EIT Detail Sheet
SG_Detail Sheet PE	Signals PE Detail Sheet
SG_Index Sheet	Signals Index Sheet
SG_Title Sheet	Signals Title Sheet
SL_Plan Sheet	Signs and Lighting Plan Sheet
SL_Title Sheet	Signs and Lighting Title Sheet
SN_Index Sheet	Signs Index Sheet
SN_Panel Sign and Post Summary...	Signs Panel Sign and Post Summary Sheet
SN_Sheet Sign and Post Summary...	Signs Sheet Sign and Post Summary Sheet
ST_Drawing Sheet	Standards Drawing Sheet
ST_Reoccurring Drawing Sheet	ST_Reoccurring Drawing Sheet
SV_Reference Point Box Sheet	Survey Reference Point Box Sheet
SV_Section Corner Reference Card...	Survey Section Corner Reference Card Sheet

Appendix J - Scale Chart

Metric	English		
	Desired Scale	True Scale (Master:Reference) (in border)	12 Scale Factor (Master:Reference) (ft border)
	1/16 in. = 1 ft	1 : 192	1 : 16
	3/32 in. = 1 ft	1 : 128	1 : 10.6666667
1 : 100	1/8 in. = 1 ft	1 : 96	1 : 8
1 : 50	3/16 in. = 1 ft	1 : 64	1 : 5.333333333
	1/4 in. = 1 ft	1 : 48	1 : 4
	3/8 in. = 1 ft	1 : 32	1 : 2.666666667
1 : 20	1/2 in. = 1 ft	1 : 24	1 : 2
	3/4 in. = 1 ft	1 : 16	1 : 1.333333333
1 : 10	1 in. = 1 ft	1 : 12	1 : 1
1 : 50	1 in. = 5 ft	1 : 60	1 : 5
1 : 100	1 in. = 10 ft	1 : 120	1 : 10
1 : 200	1 in. = 20 ft	1 : 240	1 : 20
	1 in. = 30 ft	1 : 360	1 : 30
1 : 500	1 in. = 40 ft	1 : 480	1 : 40
	1 in. = 50 ft	1 : 600	1 : 50
1 : 1000	1 in. = 60 ft	1 : 720	1 : 60
	1 in. = 100 ft	1 : 1200	1 : 100
1 : 25000	1 in = 2000ft	1 : 24000	1 : 2000



Hate Keying In A Degree Symbol Well Good Riddance With This Tip

[Print this topic](#)



Original Tip Date: May 2, 2005

Hate keying in a ° symbol? Well, good riddance with this tip!

Brent James offers this great tip!

When digitizing new linework, you can replace the degree symbol (°) with a semi-colon (;) when entering angles in AccuDraw.

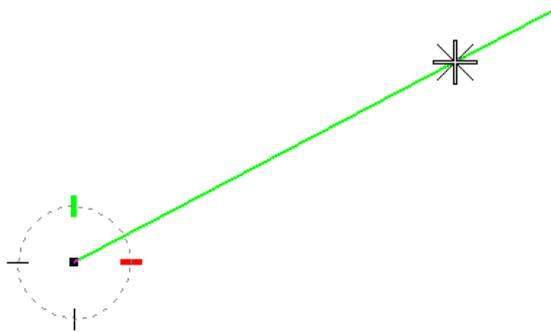
For example:

N89°59'42"E can be entered as N89;59'42"E

See also:

[Hate Keying In A Colon Well Good Riddance With This Tip](#)

[Hate Keyin In Angle Quadrants Well Good Riddance With This Tip](#)



Askinga Tip #533

Topics Linking to **Hate Keying In A Degree Symbol Well Good Riddance With This Tip**: [Askinga Tips](#) [Hate Keyin In Angle Quadrants Well Good Riddance With This Tip](#) [Hate Keying In A Colon Well Good Riddance With This Tip](#) [Stop Calculating Decimal Feet When Wanting To Enter Inches](#) | [All Linked Topics](#)

Revised on 08-20-2008 at 3:54 PM by [Hann.B](#) | 8 Revisions

Filed under: [Askinga](#), [AccuDraw](#), [tip](#) [[Edit Tags](#)]



Hate Keying In A Colon Well Good Riddance With This Tip



[Print this topic](#)



Original Tip Date: Feb. 16, 2001

Hate keying in a colon? Well, good riddance with this tip!

Hate keying in a colon (:) to separate the feet from inches when using *AccuDraw*?

Use a semi-colon (;), an apostrophe ('), or two periods (..) instead!

Thanks to Bentley's *Rudi Wells* and *John Frampton* for these tips.

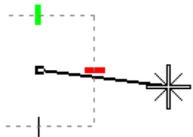
Note, what you can't see in the clip below is me entering .. for the semi-colon.

Related Tips:

[Stop Calculating Decimal Feet When Wanting To Enter Inches](#)

[Hate Keying In A Degree Symbol Well Good Riddance With This Tip](#)

[Hate Keyin In Angle Quadrants Well Good Riddance With This Tip](#)



AskInga Tip #9

Topics Linking to **Hate Keying In A Colon Well Good Riddance With This Tip**: [AskInga Tips](#) [Hate Keyin In Angle Quadrants Well Good Riddance With This](#)

[Tip Hate Keying In A Degree Symbol Well Good Riddance With This Tip](#) [Increase your productivity - use the mouse with your left hand!](#) [Stop Calculating Decimal](#)

[Feet When Wanting To Enter Inches](#) | [All Linked Topics](#)

Revised on 08-20-2008 at 3:54 PM by [Hann.B](#) | 9 Revisions

Filed under: [AskInga](#), [AccuDraw](#), [Coordinate Input](#), [tips](#) [[Edit Tags](#)]



Hate Keyin In Angle Quadrants Well Good Riddance With This Tip

[Print this topic](#)



Original Tip Date: *May 2, 2005*

Hate keyin in angle quadrants? Well good riddance with this tip!

If you want to type

N89°59'42"E you can enter it as

N89;59'42"E

Brent James shares this tidbit!

When specifying quadrants for entering angles, you can use the following numbers:

NE = 1

NW = 2

SW = 3

SE = 4

You can leverage this information by typing the quadrant number, a space and then the degree value in the angle field of AccuDraw.

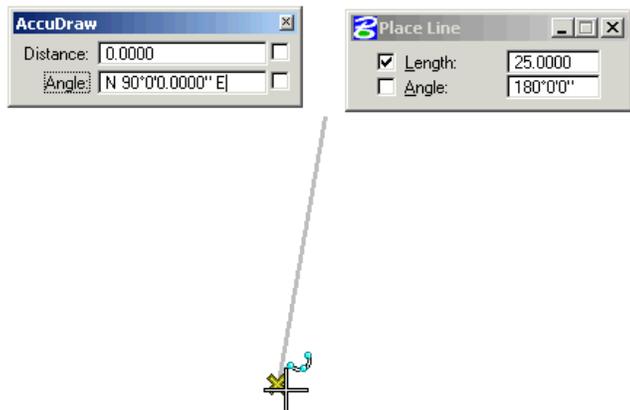
Add on this tip and look what you can do!

N89°59'42"E now becomes *1 89;59'42"*

See also:

[Hate Keying In A Degree Symbol Well Good Riddance With This Tip](#)

[Hate Keying In A Colon Well Good Riddance With This Tip](#)



Askinga Tip #534

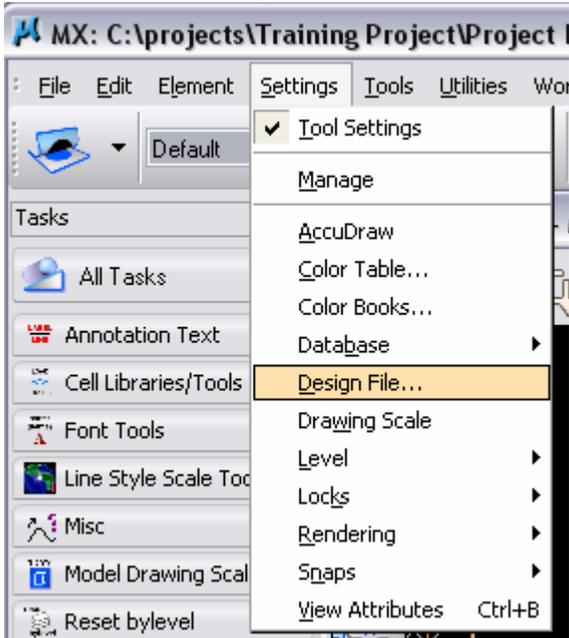
Topics Linking to **Hate Keyin In Angle Quadrants Well Good Riddance With This Tip**: [Askinga Tips](#) [BE 2005 - Tips and Tricks](#) [Hate Keying In A Colon Well Good Riddance With This Tip](#) [Hate Keying In A Degree Symbol Well Good Riddance With This Tip](#) [Stop Calculating Decimal Feet When Wanting To Enter Inches](#) | [All Linked Topics](#)

Revised on 08-20-2008 at 3:57 PM by [Hann B](#) | 10 Revisions

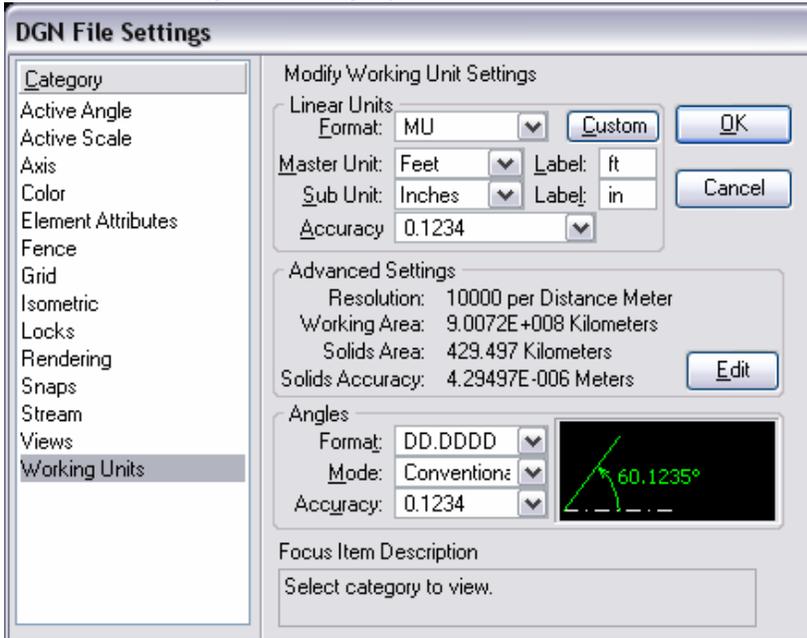
Filed under: [Askinga](#), [AccuDraw](#), [tip](#) [[Edit Tags](#)]

CAD settings for Survey

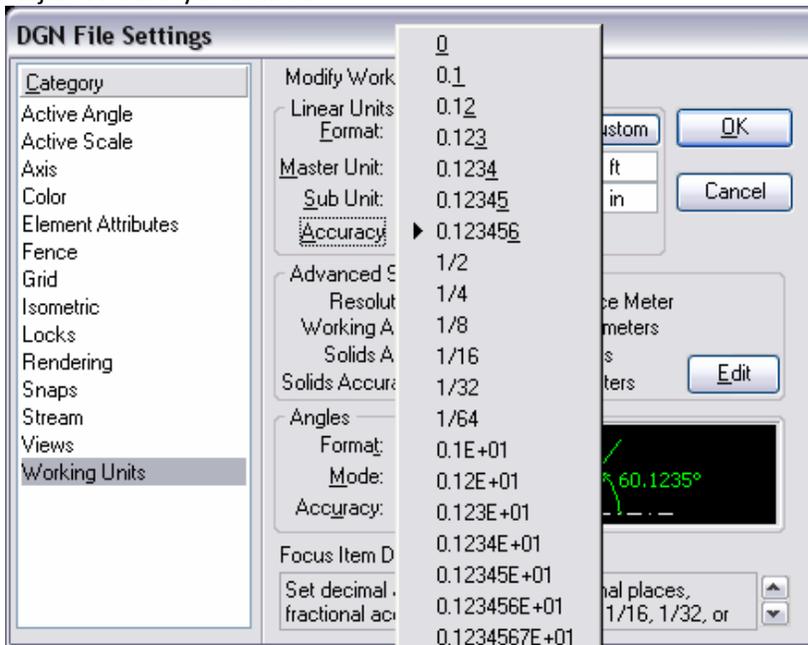
Settings Units and angles as desired.



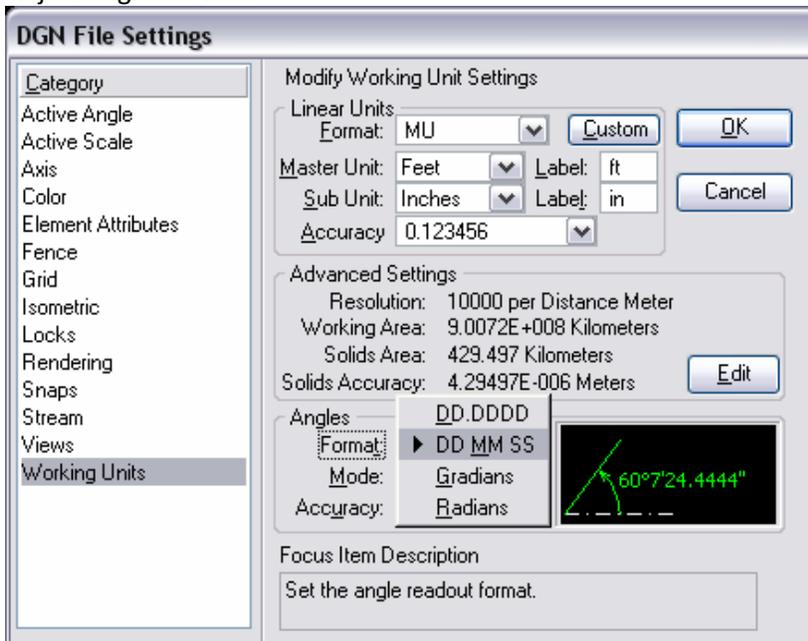
Select the working units category



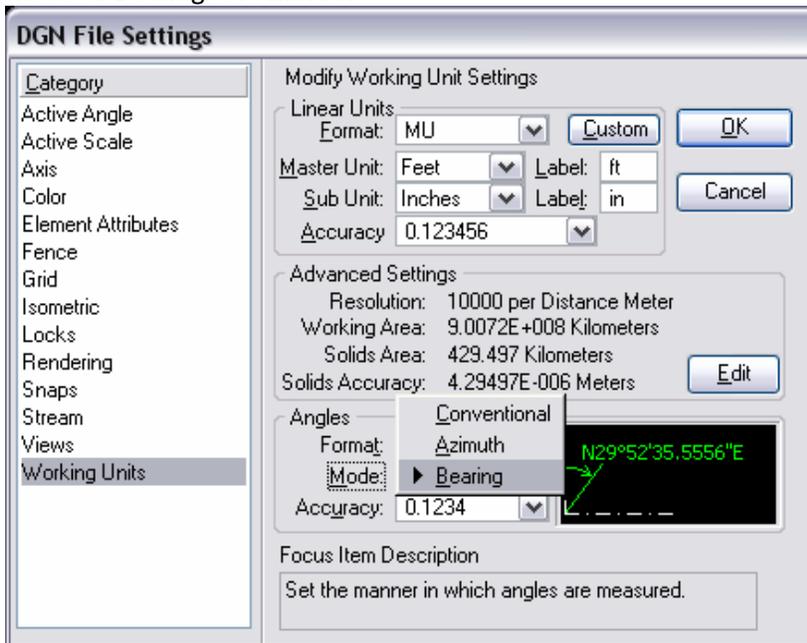
Adjust Accuracys desired



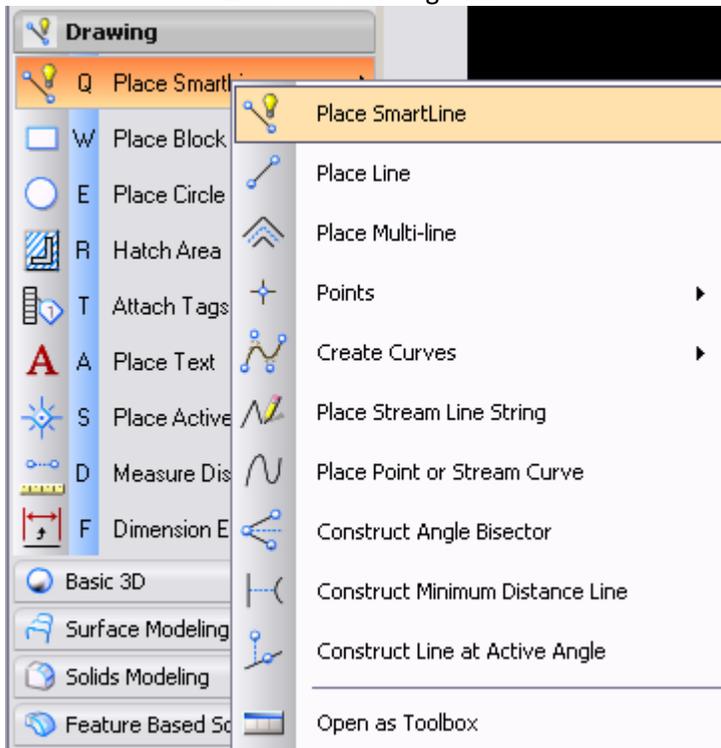
Adjust angles to DMS



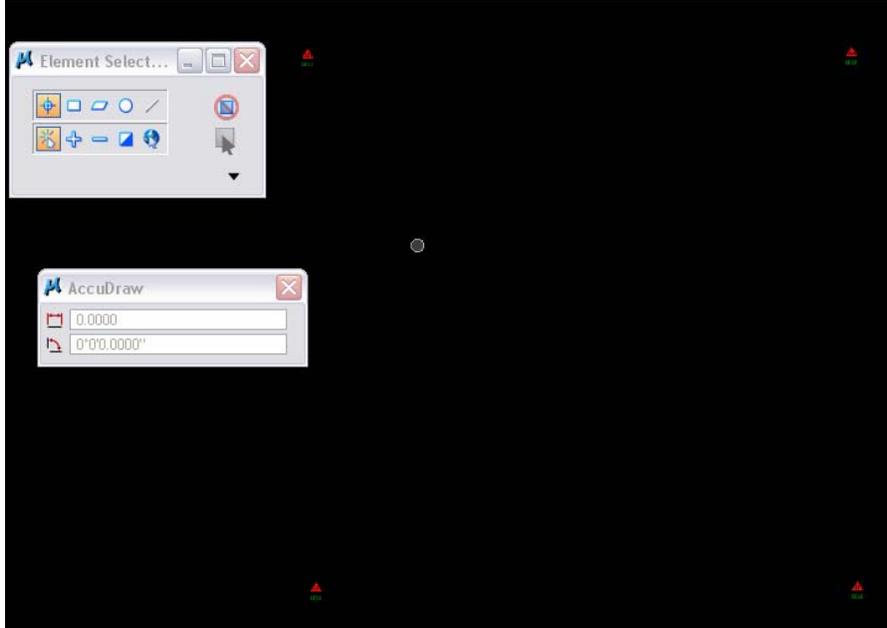
Mode to Bearings or Azimuth



Select Place SmartLine from drawing task

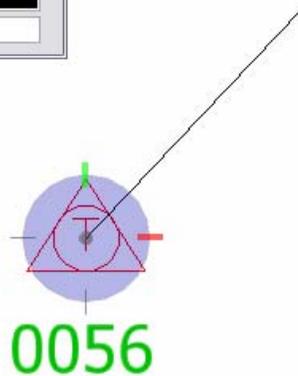
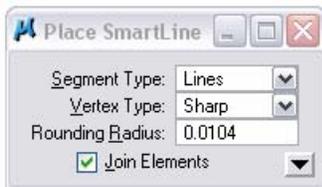


Using AccuDraw with Place Smart line
Draw in a drawing with Section corners or traverse points, or whatever.

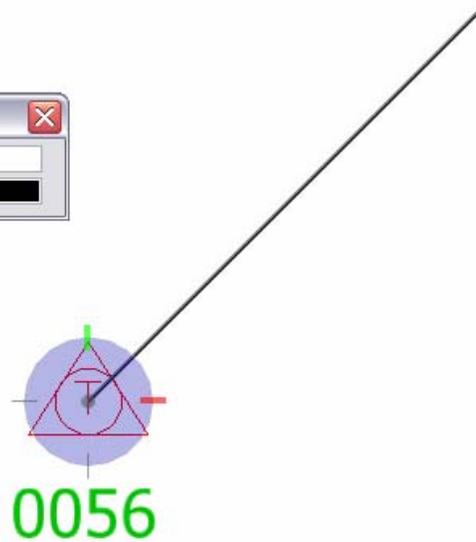
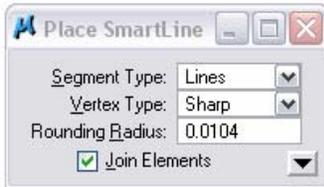


Using polar mode for AccuDraw we will enter distance and bearing, using the tab key to switch between fields. Move the cursor in the direction of the desired line. Pressing space bar will toggle between rectangular and polar entry mode.

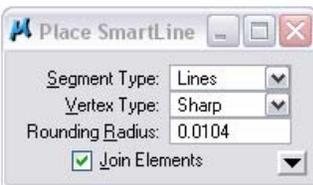
Distances can be entered in master units followed by sub units when separated by a colon.
Tip...use semicolon instead. Such as 129:5 5/8 which would be 129 ft 5 and 5/8 inches.



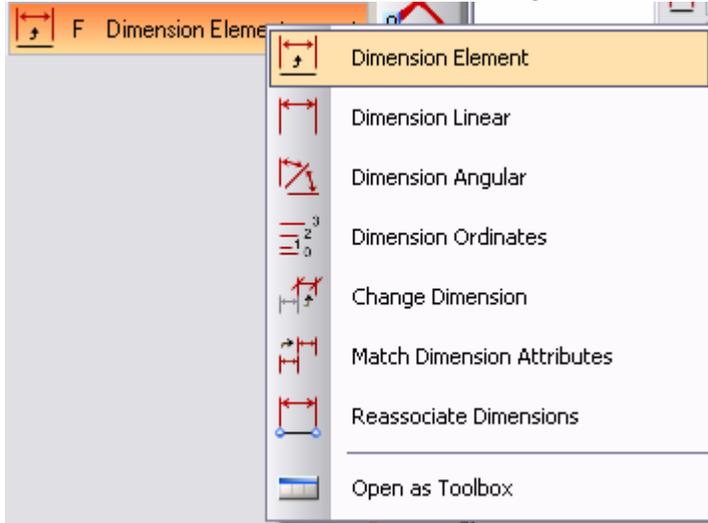
Typing the bearing as N45;00'00"E
AccuDraw will show the degree instead of semicolon



Press V after each segment is placed to reorient the compass to View rotation.
Continue placing elements...



Next we can Dimension the lines to show angles and distances.

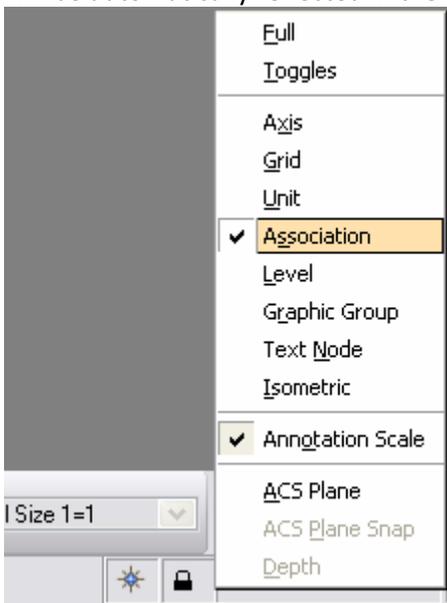


Select the Dimension style **Label Bearing Distance**

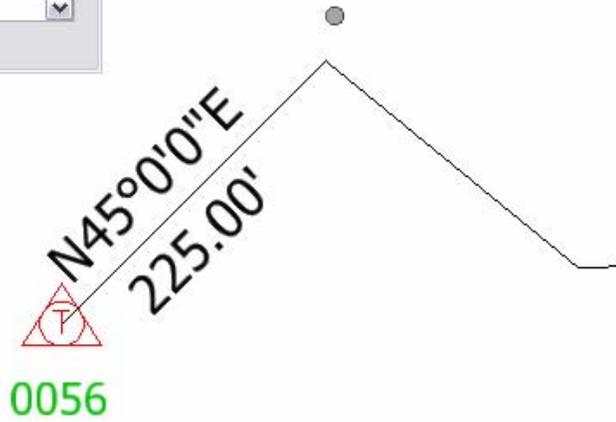
Toggle the label line icon in the middle of the panel. Also use association lock for the Dimensions



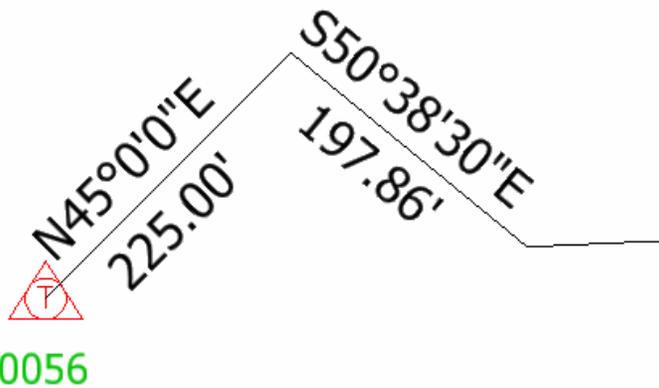
Association needs to be set for the File as will in the lower right of the status area. Changes to elements will be automatically reflected in the updated dimensions.



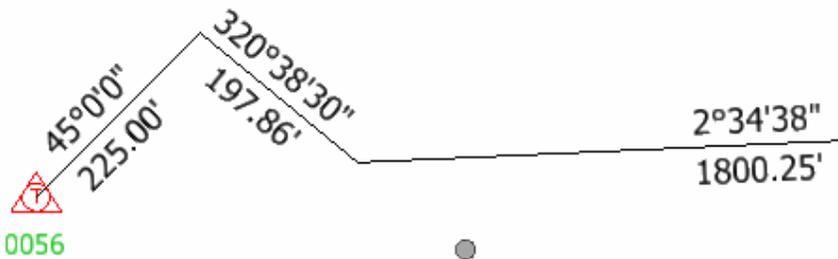
Do a Save Settings, to have settings saved.



Select each segment and then left click to place the text.



Continue with other segments.



Modify and bearings change...with association lock

Changes to Annotation Scale will update the Dimension Text.
Remember to Use the Drawings Scale Toolbar.

