CONNECTICUT DEPARTMENT OF TRANSPORTATION

DIGITAL DESIGN ENVIRONMENT GUIDE

CONNECT EDITION

Volume 13 – Contract Plans Production

Overview

The DDE no longer standardizes on the one model per DGN File sheet production workflow that was used in the SELECTSeries DDE. Each Contract Sheet DGN will contain several Design, Drawing and Sheet Models.

Creating a Sheet Model for publishing a PDF typically involves working with the following components:

- **Design Model(s)** — where the Base Models are referenced in to.
- **Saved Views** — Used to set up views required for the drawing.
- **Border Cell** — Contains the border graphics and title block.
- **Drawing Model** — Contains annotations, dimensions and callouts.
- **Sheet Model** — Contains a Border Cell, Sheet Boundary (plotting shape) and may also have annotations, dimensions and callouts.

Two methods are used to create Sheet models, one that scales the border to enclose the design, or the other that scales the design to fit the border.

With both methods, for 3D work in particular, it is a good idea to have separate files one for design models and another for the drawing and sheet models. This lets users keep the purely drawing information, such as text and dimensioning, separate from the design information. Doing this reduces the likelihood of conflicts where others who wish to reference the same design model.

This process is similar to how the manual draftsperson works. Where it differs, however, is that instead of redrawing the model's geometry for each view, like the manual system requires, users simply attach views of the design model as references. Users attach as references views of their design geometry for each plan, elevation, section, and so on. The power of this system is that any changes made to the design model then is reflected immediately in each affected view in the drawings.

Scaling the Design to Fit the Sheet Border

The sheet border cell is placed at full size and the design information is scaled up or down to fit inside the border, similar to how drawings are created with manual drafting. All text and dimensioning are placed at full size. When you create a Sheet model, you select Full Size for the Annotation Scale.

In this case, with Annotation Scale set to Full Size, the sheet boundary element appears at its real-world size (not scaled). This is a non-printing element that shows you the outer limits of the sheet size that you choose. The CTDOT Cell border will be placed at Full Size (with no scale factor) and dropped onto the sheet boundary.

References of the design are placed at the appropriate scales as required, to fit inside the sheet/border layout. For a 1/2" = 1'-0", or 1:24 scale drawing, the design model references will be

placed in the Sheet model at a scale of 1:24. Similarly, any details that are at different scales are simply referenced at the required scale. For example, a 1/4" = 1'-0", or 1:48 scale detail would be referenced at 1:48 scale.

When attaching a reference (a design or drawing model) into a sheet model, the referenced model's annotation scale is applied as the detail scale, and the Reference Scale (Master:Ref Scale) is calculated from the referenced model's annotation scale and the active model's annotation scale.

Uses:

- Miscellaneous Detail Sheet
- Typical Sections Sheet

Scaling the Sheet Border to Fit the Design

The sheet border cell is scaled up (or down) to cover the required area in the design, all text and dimensioning must be scaled the same amount, also. This is to ensure that when the scaled print is created, text and dimensioning elements are at the correct physical size.

To simplify this process, when users create a Sheet model, they have the option of associating an Annotation Scale to it, as well as a sheet boundary size. Additionally, if required, users can specify the origin of the sheet boundary and its rotation.

When an annotation scale is specified, the Sheet Boundary element also is scaled by that amount. This is a non-printing element that shows the outer limits of the sheet size that was chosen. To this, users then can attach the CTDOT border, to which you apply the same scale factor as that for the Sheet model. Additionally, any text that you place in the Sheet model, with the Annotation Scale lock enabled, automatically will be scaled by the same amount. For example, if you are creating a 1" = 40' scale drawing, any text that you place would have to be 480 times bigger than normal so that it prints at the correct size.

Uses:

- Plan View Sheet
- Profile View Sheet
- Cross Sections View Sheet

Section 1 – Review of Standards

1.1 Contract Plan grouping

Contract plans shall be grouped, by discipline into individual multiple page PDF files called discipline subsets. The PDF order will dictate how the CAD files are organized and how the Title Blocks Cells are annotated. The project manager is tasked with determining the discipline subset numbering and grouping. The first sheet in a discipline subset shall have "01" in the drawing number CAD DGN file.

1.1.1 Drawing Number vs Sheet Numbers

- The **drawing number** is used primarily for sheet to sheet linking, typically in, but not limited to, section details, section cuts, and detail callouts. **Drawing Numbers** are placed in CAD files, they consist of the discipline/sheet type designator followed by a hyphen and a number. Examples of drawing number prefixes can be found in **Volume 16** of the DDE, **Appendix 5**.
- **Sheet numbers** are applied to the discipline subset after the contract plans are published to PDF. Please review the DIGITAL PROJECT DEVELOPMENT MANUAL, Section 6, Document Preparation and Format for detailed instructions.

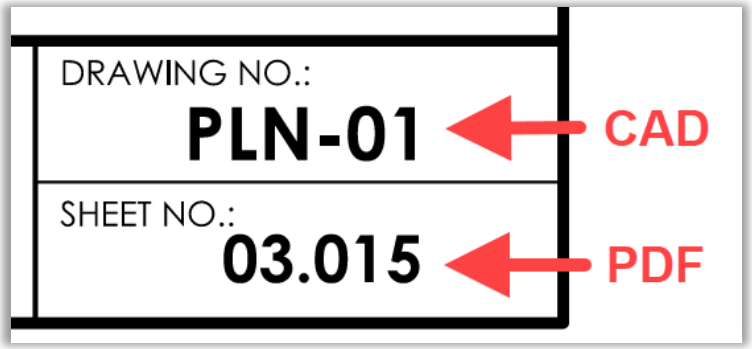


Figure 1 - Title Block Drawing Number and Sheet Number

The first page of each subset shall be a subset cover sheet, this includes FIO subsets. This cover sheet shall contain both; an index of drawings contained within the subset that includes both drawing numbers and drawing titles and the form field place holder(s) which receives the digital signatures. This table must include the subset name and number displayed as a heading.

1.1.2 Examples of the subsets

Please refer to **Volume 16** of the DDE, **Appendix 5** for Drawing Number abbreviation pre-fix list

01-General

- Title Sheet - The first page of the subset 01_General includes
  - an index of the subsets contained within the project
  - sheet count totals for all subsets
  - a list of drawings for the 01_General Subset
  - an area(s) reserved for applying the digital signature(s)
- Additional Location Plans
- Detail Estimate Sheet(S)

02-Revisions

- The Index of Revisions Sheet(s)

03-Highways

- Index of Drawings
- Index of Plans
- Survey Control Data
- Alignment Plans
- Right of Way Plans
- Typical Sections
- Highway Plans
- Drainage Plans
- Sedimentation and Erosion Control Plans
- Profile
- Cross Sections
- Site Grading Plans
- Intersection Grading Plans
- Miscellaneous Detail Sheets
- Superelevation Diagrams
- Boring Logs
- Test Pit Data
- Staging Plans includes
  - Plans
  - profiles
  - cross sections

04-Structure

- Index of Drawings
- All Structure Sheets - Multiple subsets may be required for multiple Sites Ex: 04_Structure_Br.No.1266

05-Traffic

- Index of Drawings
- Signing Pavement Markings Plans
- MPT Plans
- Traffic Signal Plans Etc.

06-Illumination

- Index of Drawings
- All Environmental Compliance Sheets required

07-Utiltiy

- Index of Drawings
- Utility Design plans.

08-CL&P FIO

- CL & P For Information Only plans are submitted in PDF – **No CAD required.** See the Digital Project Development Manual for instructions for creating this subset.
- 09-AT&T FIO
- AT & T For Information Only plans are submitted in PDF – **No CAD required.** See the Digital Project Development Manual for instructions for creating this subset.

CTDOT Highway STD CTDOT

Highway Design Standard Index and Sheets required are created in Bluebeam – **No CAD required.** See the Digital Project Development Manual for instructions for creating this subset.

CTDOT Traffic STD CTDOT

Traffic Engineering Standard Index and Sheets required are created in Bluebeam – **No CAD required.** See the Digital Project Development Manual for instructions for creating this subset.

1.2 The Contract Border Title Block Integration

1.2.1 WorkSet Project Information

The Project Number, Project Description and Towns will be automatically populated from the WorkSet Properties, there is no need to enter or edit any of this text.

Note: *Older Border Cells placed prior to March 2023 point the CONNECTED Project Properties, moving forward CTDOT will use the CTDOT WorkSet Properties. Previously set up CONNECTED Project Properties will stay in place to accommodate the older border's title block integration.*

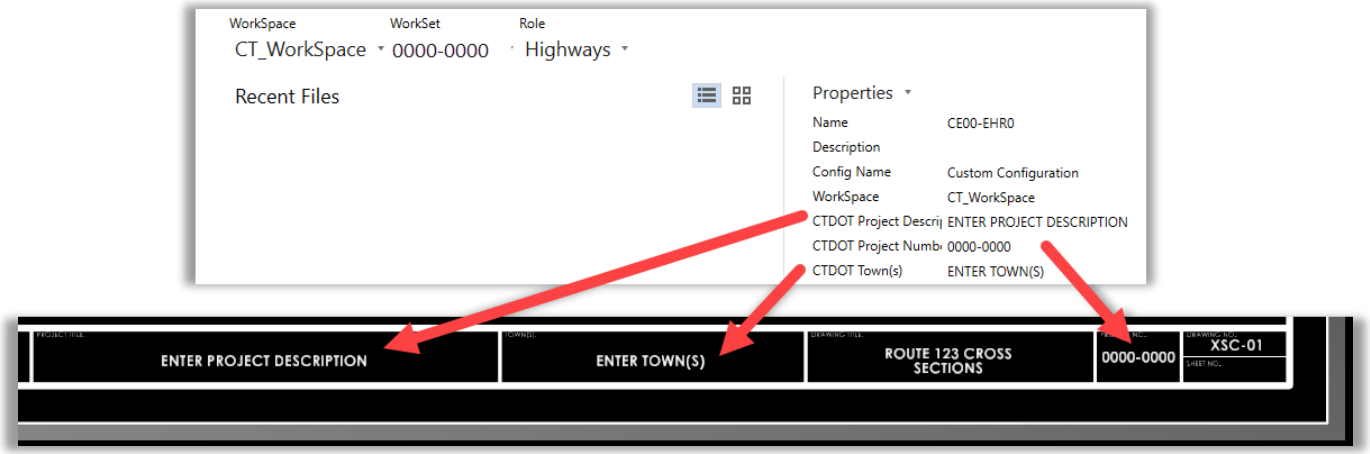


Figure 2 – Title Block

1.2.1 Drawing Title

The Drawing Title will be populated with the text entered in the Modal Description Field.

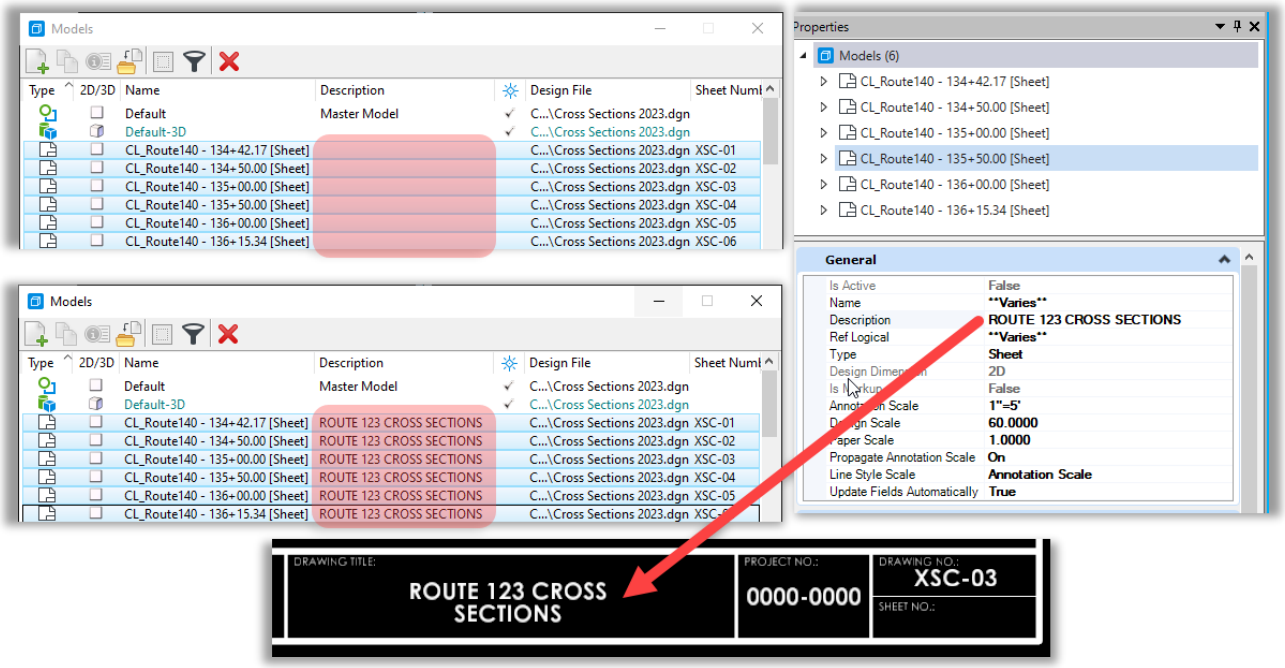


Figure - 3 Drawing Title

1.2.2 Designed and Checked By

There are two options for filling in this information:

Note: *Please refer to your supervisor to determining if Initials or First Initial. Last name will be used.*

- **Manual** - Use the **Text Editor** to enter the Design/Drafter and Check By names. This is generally used when creating a blank sheet model and manually placing the border cell.

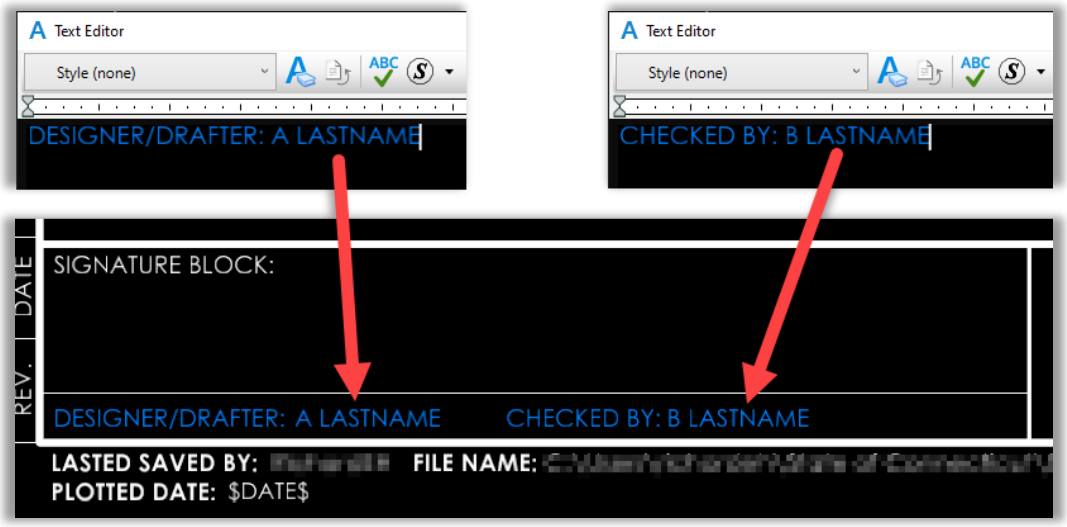


Figure 4 - Title Block Designer / Drafter / Checked By

- **Automated** – Update fields through Item Types. The Engineer Name **Item Type** has been added to all Sheet Seeds. Sheet models created using the sheet production, **Place Named Boundary Tools** and **Detailing Tools** will have this process available. Multiple models can be selected and updated at one time through the **Properties Dialog Box** under **Engineer Name**.

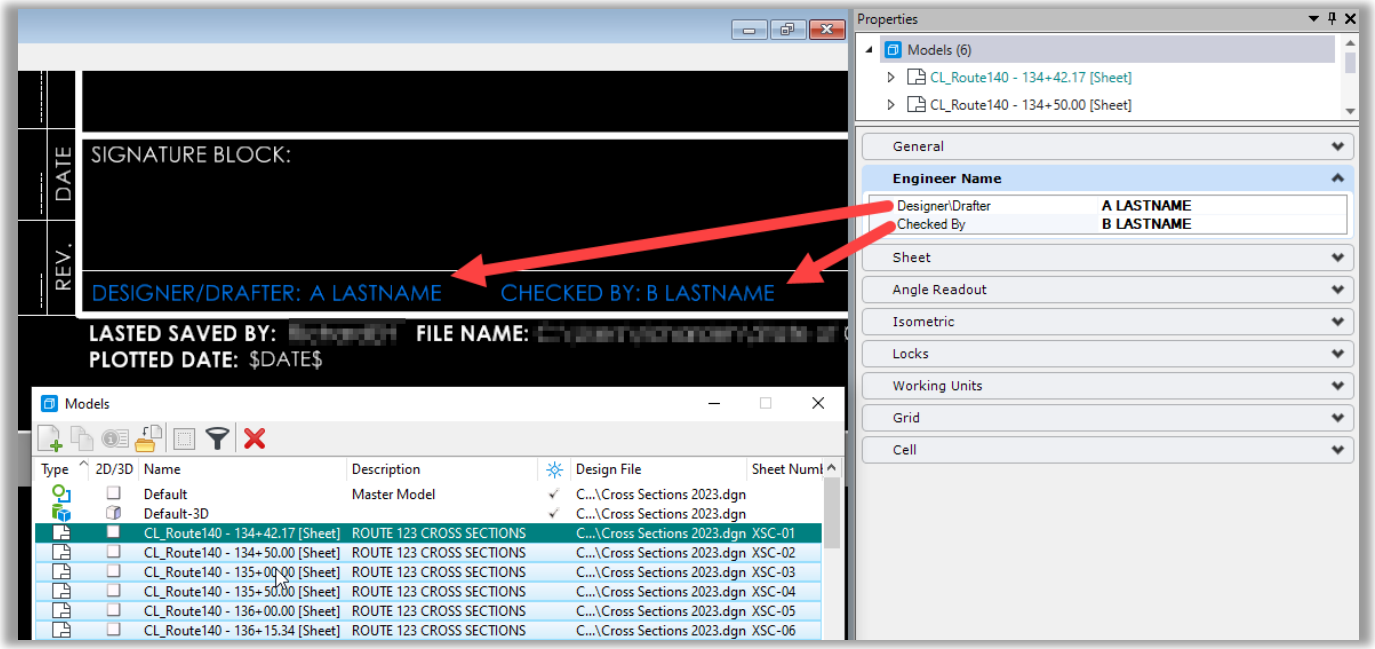


Figure 5 - Title Block Designer / Drafter / Checked By Item Type

1.2.3 Drawing Number

The **DRAWING NO.** box will be populated by filling in the Sheet Number on the Properties Dialog Box.

Note: *The **SHEET NO.** box will remain blank in the CAD file, this will be populated in the discipline subset after the contract plans are published to PDF. Please review the DIGITAL PROJECT DEVELOPMENT MANUAL, Section 4, Contract Plan Drawing and Sheet Numbering for detailed instructions.*

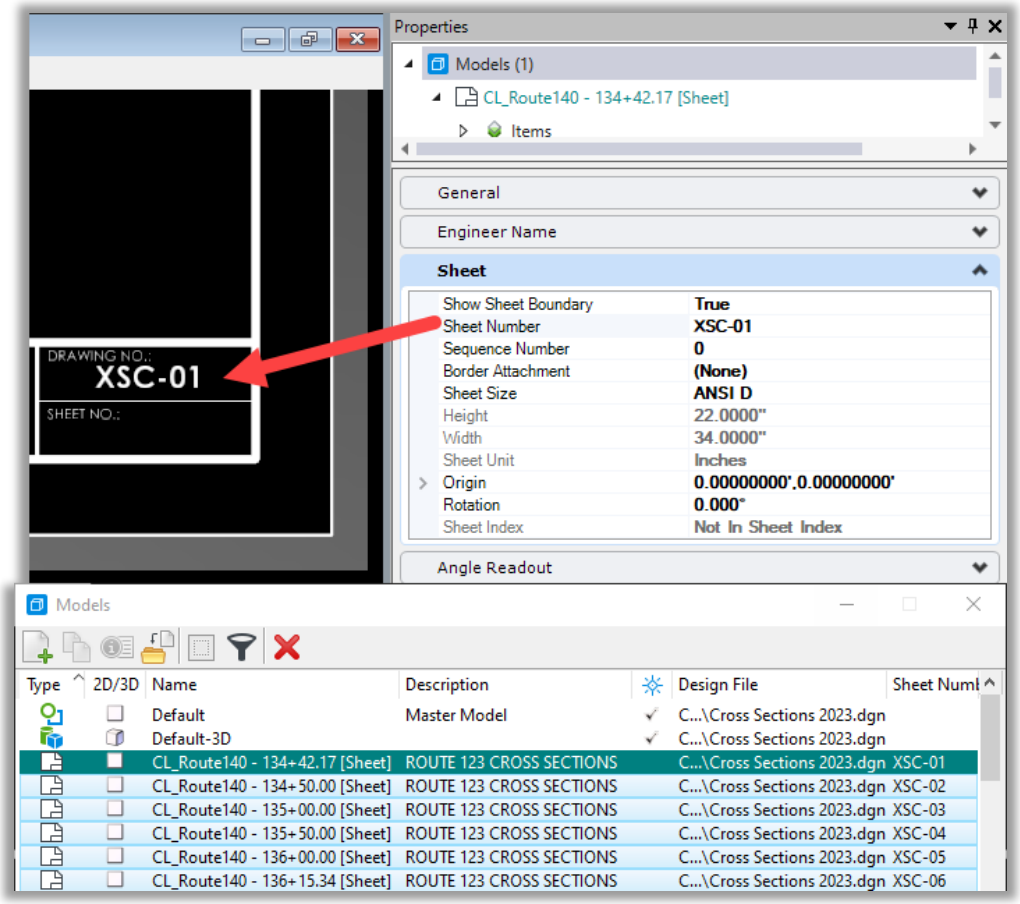


Figure 6 - Sheet Number is Drawing Number

1.2.4 Revision Block

The Revision Block can be filled in by using the Edit Text command and clicking on the Data Fields, this will prompt the Text Editor to open. **Note:** Blank Data Fields can be made visual in the View Attributes dialog box.

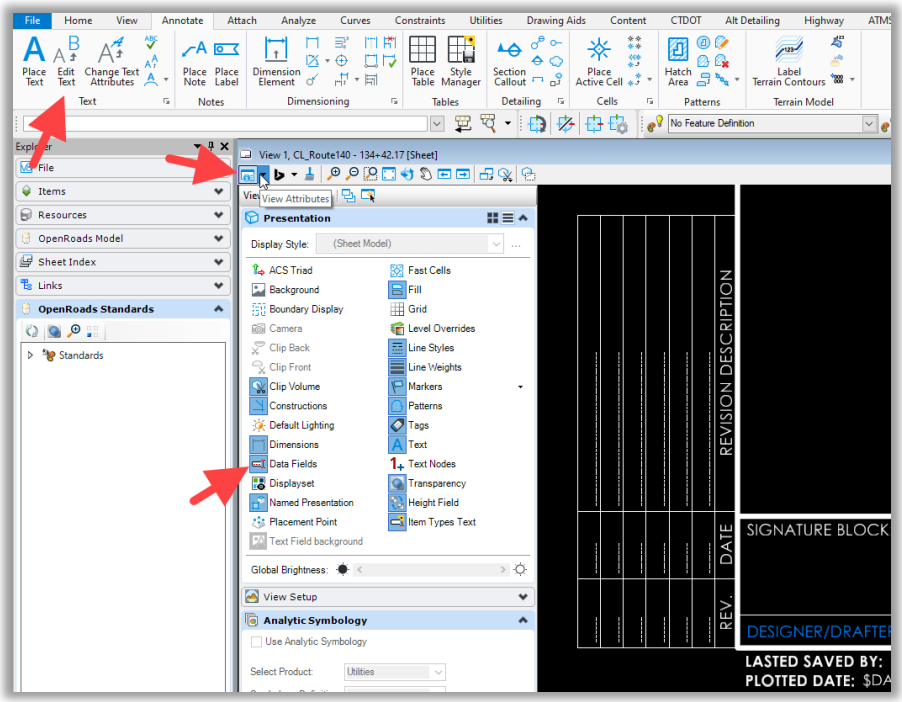


Figure 7 – Revision Block

1.2.5 Last Saved By and File Name

These fields will auto-populate with the username and file path.

Figure 8 - Last Saved By / File Name

1.2.6 PDF Text

Please review the DIGITAL PROJECT DEVELOPMENT MANUAL, Section 6 annotation placed in the PDF plans

The following will be created in the PDF not in the CAD file:

1. The Plotted Date will populate when the PDF is Created.

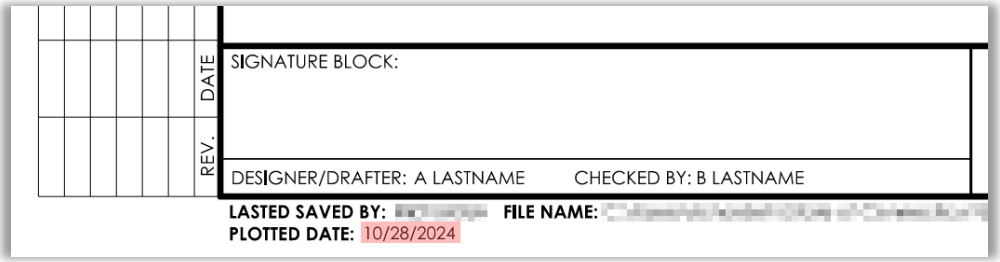


Figure 9 - PDF Plotted Date

2. The Signature Block info will also be placed as a stamp in the PDF.
3. Sheet Numbering
4. The following Stamps are available to be placed in the bottom Right above the Title Block of the PDF as needed:
    - ADDENDUM NO. Y
    - DESIGN INITIATED CHANGE ORDER NO. Y mm/dd/yy
    - NEW SHEET ADDED BY ADDENDUM NO. Y
    - NEW SHEET ADDED BY DESIGN INITIATED CHANGE ORDER NO. Y mm/dd/yy
    - DESIGN REVIEW STAMPS

    Note: *If there is no room above the Title Block these stamps can also be placed in the margin below the Title Block*

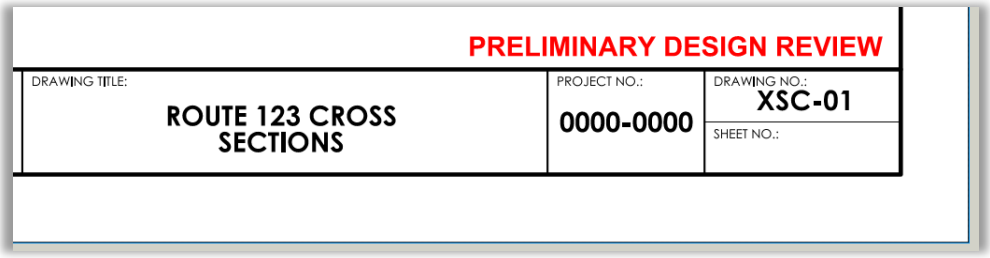


Figure 10 - Stamps

Instructions for downloading the Stamps to the CTDOT Bluebeam User Profile

1. Click on the link below and download the zip file.
   ctdot_bluebeam_user_profile
2. In **File Explorer**, browse to the downloaded location, it will most likely will show up in the **Downloads** folder. Double click on the user profile in the zip folder and the file will automatically install.

1.3 Tables

You can place tables in CONNECT Edition using the Place Table tool. Once placed, you can perform following formatting operations on a table:

- Add and remove rows
- Add title row, header row, first column, last column, and footer row, which can contain different formatting then the body rows
- Break a table
- Change height and width of rows and columns
- Merge and split cells
- Change cell margins
- Set cell fill color
- Add and remove borders
- Set border color, line style, and line weight

You can also perform following operations on the text in the table cells:

- Set text alignment
- Set text direction

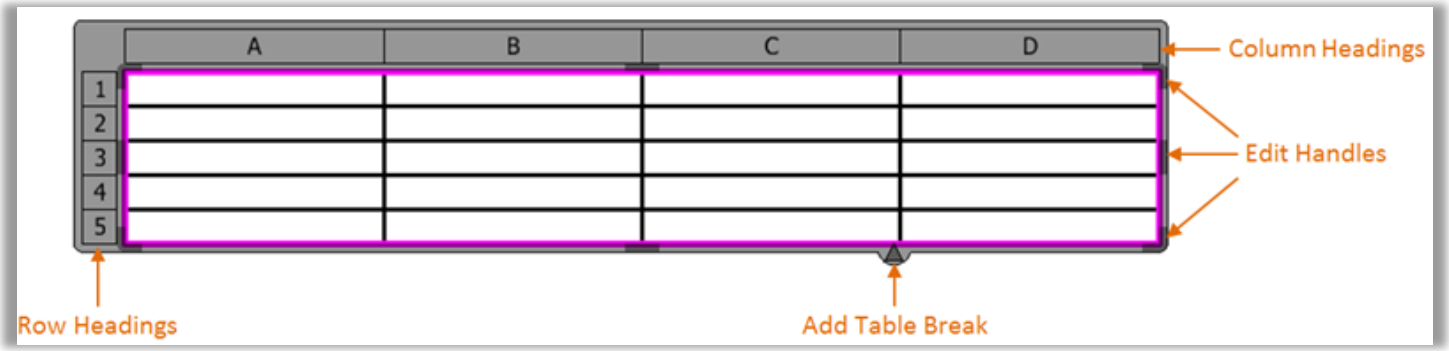


Figure 11 - Tables

You can also place a table using the data in an excel workbook or a .csv file.

If you have a report definition created, the report can be placed as a table in your model. The content in the table is automatically populated from the report definition.

You can also place a sheet index as a table.

1.3.1 Table Seeds

Table seeds are available in the CTDOT DDE to use while placing a table in your model. A table seed can contain properties, formatting, and style settings that are inherited by the table.

1.3.2 Place Table Tool

You can access this tool from the following:

- Ribbon: Drawing > Annotate > Table
- Explorer dialog Sheet Index tab: Place Sheet Index as a table
- Reports dialog: Place as table

Methods:

- Empty table - Lets you place an empty table.
- From report - Lets you place a table from a report definition.
- From file - Lets you place a table using the data in an excel workbook or .csv file.

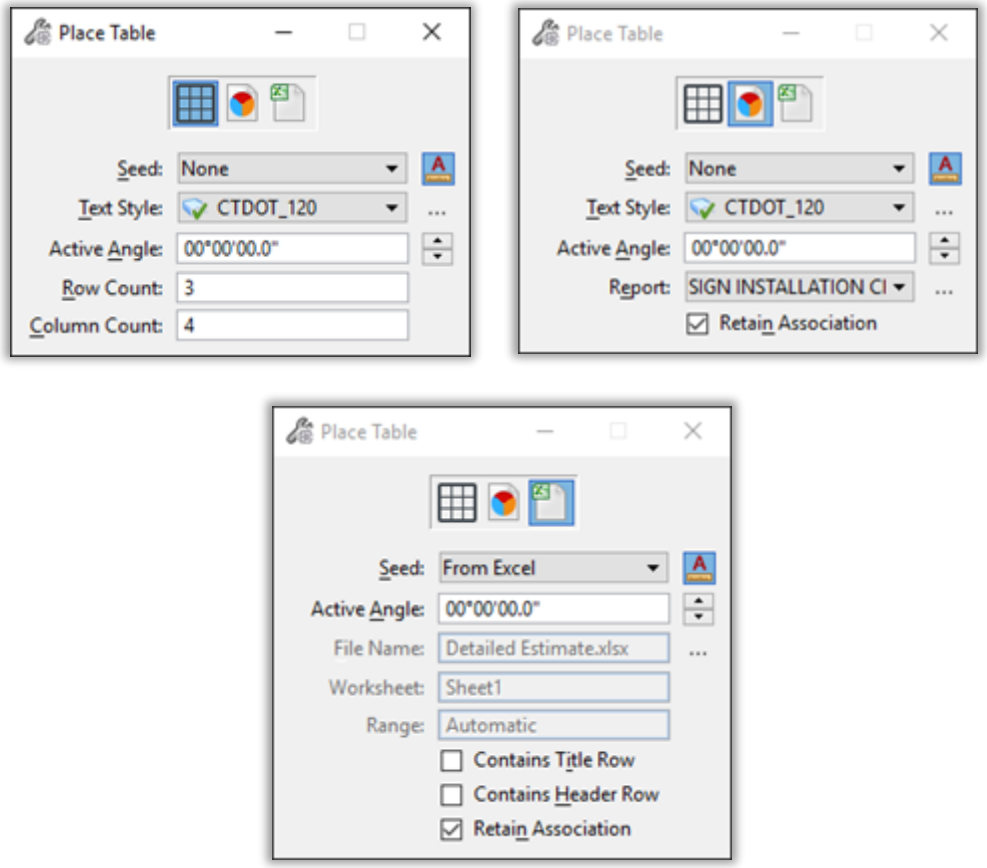


Figure 12 - Place Table Options

Options:

Seed – Lets you select a seed for the table. If you select to place a table from a Microsoft Excel file, you get an option "From Excel" in this drop-down list. If you select it, OpenBuildings Designer attempts to preserve the formatting such as colors, borders, text direction, text justification, fonts, font styles, font sizes, row/column/cell sizes, and cell margins.

Annotation Scale – Sets the Annotation Scale Lock. When this lock is on, the annotation scale is applied to the table and text within the table. By default, the annotation scale is taken from the model's Annotation Scale setting. You can change it only in the model's

properties in the Properties dialog. The exception is when the model's Propagate Annotation Scale property is off. In that case, the annotation scale can be controlled independently for each element via its properties.

Text Style - (Available only when Seed is set to None) Sets the active text style from a list of all available text styles. Clicking Browseopens the Text Styles dialog in which you can create and modify text styles.

Active Angle - Sets the angle, in degrees, at which table is placed.

Row Count - Sets the number of rows in the table.

Column Count - Sets the number of columns in the table.

Report - (Available only when From Report is selected) Places the selected report as a table. Clicking Browseopens the Reports dialog in which you can create and manage reports and report definitions.

File Name - (Available only when From File is selected) Lets you select a file from which you want to place a table. Click Browseto open the File Open dialog and select the desired file from which the table is to be placed. If you select a Microsoft Excel workbook, then the Select Cells dialog opens, in which you can select the worksheet and cell range.

The Select Cells dialog has the following options:

- Worksheet - Lists the worksheets in the selected excel workbook.
- Range - Allows you to select the cell range of the file that will be placed as a table. If set to Automatic, selects the range of cells which Microsoft Excel considers to be the "used area" of the sheet. It is usually a rectangle containing all non-empty cells, or cells which have otherwise been modified by the user, such as by resizing the rows or columns. If set to Manual, allows you to select the range of cells in the From and To fields. Named ranges are also supported.
- From - If Range is set to Manual, allows you to enter the start of the cell range.
- To - If Range is set to Manual, allows you to enter the end of the cell range.

Worksheet - (Available only when you select an excel workbook in the File Name setting) Lists the worksheets in the selected excel workbook.

Range - (Available only when you select an excel workbook in the File Name setting) Displays the cell range of the file that will be placed as a table.

Contains Title Row - (Available only when From File is selected) If on, places the first row as a title row.

Contains Header Row - (Available only when From File is selected) If on, places the second row as a header row.

Retain Association – (Available only when From Report or From File is selected) If on, the association with the report or external file from which the table is placed is retained. In such a case, if there are any changes in the report definition or the file, you can refresh the table to get the changes.

1.3.3 Refresh a Table

If you have a placed a table from a report/external file and the Retain Association option is turned on, any changes made to the report or the source file can be updated in your table using this procedure.

Select the table. The row and column headings display. Do one of the following:

1. Right-click any cell or the row or column headings and select Refresh Table from Data Source.
2. Click the Refresh Table from Data Source icon in the Table Tools contextual tab.

1.4 Annotation Tools

All annotation such as: call outs, labels, notes and dimensions are placed in drawing and/or sheet models. It is important that the proper tools are selected so the annotation is placed using the correct attribution.

Common Annotation Tools can be found in the Ribbon by selecting the **CTDOT Workflow**. Users will find the needed tools in the **Annotation** and **Dimensioning** sections on the **CTDOT Tab**.

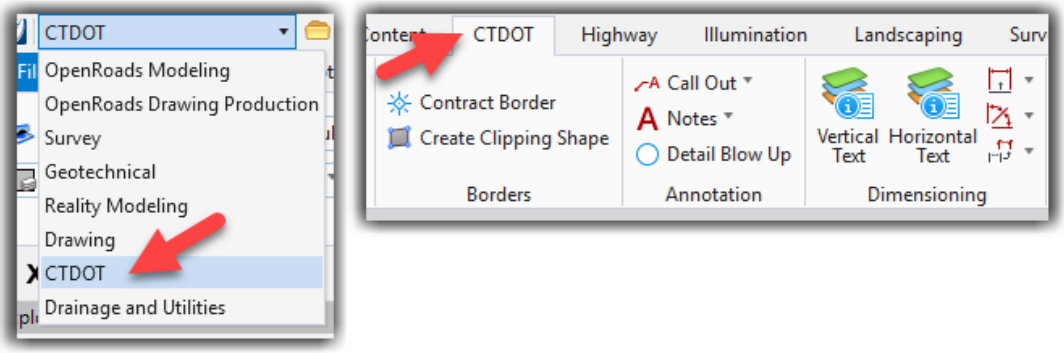


Figure 13 - CTDOT Workflow

1.4.1 Call Outs

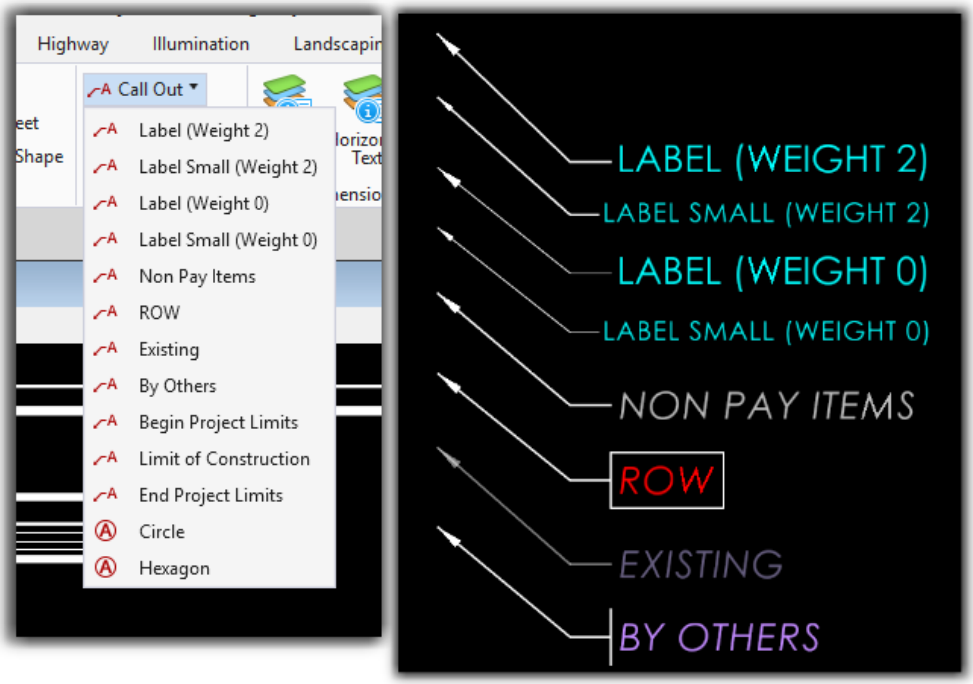


Figure 14 - CTDOT Call Outs

There are several call out options available:
Label (Weight 2) - Used for Plan View Annotation of General Pay Items.
Small Label (Weight 2) - Used for Plan View Annotation of General Pay Items where space maybe limited.
Label (Weight 0) - Used for Detail Annotation.
Small Label (Weight 0) - Used for Detail Annotation where space maybe limited.
Non-Pay Item – Used for items that remain in place, or become the property of the contractor, or to be saved and no associated cost/pay is incurred.
Paid by Others - Is usually for utility items, such as poles to be removed, replaced or placed by the utility companies. Any work that is not performed by the project contractor will be called out with this item.
ROW – Used for Right of Way items such as but not limited to Taking Line, Construction Line and Drainage Right of Way (D.R.O.W.).
Begin Project Limits – Used to define the beginning of project, this note will include the following information:

Begin Project No. XXXX-XXXX
F.A.P. NO. XXXX(XXX)
CL STA. XX+XX
Northing Coordinate
Easting Coordinate

Limits of Construction – Used to define the limits of construction on intersecting roadways, this note will include the following information:

Limits of Construction
℄ STA. XX+XX
Northing Coordinate
Easting Coordinate

End Project Limits – Used to define the end of project, this note will include the following information:

End Project No. XXXX-XXXX
F.A.P. NO. XXXX(XXX)
℄ STA. XX+XX
Northing Coordinate
Easting Coordinate

The **Circle** and **Hexagon** call outs can be used as needed to annotate Plans and Details.

1.4.2 Notes

Notes are used to convey information such as right of way and construction sequencing. General Notes are usually found on the first plan view sheet of each subset but can be placed on any sheet as needed. The Notes Tool is also used for Legends on Typical Section Sheets, Notes on Detail Sheets and for Row Legends. Tools to place annotation for Existing Features, Match Mark Lines and Match Mark Text are also located on this Menu.

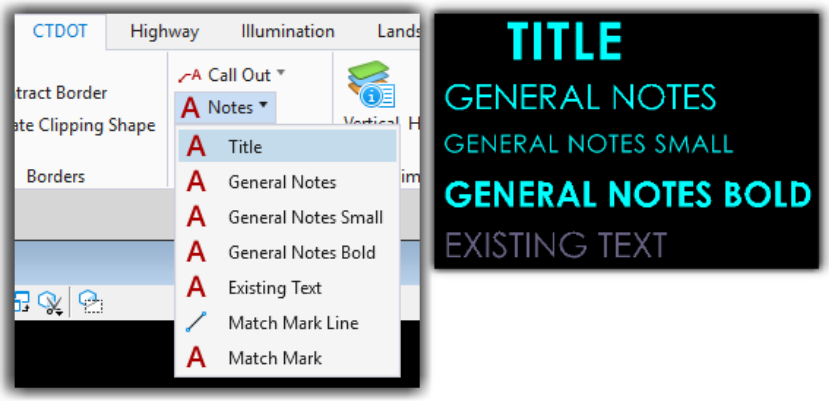


Figure- 15 CTDOT Notes

General Notes can also be placed in a table. A Table Seed for General Notes is provided for this use.Tables will allow auto-return of text when the width is adjusted.

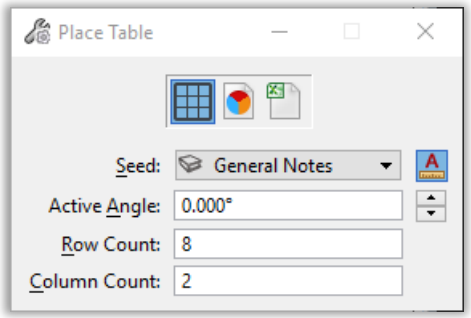


Figure 16 – General Notes Table Dialog Box

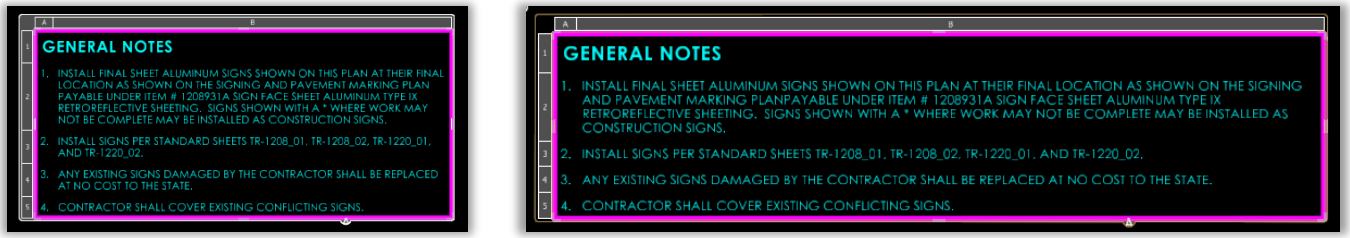


Figure 17 - General Notes Table Editing

1.4.3 Dimensions

The **Set Style** tools in the Dimensioning section will set basic attributes for dimensioning. After choosing one of these options a **Placement Tool** will need to be selected.

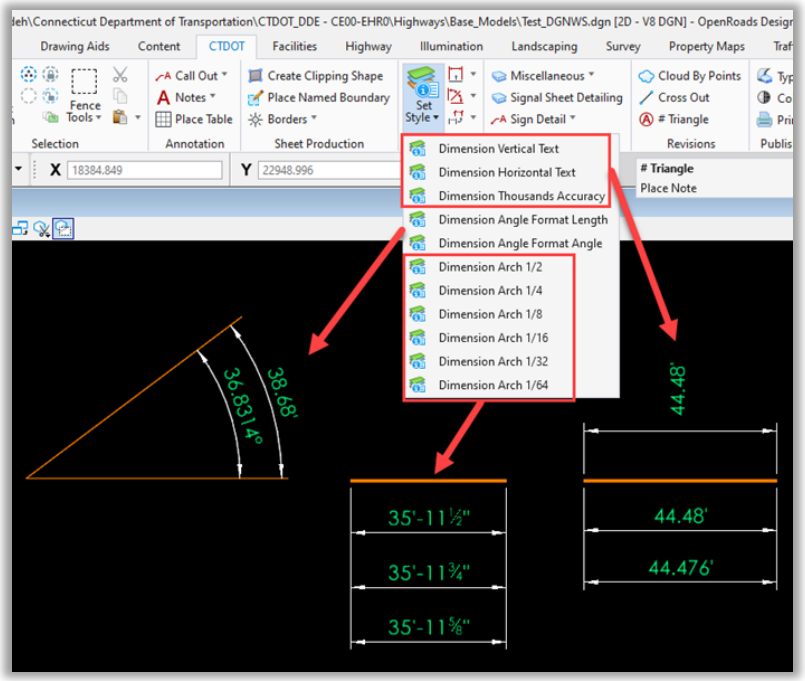


Figure 18 – CTDOT Dimensioning

After a **Placement Tool** is activated a dialog box will appear, users can now select the needed options to get the desired output for the Dimension.

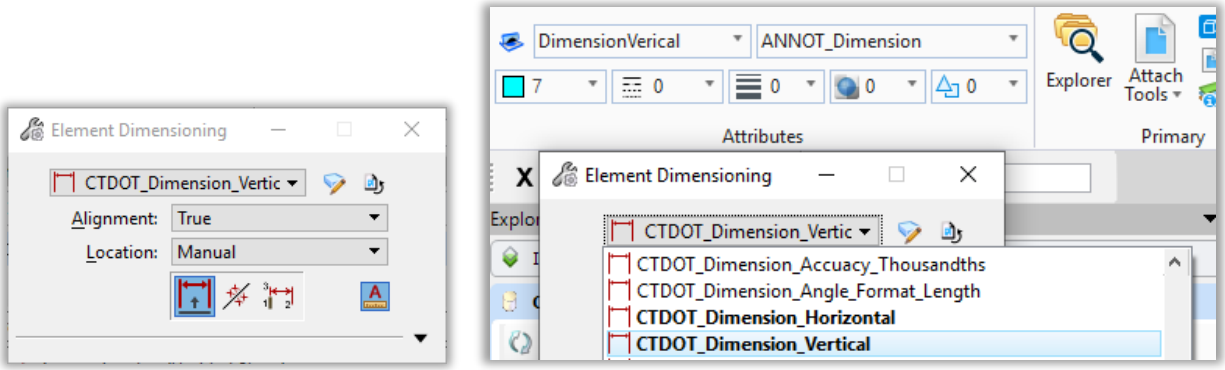


Figure 19 CTDOT Dimensioning Options

1.4.4 Annotation Attribute Pointers

The example of how an annotation tool calls for the correct Annotation Attributes is detailed below.

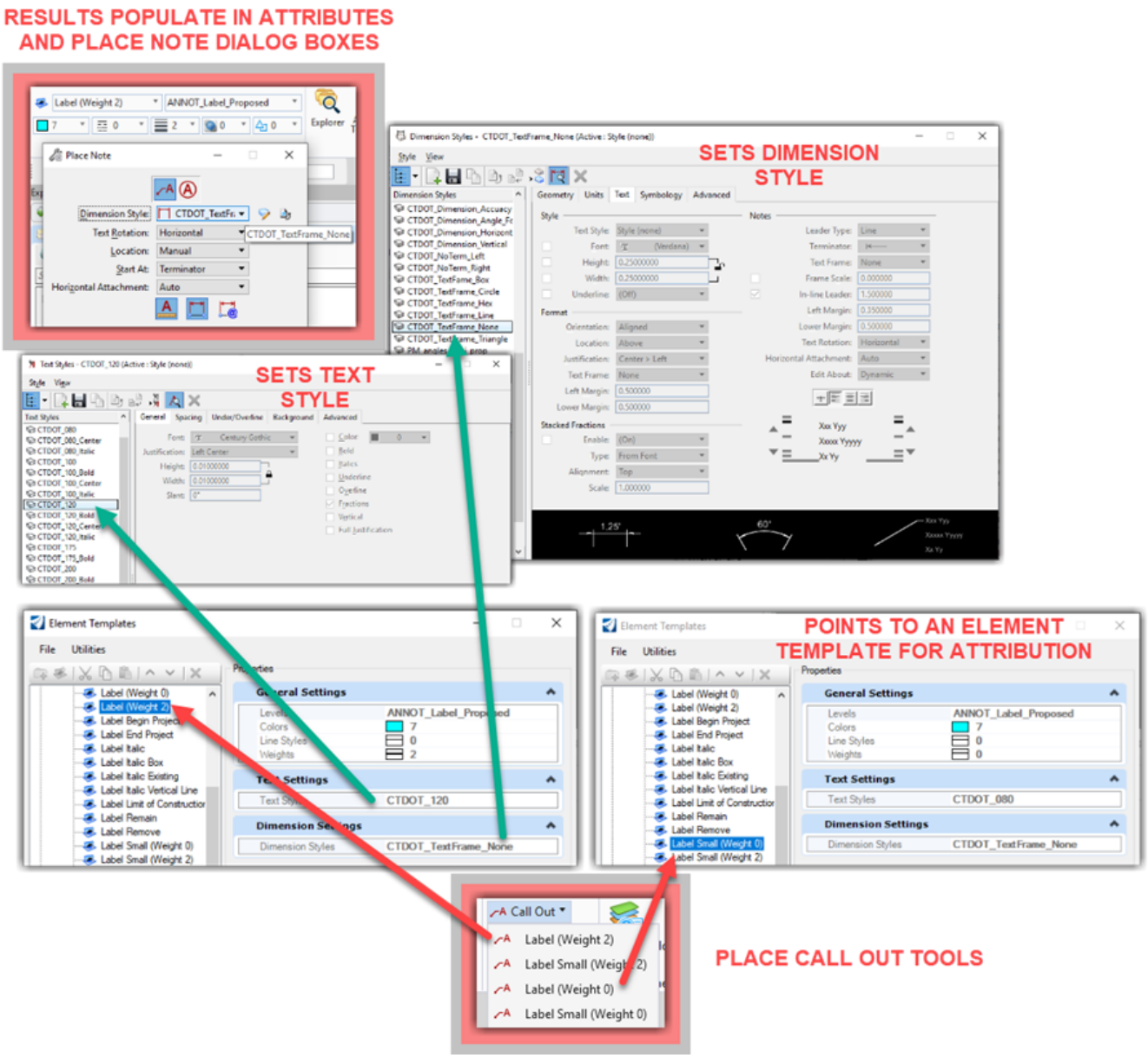


Figure 20 - Annotation Attribute Pointers

1.5 Screening for PDF Creation

The Pen Tables delivered with the CTDOT CONNECT DDE gives the user the ability to set screening options when PDF files are created.

…CT_Configuration\Organization\Pen_Tables

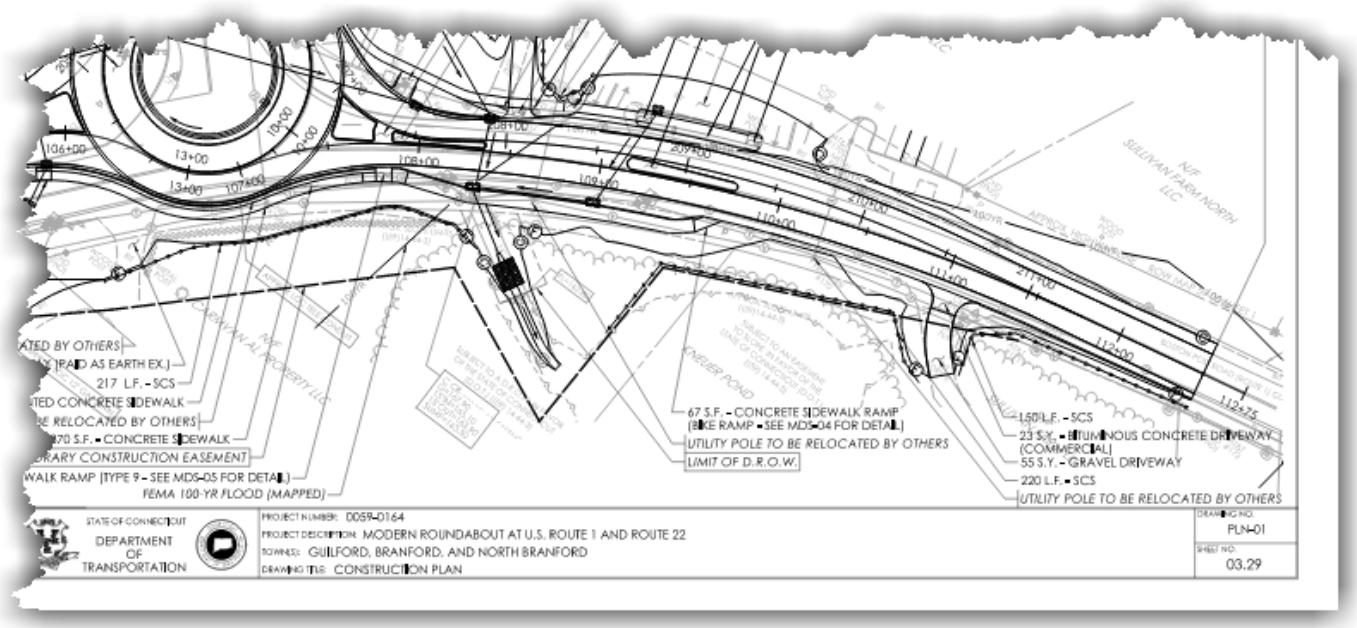


Figure 21 – PDF Plan

Users can direct the PDF to create with certain reference files screened by using a wildcard in the DGN reference file's logical name.

- If the reference logical name begins with "screen" the output weight is 2
- If the reference logical name begins with "one" the output weight is 1
- If the reference logical name begins with "sww" the output weight is unchanged

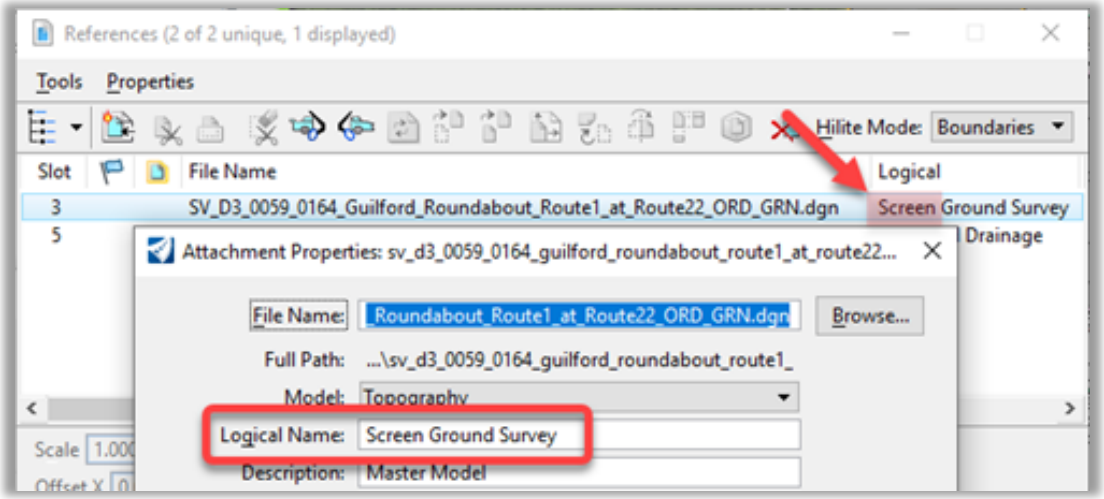


Figure 22 – Reference Screening

Wildcard Examples:

Screen – Shows as screened with a default remap line weight of 2 when the PDF is created. Example Logical Name: **Screen Ground Survey**

one - Shows as screened with a default remap line weight of 1 when the PDF is created. Example Logical Name: **one Ground Survey**

sww – Stands for "screen with weights". Shows as screened and will retain the original weights of a particular reference file when the PDF is created. Example Logical Name: **sww Ground Survey**

1.6 Level Display in Plan Sheets

A better understanding of how OpenX Products handles **new levels** and the level display of nested references with **display overrides** is needed to determine how to change the level display in sheet models when the source data is attached as a nested reference. This section will be helpful to review before using the **Place Named Boundary** tools. When the drawing boundary seeds are used to automatically create drawings from data attached as a nested reference, an additional type of level display control is used called **Synchronize View**.

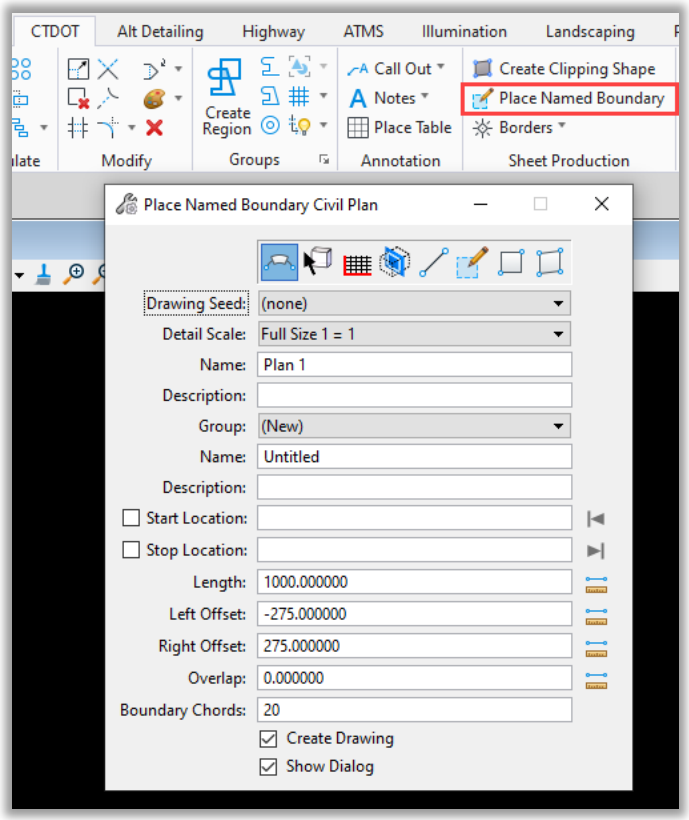


Figure 23 - Place Named Boundaries

Sheets can be manually created using reference attachments and when manual reference attachments are made, the default settings for reference attachments allow the level display to be controlled entirely in the **Sheet Model**.

New Level Display Setting

The display of information on new levels is controlled globally through a configuration variable, MS_REF_NEWLEVELDISPLAY. When elements are added to new levels in the source data, those referenced levels will be toggled on for display in the sheets automatically. The automatic turning on of new levels makes it easier for downstream users of referenced design files to be aware of additional design work that has been drawn in a file.

Sheet Container File

When working in the CTDOT Workspace and using the CTDOT preference seeds, level display in the sheets is most easily controlled from the **Design Model (Assembler)** of the container file. As it is explained below, the Synchronize View setting, for the reference to the source data, is set to display the levels that are turned on in the **Design Model (Assembler)**. Any changes to the displayed levels in the sheets are temporary. This is by design. The level display can be reset and saved in individual sheets, but the reference attachment settings that synchronize the view will need to be modified in the **Drawing Model** first.

Definitions

- **CP (Contract Plan)** – multiple sheet models such as Plans and Profiles can be generated in a dgn file. The Contract Plan file is a container file. The Default model contains references to source data and named boundaries for production of drawing and sheet type models.
- **Design Model (Assembler)** – This model contains the direct References to the Contract Base Models, Existing Survey Terrain Models, and Existing Ground Models. This will be the Default model of an **CP** file.
- **Drawing Model (Annotation)**– This model type is the link between the Sheet and Design model in the **CP** file. They house the Saved View of each Named Boundary.
- **Sheet Model (Publishing Portal)**– This model that contains your assembled sheet is the model that you print from. This sheet type model contains a plotting shape and border cell with the title block information. A Sheet Model is the only model type that includes the ability to Number Models. CTDOT uses the sheet number field to fill in the Drawing Number.
- **MS_REF_NEWLEVELDISPLAY** is a variable that controls whether you automatically see additional information on previously unused levels in any reference file – direct attachment or nested reference. In the CTDOT WorkSpace, this variable is set to true. It is critical for new information drawn in a design to automatically be shown in the sheet. When designers update their source data, and use new levels, that information will automatically display in the assembled sheets.
- **Reference / Display Overrides** affect nested references only when **Synchronize View – Setting from Design Model is not used** and sets where the level display takes place. Because it is important that the level display be able to be controlled from the **Sheet Model**, the default preference for reference attachments is set and locked to "**Always**", so that the sheet level display always overrides the source or parent. If it is your intention to control the display of levels in the sheet from the original reference to the source data, you may change the sheet nested reference attachment setting to **"Never"** after the attachment

has been made. A setting of "Never" makes level display changes in the sheet temporary – they can never permanently override the display of the levels from the source data.

1.6.1 Synchronize View and Adjusting the Level Display

When sheets are automatically created using named boundaries, the drawing-type **model** that is created uses a setting on its reference attachment to the parent model, called Synchronize View and it is set to "Settings From Design Model". This setting prevents level display changes in the sheet from being permanent. **To permanently change the level display in the sheet, the level display in the Default (Design Model (Assembler)) model must be changed and those level display settings will propagate through the drawing-type model to the sheet.**

Note: *When Synchronize View is set to "Settings From Design Model", changes to the level display in the Default model will affect the level display of every sheet created from a named boundary in the Default model.*

When level display changes need to be made to just one sheet model, the Synchronize View reference attachment setting in the drawing-type model that is the source for the sheet, can be changed to "Presentation Only" or "Volume Only". "Presentation Only" allows the levels to be controlled from the sheet model, the setting of "Volume Only" allows both the level display and the clipping boundary to be modified in the sheet.

How Synchronize View Settings in Drawing Models Affects the Sheet Model

Settings From Design Model	In the sheet model, the clip boundary commands do not function; level display changes are temporary. Adjustments to level display or named boundaries must be performed in the design model (Default).
Presentation Only	In the sheet model, the clip boundary commands do not function; adjustments to named boundaries must be performed in the design model (Default). Level display changes that are made in the sheet are saved. Level display changes in Default do not affect the sheets whose drawing models use Presentation Only.
Volume Only	In the sheet model, the clip boundaries may be reclipped or removed. Adjustments to named boundaries in Default do not affect the sheets whose drawing models use Volume Only. Level display changes that are made in the sheet are saved. Level display changes in Default do not affect the sheets whose drawing models use Volume Only.
None	

1.6.2 Synchronize View Set to Presentation Only or Volume Only

The following information is valid only when not using Synchronize View set to Settings From Design Model. "From Design Model" will be used when the sheets are initially created, the drawing Models references can be set post process to Presentation Only or Volume Only

Using a CP (Contract Plan), can reduce the number of direct reference attachments to a plan sheet. Another benefit is that the Reference Attachment Settings provide the ability to choose where to control the level display of the nested base references. The Display Overrides allow you to set which model controls the level display - either the plan sheet itself, or the **Assembler Model**. A default reference attachment setting currently sets the Display Override value to "Always". When the initial reference attachment is made, the levels in the sheet display the same as the levels in the model that is attached as a reference (parent). The setting of "Always" lets you perform level display changes in each individual sheets.

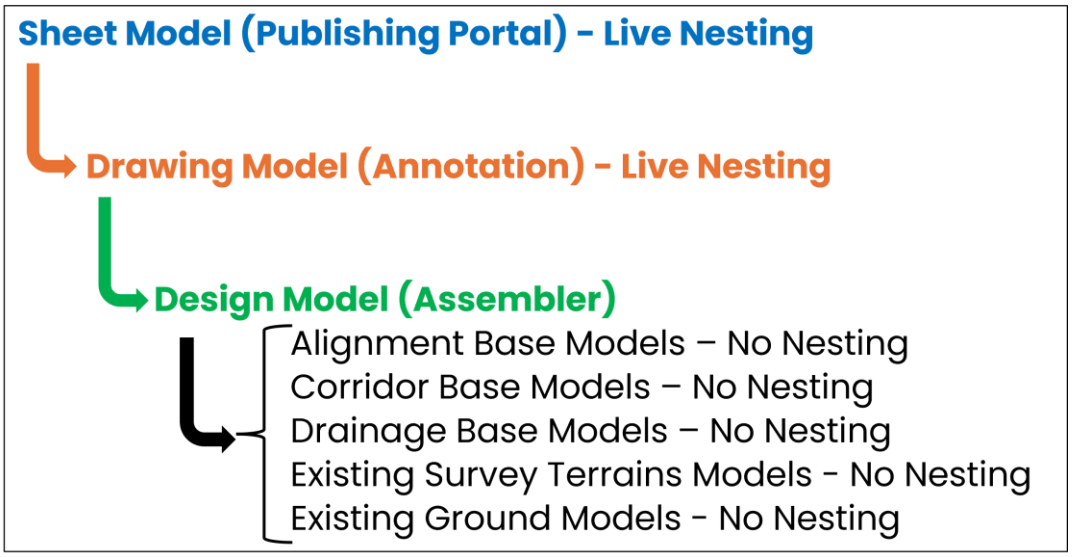


Figure 24 - Hierarchy of Plan Sheet Assembly

Display Overrides

Allow	**Design Model** is **allowed** to override the **Drawing Model** or **Sheet Model** until settings are changed or saved in these parent models. After parent settings are changed or saved, the **Parent settings always override the Child Model**.
Always	**Drawing Model** or **Sheet Model** settings for level display of reference levels **ALWAYS** override the Design Model.
Never	Design Model settings for level display of reference levels **NEVER OVERRIDE** the Parents - **Design Model rules**

Note: *Save Settings (on Exit) – The use of the command* ***File > Save Settings*** *in the* ***Plan Sheet*** *or setting your workspace preference "****Save Settings on Exit****" effectively reduces the*

*Display Overrides to just two: Always or Never. After settings are saved in the **Plan Sheet**, Allow acts just like Always.*

Out Comes

Allow with Save Settings on Exit / **Always**	**Never**
I want to control the level display from the plan sheet file. If I use a Design Model (Assembler), I will set the level display up for my plan sheets in the CAD Base file before I attach it as a reference. Adjustments to the level display in each plan sheet will be performed in the plan sheet file on that specific reference attachment. If I open the Design Model (Assembler Model) and make level display changes there – those changes will NOT be seen in my plan sheets. **Parent Model rules**	I want to control the level display in all plan sheets from the Design Model (Assembler). I will set the level display up for my plan sheets in the CAD Base file before I attach it as a reference. When I need to change level displays in a plan sheet, I open the CAD Base file and make the change there. The CAD Base file level display will now be seen in all of the plan sheets. **Design Model (Assembler Model) rules**

Changing the Display Overrides

Display Overrides may be changed from **Always** to **Never** on any nested reference attachment(s) to dynamically see level display settings in the CAD Base file. If you wish to keep the new choice, save the settings before exiting the file. Also, be aware that **Never** passes reference display on/off toggles to the Master file and reverting to **Always** does not reset a display toggle change. If a nested reference was toggled off while changing the Display Overrides, you will have to manually toggle it back on. It is because of the reference display toggle behavior that it is recommended to maintain a separate CAD Base file for a plan sheet assembled with a different set of discipline base files, such as a drainage plan.

Section 2 - General Workflows

2.1 Startup

Before attempting to open or create DGN files users should make sure the following is in place:

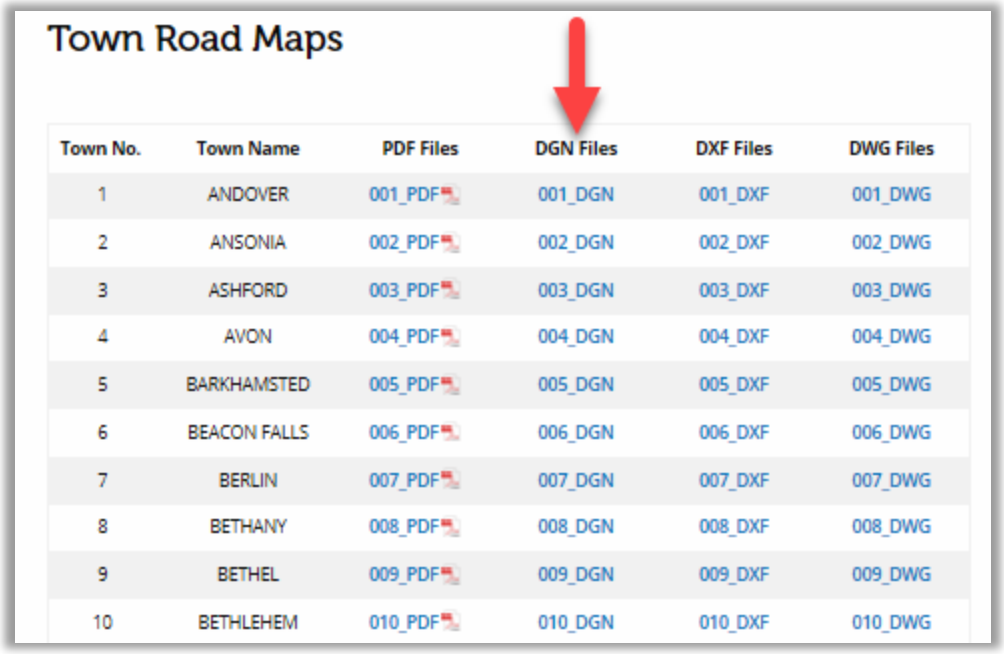
1. CTDOT users should have the CTDOT CONNECT DDE synced through SharePoint with the COMPASS Project Synced along with the CAD Configuration.
2. Consultants should have CTDOT DDE properly installed or be syncing to the CTDOT DDE SharePoint/COMPASS system.
3. Make note of the **Coordinate System** you will be working in. If you have existing survey data, you will need to find out what system is being used **(NAD 83/NAVD 88 or NAD 27/NAVD 29).**
4. Log on to the CONNECTION Client. Bentley CONNECT licensing requires users to log into their Bentley account to secure a software license. CTDOT users should log in using your CTDOT email address and Bentley password. If you do not see the dialog box, select the ^ icon on the bottom Windows Screen. Click on the Connection Client Icon and select Open.
5. Access OpenX Applications through Accounting or the Customized Icon following
6. On the OpenX Splash Screen select **Custom Configuration**, using the small drop-down arrows select the Workspace **CT_Workspace**, the needed **WorkSet** and **Role**.

2.2 Assembling the General Subset

2.2.1 Town Road Maps

Before the Project Title Sheet is created, the Town Road (TRU) Map(s) for the town(s) where the project is located needs to be copied into the Project Container (WorkSet folder).

1. These Maps can be found on CTDOT's Website, Town Road Maps Page.
2. Locate the town(s) needed for your project and download the required DGN File(s) to your project directory under ***… \| Share***. All Design and Survey Units have access permission to this folder. This central storage location will prevent multiple copies of the same maps and images in a project container. Any acquired files from Google Maps, Aerial Images, LiDAR Data or other resources should also be stored in this folder.



Town Road Maps

Town No.	Town Name	PDF Files	DGN Files	DXF Files	DWG Files
1	ANDOVER	001_PDF	001_DGN	001_DXF	001_DWG
2	ANSONIA	002_PDF	002_DGN	002_DXF	002_DWG
3	ASHFORD	003_PDF	003_DGN	003_DXF	003_DWG
4	AVON	004_PDF	004_DGN	004_DXF	004_DWG
5	BARKHAMSTED	005_PDF	005_DGN	005_DXF	005_DWG
6	BEACON FALLS	006_PDF	006_DGN	006_DXF	006_DWG
7	BERLIN	007_PDF	007_DGN	007_DXF	007_DWG
8	BETHANY	008_PDF	008_DGN	008_DXF	008_DWG
9	BETHEL	009_PDF	009_DGN	009_DXF	009_DWG
10	BETHLEHEM	010_PDF	010_DGN	010_DXF	010_DWG

Figure 25 - Town Road Maps Web Page

2.2.2 Title Sheet

The Title Sheet is the cover page for all Connecticut Department of Transportation (CTDOT) Capital Projects Plan Sets. The title sheet identifies the subsets of plans, conveys the general type of work planned, and locates the project within the State.

The title sheet includes:

- Project Title
- Town(s) and/or City(s)
- Route Number and Length
- F.A.P. Number
- Project Number
- Connecticut Map & Town Map
- Location Plan
- List of Subsets
- Signature Fields
- Total number of plan sheets

It is important that the Title Sheet is created early in the design process, so it can be attached to concept plan sets, preliminary plan sets and all other required/needed plan sets. The title sheet should be kept up to date at all times. The signature fields are not required until FDP submittal or as required by the Digital Project Development Manual (latest version). The title sheet is standardized, and no modifications should be made other than as described in the steps below.

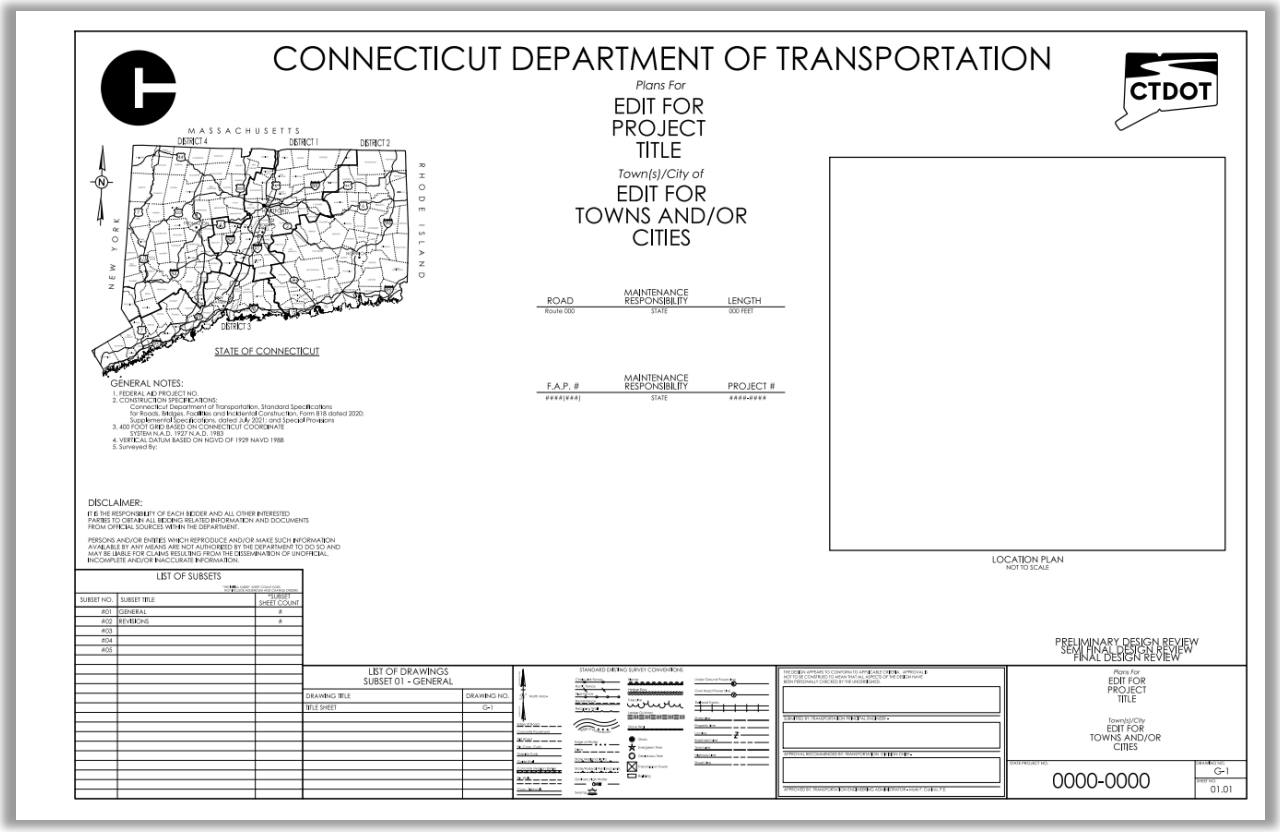


Figure 26 – PDF Blank Title Sheet

The Title Sheet for each project is created by the lead discipline (unit). The lead unit is responsible to create the Title Sheet and assign the Subset numbers for each of the disciplines. Subset numbers 01 & 02 are reserved for General and Revisions respectively. The next subset number 03 is for the lead unit. Other subset numbers follow as needed. The lead discipline's project engineer should notify the other disciplines of the subset numbers assigned.

1. To create a project title sheet, click on the **New File** icon. Click on the **Browse** button to select the CTDOT Title Sheet dgn seed file.

   …\|CT_Configuration\|Organization\|Seed\|CTDOT_Title_Sheet_Seed.dgn

2. Browse to the location you would like to save the file to and type in the file name using the DDE file naming convention ***HW_CP_1234_1234_GeneralSubset.dgn***

   Click on **Save**.

3. **Fit View** when the new title sheet file opens.

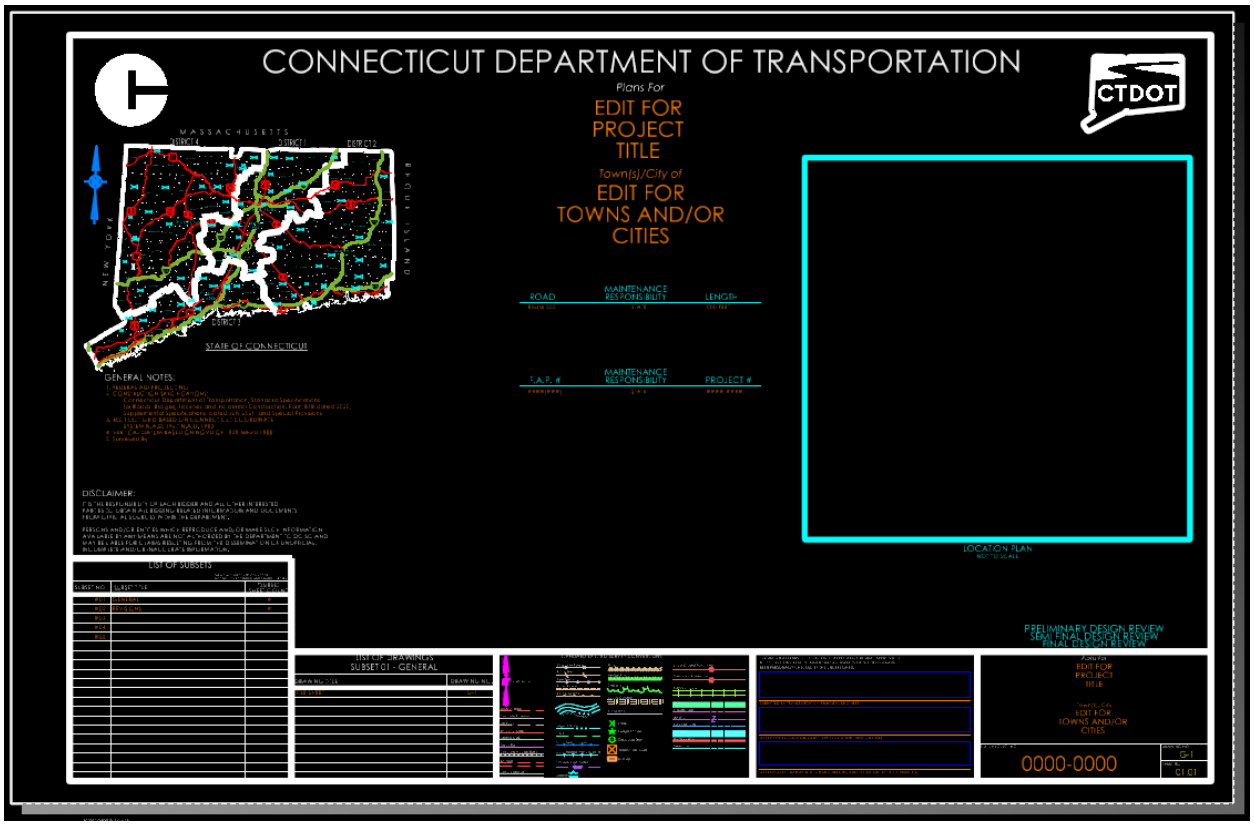


Figure 27 - DGN Blank Title Sheet

4. Use the **Text Edit** command to edit the following Orange text:
    - Project Title
    - Town Name in the center of the sheet and in the bottom right box.
    - General notes
        - Add the F.A.P. #
        - Update the specification form and supplement year as needed.
        - Delete either NAD 1927 or NAD 1983.
        - Delete either NGVD 1929 or NAVD 1988.
        - For Surveyed by: list the surveyor of record (examples - District 1 or ABC Company)

    Turn off the levels for items not needed, such as preliminary or semi-final design review, etc. Levels can be turned off using Off By Element in the Level Display dialog box or can be deleted. The top Maintenance Responsibility notes should be used primarily by Highway the bottom by Traffic.

5. The District Maps shown in the Location Plan area are used for Signal projects. They can be turned off in the References dialog box. All other project types will have the TRU Maps in the Location Plan Box. To place the TRU Map first turn off the district maps references and then reference in the TRU map(s) that were copied into your project directory – Shared_Rasters folder. Move, scale, clip to show the location of your project area. Turn

off un-needed levels. Clip this Reference file - Use the Location Plan Shape for the clipping Boundary Element. Annotate as needed. The location map should be scaled so road names etc. can be read. Place a circle to mark the project location.

Figure 28 – Location Plan Are

6. The town map will be placed under the Maintenance Responsibility note. Reference in the TRU map(s), move and scale to fit the whole town map. Turn Off unneeded levels and annotate as needed.
7. To shade Towns, make the MAP_Town_Shade level active. Use the **Create Complex Shape** Tool and select the needed town boundary lines.
8. Consultant designed projects shall not include the disclaimer located above the signature block. This shall be deleted.
9. Consultants will need to delete the CTDOT signature blocks on the title sheet and place a digital signature placeholder as detailed in the Digital Project Development Manual.

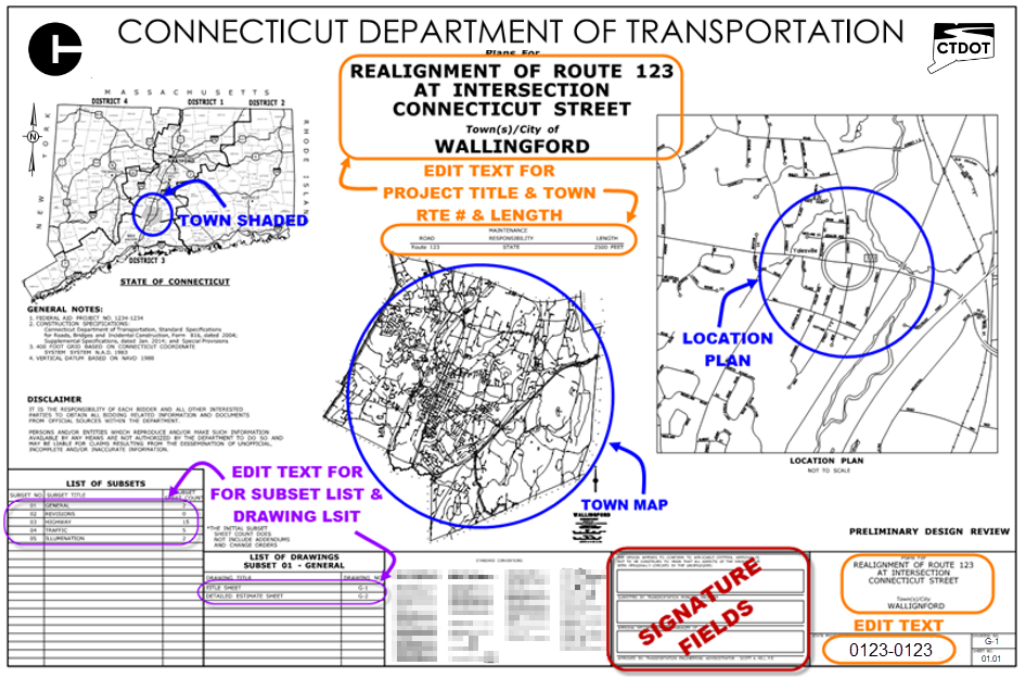


Figure 29 - PDF Title Sheet Overview

2.2.3 Additional Location Plan Sheets

The location plan depicts the approximate area(s) of the project location(s). In most cases the location plan(s) will fit on the title sheet. Additional space will be needed for the Location Plan(s) when a project has multiple locations, towns or is extra-long. The additional location Plans will be placed on contract sheets directly after the Title Sheet as part of the General Subset for the project.

1. To house the needed Location Plans, create additional 2D Sheet Models in the ***General Subset dgn.***
2. Place the regular Contract Border Cell to line up with the transient shape.
3. Reference in the TRU map(s) for the project.
4. Move, scale, clip to show the location of your project area. Turn off un-needed levels. Clip this Reference file and annotate as needed. The location map should be scaled so road names etc. can be read.
5. Place a **Circle** to mark the project location or On the CTDOT Workflow, CTDOT Tab use the **notes Begin** and **End** to show the limits of the project, include a North Arrow to orient the viewer. You can also thicken or draw a line to better show the project limits.
6. Repeat steps 3-5 as needed adding additional location plans or go back to step 1 to add additional contract sheet models.

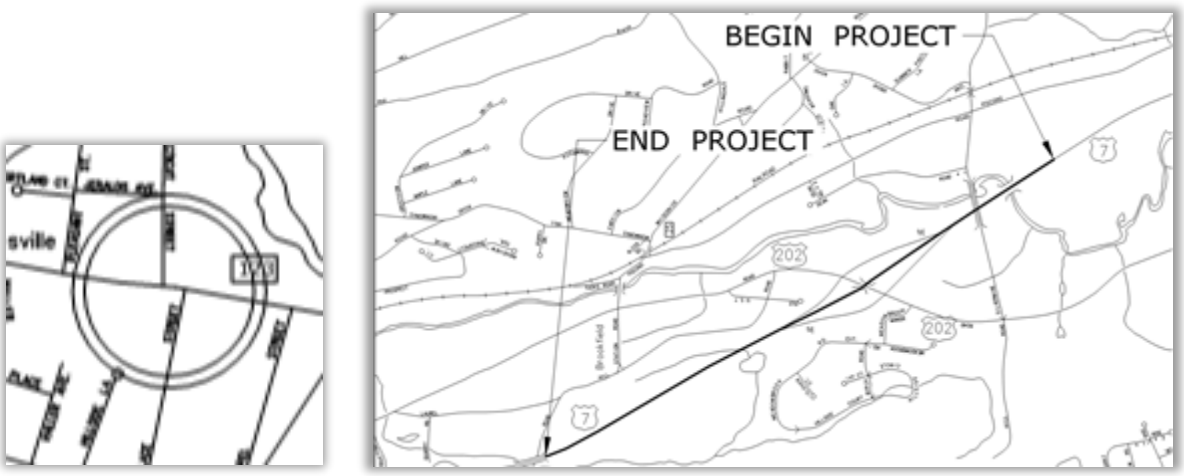
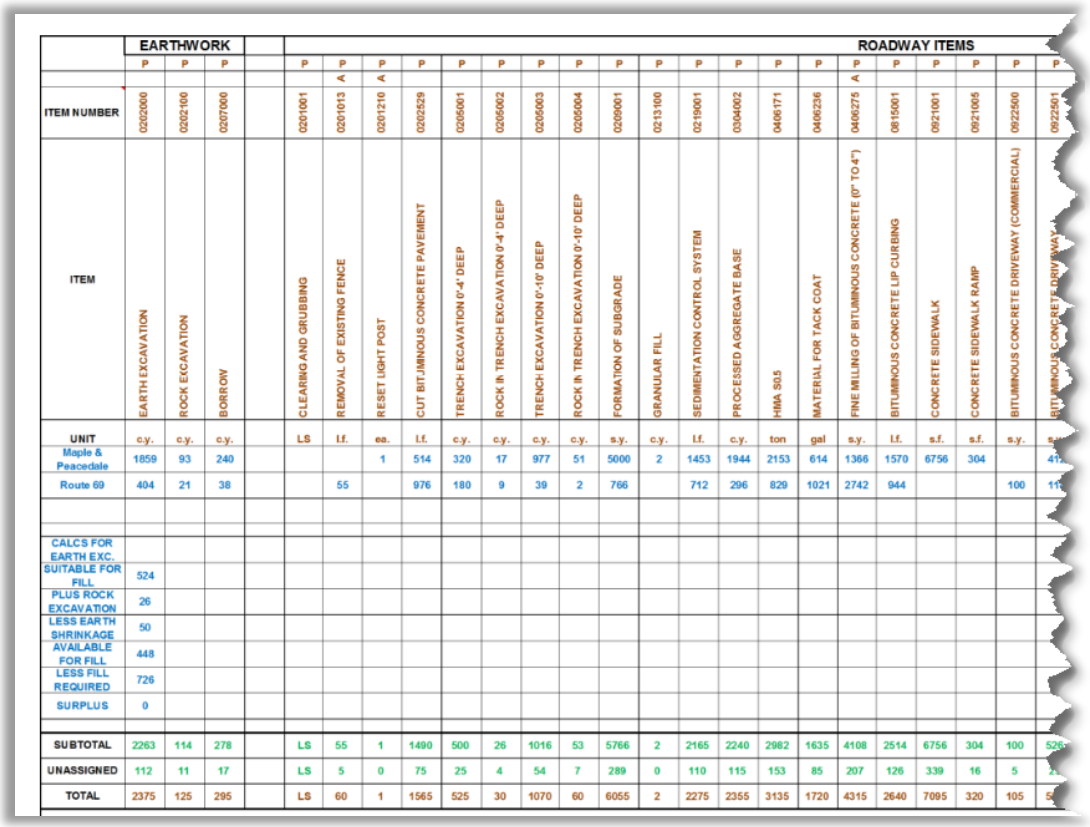


Figure 30 – Title Sheet Annotation

7. **Fill** in the contract border title blocks, use Location Plan as Drawing Title; include these sheets in the general subset under the list of drawings.

2.2.4 Detailed Estimate Sheets

The Detail Estimate Sheets are part of the digital contract plans under the General Subset and it contains all the pay items and quantities associated with the construction cost of a project. The lead designer will create the detail estimate sheet models and will attach or reference in the detail estimates from the other disciplines.



	EARTHWORK			ROADWAY ITEMS																				
	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P
ITEM NUMBER	0202000	0202100	0207000	0201001	0201013	A	0201210	A	0202529	0205001	0205002	0205003	0205004	0209001	0213100	0219001	0304002	0406171	0406236	0406275	0815001	0821001	0821005	0922500	0922501
ITEM	EARTH EXCAVATION	ROCK EXCAVATION	BORROW	CLEARING AND GRUBBING	REMOVAL OF EXISTING FENCE		RESET LIGHT POST		CUT BITUMINOUS CONCRETE PAVEMENT	TRENCH EXCAVATION 0'-4' DEEP	ROCK IN TRENCH EXCAVATION 0'-4' DEEP	TRENCH EXCAVATION 0'-10' DEEP	ROCK IN TRENCH EXCAVATION 0'-10' DEEP	FORMATION OF SUBGRADE	GRANULAR FILL	SEDIMENTATION CONTROL SYSTEM	PROCESSED AGGREGATE BASE	HMA S0.5	MATERIAL FOR TACK COAT	FINE MILLING OF BITUMINOUS CONCRETE (0" TO 4")	BITUMINOUS CONCRETE LIP CURBING	CONCRETE SIDEWALK	CONCRETE SIDEWALK RAMP	BITUMINOUS CONCRETE DRIVEWAY (COMMERCIAL)	BITUMINOUS CONCRETE DRIVEWAY
UNIT	c.y.	c.y.	c.y.	LS	l.f.		ea.		l.f.	c.y.	c.y.	c.y.	c.y.	s.y.	c.y.	l.f.	c.y.	ton	gal	s.y.	l.f.	s.f.	s.f.	s.y.	s.
Maple & Peacedale	1859	93	240				1		514	320	17	977	51	5000	2	1453	1944	2153	614	1366	1570	6756	304		41
Route 69	404	21	38		55				976	180	9	39	2	766		712	296	829	1021	2742	944			100	11
CALCS FOR EARTH EXC.																									
SUITABLE FOR FILL	524																								
PLUS ROCK EXCAVATION	26																								
LESS EARTH SHRINKAGE	50																								
AVAILABLE FOR FILL	448																								
LESS FILL REQUIRED	726																								
SURPLUS	0																								
SUBTOTAL	2263	114	278	LS	55		1		1490	500	26	1016	53	5766	2	2165	2240	2982	1635	4108	2514	6756	304	100	526
UNASSIGNED	112	11	17	LS	5		0		75	25	4	54	7	289	0	110	115	153	85	207	126	339	16	5	27
TOTAL	2375	125	295	LS	60		1		1565	525	30	1070	60	6055	2	2275	2355	3135	1720	4315	2640	7095	320	105	553

Figure 31 – Detailed Estimate Sheet

1. Use Excel to enter your detailed estimate information (Pay Items should be listed along the top, Sections on left most column and Totals on the bottom, seethe image above as an example). Make note of the range of information needed to be brought into each DGN model. Example: A1 to H20. Request that the support units do the same and send you a link to their excel files.
2. To house the needed Detailed Estimate Sheets in CAD, create additional 2D Sheet Models in the ***General Subset dgn.*** One for each sheet needed including those from the support disciplines.
3. Place the regular Contract Border Cell to line up with the transient shape.
4. On the **Annotate Tab** select **Place Table**. For Seed choose **From Excel**. Make sure **Retain Association** is toggle on. Browse out the needed excel file. Choose the

correct **Worksheet** and set the **Range** to ***Manual.*** Set the **From/To** ranges and follow the prompts to place the linked table.

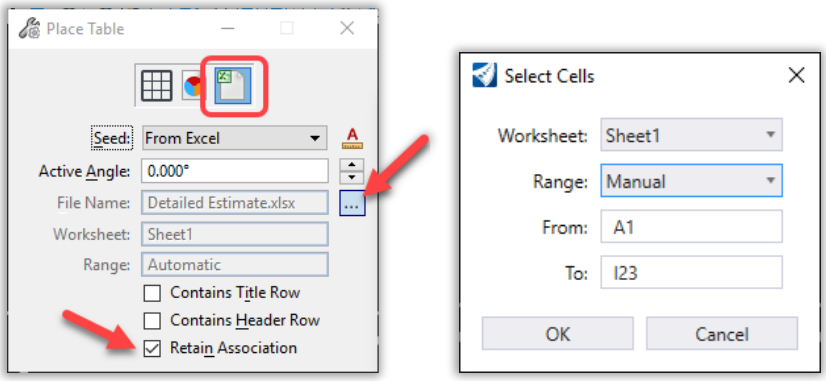


Figure 32 – Attaching an Excel Sheet

5. **Fill** in the contract border title block, use Detailed Estimate as Drawing Title; include these sheets in the general subset under the list of drawings.
6. Repeat for each 2- 5 for each sheet needed.
7. When printing select **Monochrome** as printing color.

Place Table from Table Seed

The CONNECT Edition provided the feature of creating tables in your DGN files. The CTDOT DDE provides standard templates that your tables should follow, users can apply them while placing tables in models. This feature is called Table Seed.

The table seed displays in the Seed drop-down list of the Place Table tool settings window.

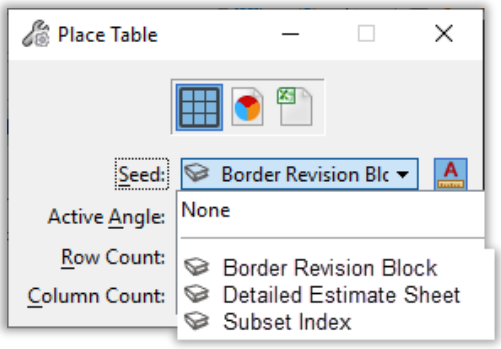


Figure 33 – Table From Seed

Please Note: The Table Seed for the Detailed Estimate Sheet is not yet available in the DDE. This will be added into the next release of the CTDOT CONNECT DDE.

1. Each disciple will create a DGN file to house the Detailed Estimate Tables. Create a Design Model for each table needed and use the Place Table tool in each model. Fill in the Table as needed.
2. These tables will be reference in models in the General Subset dgn. In the General Subset dgn create additional 2D Sheet Models, one for each table needed, including those from the support disciplines. Reference in the tables creating in step 1.
3. Place the regular Contract Border Cell to line up with the transient shape.

2.3 Index of Revisions Sheet

The Index of Revisions sheet(s) for each project is created and maintained by the lead discipline (unit).

1. To create a Revision Index sheet, within OpenRoads, OpenBridge, OpenBuildings, or OpenRail click on the **New File** icon.
2. Click on the **Browse** button to select the Revision Sheet dgn seed file***…\|CT_Configuration\|Organization\|Seed\| CTDOT_02_Revisions_Sheet_Seed.dgn***
3. Browse to the location you would like to save the file to and type in the file name using the DDE file naming convention. Example: ***HW_CP_1234_1234_RevisionsSheet.dgn***
4. Click on **Save**.
5. Enter the Title Block Information as instructed in the section: Section 1 - Introduction
6. Select the edit text tool and click in the table to add text.Below is a description of each column:

   1\| Enter the Addendum or Design Initiated Change Order Revision #.

   2\| Enter the revised or new sheet number.

   3\| Enter the Date mm/dd/yy

   4\| 5\| 6\| Enter a Bold Capital **X** in the appropriate box per row to describe the action taken, new sheet, revised sheet, or sheet deleted.

   7\| Enter a brief description that is like the description on the actual sheet being revised.

   Note: The Engineer is not required to input changes numerically by Sheet No. If another changed sheet is added to an Addendum in the eleventh hour, it can be placed at the bottom of the list on the “Index of Revisions Subset”.
7. On the **CTDOT** Workflow, **CTDOT** tab in the **Publishing** section, select ***Print\|Browse to Print***.
8. Select the desired location to save the file.When complete move the PDF file to the project’s ***Contract Documents / 100 Contract Plans*** folder.

9. Now proceed with Bluebeam tools to:
    - be digitally signed
    - add the Sheet Numbers
    - place the ADP/DICO # stamp
10. Use the same DGN file to add Addendum or Design Initiated Change Order Revision # lines, keeping the old lines intact.
11. If you have filled the sheet create another file new ***HW_CP_1234_1234_RevisionsSheet2.dgn*** and repeat the steps above.

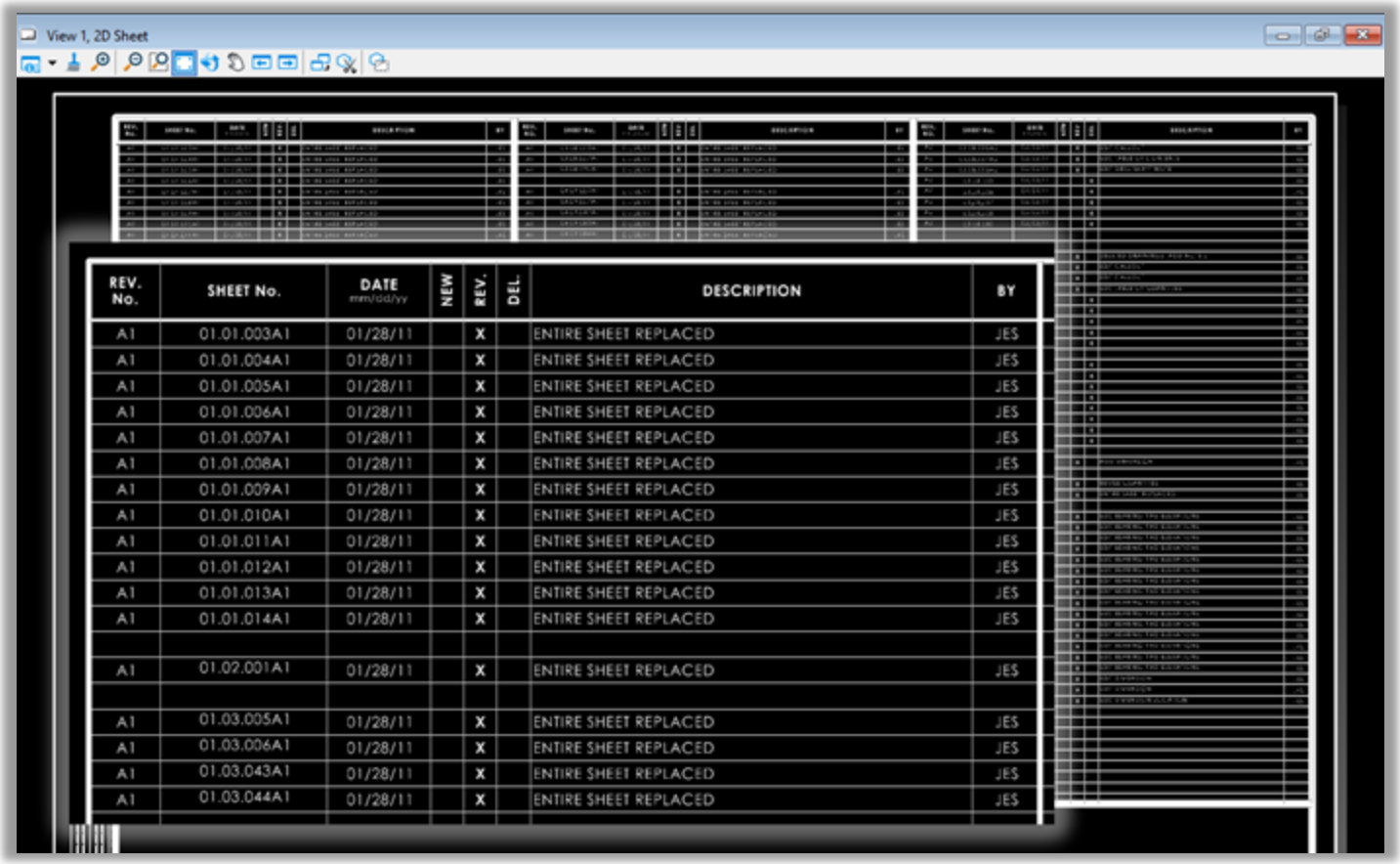


Figure 34 - Index of Revisions Sheet

2.4 Discipline Subset Cover Sheet / Index of Drawings

1. To create a Subset cover sheet, within OpenX products click on the **New File** icon.
2. Click on the **Browse** button to select the CTDOT Cover Sheet dgn seed file.

   …\|CT_Configuration\|Organization\|Seed\|CTDOT_State_Cover_Sheet_Seed.dgn

   or

   …\|CT_Configuration\|Organization\|Seed\|CTDOT_Consultant_Cover_Sheet_Seed.dgn
3. Browse to the location you would like to save the file to and type in the file name using the DDE file naming convention ***HW_CP_1234_1234_SubsetCoverSheet.dgn***
4. Click on **Save**.
5. The file will open with the Drawing Title and Drawing Number filled in. In the Models Property Dialog Box Sheet Number Field edit the Drawing Number Prefix as needed for the specific disciple.
6. Click on the Index of Drawing Table and fill in the needed information. Edit the Table Title Header with the corresponding Subset Number and Discipline Name. Edit the Index Prefix to match the Drawing Number Prefix if it was changed in the Title Block (step 3).

SUBSET NUMBER - DISCIPLINE
INDEX OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE
INX-01	INDEX OF DRAWINGS	LDS-01 - LDS-02	LANDSCAPE SHEETS
TYP-01 - TYP-03	TYPICAL SECTIONS	PLN-01 - PLN-03	CONSTRUCTION PLAN SHEETS
MDS-01 - MDS-05	MISCELLANEOUS DETAILS	PRO-01 - PRO-03	PROFILE SHEETS
DGS-01 - DGS-10	DRAINAGE GUIDE SHEETS	XSC-01 - XSC-50	CROSS SECTION SHEETS
BOR-01 - BOR-02	BORING LOGS	STG-01 - STG-02	TYPICAL SECTIONS AND DETAILS - TEMPORARY ROADWAYS
ALN-01 - ALN-03	ALIGNMENT / ROW BREAKOUT PLANS	STG-03 - STG-04	ALIGNMENT PLANS - TEMPORARY ROADWAY
IGP-01	INTERSECTION GRADING PLAN	STG-05 - STG-11	PLAN SHEETS - TEMPORARY ROADWAYS
CURB-01	CURBING PLAN	STG-12 - STG14	PROFILE SHEETS - TEMPORARY ROADWAYS
DRG-01 - DRG-03	DRAINAGE PLANS	STG-15 - STG-28	CROSS SECTION SHEETS - TEMPORARY ROADWAYS

Figure 35 - Discipline Subset Cover Sheet / Index of Drawings

7. Insert Rows as needed.

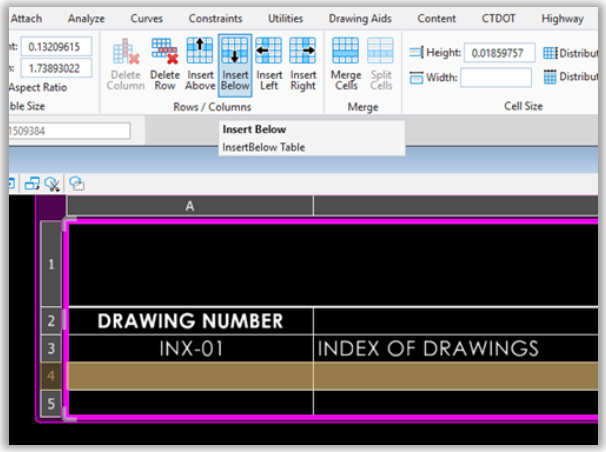


Figure 36 – Insert Rows

8. The Signature Block is located in the bottom right of the sheet and will be signed in the PDF.

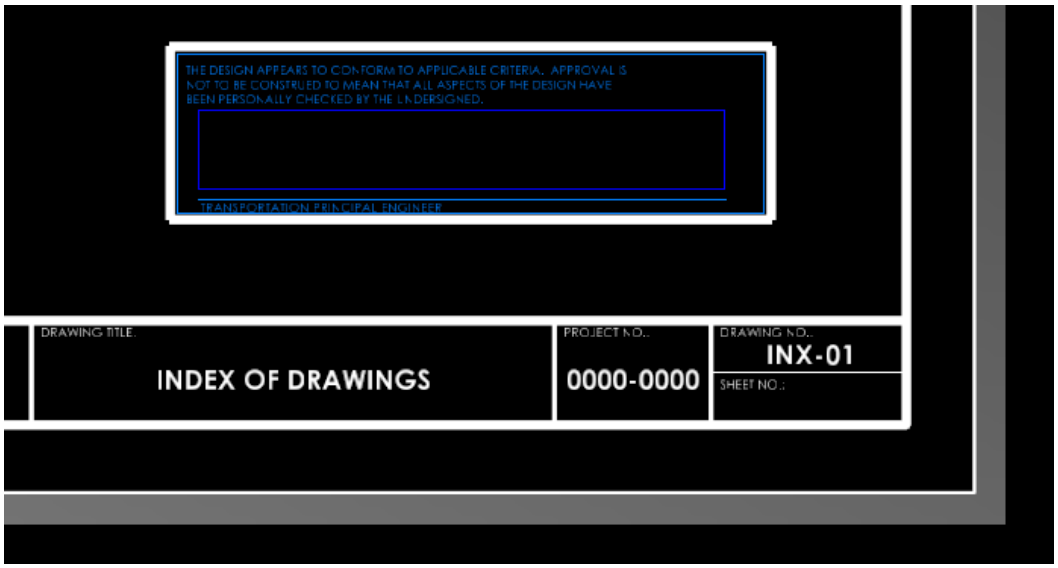


Figure 37 - State Design Cover Sheet Seed Signature Block

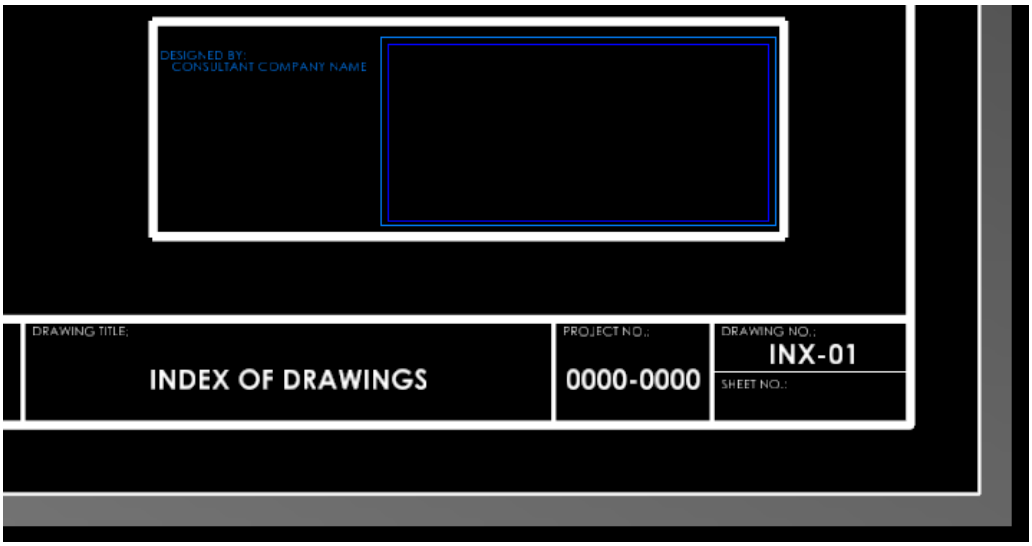


Figure 38 - Consultant Cover Sheet Seed Signature Block

Section 3 - Creating Detail Sheets

Introduction to Productivity Tools

Option 1 – Auxiliary Scale Detailing

Multiple details draw directly on a sheet at different scales.

Use this workflow to have several details drawn directly on a sheet and have each one drawn using its own scale. This will allow users to work in one model when detailing and not have to switch out and manage multiple models.

Users will work in a 2D Sheet Model at full scale and select **Auxiliary Scales** to work on different details. Users will dimension and annotate each detail in the Sheet Model.

Option 2 – Base Graphics Detailing

Reusing base graphics on multiple details at different scales.

Use this workflow to have base graphics re-used in multiple details. This method will have users draw base graphics in a Design Model, then reference those same graphics into a sheet model for different details. The details in the design model can be referenced into the sheet several times using different scales as needed. Users will dimension and annotate each detail in the Sheet Model.

The productivity tools can be found on the CTDOT Workflow, on the Alt Detailing Tab.

The Scaled Dimension section will be used when dimensioning each detail. Pull down menus are provided for dimensions using both 120 and 080 text sizes. Each pull down menu has tools that will set the needed Auxiliary Scale. There are also tools for Call Outs, Notes, Detail Titles and Scales in the Annotation section.

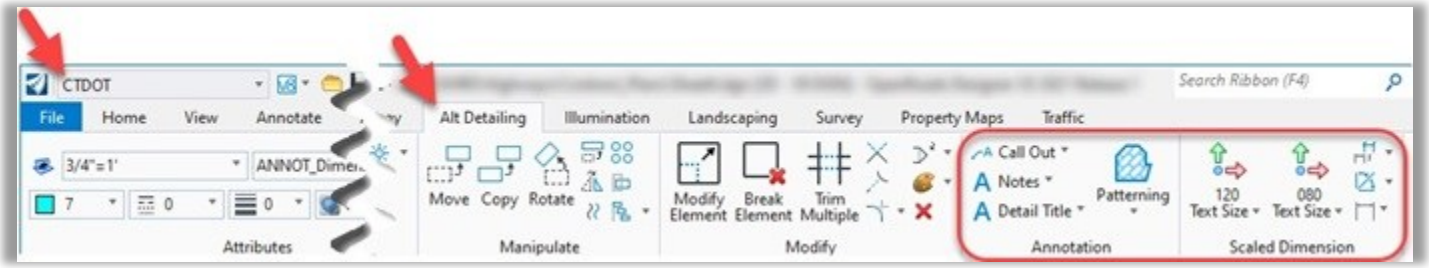


Figure 39 – Alt Detailing

What does each Aux Scale tool trigger?

Selecting the **Scaled Dimension** section **120 Text Size/Aux Scale 3/4" = 1'**, changes the ACS Scale and Element Template, which has an assigned Text Style, Dimension Style and Level.

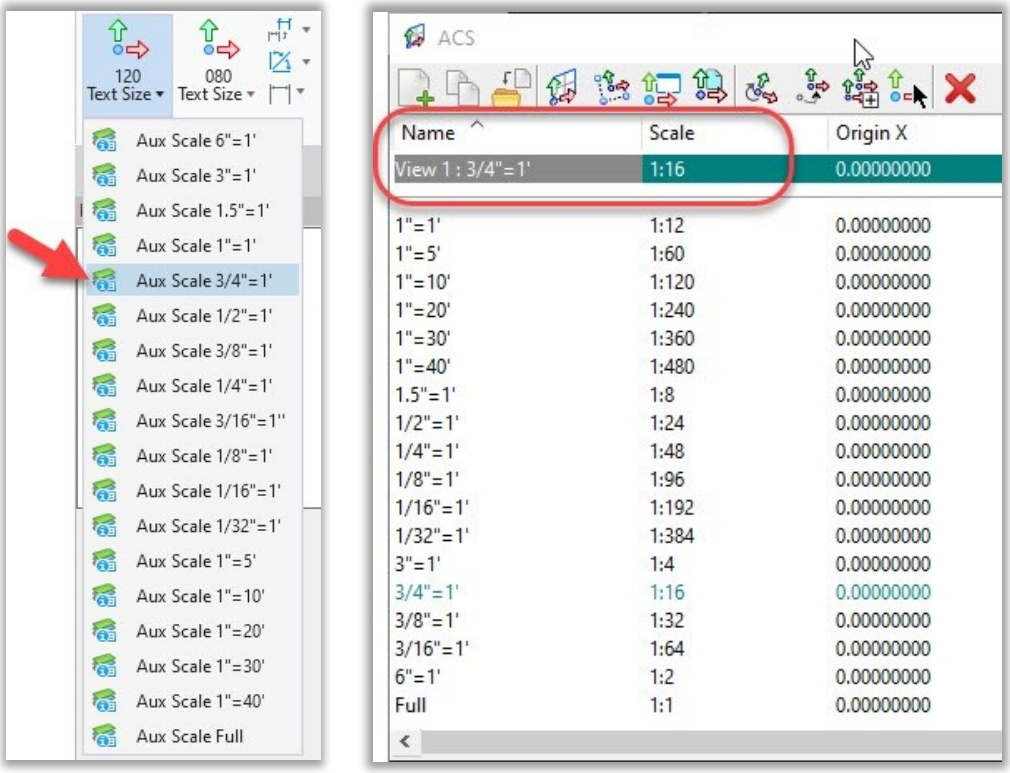


Figure 40 –Detailing

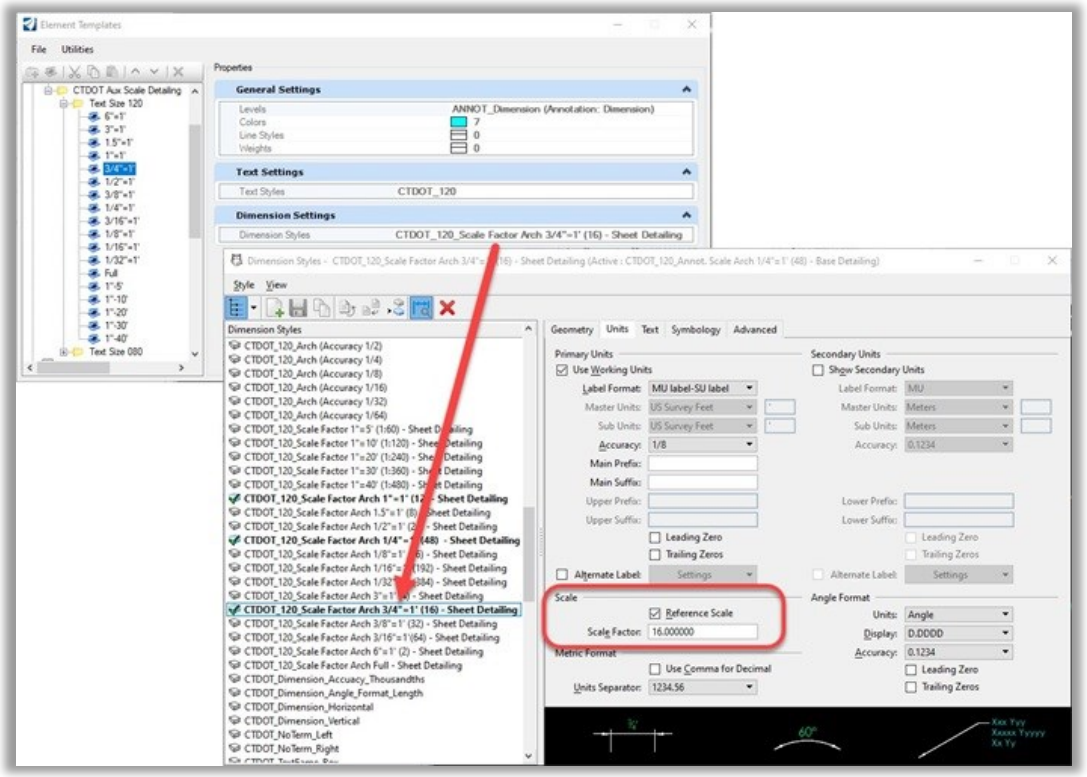


Figure 41 - Detailing

3.1 Startup

Before attempting to open or create DGN files users should make sure the following is in place:

1. CTDOT users should have the CTDOT CONNECT DDE synced through SharePoint with the COMPASS Project Synced along with the CAD Configuration.
2. Consultants should have CTDOT DDE properly installed or be syncing to the CTDOT DDE SharePoint/COMPASS system.
3. Make note of the **Coordinate System** you will be working in. If you have existing survey data, you will need to find out what system is being used **(NAD 83/NAVD 88 or NAD 27/NAVD 29).**
4. Log on to the CONNECTION Client. Bentley CONNECT licensing requires users to log into their Bentley account to secure a software license. CTDOT users should log in using your CTDOT email address and Bentley password. If you do not see the dialog box, select the ^ icon on the bottom Windows Screen. Click on the Connection Client Icon and select Open.
5. Access OpenRoads through Accounting or the Customized Icon following
6. On the OpenRoads open screen select **Custom Configuration**, using the small drop-down arrows select the Workspace **CT_Workspace**, the needed **WorkSet** and **Role**.

3.2 Auxiliary Scale Detailing Workflow

1. Create a file using the corresponding seed file.
2. **Note:** If there is already a dgn file created for other detail sheets, users should import the Sheet Model from one of the seed files below. There are ACS Scales in these models that will be needed when using the productivity tools.

   OpenRoads
   …\|Organization\|Seed\|Road\|Seed2D - CT RoadSheet-Alt Detailing.dgn
   OpenRail
   …\|Organization\|Seed\|Rail\|Seed2D - CT RoadSheet-Alt Detailing.dgn

   OpenBuildings
   …\|Organization\|Seed\|Buildings\|Seed2D - CT BuildingsSheet-Alt Detailing.dgn

   OpenBridge
   …\|Organization\|Seed\|Bridge\|Seed2D - CT BridgeSheet-Alt Detailing.dgn
3. Click on the **Models** icon and open the Sheet Model. Ensure that the ACS Plane Lock is enabled, on the Models Dialog select and highlight the **Sheet Model** and in the **Properties** dialog box make sure **Locks \ ACS** Plane is set to **True**.

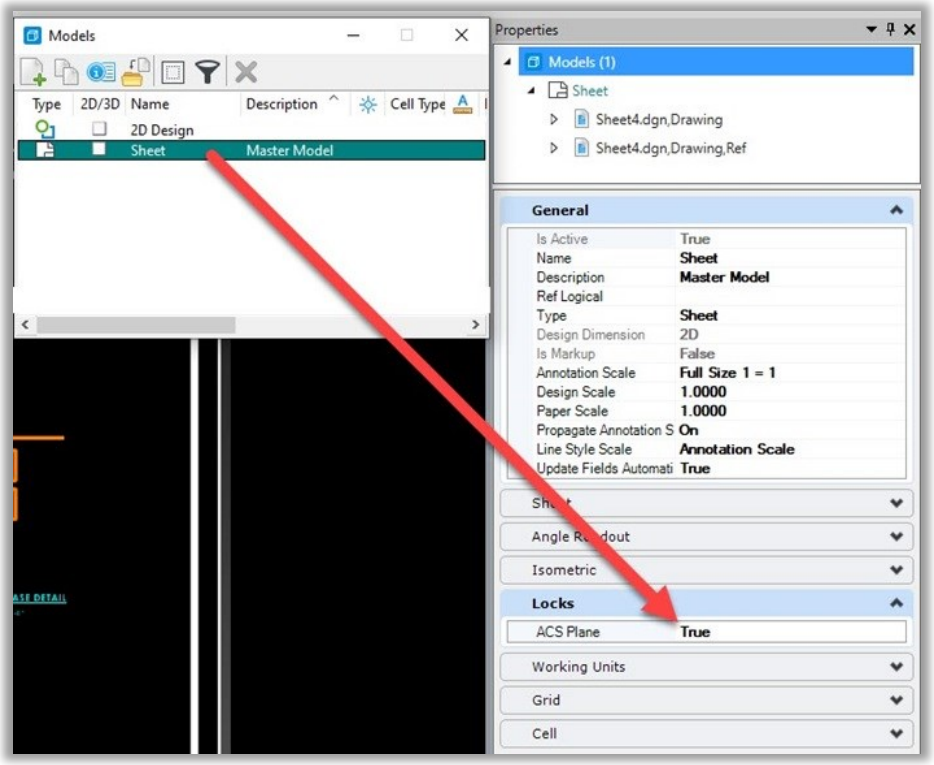


Figure 42 – Alt Detailing

4. Select the **CTDOT** workflow and click on the **Alt Detailing** tab.
5. In the **Annotation** section click on the **Detail Title** pull down and select the desired scale for the detail. Place the Cell inside the sheet border and edit the ***Title*** text as needed.
6. In the **Scaled Dimension** section select either **120 Text Size** or **080 Text Size**, then proceed to pick your **Aux Scale** tool.
7. Inside the sheet draw the detail above the title using the Placement Tools.
8. To Dimension be sure to pick the corresponding **Aux Scale** tool again just to be sure the settings did not get changed while drawing the detail.
9. Use the **Call Out** and **Notes** tools to finish annotating.
10. Repeat 3-9 selecting a different scale, notice the dimensions work properly as they are based of the ACS Scale.
11. Save Settings.

3.3 Base Model Detailing Workflow

1. In the same file created in the Auxiliary Scale Detailing Workflow open the **Design Model**. Proceed to draw the line work for the Detail at full scale.
2. When the line work is complete open the **Sheet Model**. Click on the **Models** icon and open the Sheet Model. Ensure that the ACS Plane Lock is enabled, on the Models Dialog select and highlight the **Sheet Model** and in the **Properties** dialog box make sure **Locks \ ACS** Plane is set to **True**.

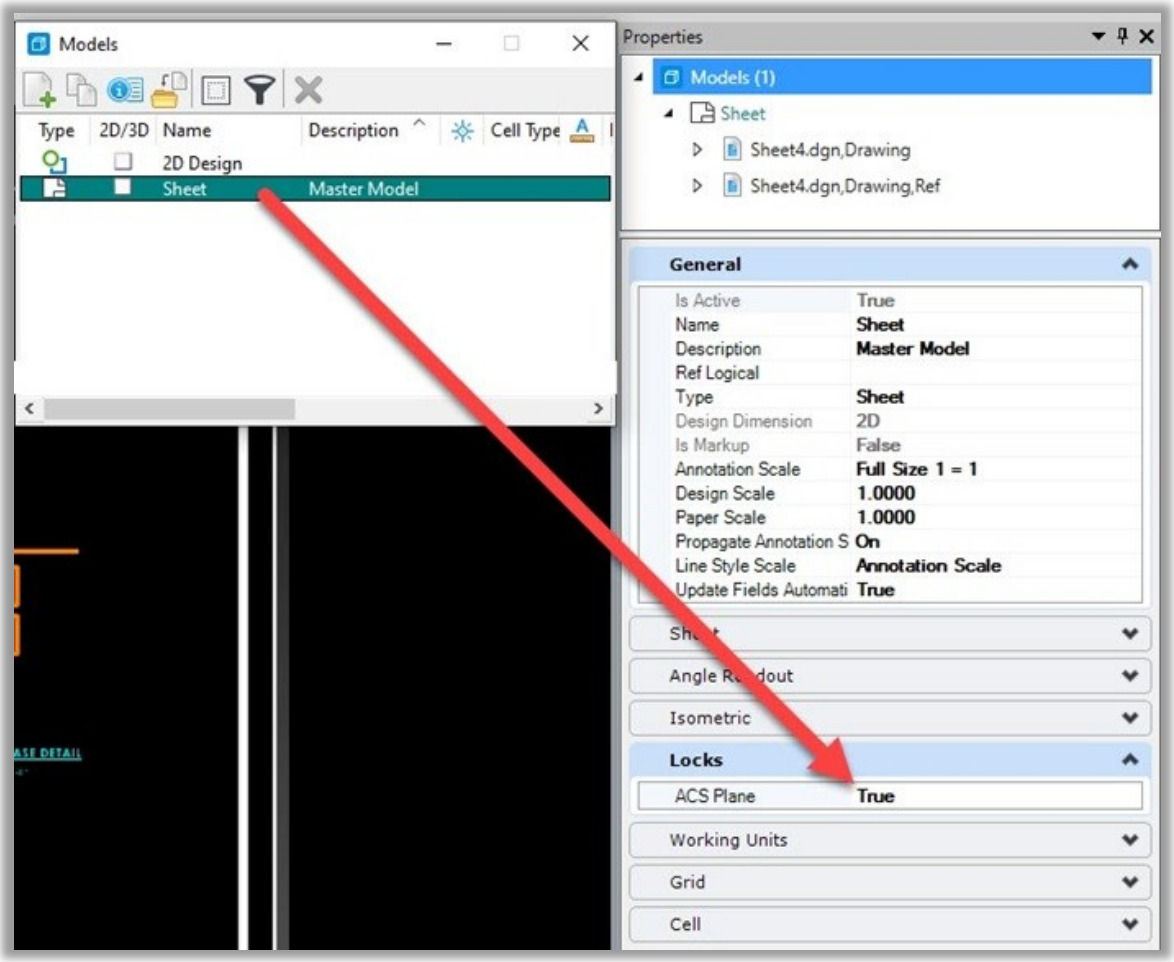


Figure 43 ASC Plane Lock

3. Click on the **Annotate** tab, in the **Detailing** section select to the **Detailing Symbols Styles** dialog box. Right click on the **Center Style** option and select **Activate**.

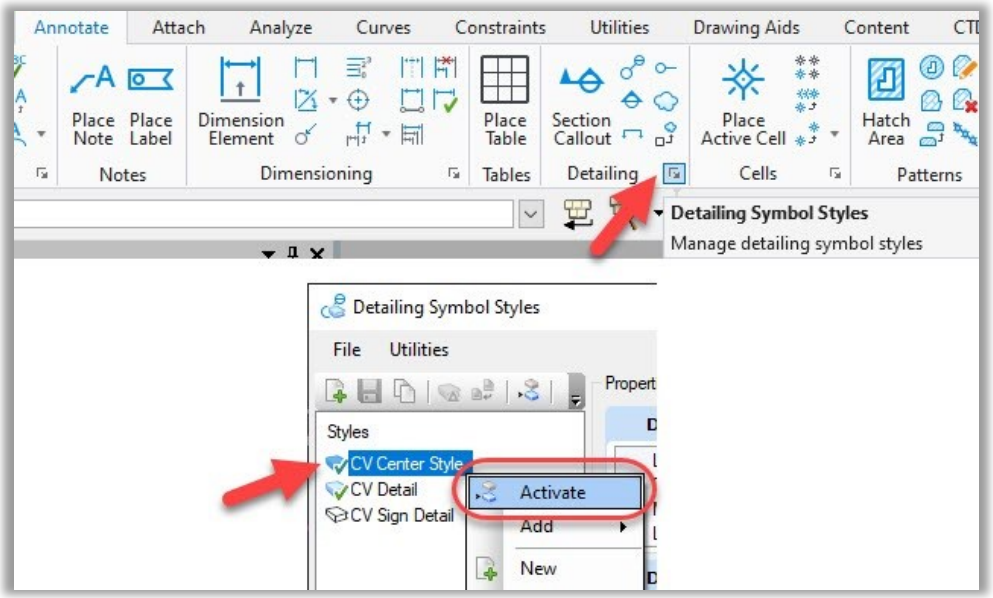


Figure 44 – Activate Detailing Symbol Style

4. Reference in the **Design Model** using the following settings:
   - Model: Select the Design Model
   - Orientation: Standard Views > Top
   - Detail Scale: Set as needed
   - Name: Name the Detail
5. Select **OK** and place the reference inside the Sheet Border.
6. Clip the Reference file Boundary as needed.
7. To Dimension access the **Scaled Dimension** section, select the desired **Text Size** pull down and pick the **Aux Full Scale** tool.
8. Use the **Call Out** and **Notes** tools to finish annotating.

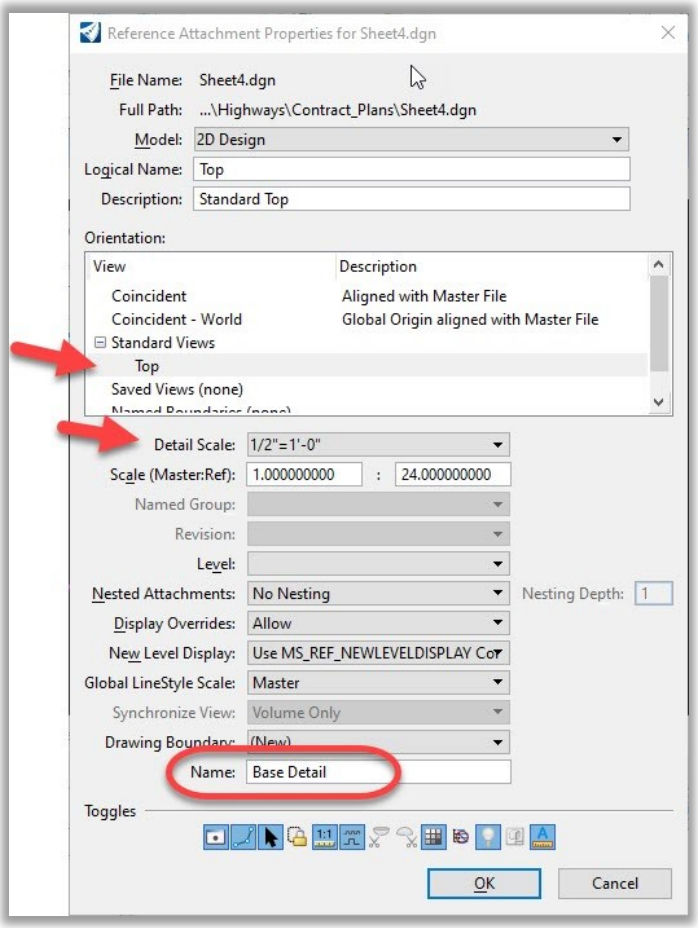


Figure 45 - Referencing

9. Open the **References** dialog box, click on the **Design Model** Reference File make the option for **Treat Attachment as Element for Manipulation** active.

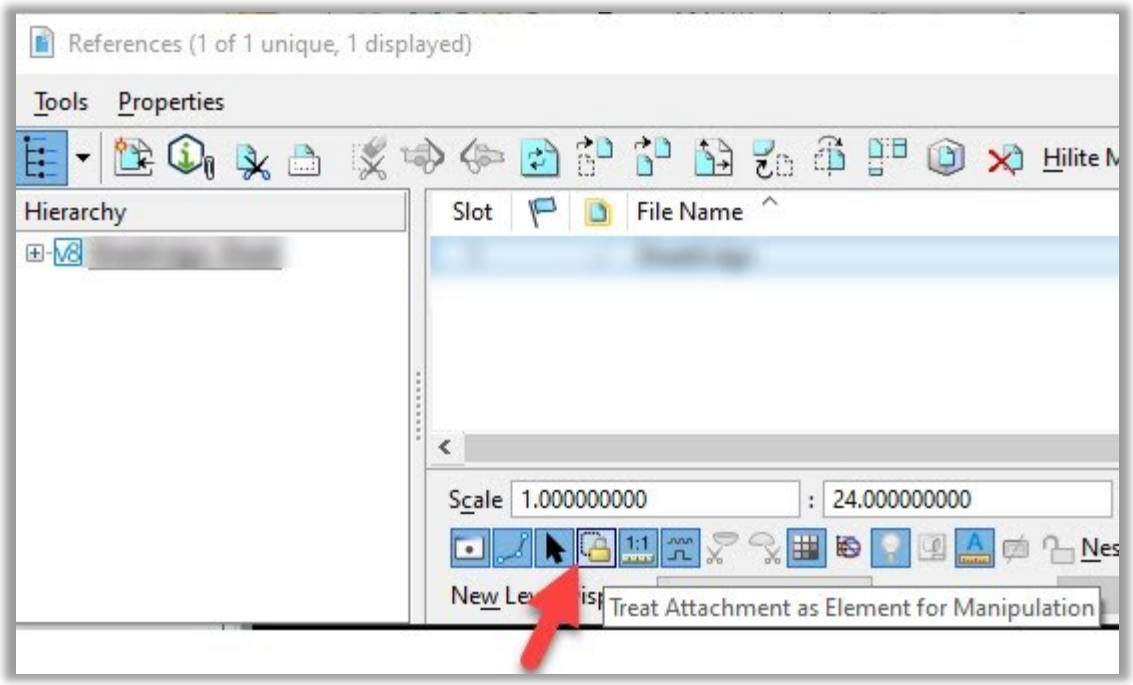


Figure 46 - Referencing

10. Use the **Section** tool to select all the elements of the Detail (Reference File, Annotation and Dimension) and move the Detail inside the sheet border as needed.
11. Repeat steps 4-9 using a different Scale, notice the dimensions work properly as they are based of the Design Model.
12. Save Settings.

Section 4 – Roadway Sheets

4.1 Overview

All files for contract plans, profiles and cross sections will reside in the Contract_Plans folder under the disciplines folder; example: project folder/Highways/Contract_Plans.

4.1.1 Named Boundaries

OpenRoads designer uses MicroStation **Named Boundaries** to define plan, profile, and cross section clipping areas. The Named Boundaries tools will create Drawing and Sheet models needed for plan, profiles and cross section contract sheets. Sheets are generated in their own design file. Files can be created using seeds found in the CTDOT DDE Configuration.

Sheets are clipped using **Named Boundary** tools from the **OpenRoads Modeling workflow** on the **Drawing Production** tab.

The top of the dialog contains several icons to select the type of named boundary that you wish to place.

 Civil Plan

 Civil Profile

 Civil Cross Section

 Civil Cross Section 2 Points

 By 2 Points

 By Polygon

CTDOT has configured sheet clipping options for plan, profile, and cross section sheets with common scale options. These configurations are stored in DGN Libraries and will appear in the Drawing Seed drop down menus, see below.

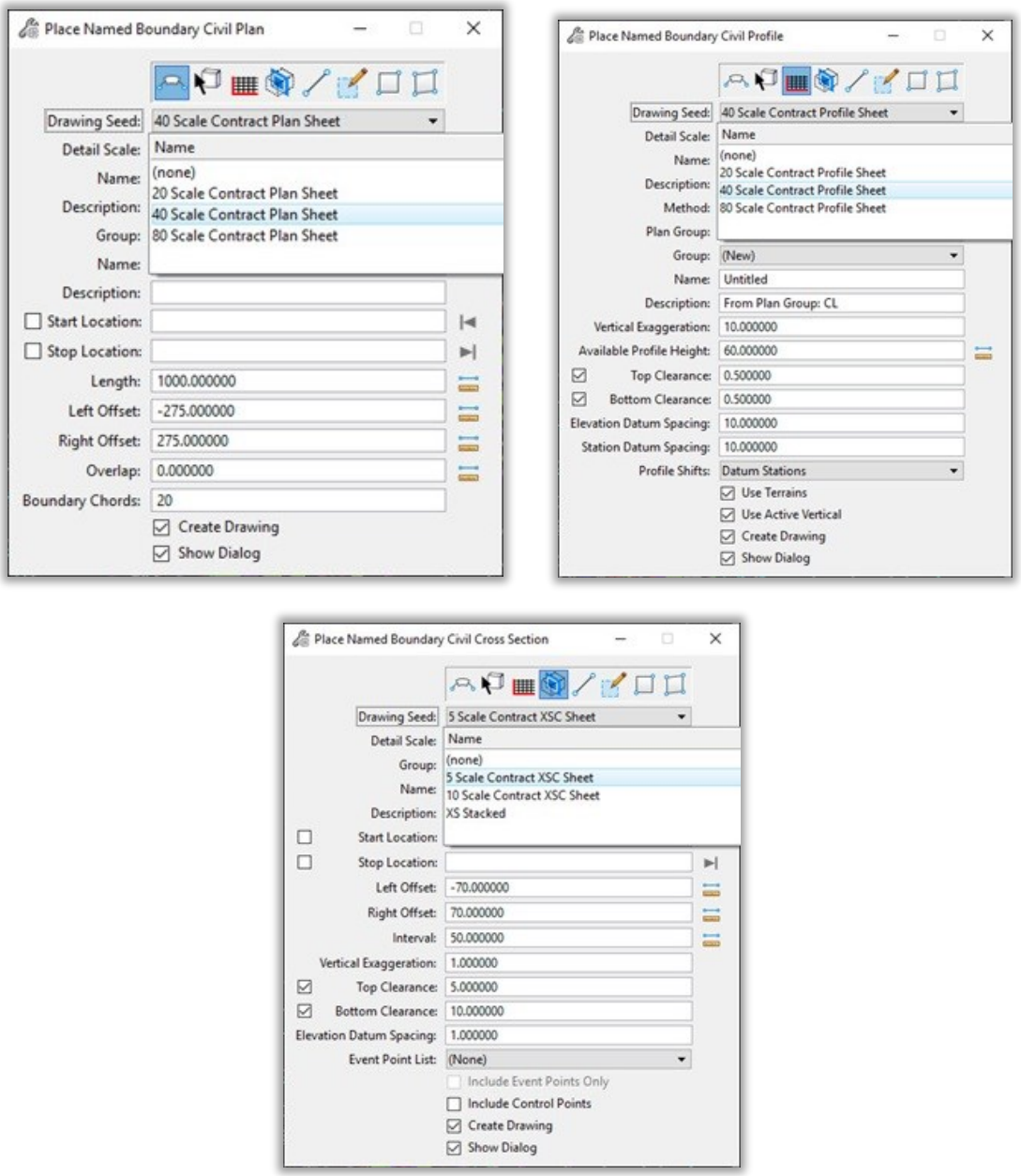


Figure 47

A sheet design file is created to house the named boundaries as well as the completed sheets. The various base model design files required to assemble the sheets are attached as reference files to the Design Model in the sheet design file. The named boundaries are placed in the design model relative to a selected alignment, profile, or 3D model for cross sections.

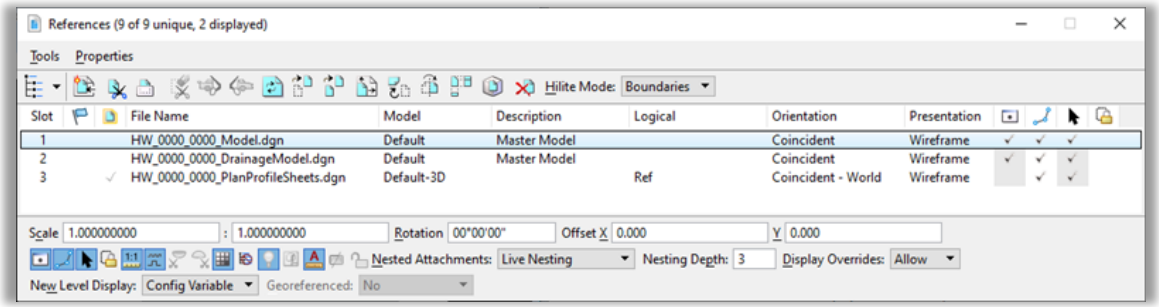


Figure 48

4.1.2 Plan and Profiles

Examples showing four named boundaries placed for the plan and profile sheet production are shown below.

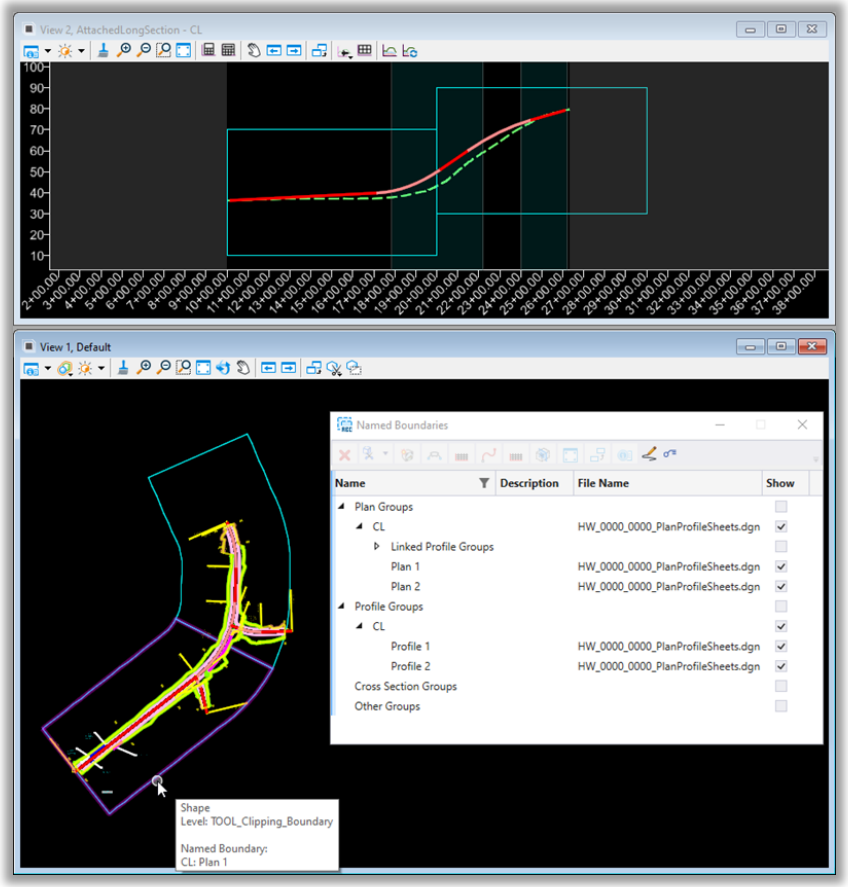


Figure 49

Tip: *When the file containing the existing ground terrain is attached, setting the terrain active is necessary to display the existing ground profile on the sheets. When the terrain model is set active, a 3D model is created in the active file and attached as a reference to the plan view. The 3D model is typically not needed for plan and profile sheets and the display should normally be turned off in the when the sheets are generated, the software creates a MicroStation drawing model for each named boundary, plan, profile, or cross section. An example of the drawing model for a plan view named boundary is shown below.*

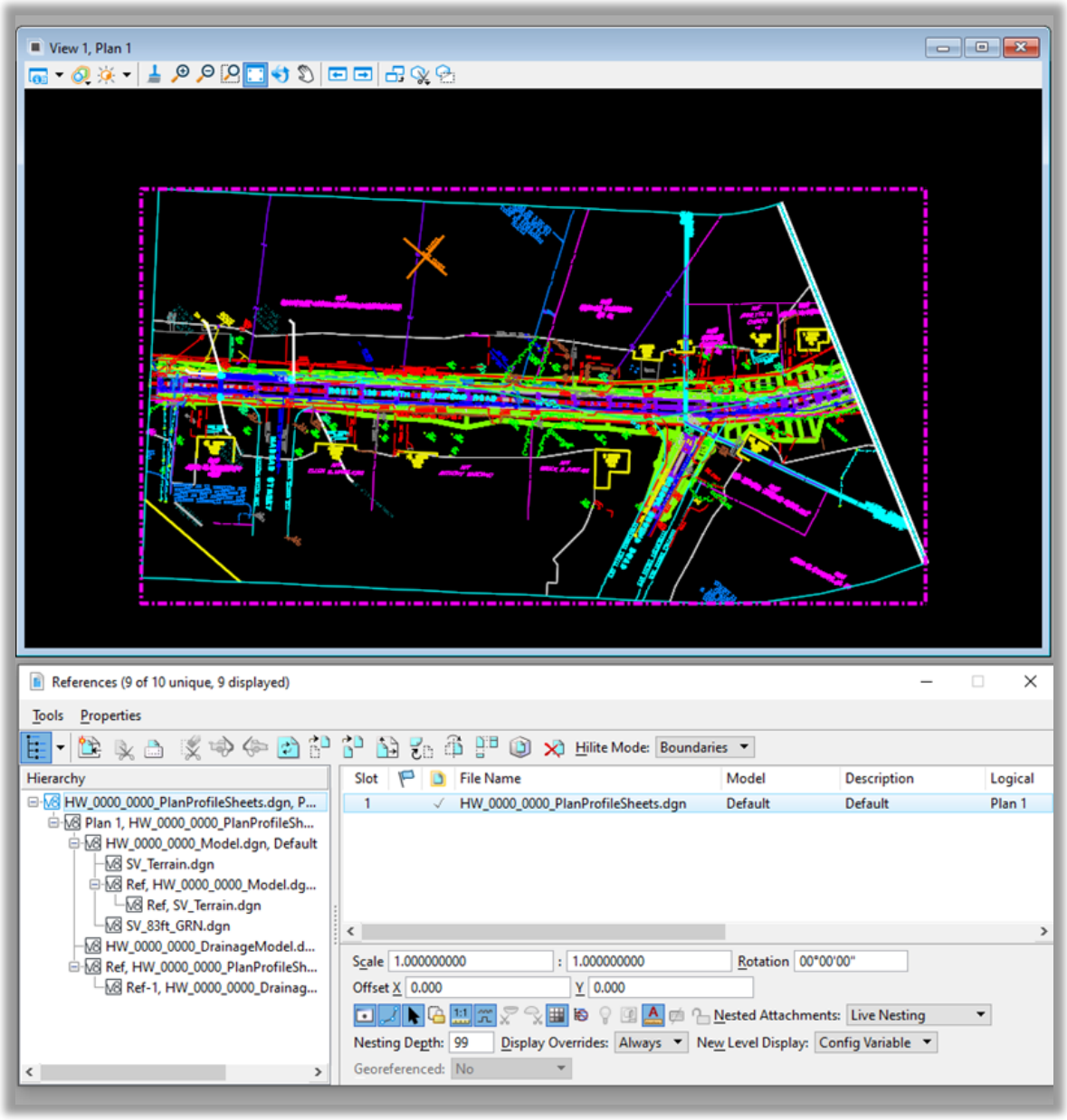


Figure 50

The drawing models are referenced to a sheet model with a sheet border to assemble the completed sheets for PDF generation as shown in the example below.

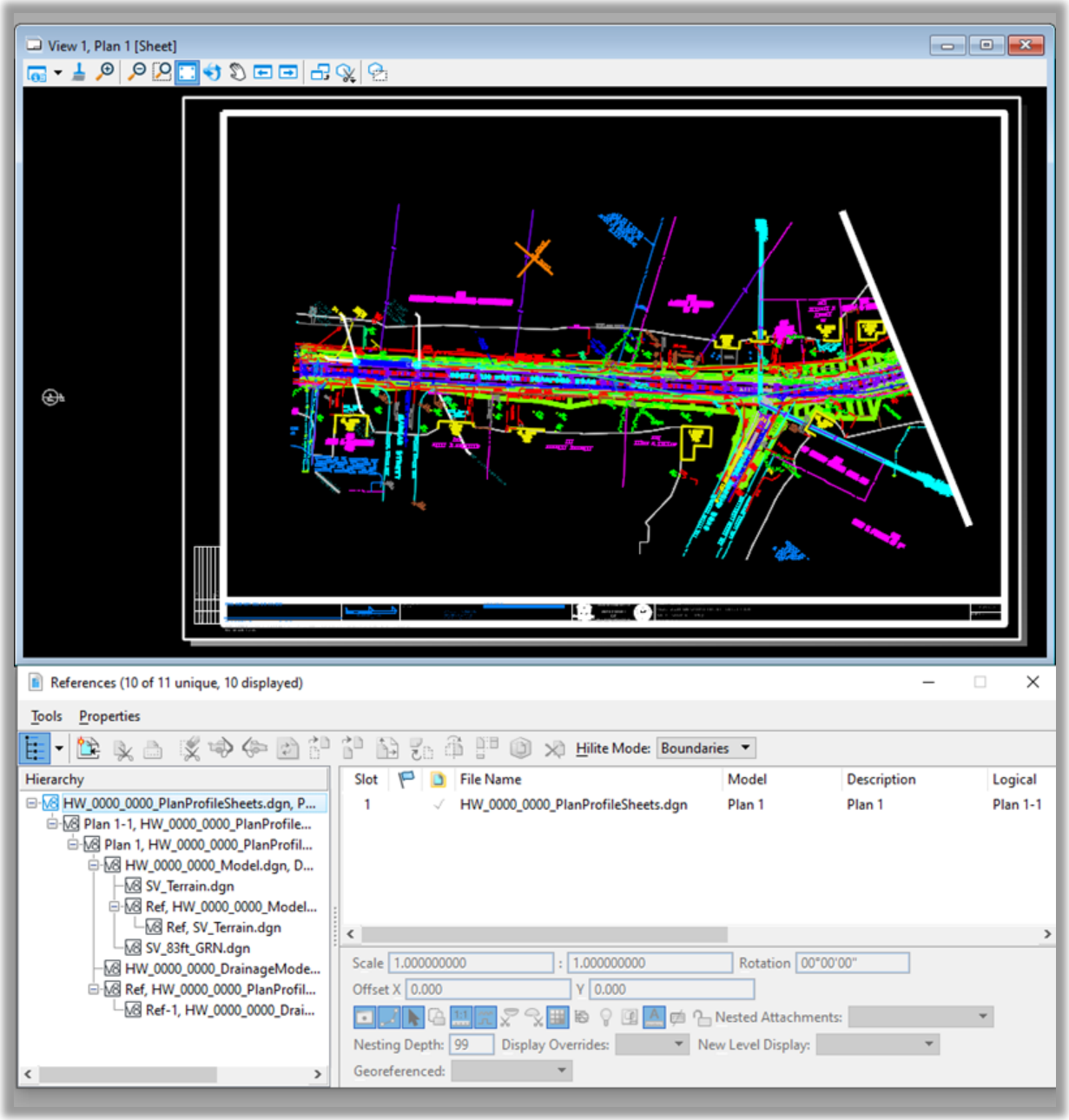


Figure 51

The sheet model is intended for PDF generation. Most annotations should be placed in the various drawing models, not in the sheet models.

4.1.3 Cross Sections

Cross-section sheets are generated in their own design file. Within this file, OpenRoads designer uses MicroStation Named Boundaries to define cross-section clipping locations.

Before generating the named boundaries, a design file is created to house the cross-section sheets. The various base model design files required to assemble the cross sections are attached as reference files to the Design Model in the design file. The 3D model must be displayed. The cross section is cut from the 3D model. In the example below, the geometry, survey, and corridor model base models are attached to the plan view with the 3D model displayed. The named boundaries are placed in the 3D model relative to a selected alignment like the example below.

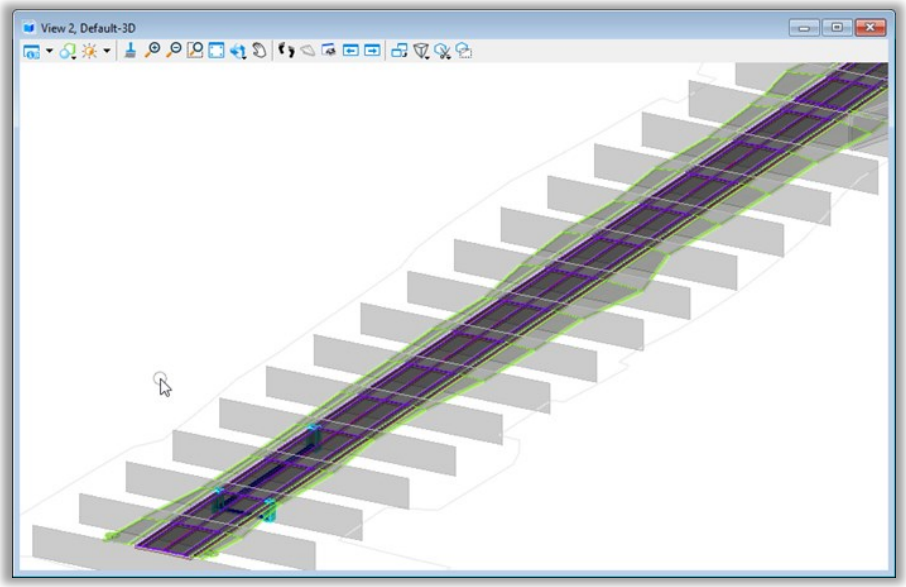


Figure 52

When the sheets are generated, the software creates a MicroStation drawing model for each named boundary. An example of the drawing model for a cross-section is shown below.

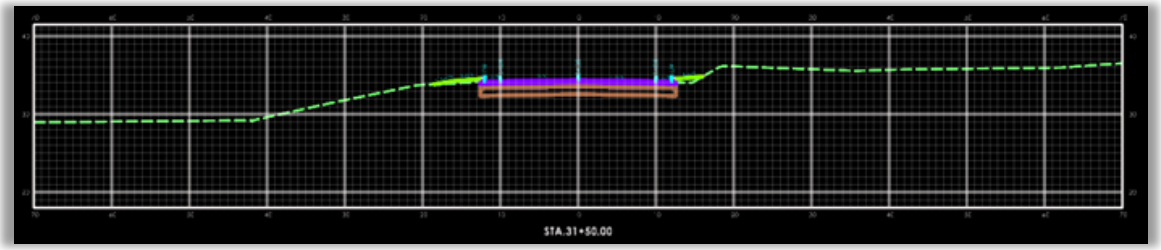


Figure 53

The drawing models are referenced to a sheet model with a sheet border to assemble the completed cross-section as shown in the example below.

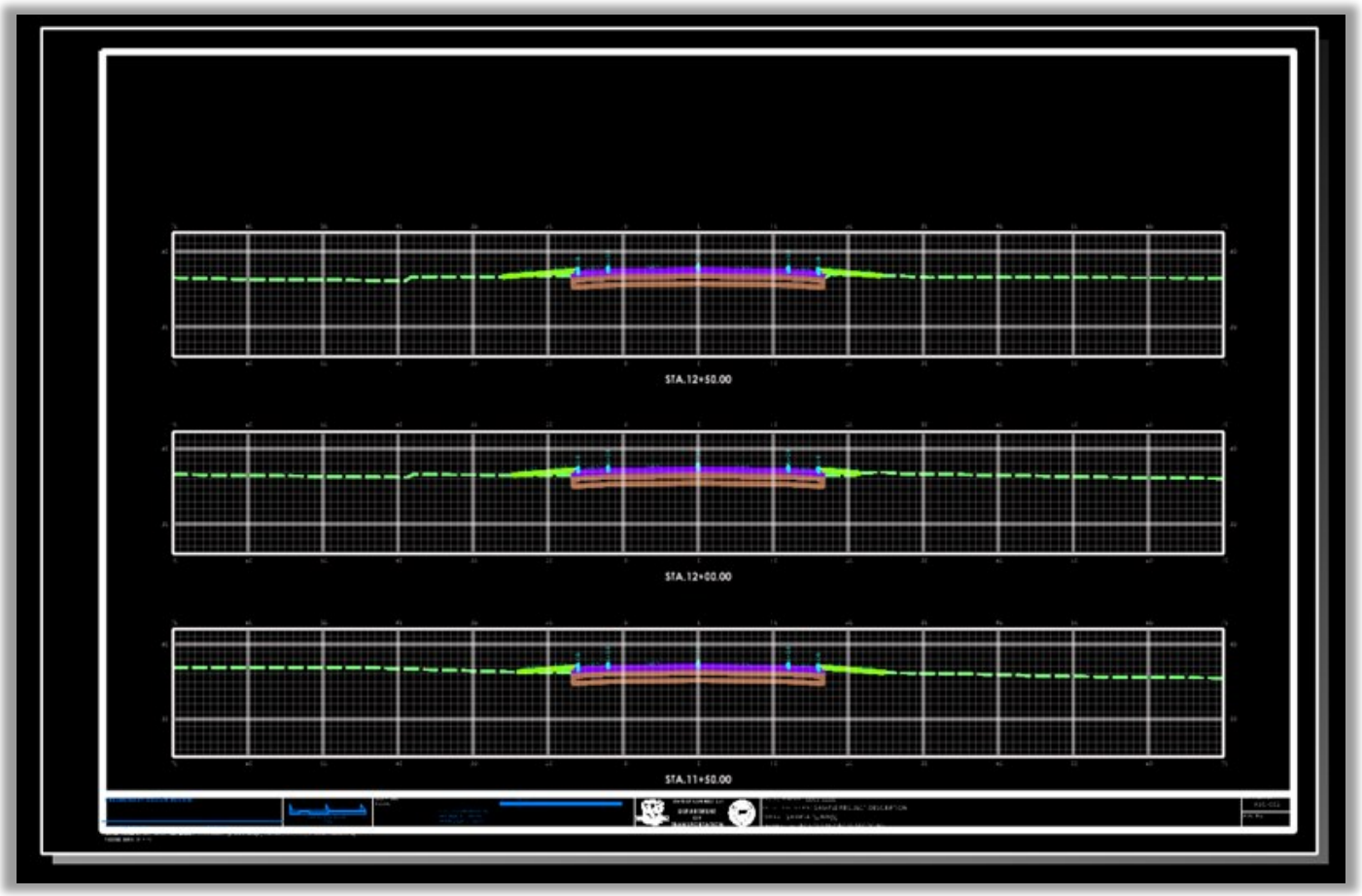


Figure 54

The sheet model is intended for PDF generation. Most annotations should be placed in the various drawing models, not in the sheet models.

4.2 Startup

Before attempting to open or create DGN files users should make sure the following is in place:

1. CTDOT users should have the CTDOT CONNECT DDE synced through SharePoint with the COMPASS Project Synced along with the CAD Configuration.
2. Consultants should have CTDOT DDE properly installed or be syncing to the CTDOT DDE SharePoint/COMPASS system.
3. Make note of the **Coordinate System** you will be working in. If you have existing survey data, you will need to find out what system is being used **(NAD 83/NAVD 88 or NAD 27/NAVD 29).**
4. Log on to the CONNECTION Client. Bentley CONNECT licensing requires users to log into their Bentley account to secure a software license. CTDOT users should log in using your CTDOT email address and Bentley password. If you do not see the dialog box, select the ^ icon on the bottom Windows Screen. Click on the Connection Client Icon and select Open.
5. Access OpenRoads through CAD Accounting or the Customized Icon.
6. On the OpenRoads open screen select **Custom Configuration**, using the small drop-down arrows select the Workspace **CT_Workspace**, the needed **WorkSet** and **Role**.

4.3 Typical Section Sheets

1. Create a DGN file from the civil sheet seed and save it to the Contract_Plans folder.

   ...CT_Configuration|Organization|Seed|Road|Seed2D - CT RoadSheet.dgn

2. Activate the **CTDOT Workflow**.

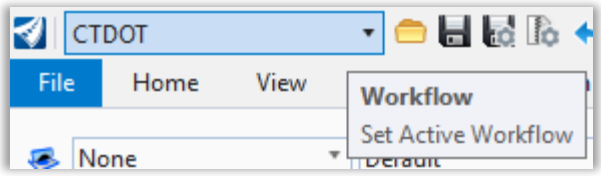


Figure 55

3. In the 2D Sheet Model change the Annotation Scale to **Full Size 1 = 1**.

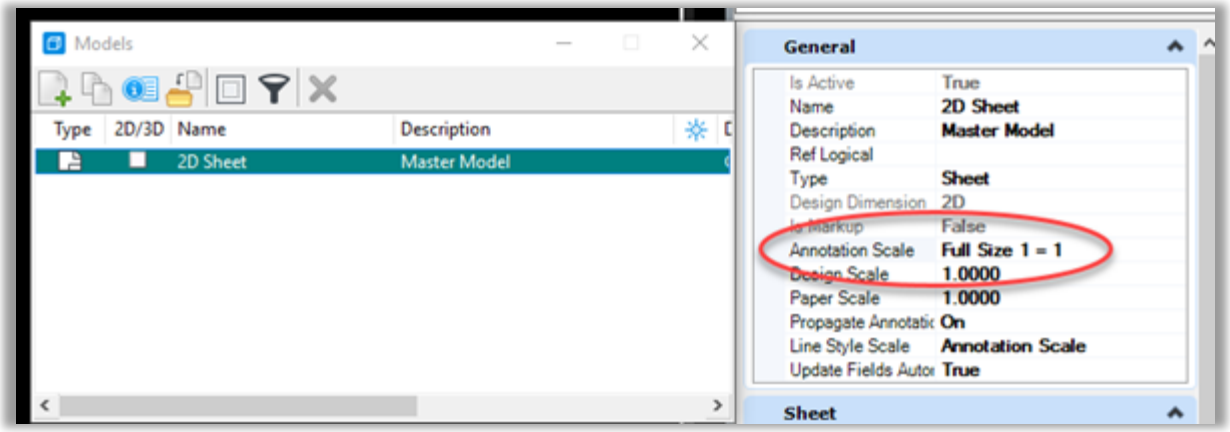


Figure 56

4. Edit the Sheet Name as needed.

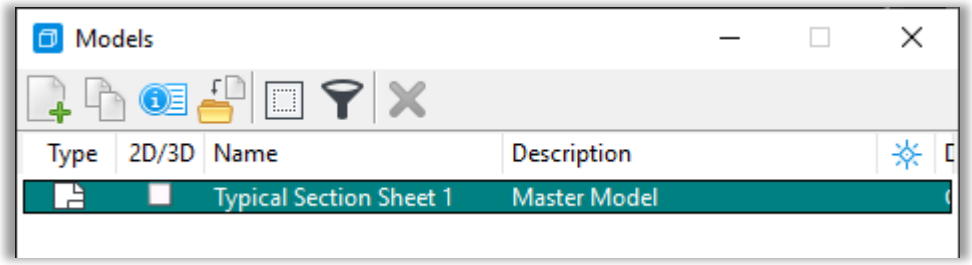


Figure 57

5. Place the CTDOT **Contract Border** Cell using the tool supplied in the Ribbon.

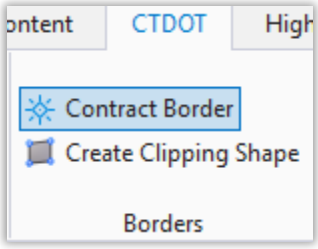


Figure 58

6. In the Properties Dialog Box Edit the Border information. This will update the Border
   Description: ***Drawing Title.***
   Sheet Number: ***Drawing No.***
7. A Design Model will need to be created to hold the Typical Sections and/or Detail graphics. On the Models Dialog Box select the **New File** Icon, in the Create Model Dialog Box select the following:
   Type: ***Design From Seed.***
   Annotation Scale: ***Full Size 1 = 1***.
   Enter a Name for the Model and Click ***OK***.

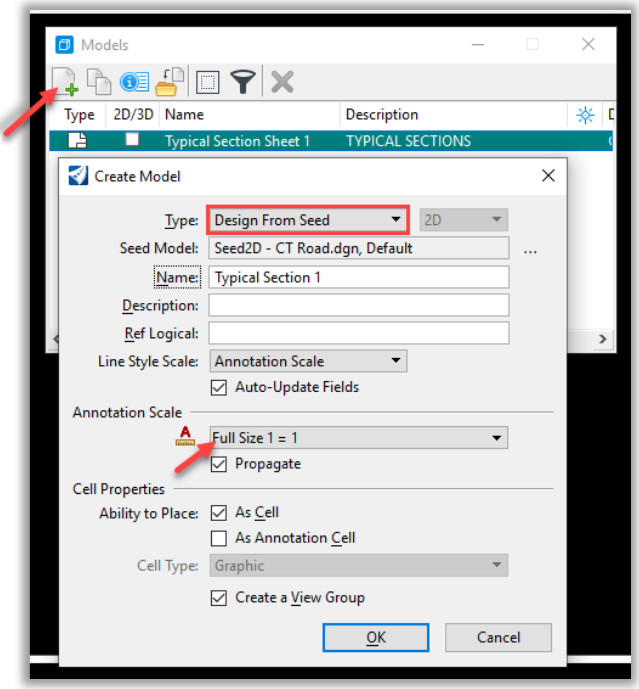


Figure 59

8. To automate the drafting process Typical Sections can be displayed from the Roadway Template Library. In the Design model, use the **Search** command by Typing ***Display Template***. The tool will appear, follow the prompts to place the Desired Roadway Template (if your Roadway Template Library is blank, see procedures in Volume 3.2. The Template will place using the active attributes, users will need to edit as necessary to get the desired look and layout.

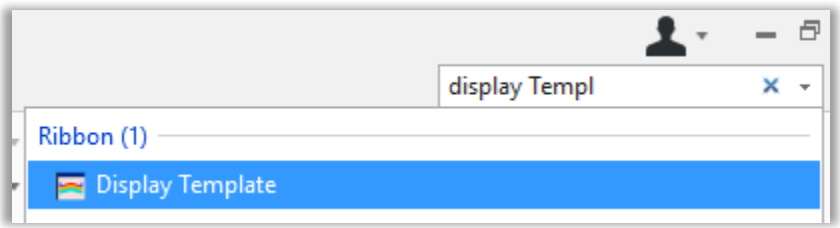


Figure 60

9. On the bottom left locate the **Model Selector** and change back to the ***Sheet Model***.

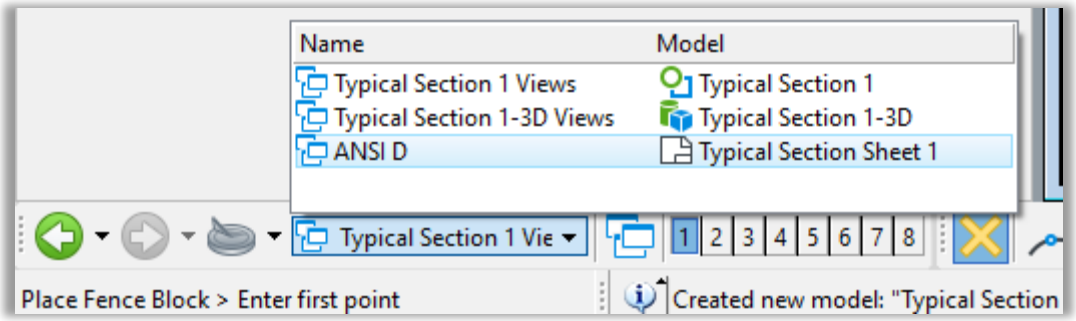


Figure 61

10. Make sure the Models Dialog Box is opened. To reference drag the ***Design Model*** from the Model Dialog Box into a ***View*** in the Sheet Model. In the Attach Source files Dialog Box select the Attachment Method: **Top**.

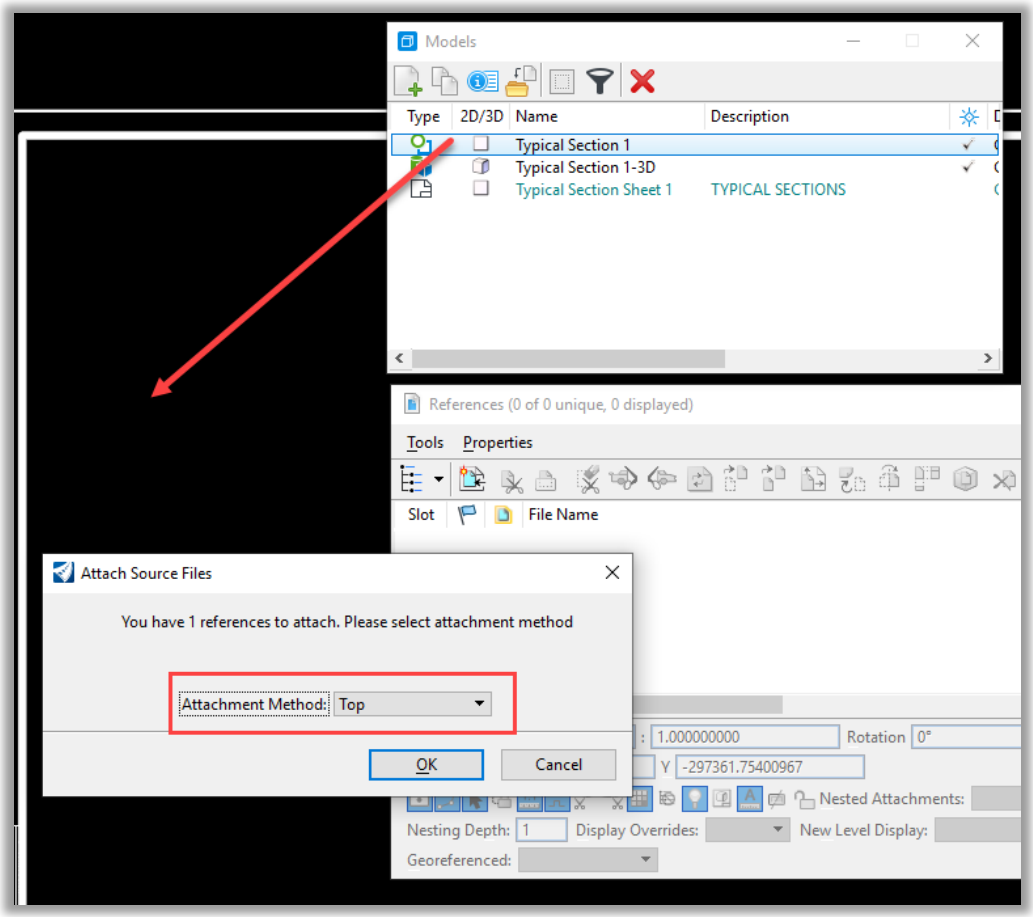


Figure 62

11. Follow the prompts for reference placement, it will come in very large (at full size).
12. In the **References** Dialog Box change the **Detail Scale** as needed and move the Reference File to the desired location on the sheet.

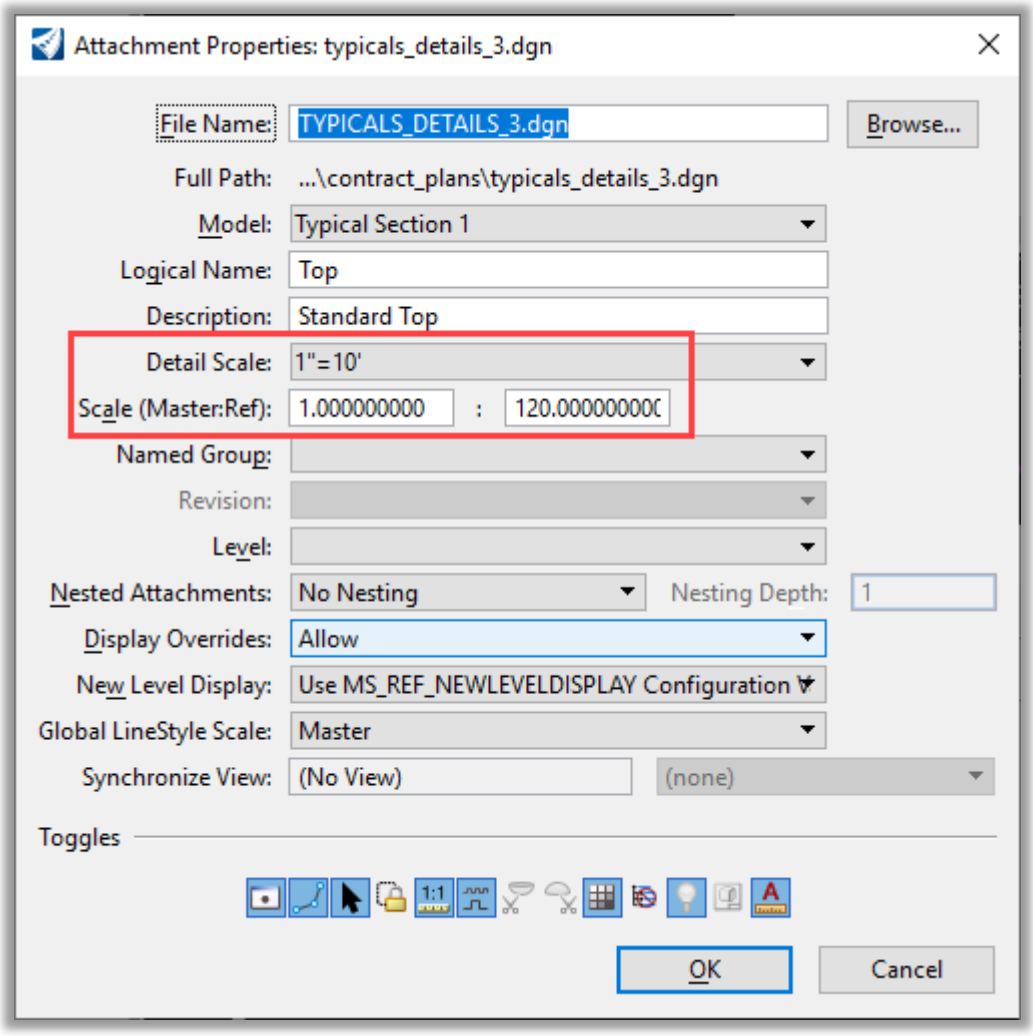


Figure 63

13. Dimension and Annotate as needed using the **CTDOT Annotation** and **Dimensioning** Tools.

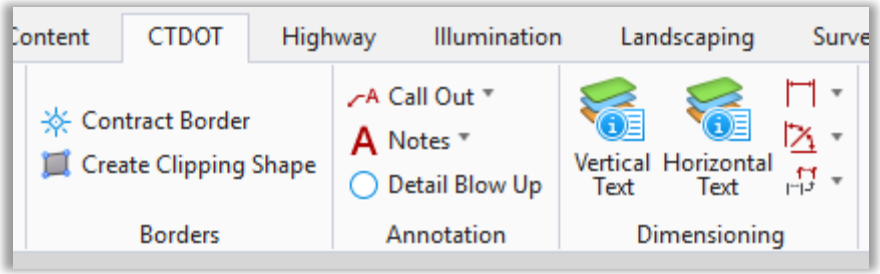
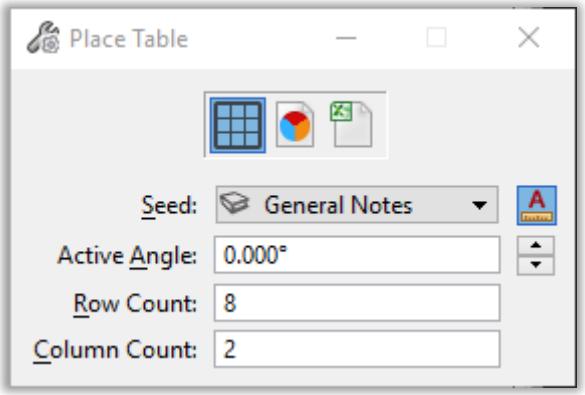


Figure 64

14. Add General Notes and a Legend. There is a table seed for the General Notes available in the Table Tool. In **Search** type **Place *Table***, on the Place Table Dialog Box select Seed: ***General Notes*** and proceed to place the table.



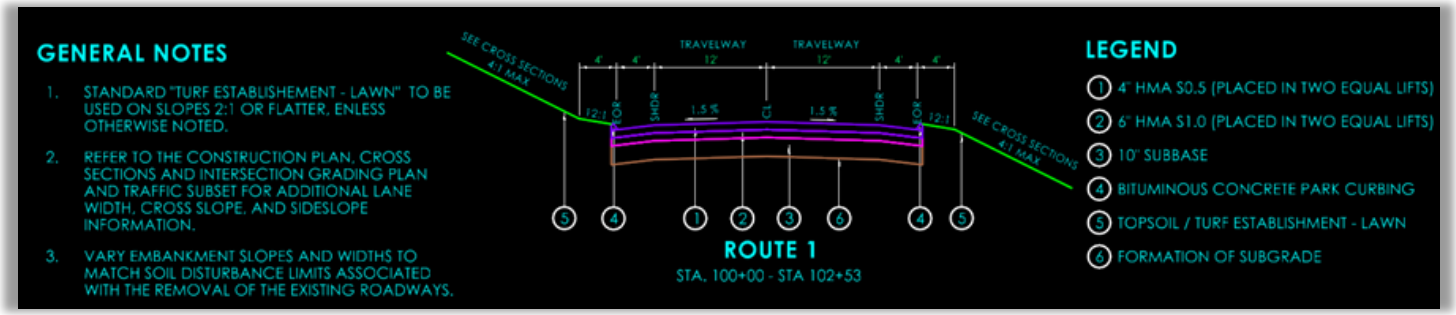


Figure 65

15. Create another Design Model and place the Line Work for another Detail.
16. Change back to the Sheet Model.
17. Drag the new Design Model into the Sheet Model using the Attachment Method: **Top**.
18. In the References Dialog Box edit the Detail Scale as needed (for demonstration purposes) change it to something other than what was used in step 12.
19. Move the Detail to the desired location on the sheet.
20. Dimension and Annotate as needed.

21. Notice the Text is the same size in both the Typical Section and Detail even though they are placed at two different detail scales.

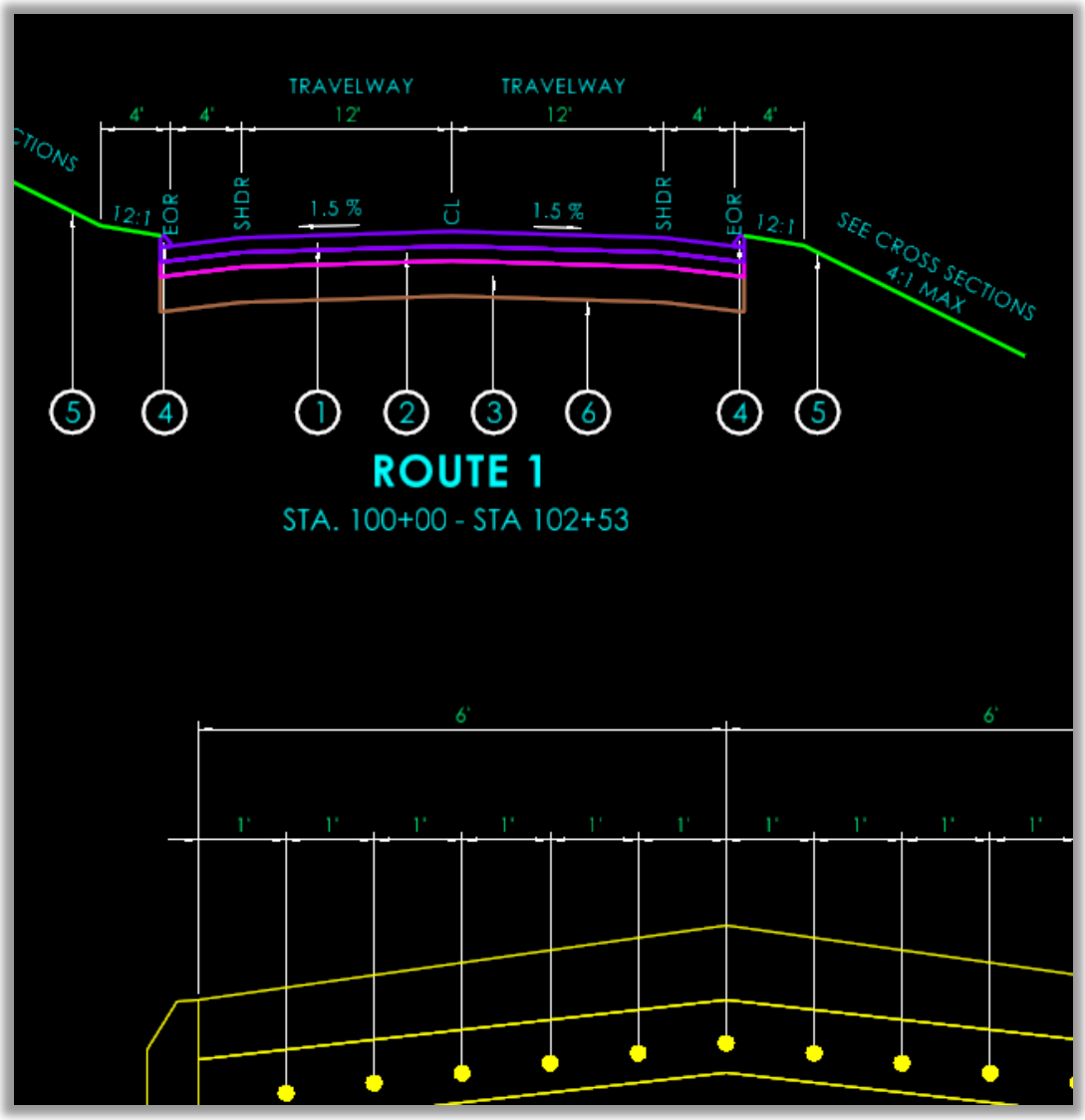


Figure 66

22. Use the Measure Distance tool to measure elements in each detail, notice that it will measure at paper size. In the Reference Dialog Box **Activate** on a Reference and measure, notice you now get the true size. When dimensioning a reference the results will also yield the true element size.

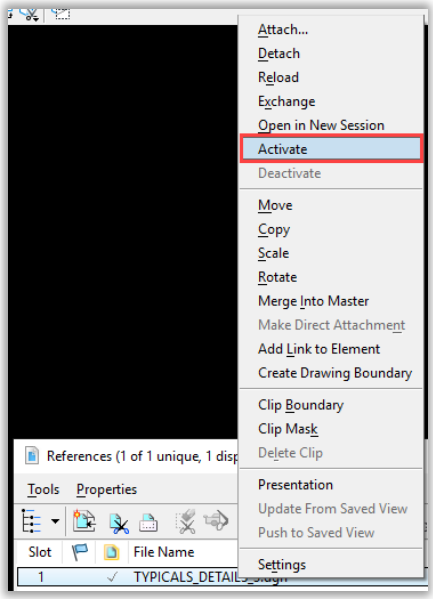


Figure 67

23. To return to editing the Sheet Deactivate the Reference.

4.4 Plan and Profile Sheets

4.4.1 Create Plan Sheet

1. Create a design model that will be used to create the plan and profile sheets for the project.Browse to the Contract_Plans folder to create a new 2D design file using the file naming convention as described in the Volume 16 Appendix 4 - File Naming

   example: HW_CP_5678_5678_PlanPro_SR_14.dgn

   using the correct seed file:

   ...CT_Configuration\|Organization\|Seed\|Road\|Seed2D - CT RoadDesign.dgn

   If the survey was done in an old Datum, use the 2D Seed Files in this folder ***...CT_Configuration\|Organization\|Seed\|GCS\|***

2. Reference in the needed base model files, they reside in the Highways/Base_Models folder within the project folder. The models will be referenced using No Nesting. This will include the Alignment Models, the Corridor Models, Drainage Models, the 2D Layout Models, and the Existing Terrain, ROW and Annotation Models.

4. Set up the display views to show Default view and profile view. Set the terrain to active and **Save Settings**. Turn off

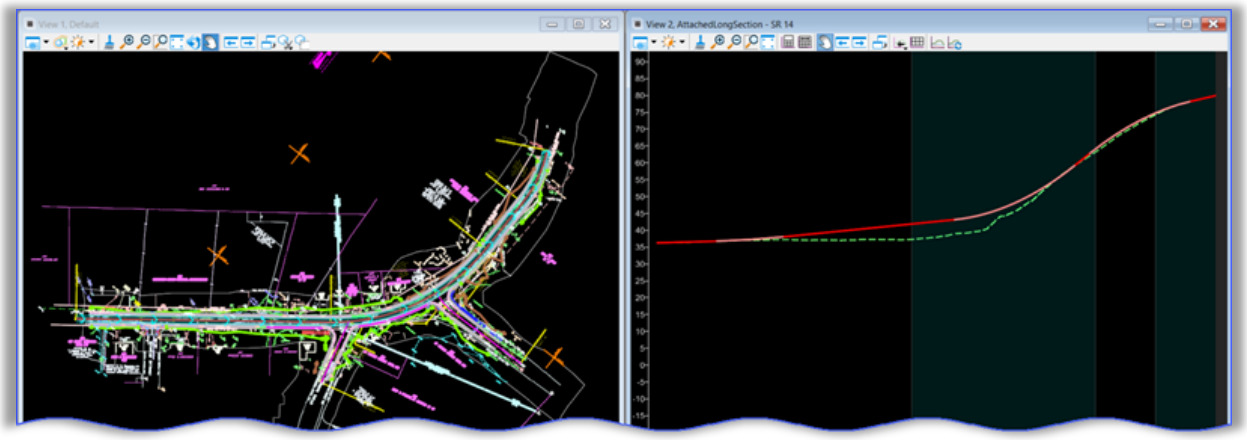


Figure 68

5. Select **Drawing Production > Named Boundaries > Named Boundary > Place Named Boundary**. A named boundary is a closed element that has a name associated with it. Previously you could create named fences from fences, clip volumes and clipped masks.

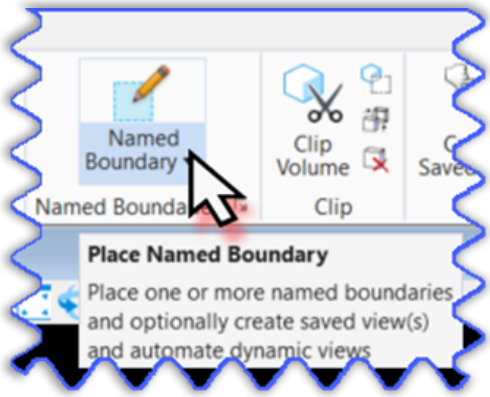


Figure 69

6. Select the **Civil Plan** mode. Set Drawing Seed to ***40 Scale Contract Plan Sheet***. Set the Detail Scale to 1"=40'. The Set Name will be set to Plan 1.

   TIP: Including the number 1 at the end of the name keeps the names of the named boundaries and sheets more uniform because the number is included in the first name. Otherwise, the incremented numbering begins with the second name, example: Plan, Plan 1, Plan 2.

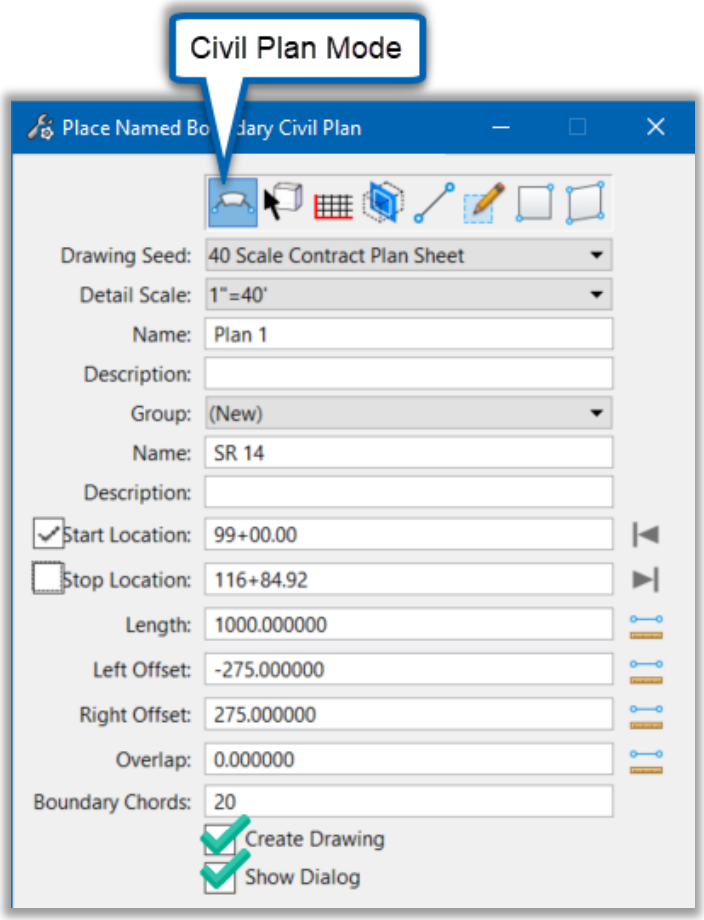


Figure 70

7. Set the ***Group to (New)***. Set the Group Name to match alignment name, usually the Route Number or Street name (This is the lower name field which defines the name of the named boundary group.) Example: SR 14 (for State Route 14). Length (length of alignment on one sheet), Left Offset and Right Offset (offset from the alignment), Overlap should be set to 0 (a sheet overlaps the other), and Boundary Chords have preset values.
8. Enable the ***Create Drawing*** option so that the sheets are created as soon as the named boundaries are created. Enable the ***Show Dialog*** option. This dialog is used to override settings defined by the Drawing Seed if needed.
9. In the 2D view (default plan view), select the alignment along which the plan named boundaries will be created. The command line (lower left corner) will read: ***Place Named Boundary Civil Plan > Identify Path Element***. With the cursor select the alignment.
10. 1Select the desired Start Location. Follow the prompts.C ommand Line: ***Place Named Boundary Civil Plan > Accept/Reject. Identify Path start point to place boundary***. Follow the prompts.

    ***TIP*:** Add extra to the left of the start of your Stationing, example: Beginning Station is 100+00, at Start Location type in 99+00, this will move the named boundary to the left of the start of alignment. Bring your cursor back into the dialog box, enter the Start Station, click the Tab button, back in the view left click to Accept.
11. Next select the ***Stop Location***. Command Line: ***Place Named Boundary Civil Plan > Identify Path end point to place boundary***. The named boundaries are displayed interactively as the cursor moves. Accept the endpoint location for the named boundary. Command Line: ***Place Named Boundary Civil Plan > Accept/Reject. Datapoint point in Plan View to place boundary. Identify Path end point to place boundary.***

12. The **Create Drawing** dialog box will appear. Ensure the ***Mode:*** is set to Plan, Name: should be populated with the Plan 1 from Place Named Boundary Civil Plan tool. In the Drawing Model portion of the dialog set the annotation scale to ***1" = 40'***. In Sheet Model portion of the dialog, set the Detail Scale to ***1" = 40'***.
13. Enable the ***Add to Sheet Index*** option. This option will be discussed later in this module. Enable the ***Open Model*** option.
14. Click **OK** to create the sheets. Follow the prompts in the lower left corner left click to define the named boundaries. Multiple left clicks may be required.

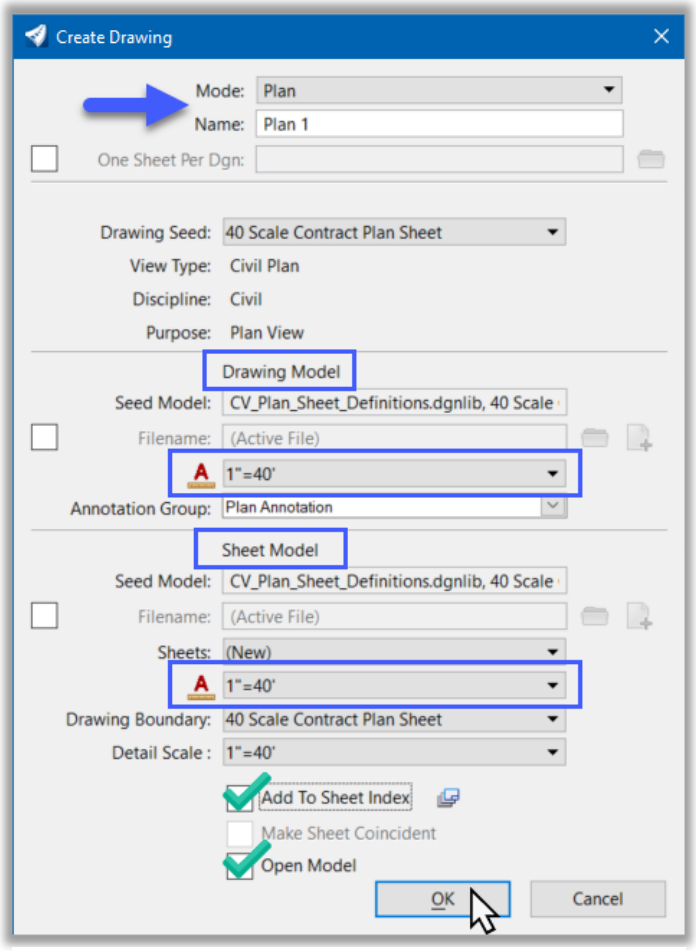


Figure 71

15. In the view group dialog, you can now see the newly created drawing models and sheet models.

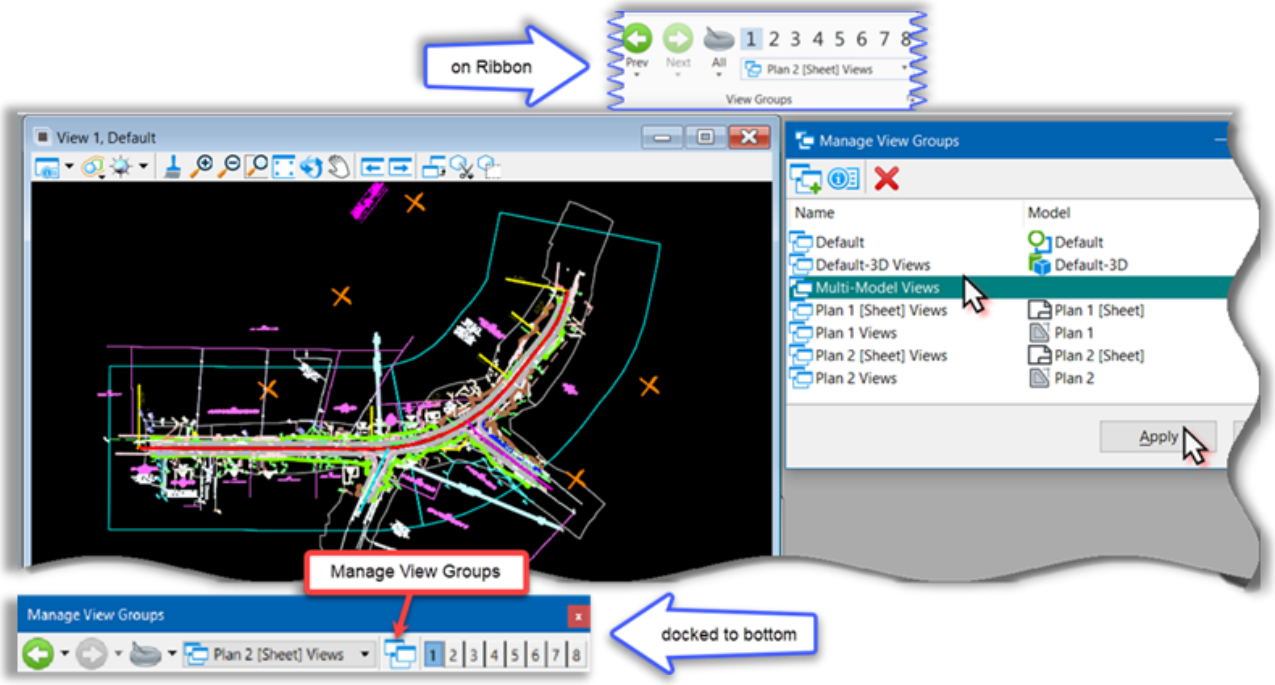


Figure 72

4.4.2 Create Profile Sheet

1. Open the Plan and Profile Design Model and display the profile view. If not already open.

   ***TIP*:** If you saved settings after setting up your views (step 2 from create plan sheet section) change the active view group to Multi-Model Views.

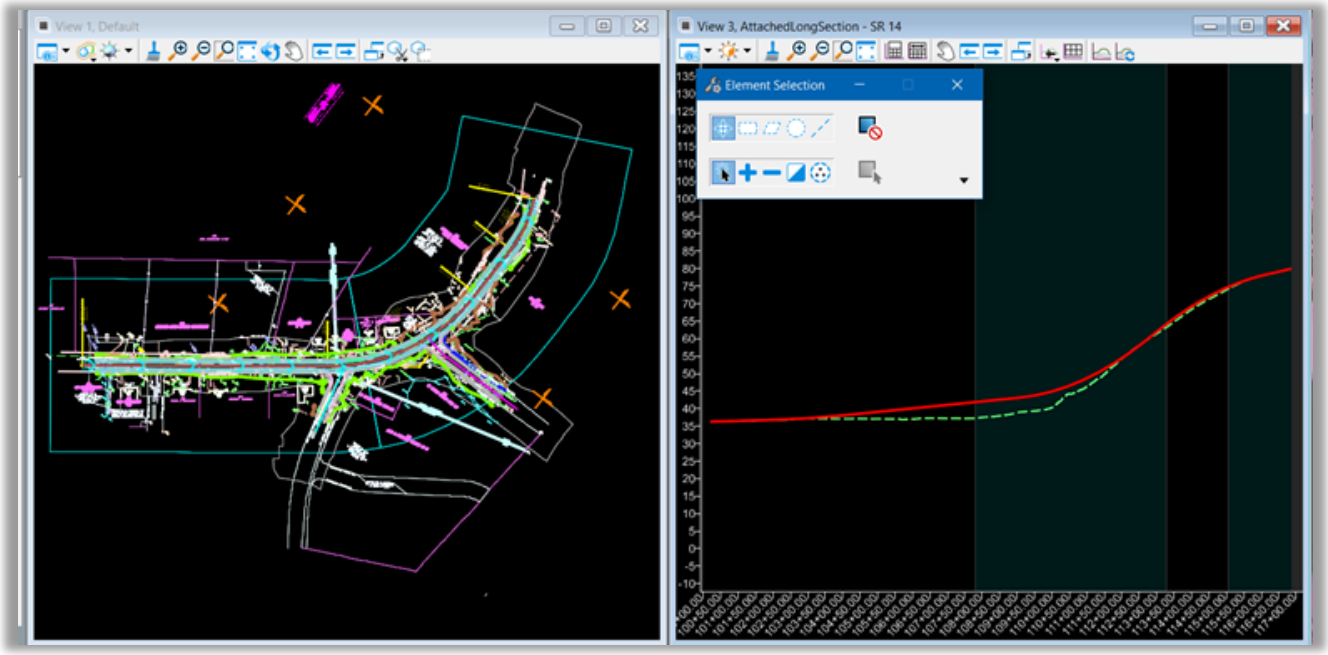


Figure 73

2. Select ***Drawing Production > Named Boundaries > Named Boundary > Place Named Boundary***.
3. Select the **Civil Profile** mode. Set the dialog fields as follows:
   - Drawing Seed > 40 Scale Contract Profile Sheet
   - Detail Scale > 1"=40'
   - Name > Profile 1 (This is the top name field which defines the name of the named boundary)
   - Method > From Plan Group
4. The ***From Plan Group method*** matches the profile named boundaries to the plan named boundaries. The *Station Limits method* is used to defined profile named boundaries that are not matched to plan boundaries such as for profile only sheets, example: profile sheet for a local road.
   - ***Plan Group*** > Choose the desired Plan Group if there are multiples in this file. This is the name of the plan group that contains the plan named boundaries that will also define the profile named boundary locations, example: as named Plan sheets: SR 14 or State Route 14.
   - ***Group*** > (New)
   - ***Name*** > Route Number or Street name, example: SR 14 or State Route 14.

- This is the lower name field which defines the name of the named boundary group for profiles. This is the same group name we used for the plan portion, but they are two different groups, one associated with Plan, the other associated with Profile. More on this later in this module.
- Vertical Exaggeration > 10
- Available Profile Height, Top Clearance (toggled on), Bottom Clearance (toggled on), Elevation Datum Spacing, Station Datum Spacing and Profile Shifts are set by the drawing seed.
- Make sure all are toggled on.
- Use Terrains
- Use Active Vertical
- Create Drawing
- Show Dialog Box

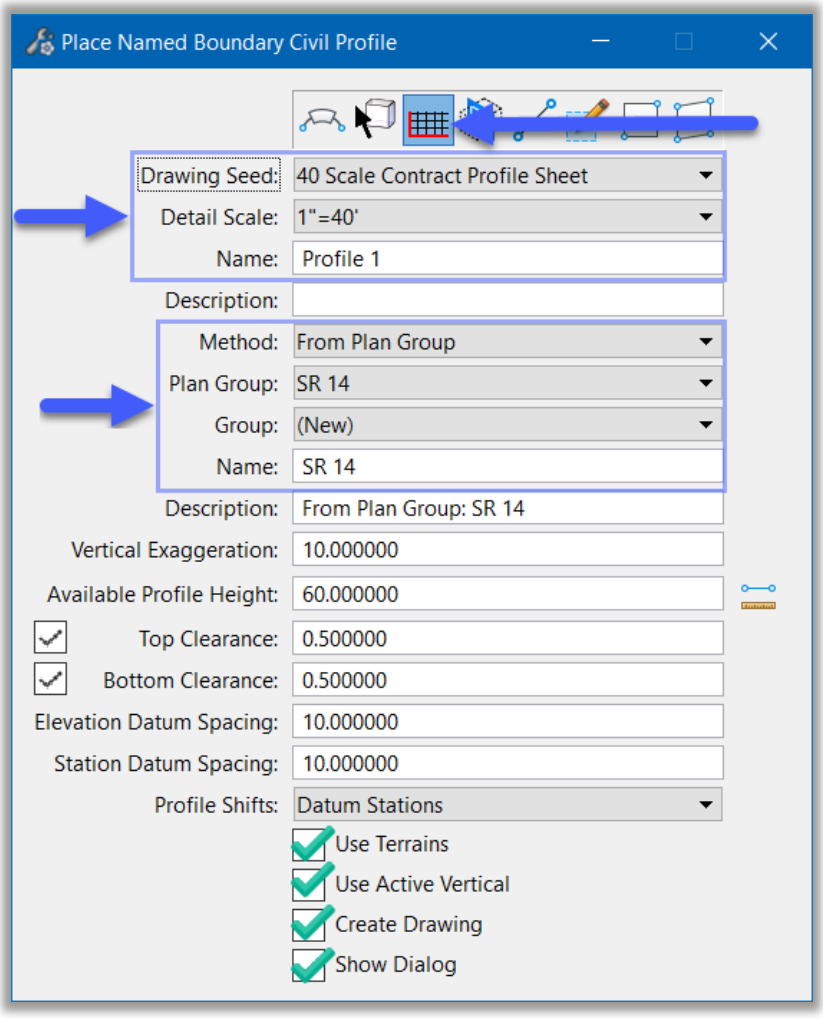


Figure 74

5. Follow the prompts in the lower left corner left, Command Line: ***Place Named Boundary Civil Profile > Identify Profile View*** click in the Profile View to define the named boundaries. More than one click is required.
6. The **Create Drawing** dialog box will appear. Change the Mode to ***Profile*** and the Name to ***Profile 1*** (or short Pro 1). Everything else is preset for you.
7. Toggle on: ***Add To Sheet Index*** and **Open Model**.
8. Click **OK** to create the sheets. Follow the prompts in the lower left corner left click to define the named boundaries. Multiple left clicks may be required.

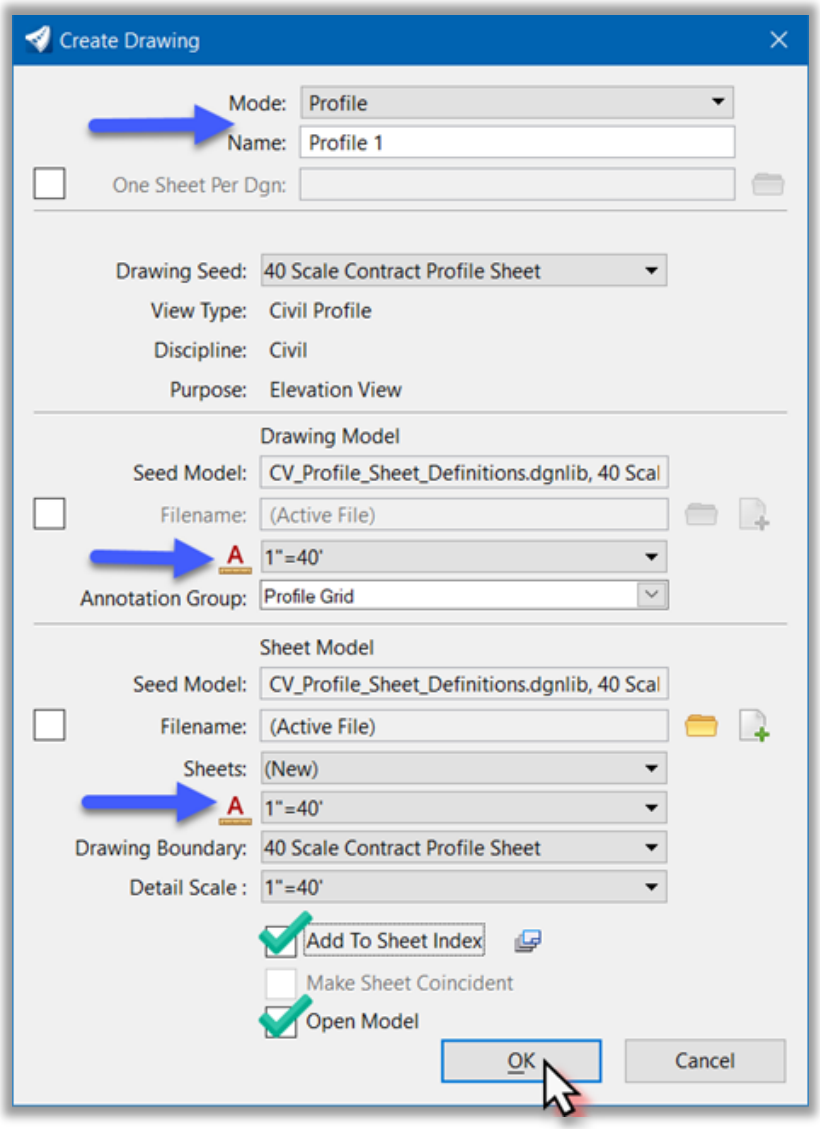


Figure 75

4.4.3 Review Plan and Profile Sheets

There are several ways to review individual sheets. Click on the ***View Tab > Within the View Groups tools set*** you can select any of the sheets. The same tool is also available in the ***Manage View Groups toolbox*** if docked on the bottom (it usually is).

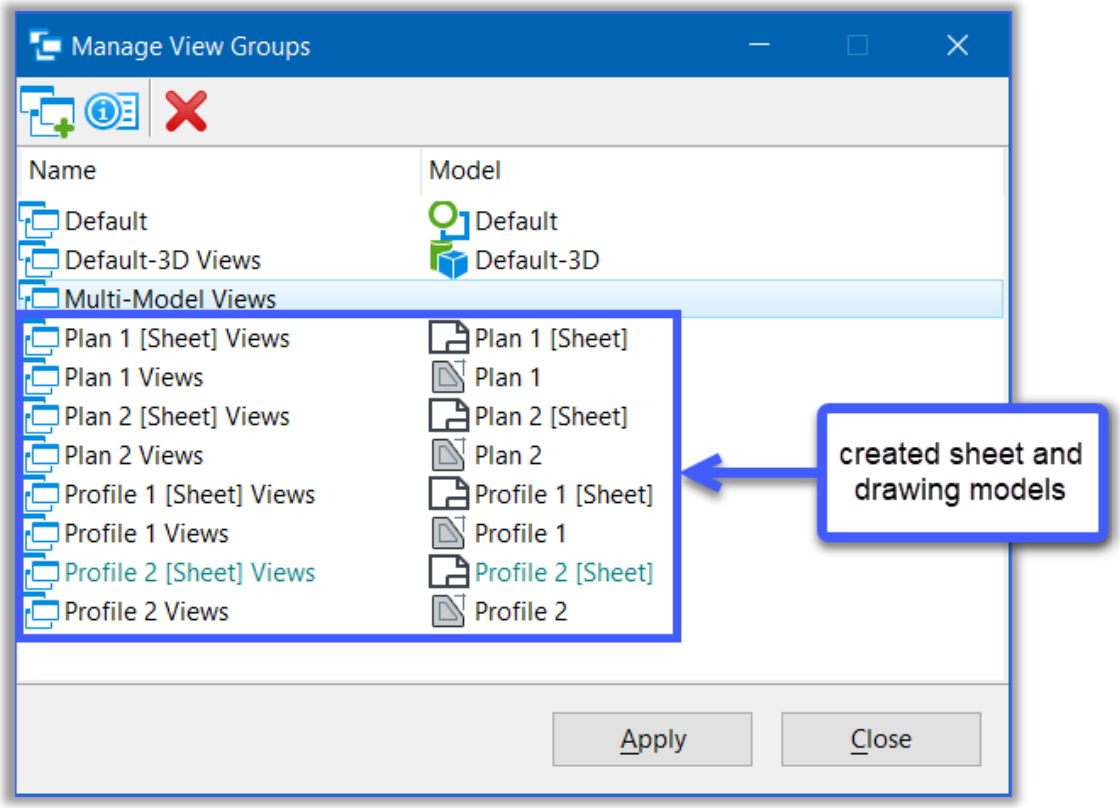


Figure 76

1. Select the ***View Group tool*** to view the sheets. Each sheet has a Drawing Model and a Sheet Model.

   The **Drawing Model** is always 2D, is a subset of a 2D or 3D design model and is a direct reference of the named boundary area, it is geospatially correct. The Drawing Model is used to apply annotations, dimensions and callouts to a design, examples: call outs for items such as slope limits and catch basins or dimensions for guiderail offsets. The Drawing Model is then referenced into the Sheet Model.

   The **Sheet Model** is always 2D, serves as an electronic drawing sheet (printed sheet), typically has drawing and design model references that are scaled and positioned to create a printable drawing.

   Open and review the Sheet Model for Plan 1 by selecting Plan 1 [Sheet] Views and then select ***Apply***.

   ***TIP*:** You can also double-click on any model in the list to open it as well.

2. The Sheet Model for Plan 1 will open. Notice the border cell is placed at 0,0 axis, the named boundary shape and all design models are referenced. The project number, description and town name(s) will be automatically populated from the Project, the Drawing Title will be populated with the text entered in the Model Description Field.

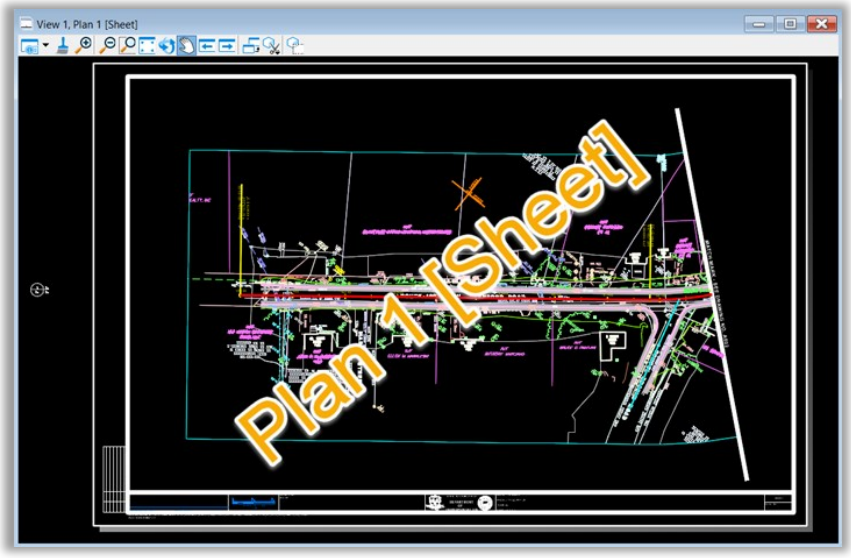


Figure 77

3. ***Open and review*** the Drawing Model for Plan 1 by selecting Plan 1 Views from the list and then selecting ***Apply***.

   The Drawing Model for Plan 1 will open. Notice the Named Boundary shape is referenced, the Match Mark line and call out has been added to the Drawing Model as well and the model is geospatially correct. Plan view annotation should be done in the drawing model.

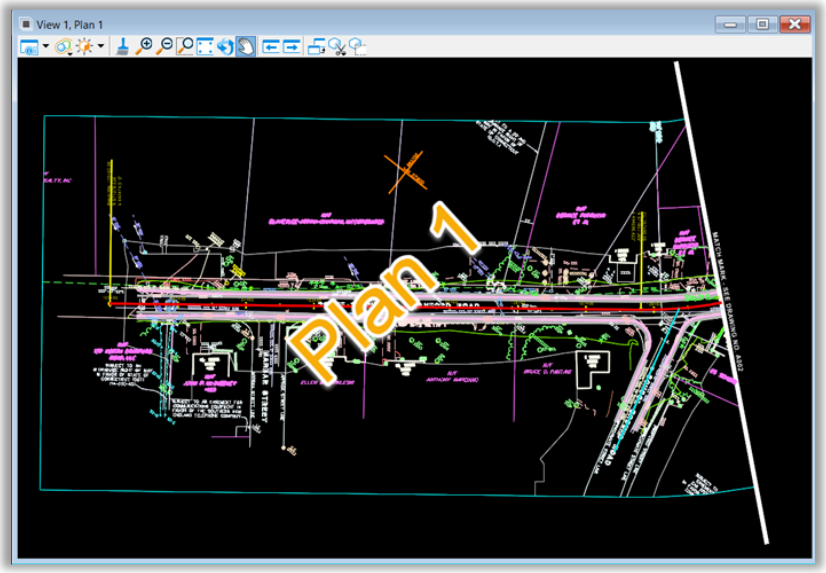


Figure 78

4. Review the remaining Sheet Models by using the same steps described above. Become familiar how to navigate between the various drawing and sheet models.

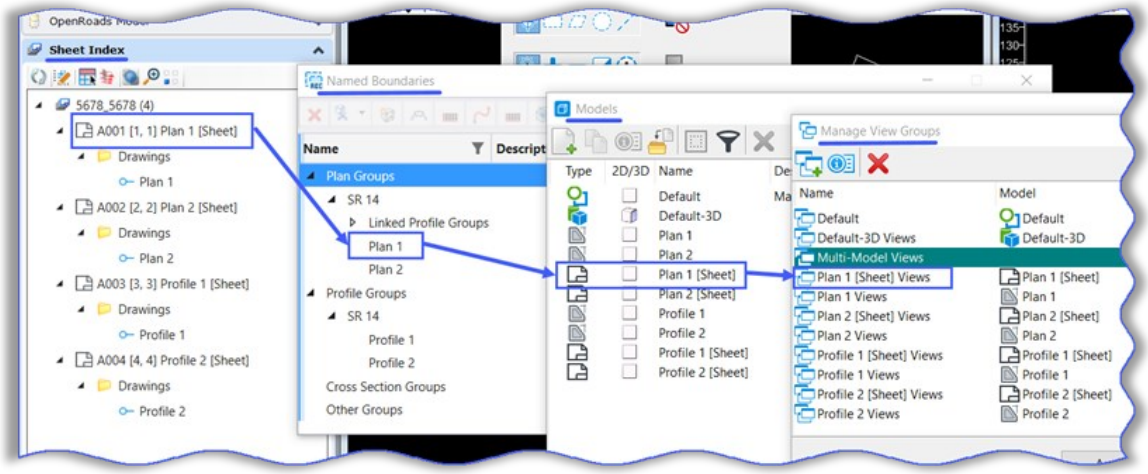


Figure 79

4.4.4 Review Named Boundaries

1. Select the Multi-Model view again.
2. Open the ***Drawing Production > Named Boundaries > Named Boundaries*** dialog.

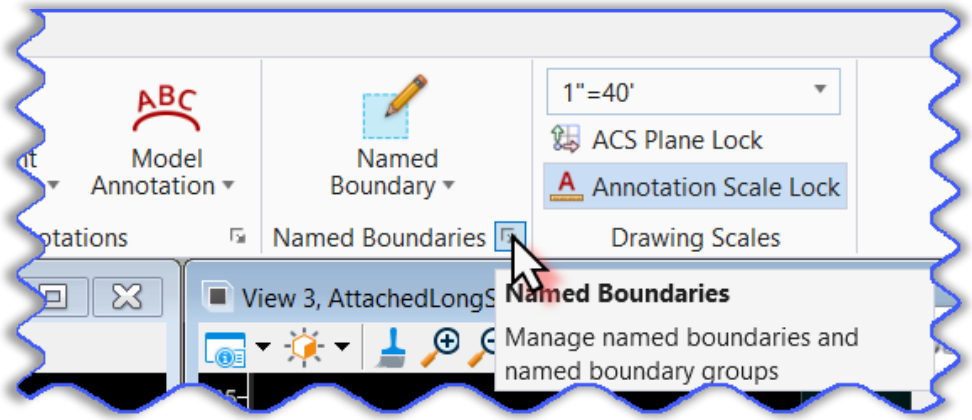


Figure 80

3. In the Named Boundaries box, expand ***Plan Groups***.There is a plan group for the Plan Sheets named during creation, example: SR 14. The name of the group and the individual named boundaries come from the values defined on the Place Named Boundary dialog. Expanding the ***Linked Profile Groups***, shows a linkage to the profile group: example SR 14, that is also named as the plan group.
4. By clicking on the individual plan, the named boundary is highlighted in view 1.
5. Expand ***Profile Groups***.There is a profile group to see the individual profile named boundaries for the Profile Sheets named during creation, example: SR 14.

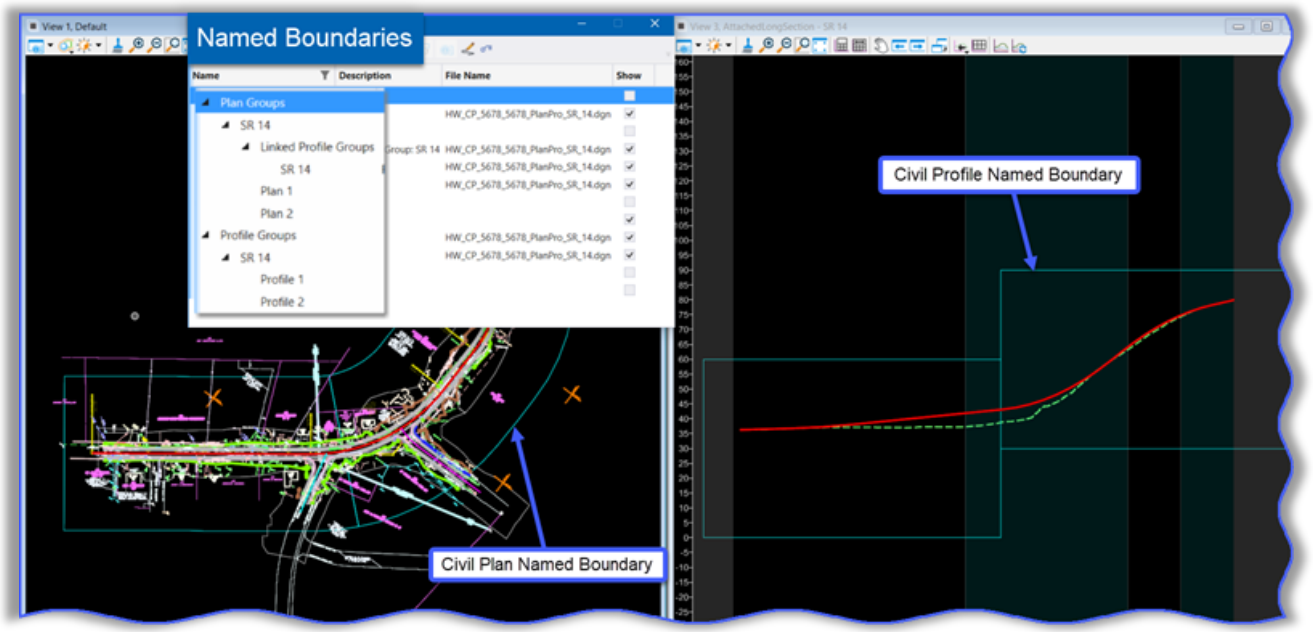

Named Boundaries
Name
Description
File Name
Show
Plan Groups
SR 14
Linked Profile Groups
SR 14
Plan 1
Plan 2
Profile Groups
SR 14
Profile 1
Profile 2
Civil Plan Named Boundary
Civil Profile Named Boundary

Figure 81

4.4.5 Adjust Sheet Layout

1. Final adjustments to sheet layouts can be made in the reference attachments.
2. Use the ***View Group*** tool to select a Plan [Sheet] Views model, example: Plan 2 [Sheet] Views.

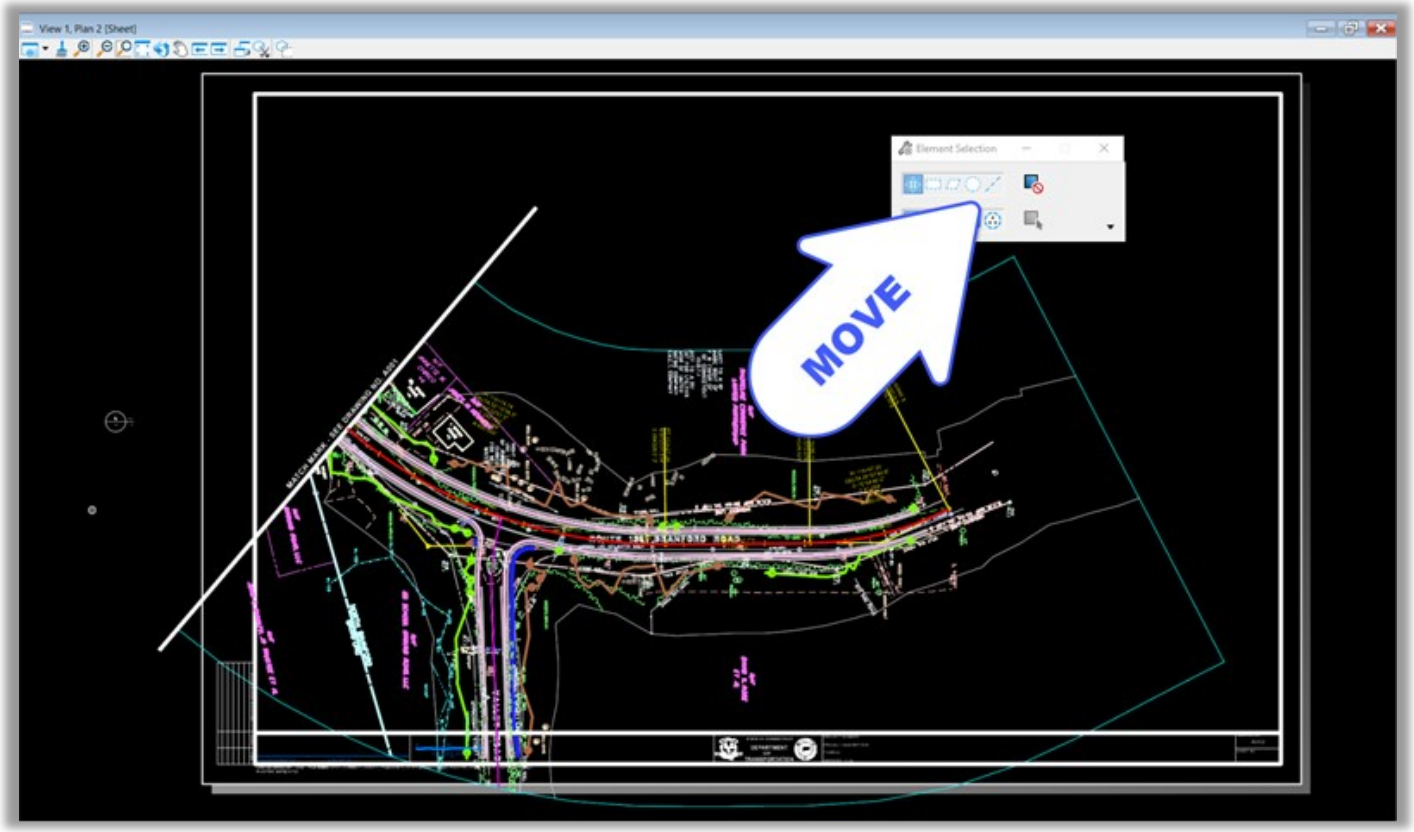


Figure 82

3. Select ***Home > Primary > Attach Tools > References***.In the References dialog, select the first attachment, this is the Plan Drawing Model, example: (Logical) Plan 2-1, HW_CP_5678_5678_PlanPro_SR_14.

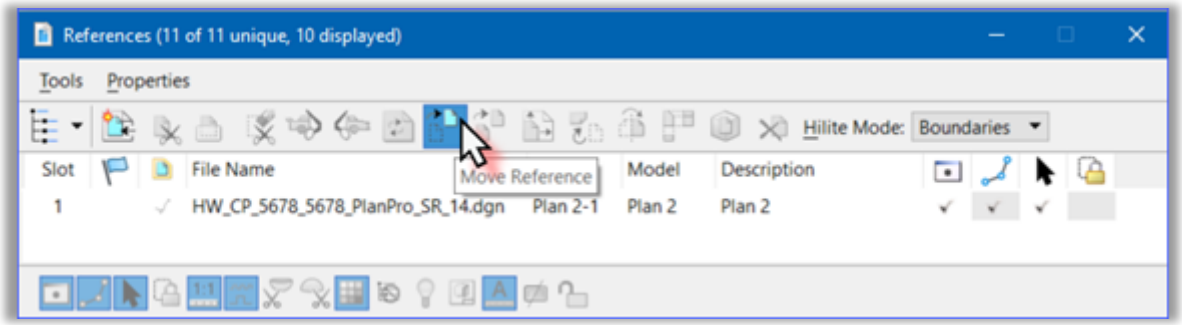


Figure 83

4. Click on the '***Move Reference***' command to activate, then click on the Named Boundary, this will activate the named boundary with all references (should be highlighted) and are "attached" to the cursor, move all for a better fit within the sheet outline.

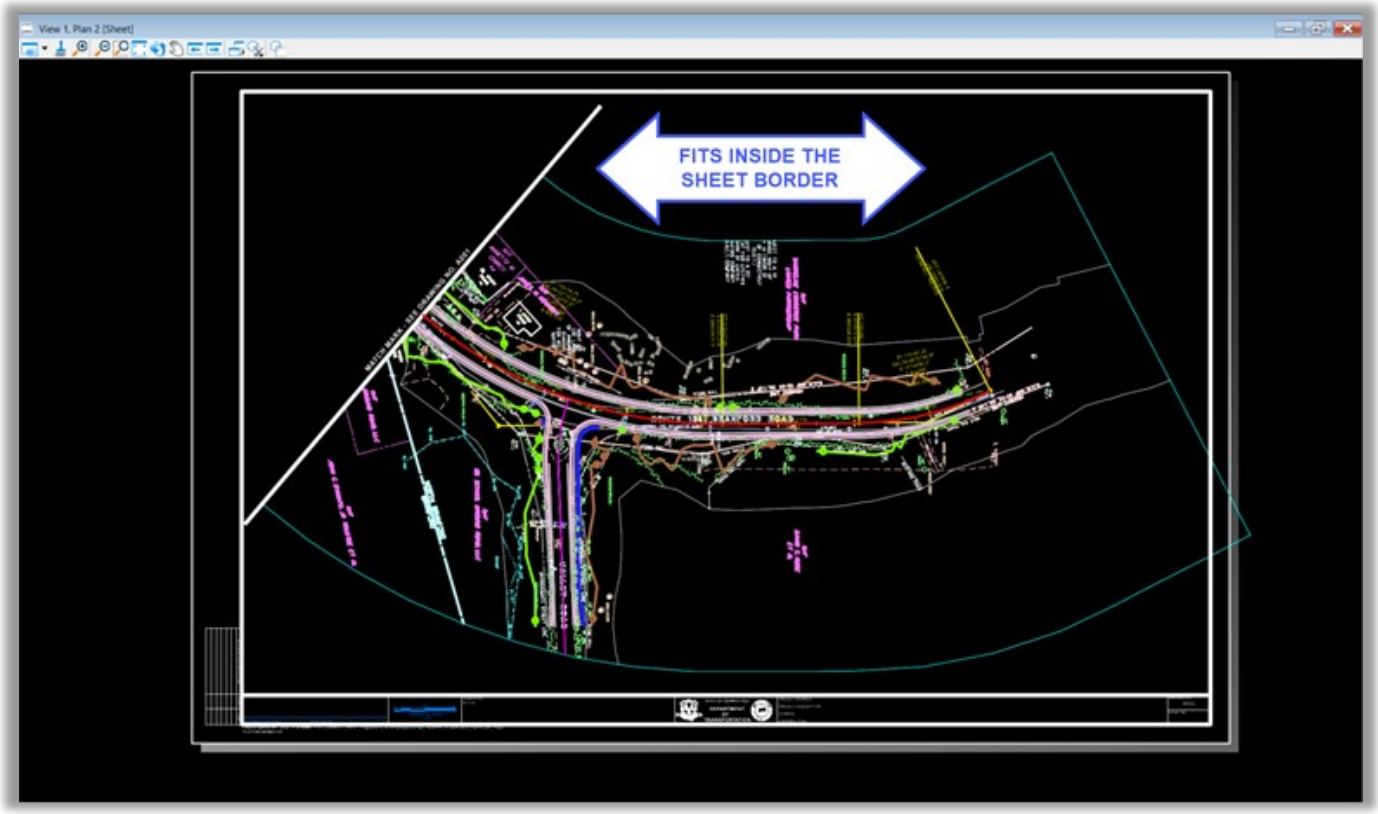


Figure 84

5. ***Left click*** to accept the new reference location.

   Remember, sheets are references of the respective plan, profile, or cross section space. Any elements that are visible in the source drawing will automatically appear on the sheets.

4.4.6 Adjusting Profile Named Boundaries

If necessary, the vertical position of a profile named boundary can be adjusted.Open the Multi-Model Views.

1. Select ***Drawing Production > Named Boundaries > Named Boundary > Adjust Profile Named Boundary.***

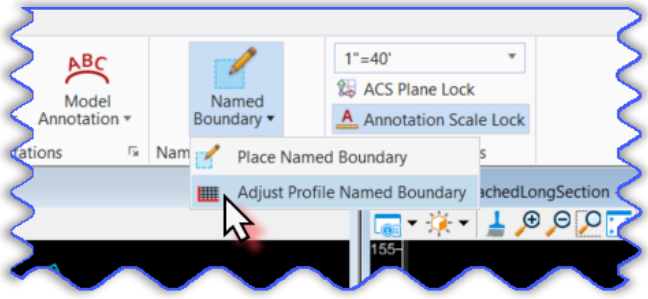


Figure 85

2. Left click in the ***profile view*** (example: View 2).
3. Left click on one of the ***profile named boundaries***. The name boundary moves vertically with the cursor allowing you to adjust the exact position of the boundary. Notice that the boundary moves in increments defined by the Elevation; Datum Spacing, in this example 10'. The Elevation Datum Spacing was one of the parameters that could be set when the named boundaries were created.

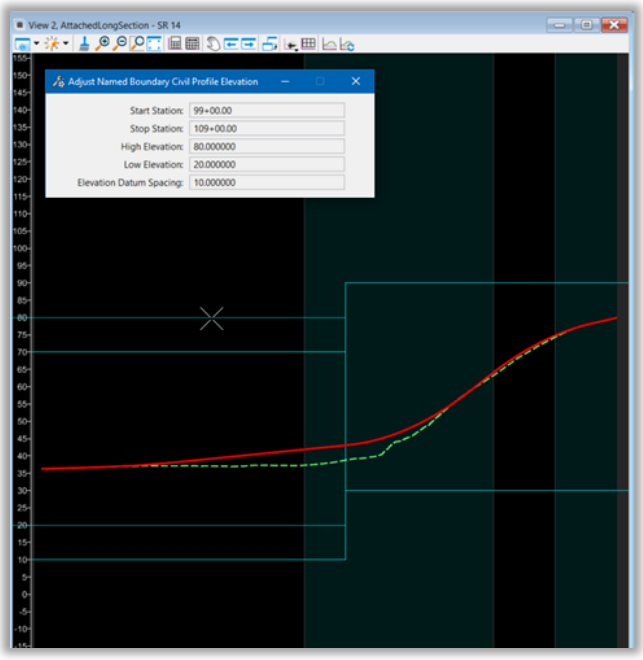


Figure 86

4.4.7 Deleting Sheets

Sometimes it is necessary to delete sheets. There are multiple parts to a sheet.

- The named boundary that defines the boundaries of what is shown in the plan or profile.
- The Drawing Models for annotation and dimensioning.
- The Sheet Models with the electronic drawing sheets.

To completely delete the sheet these all need to be deleted.

***TIP*:** When it becomes necessary to delete sheets depending on the number of sheets for your project, it may be easier to create a new design model and start over and only delete from the sheet index. This is because usually the plan named boundary is linked to the profile named boundary and profiles will need to be deleted also.

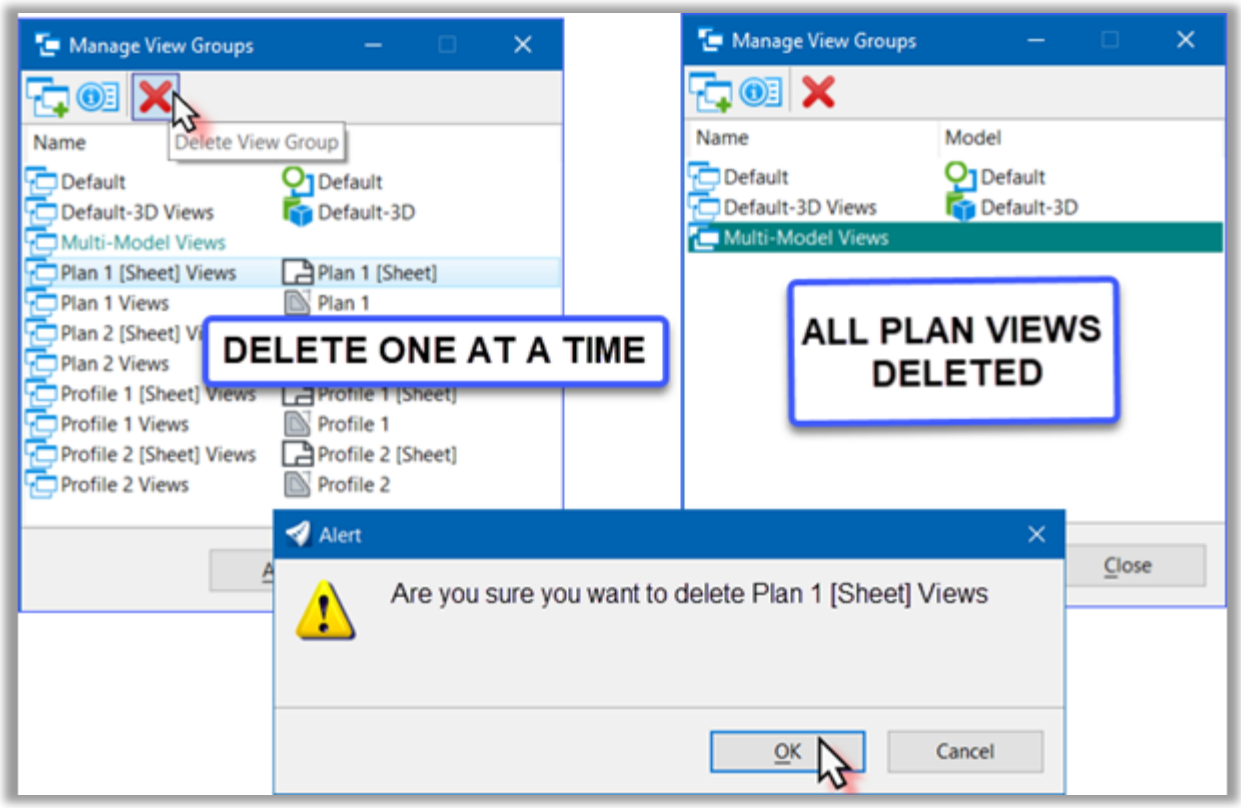


Figure 87

1. Select ***Home > Primary > Models***. Select all of the Drawing and Sheet models for the plan and profile views; example Plan 1 and 2 [Sheet] views and Plan 1 and 2, Profile 1 and 2 [Sheet] views and Profile 1 and 2. Click ***Delete Model(s)***. NOTICE: The sheet models are also deleted from the sheet index if necessary. Close the Models dialog.

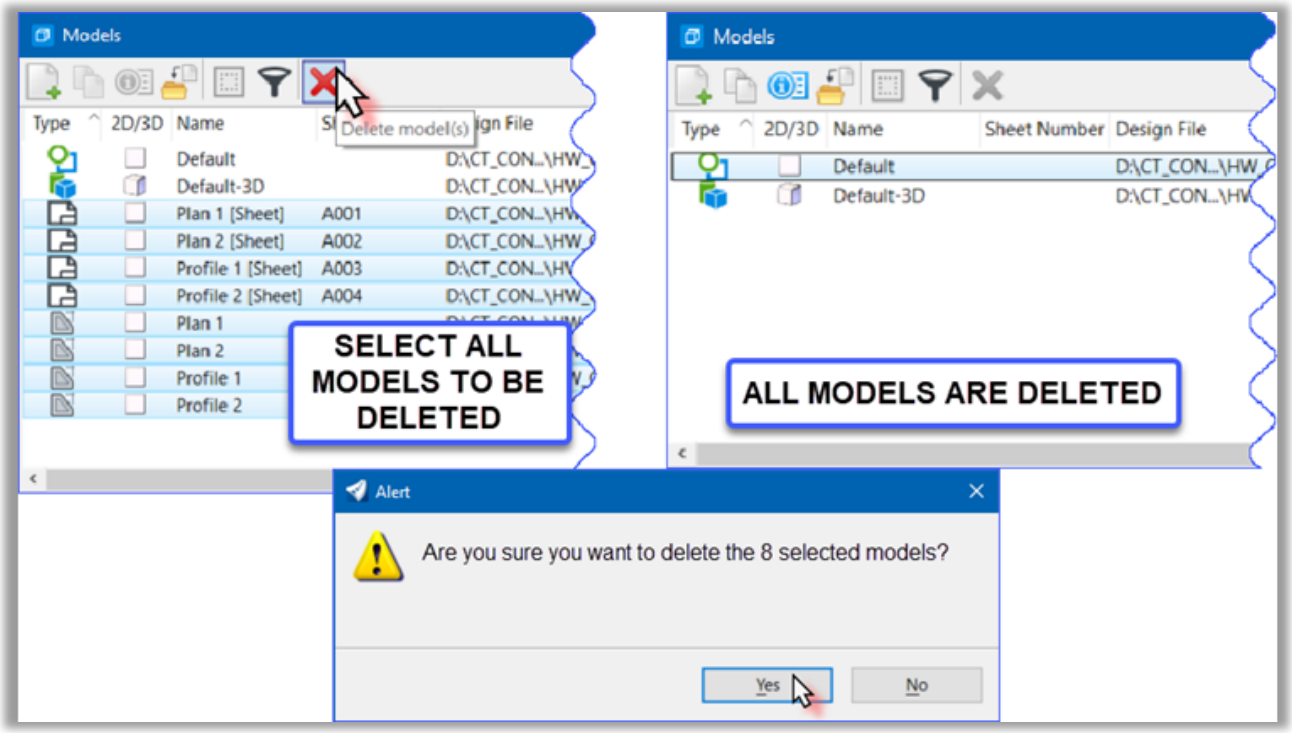


Figure 88

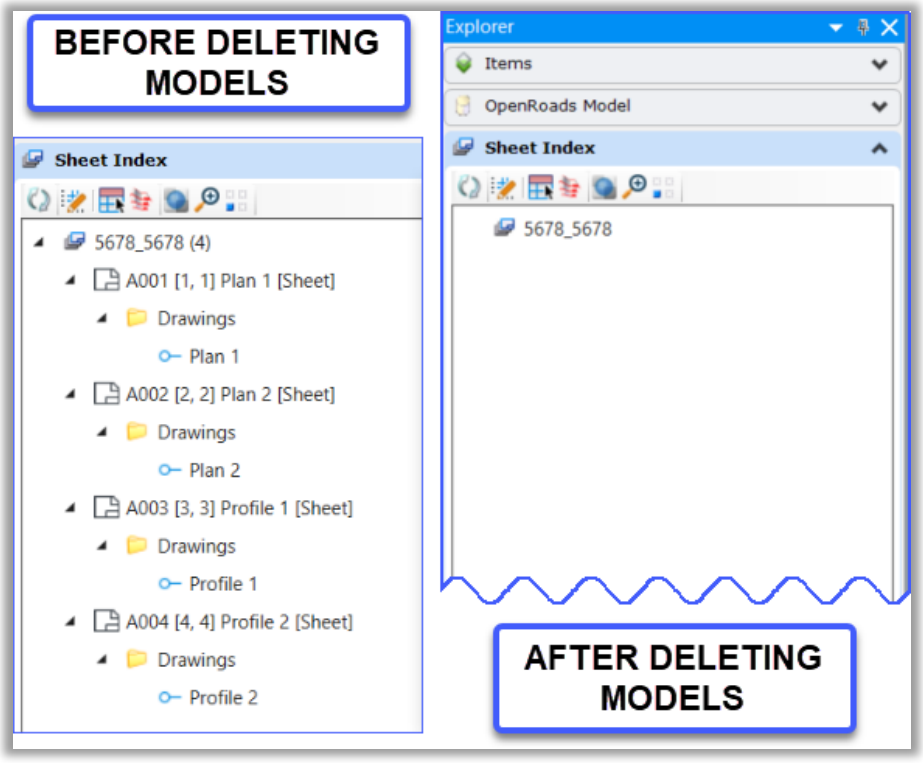


Figure 89

2. ***Delete*** the Named Boundaries for the Plan Sheets and Profile Sheets. Open the ***Drawing Production > Named Boundaries Named Boundaries*** dialog.

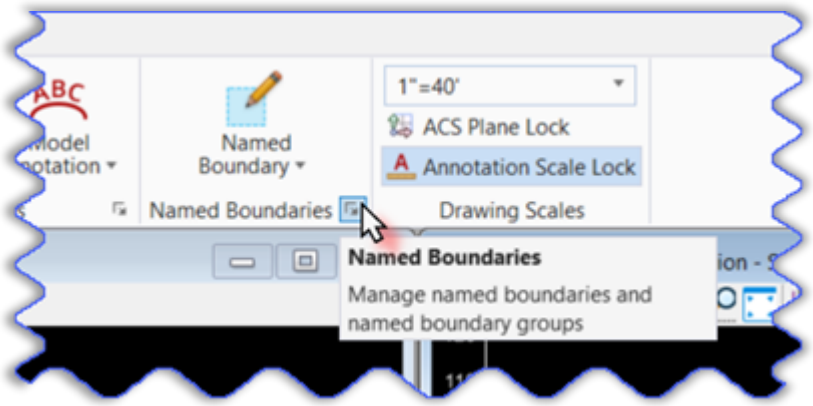


Figure 90

3. Expand the ***Plan and Profile Groups*** sections.Select the Plan Group, example SR 14.

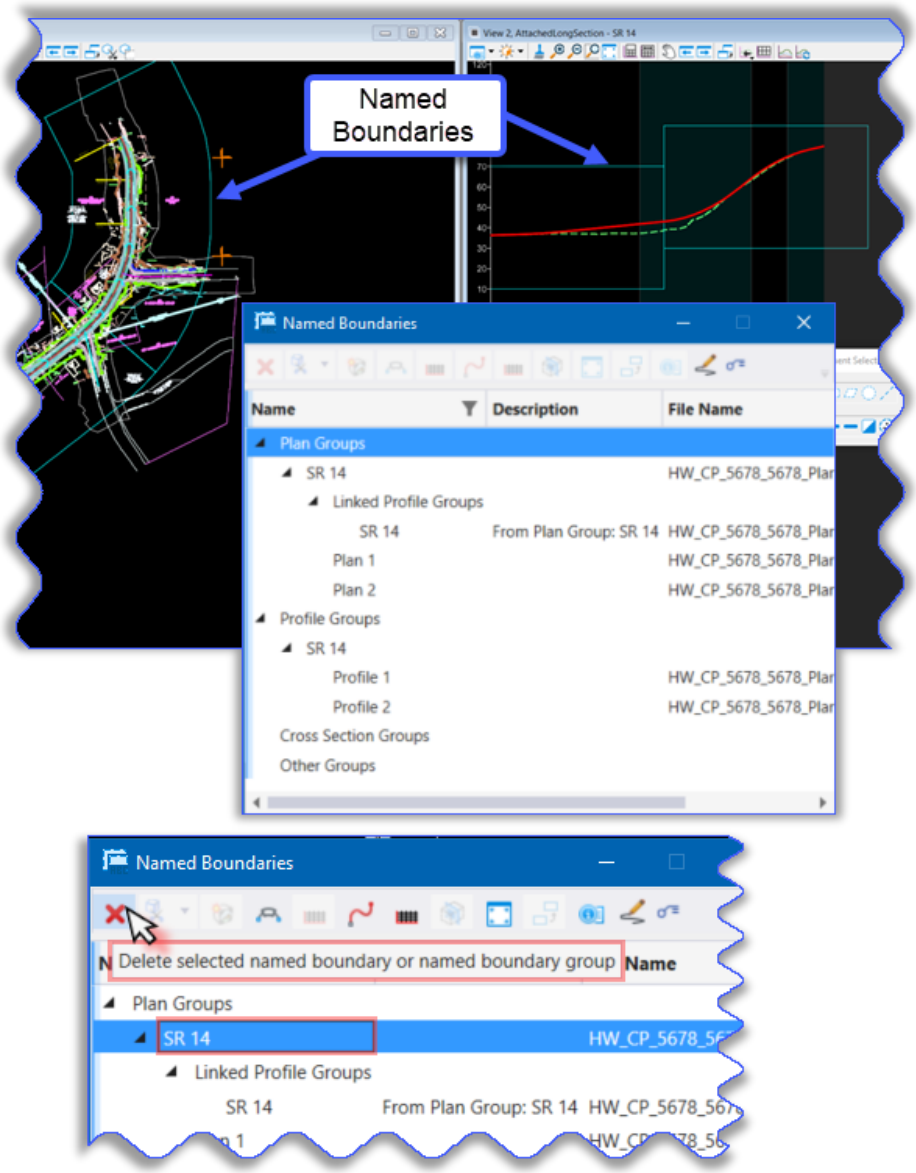


Figure 91

4. An ***Alert appears*** confirming the Named Boundaries and their associated saved views will be deleted.Click on Yes.Every boundary is deleted.

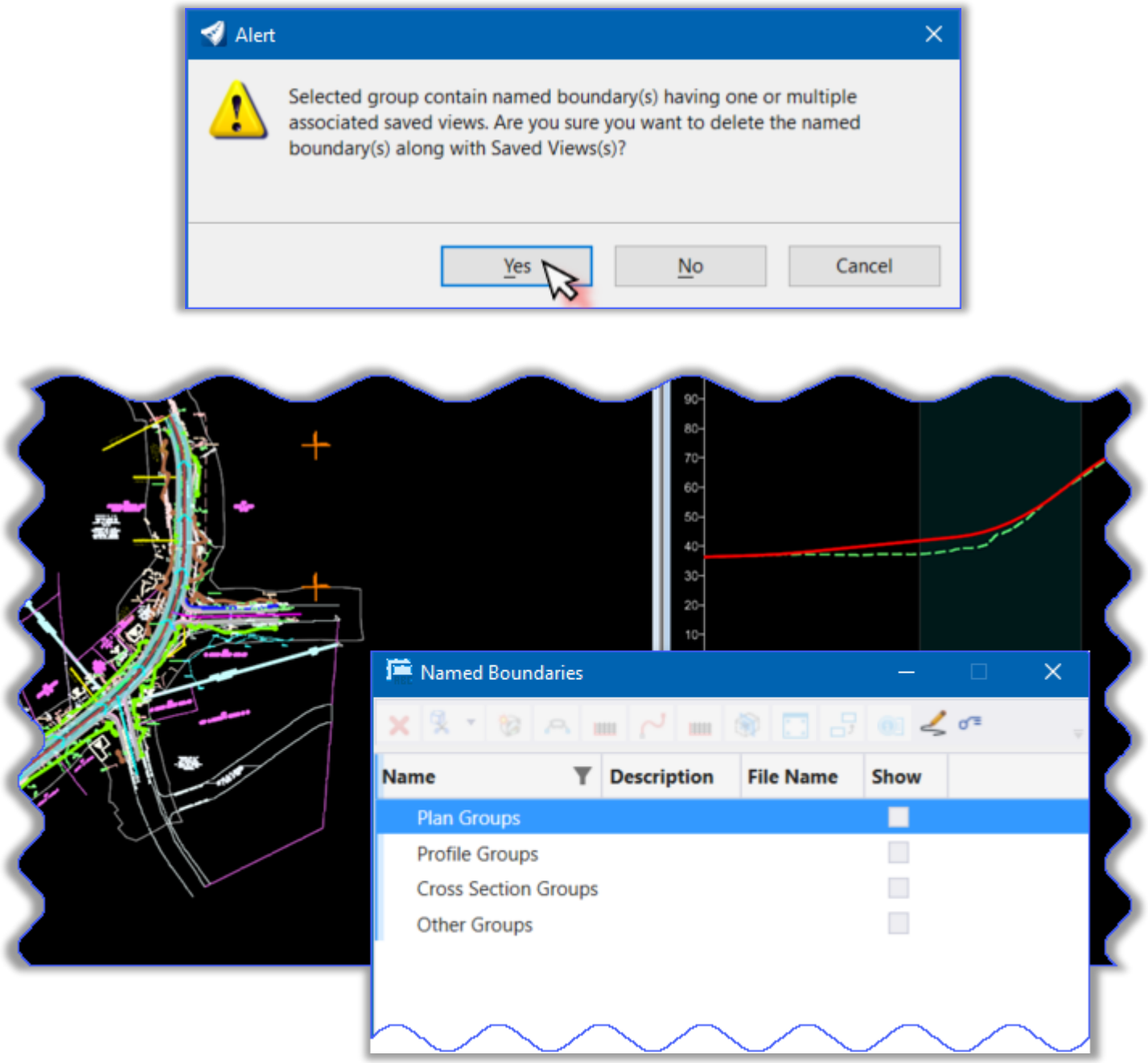

Alert
Selected group contain named boundary(s) having one or multiple associated saved views. Are you sure you want to delete the named boundary(s) along with Saved Views(s)?
Yes
No
Cancel
Named Boundaries
Name
Description
File Name
Show
Plan Groups
Profile Groups
Cross Section Groups
Other Groups

Figure 92

4.5 Create Blown Up Detail

This video demonstrates how to place a 20 Scale Detail on an existing 40 Scale Sheet.

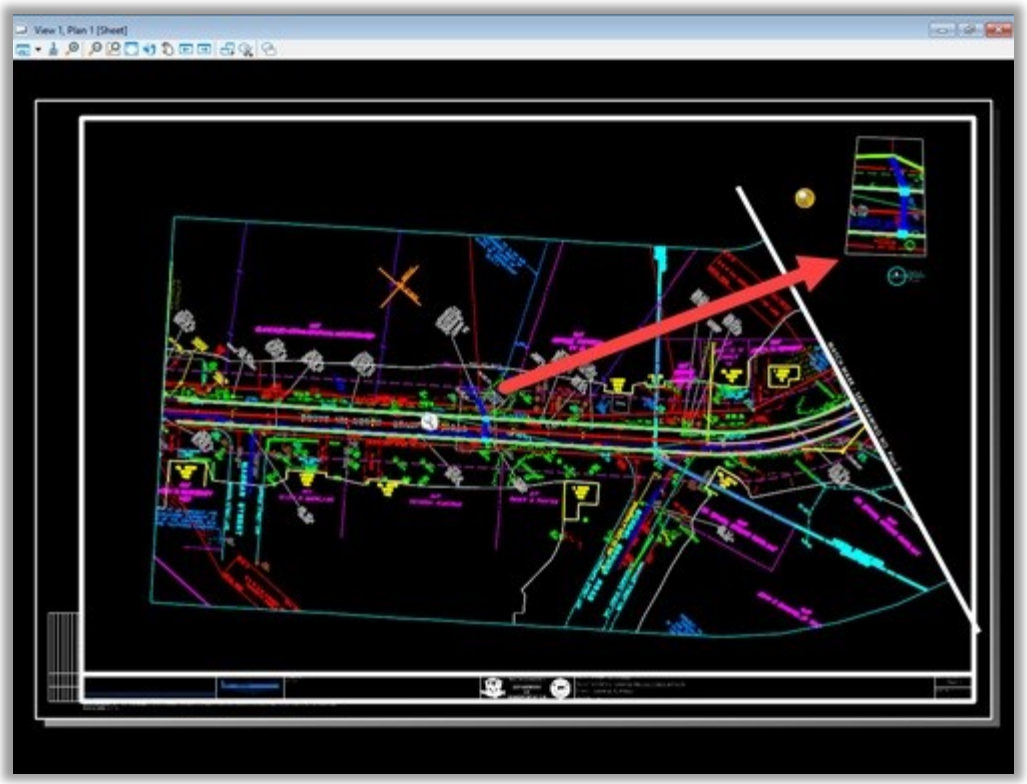


Figure 93

4.6 Plan Annotation

The OpenRoads Designer includes the MicroStation Place Label tool which can read civil object data such as curve information for arcs, alignment names, bearings, stations, northing and easting, and offsets. Labels are associated with elements and can update and move as the reference element changes. Reference elements can be located in the active file or in a reference. The Place Label tool is also used for call outs of roadway items.

There are four terms you should become familiar with when placing and editing labels.

- *Text Style* = format of text such as font, font size, spacing, justification etc.

- *Dimension Style* = format of dimensions such as terminator arrow, leader lines, text orientation, symbology (color, line style and weight of dimension & extension lines and terminators).
- *Text Favorite* = Intelligent reusable label that can be made up of text and fields.
- *Field* = A link or pointer to object information. This could be civil object information such as the delta of a curve, coordinates of a curve PI, name of an alignment, station values or general MicroStation information such as level name, color, weight.

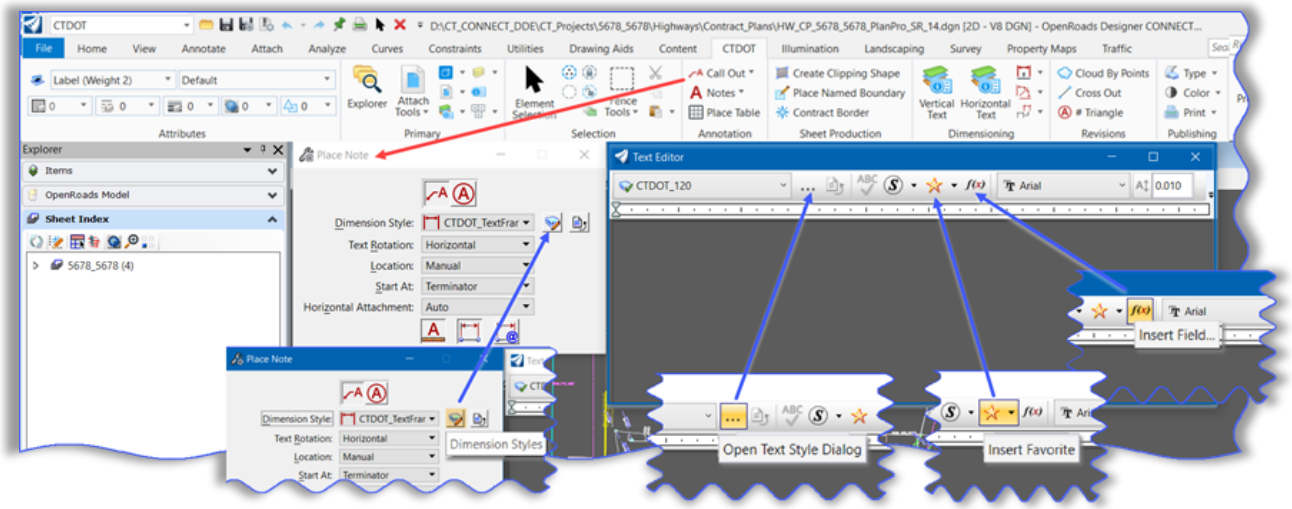


Figure 94

Labels can be placed for plan, profile, and cross-sections objects.

- *Plan view labels* can be placed in Design or Drawing models, but <u>not</u> Sheet models.
- *Labels* that need to be rotated to the sheet, <u>should</u> be created in the Drawing model.
- *General labels* that are not sheet specific and whose rotation does not matter can be placed in a Design model and referenced to all sheets, example: horizontal alignment stationing and curve data.
- *Profile and cross section labels* <u>must</u> be placed in Drawing models.

There are three icons along the bottom of the Place Note or Place Label toolbox that define how the label behaves when the drawing scale is changed or when the referenced element changes.

a. *Annotation Lock* - Labels created with this option enabled <u>will scale</u> when the Annotation Scale is adjusted.

b. *Association to Element* - Labels created with this option enabled but with the Relative Association to Element option disabled will remain at their placement location when the reference element changes. Only the leader line moves.

c. *Relative Association to Element* - Labels created with this option enabled will remain at their relative location to the reference element when that reference element changes.

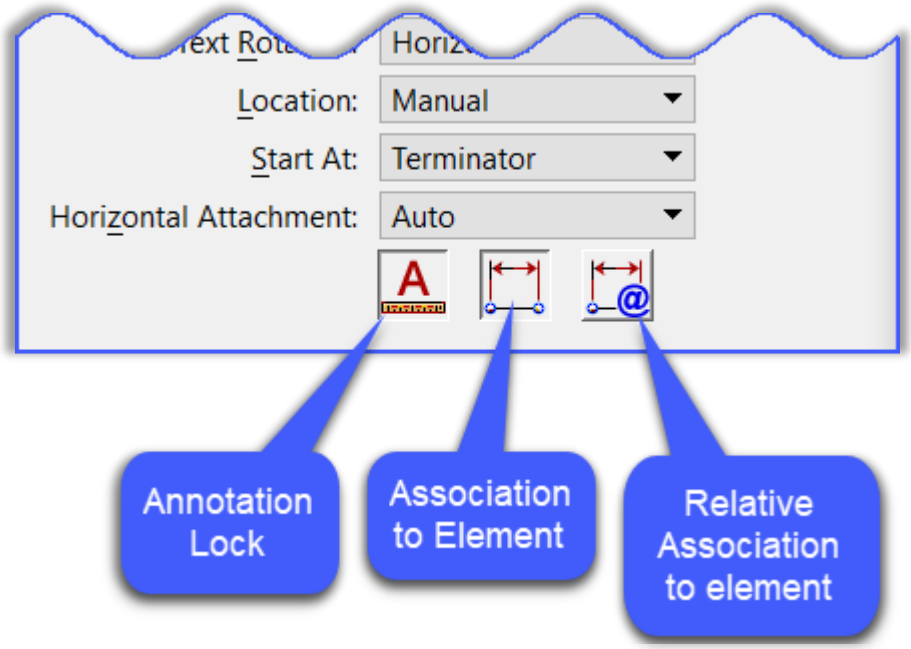


Figure 95

Labels created in OpenRoads have three parts (Leader, Text, and Anchor Point). Labels created in MicroStation only have the first two parts.

- *Leader* - Optional line and arrow connecting between the Text and the Anchor Point.
- *Text* - The label content which is made up of text, text fields, and graphics.
- *Anchor Point* - The point that is used to compute values in the fields.

4.6.1 Label - Horizontal Alignment

The horizontal Alignment should have stationing, PC's, PI's, PT's, curve data and bearings. This has been automated, the labeling/annotation will be in the design file (alignment dgn-file) and is usually done after the alignment is created. This annotation will be placed in the Alignment Base Model with the Centerline and Base Lines.

4.6.2 Label – Profile (Vertical Alignment)

The Profile (vertical alignment) annotation has been automated to show:

- Stationing and Elevations at the grid marks
- Stations and Elevations for PVC's, PVI's and PVT's
- Length of vertical curves with K-factor and Stopping Sight Distance
- Slope of tangent sections

The annotation will be in the profile drawing models (example: Profile 1 views and Profile 2 views for the plan and profile design file HW_CP_5678_5678_PlanPro_SR_14.dgn).

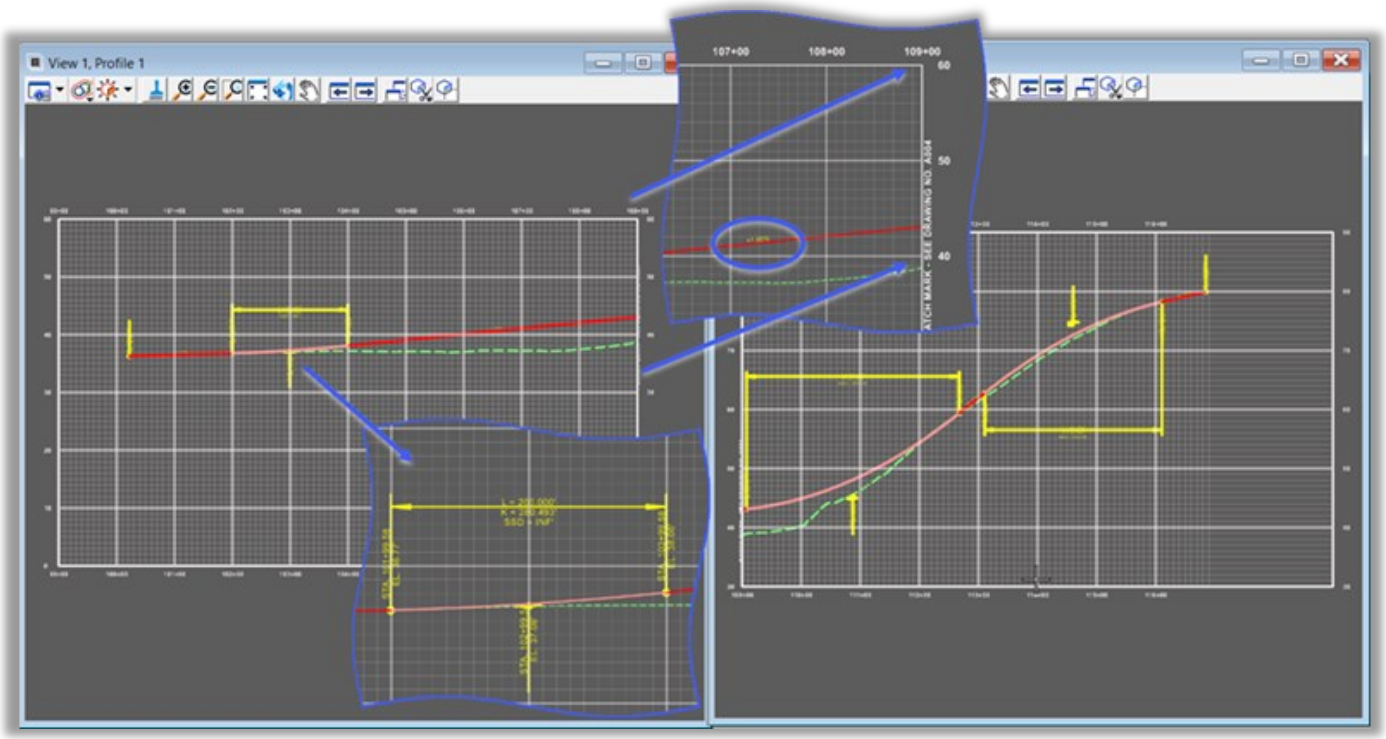


Figure 96

4.6.3 CTDOT Annotation Tools

The CT_CONNECT_DDE workspace has been set-up to ease the annotation for plan sheets, adjustments and additions are added periodically. Select the CTDOT workflow and click the CTDOT Tab. Here are tools set-up for each discipline and for various subject matters, here we will discuss the annotation tools.

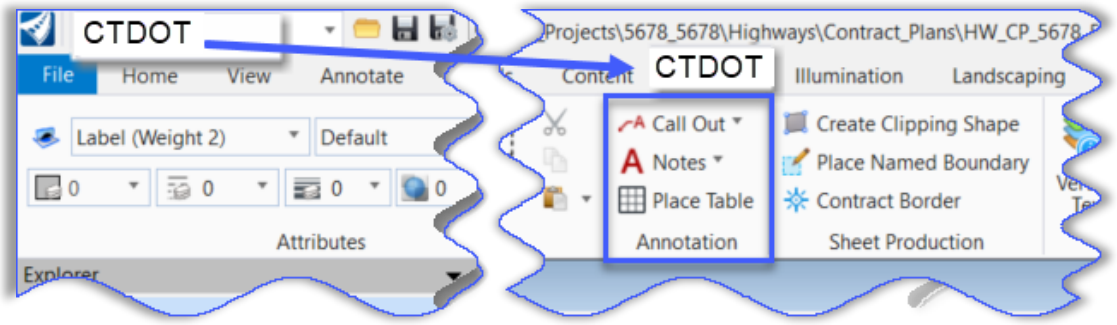


Figure 97

These annotation tools have been set-up with appropriate attributes (level, color, line style, text style, dimension style) these should not be changed by the user.

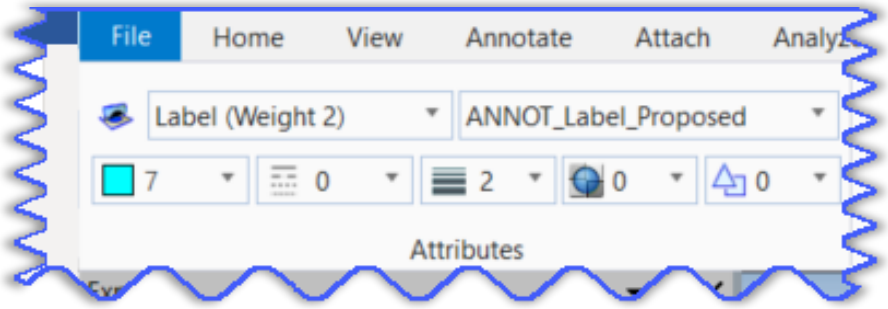


Figure 98

4.6.4 Label the Beginning of Project, End of Project, and Limit of Construction

1. Select the ***Plan Views*** (example Plan 1 Views) – Drawing Model. Select the **CTDOT workflow** and the **CTDOT tab**.
2. Click on the ***Begin Project Limits*** tool. The Place Note toolbox opens, and the Text Editor box should open. In the editor type in the project number, F.A.P. number, centerline station, Northing and easting coordinates.

   Example:
   BEGIN PROJECT NO. 5678-5678
   F.A.P. NO. NH78(123)
   CL STA. 100+40.00
   N 671 403.048
   E 993 511.112
3. Follow the prompts. ***Place Note > Define start point >*** snap to the beginning, ***associate point > snap to the next point, > Define NextPoint, or <Reset> to complete***. Place the leader and text to fit within the sheet.

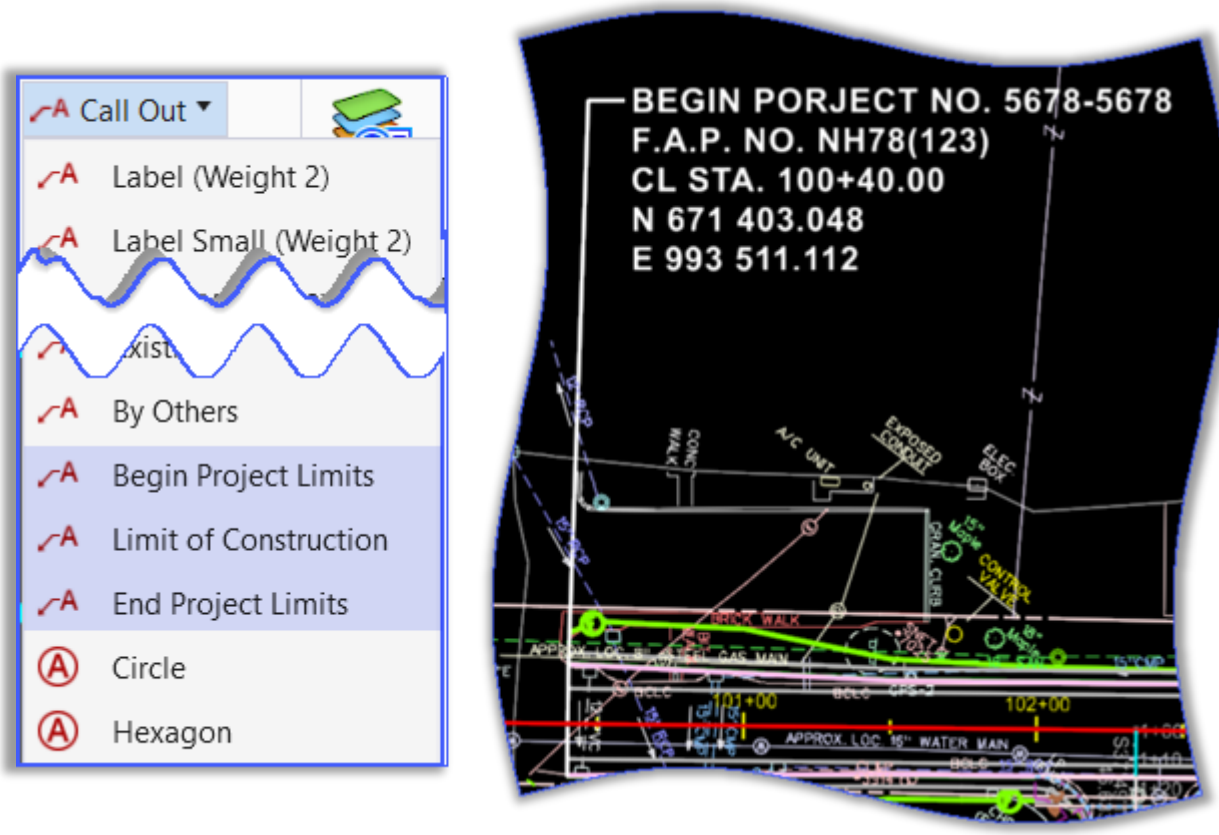


Figure 99

4. Select **Profile Views** (example: Profile 1 Views) and repeat the previous steps to label the beginning and end of the project.

   Example:

   BEGIN PROJECT NO. 5678-5678
   F.A.P. NO. NH78(123)
   CL STA. 100+40.00
   N 671 403.048
   E 993 511.112

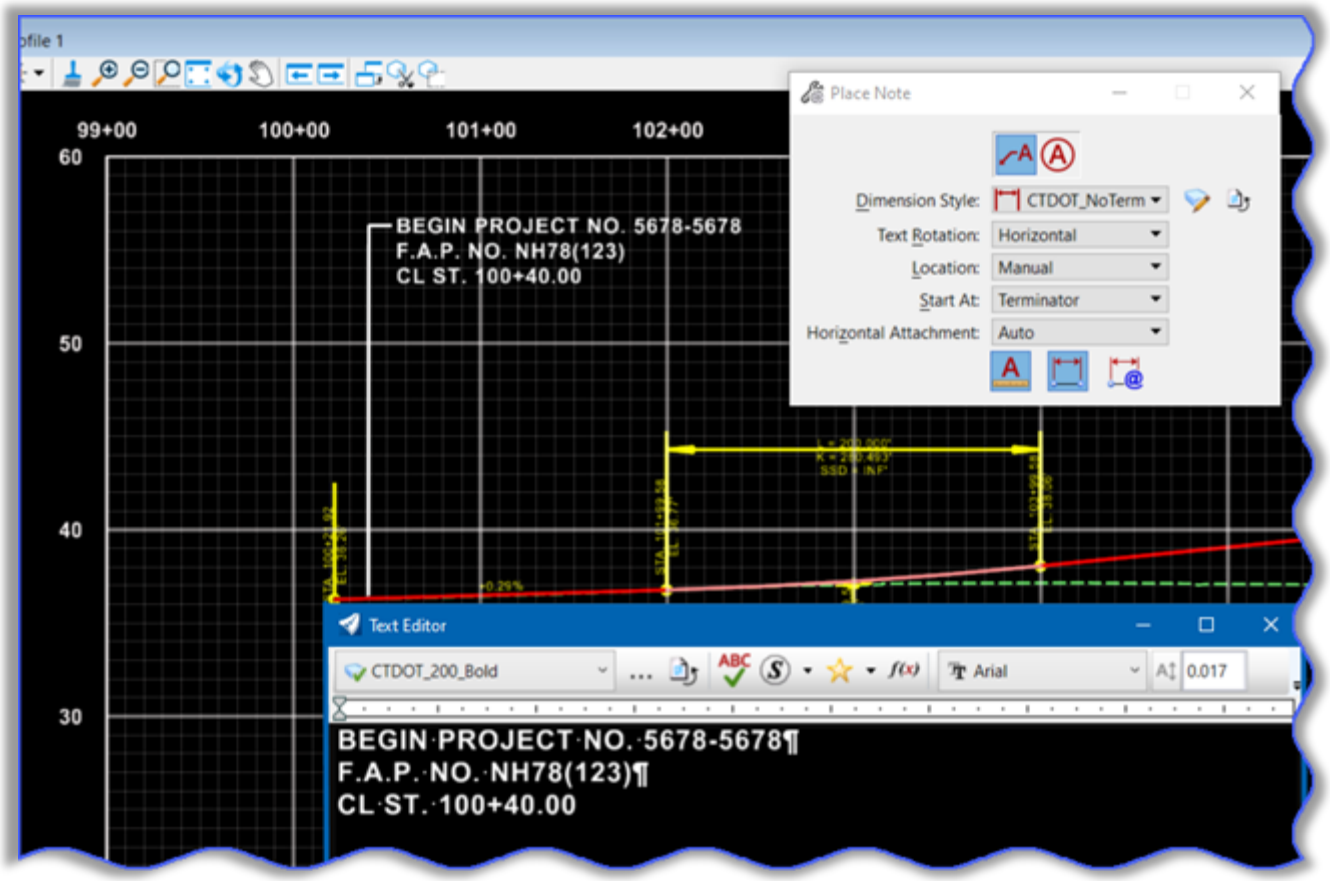


Figure 100

4.6.5 Label – Place Call Outs

1. Select the ***Plan Views*** (example Plan 1 Views) – **Drawing Model**.Select the **CTDOT workflow** and the **CTDOT tab**.Click on the **Call Out** tool.
2. Click on the ***Label (Weight 2)*** tool or anyone of the other Label tools: ***Label Small (Weight 2) Label (Weight 0)*** or ***Label Small (Weight 0)***. The Place Note toolbox opens, and the Text Editor box should open. In the editor type in the label for the item.
3. Example: "**APPROX. SLOPE LIMITS**". The difference of the Weight 2 or 0 is the line weight of the leader line. The weight is chosen according to the complexity of the call outs.
4. Follow the prompts. **Place Note > Define start point >** snap to the beginning, **associate point > snap to the next point, > Define NextPoint, or <Reset> to complete**. Place the leader and text to fit within the sheet.

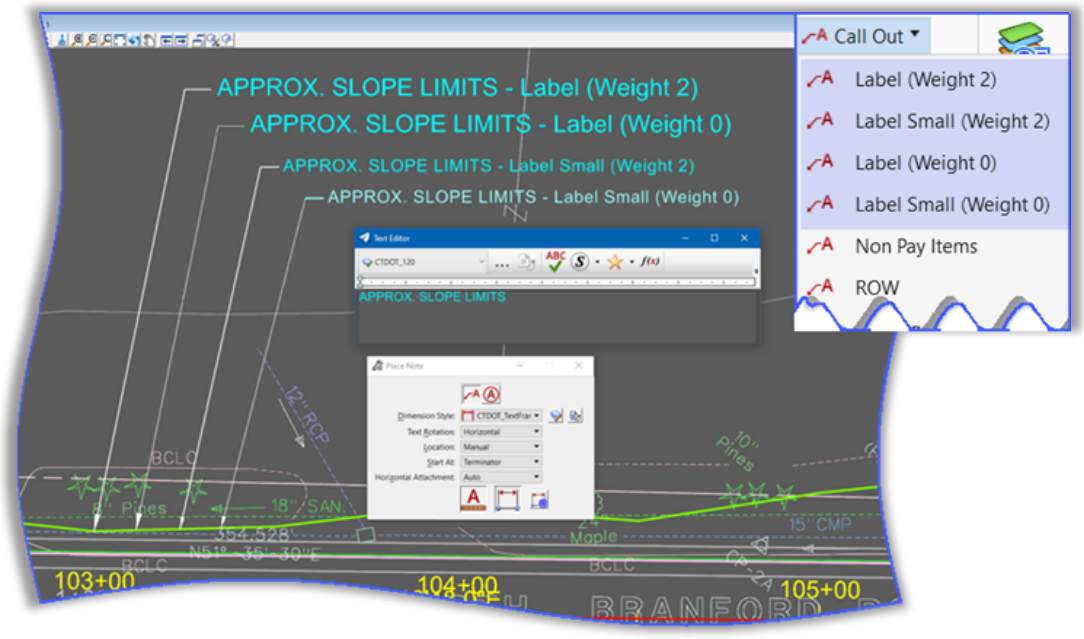


Figure 101

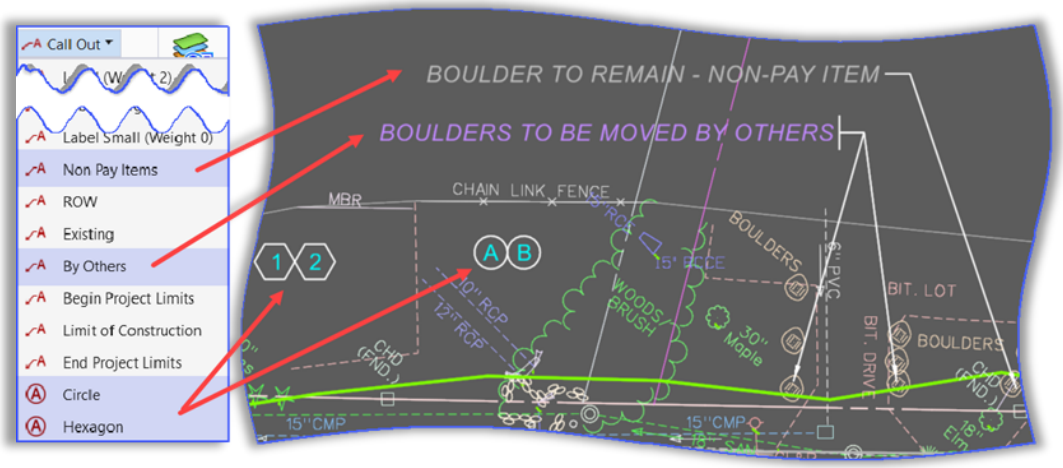


Figure 102

4.6.6 Notes

Notes should generally be placed in the **sheet model**. Notes are used to convey information such as right of way, general construction notes, drainage notes and construction sequencing. There are several Note tools available.

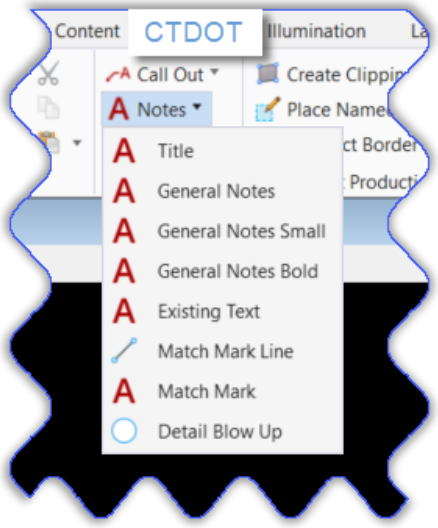


Figure 103

Title – used for the title of a detail blow up or as the label for construction sequences on one sheet.

General Notes, ***General Notes Small*** and ***General Notes Bold –*** are used for notes pertaining to the project, example: All highway markers to be protected during construction.

Existing Text – is for an existing item to be labeled, such as a mailbox to remain.

Match Mark Line and ***Match Mark -*** are used to mark and annotate the match mark between two sheets, this is automated when using the Plan and Profile Production tool.

Detail Blow Up - sets the attributes for the blow-up circle or box.

Place Table tool - is used to place a table for the General Notes. It is formatted and can be filled in; for a more detailed description using tables see Bentley Help - Place Table.

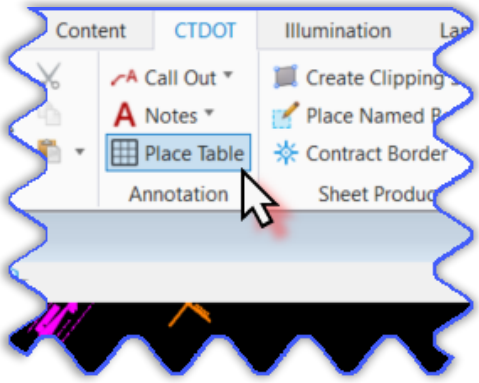


Figure 104

1. Select the ***Place Table*** command. In the Place Table toolbox select the first icon.
2. Click on Seed: find the table for ***General Notes***, select how many rows and columns are needed (this can be edited later if needed). Now the table will be visible on the cursor, place the table on the sheet as needed.

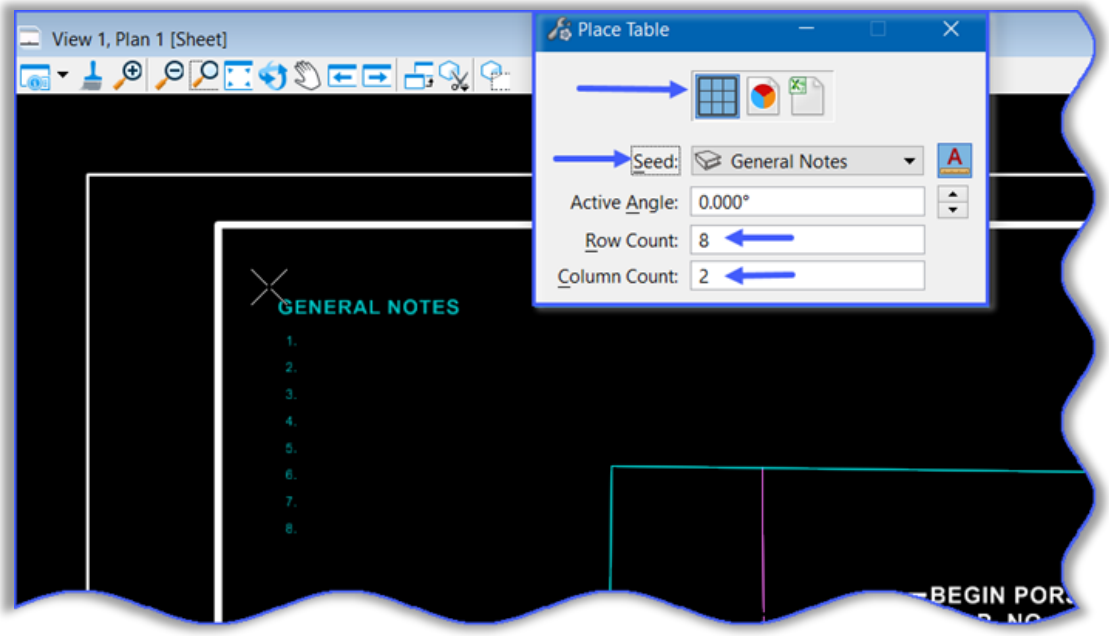


Figure 105

3. To add/fill in the table select the ***Annotate*** tab and choose the ***Edit Text*** tool. *NOTE*: Avoid using the Element Selection tool to edit the table as this will lock up the file.

***TIP*:** To better view the Text Editor, the User Preferences have been changed in the View Optionsthe Black Background -> White.

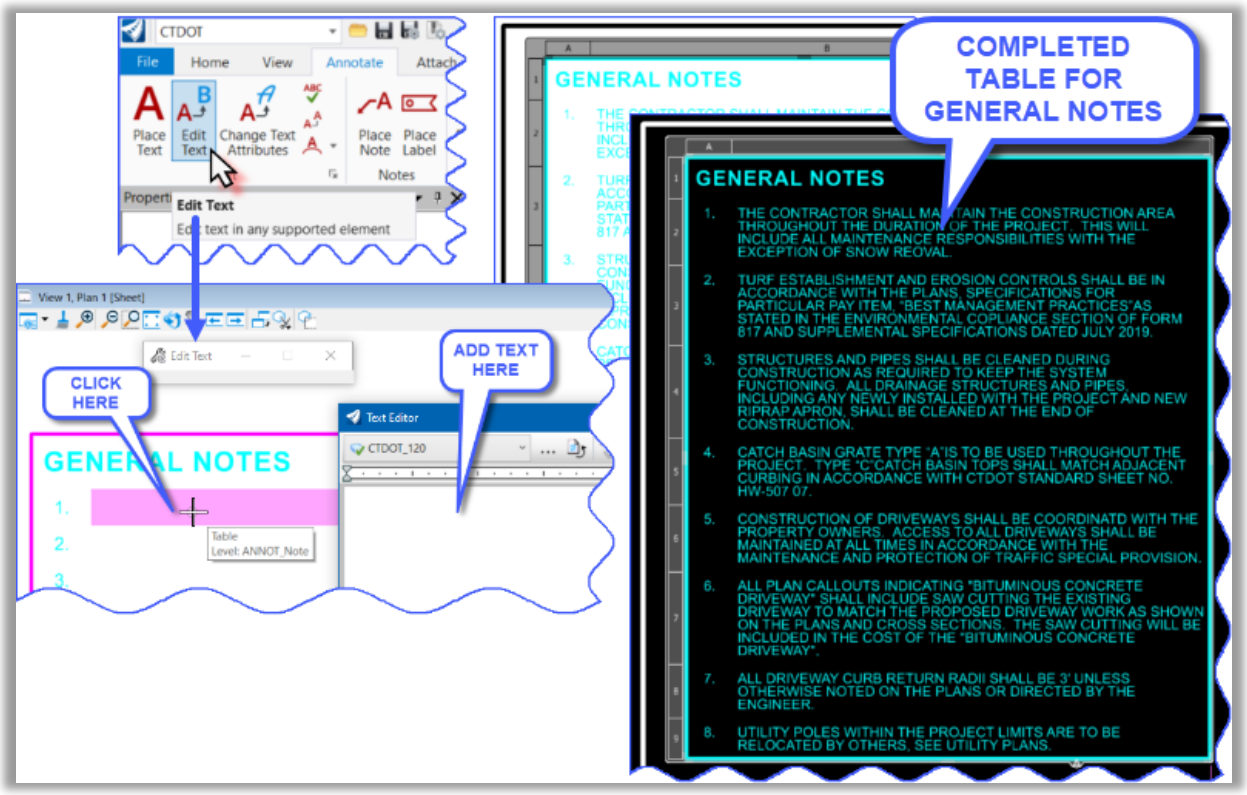


Figure 106

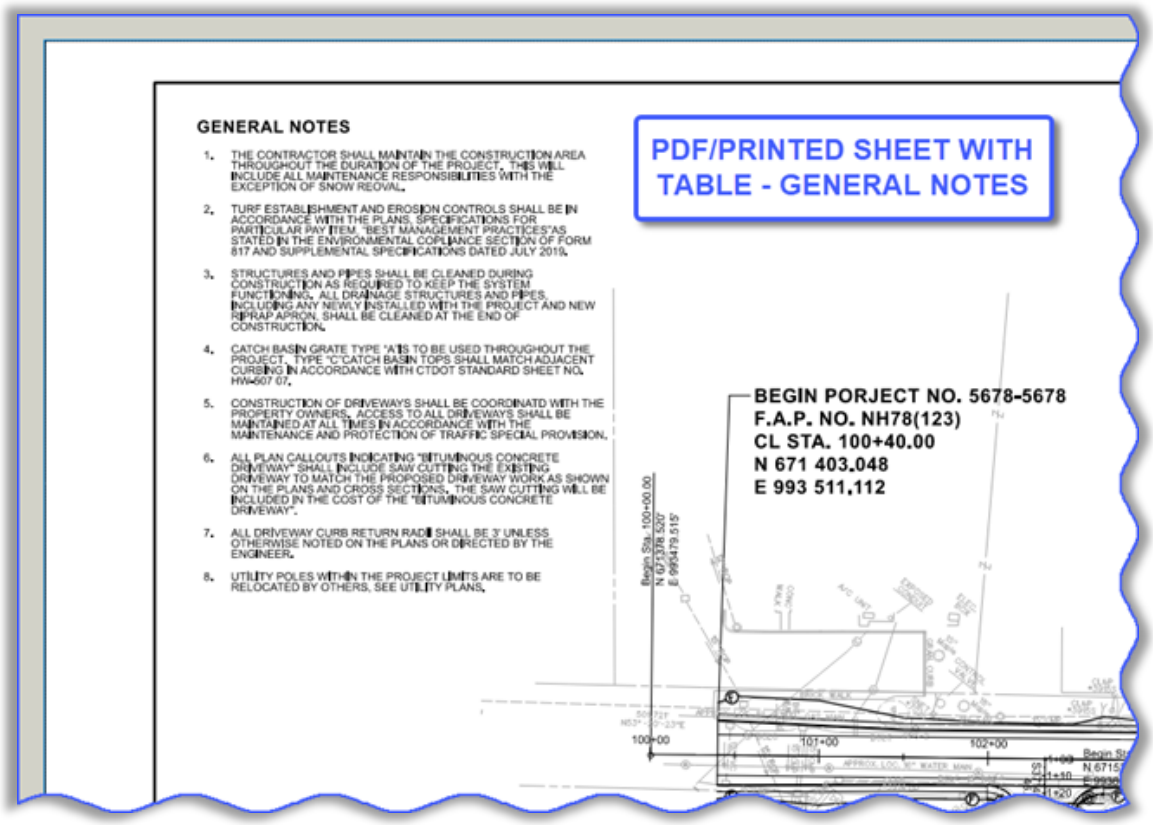


Figure 107

4.7 Cross-Section Sheets

4.7.1 Create Cross-Section Sheets

All files for project contract plans: plans, profiles and **cross-sections** will reside in the Contract_Plans folder under the disciplines folder; example: project folder/Highways/Contract_Plans.

1. Create a design model that will be used to create the cross-section sheets for the project. Browse to the Contract_Plans folder to create a new 2D file using the file naming convention as described in the **Volume 16 Appendix 4 - File Naming**

   Example:
   HW_CP_5678_5678_XSC_SR_14.dgn
   created with the Seed2D – CT RoadDesign.dgn seed file

   ...CT_Configuration|Organization|Seed|Road|Seed2D - CT RoadDesign.dgn

   If the survey was done in an old Datum, use the 2D Seed Files in this folder
   ...CT_Configuration|Organization|Seed|GCS|

2. Reference in the needed base model file, they reside in the Highways/Base_Models folder within the project folder as well as the needed existing survey models. The model is referenced using No Nesting.

3. Select the existing terrain boundary and set it active. Then set up the display views to show **View 1, Default** and **View 2, Default-3D**. Save settings, this will also establish the Multi-Model views.

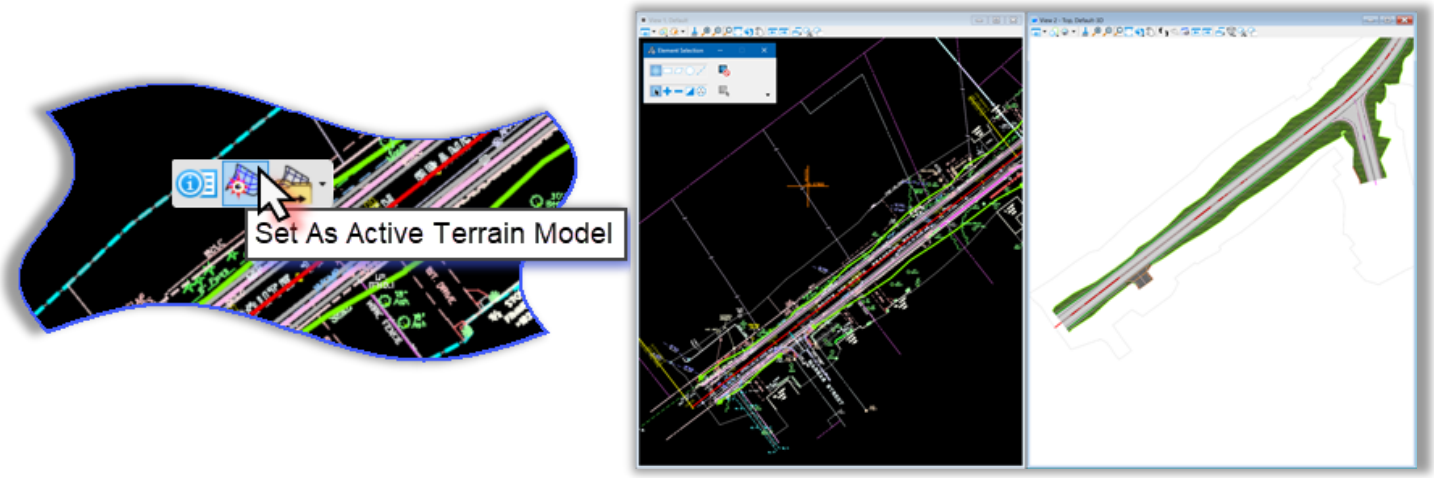


Figure 108

4. Select ***Drawing Production > Named Boundaries > Named Boundary > Place Named Boundary***. A named boundary is a closed element that has a name associated with it.

5. The **Place Named Boundary Civil Plan, Profile or Cross-Sections** dialog box opens. Select the ***Civil Cross-Section*** mode. Set Drawing Seed to ***5 Scale Contract XSC Sheet***, this will also set the ***Detail Scale to 1" = 5'***.

   The **drawing seed** defines default values and other important parameters required to create sheets. Selecting the drawing seed should always be the first step when creating named boundaries. The drawing seed has been set-up for the ANSI D size paper (34"x22"), and defaults include:

   - Options on **Named Boundary** for left and right offsets, section intervals, vertical exaggeration, and top and bottom clearances between sections (these can be changed if needed).
   - Options to **Include Control Points**, these are usually the PC's, PI's, PT's of the horizontal alignment.
   - Options to **Include Event Points Only**, this will require the user to establish an Event Point List (drainage crossings as example).

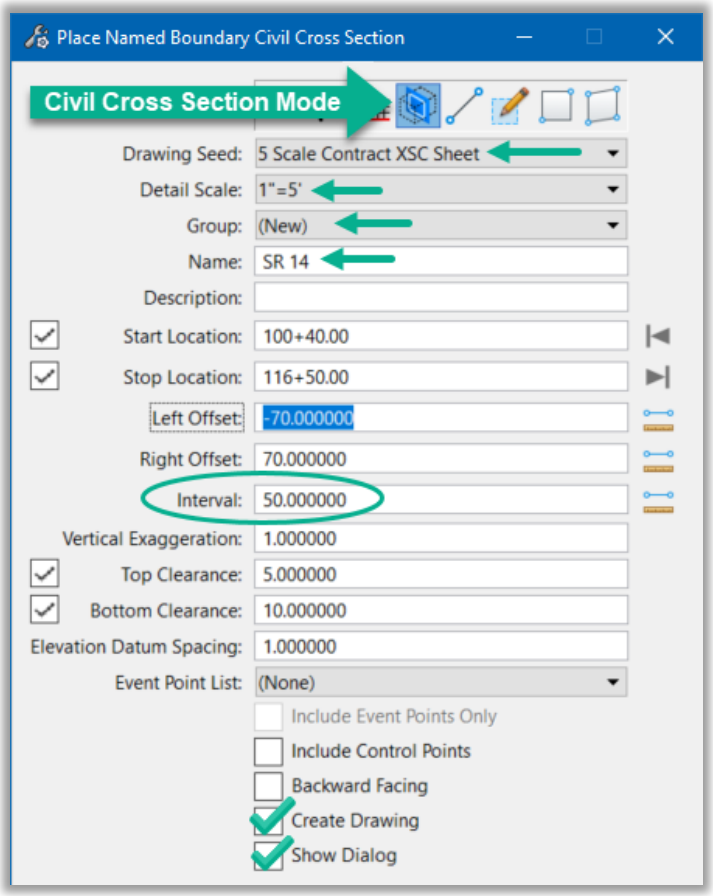


Figure 109

6. Set the ***Group to (New)***. Set the ***Name:*** to match the alignment name, usually the Route Number or Street name (this name field will define the name of the Named Boundary Group) Example: SR 14 (for State Route 14). Clicking on the horizontal alignment will also populate this name field with the name of the horizontal alignment.
7. Enable the ***Create Drawing*** option, so that the sheets are created as soon as the named boundaries are created. Enable the ***Show Dialog*** option, this dialog is used to override settings defined by the Drawing Seed if needed.
8. In the 2D view (default plan view), select the alignment along which the named boundaries (sheets) will be created. The command line (lower left corner) will read: ***Place Named Boundary Civil Cross-Section > Identify Path Element***. With the cursor select the horizontal alignment. Now a light blue line should be visible on the cursor. This allows the user to pick the start and stop locations of the named boundaries for cross-sections.
9. Select the desired Start Location. Follow the prompts. Command Line: ***Place Named Boundary Civil Cross-Section > Accept/Reject. Identify Path start point to place boundary***.

Figure 110

10. Next select the ***Stop Location***. Command Line: ***Place Named Boundary Civil Cross-Section > Identify Path end point to place boundary***. The named boundaries are displayed interactively as the cursor moves. Accept the endpoint location for the named boundary. Command Line: ***Place Named Boundary Civil Cross-Section > Accept/Reject. Datapoint point in Plan View to place boundary. Identify Path end point to place boundary.***
11. The **Create Drawing** dialog box will appear. Ensure the ***Mode:*** is set to ***Cross-Section***, ***Name:*** here the cross-section boundaries are named > this will name all drawing models and defaults to the station, example: 100+40.00, but can be named

XSC-1 if desired. In the **Drawing Model portion** of the dialog set the ***Annotation Scale*** to ***1" = 5'***. In **Sheet Model portion** of the dialog, set the ***Annotation Scale*** and the ***Detail Scale*** to ***1" = 5'***.

12. Enable the ***Add to Sheet Index*** option. This option will be discussed later in this module. Enable the ***Open Model*** option.

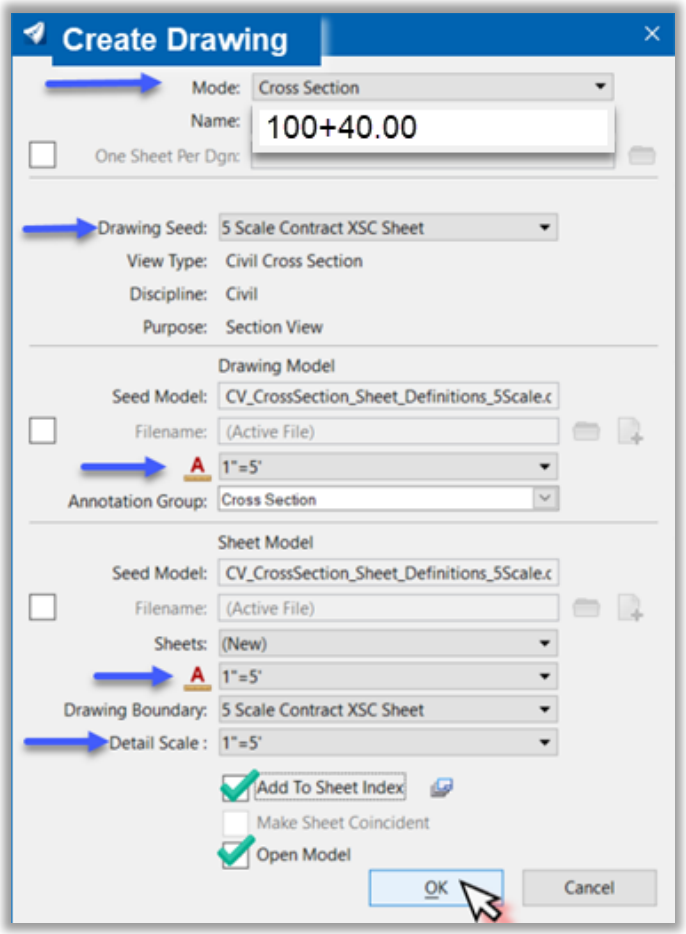


Figure 111

13. Click **OK** to create the sheets. At the bottom of the view windows, a gage will appear showing the progress of Sheets Created and then the progress of Drawing Models Annotated. When all is completed the last cross-section sheet will be open.

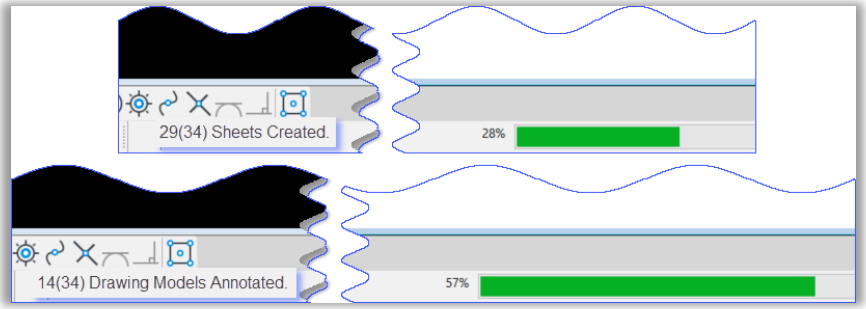


Figure 112

4.7.2 Review Cross-Sections

There are several ways to review individual sheet models or drawing models.

- Manage View Group dialog
- Named Boundaries dialog
- Models dialog
- Sheet Index

1. Click on the ***View Tab > Within the View Groups tools set*** and select any of the sheet models or drawing models. The same tool is also available in the ***Manage View Groups toolbox*** if docked on the bottom (it usually is). Each sheet model has drawing models for each section on the sheet model.

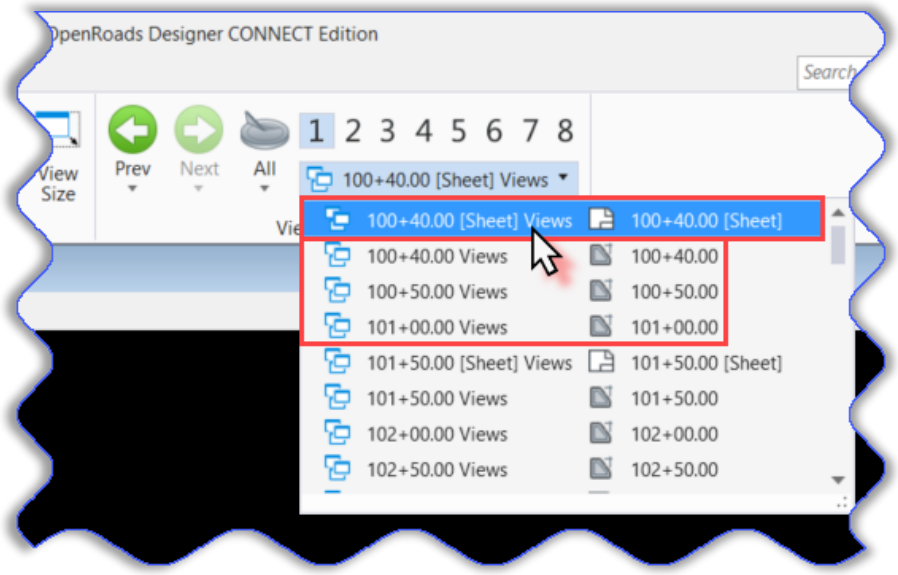


Figure 113

The **Drawing Model** is always 2D, is a subset of a 2D or 3D design model and is a direct reference of the named boundary area. The Drawing Model is used to apply annotations, dimensions and callouts to a design, examples: annotation for slopes, Edge of Road or Centerline elevations. The Drawing Model is then referenced into the Sheet Model.

The **Sheet Model** is always 2D, serves as an electronic drawing sheet (printed sheet), typically has drawing model references that are scaled and positioned to create a printable drawing.

For more information see OpenRoads Designer CONNECT Edition Help Menu.

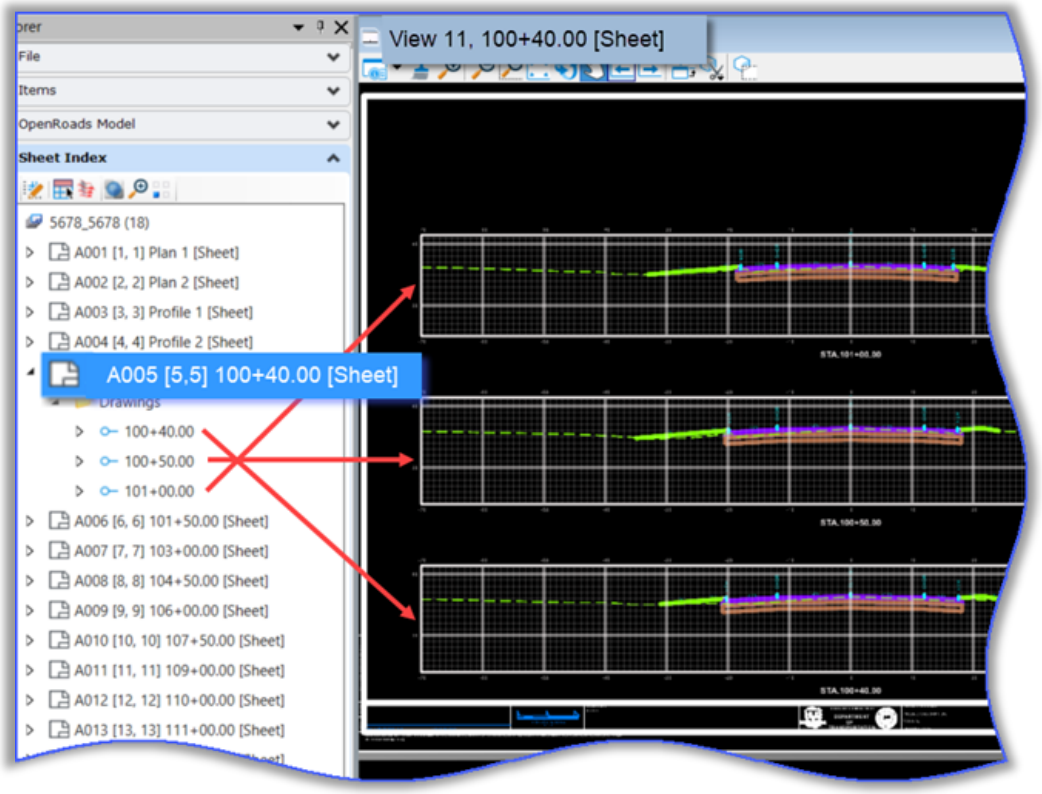


Figure 114

NOTICE: *There is a correlation between the Sheet Index, Manage View Groups, Named Boundaries and Models*

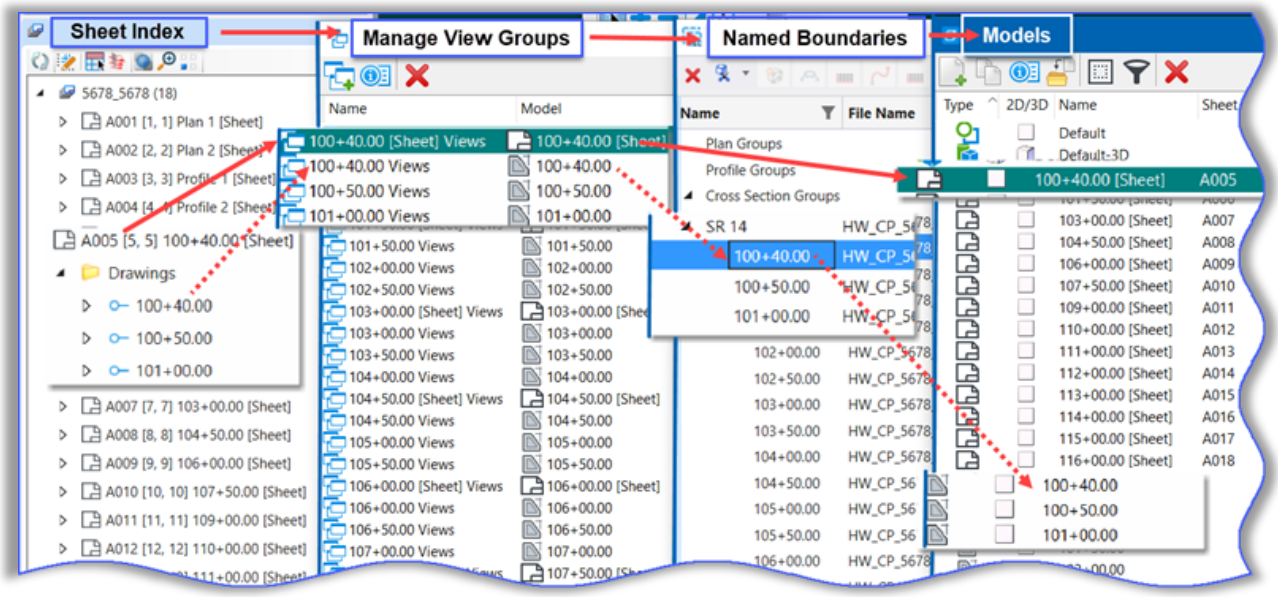


Figure 115

2. **Open and review** a **Sheet Model** by selecting **XX+XX.XX [Sheet] Views** (example: 101+50.00 [Sheet] Views) and then select **Apply**.

TIP: *You can also double-click on any model in the list to open it as well.*

The Sheet Model for the sections will open. Notice the border cell is placed at 0,0 axis, the named boundary shape and all design models are referenced. The project number, project description and town name(s) will be automatically populated from the CONNECTED Project, the Drawing Title will be populated with the text entered in the Model Description Field.

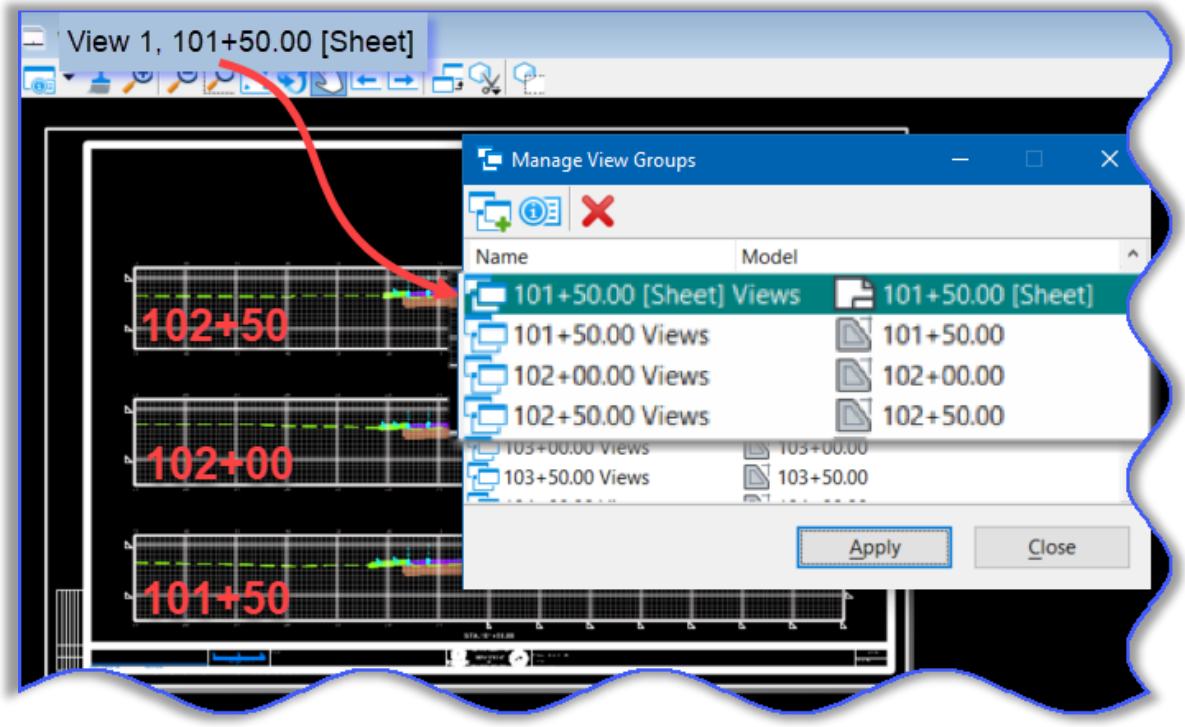


Figure 116

3. ***Open and review*** the **Drawing Models** for cross-section sheet by selecting the drawing views for the cross-section sheet (example: for 101+50.00 [Sheet] Views select 101+50 Views) and then selecting ***Apply***. (Or double click on the view)

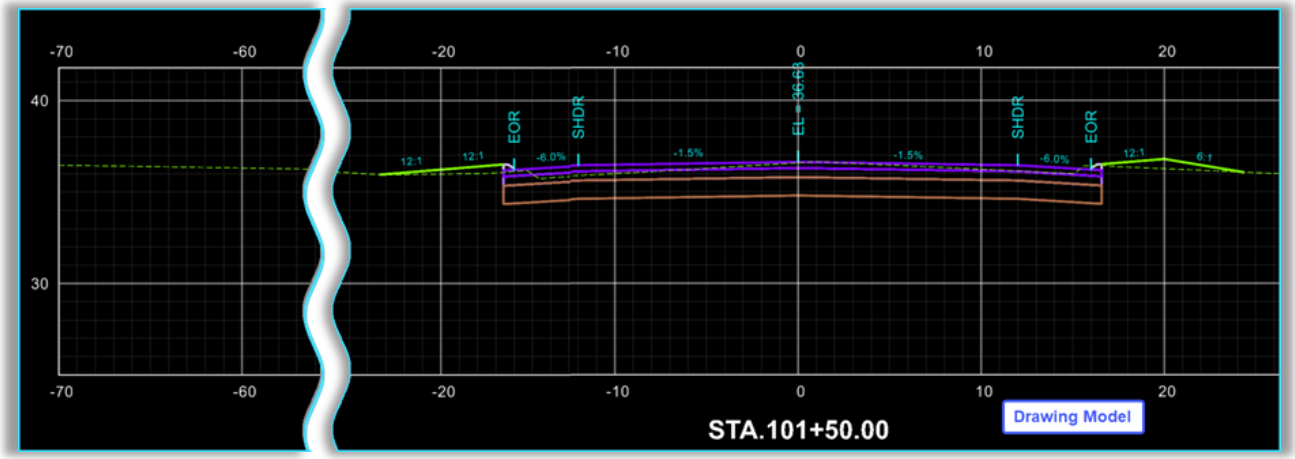


Figure 117

The Drawing Model for the cross-section will open. Notice there is only one cross-section in the drawing model, it shows a grid with elevation and offsets, it shows the existing terrain and proposed design, and has annotation for station, slopes and call outs for Edge Of Road and Center Line. Cross-Section annotation should be done in the drawing model.

Review the remaining Sheet Models by using the same steps described above. Become familiar how to navigate between the various drawing and sheet models.

4.7.3 Adjust Sheet Layout – Add Single Cross-Section

Sometimes it becomes necessary to add a cross-section at one particular station that does not fall on the interval stations of the cross-section creation, this can be done if necessary.

As an example: A driveway was not on the original survey (Terrain) and added later. The design model (corridor) was updated to include the driveway, but the cross-section drawing models and sheet models do not include this added driveway. The particular cross-section sheet model for the project has room to add the driveway cross-section.

NOTE: This should only be done if necessary and the drawing models can be adjusted to allow for the additional drawing model onto the sheet model. If more additional cross-sections are needed, it may be necessary to redo the cross-section plan production and add an event point list.

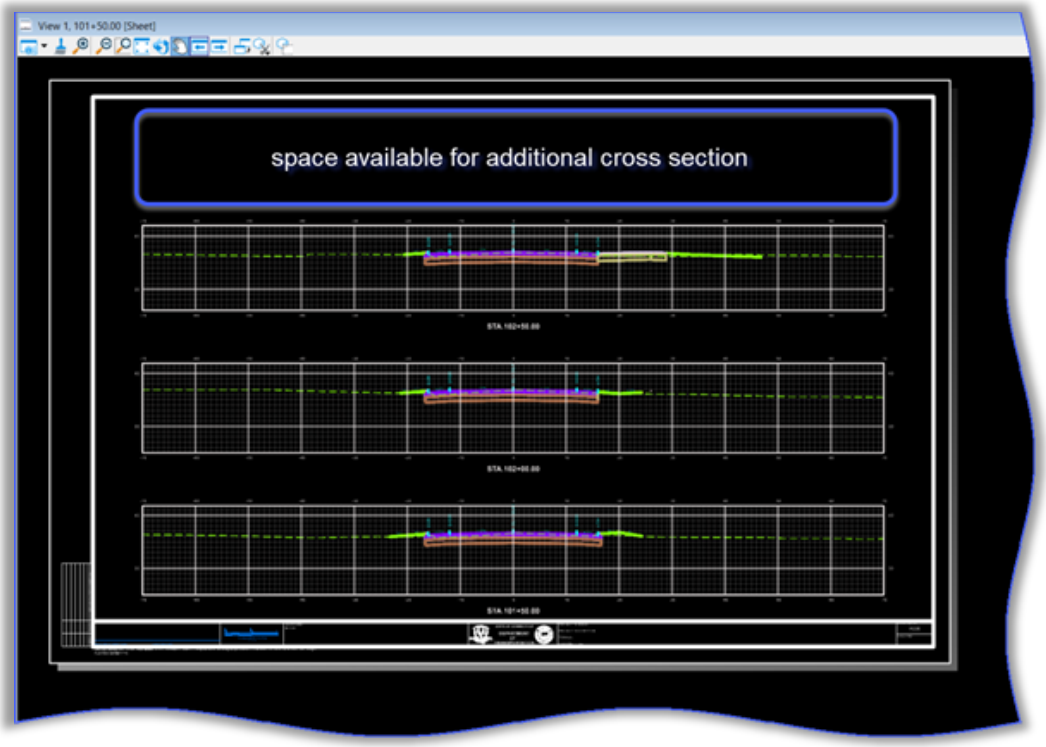


Figure 118

Adjustments to the sheet layout are made in the reference attachments.

1. Use the ***View Group*** tool to select the cross-section sheet view (sheet model) to add the additional section drawing model, example: 101+50.00 [Sheet] Views.
2. Select ***Home > Primary > Attach Tools > References***. In the References dialog there are references for each cross-section drawing model, select the drawing model attachment for the section that will be moved, example: (Logical) 102+50-1, for the dgn-file: HW_CP_5678_5678_XSC_SR_14.dgn, see the dash-dot outline around the cross-section.

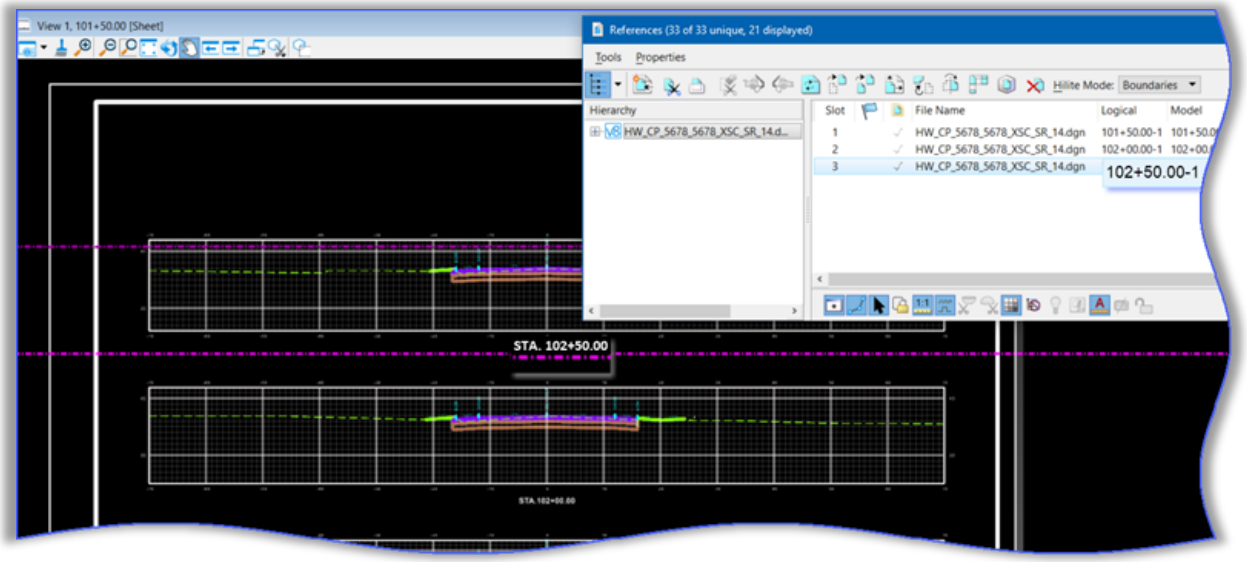


Figure 119

3. Click on the '***Move Reference***' command to activate, then click on the Named Boundary (cross-section drawing model), this will allow the reference to be moved (should be highlighted) and are "attached" to the cursor, move to the desired location within the sheet outline.

   TIP: It helps to activate Accudraw for this command, first deactivate Civil Accudraw if active.

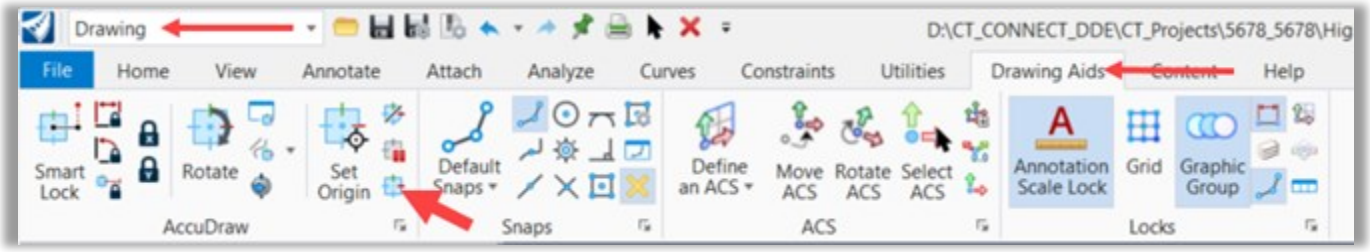


Figure 120

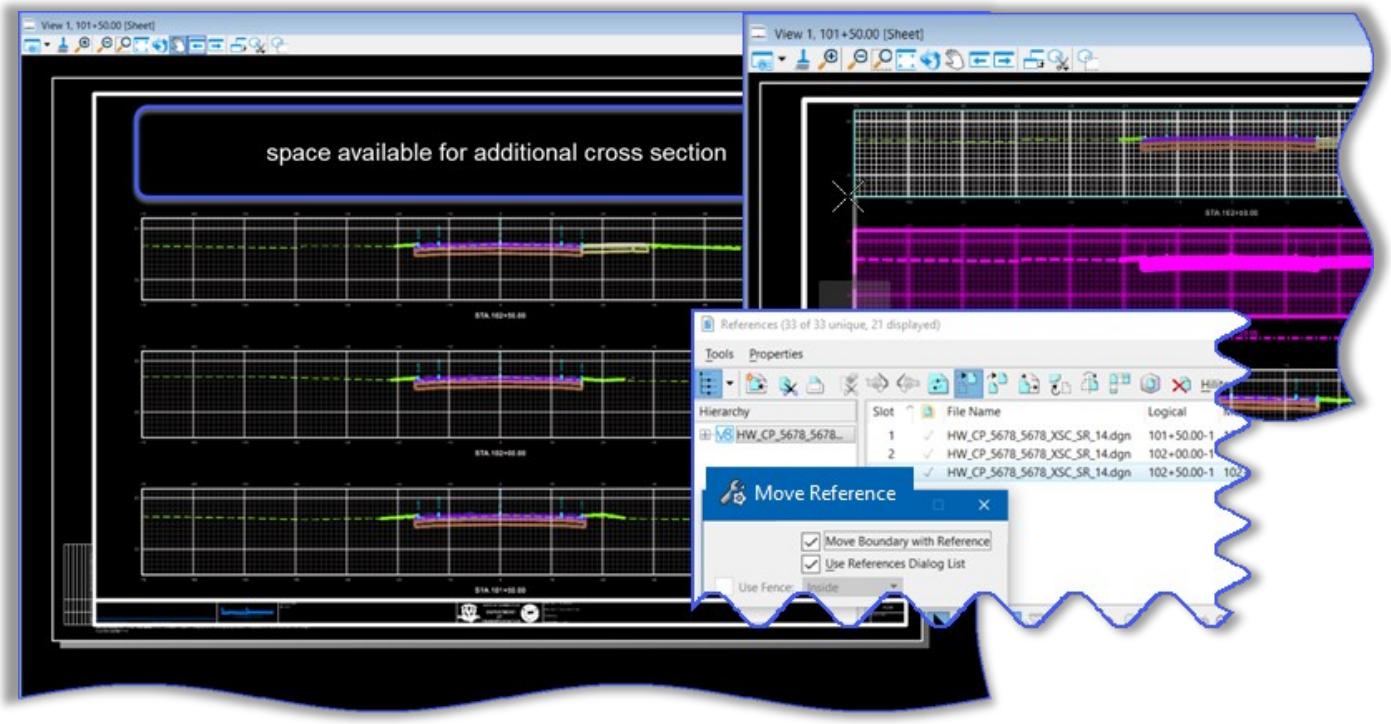


Figure 121

4. ***Left click*** to accept the new reference location. Turn of Accudraw, if activated.

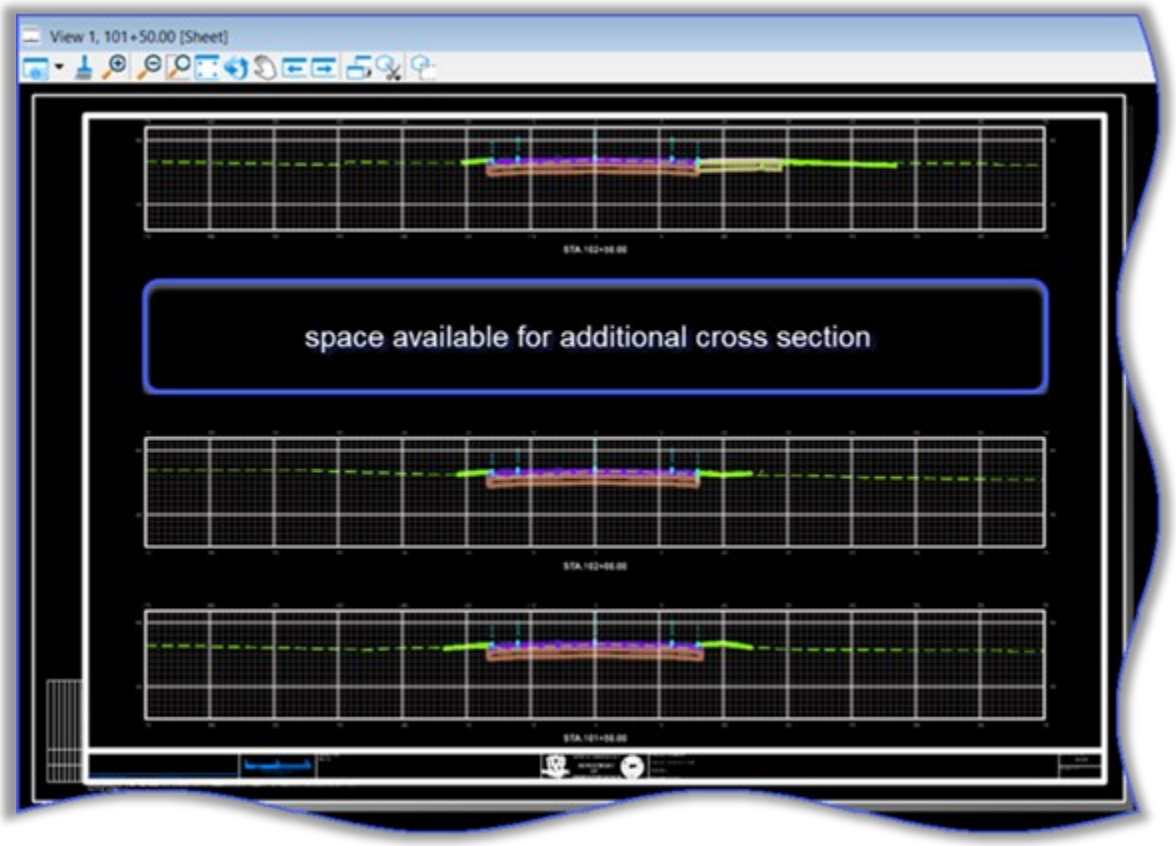


Figure 122

5. Set the **View Group** to ***Multi-Model Views***, once more. Using drawing tools create a line across the alignment where the cross-section is to be cut. Example: centerline of driveway at Sta.102+34.00 about the same length as the named boundaries lines of the other sections.

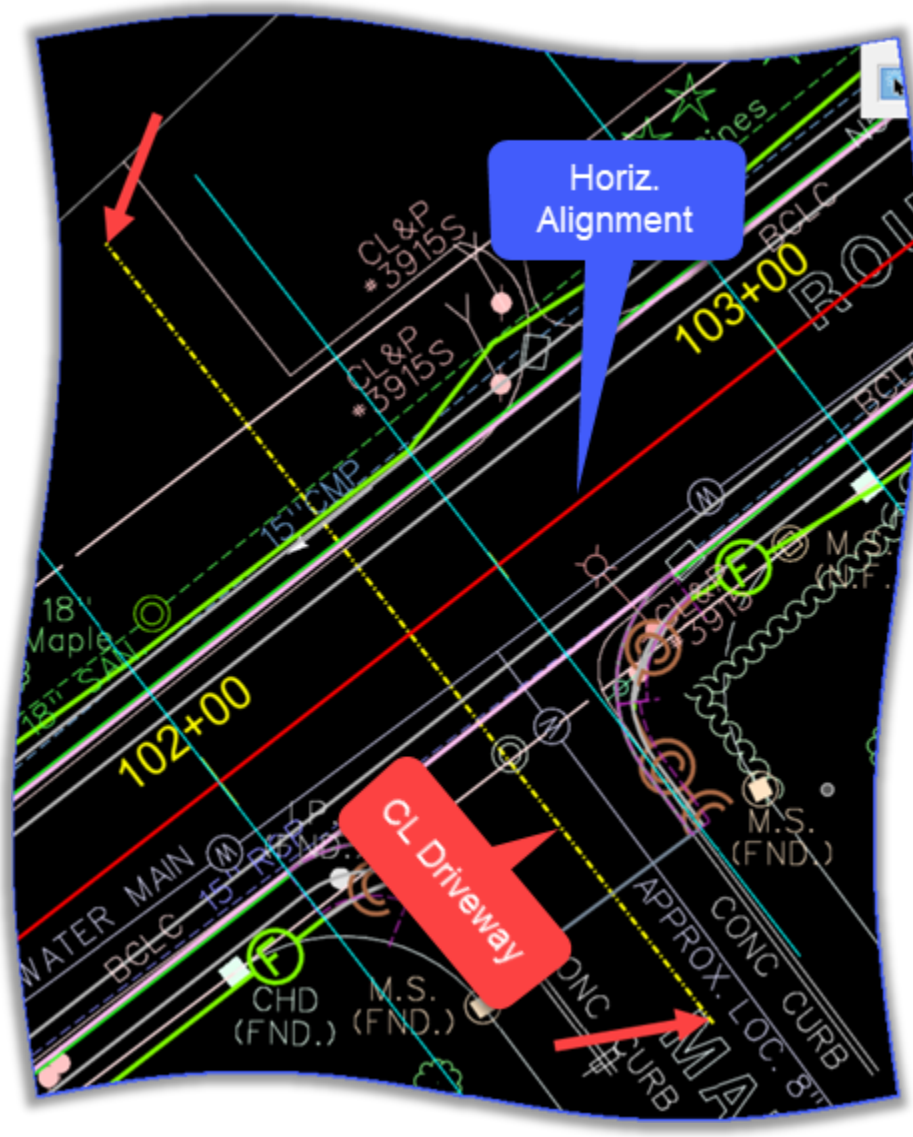


Figure 123

6. Create a single **Cross-Section Drawing Model**. Select ***Drawing Production > Named Boundaries > Named Boundary > Place Named Boundary***.
7. In the **Place Named Boundary Civil Cross-Section** dialog, select ***Civil Cross-Section 2 Points***. This command will create a cross-section along a path (alignment) from a line crossing the alignment. Set the Drawing Seed to ***5 Scale Contract XSC Sheet***. Select the **Group** from the previous groups (example: SR 14). Check ***ON*** the ***Create Drawing*** option and the ***Show Dialog*** option.

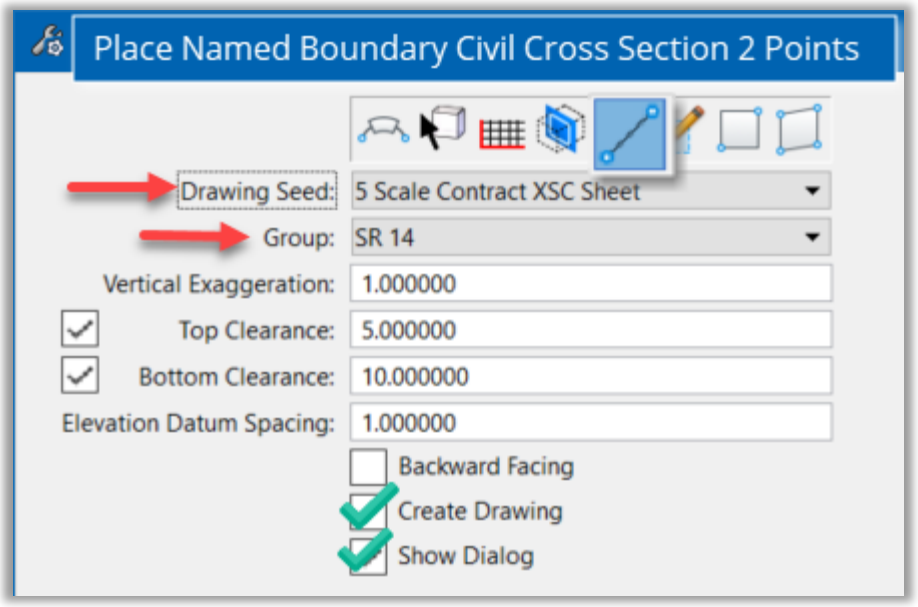


Figure 124

8. Follow the prompts: ***Place Named Boundary Civil Cross-Section 2 Points > Identify Path Element*** (this is the horizontal alignment, example: SR 14); ***> Enter first point*** (click on the first point of the line, should be to the left of the alignment); ***> Enter second point*** (click to the end point of the line to the right of the alignment) ***> Accept/Reject. Data point in Plan View to place boundary***. The single cross-section boundary is placed in the 2D view and 3D view.

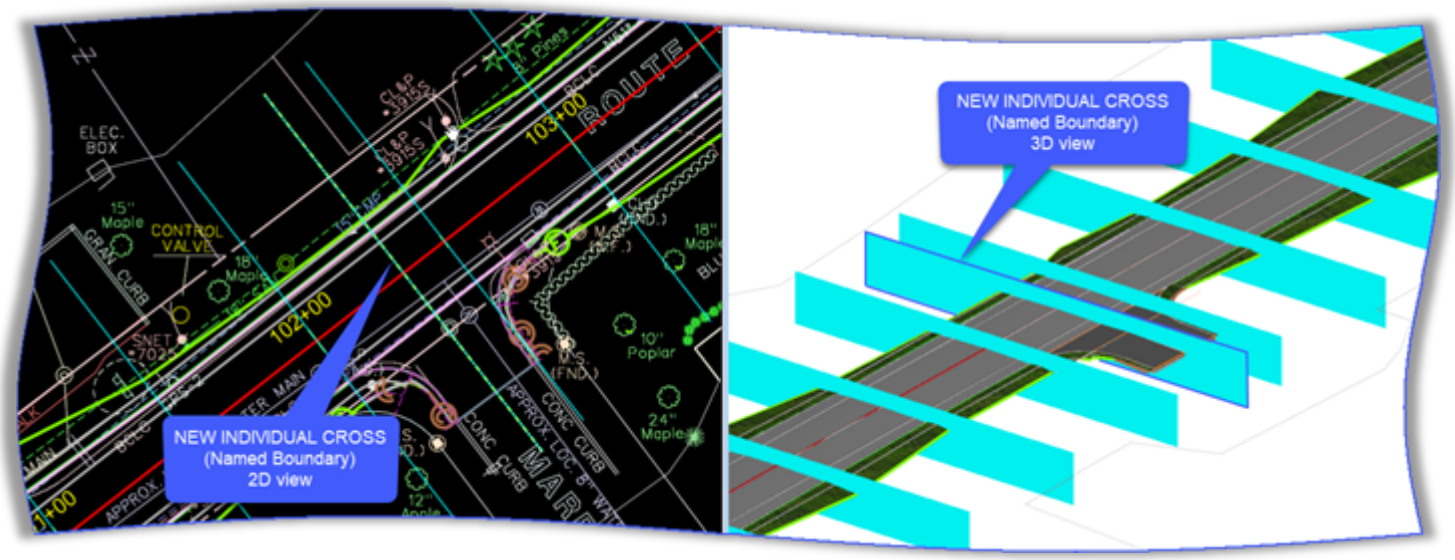


Figure 125

9. The **Create Drawing** box comes up, set the following: Mode: ***Cross-Section***; Name: automatically fills in (example: 102+34.00); Drawing Seed: ***5 Scale Contract XSC Sheet***; all Scales should be ***1" = 5'***; Check ***ON*** Open Model, but check ***OFF*** Add To Sheet Index; Click **Ok**.

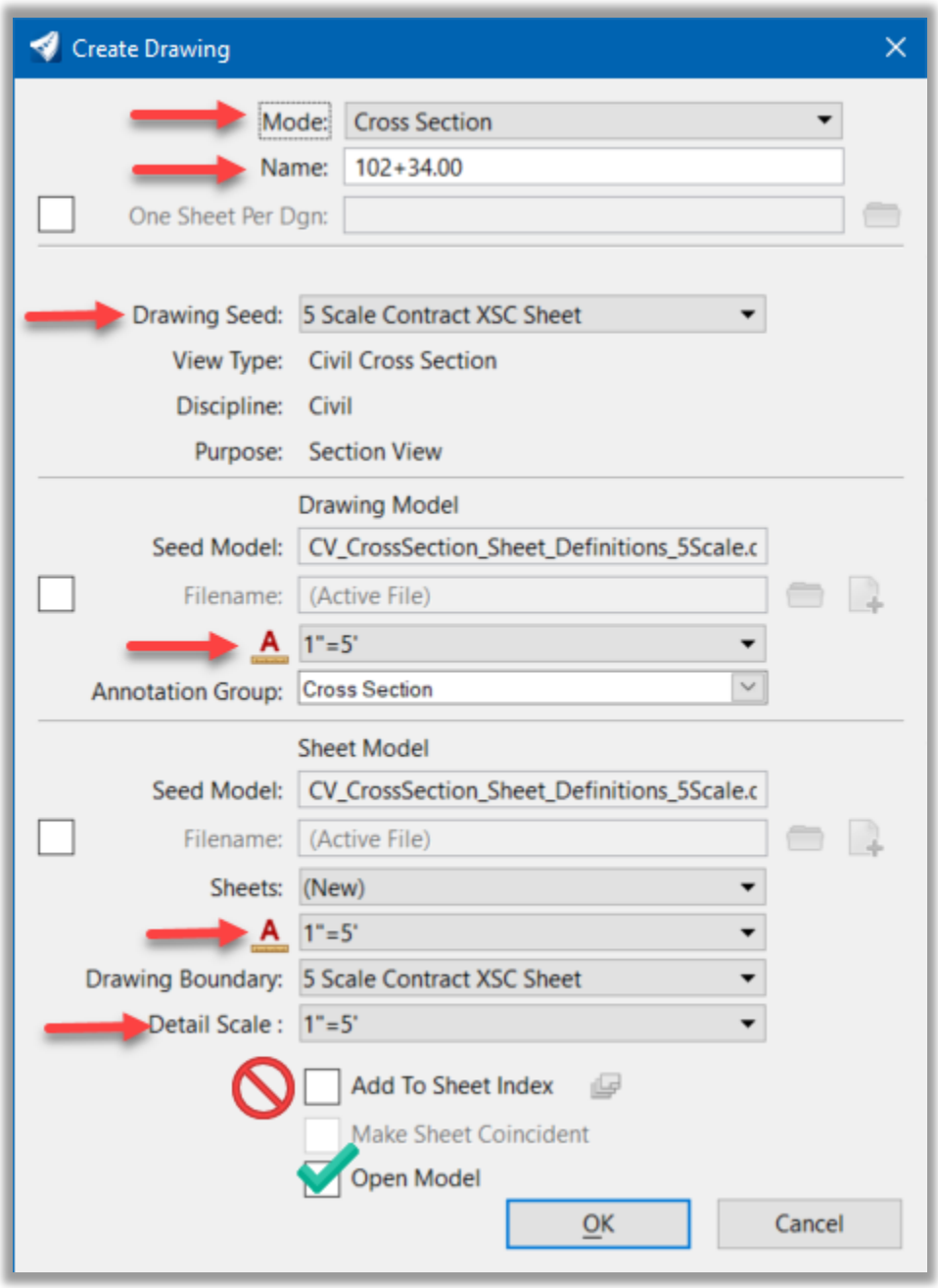


Figure 126

10. The new single cross-section sheet will open, with the single cross-section drawing model referenced in. Open the references dialog to review the sheet and drawing models, example View 1, 102+34.00 [Sheet] and referenced drawing model 102+34.00.

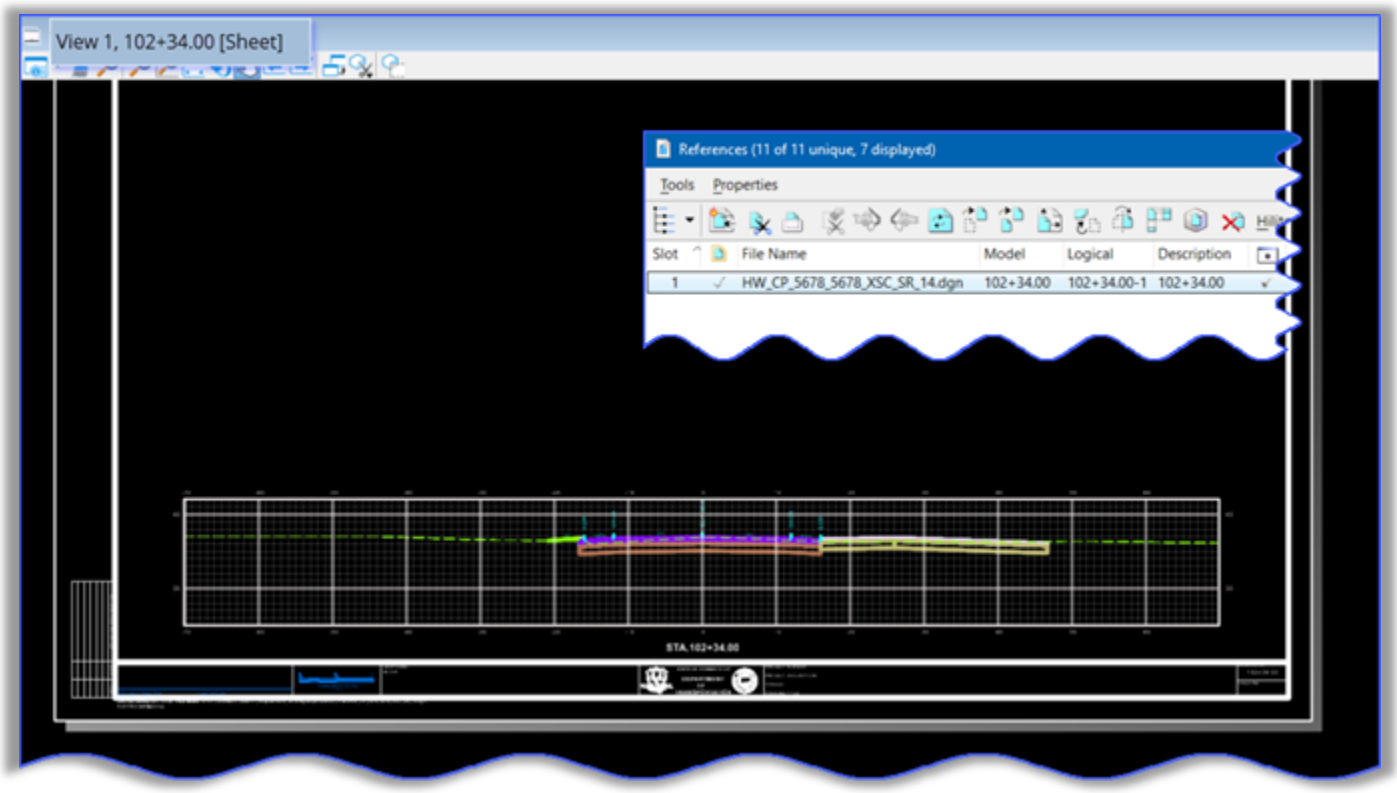


Figure 127

11. This drawing model must now be referenced into the ***prepared sheet model***. Open the prepared sheet model, example: View 1 101+50.00 [Sheet]. Open the references dialog. Attach the drawing model by referencing into the contract plans cross-section file, example: HW_CP_5678_5678_XSC_SR_14.dgn. Reference Attachment Properties settings as follows (should be the same settings as the other cross-section drawing models for this sheet): cross-section drawing models for this sheet):

    - ***Model:*** pick the added cross-section (102+34.00)
    - ***Logical Name:*** should populate to added cross-section (102+34.00)
    - ***Orientation:*** Coincident – Aligned with Master File
    - ***Detail Scale:*** 1" = 5"
    - ***Nested Attachments:*** Live Nesting
    - ***Nesting Depth:*** 99

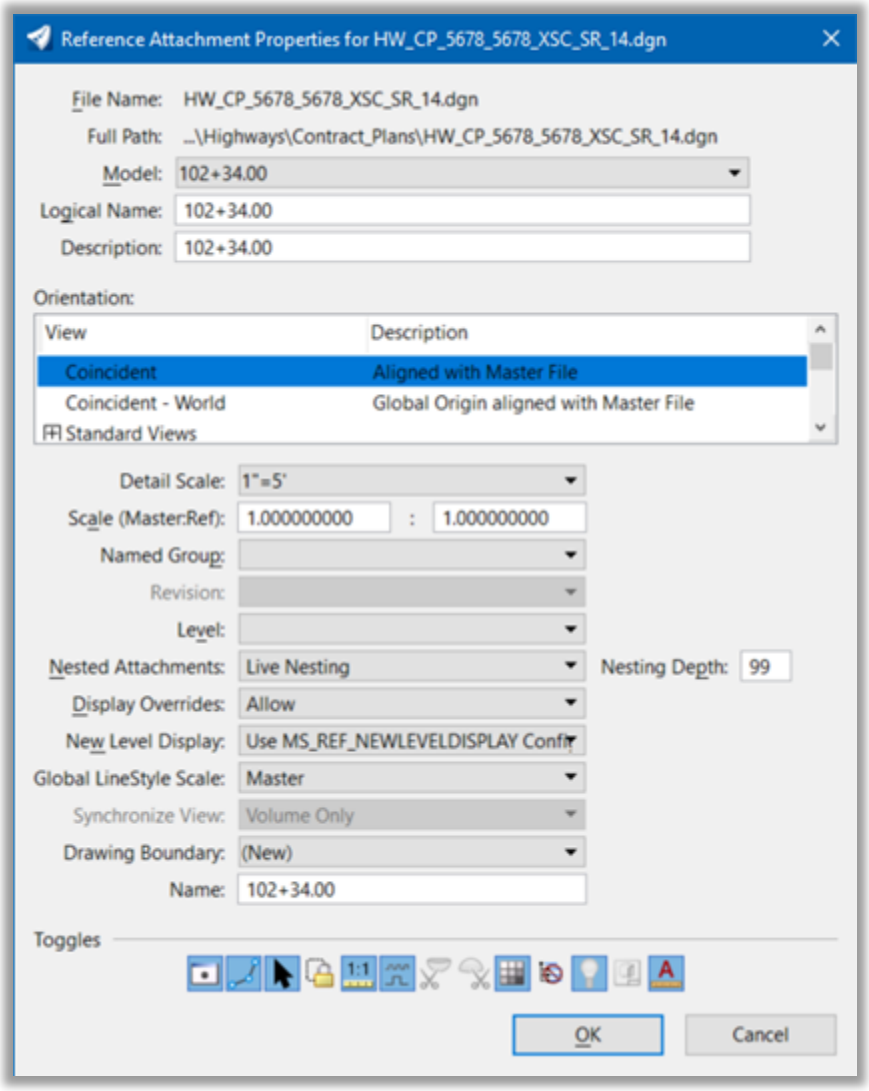


Figure 128

12. Click **Ok**. The drawing model is attached, it may be necessary to move the drawing model into the right position.

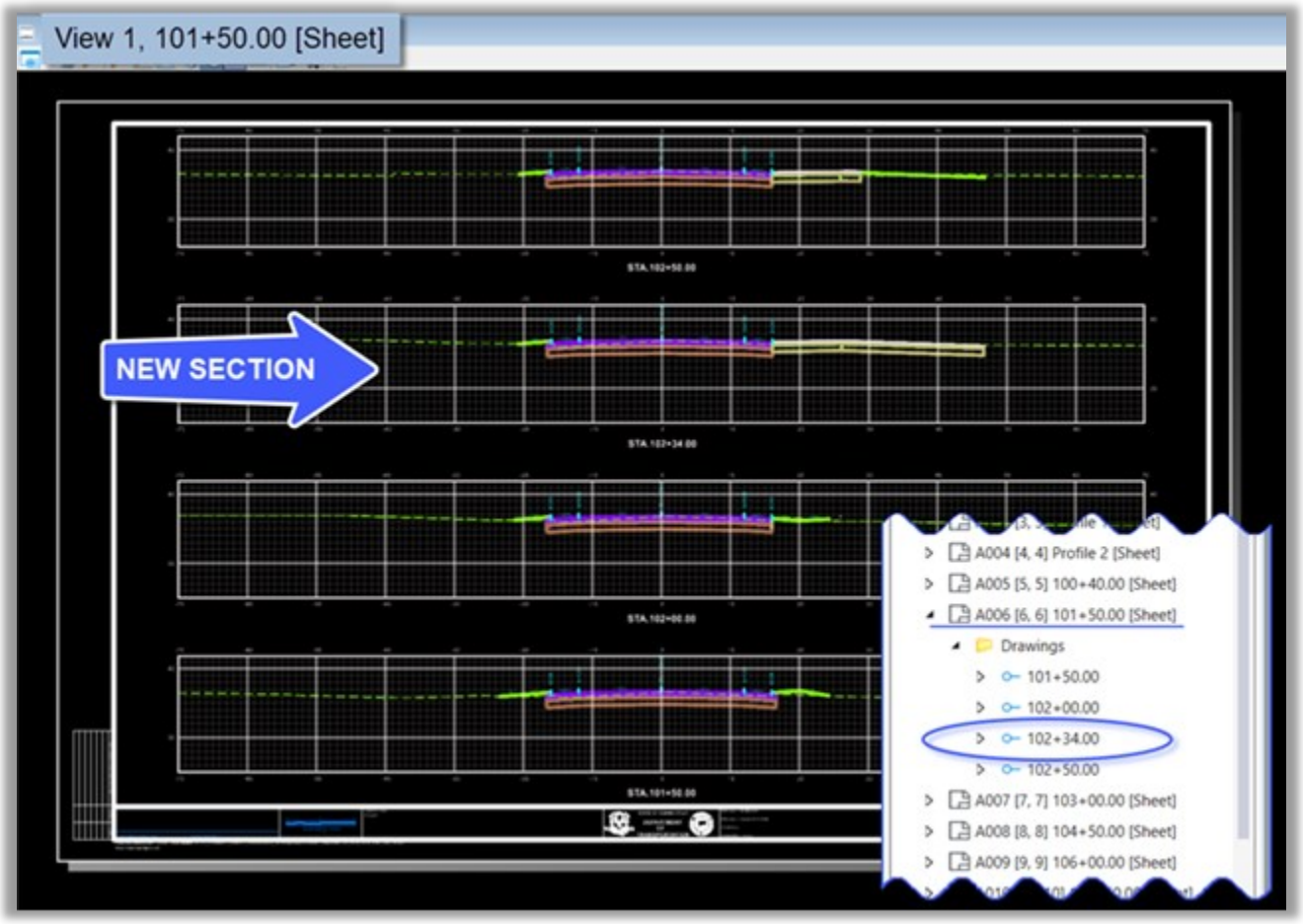


Figure 129

13. For the drawing model to be shown in the sheet index, refresh the sheet index.
14. Click on the Models icon to open the dialog. Here the **sheet model** for the added cross-section needs to be deleted. Select the sheet model (example: 102+34.00 [Sheet]), click on the Delete model(s) button.

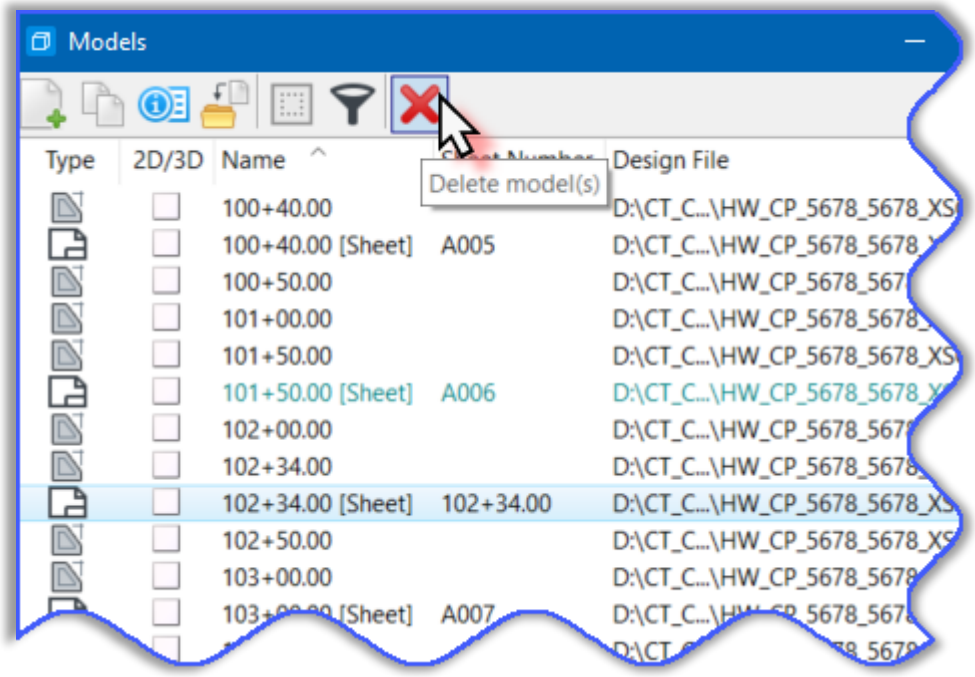


Figure 130

4.7.4 Deleting Cross-Section Sheets

Sometimes it is necessary to delete sheets. There are multiple parts to a sheet.

- The **Named Boundary** that defines the boundaries of what is shown in the cross-sections
- The **Drawing Models** for annotation and dimensioning
- The **Sheet Models** with the electronic drawing sheets – printed sheets

To completely delete the sheets, these all need to be deleted.

TIP: When it becomes necessary to delete sheets depending on the number of sheets for your project, it may be easier to create a new design model and start over and only delete the cross-section sheets from the sheet index.

1. Select ***Home > Primary > Models***. Select all of the ***Drawing and Sheet models*** for the cross-section views; example: 100+40.00 and 100+40.00 [Sheet], 100+50.00 and 100+50.00 [Sheet], 101+00.00 and 101+00.00 [Sheet], and so on (click on the first model, hold down the shift key and scroll to the last model, but leaving ***Default and Default-3D***). Click ***Delete Model(s)***. An Alert box may open, Click **Yes**. Close the Models dialog.

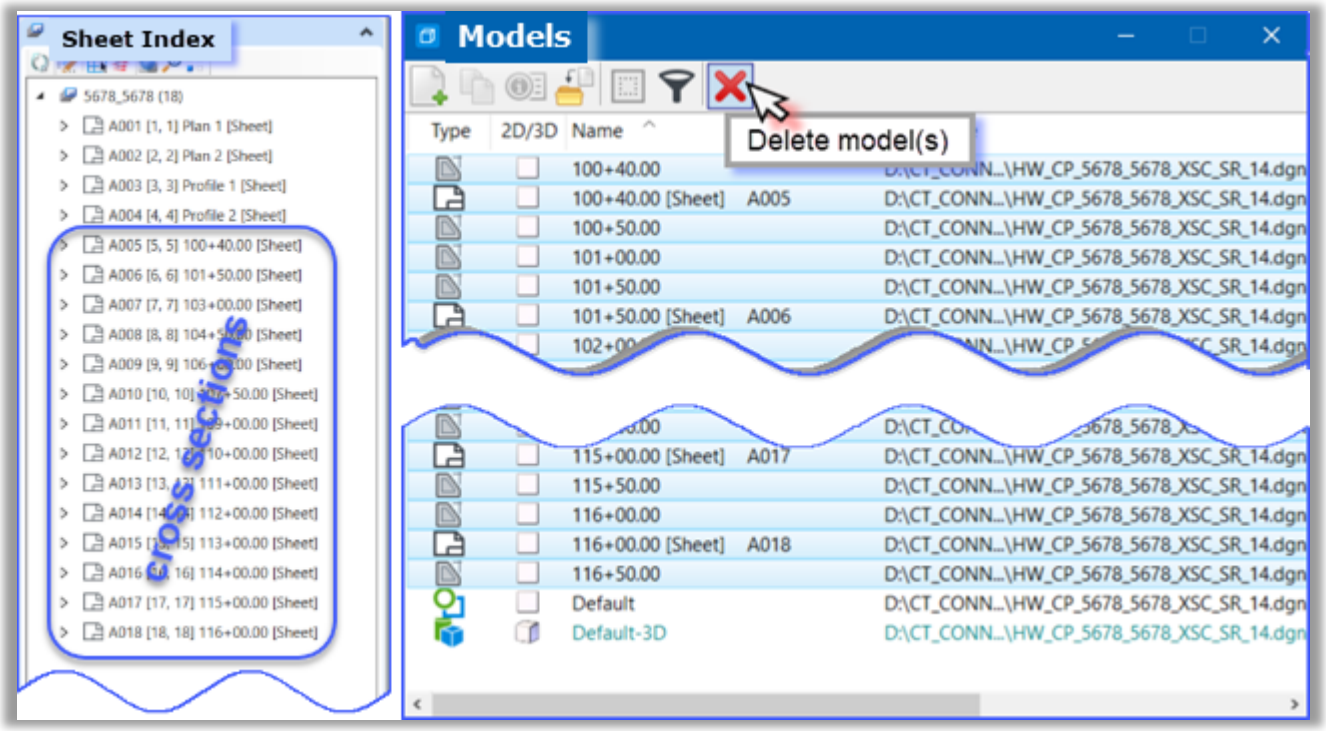


Figure 131

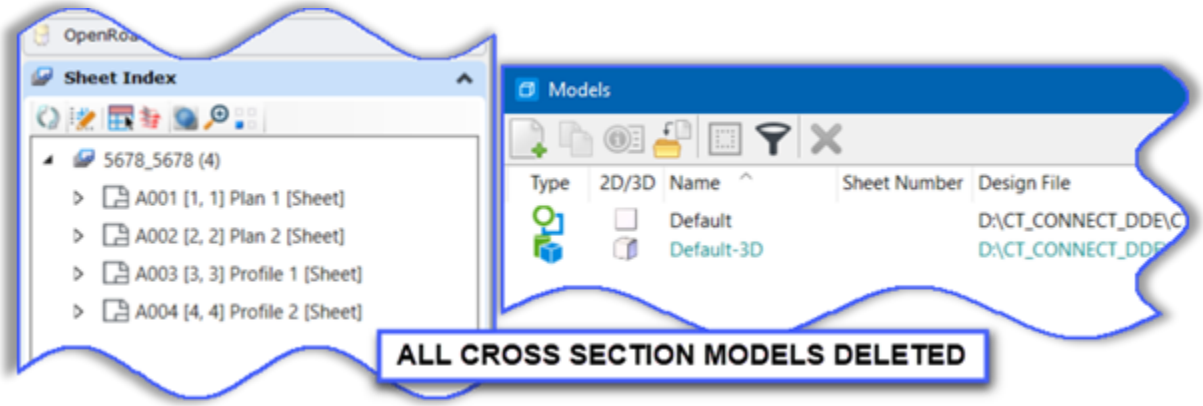


Figure 132

NOTICE: The sheet models are also deleted from the sheet index.

2. Delete the **Named Boundaries** for all Cross-Section Sheets. Open the ***Drawing Production > Named Boundaries Named Boundaries*** dialog.
3. Expand the ***Cross-Section Groups*** folder. Click on the ***Cross-Section group***, example: SR 14. In the Default-3D view all cross-section named boundaries should be highlighted. Click on the ***delete*** icon.

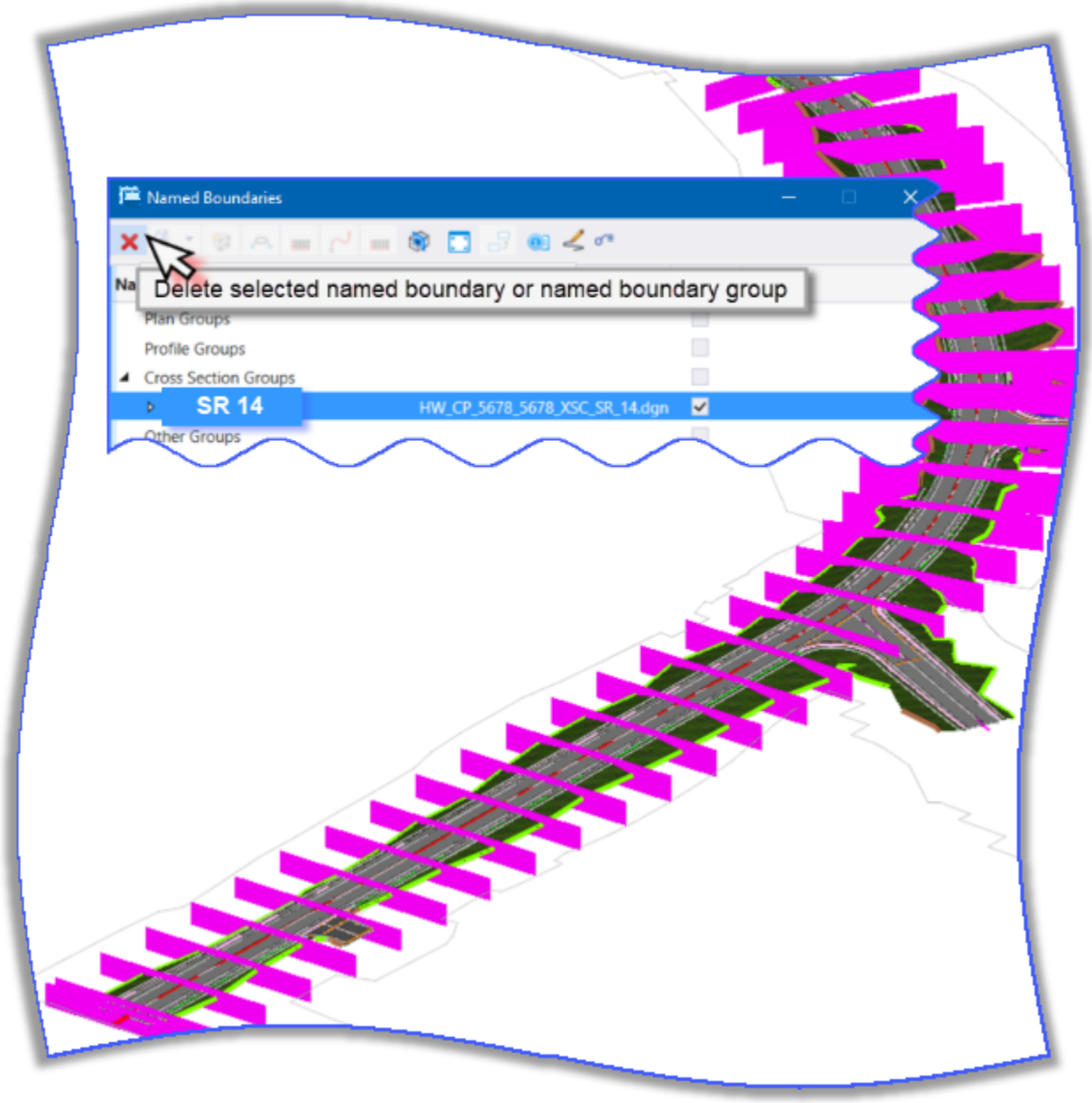


Figure 133

4. An Alert appears confirming the Named Boundaries and their associated saved views will be deleted. Click on **Yes**. Every boundary is deleted, review the Default and Default-3D views, if boundaries still visible, refresh the view.

4.7.5 Place Labels (Annotation)

As explained previously OpenRoads Designer includes the MicroStation Place Label tool which can read civil object data. Labels are associated with elements and can update and move as the reference element changes. Reference elements can be located in the active file or in a reference. The Place Label tool is used for call-outs.

There are four terms: **Text Style**, **Dimension Style**, **Text Favorite** and **Field**; that you should become familiar with when placing and editing labels.

Labels can be placed for plan, profile, and **cross-sections** objects.

- *Cross-Section labels* must be placed in **Drawing models**.
- *General Notes* for cross-sections should be placed in the sheet model.

Along the bottom of the Place Note or Place Label toolbox are three icons that define how the label behaves: *Annotation Lock - Association to Element - Relative Association to Element*

Labels created in OpenRoads have three parts: *Leader*, *Text*, and *Anchor Point*. Labels created in MicroStation only have the first two parts.

This module will cover some of the labeling tools, but not all. For more detailed descriptions and instructions go to the Bentley ORD Help Menu.

4.7.6 CTDOT Annotation Tools

The CT_CONNECT_DDE workspace has been set-up to ease the annotation for cross-section sheets, adjustments and additions are added periodically to the workspace.

Select the CTDOT workflow and click the CTDOT Tab. Here are tools set-up for each discipline and for various subject matters. These annotation tools have been set-up with appropriate attributes (level, color, line style, text style, dimension style) these should not be changed by the user.

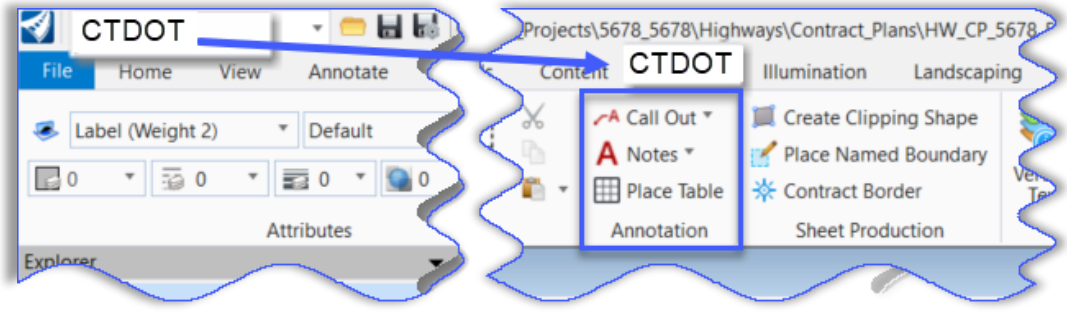


Figure 134

4.7.7 Labeling and Annotation for Cross-Sections

For cross-section annotation a lot of automation has been set up for the user. When creating the cross-sections drawing models the following annotation will be placed:

- Station
- Breakpoints: Edge Of Road, Shoulder, Elevation (centerline or baseline)
- Slopes within roadway in %
- Slopes of cut and fill in H:V

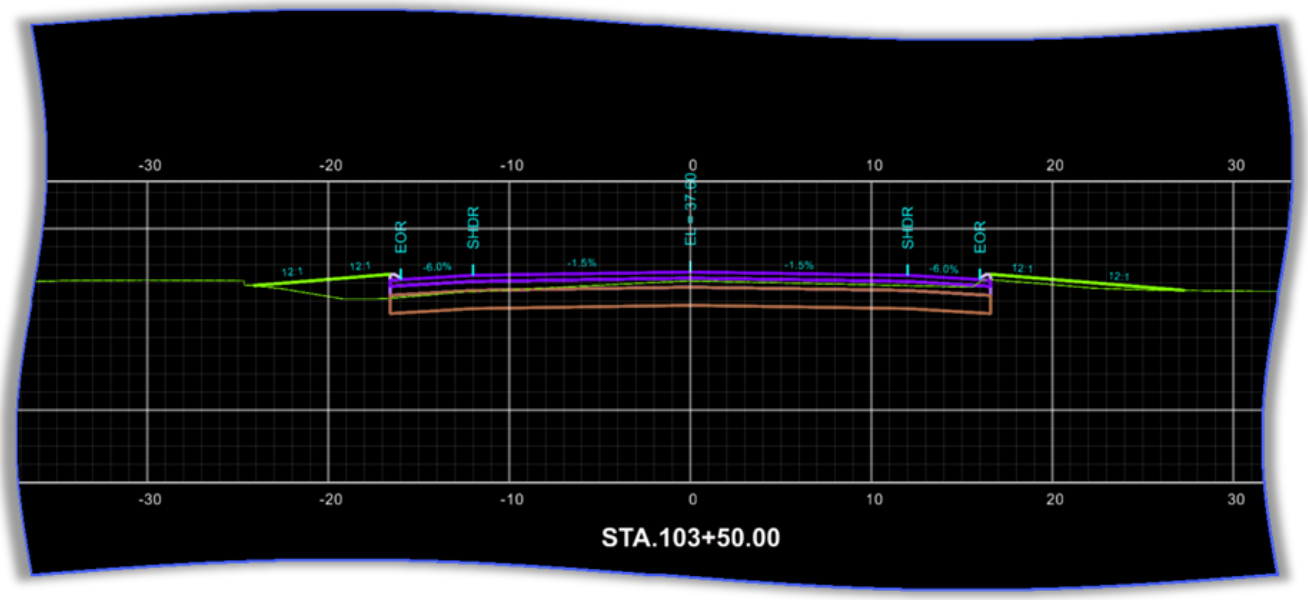


Figure 135

4.7.8 Adjust the Existing Ground Dashed Line Display Settings

It is CTDOT's standards to show the existing ground display as a dashed green line on the cross-section sheets. There is a setting that needs to be adjusted after the sheets are created so the dashed line shows up properly on the Cross-Section Sheets.

Please Note: *This will be done after the Place Named Boundary Civil Cross-Section tool is used to cut and create the cross-section sheets.*

1. Open the 3D Model that houses the Cross-Section's Named Boundaries.

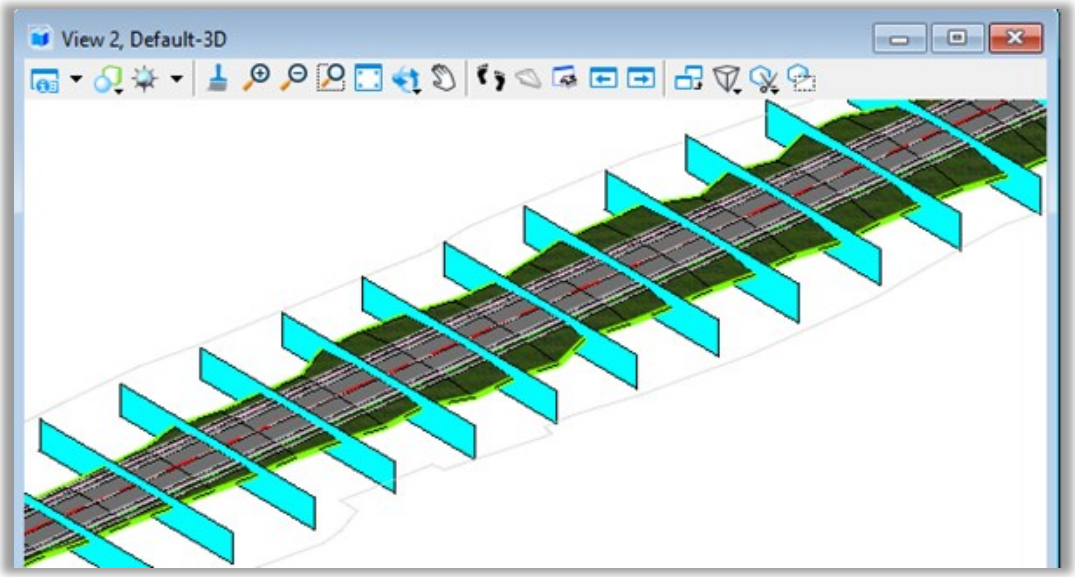


Figure 136

2. Click on the **Element Selection** Icon. In the Element Selection dialog box choose the **Down Arrow** to Show Extended Settings. Click on the **Element Class** tab and select the Element Class **Construction**.

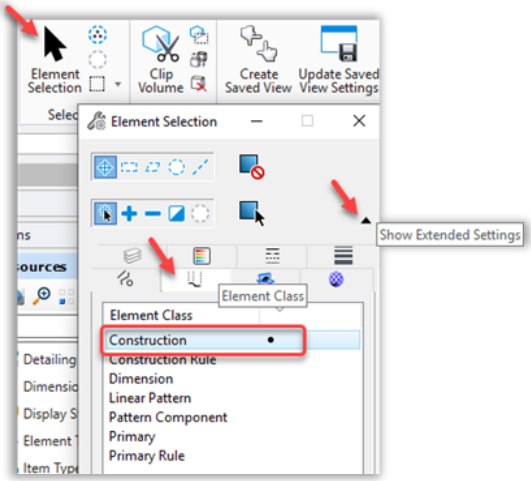


Figure 137

3. In the Properties dialog box select all the **Named Boundaries** at once. Change the ***Back Depth to -.001***.

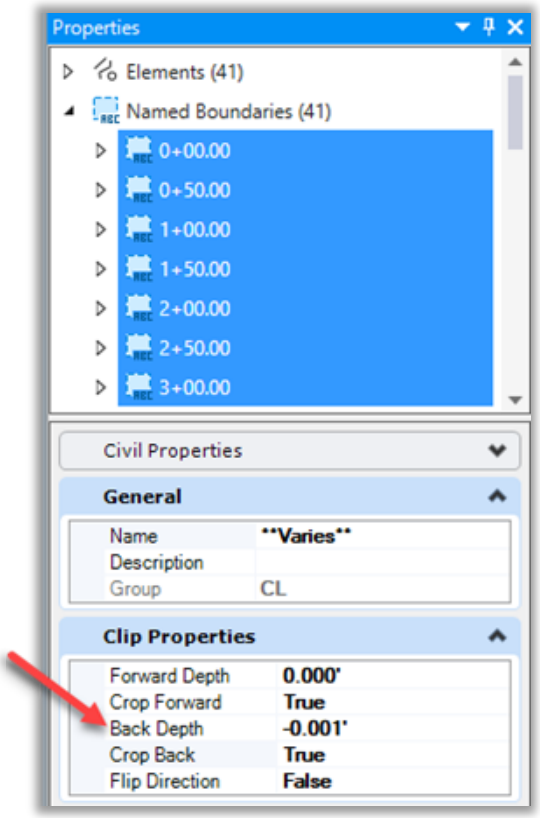


Figure 138

4. Open several Cross-Sections Sheet Models to view the correction made to the existing ground dashed lines. Below is a screen shot of a pdf showing the before and aftereffects of applying the adjustment.

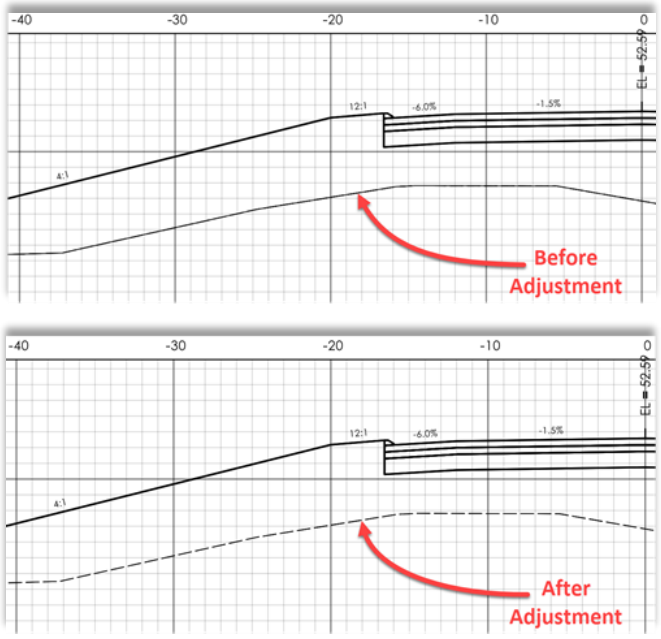


Figure 139

Section 5 – Traffic Signal Sheets

5.1 Create New File

Before attempting to open or create DGN files users should make sure the following is in place:

1. CTDOT users should have the CTDOT CONNECT DDE synced through SharePoint with the COMPASS Project Synced along with the CAD Configuration.
2. Consultants should have CTDOT DDE properly installed or be syncing to the CTDOT DDE SharePoint/COMPASS system.
3. Make note of the **Coordinate System** you will be working in. If you have existing survey data, you will need to find out what system is being used **(NAD 83/NAVD 88 or NAD 27/NAVD 29).**
4. Log on to the CONNECTION Client. Bentley CONNECT licensing requires users to log into their Bentley account to secure a software license. CTDOT users should log in using your CTDOT email address and Bentley password. If you do not see the dialog box, select the ^ icon on the bottom Windows Screen. Click on the Connection Client Icon and select Open.
5. Access OpenRoads through Accounting or the Customized Icon following
6. On the OpenRoads open screen select **Custom Configuration**, using the small drop-down arrows select the Workspace **CT_Workspace**, the needed **WorkSet** and **Role**.
7. Select the **New File** icon. In the New dialog box browse to the ***Traffic/Contract_Plans*** folder.
8. The Seed file should be set to ***Seed2D - CT RoadDesign.dgn***. If this is not the case, click on the **Browse** button. Browse to **...CT_Configuration \ Organization \ Seed \ Road** and select **Seed2D - CT RoadDesign.dgn**

   If the survey was done in an old Datum, use the 2D Seed Files in this folder ***...CT_Configuration|Organization|Seed|GCS|***
9. In the ***File name*** field enter a name for your file using the CTDOT file naming structure.

   Example: ***TR_CP_1234_1234_Signal_123_123.dgn***
10. Select **Save** and the new file will open.
11. If it has been determined the provided survey is in NAD 27/NAVD 29 you will need to re-project your design file's Geospatial Header.

5.2 Set up the Default Model

1. Select the **CTDOT** workflow and click on the **Attach** tab, in the ***References Section*** click on **Attach Reference**.
    - Reference the needed Proposed Base Model dgn files including but not limited to:
    - Signal
    - Signing and Pavement Markings
    - Alignment
    - Highway
    - Drainage
    - Bridge/Structures
    - Illumination
2. In the Attach Reference Box browse and select the desired file and click **Open**. In the Reference Attachment Dialog Box choose:

    Model: Most likely it's "***Default***" but this could vary depending how the file has been set up.
    Nested Attachments: *No Nesting*
    Global LineStyle Scale: *Master*
3. Click **OK** finish the Attachment process.
4. Repeat Steps 1 - 3 for all Proposed Base Models
5. Select **Level Display** and turn off or on the desired levels.
6. Reference the Existing Survey dgn files. Select the **CTDOT** workflow and click on the **Attach** tab, in the ***References Section*** click on **Attach Reference**.
7. In the Attach Reference Box browse the ***Active Survey Folder*** and select the desired Existing Survey DGN file and click **Open**. In the Reference Attachment Dialog Box choose:

    Model: Most likely it's "***Default***" but this could vary depending how the file has been set up.
    Nested Attachments: *No Nesting*
    Global LineStyle Scale: *Master*
8. Click **OK** finish the attachment process.
9. If the Survey does not line up with the Proposed Design File it is most likely an older Survey File that was created with V8i. Older files will need to be referenced in with certain settings to get them to line up in the correct geospatial location.

    Select the **Home** Tab, in the **Primary Section** select the **Attach Tool** drop down and choose **References**. This will open the References Dialog box.

    Turn **True Scale** off and set the Scale to ***1:1***.

10. Each existing Survey File may need to be referenced twice so some levels can be **BOLD** and other levels SCREENED when creating the PDF plans.

    This can be done by using a specific Logical Name in the Reference Attachment Properties:

    BOLD Ground Survey – Will leave all levels in this reference unscreened when the PDF is created.

    Common features to be bold:

    - Edge of Road
    - Right of Way Lines
    - Utility Poles and other Above Ground Utilities
    - Sidewalks
    - Catch Basins
    - Rock Walls
    - Fences

    SWW Ground Survey – Will leave all levels in the reference screened with the displayed line weights when the PDF is created.

    Common features to be screened:

    - Trees
    - Underground Utilities and Storm Water Pipes
    - Pavement Markings

11. Select **Level Display** and turn off or on the desired levels for each referenced Ground Survey.

    Note: *For signal revisions with no proposed roadway work (realignments or widening) it is common in the BOLD Ground Survey reference to turn off all the levels except for the existing edge of road, drainage structures, right of way, guiderail, utility poles and related text Levels. These levels will not be screened in this reference file. All the other levels will be screened in the SWW reference file. In this case the SSW Ground Survey reference would have the Bold levels off and all the others needed levels displayed on.*

12. Use the Update Sequence dialog box to reorder Reference attachments (appear behind or in front of other references) or active file elements In the Reference dialog box, go to **Settings > Update Sequence**. In the Update Sequence dialog box select the Reference (or active file) and then click the up or down arrow buttons to move the file up or down. The order listed is how the updated data appears in the view - lower files/elements appear above higher elements.

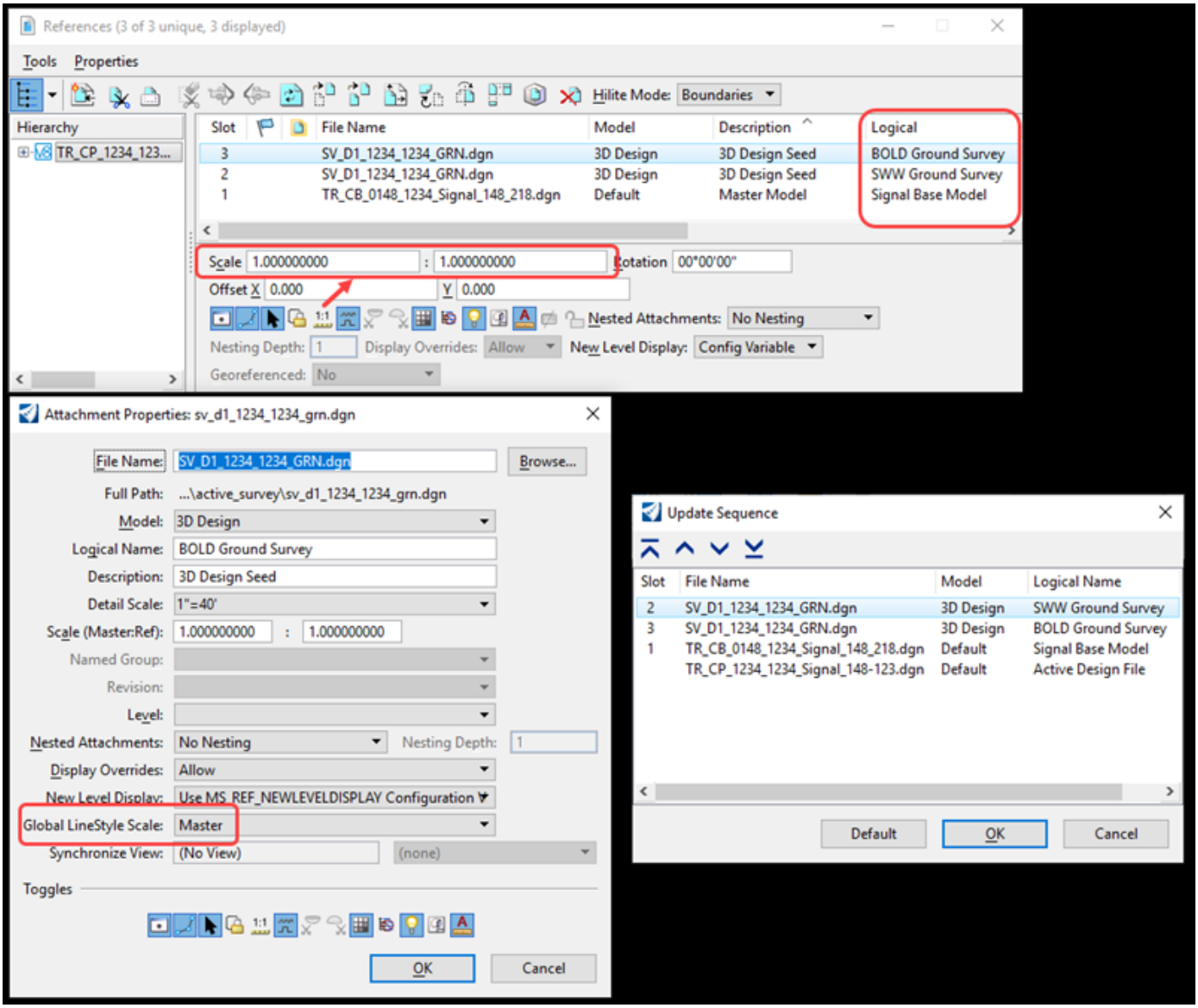


Figure 140

13. Rotate the view so that the main road is parallel to the screen. On the **View Window** select the **Rotate View** tool. Use the **2 Points** Method. Follow the prompts to rotate the view.

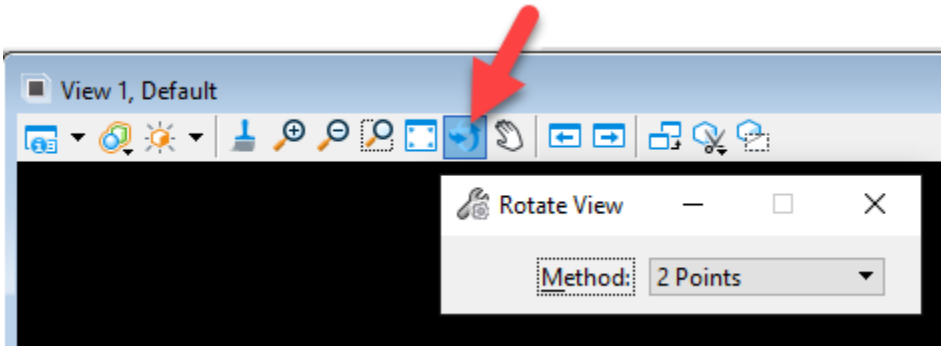


Figure 141

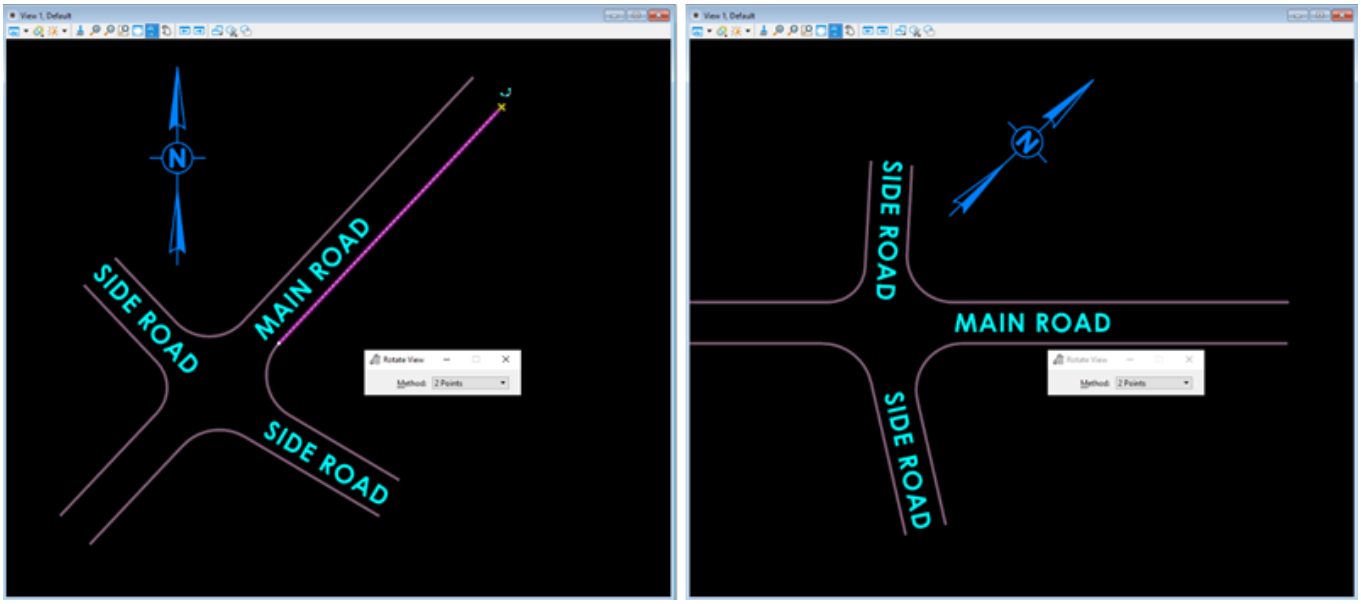


Figure 142

14. Select **Save Settings**.

5.3 Use Place Name Boundary to Create a Sheet Model

1. Select the **CTDOT** workflow and on the **Annotate** tab locate the **Detailing** section and select the bottom right **Styles button**. In the Detailing Symbol Styles dialog right click on ***CV_Detail*** and select **Activate**.

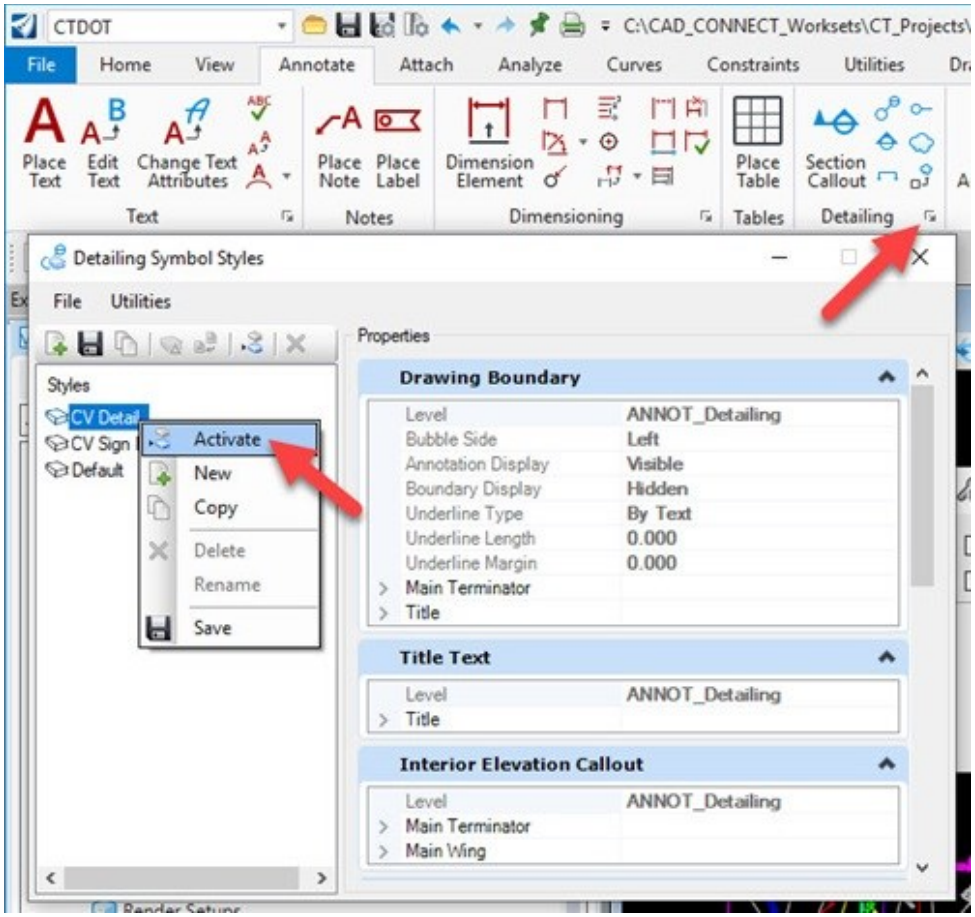


Figure 143

2. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.

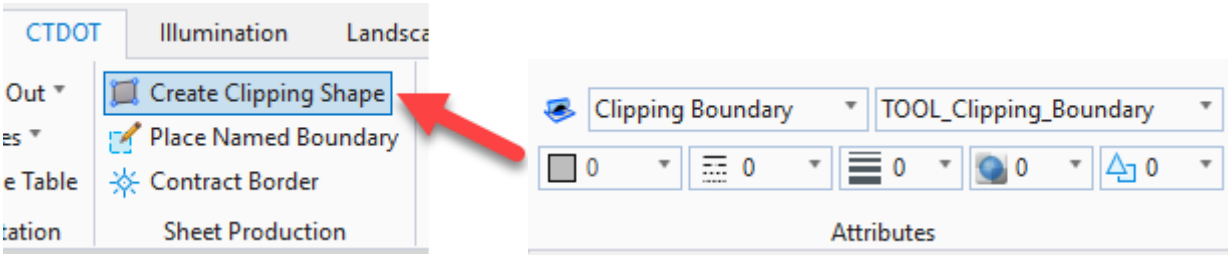
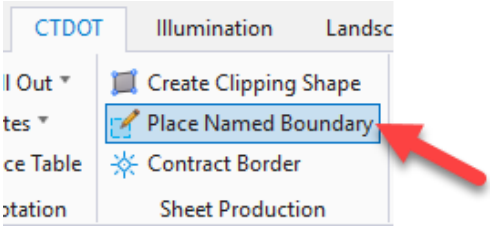
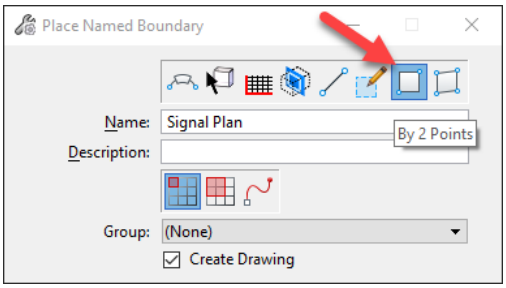


Figure 144

3. Select the **Place Named Boundary** tool and the Place Named Boundary Dialog box will appear.



4. In the Place Named Boundary dialog box. set the following options in the tool's settings window:
5. **Method (icon): By 2 Points**
6. ***Name:* Signal Plan**
7. ***Mode (icon):* Place Single Named Boundary**
8. ***Create Drawing:* Enabled**



9. Follow the prompts to place a Named Boundary (Clipping Boundary) around the design. Data point first in the lower left and ending in the upper right. This element can be edited later to refine the shape and add additional points.
10. After accepting the placement of the named boundary the Create Drawing dialog box will appear. Ensure the following options are set:
    - Name: **Signal Plan**
    - Drawing Seed: **Signal Plan**
    - Create Drawing Model: **Enabled**
    - Annotation Scale: **Full Size 1" = 40'**
    - Create Sheet Model: Enabled
    - Sheets: **New**
    - Annotation Scale: **Full Size 1 = 1**
    - Drawing Boundary: **New**
    - Detail Scale**: 1"=40'**
    - Add to Sheet Index: **Disabled**
    - Open Model: **Enabled**

11. Click **OK**. The newly created sheet model will open with the Named Boundary referenced and centered onto the sheet.

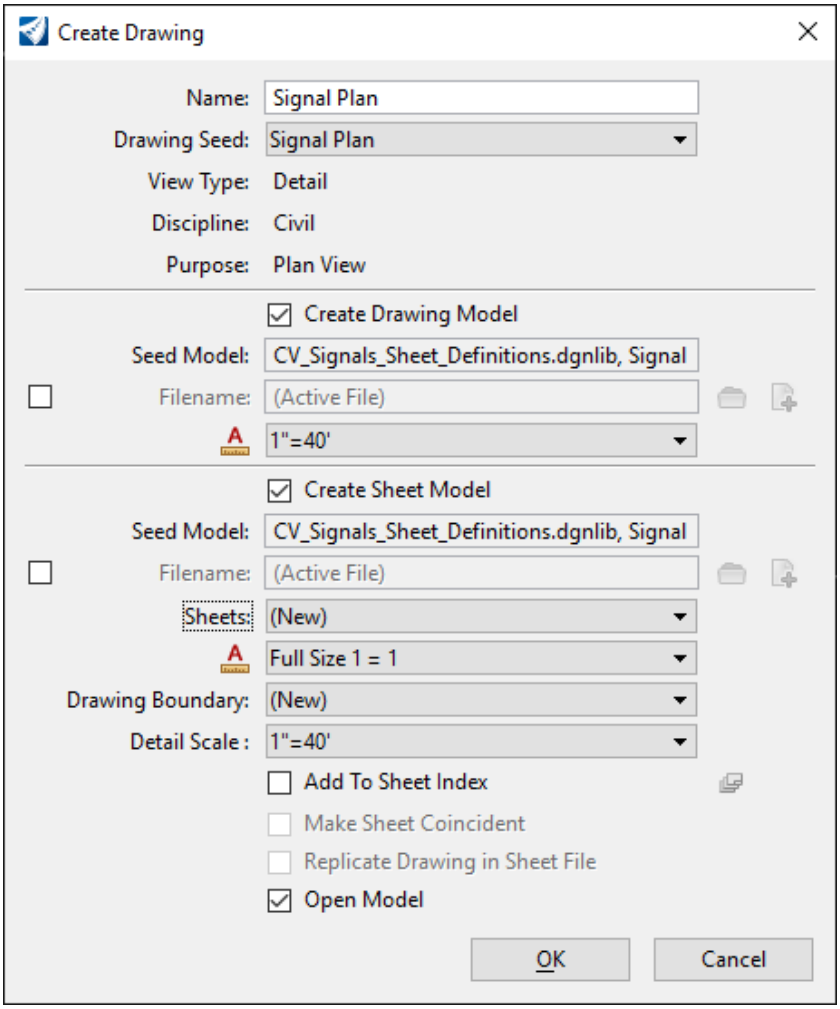


Figure 145

5.4 Edit the Title Block

1. From the Ribbon click on the **Models** icon and select to open the ***Sheet Model***.
2. View the **Properties** of the model. Notice the Sheet Model's Annotation Scale is ***Full Size 1 = 1***.
3. In the **Properties** dialog box edit or fill in the following fields:

- Description: ***TRAFFIC SIGNAL CONTROL PLAN***
- Sheet Number: ***TR-01***

Notice the ***Drawing Number*** in the Title Block will be updated to match the Properties.

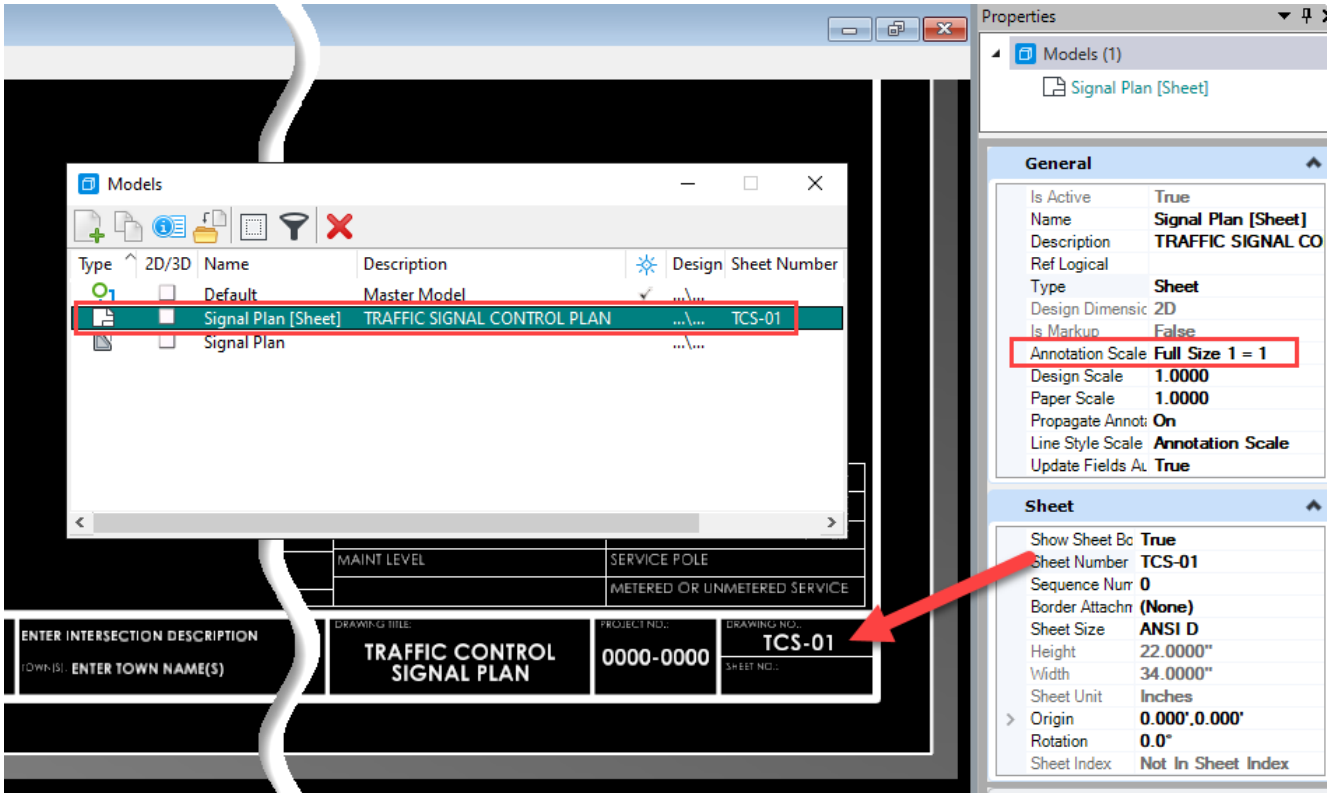


Figure 146

4. Use the **Edit Text** tool to update the ***ENTER INTERSECTIO DESCRIPTION*** **and ENTER TOWN NAME(S)**.

5. Open the **References** Dialog box and double click on the file to view the **Attachment Properties** of the reference. The Drawing Model will be referenced in at a ***1" = 40'*** Detail Scale.

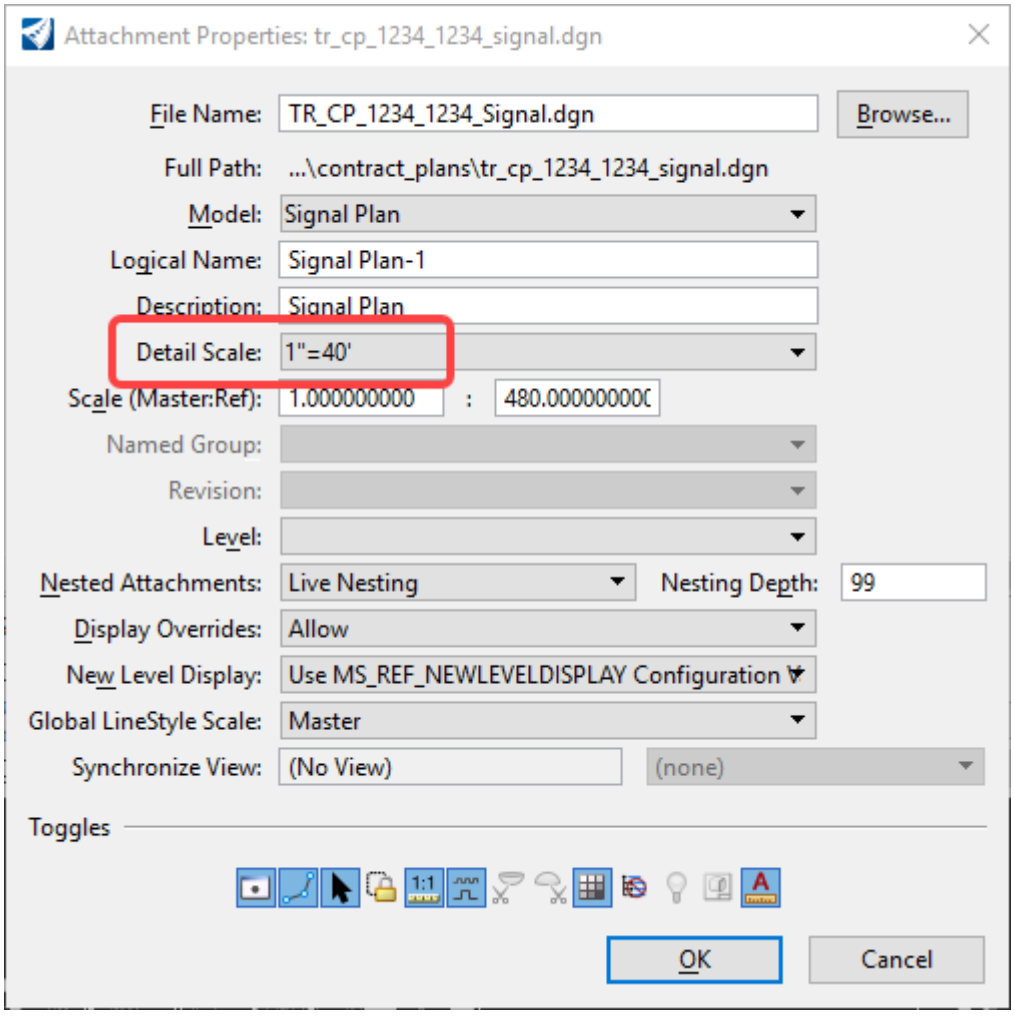


Figure 147

6. Select **Save Settings**.

5.5 Adjust the Named Boundary

1. From the Ribbon click on the **Models** icon and select to open the Default Design Model.
2. On the Ribbon select **Home > Selection** and make the **Element Selection** tool active.
3. Select the Named Boundary shape and adjust by dragging the handles to the desired location.

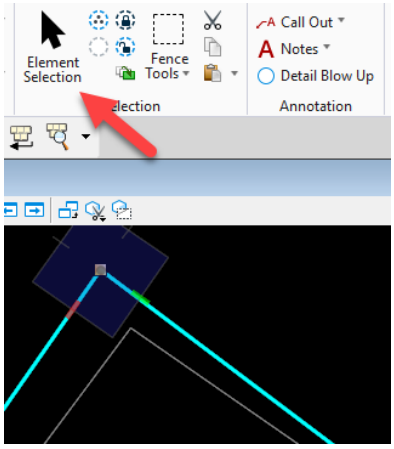


Figure 148

4. The **Insert Vertex** or **Delete Vertex** tools can also be used to edit the shape.

Figure 149

5. Return to the sheet model by hovering the cursor over the Marker and click the **Signal Sheet** and select the folder Icon (Open Target Tool). This action returns you back to the sheet model. Notice that by changing the boundary in the design model, this has propagated to the sheet.

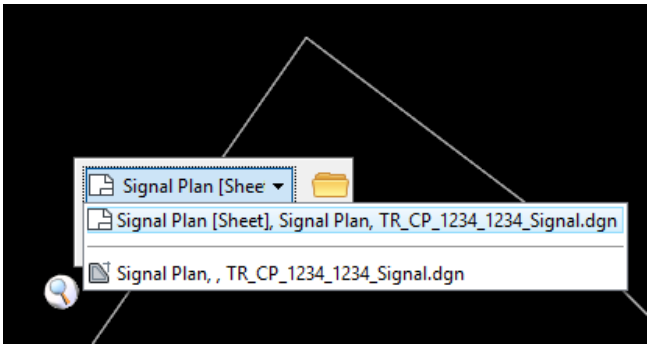


Figure 150

6. Models can also be opened using the **View Group** drop down tool located at the bottom left of the screen.

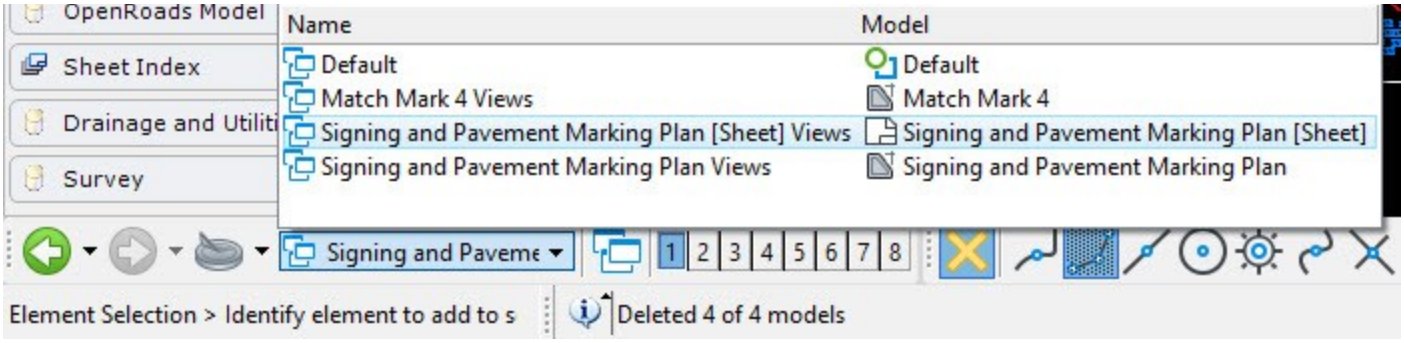


Figure 151

7. Select **Save Settings**.

5.6 Move the Name Boundary Inside the Sheet Border

1. From the Ribbon click on the **Models** icon and select to open the ***Sheet Model***.
2. Select the **References** Icon, in the dialog box right click on the file, select move to re-position the reference file within the border.
3. Follow the prompts to execute the move command.

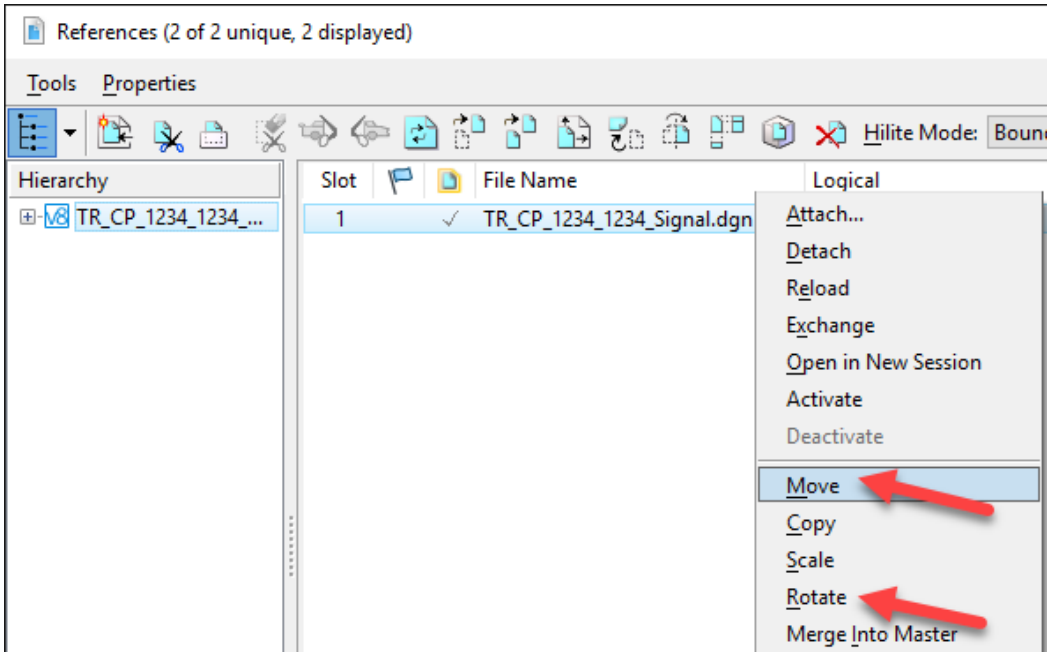


Figure 152

4. Select **Save Settings**.

5.7 Additional Reference Settings in the Sheet Model

1. From the Ribbon click on the **Models** icon and select to open the Sheet Model.
2. Open the References dialog box and select the reference file, toggle the **Scale Line Styles By Reference Scale** so the lines appear to be the correct size.

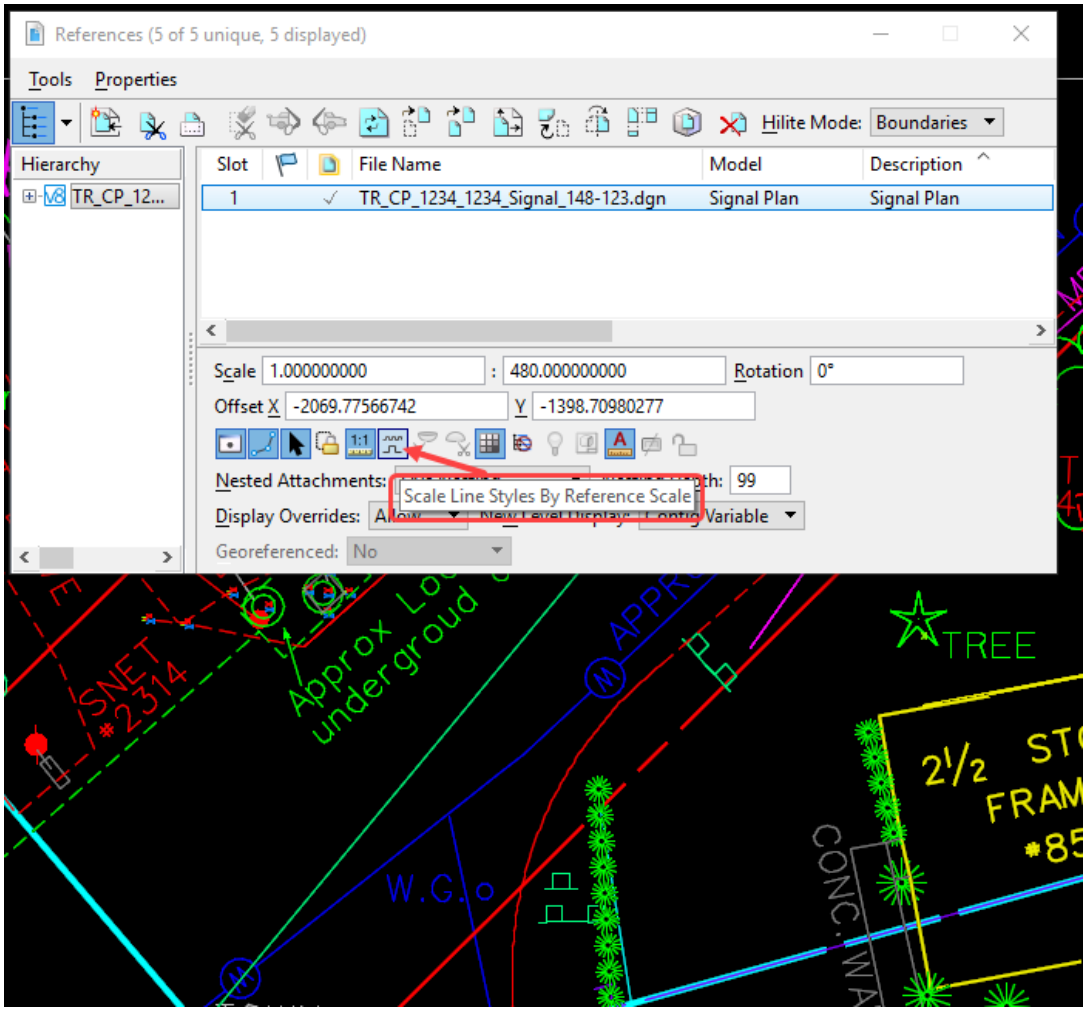


Figure 153

3. If the user would like the Levels that are on and off in the Default Design Model to auto-match in the Sheet Model select **Never** in the **Display Overrides**.

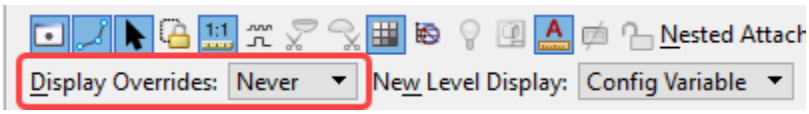


Figure 154

5.8 Create Match Marked Areas

1. If the design is too large for the sheet, Match Marks will be required and additional Named Boundaries will need to be created.
2. Go back into the Design Model and place another Named Boundary adjacent to the original named boundary. This will be the Match Mark.
3. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.
4. Select the **Place Named Boundary** tool and the Place Named Boundary dialog box will appear, set the following options:
   - Method (icon): ***By 2 Points***
   - Name: ***Signal Plan Match Mark 1***
   - Mode (icon): ***Place Single Named Boundary***
   - Create Drawing: ***Enabled***
5. Follow the prompts to create a named boundary of the around the additional area.
6. After accepting the placement of the named boundary the Create Drawing dialog will appear. Ensure the following options are set:
   - *Name*: ***Signal Plan Match Mark 1***
   - *Drawing Seed*: ***Signal Plan***
   - *Create Drawing Model*: ***Enabled***
   - *Annotation Scale*: ***Full Size 1" = 40'***
   - *Create Sheet Model*: ***Enabled***
   - *Sheets*: ***Signal Plan [Sheet]***
   - *Drawing Boundary*: ***New***
   - *Detail Scale*: ***1" = 40'***
   - *Add to Sheet Index*: ***Disabled***
   - *Open Model*: ***Enabled***
7. The existing Sheet Model will open, move the reference to the desired location on the sheet.
8. Select **Save Settings**.

5.9 Annotate the Drawing Models

Note: Annotation will be placed in both the Drawing Models and the Sheet Model.

- Call-outs and Dimensions should be placed in the Drawing Models. Placing the Call-Outs and Dimensions in the Drawing Model will make it easier to move each detail inside the Sheet Model's Border as the Features and Annotation will all move together.
- Notes that pertain to the whole sheet can be placed in the Sheet Models.

1. Open a Drawing Model and use the tools on the **CT DOT** Ribbon's, **Annotation** section to place **Call Outs**. Select **Label Small (Weight 0)** and follow the prompts for placement.

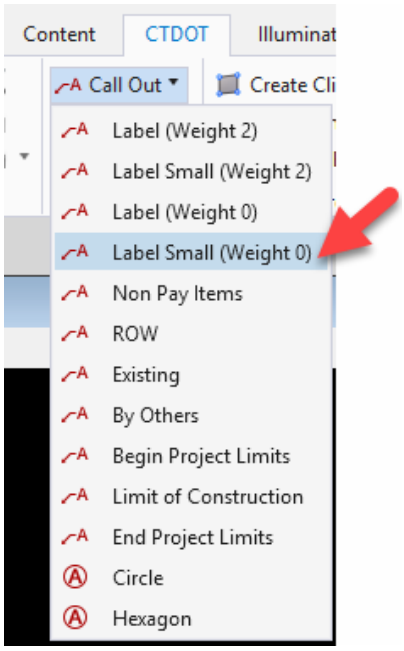


Figure 155

2. Any Property of an Element can be targeted for annotation automation by using the **Insert Field** tool. Select the **Label Small (Weight 0**) tool. In the **Text Editor** dialog box select the **Insert Field** icon.

Figure 156

3. For Field Type select **Element Properties** and **OK**.

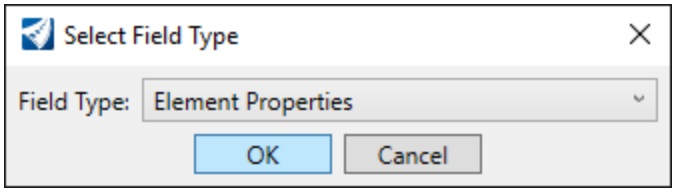


Figure 157

4. Click on the element you would like to annotate, and the Fields Editor will pop up. Select the **desired field** and click **OK**. In this example a cell with an Item Type was selected and the Item_Description field will be annotated.

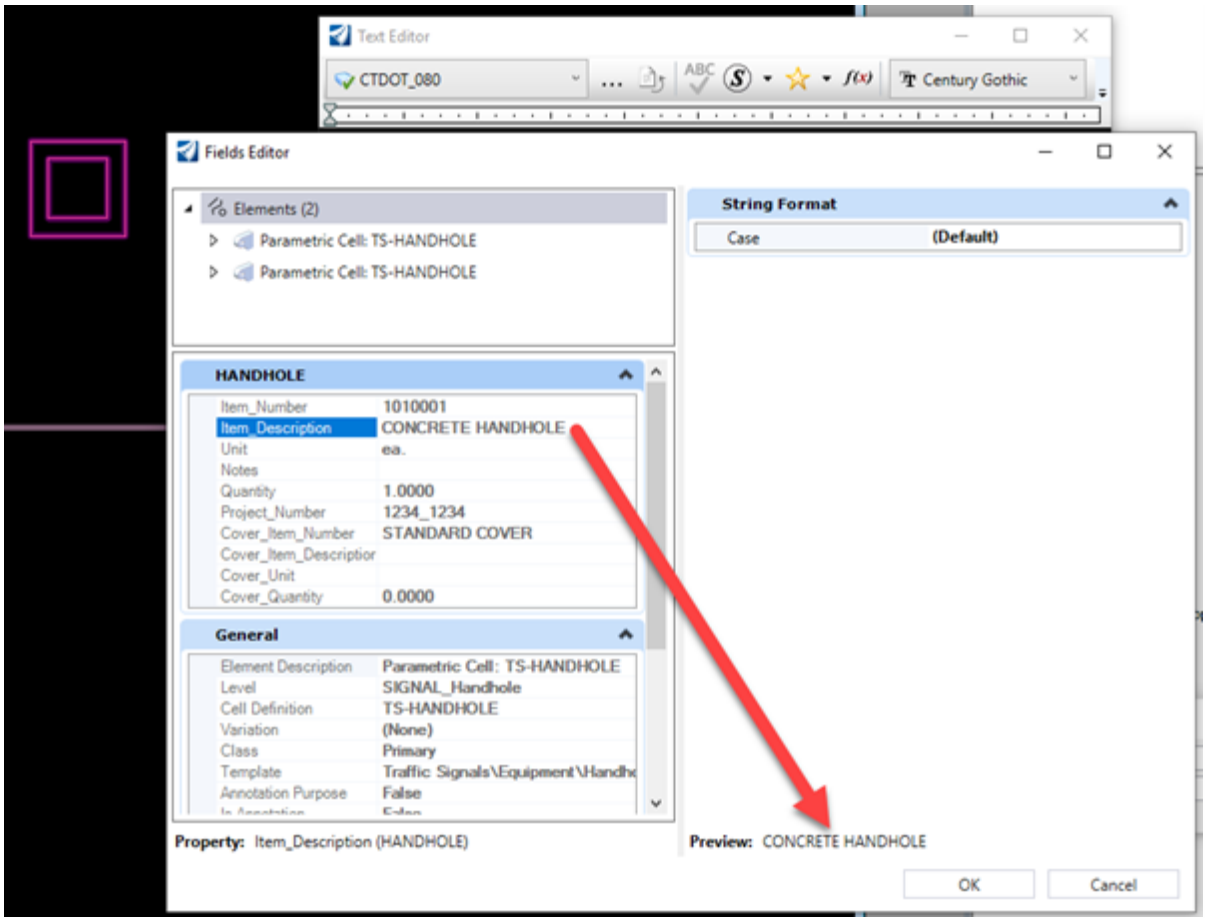


Figure 158

5. Follow the prompts to place the call out.

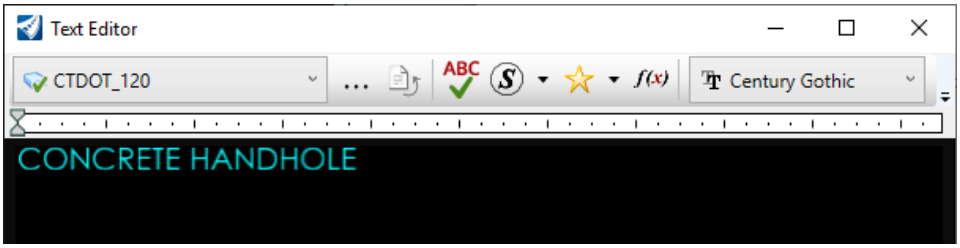


Figure 159

Figure 160

6. Use the **Note** pull down menu's, **General Note Small** tool. In the Text Editor dialog box select the **Insert Field**.

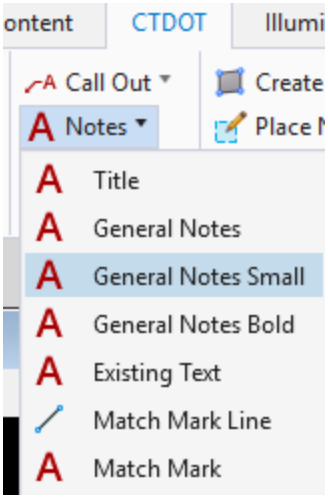


Figure 161

7. Click on the element you would like to annotate, and the Fields Editor will pop up. Select the **desired field** and click **OK**. In this example a cell with an Item Type was selected and the **ID_Number** field will be annotated.

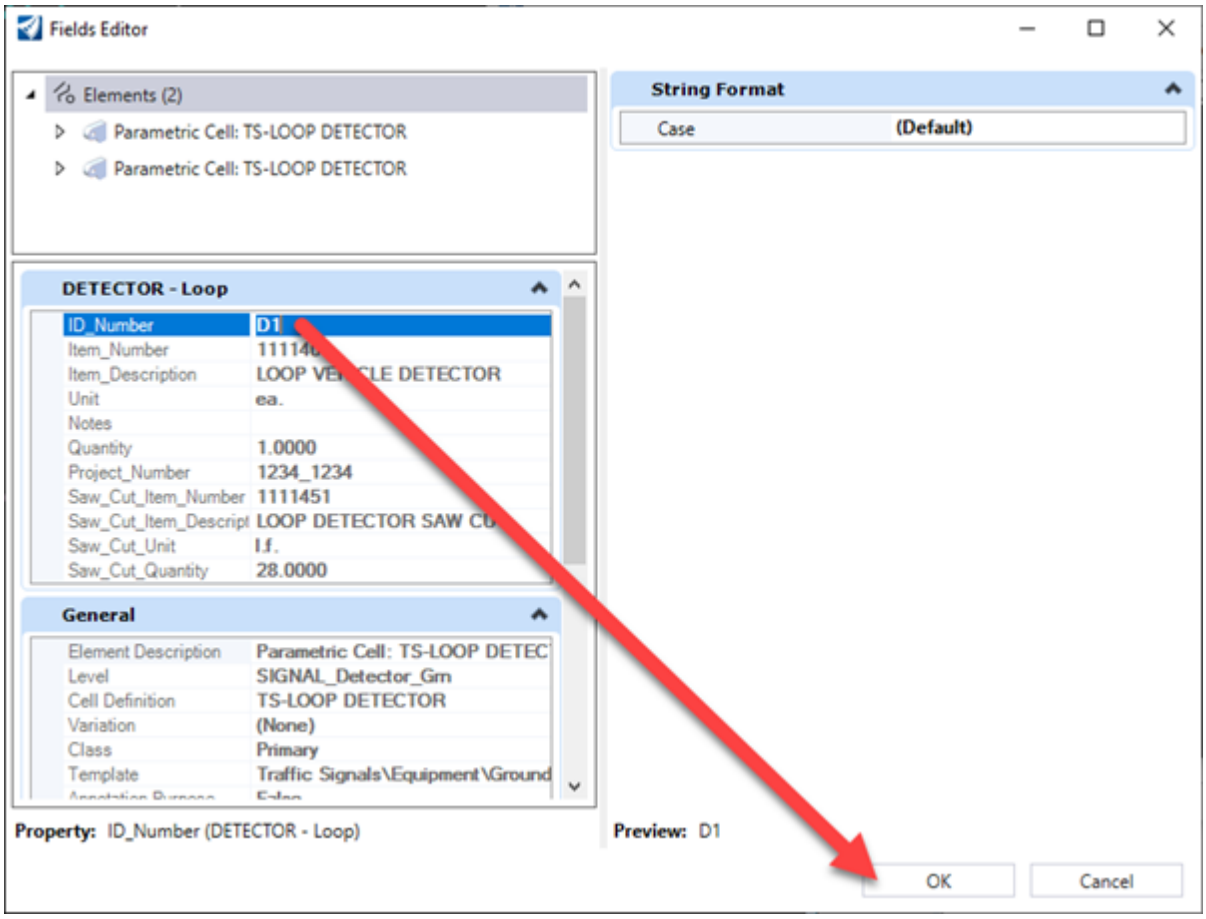


Figure 162

8. Follow the prompts to place the note.

Figure 163

9. Match Marks are to be placed in the Drawing Model using the tools in the **Notes** pull down menu.

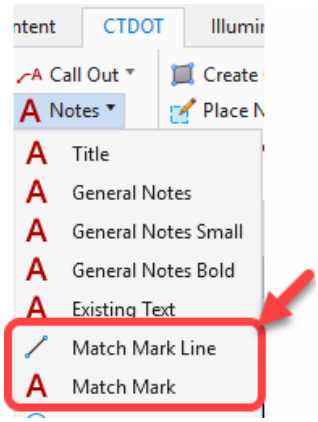


Figure 164

10. Place Dimensions in the Drawing Model. To place a Dimension, select either the **Vertical** or **Horizontal** Text Tool on the **CTDOT** ribbon, then select one of the desired **Dimensioning** tools. The Element Dimensioning dialog box will appear, select the desired **Dimension Style** and enable **Association**.

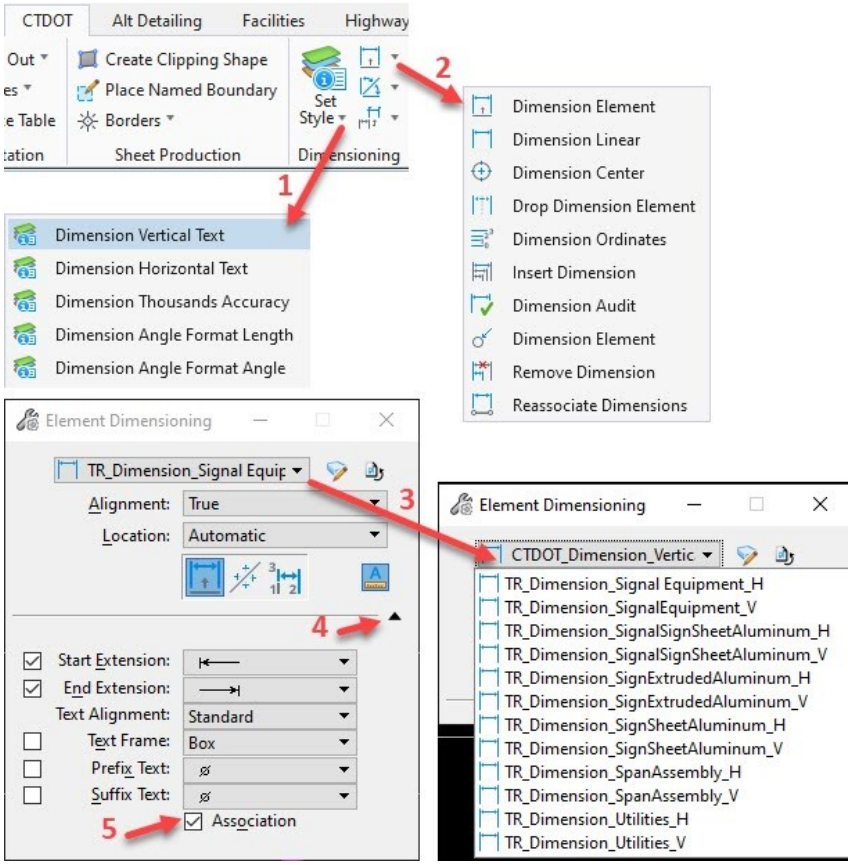


Figure 165

11. *Note: To correctly dimension elements being referenced from in old survey files it is suggested to make copies of the delivered dimension styles and in the Units tab add a scale Factor of 480.*

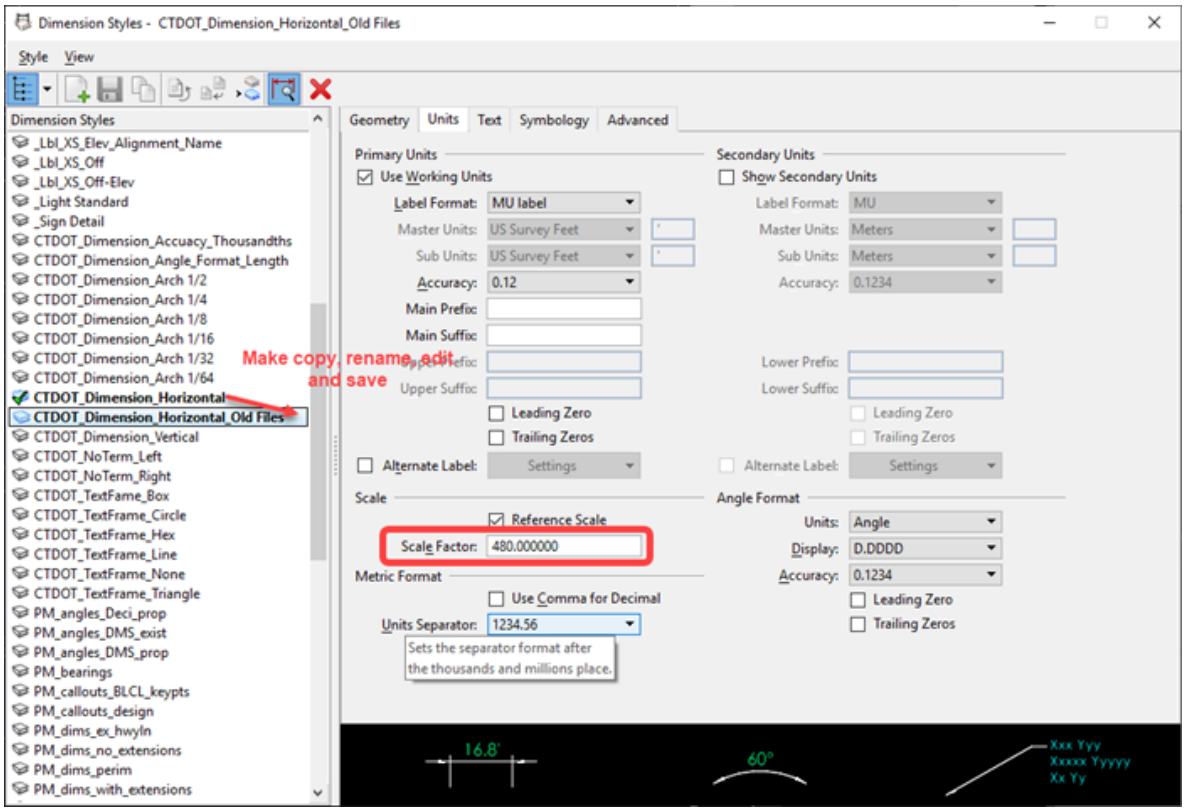


Figure 166

5.10 Annotate the Sheet Model

Note: *Annotation will be placed in both the Drawing Models and the Sheet Model.*

- *Call-outs and Dimensions should be placed in the Drawing Models. Placing the Call-Outs and Dimensions in the Drawing Model will make it easier to move each detail inside the Sheet Model's Border as the Features and Annotation will all move together.*
- *Notes that pertain to the whole sheet can be placed in the sheet models.*

5.10.1 Detailing Cell Library

Choose the **CTDOT** workflow and select the **CTDOT** tab. In the **Detailing** section select **Miscellaneous > Open Signal Detailing**. A cell library will open, this cell library contains Tables, Turning Movements and Signal Face Details. Double click to activate the needed cell and follow the prompts for placement.

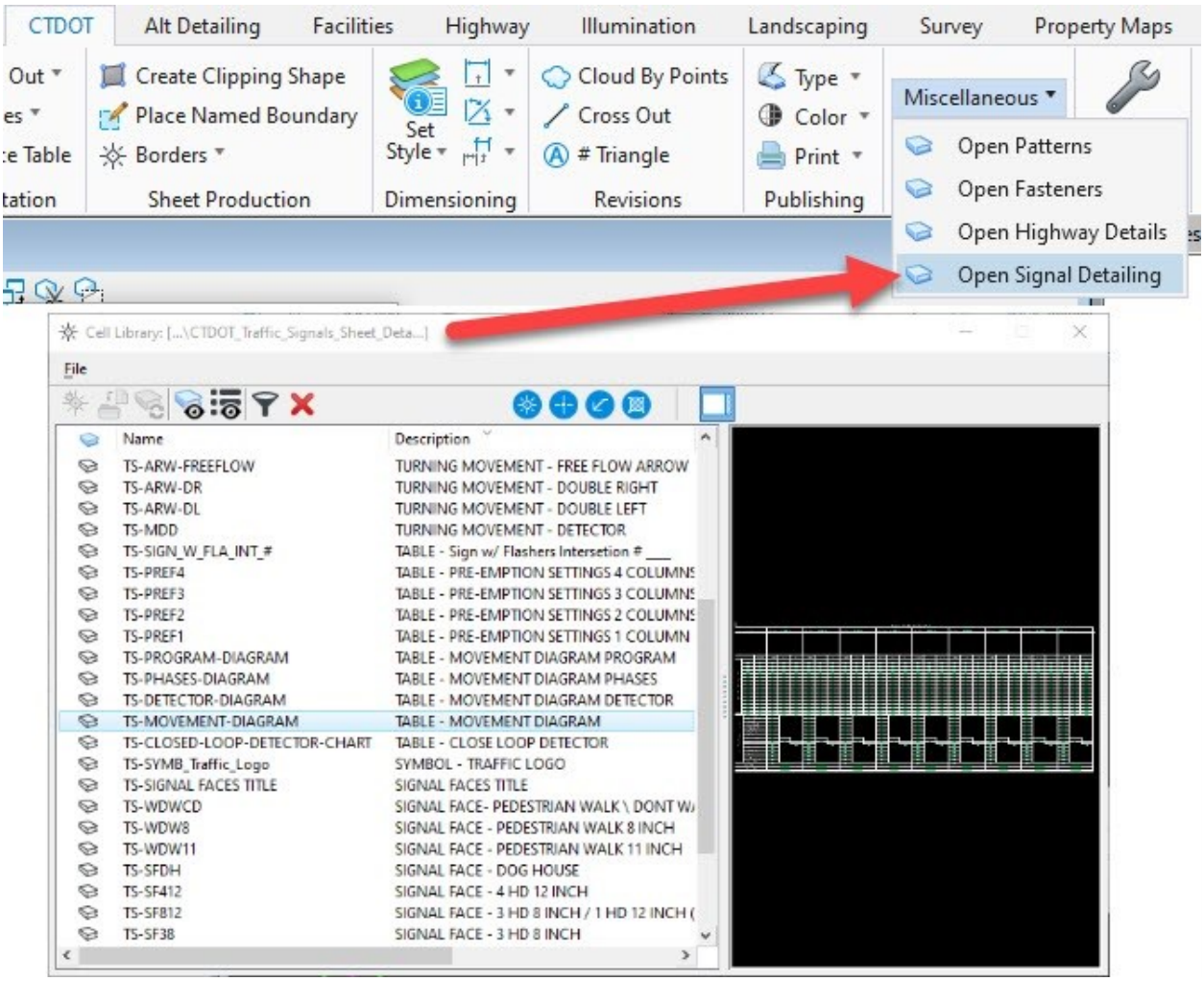


Figure 167

1. Several tables have been created and can be used instead of the Cells in the Detailing Cell Library. From the Ribbon click on the **Models** icon and select to open the Sheet Model.
2. On the **CTDOT** Ribbon select the **Annotate** Tab and click on the **Place Table** icon.

   Preconfigured Custom CTDOT Table Seeds are available for placement. In this exercise we will place both empty tables and table populated from a report.

   Empty Tables will come with prepopulated with Title and Header Information and blank body cells to be filled out by the user. Examples:
   - Movement Diagram Top
   - Movement Diagram Bottom

   Tables from Reports will place with all the needed information already filled in. Examples:
   - Mast Arm Information
   - Span Pole Information
3. On the Place Table dialog box select the **Empty Table** Icon. Select the ***SIGNAL – Movement Diagram - Top*** seed and follow the prompts for placement in the upper left-hand corner of the sheet.
4. Select the ***SIGNAL – Movement Diagram – Bottom*** and snap to the bottom left corner of the top movement diagram.

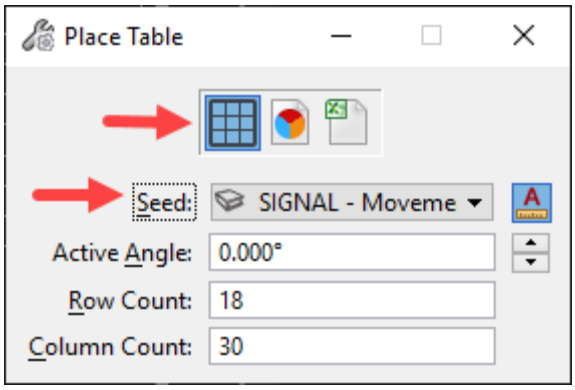


Figure 168

5. To add information to the table select the **Annotate** tab and choose **Edit Text**. ***Note:*** *Avoid using the Element Selection tool to edit the table as this will lock up the file.*

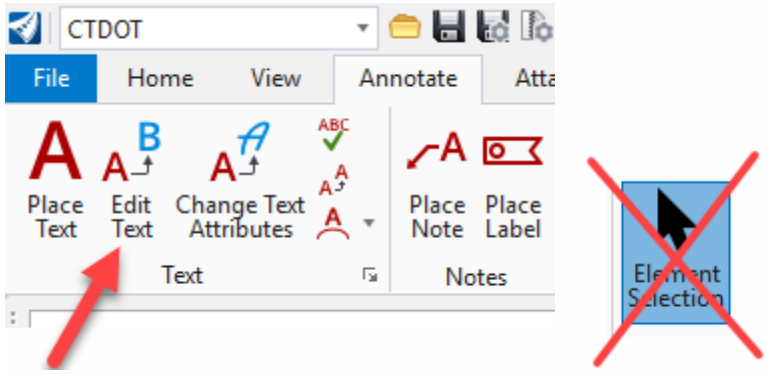


Figure 169

6. After the Text and Number entries are complete in the tables, Cells will need to be placed on top of the Table. The Table should be locked before the cells are placed. To lock a table, select the table in the View Window and in the **Extended Section** of the **Properties** dialog box select **Locked**.

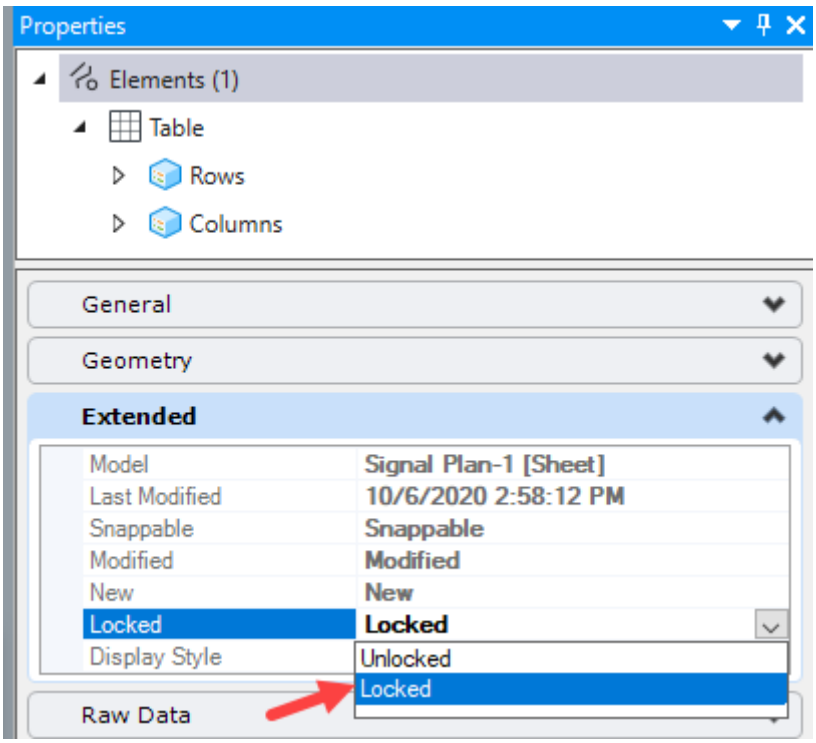


Figure 170

7. The Cells needed to complete the Movement Diagram can be accessed choosing the **CTDOT** workflow and selecting the **CTDOT** tab. In the **Detailing** section select **Miscellaneous > Open Signal Detailing**. A cell library will open, double click to activate the one of the ***TURNING MOVEMENT*** cells and follow the prompts for placement.

8. On the Place Table dialog box select the **From Report** Icon. Select the desired **Seed** and **Report**. **Retain Association** should be toggled on. Selections for Mast Arm and Span Poles:

Seed	Report
SIGNAL – Mast Arm Information	MAST ARM INFORMATION
SIGNAL – Combination Mast Arm Information	COMBINATION MAST ARM INFORMATION
SIGNAL – Span Pole Information	SPAN POLE INFORMATION
SIGNAL – Combination Span Pole Information	COMBINATION SPAN POLE INFORMATION

9. Select the **Browse** button next to report.

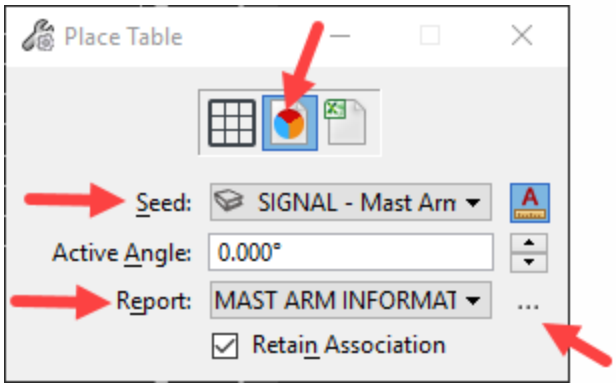


Figure 171

10. On the Reports dialog box right click on the desired report and select **Save to active file**. Now move to the right part of the dialog box and for **Model** assure that the **Default Model** is selected. Follow the prompts for placement.

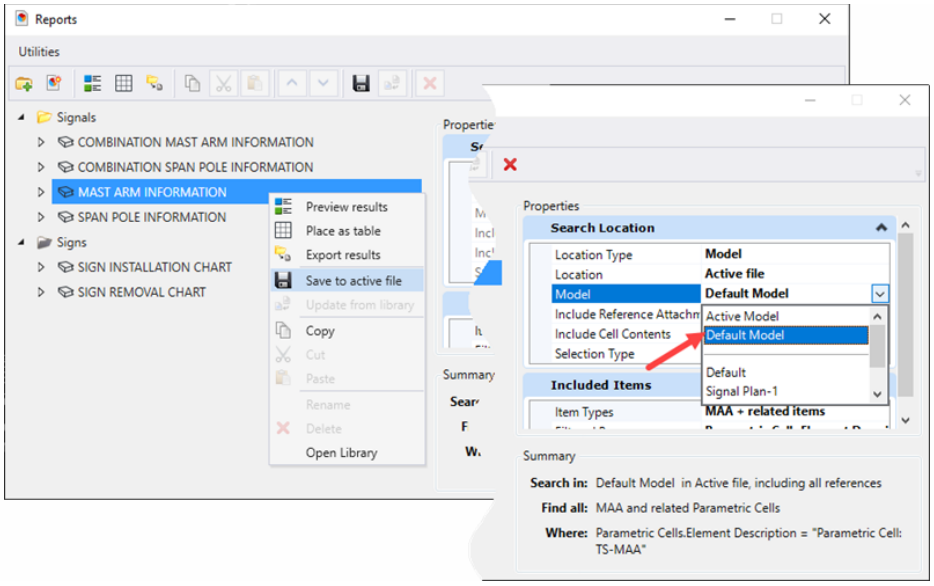


Figure 172

5.10.3 Notes

Use the tools on the **CTDOT** Ribbon's, **Annotation** section to place **Notes**.

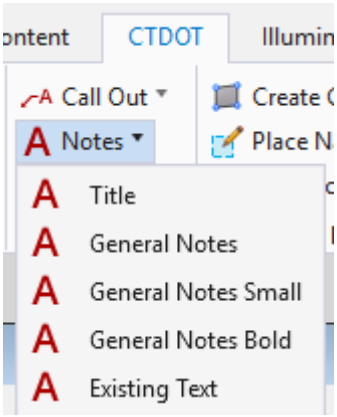


Figure 173

5.11 Create a Signal Face Detail

1. Go back into the Design model and Place another Named Boundary, but this time only around the Signal Faces.
2. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.
3. Select the **Place Named Boundary** tool and the Place Named Boundary dialog box will appear, set the following options:
   - Method (icon): ***By 2 Points***
   - Name: ***Signal Faces***
   - Mode (icon): ***Place Single Named Boundary***
   - Create Drawing: ***Enabled***
4. Follow the prompts to create a named boundary around the Signal Faces.
5. After accepting the placement of the named boundary the Create Drawing dialog will appear. Ensure the following options are set:
   - *Name*: ***Sign Face Detail***
   - *Drawing Seed*: ***Signal Plan***
   - *Create Drawing Model*: ***Enabled***
   - *Annotation Scale*: ***Full Size 1" = 20'***
   - *Create Sheet Model*: **Enabled**
   - *Sheets*: Signal Plan [Sheet]
   - *Drawing Boundary*: **New**
   - *Detail Scale*: ***1" = 20'***
   - *Add to Sheet Index*: ***Disabled***
   - *Open Model*: **Enabled**
6. The existing Sheet Model will open, move the reference to the desired location on the sheet.
7. In the Drawing Model annotate the detail.
8. Select **Save Settings**.

5.12 Create a Mast Arm Detail

1. In the Contract Plan DGN file create a new 2D Design Model. From the Ribbon open the **Models** dialog box.

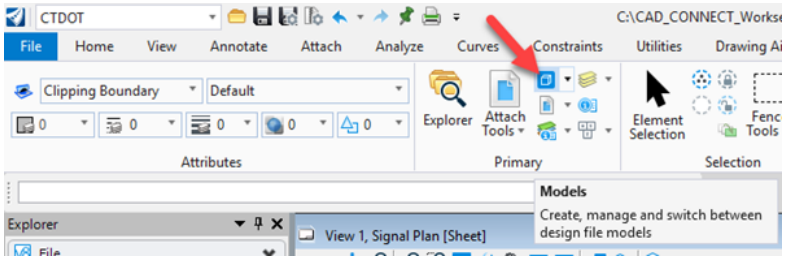


Figure 174

2. On the Models dialog box select the **Create a new model** icon.

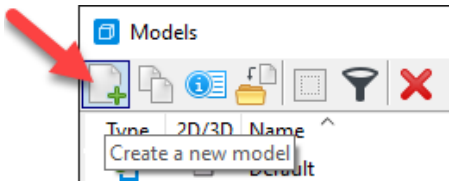


Figure 175

3. In the Create Model dialog box, ensure the following options are set:
   - *Type*: ***Design From Seed***
   - *Seed Model*: ***Seed2D – CT Road.dgn, Default***
   - *Name*: ***Mast Arm Detail***
   - *Annotation Scale*: **3/16"=1'-0"**
   - *Propagate*: **Enable**
4. Click **OK**.

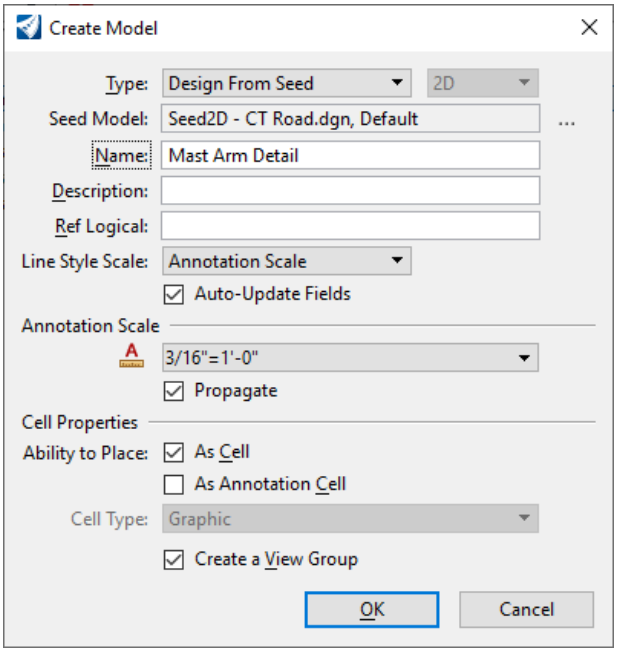


Figure 176

5. In the new model draw the elevation view of the mast arm. Annotate and dimension the detail. **Note:** This detail can be annotated and dimensioned in this same model as it is not a Geospatial Base Model.
6. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.
7. Using the **Place Named Boundary** tool, place a Named Boundary around the detail. Ensure the following options are set:
   - Method (icon): ***By 2 Points***
   - Name: ***Mast Arm Detail***
   - Mode: ***Place Single Named Boundary***
   - Create Drawing: ***Disabled***
8. Open the ***Signal Plan*** Sheet Model. This can be done using the **View Group** drop down tool located at the bottom left of the screen. Select **Signal Plan (Sheet) Views**.

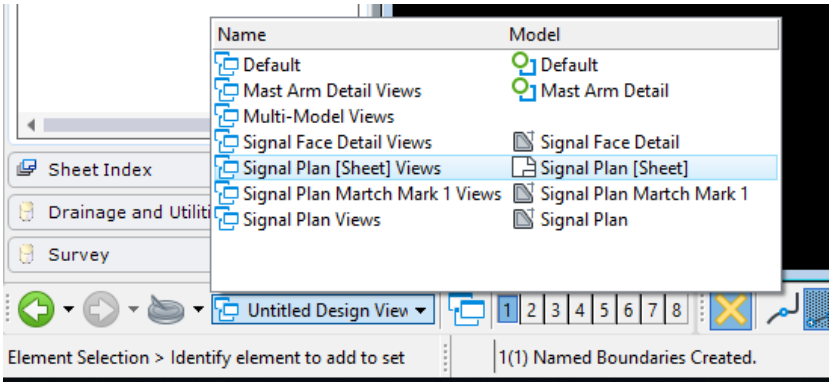


Figure 177

9. Reference in the Mast Arm Detail. In the Reference Attachment Properties ensure the following options are set:
   - *Model*: ***Mast Arm Detail***
   - *Orientation*: ***Named Boundaries / Mast Arm Detail***
   - *Detail Scale*: ***3/16" = 1'-0"***

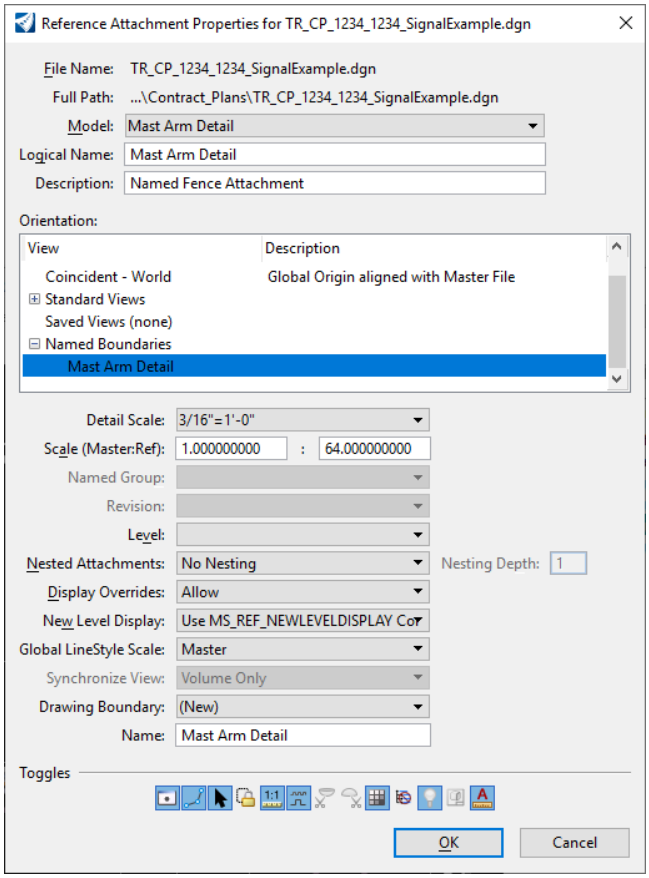


Figure 178

10. Click **OK** and follow the prompts for placement in an empty location inside the Sheet Border. Select **Save Settings**.

Section 6 – Signing & Pavement Marking Sheets

6.1 Create New File

Before attempting to open or create DGN files users should make sure the following is in place:

1. CTDOT users should have the CTDOT CONNECT DDE synced through SharePoint with the COMPASS Project Synced along with the CAD Configuration.
2. Consultants should have CTDOT DDE properly installed or be syncing to the CTDOT DDE SharePoint/COMPASS system.
3. Make note of the **Coordinate System** you will be working in. If you have existing survey data, you will need to find out what system is being used **(NAD 83/NAVD 88 or NAD 27/NAVD 29).**
4. Log on to the CONNECTION Client. Bentley CONNECT licensing requires users to log into their Bentley account to secure a software license. CTDOT users should log in using your CTDOT email address and Bentley password. If you do not see the dialog box, select the ^ icon on the bottom Windows Screen. Click on the Connection Client Icon and select Open.
5. Access OpenRoads through Accounting or the Customized Icon following
6. On the OpenRoads open screen select **Custom Configuration**, using the small drop-down arrows select the Workspace **CT_Workspace**, the needed **WorkSet** and **Role**.
7. 4. Select the **New File** icon. In the New dialog box browse to the ***Traffic/Contract_Plans*** folder.
8. The Seed file should be set to ***Seed2D - CT RoadDesign.dgn***. If this is not the case, click on the **Browse** button. Browse to ***...CT_Configuration|Organization|Seed|Road*** and select **Seed2D - CT RoadDesign.dgn**

   If the survey was done in an old Datum, use the 2D Seed Files in this folder ***...CT_Configuration|Organization|Seed|GCS|***

9. In the ***File name*** field enter a name for your file using the CTDOT file naming structure. Example: ***TR_CP_1234_1234_SPM.dgn***
10. Select **Save** and the new file will open.
11. If it has been determined the provided survey is in NAD 27/NAVD 29 you will need to re-project your design file's Geospatial Header

6.2 Set up the Default Model

1. Select the **CTDOT** workflow and click on the **Attach** Tab, in the **References Section** click on **Attach Reference**.
2. Navigate to the ***Traffic|Base_Models*** folder and reference the Master Base Model file. Choose the needed Model (most likely its "Default") and use **Live Nesting** at a **Nesting Depth of 2**.
3. Select the **Home** Tab, in the **Primary Section** select the **Attach Tool** drop down and choose **References**. This will open the References Dialog box.
4. Review the Attachments. If all the needed files did not propagate to reference with Live Nesting in the above step, you will need to reference the files directly. If there is no Existing Survey users can attach Raster Images or use a Background Map, these workflows can be found in Volume 2 – Module 2 - Attaching Imagery and LiDAR Data.
5. To reference the Survey navigate to the ***Active_Survey*** folder and reference the Survey *.dgn file. **Note:** Older DGN Files will need to be referenced in with certain settings to get them to line up in the correct Geospatial location.
6. For older reference files turn **True Scale** off and set the Scale to ***1:1***. **Note:** Always do a check by clicking on the Survey's Northing and Easting Grid Marks to compare the files read out. If they do not match you did not properly align the file Geospatially.
7. Select **Level Display** and turn off the desired levels.
8. Rotate the view so that the main road is parallel to the screen. On the **View Window** select the **Rotate View** tool. Use the **2 Points** Method. Follow the prompts to rotate the view.

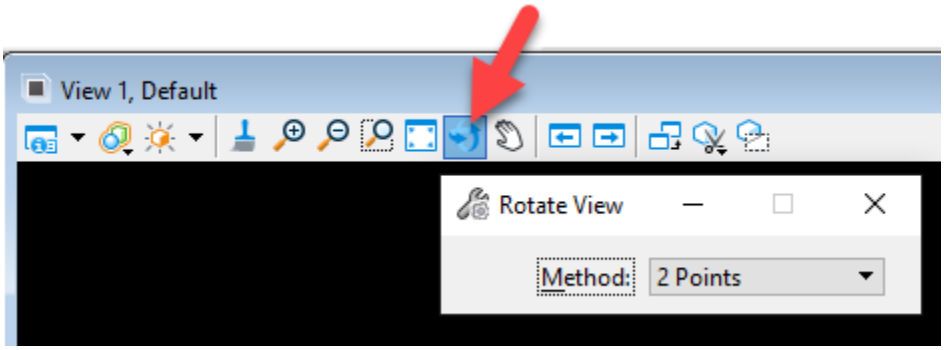


Figure 179

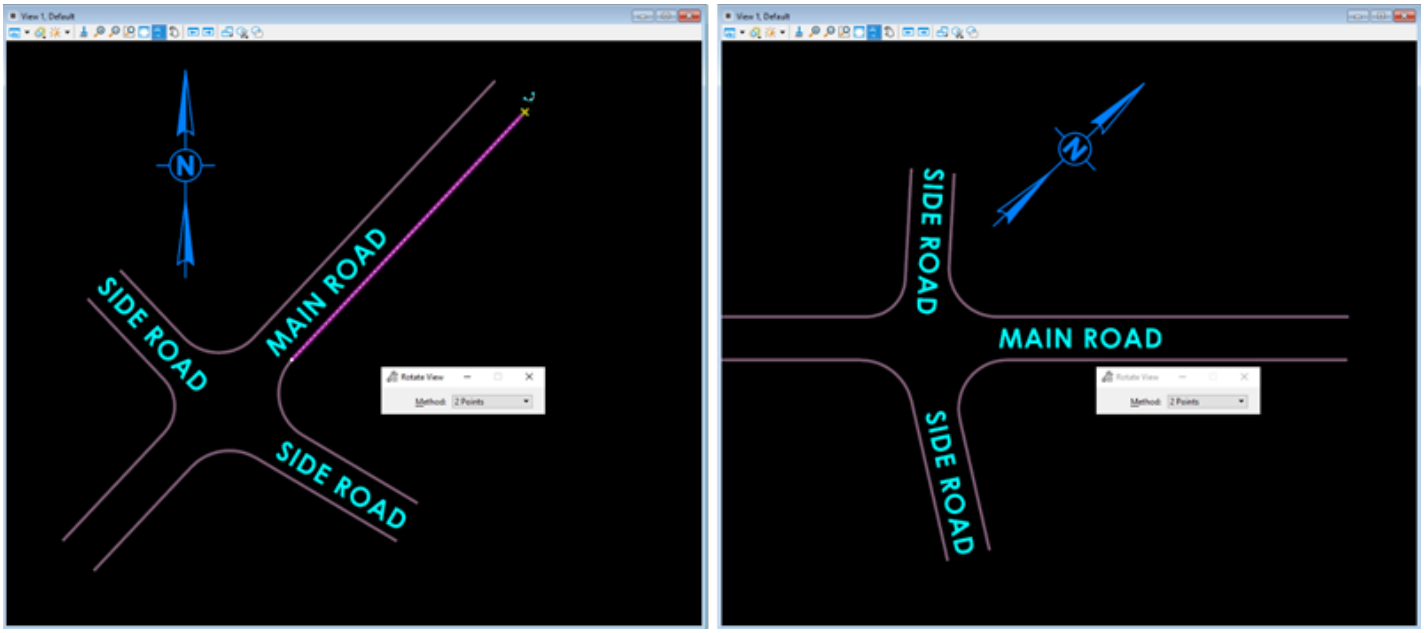


Figure 180

9. Select **Save Settings**.

6.3 Place Named Boundaries

6.3.1 By 2 Point Method

Place Named Boundary By 2 Points - used when only one sheet is needed with several details on the sheet.

1. Select the **CTDOT** workflow and on the **Annotate** tab locate the **Detailing** section and select the bottom right **Styles button**. In the Detailing Symbol Styles dialog right click on ***CV_Detail*** and select **Activate**.

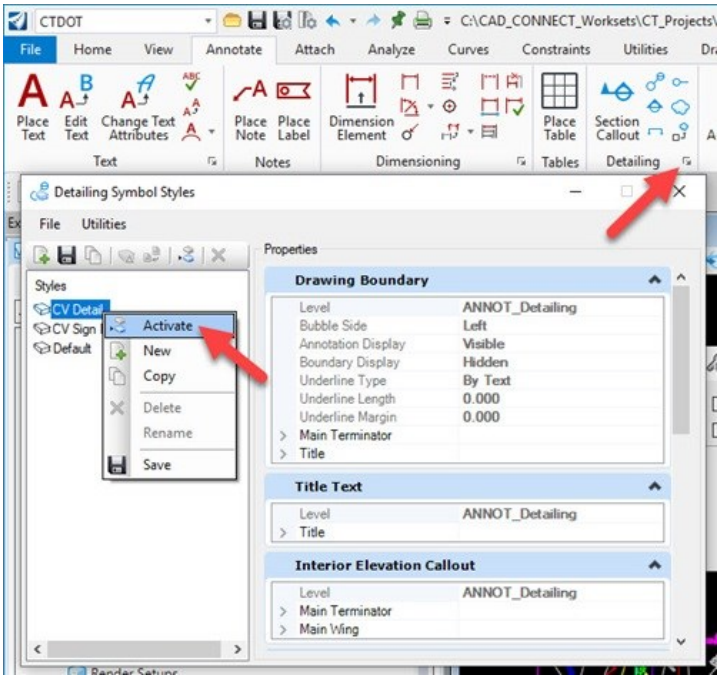


Figure 181

2. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.

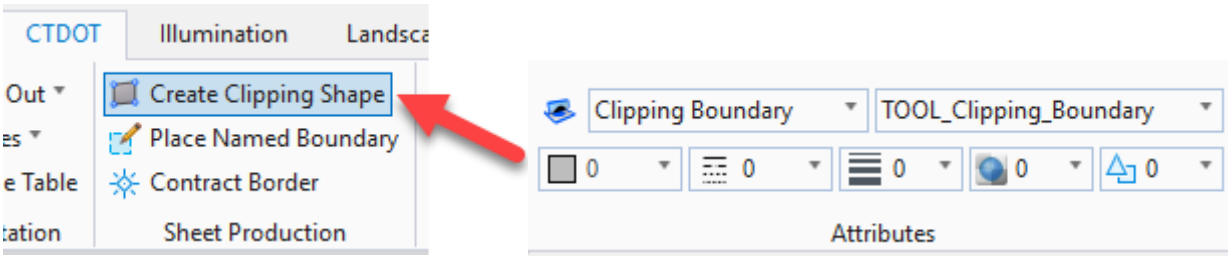


Figure 182

3. Select the **Place Named Boundary** tool and the Place Named Boundary Dialog box will appear.

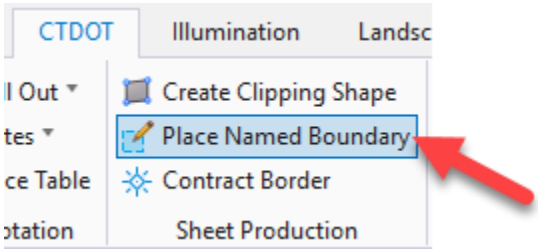


Figure 183

4. In the Place Named Boundary dialog box, set the following options in the tool's settings window:
   - Method (icon): ***By 2 Points***
   - Name: ***Signing and Pavement Marking Plan***
   - *Mode (icon)*: ***Place Single Named Boundary***
   - *Create Drawing*: ***Enabled***

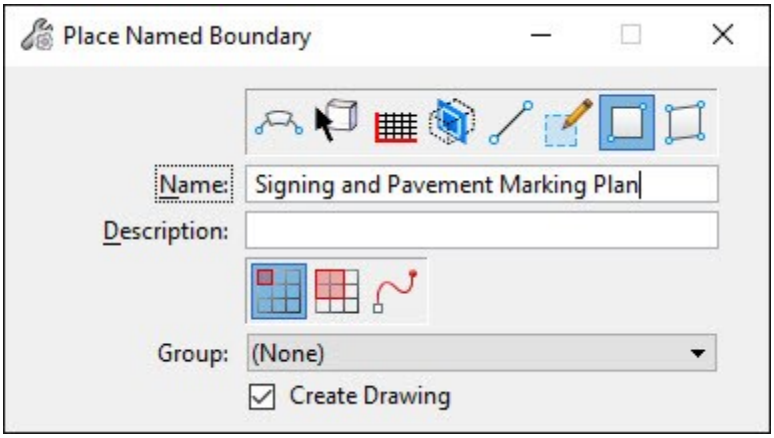


Figure 184

5. Follow the prompts to place a Named Boundary (Clipping Boundary) around the design. Data point first in the lower left and ending in the upper right. This element can be edited later to refine the shape and add additional points.

6. After accepting the placement of the named boundary, the Create Drawing dialog box will appear. Ensure the following options are set:

   Top Section

   - Name: ***Signing and Pavement Marking Plan***
   - Drawing Seed: ***40 Scale Contract Plan Sheet***

   Drawing Model Section

   - Create Drawing Model: ***Enabled***
   - Annotation Scale: ***Full Size 1" = 40'***

   Sheet Model Section

   - Create Sheet Model: ***Enabled***
   - Sheets: ***New***
   - Annotation Scale: ***Full Size 1" = 40'***
   - Drawing Boundary: ***New***
   - Detail Scale: ***1"=40'***
   - Add to Sheet Index: ***Disabled***
   - Open Model: ***Enabled***

7. Click **OK**.

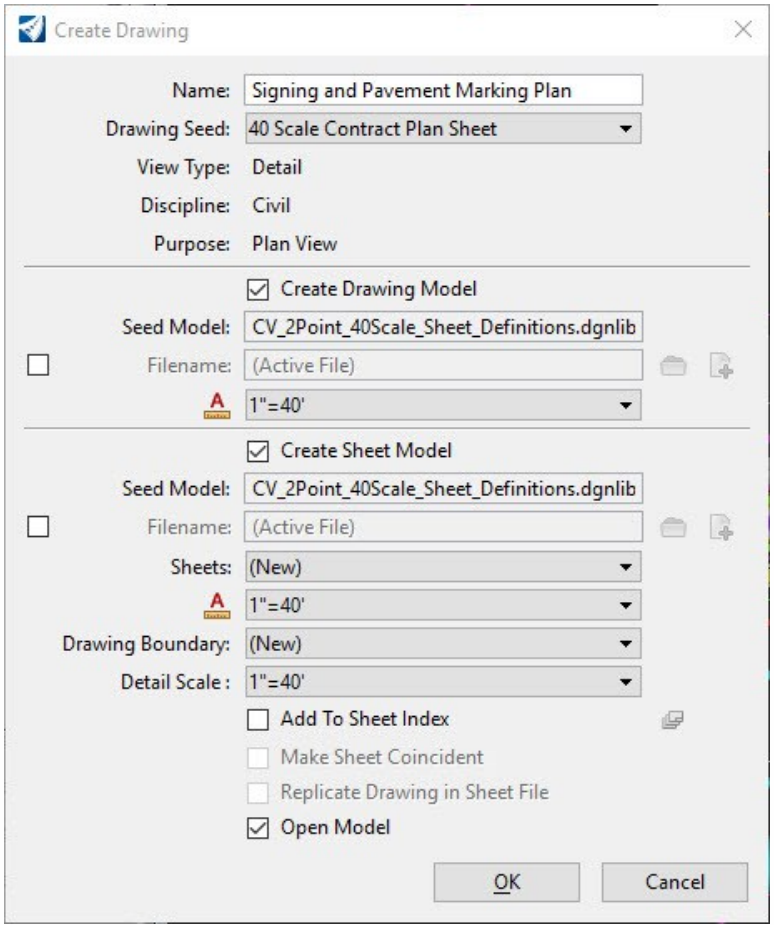


Figure 185

1. Place Named Boundary Civil Plan - used when multiple sheets are needed along a corridor. To use this method a centerline needs to be present in one of the Design Models References. Select the **Place Named Boundary** tool and the Place Named Boundary Dialog box will appear.

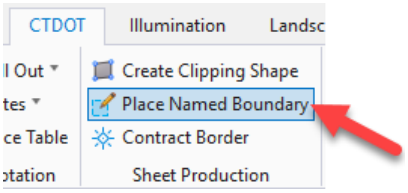


Figure 186

2. In the Place Named Boundary Civil Plan dialog box, ensure the following options are set in the tool's settings window:
   - Method (icon): ***Civil Plan***
   - Drawing Seed: ***40 Scale Contract Plan Sheet***
   - Detail Scale: ***1"= 40'***
   - Name: ***Plan 1***
   - Group: ***New***
   - Length: ***1000***
   - Right Offset: ***-275***
   - Left offset: ***275***
   - Overlap: ***0***
   - Boundary Cord: ***20***
   - Create Drawing: ***Enabled***
   - Show Dialog: ***Enabled***

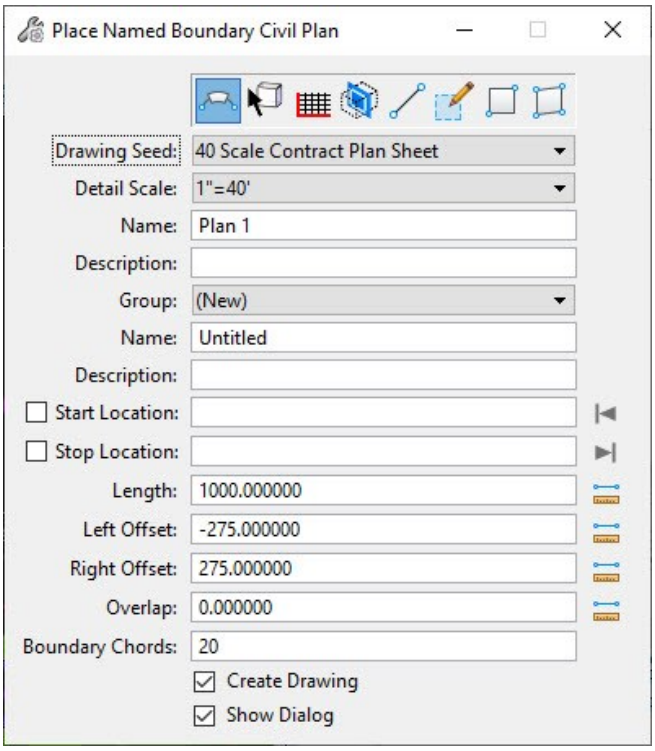


Figure 187

3. Follow the prompts to create a named boundary along the Centerline.

   After accepting the placement of the named boundaries the Create Drawing dialog will appear. Ensure the following options are set:

   Drawing Model Section

   - Annotation Scale: ***Full Size 1" = 40'***

   Sheet Model Section

   - Sheets: ***New***
   - Annotation Scale: ***Full Size 1" = 40'***
   - Detail Scale: ***1" = 40'***
   - Add to Sheet Index: ***Disabled***
   - Open Model: ***Enabled***

4. Click **OK**. The Drawing Models and Sheet Models will be created.

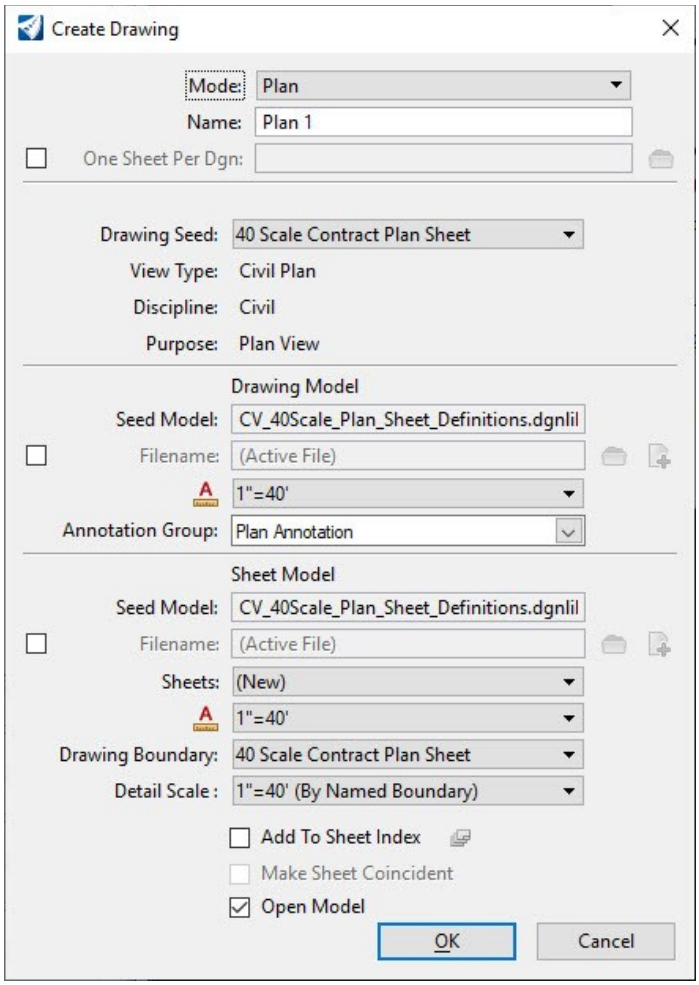


Figure 188

6.4 Edit the Title Block

1. The newly created sheet model will open with the Named Boundary referenced and centered onto the sheet. From the Ribbon open the **Models** dialog box.
2. View the **Properties** of the model. Notice the Sheet Model's Annotation Scale is ***Full Size 1 = 1***.
3. In the **Properties** dialog box edit or fill in the following fields:
   - *Description*: ***SIGNING AND PAVEMENT MARKING PLAN***
   - *Sheet Number*: ***SPM -01***

   Notice the **Drawing Title** and **Drawing Number** in the Title Block will be updated to match the Properties. The Project Number, Project Description and Town should match the WorkSet Properties.

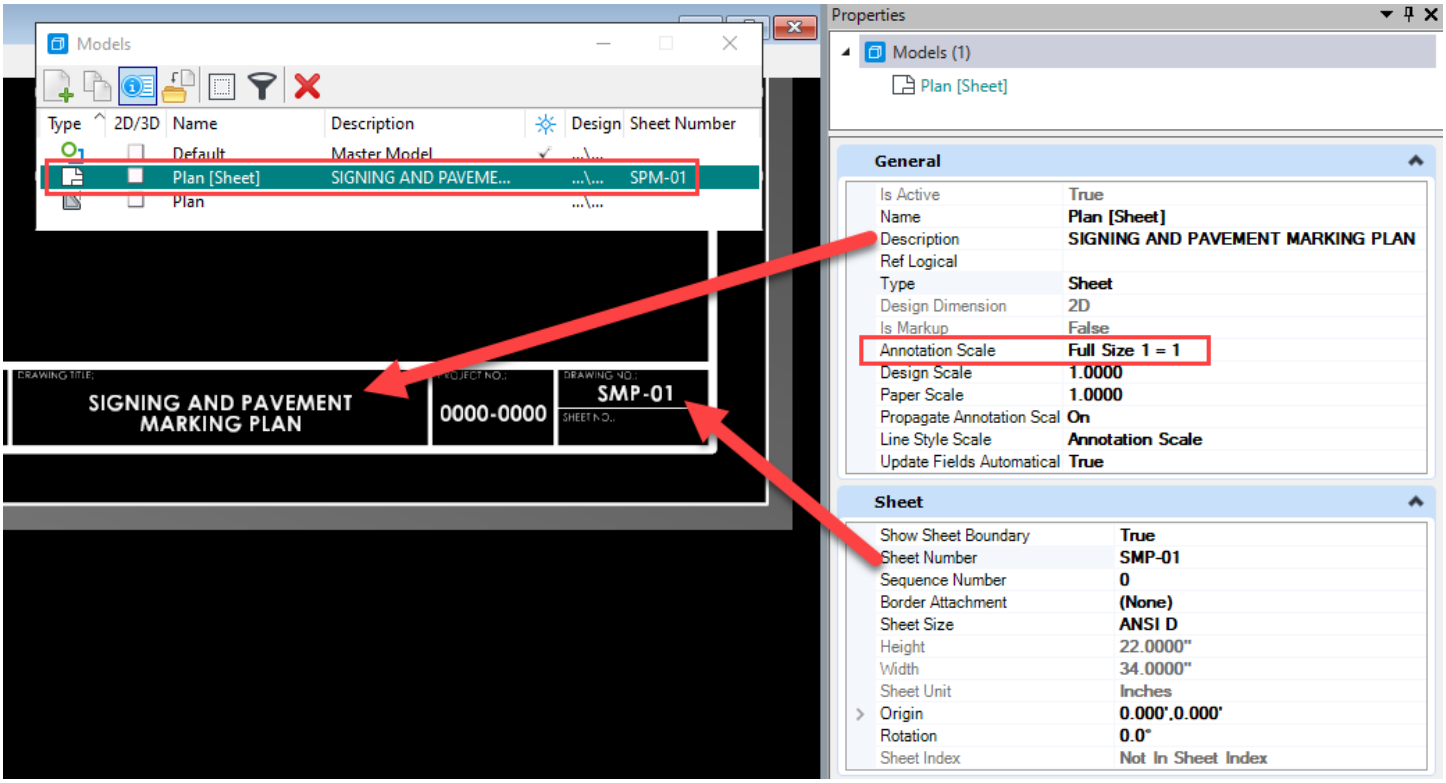


Figure 189

4. Select **Save Settings**.

6.5 Adjust the Named Boundary

1. On the Ribbon select **Home > Selection** and make the **Element Selection** tool active.
2. Select the Named Boundary shape and adjust by dragging the handles to the desired location.

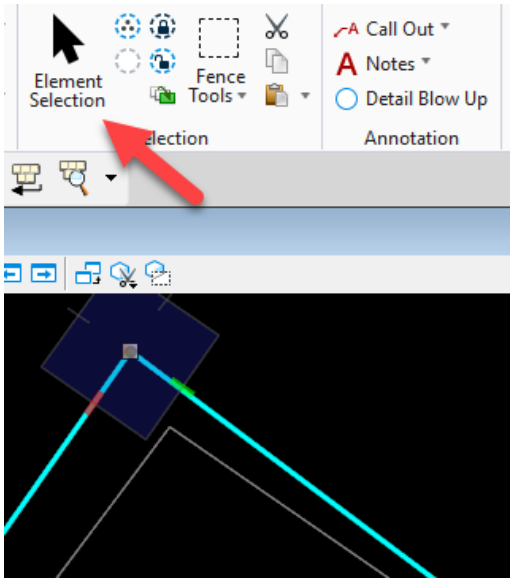


Figure 190

3. The **Insert Vertex** or **Delete Vertex** tools can also be used to edit the shape.

Figure 191

4. Return to the sheet model by hovering the cursor over the Marker and click the **Sheet** and select the folder Icon (Open Target Tool). This action returns you back to the sheet model. Notice that by changing the boundary in the design model, this has propagated to the sheet.

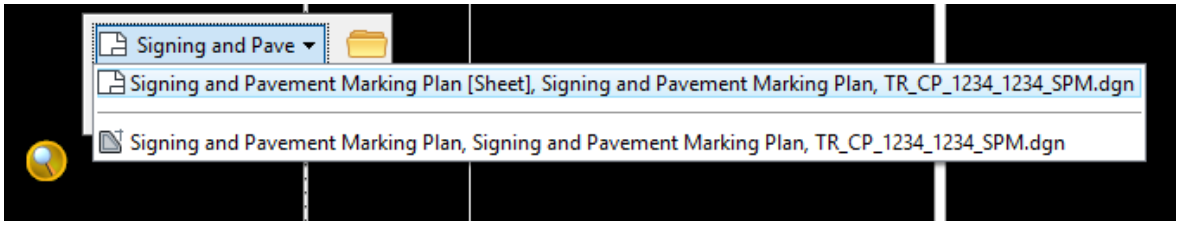


Figure 192

5. Models can also be opened using the **View Group** drop down tool located at the bottom left of the screen.

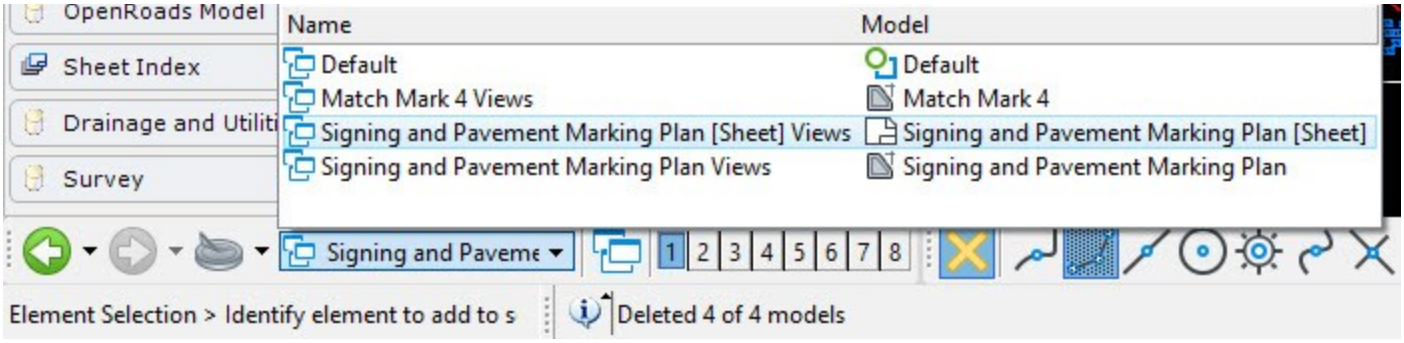


Figure 193

6. Select **Save Settings**.

6.6 Move the Name Boundary inside the Sheet Border

1. From the Ribbon click on the **Models** icon and select to open the ***Sheet Model***.
2. Select the **References** Icon, in the dialog box right click on the file, select **Move** to re-position the reference file within the border.
3. follow the prompts to execute the move command.

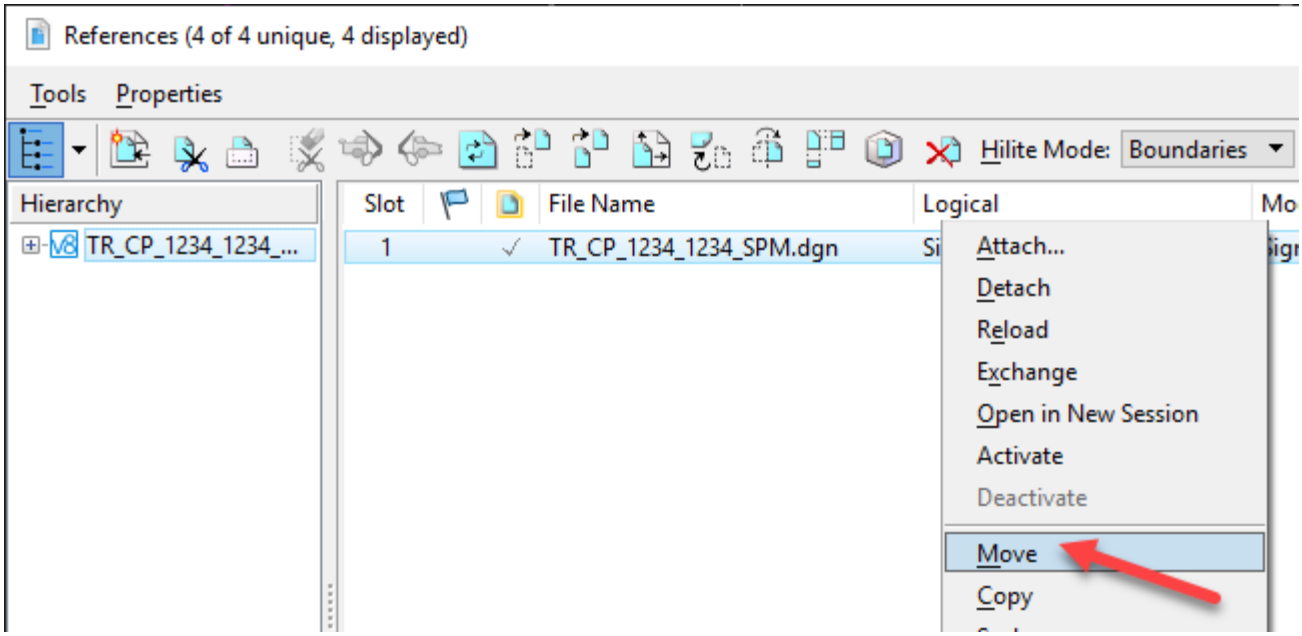
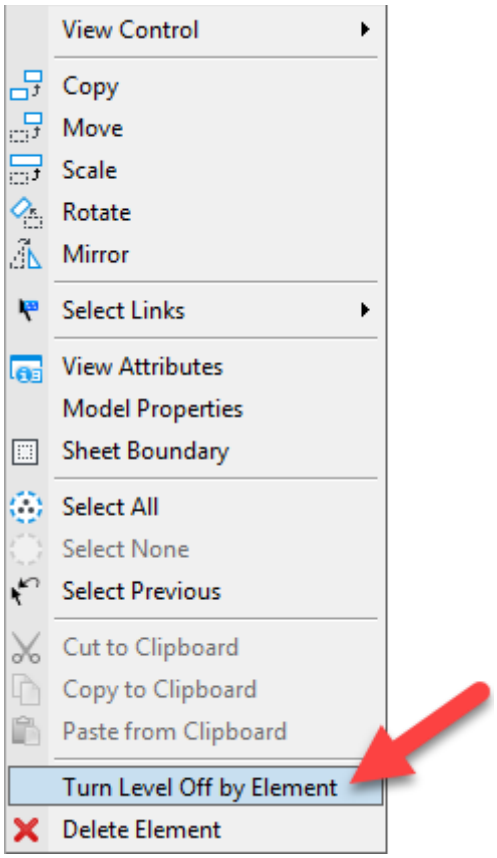


Figure 194

4. Select **Save Settings**.

6.7 Turn off Levels

1. Right-press and hold to bring up the contextual menu. From here, select **Turn Level Off by Element**.



2. Issue a Data Point on the Named Boundary, hence turning off the level. Data Point on other elements for levels you would like turned off.
3. Select **Save Settings**.

6.8 Create Match Marked Areas

1. If the design is too large for the sheet, Match Marks will be required, and additional Named Boundaries will need to be created. This will be used to include side roads that extend past the original clipping boundary or if the main line is slightly too long to fit within the original clipping boundary.
2. Go back into the Design model and place another Named Boundary adjacent to the original named boundary. This will be the Match Mark.
3. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.
4. Select the **Place Named Boundary** tool and the Place Named Boundary dialog box will appear, set the following options:
   - Method (icon): ***By 2 Points***
   - Name: ***Match Mark 1***
   - Mode (icon): ***Place Single Named Boundary***
   - Create Drawing: ***Enabled***
5. follow the prompts to create a named boundary of the around the additional area.
6. After accepting the placement of the named boundary the Create Drawing dialog will appear. Ensure the following options are set:
   - *Name*: ***Match Mark 1***
   - *Drawing Seed*: ***40 Scale Contract Plan Sheet***
   - *Create Drawing Model*: ***Enabled***
   - *Annotation Scale*: ***Full Size 1" = 40'***
   - *Create Sheet Model*: ***Enabled***
   - *Sheets*: ***Signing and Pavement Marking Plan [Sheet]***
   - *Drawing Boundary*: ***New***
   - *Detail Scale*: ***1" = 40'***
   - *Add to Sheet Index*: ***Disabled***
   - *Open Model*: ***Enabled***
7. The existing Sheet Model will open, move the reference to the desired location on the sheet.
8. Select **Save Settings**.

6.9 Create Blown Up Detail

This video demonstrates how to place a 20 Scale Detail on an existing 40 Scale Sheet.

Figure 195

6.10 Annotate the Drawing Models

Note: Annotation will be placed in both the Drawing Models and the Sheet Model.

- Call outs and Dimensions should be placed in the Drawing Models. Placing the Call Outs and Dimensions in the Drawing Model will make it easier to move each detail inside the Sheet Model's Border as the Features and Annotation will all move together.
- Notes that pertain to the whole sheet can be placed in the Sheet Models.

1. Open a Drawing Model and use the tools on the **CT DOT** Ribbon's, **Annotation** section to place **Call Outs**.

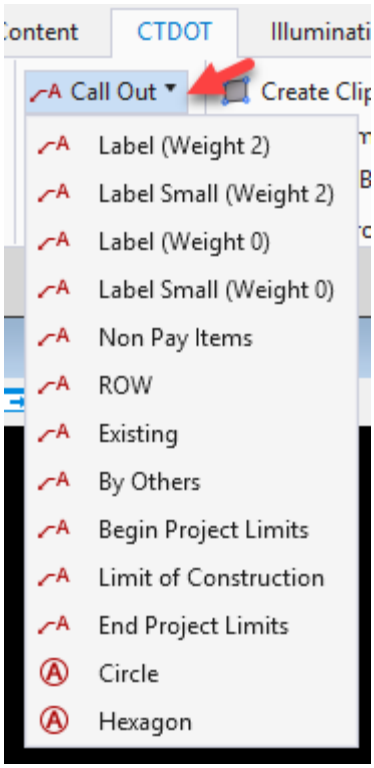


Figure 196

2. Match Marks are to be placed in the Drawing Model using the tools in the **Notes** pull down menu.

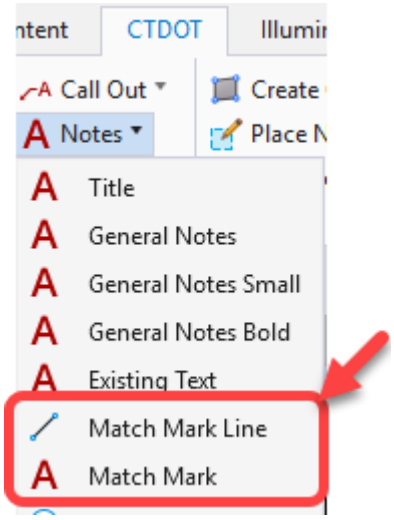


Figure 197

3. Place Dimensions in the Drawing Model. To place a Dimension, select either the **Vertical** or **Horizontal** Text Tool on the **CTDOT** ribbon, then select one of the desired **Dimensioning** tools. The Element Dimensioning dialog box will appear. Select the desired **Dimension Style** and enable **Association** and follow the prompts for placement.

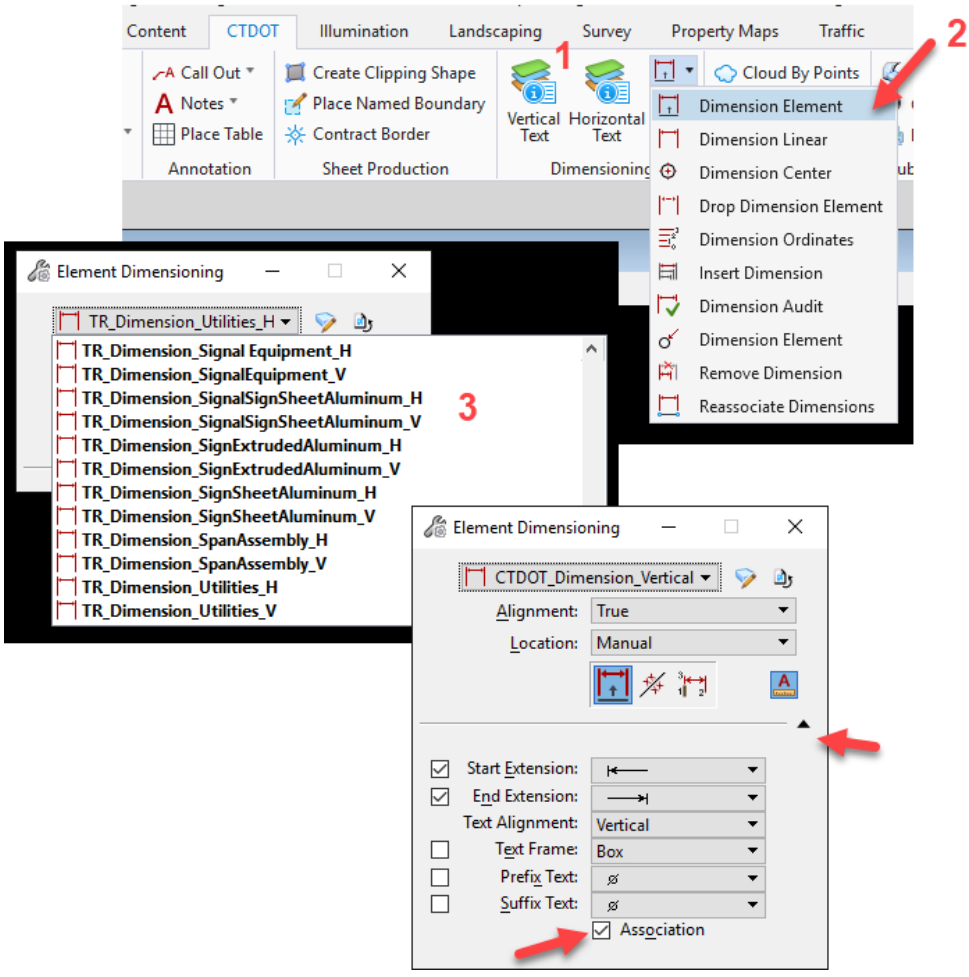


Figure 198

6.10.1 Annotate a Sign Detail

In the Drawing Model use the tools on the **CT DOT** Ribbon's, **Detailing** section.

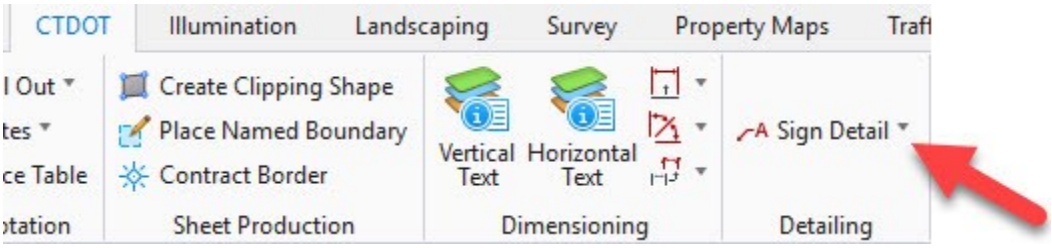


Figure 199

Use the tools in the **Sign Detail** pull down to complete the annotation. This video shows how to harvest the Item Type Properties to fill in the Detail Bubbles.

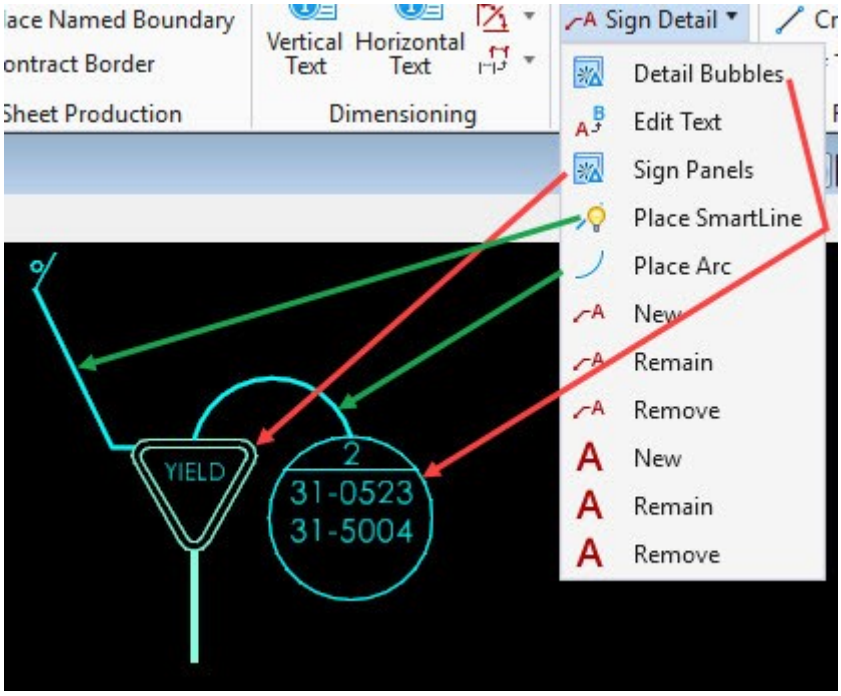


Figure 200

6.11 Annotate Pavement Markings

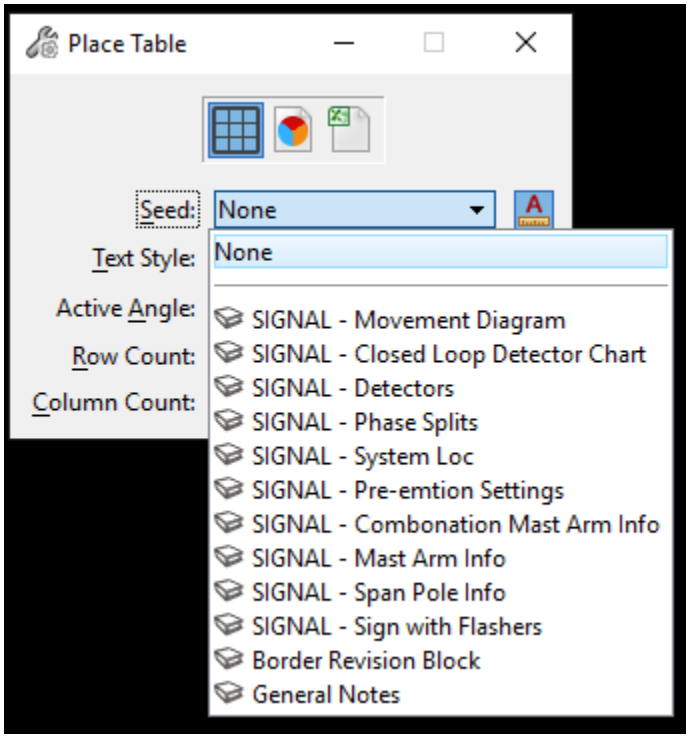
Coming Soon

6.12 Annotate the Sheet Models

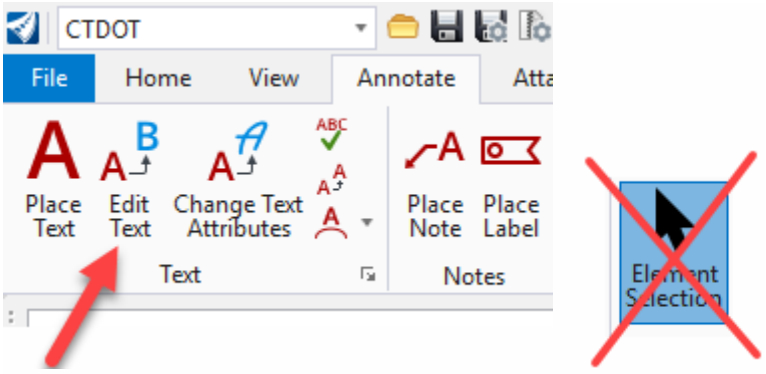
Note: Annotation will be placed in both the Drawing Models and the Sheet Model.

- Call outs and Dimensions should be placed in the Drawing Models. Placing the Call Outs and Dimensions in the Drawing Model will make it easier to move each detail inside the Sheet Model's Border as the Features and Annotation will all move together.
- Notes that pertain to the whole sheet can be placed in the sheet models.

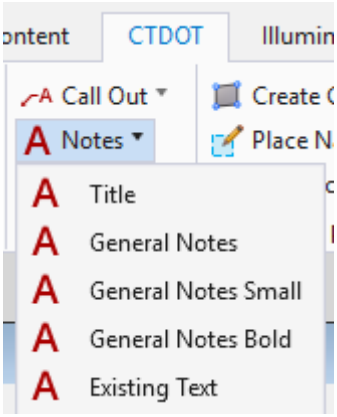
1. Use the **Place Table** tool on the CT DOT Ribbon to place preconfigured Tables. Select the **General Notes** table and follow the prompts for placement.



2. To add information to the table select the **Annotate** tab and choose **Edit Text**. **Note:** Avoid using the Element Selection tool to edit the table as this will lock up the file.



3. Use the tools on the **CT DOT** Ribbon's, **Annotation** section to place **Notes**.



Section 7 – Roadway Illumination Sheets

7.1 Create New File

Before attempting to open or create DGN files users should make sure the following is in place:

1. CTDOT users should have the CTDOT CONNECT DDE synced through SharePoint with the COMPASS Project Synced along with the CAD Configuration.
2. Consultants should have CTDOT DDE properly installed or be syncing to the CTDOT DDE SharePoint/COMPASS system.
3. Make note of the **Coordinate System** you will be working in. If you have existing survey data, you will need to find out what system is being used **(NAD 83/NAVD 88 or NAD 27/NAVD 29).**
4. Log on to the CONNECTION Client. Bentley CONNECT licensing requires users to log into their Bentley account to secure a software license. CTDOT users should log in using your CTDOT email address and Bentley password. If you do not see the dialog box, select the ^ icon on the bottom Windows Screen. Click on the Connection Client Icon and select Open.
5. Access OpenRoads through Accounting or the Customized Icon following
6. On the OpenRoads open screen select **Custom Configuration**, using the small drop-down arrows select the Workspace **CT_Workspace**, the needed **WorkSet** and **Role**.
7. Select the **New File** icon. In the New dialog box browse to the ***Illumination/Contract_Plans*** folder.
8. The Seed file should be set to ***Seed2D - CT RoadDesign.dgn***. If this is not the case, click on the **Browse** button. Browse to ***...CT_Configuration\|Organization\|Seed\|Road*** and select **Seed2D - CT RoadDesign.dgn**

   If the survey was done in an old Datum, use the 2D Seed Files in this folder ***...CT_Configuration\|Organization\|Seed\|GCS\|***
9. In the ***File name*** field enter a name for your file using the CTDOT file naming structure. Example: ***IL_CP_1234_1234_Illumination.dgn***
10. Select **Save** and the new file will open.
11. If it has been determined the provided survey is in NAD 27/NAVD 29 you will need to re-project your design file's Geospatial Header.

7.2 Set up the Default Model

1. Select the **CTDOT** workflow and click on the **Attach** Tab, in the **References Section** click on **Attach Reference**.
2. Navigate to the ***Illumination\Base_Models*** folder and reference the Master Base Model file. Choose the needed Model (most likely its "Default") and use **Live Nesting** at a **Nesting Depth of 2**.
3. Select the **Home** Tab, in the **Primary Section** select the **Attach Tool** drop down and choose **References**. This will open the References Dialog box.
4. Review the Attachments. If all the needed files did not propagate to reference with Live Nesting in the above step, you will need to reference the files directly. If there are no Existing Survey users can attach Raster Images or use a Background Map, these workflows can be found in Volume 2 – Module 2 - Attaching Imagery and LiDAR Data.
5. To reference the Survey navigate to the ***Active_Survey*** folder and reference the Survey *.dgn file. **Note:** Older DGN Files will need to be referenced in with certain settings to get them to line up in the correct Geospatial location.
6. For older reference files turn **True Scale** off and set the Scale to ***1:1***. **Note:** Always do a check by clicking on the Survey's Northing and Easting Grid Marks to compare the files read out. If they do not match you did not properly align the file Geospatially.
7. Select **Level Display** and turn off the desired levels.
8. Rotate the view so that the main road is parallel to the screen. On the **View Window** select the **Rotate View** tool. Use the **2 Points** Method. Follow the prompts to rotate the view.

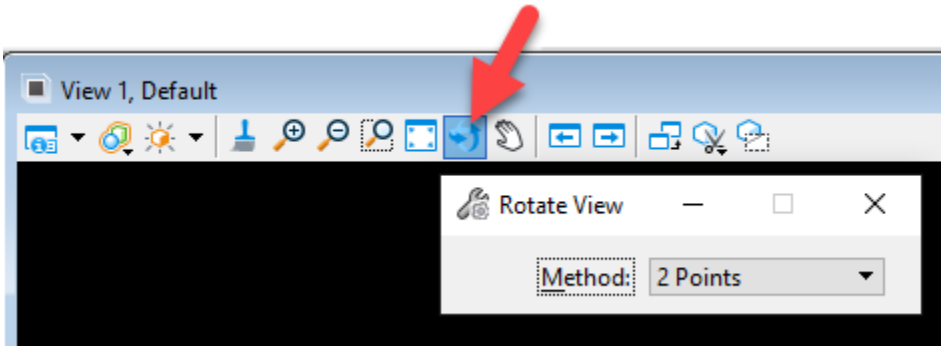


Figure 201

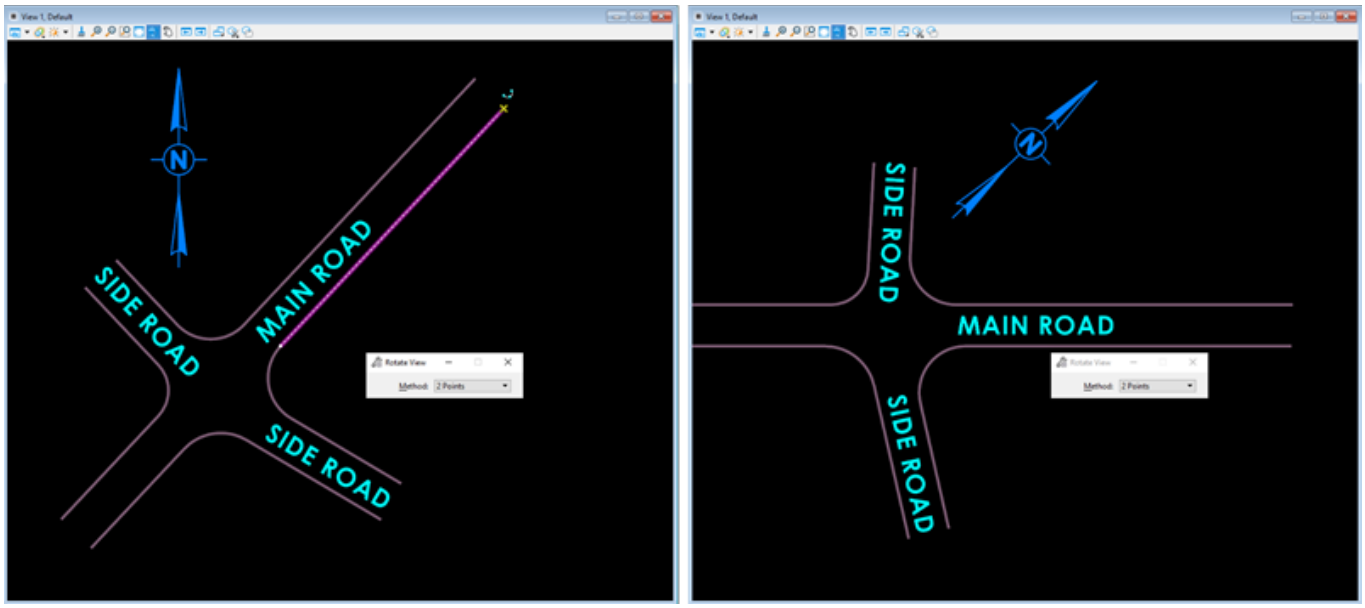


Figure 202

9. Select **Save Settings**.

7.3 Place Named Boundaries

7.3.1 By 2 Point Method

Place Named Boundary By 2 Points - used when only one sheet is needed with several details on the sheet.

1. Select the **CTDOT** workflow and on the **Annotate** tab locate the **Detailing** section and select the bottom right **Styles button**. In the Detailing Symbol Styles dialog right click on ***CV_Detail*** and select **Activate**.

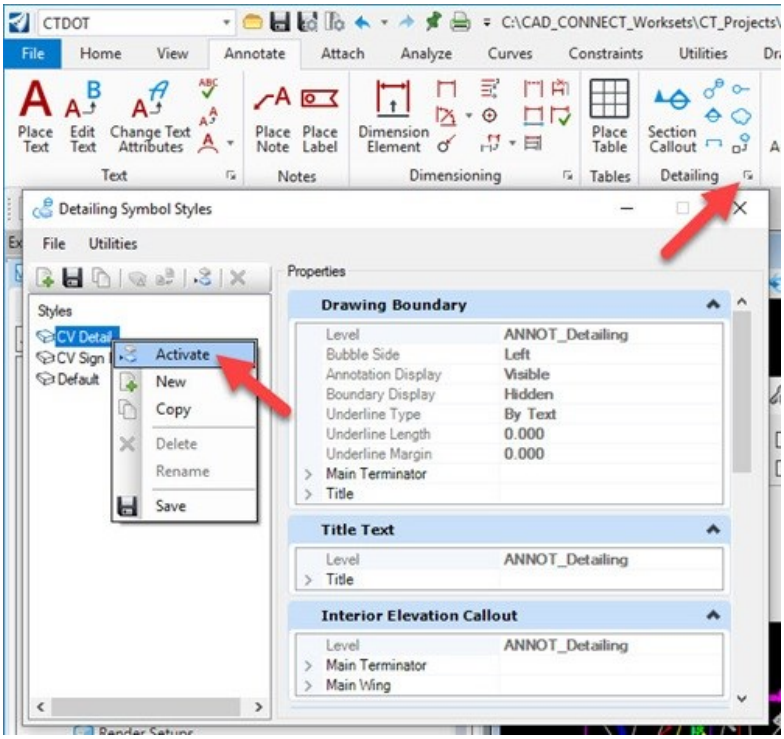


Figure 203

2. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.

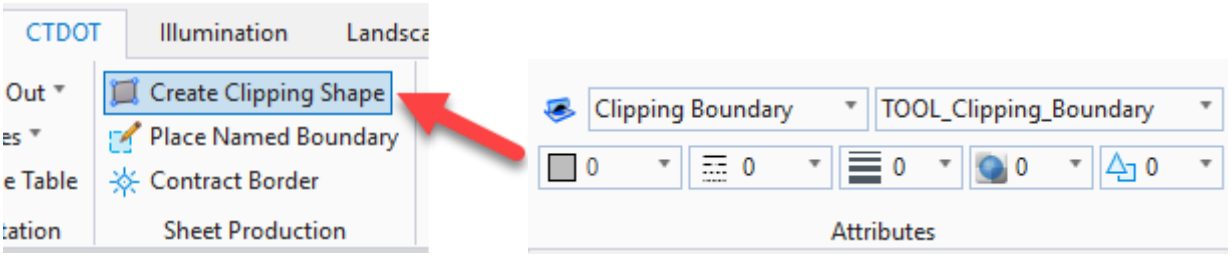


Figure 204

3. Select the **Place Named Boundary** tool and the Place Named Boundary Dialog box will appear.

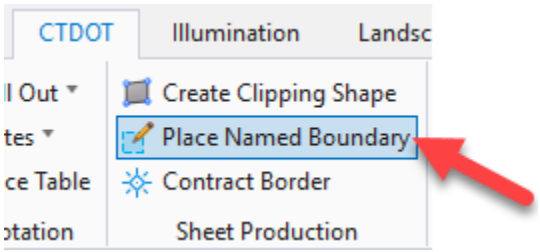


Figure 205

4. In the Place Named Boundary dialog box, set the following options in the tool's settings window:
   - Method (icon): ***By 2 Points***
   - *Name*: ***Illumination Plan***
   - *Mode (icon)*: ***Place Single Named Boundary***
   - *Create Drawing*: ***Enabled***

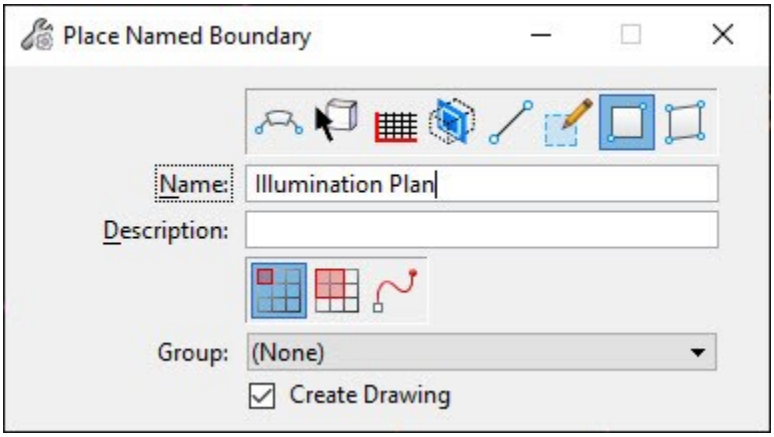


Figure 206

5. Follow the prompts to place a Named Boundary (Clipping Boundary) around the design. Data point first in the lower left and end in the upper right. This element can be edited later to refine the shape and add additional points.

6. After accepting the placement of the named boundary the Create Drawing dialog box will appear. Ensure the following options are set:

Top Section

- Name: ***Illumination Plan***
- Drawing Seed: ***40 Scale Contract Plan Sheet***

Drawing Model Section

- Create Drawing Model: ***Enabled***
- Annotation Scale: ***Full Size 1" = 40'***

Sheet Model Section

- Create Sheet Model: ***Enabled***
- Sheets: ***New***
- Annotation Scale: ***1" = 40'***
- Drawing Boundary: ***New***
- Detail Scale: ***1" = 40'***
- Add to Sheet Index: ***Disabled***
- Open Model: ***Enabled***

7. Click **OK**.

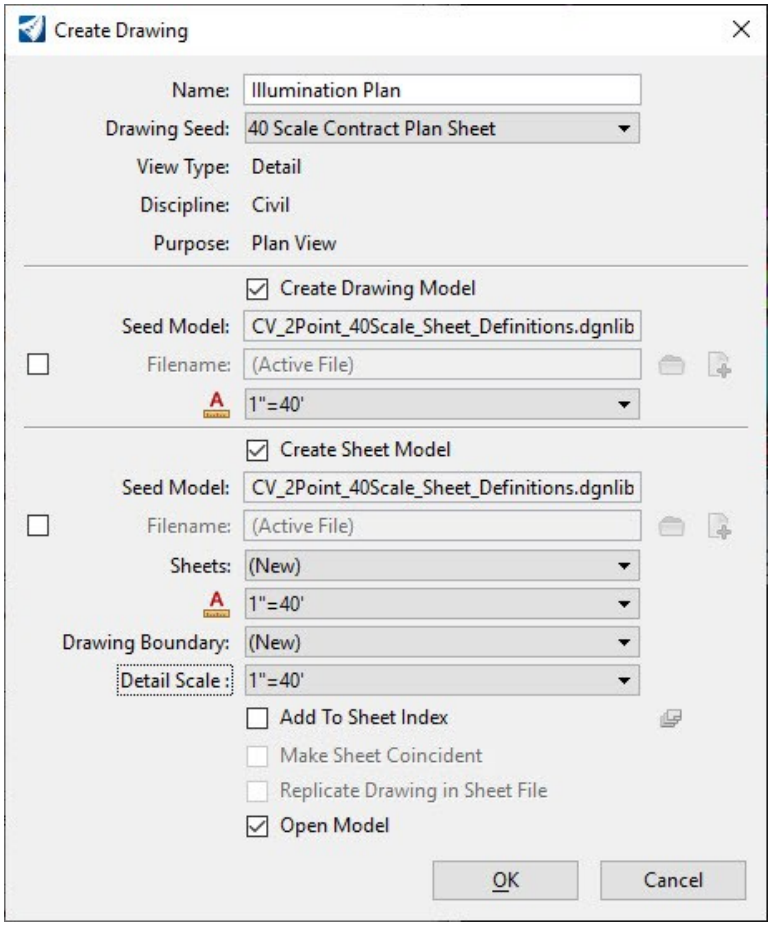


Figure 207

7.3.2 Civil Plan Method

Place Named Boundary Civil Plan - used when multiple sheets are needed along a corridor. To use this method a centerline needs to be present in one of the Design Models References.

1. Select the **Place Named Boundary** tool and the Place Named Boundary Dialog box will appear.

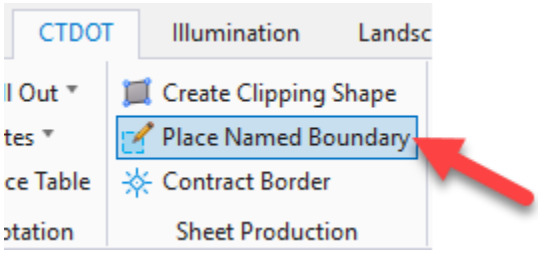


Figure 208

2. In the Place Named Boundary Civil Plan dialog box, ensure the following options are set in the tool's settings window:

- Method (icon): ***Civil Plan***
- Drawing Seed: ***40 Scale Contract Plan Sheet***
- Detail Scale: ***1" = 40'***
- Name: ***Plan 1***
- Group: ***New***
- Length: ***1000***
- Right Offset: ***-275***
- Left offset: ***275***
- Overlap: ***0***
- Boundary Cord: ***20***
- Create Drawing: ***Enabled***
- Show Dialog: ***Enabled***

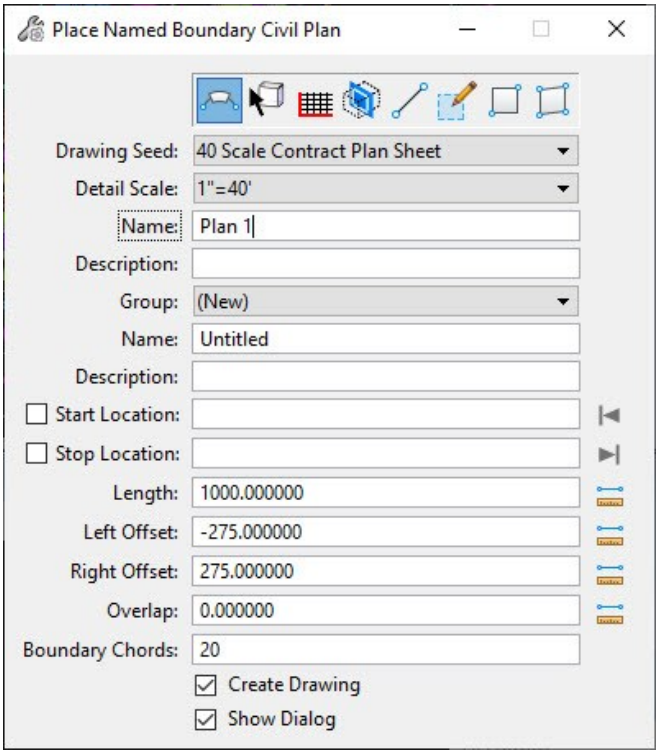


Figure 209

3. Follow the prompts to create a named boundary along the Centerline.
4. After accepting the placement of the named boundaries the Create Drawing dialog will appear. Ensure the following options are set:

Drawing Model Section

- Annotation Scale**:** ***Full Size 1" = 40'***

Sheet Model Section

- Sheets: ***New***
- Annotation Scale: ***1" = 40'***
- Detail Scale: ***1" = 40'***
- Add to Sheet Index: ***Disabled***
- Open Model**: Enabled**

5. Click **OK**. The Drawing Models and Sheet Models will be created.

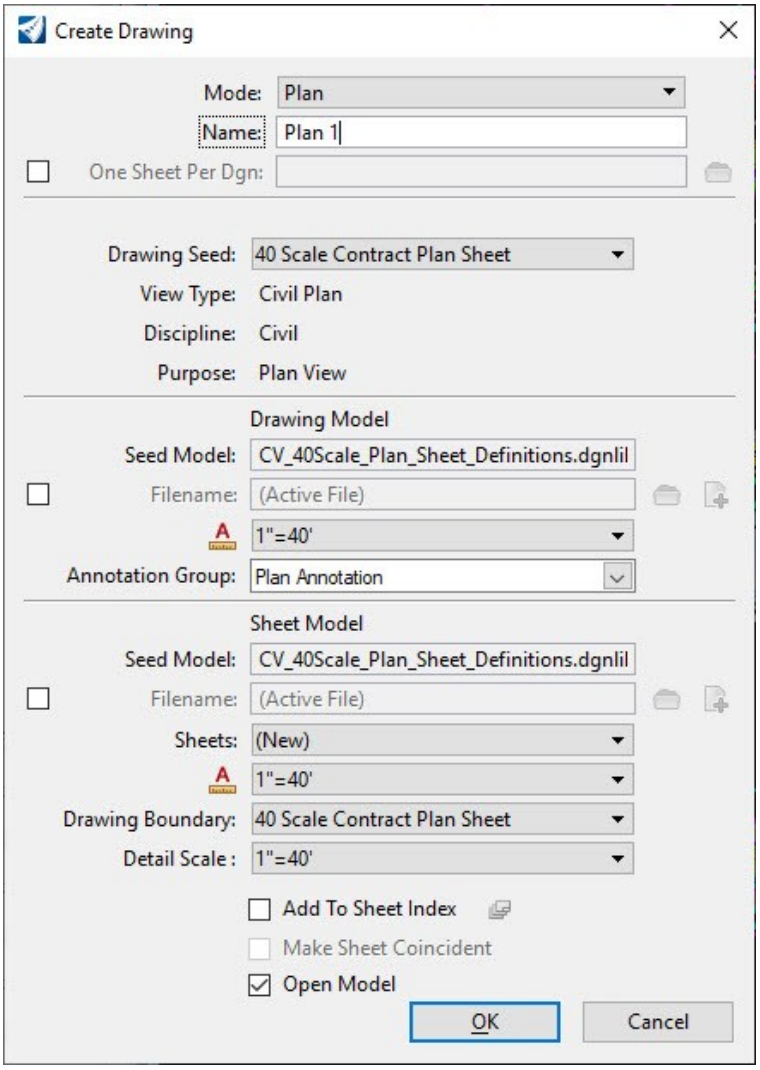


Figure 210

7.4 Edit the Title Block

1. The newly created sheet model will open with the Named Boundary referenced and centered onto the sheet. From the Ribbon open the **Models** dialog box.
2. View the **Properties** of the model. Notice the Sheet Model's Annotation Scale is ***Full Size 1 = 1***.
3. In the **Properties** dialog box edit or fill in the following fields:
   - *Description*: ***ILLUMINATION PLAN***
   - *Sheet Number*: ***IL-01***
4. Notice the **Drawing Title** and **Drawing Number** in the Title Block will be updated to match the Properties. The Project Number, Project Description and Town should match the WorkSet Properties.

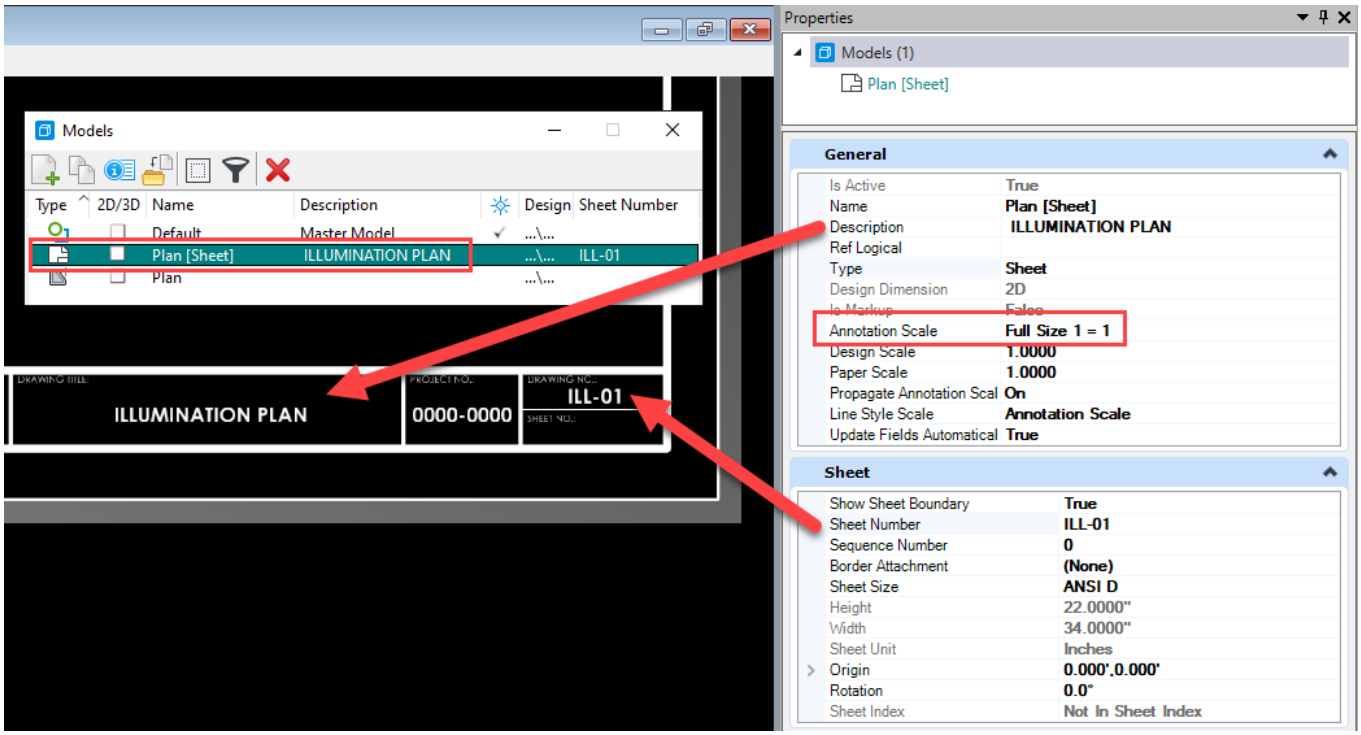


Figure 211

5. Select **Save Settings**.

7.5 Adjust the Named Boundary

1. On the Ribbon select **Home > Selection** and make the **Element Selection** tool active.
2. Select the Named Boundary shape and adjust by dragging the handles to the desired location.

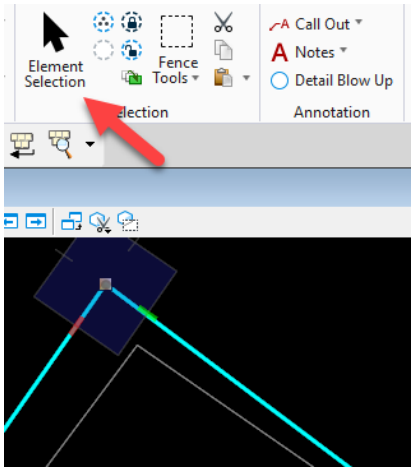


Figure 212

3. The **Insert Vertex** or **Delete Vertex** tools can also be used to edit the shape.

Figure 213

4. Return to the sheet model by hovering the cursor over the Marker and click the **Signal Sheet** and select the folder Icon (Open Target Tool). This action returns you back to the sheet model. Notice that by changing the boundary in the design model, this has propagated to the sheet.

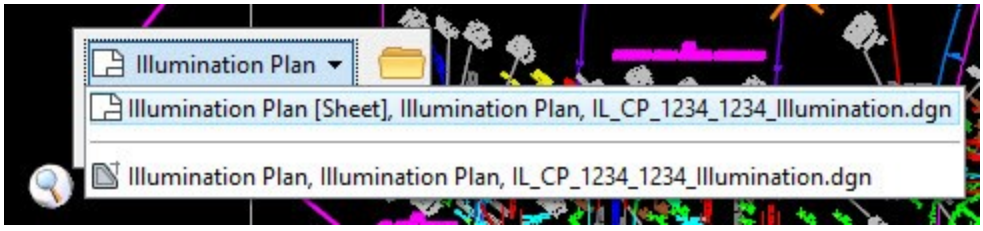


Figure 214

5. Models can also be opened using the **View Group** drop down tool located at the bottom left of the screen.

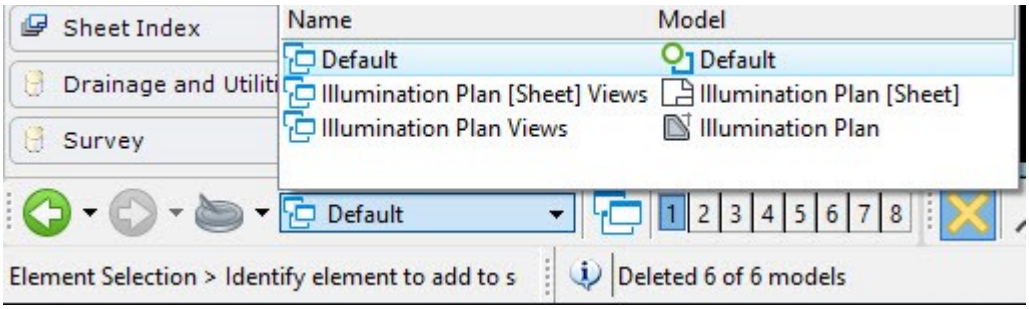


Figure 215

6. Select **Save Settings**.

7.6 Move the Name Boundary inside the Sheet Border

1. From the Ribbon click on the **Models** icon and select to open the ***Sheet Model***.
2. Select the **References** Icon, in the dialog box right click on the file, select **Move** to re-position the reference file within the border.
3. Follow the prompts to execute the move command.

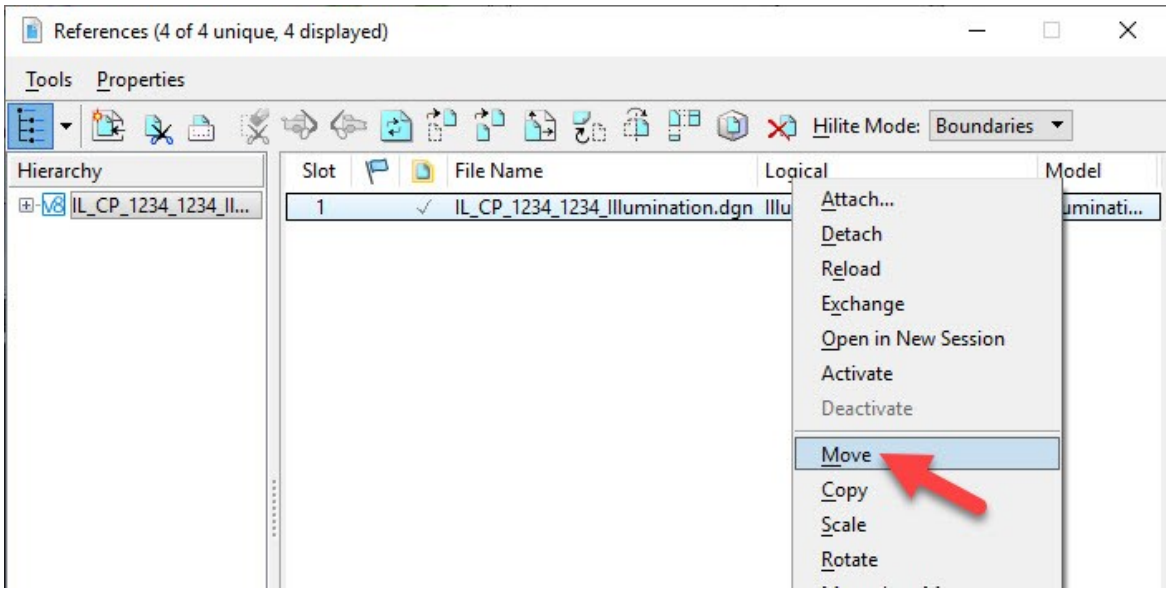
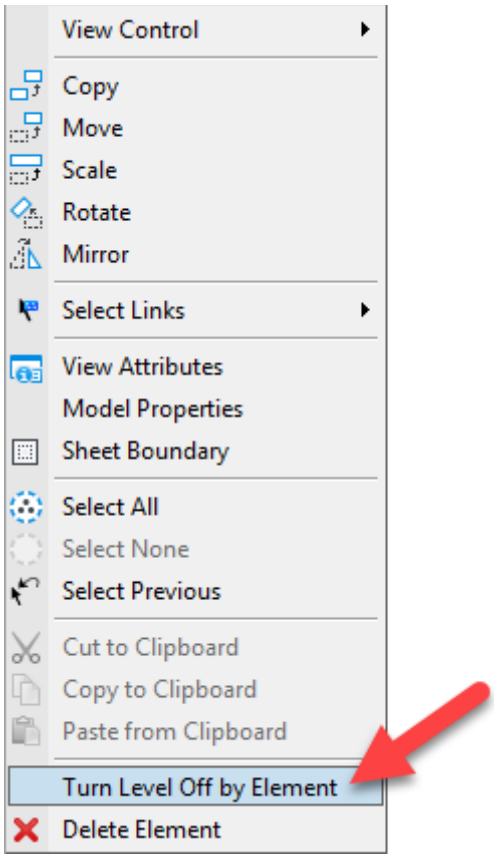


Figure 216

4. Select **Save Settings**.

7.7 Turn off Levels

1. Right-press and hold to bring up the contextual menu. From here, select **Turn Level Off by Element**.



2. Issue a Data Point on the Named Boundary, hence turning off the level. Data Point on other elements for levels you would like turned off.
3. Select **Save Settings**.

7.8 Create Match Marked Areas

If the design is too large for the sheet, Match Marks will be required, and additional Named Boundaries will need to be created. This will be used to include side roads that extend past the original clipping boundary or if the main line is slightly too long to fit within the original clipping boundary.

1. Go back into the Design model and place another Named Boundary adjacent to the original named boundary. This will be the Match Mark.

2. Select the **CTDOT** workflow and in the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.

3. Select the **Place Named Boundary** tool and the Place Named Boundary dialog box will appear, set the following options:

- Method (icon): ***By 2 Points***
- Name: ***Match Mark 1***
- Mode (icon): ***Place Single Named Boundary***
- Create Drawing: ***Enabled***

4. Follow the prompts to create a named boundary of the around the additional area.

5. After accepting the placement of the named boundary the Create Drawing dialog will appear. Ensure the following options are set:

Top Section

- *Name*: ***Match Mark 1***
- *Drawing Seed*: ***40 Scale Contract Plan Sheet***

Drawing Model Section

- Create Drawing Model: ***Enabled***
- Annotation Scale: ***Full Size 1" = 40'***

Sheet Model Section

- Create Sheet Model: ***Enabled***
- Sheets: ***Illumination Plan [Sheet]***
- Drawing Boundary: ***New***
- Detail Scale: ***1" = 40'***
- Add to Sheet Index: ***Disabled***
- Open Model: ***Enabled***

6. The existing Sheet Model will open, move the reference to the desired location on the sheet.

7. Select **Save Settings**.

7.9 Create Blown Up Detail

This video demonstrates how to place a 20 Scale Detail on an existing 40 Scale Sheet.

Figure 217

7.10 Annotate the Drawing Models

Note: Annotation will be placed in both the Drawing Models and the Sheet Model.

- Call outs and Dimensions should be placed in the Drawing Models. Placing the Call Outs and Dimensions in the Drawing Model will make it easier to move each detail inside the Sheet Model's Border as the Features and Annotation will all move together.
- Notes that pertain to the whole sheet can be placed in the Sheet Models.

1. Open a Drawing Model and use the tools on the **CT DOT** Ribbon's, **Annotation** section to place **Call Outs**.

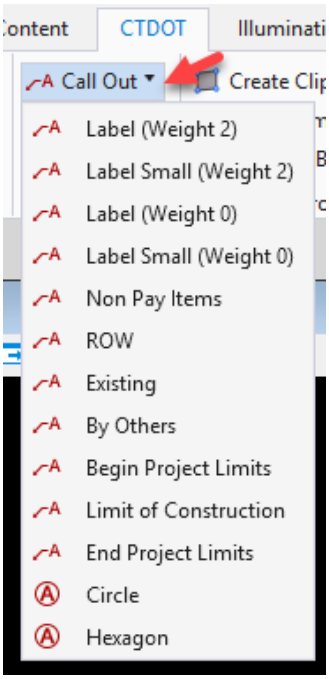


Figure 218

2. Match Marks are to be placed in the Drawing Model using the tools in the **Notes** pull down menu.

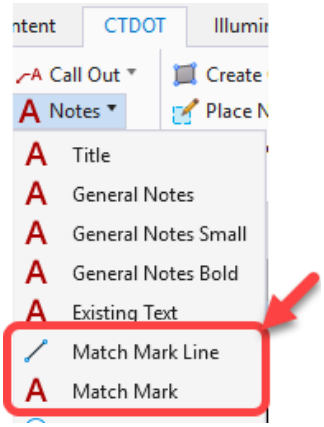


Figure 219

3. Place Dimensions in the Drawing Model. To place a Dimension, select either the **Vertical** or **Horizontal** Text Tool on the **CTDOT** ribbon, then select one of the desired **Dimensioning** tools. The Element Dimensioning dialog box will appear. Enable **Association** and follow the prompts to place the dimension.

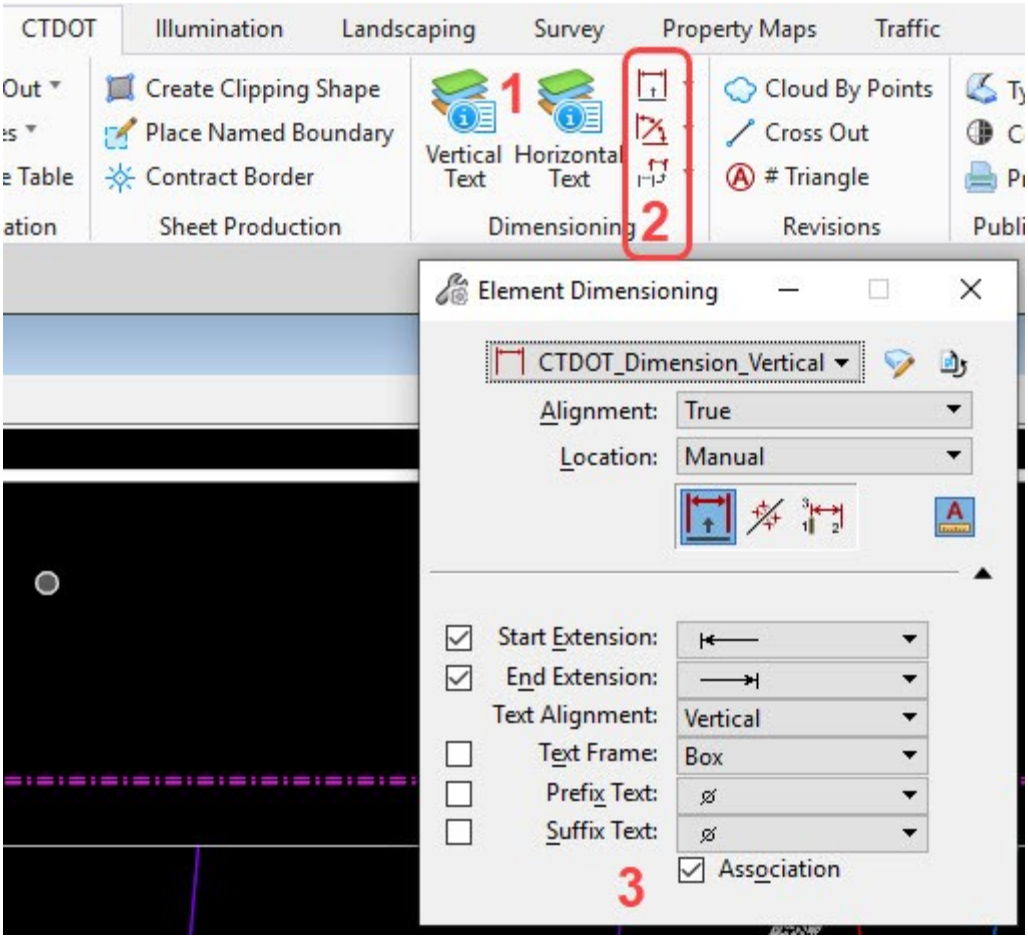


Figure 220

4. Light Standard Annotation.

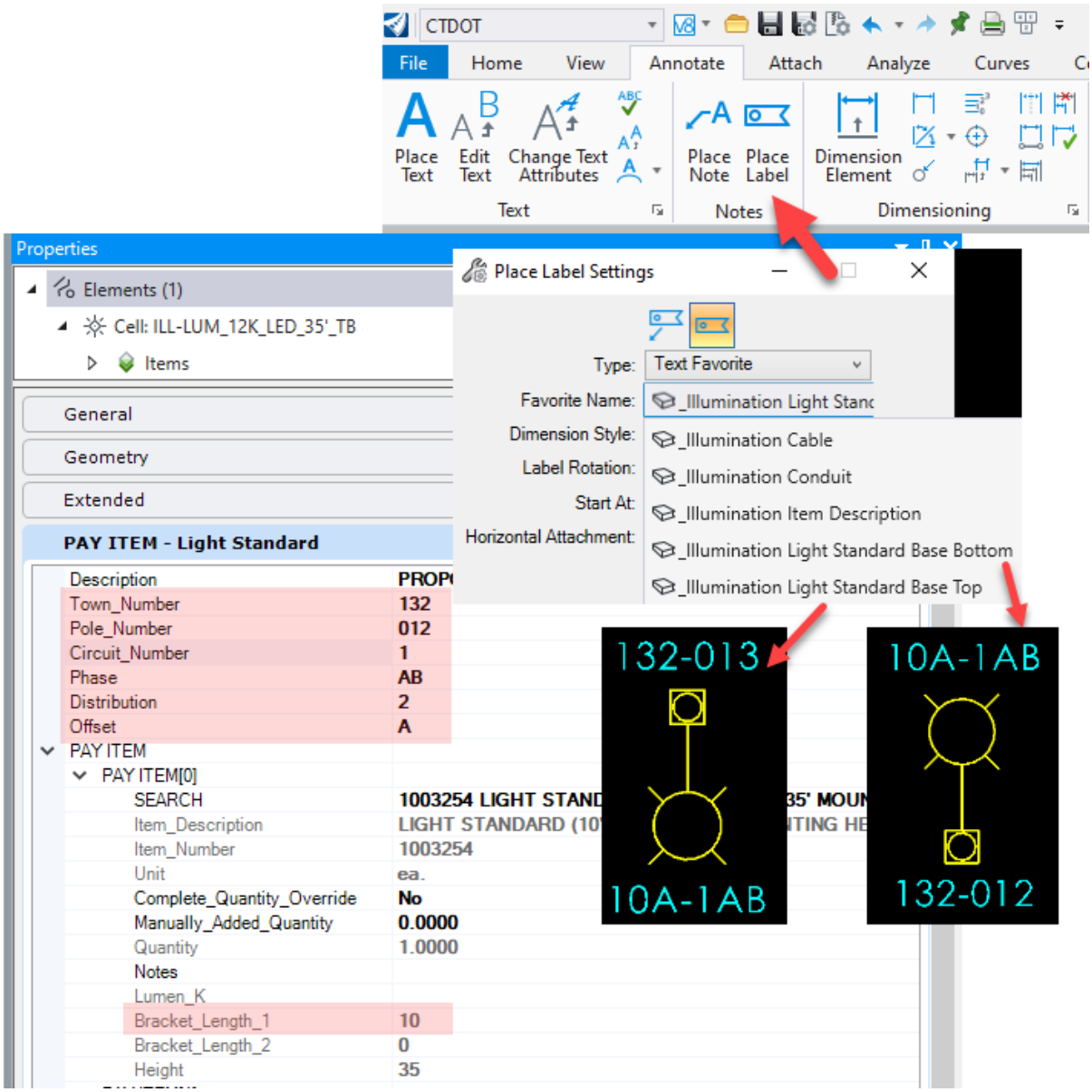
5. Custom labels have been created for annotating a Light Standard. This information is pulled from the Item Type fields. Select the **Annotation** Tab, in the **Notes** section select **Place Label**. On the Place Label Settings dialog box, select the second Icon **Place Label without a Leader**.

   Select:

   Type: ***Text Favorite***

   Favorite Name: ***_Illumination Light Standard Base Bottom*** or ***_Illumination Light Standard Base Top***

6. Select the Light Standard cell and follow the prompts to place the annotation. You may have to move the text to line up it up properly after placement.



7.11 Annotate the Sheet Models

Note: Annotation will be placed in both the Drawing Models and the Sheet Model.

- Call-outs and Dimensions should be placed in the Drawing Models. Placing the Call-Outs and Dimensions in the Drawing Model will make it easier to move each detail inside the Sheet Model's Border as the Features and Annotation will all move together.
- Notes that pertain to the whole sheet can be placed in the sheet models.

1. Use the **Place Table** tool on the CT DOT Ribbon to place preconfigured Tables. Select the **General Notes** table and follow the prompts for placement.

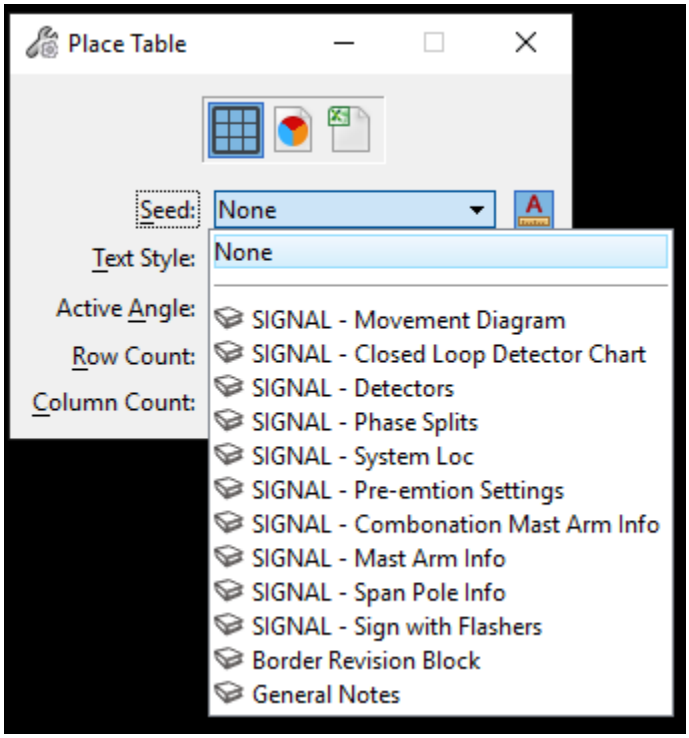


Figure 221

2. To add information to the table select the **Annotate** tab and choose **Edit Text**. Note: Avoid using the Element Selection tool to edit the table as this will lock up the file.

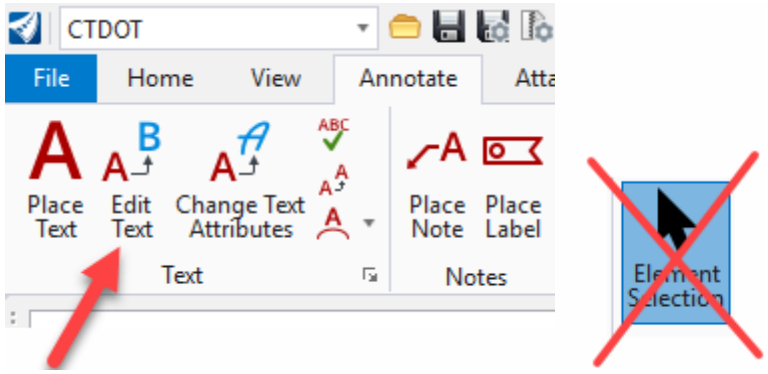


Figure 222

3. Use the tools on the **CT DOT** Ribbon's, **Annotation** section to place **Notes**.

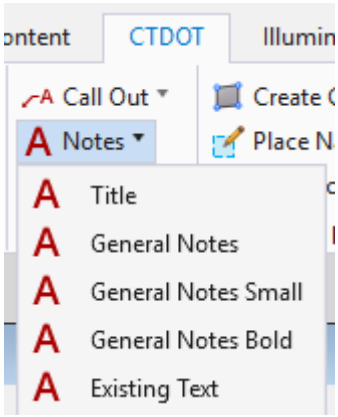


Figure 223

Section 8 – Landscape Sheets

8.1 Create New File

Before attempting to open or create DGN files users should make sure the following is in place:

1. CTDOT users should have the CTDOT CONNECT DDE synced through SharePoint with the COMPASS Project Synced along with the CAD Configuration.
2. Consultants should have CTDOT DDE properly installed or be syncing to the CTDOT DDE SharePoint/COMPASS system.
3. Make note of the **Coordinate System** you will be working in. If you have existing survey data, you will need to find out what system is being used **(NAD 83/NAVD 88 or NAD 27/NAVD 29).**
4. Log on to the CONNECTION Client. Bentley CONNECT licensing requires users to log into their Bentley account to secure a software license. CTDOT users should log in using your CTDOT email address and Bentley password. If you do not see the dialog box, select the ^ icon on the bottom Windows Screen. Click on the Connection Client Icon and select Open.
5. Access OpenRoads through Accounting or the Customized Icon following
6. On the OpenRoads open screen select **Custom Configuration**, using the small drop-down arrows select the Workspace **CT_Workspace**, the needed **WorkSet** and **Role**.
7. Select the **New File** icon. In the New dialog box browse to the ***Landscape/Contract_Plans*** folder.
8. The Seed file should be set to ***Seed2D - CT RoadDesign.dgn***. If this is not the case, click on the **Browse** button. Browse to ***...CT_Configuration\|Organization\|Seed\|Road*** and select **Seed2D - CT RoadDesign.dgn**

   If the survey was done in an old Datum, use the 2D Seed Files in this folder ***...CT_Configuration\|Organization\|Seed\|GCS\|***
9. In the ***File name*** field enter a name for your file using the CTDOT file naming structure Example: ***LS_CP_1234_1234_Landscape.dgn***
10. Select **Save** and the new file will open.

8.2 Set up the Default Model

1. Select the **CTDOT** workflow and click on the **Attach** Tab, in the **References Section** click on **Attach Reference**.
2. Navigate to the Landscape ***Landscape\|Base_Models*** folder and reference the Master Base Model file. Choose the needed Model (most likely its "Default") and use **Live Nesting** at a **Nesting Depth of 2**.
3. Select the **Home** Tab, in the **Primary Section** select the **Attach Tool** drop down and choose **References**. This will open the References Dialog box.
4. Review the Attachments. If all the needed files did not propagate to reference with Live Nesting in the above step, you will need to reference the files directly. If there are no Existing Survey users can attach Raster Images or use a Background Map, these workflows can be found in Volume 2 – Module 2 - Attaching Imagery and LiDAR Data.
5. To reference the Survey navigate to the ***Active_Survey*** folder and reference the Survey *.dgn file. **Note:** Older DGN Files will need to be referenced in with certain settings to get them to line up in the correct Geospatial location.
6. For older reference files turn **True Scale** off and set the Scale to ***1:1***. **Note:** Always do a check by clicking on the Survey's Northing and Easting Grid Marks to compare the files read out. If they do not match you did not properly align the file Geospatially.
7. Select **Level Display** and turn off the desired levels.
8. Rotate the view so that the main road is parallel to the screen. On the **View Window** select the **Rotate View** tool. Use the **2 Points** Method. Follow the prompts to rotate the view.

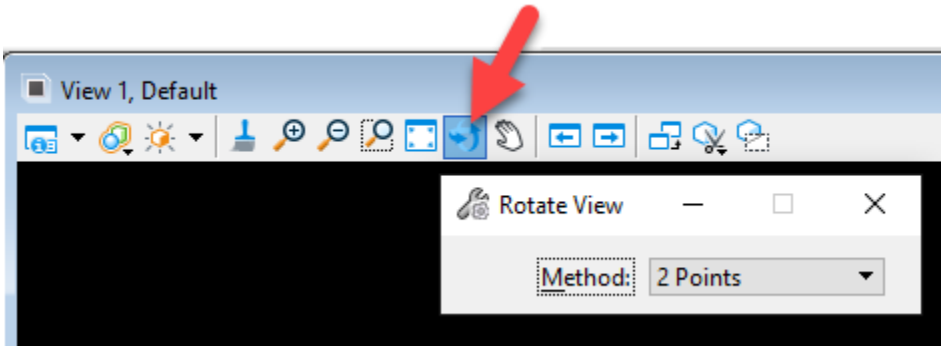


Figure 224

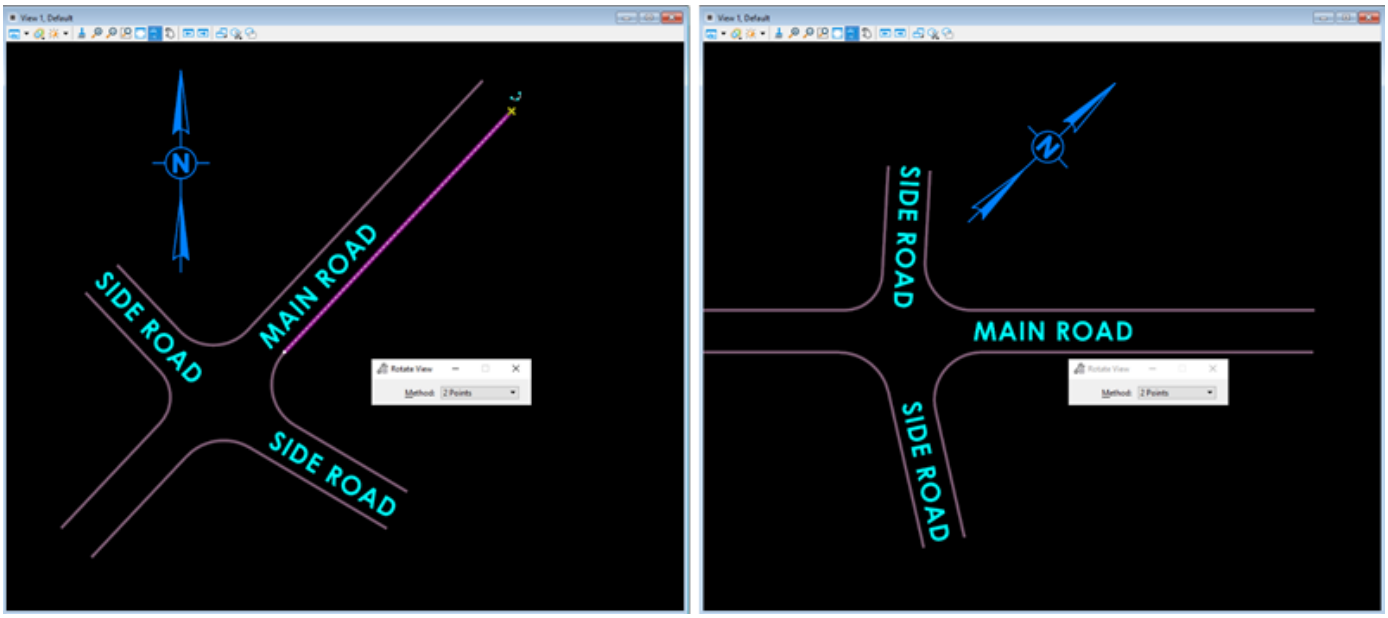


Figure 225

9. Select **Save Settings**.

8.3 Place Named Boundaries

8.3.1 By 2 Point Method

Place Named Boundary By 2 Points - used when only one sheet is needed with several details on the sheet.

1. Select the **CTDOT** workflow and on the **Annotate** tab locate the **Detailing** section and select the bottom right **Styles button**. In the Detailing Symbol Styles dialog right click on ***CV_Detail*** and select **Activate**.

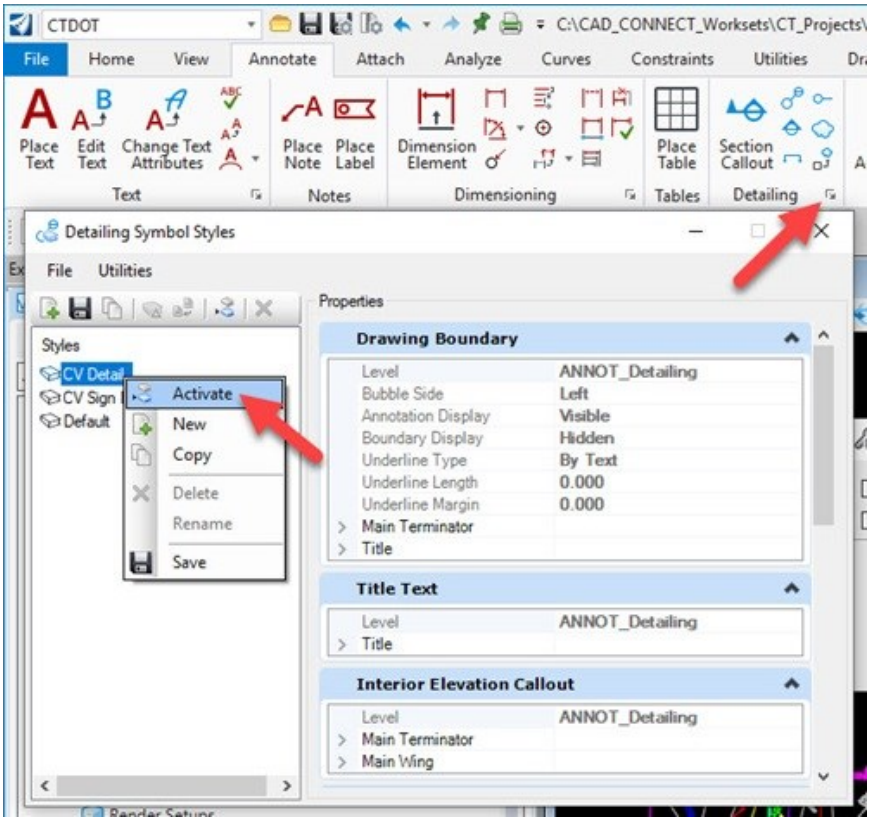


Figure 226

2. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.

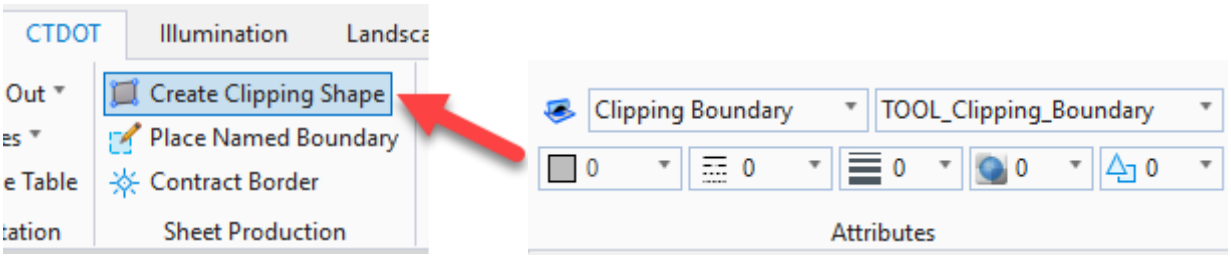


Figure 227

3. Select the **Place Named Boundary** tool and the Place Named Boundary dialog box will appear.

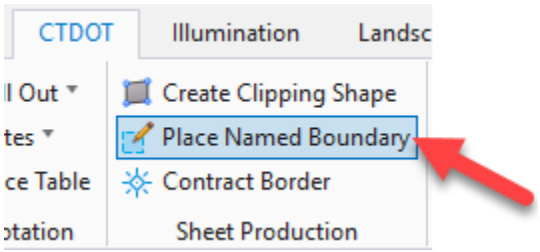


Figure 228

4. In the Place Named Boundary dialog box, set the following options in the tool's settings window:

- Method (icon): **By 2 Points**
- *Name*: **Landscape Plan**
- *Mode (icon)*: **Place Single Named Boundary**
- *Create Drawing*: **Enabled**

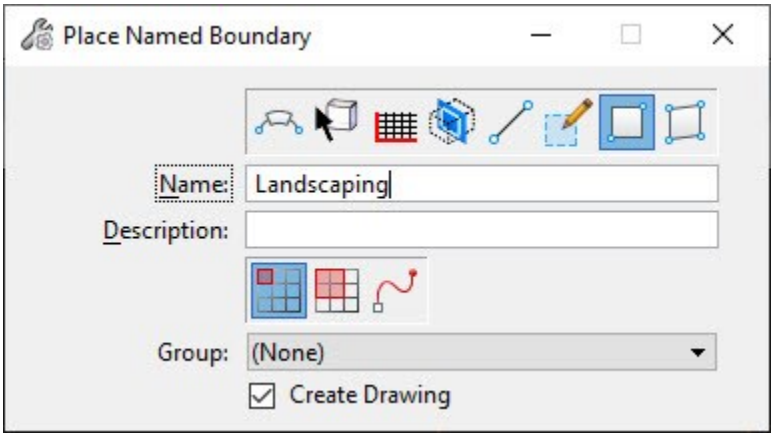


Figure 229

5. Follow the prompts to place a Named Boundary (Clipping Boundary) around the design. Data point first in the lower left and ending in the upper right. This element can be edited later to refine the shape and add additional points.
6. After accepting the placement of the named boundary the Create Drawing dialog box will appear. Ensure the following options are set:

Top Section

- Name: ***Landscape Plan***
- Drawing Seed: ***40 Scale Contract Plan Sheet***

Drawing Model Section

- Create Drawing Model: ***Enabled***
- Annotation Scale: ***Full Size 1" = 40'***

Sheet Model Section

- Create Sheet Model: ***Enabled***
- Sheets: ***New***
- Annotation Scale: ***1" = 40'***
- Drawing Boundary: ***New***
- Detail Scale: ***1" = 40'***
- Add to Sheet Index: ***Disabled***
- Open Model: ***Enabled***

7. Click **OK**.

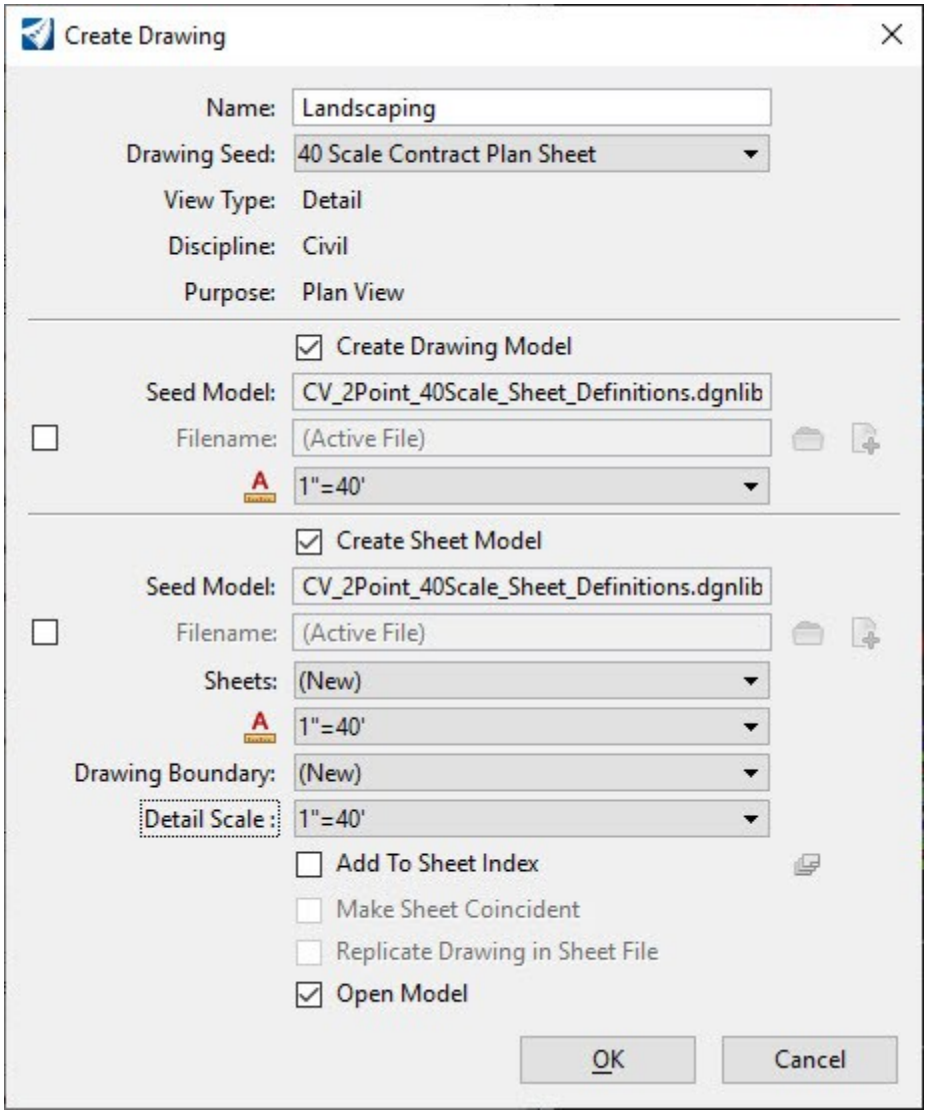


Figure 230

8.3.2 Civil Plan Method

Place Named Boundary Civil Plan - used when multiple sheets are needed along a corridor. To use this method a centerline needs to be present in one of the Design Models References.

1. Select the **Place Named Boundary** tool and the Place Named Boundary Dialog box will appear.

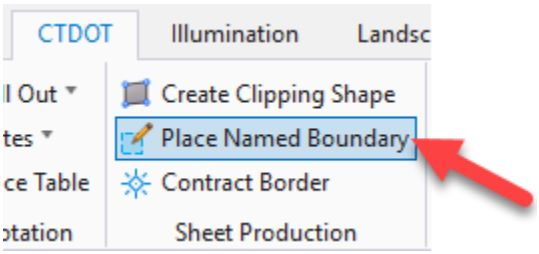


Figure 231

2. In the Place Named Boundary Civil Plan dialog box, ensure the following options are set in the tool's settings window:

Method (icon): ***Civil Plan***
Drawing Seed: ***40 Scale Contract Plan Sheet***
Detail Scale: ***1" - 40'***
Name: ***Plan 1***
Group: ***New***
Length: ***1000***
Right Offset: ***-275***
Left offset: ***275***
Overlap: ***0***
Boundary Cord: ***20***
Create Drawing: ***Enabled***
Show Dialog: ***Enabled***

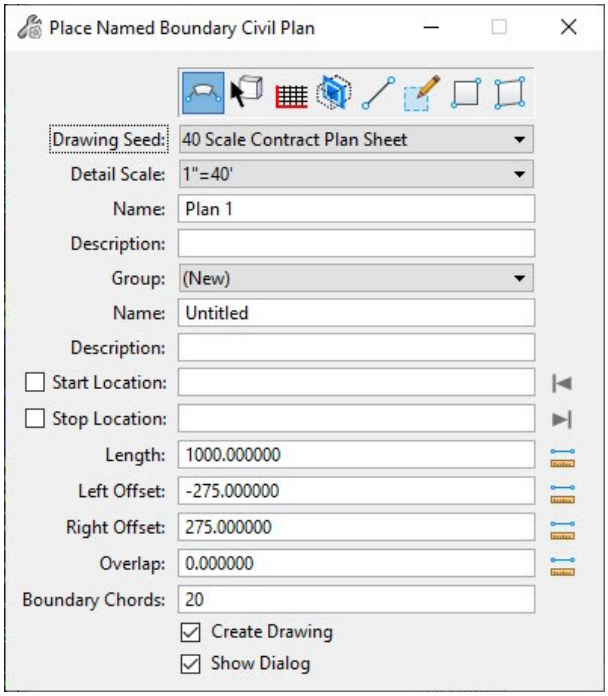


Figure 232

3. Follow the prompts to create a named boundary along the Centerline.
4. After accepting the placement of the named boundaries the Create Drawing dialog will appear. Ensure the following options are set:

   Drawing Model Section
   - Annotation Scale: **Full Size 1" = 40'**

   Sheet Model Section
   - Sheets: **New**
   - Annotation Scale: **1" = 40"**
   - Detail Scale**: 1" = 40'**
   - Add to Sheet Index: **Disabled**
   - Open Model: **Enabled**
5. Click **OK**. The Drawing Models and Sheet Models will be created.

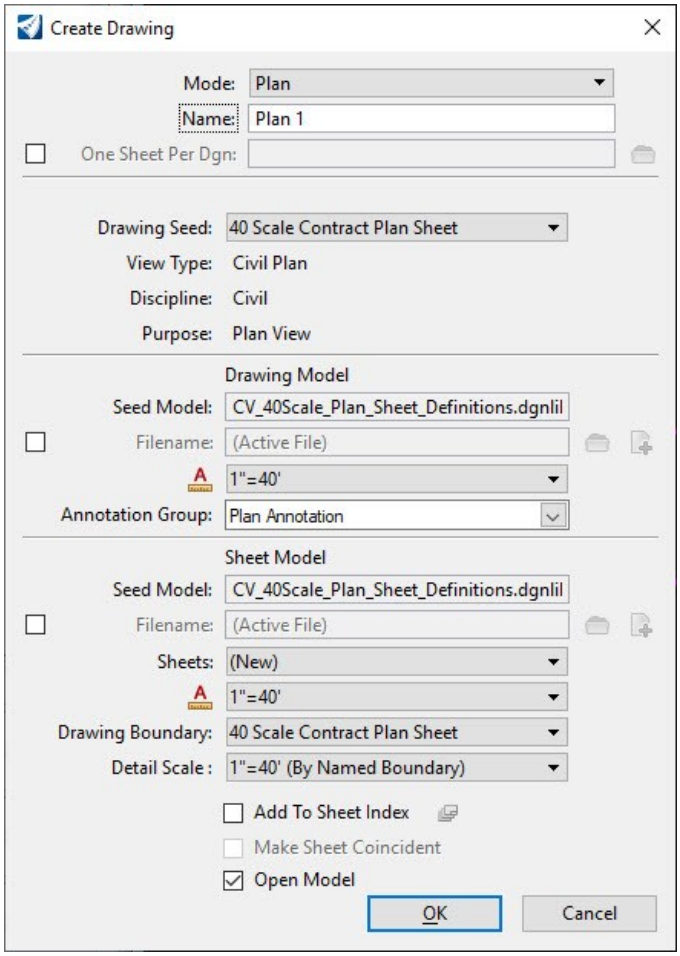


Figure 233

8.4 Edit the Title Block

1. The newly created sheet model will open with the Named Boundary referenced and centered onto the sheet. From the Ribbon open the **Models** dialog box.
2. View the **Properties** of the model. Notice the Sheet Model's Annotation Scale is ***Full Size 1 = 1***.
3. In the **Properties** dialog box edit or fill in the following fields:
   - *Description*: ***LANDSCAPE PLAN***
   - *Sheet Number*: ***LSD-01***
4. Notice the **Drawing Title** and **Drawing Number** in the Title Block will be updated to match the Properties. The Project Number, Project Description and Town should match the WorkSet Properties.

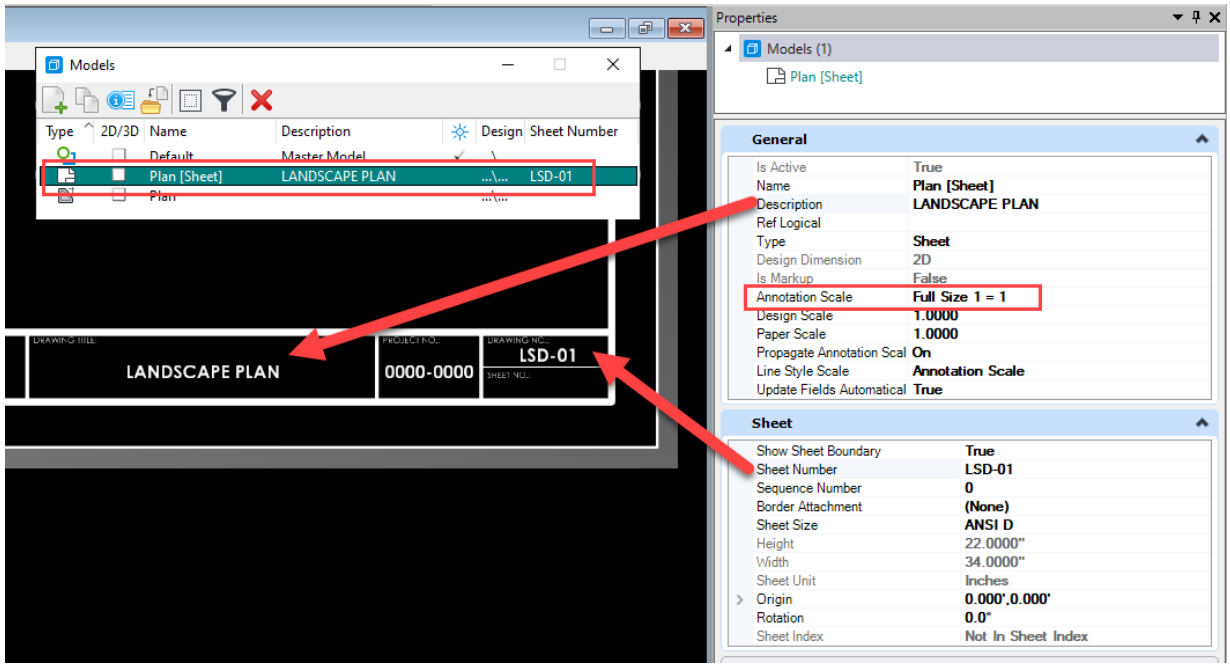
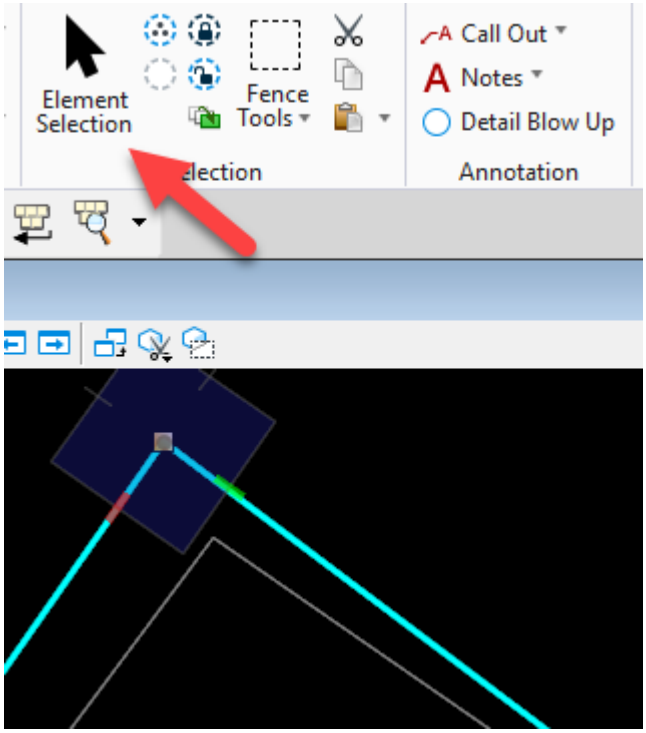


Figure 234

5. Select **Save Settings**.

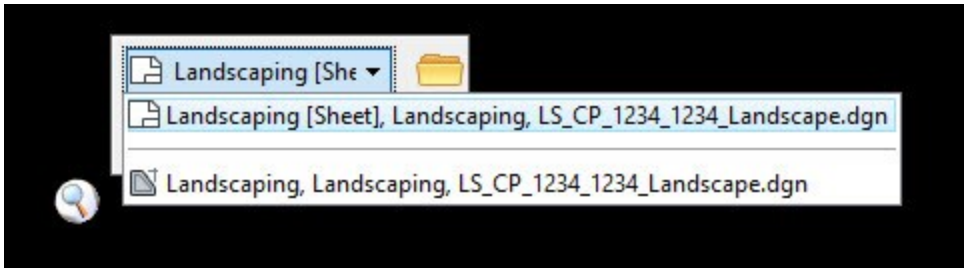
8.5 Adjust the Named Boundary

1. On the Ribbon select **Home › Selection** and make the **Element Selection** tool active.
2. Select the Named Boundary shape and adjust by dragging the handles to the desired location.

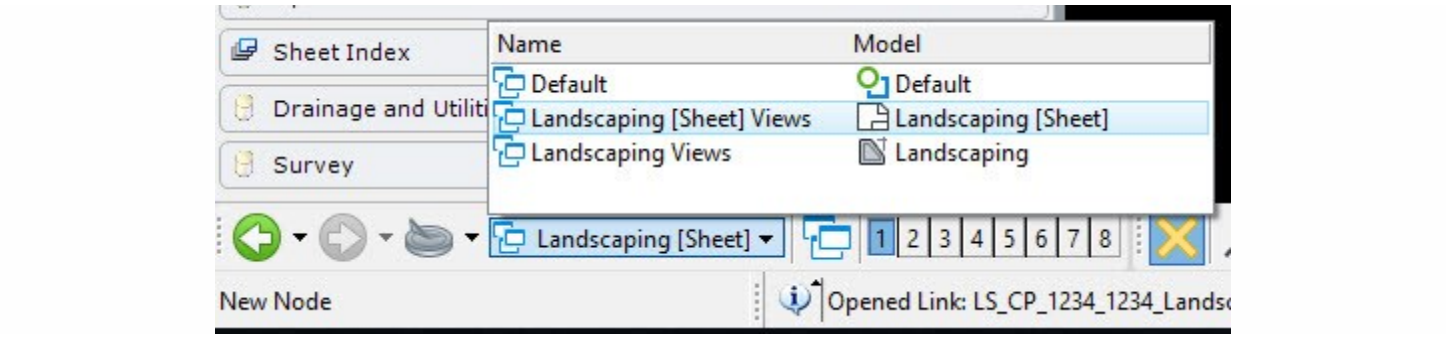


3. The **Insert Vertex** or **Delete Vertex** tools can also be used to edit the shape.

4. Return to the sheet model by hovering the cursor over the Marker and click the **Signal Sheet** and select the folder Icon (Open Target Tool). This action returns you back to the sheet model. Notice that by changing the boundary in the design model, this has propagated to the sheet.



5. Models can also be opened using the **View Group** drop down tool located at the bottom left of the screen.



6. Select **Save Settings**.

8.6 Move the Name Boundary inside the Sheet Border

1. From the Ribbon click on the **Models** icon and select to open the ***Sheet Model***.
2. Select the **References** Icon, in the dialog box right click on the file, select **Move** to re-position the reference file within the border.
3. Follow the prompts to execute the move command.

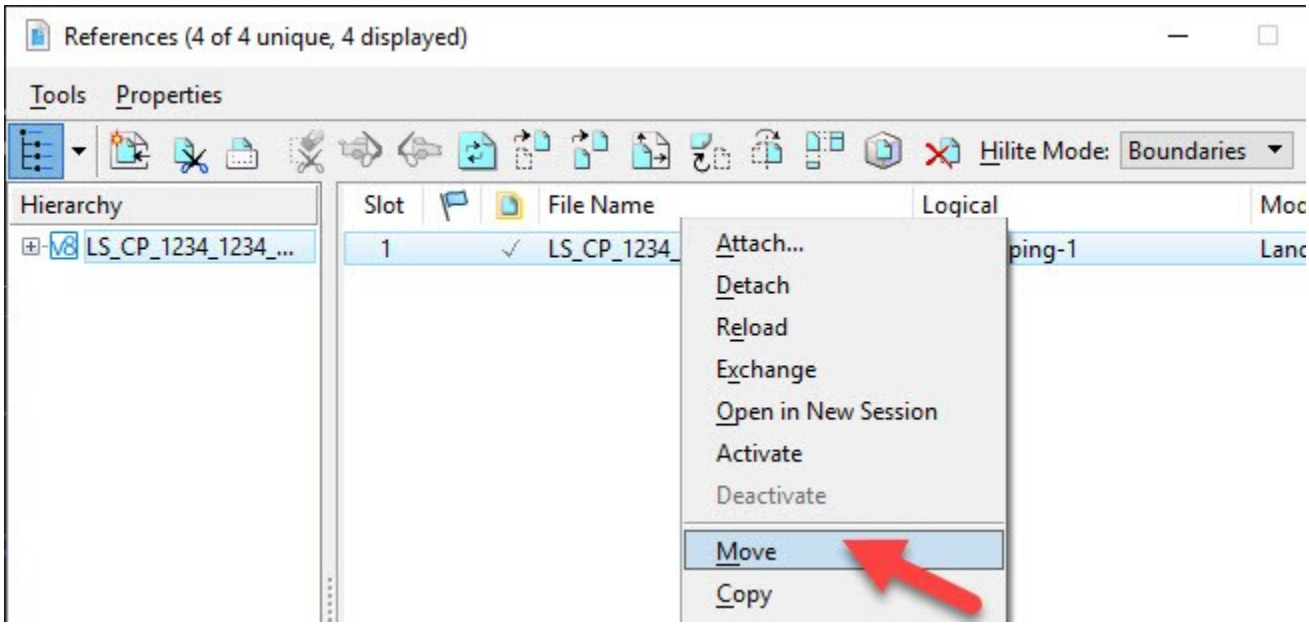
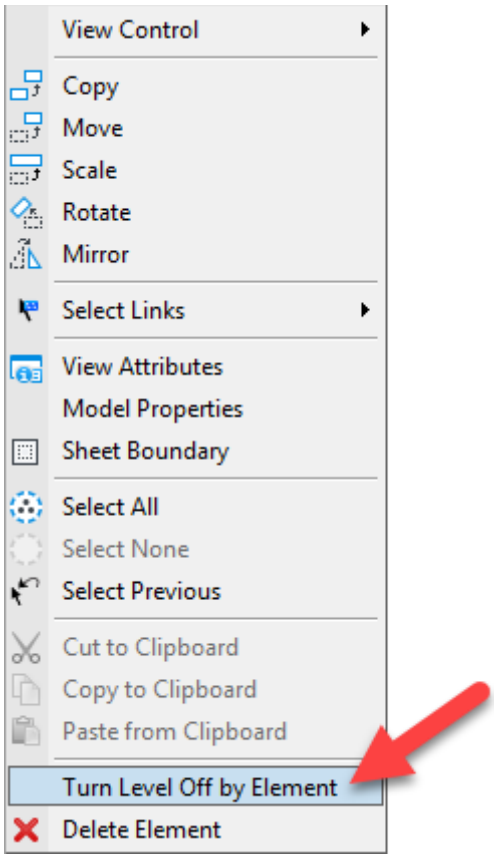


Figure 235

4. Select **Save Settings**.

8.7 Turn off Levels

1. Right-press and hold to bring up the contextual menu. From here, select **Turn Level Off by Element**.



2. Issue a Data Point on the Named Boundary, hence turning off the level. Data Point on other elements for levels you would like turned off.
3. Select **Save Settings**.

8.8 Create Match Marked Areas

If the design is too large for the sheet, Match Marks will be required, and additional Named Boundaries will need to be created. This will be used to include side roads that extend past the original clipping boundary or if the main line is slightly too long to fit within the original clipping boundary.

1. Go back into the Design model and place another Named Boundary adjacent to the original named boundary. This will be the Match Mark.

2. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.

3. Select the **Place Named Boundary** tool and the Place Named Boundary dialog box will appear, set the following options:

- Method (icon): ***By 2 Points***
- Name: ***Match Mark 1***
- Mode (icon): ***Place Single Named Boundary***
- Create Drawing: ***Enabled***

4. Follow the prompts to create a named boundary of the around the additional area.

5. After accepting the placement of the named boundary the Create Drawing dialog will appear. Ensure the following options are set:

Top Section

- *Name*: Match ***Mark 1***
- *Drawing Seed*: ***40 Scale Contract Plan Sheet***

Drawing Model Section

- Create Drawing Model: ***Enabled***
- Annotation Scale: ***Full Size 1" = 40'***

Sheet Model Section

- Create Sheet Model: ***Enabled***
- Sheets: ***Illumination Plan [Sheet]***
- Drawing Boundary: ***New***
- Detail Scale: ***1" = 40'***
- Add to Sheet Index: ***Disabled***
- Open Model: **Enabled**

6. The existing Sheet Model will open, move the reference to the desired location on the sheet.

7. Select **Save Settings**.

8.9 Create Blown Up Detail

This video demonstrates how to place a 20 Scale Detail on an existing 40 Scale Sheet.

Figure 236

8.10 Annotate the Drawing Models

Note: Annotation will be placed in both the Drawing Models and the Sheet Model.

- Call outs and Dimensions should be placed in the Drawing Models. Placing the Call Outs and Dimensions in the Drawing Model will make it easier to move each detail inside the Sheet Model's Border as the Features and Annotation will all move together.
- Notes that pertain to the whole sheet can be placed in the Sheet Models.

1. Open a Drawing Model and use the tools on the **CT DOT** Ribbon's, **Annotation** section to place **Call Outs**.

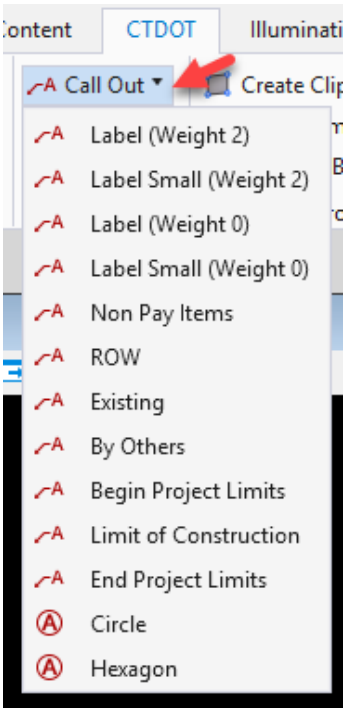


Figure 237

2. Match Marks are to be placed in the Drawing Model using the tools in the **Notes** pull down menu.

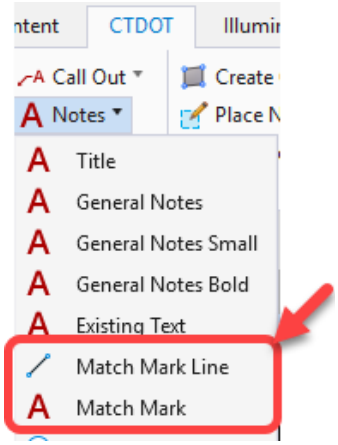


Figure 238

3. Place Dimensions in the Drawing Model. To place a Dimension, select either the **Vertical** or **Horizontal** Text Tool on the **CTDOT** ribbon, then select one of the desired **Dimensioning** tools. The Element Dimensioning dialog box will appear. Enable **Association** and follow the prompts to place the dimension.

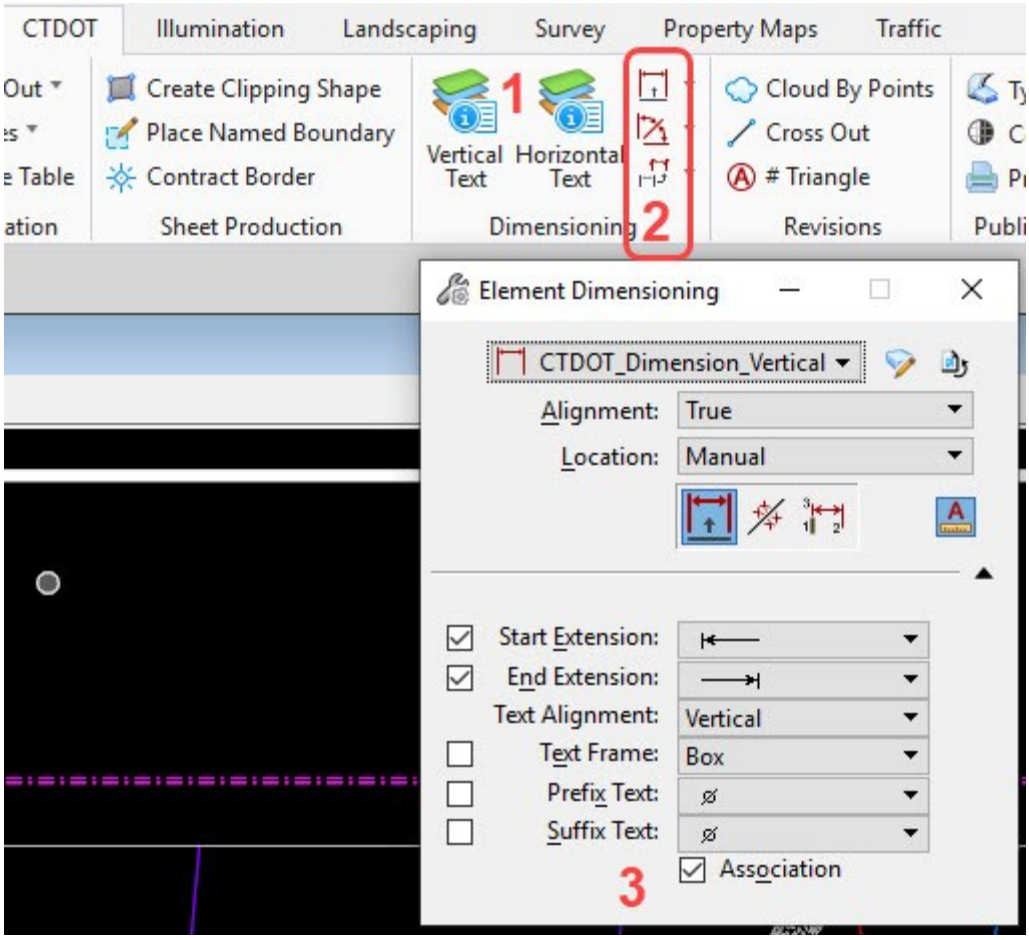


Figure 239

8.11 Item Annotation using fields

Coming Soon

8.12 Annotate the Sheet Models

Note: Annotation will be placed in both the Drawing Models and the Sheet Model.

- Call outs and Dimensions should be placed in the Drawing Models. Placing the Call Outs and Dimensions in the Drawing Model will make it easier to move each detail inside the Sheet Model's Border as the Features and Annotation will all move together.
- Notes that pertain to the whole sheet can be placed in the sheet models.

1. Use the **Place Table** tool on the CT DOT Ribbon to place preconfigured Tables. Select the **General Notes** table and follow the prompts for placement.

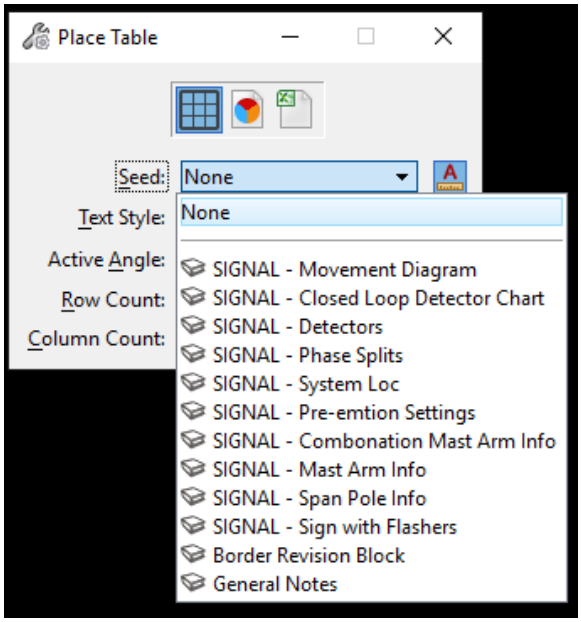


Figure 240

2. To add information to the table select the **Annotate** tab and choose **Edit Text**. Note: Avoid using the Element Selection tool to edit the table as this will lock up the file.

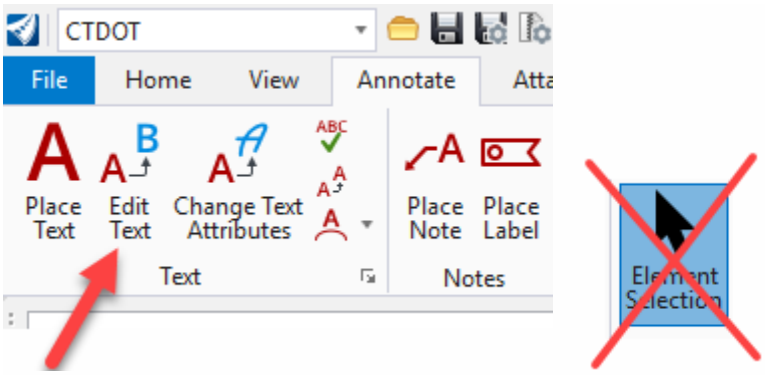


Figure 241

3. Use the tools on the **CT DOT** Ribbon's, **Annotation** section to place **Notes**.

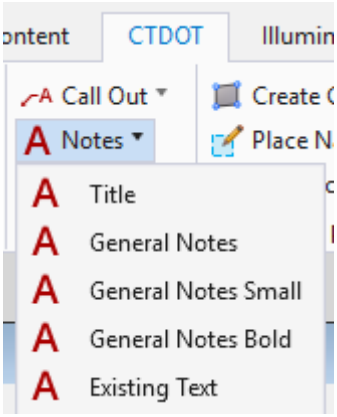


Figure 242

8.13 Adding Planting Key

Coming soon

Section 9 – Site Design Sheets

9.1 Create New File

Before attempting to open or create DGN files users should make sure the following is in place:

1. CTDOT users should have the CTDOT CONNECT DDE synced through SharePoint with the COMPASS Project Synced along with the CAD Configuration.
2. Consultants should have CTDOT DDE properly installed or be syncing to the CTDOT DDE SharePoint/COMPASS system.
3. Make note of the **Coordinate System** you will be working in. If you have existing survey data, you will need to find out what system is being used **(NAD 83/NAVD 88 or NAD 27/NAVD 29).**
4. Log on to the CONNECTION Client. Bentley CONNECT licensing requires users to log into their Bentley account to secure a software license. CTDOT users should log in using your CTDOT email address and Bentley password. If you do not see the dialog box, select the ^ icon on the bottom Windows Screen. Click on the Connection Client Icon and select Open.
5. Access OpenRoads through Accounting or the Customized Icon following
6. On the OpenRoads open screen select **Custom Configuration**, using the small drop-down arrows select the Workspace **CT_Workspace**, the needed **WorkSet** and **Role**.
7. Select the **New File** icon. In the New dialog box browse to the ***F_Civil|Contract_Plans*** folder.
8. The Seed file should be set to ***Seed2D - CT RoadDesign.dgn***. If this is not the case, click on the **Browse** button. Browse to ***...CT_Configuration|Organization|Seed|Road*** and select **Seed2D - CT RoadDesign.dgn**

   If the survey was done in an old Datum, use the 2D Seed Files in this folder ***...CT_Configuration|Organization|Seed|GCS|***
9. In the ***File name*** field enter a name for your file using the CTDOT file naming structure. Example: ***FC_CP_1234_1234_Site.dgn***
10. Select **Save** and the new file will open.
11. If it has been determined the provided survey is in NAD 27/NAVD 29 you will need to re-project your design file's Geospatial Header, follow Volume 2 – Module 1 - Working with Geographic Coordinate Systems to complete this task.

9.2 Set up the Default Model

1. Select the **CTDOT** workflow and click on the **Attach** tab, in the **References Section** click on **Attach Reference**.
2. Navigate to the Landscape ***F_Civil\Base_Models*** folder and reference the Master Base Model file. Choose the needed Model (most likely its "Default") and use **Live Nesting** at a **Nesting Depth of 2**.
3. Select the **Home** Tab, in the **Primary Section** select the **Attach Tool** drop down and choose **References**. This will open the References dialog box.
4. Review the Attachments. If all the needed files did not propagate to reference with Live Nesting in the above step, you will need to reference the files directly. If there are no Existing Survey users can attach Raster Images or use a Background Map, these workflows can be found in Volume 2 – Module 2 - Attaching Imagery and LiDAR Data.
5. To reference the Survey navigate to the ***Active_Survey*** folder and reference the Survey *.dgn file. **Note:** Older DGN Files will need to be referenced in with certain settings to get them to line up in the correct Geospatial location.
6. For older reference files turn **True Scale** off and set the Scale to ***1:1***. **Note:** Always do a check by clicking on the Survey's Northing and Easting Grid Marks to compare the files read out. If they do not match you did not properly align the file Geospatially.
7. Select **Level Display** and turn off the desired levels.
8. Rotate the view if desired. On the **View Window** select the **Rotate View** tool. Use the **2 Points** Method. Follow the prompts to rotate the view.

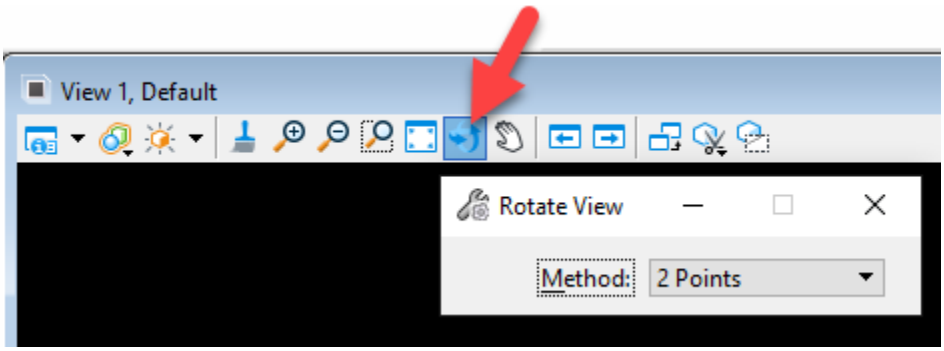


Figure 243

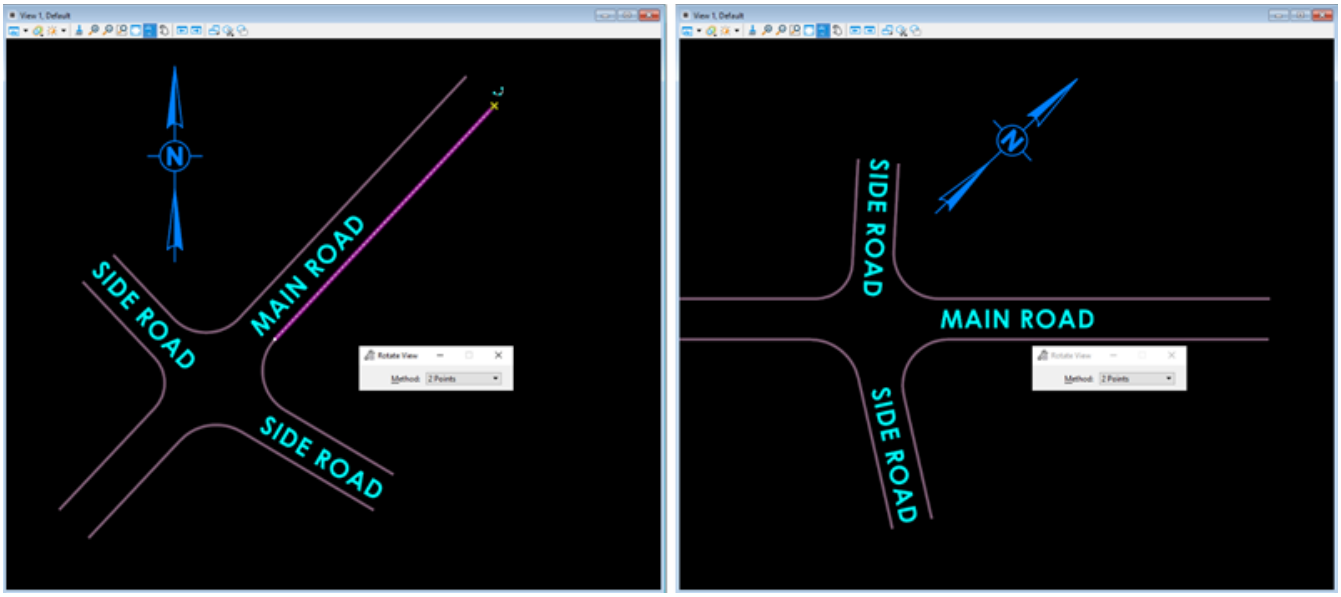


Figure 244

9. Select **Save Settings**.

9.3 Create the Drawing and Sheet Models

1. Select **Level Display** and turn off the desired levels.
2. Select the **CTDOT** workflow and on the **Annotate** tab locate the **Detailing** section and select the bottom right **Styles button**. In the Detailing Symbol Styles dialog right click on ***CV_Detail*** and select **Activate**.

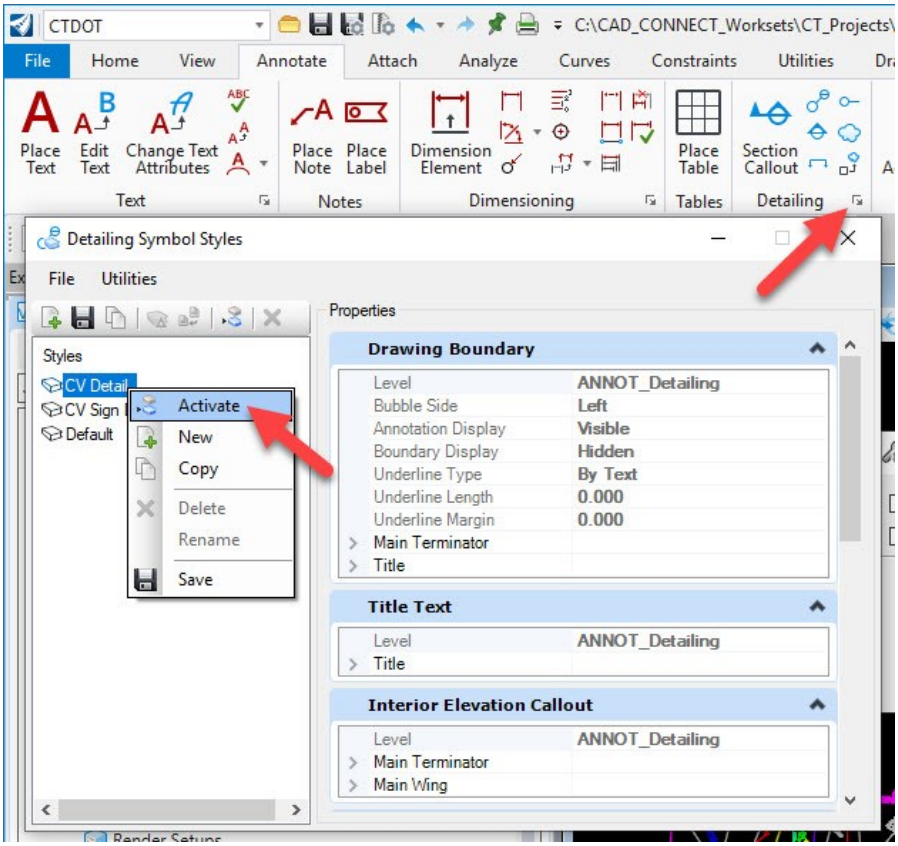


Figure 245

3. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.

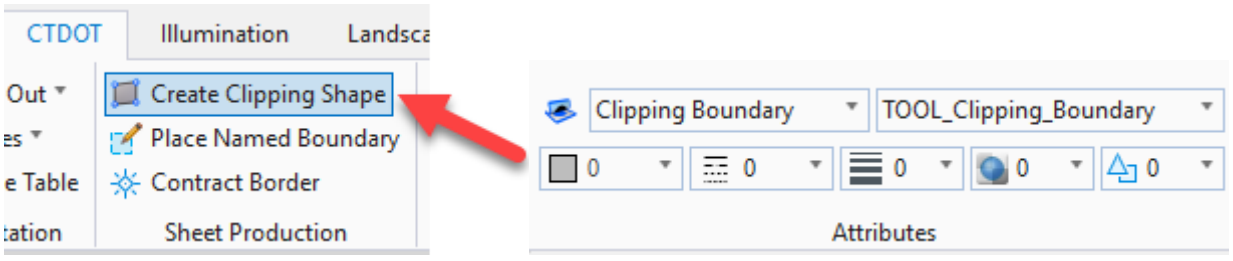


Figure 246

4. Select the **Place Named Boundary** tool and the Place Named Boundary dialog box will appear.

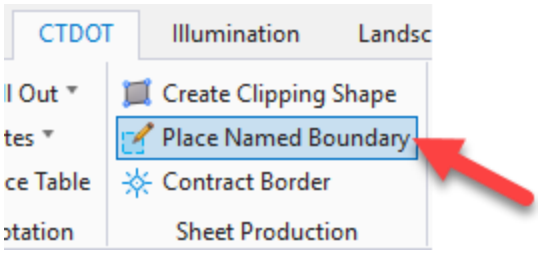


Figure 247

5. In the Place Named Boundary dialog box, set the following options in the tool's settings window:
   - Method (icon): ***By 2 Points***
   - *Name*: ***Demolition Site Plan***
   - *Mode (icon)*: ***Place Single Named Boundary***
   - *Create Drawing*: ***Enabled***

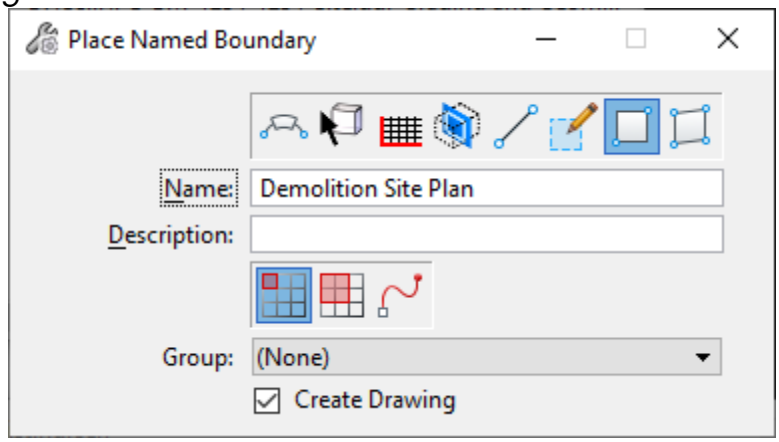


Figure 248

6. Follow the prompts to place a Named Boundary (Clipping Boundary) around the design. Data point first in the lower left and ending in the upper right. This element can be edited later to refine the shape and add additional points.

7. After accepting the placement of the named boundary the Create Drawing dialog box will appear. Ensure the following options are set:

   Top Section
   - *Name*: ***Demolition Site Plan***
   - *Drawing Seed*: **Misc Plan**

   Drawing Model Section
   - *Create Drawing Model*: ***Enabled***
   - *Annotation Scale*: ***Full Size 1" = ??' (Match Detail Scale below)***

Sheet Model Section

- *Create Sheet Model*: ***Enabled***
- *Sheets*: ***New***
- *Annotation Scale*: ***1 = 1***
- *Drawing Boundary*: **New**
- *Detail Scale*: ***1" = ??' (Fit View to Sheet Boundary)***
- *Add to Sheet Index*: **Disabled**
- *Open Model*: ***Enabled***

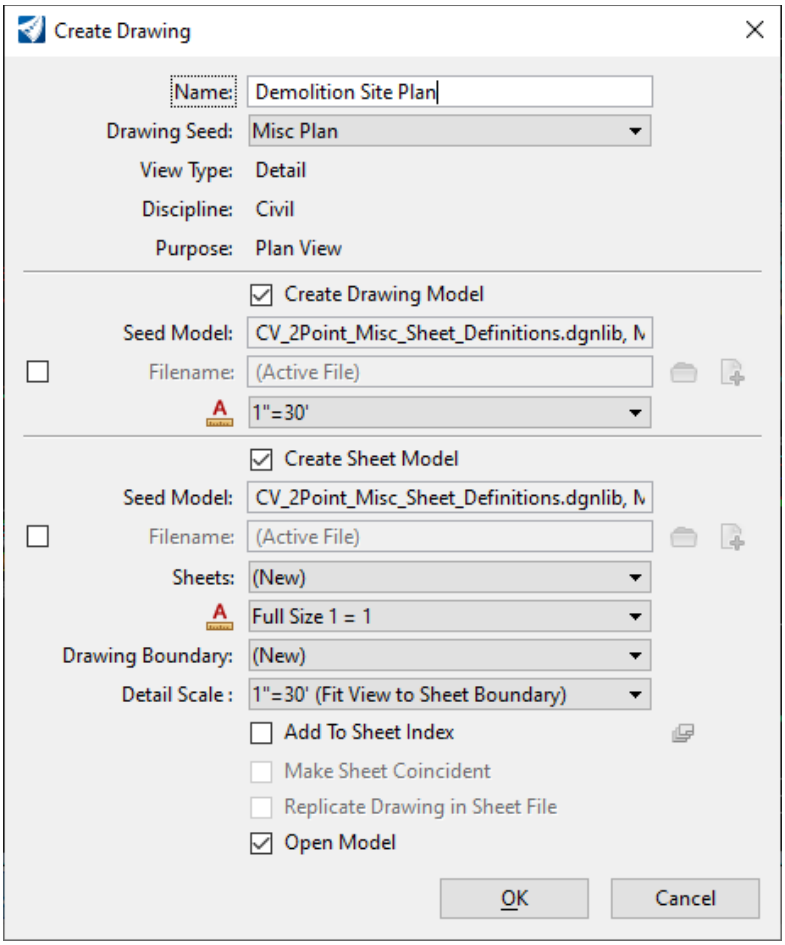


Figure 249

8. Click **OK**.
9. Open the Default Design Model and repeat steps 1-5 for creating the Site / Drainage Plan and Grading / Geometry Plan.

9.4 Edit the Title Block

1. From the Ribbon open the **Models** dialog box open each newly created sheet models.
2. In the **Properties** dialog box edit or fill in the following fields:

- Description: ***SITE GRADING PLAN***
- Sheet Number: ***SGP-01***

3. Notice the **Drawing Title** and **Drawing Number** in the Title Block will be updated to match the Properties. The Project Number, Project Description and Town should match the WorkSet Properties.

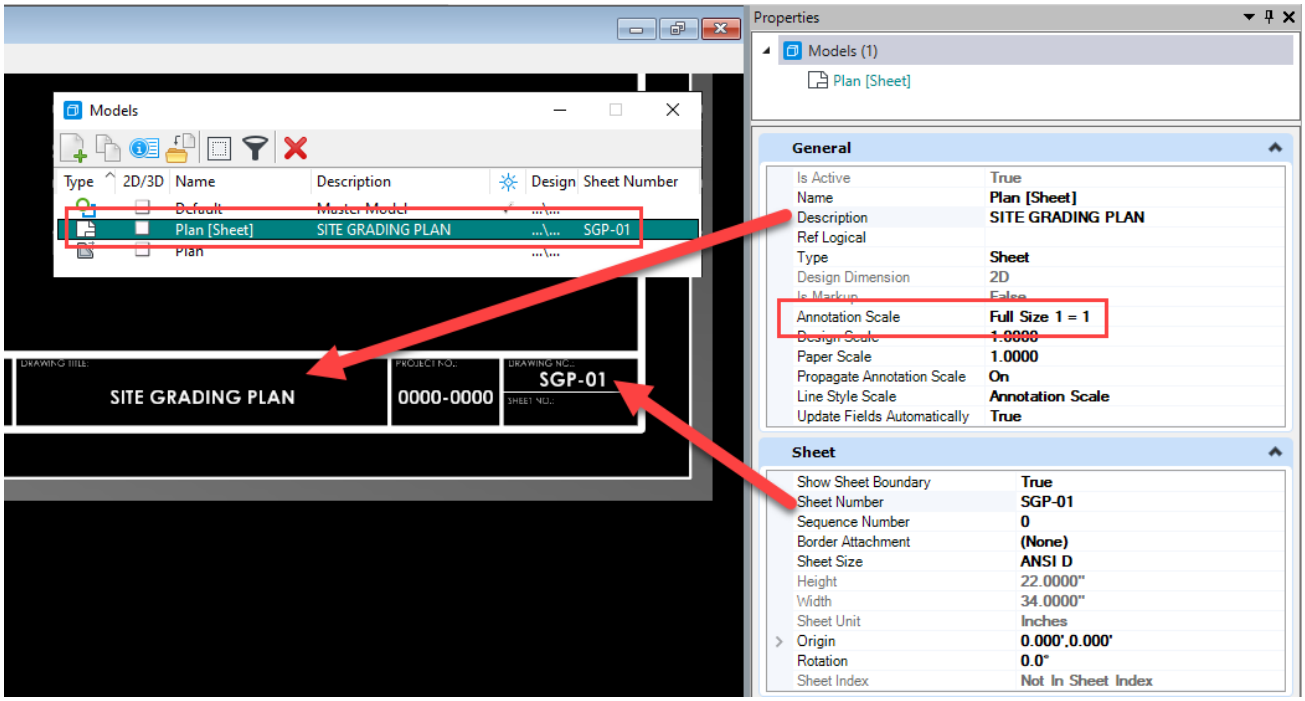


Figure 250

4. Select **Save Settings**.

9.5 Adjust the Named Boundary

1. Open the Default Design Model to edit the Named Boundaries as needed. On the Ribbon select **Home > Selection** and make the **Element Selection** tool active.
2. Select the Named Boundary shape and adjust by dragging the handles to the desired location.

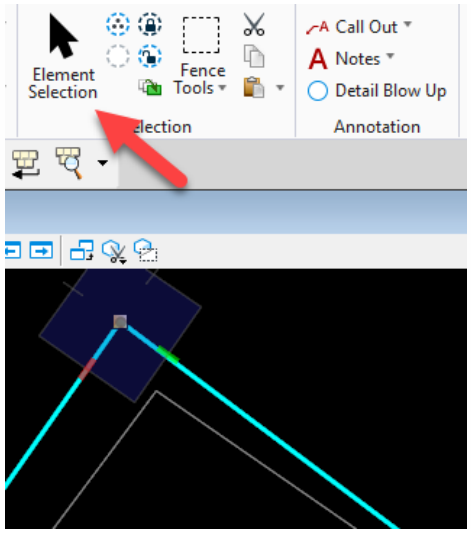


Figure 251

3. The **Insert Vertex** or **Delete Vertex** tools can also be used to edit the shape.

Figure 252

4. Return to the sheet model by hovering the cursor over the Marker and click the **Signal Sheet** and select the folder Icon (Open Target Tool). This action returns you back to the sheet model. Notice that by changing the boundary in the design model, this has propagated to the sheet.

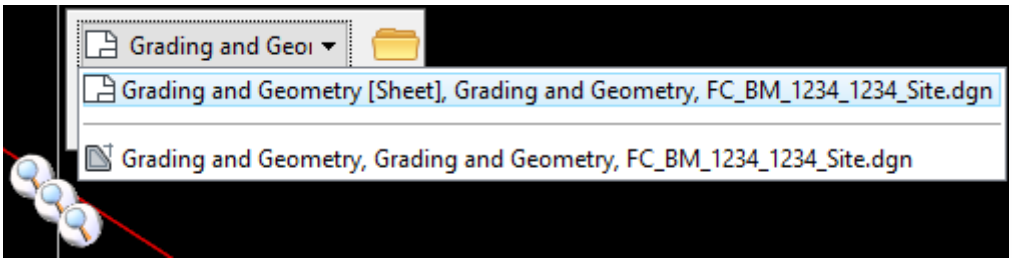


Figure 253

5. Models can also be opened using the **View Group** drop down tool located at the bottom left of the screen.

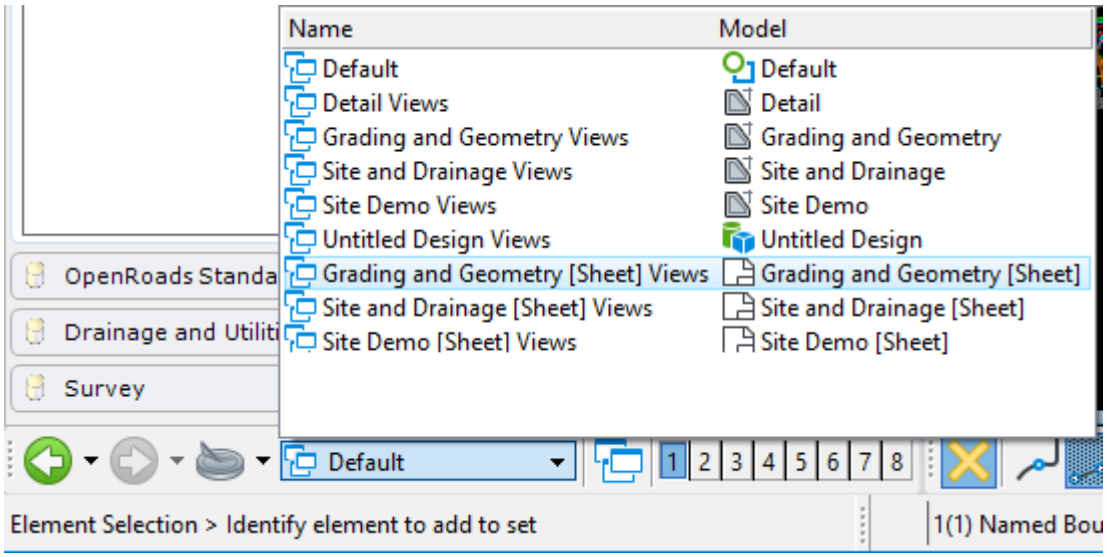


Figure 254

6. Select **Save Settings**.

9.6 Edit the Sheets

9.6.1 Move the Name Boundary inside the Sheet Border

1. Open the desired sheet model and select the **References** Icon, in the dialog box right click on the file, select **Move** to re-position the reference file within the border.

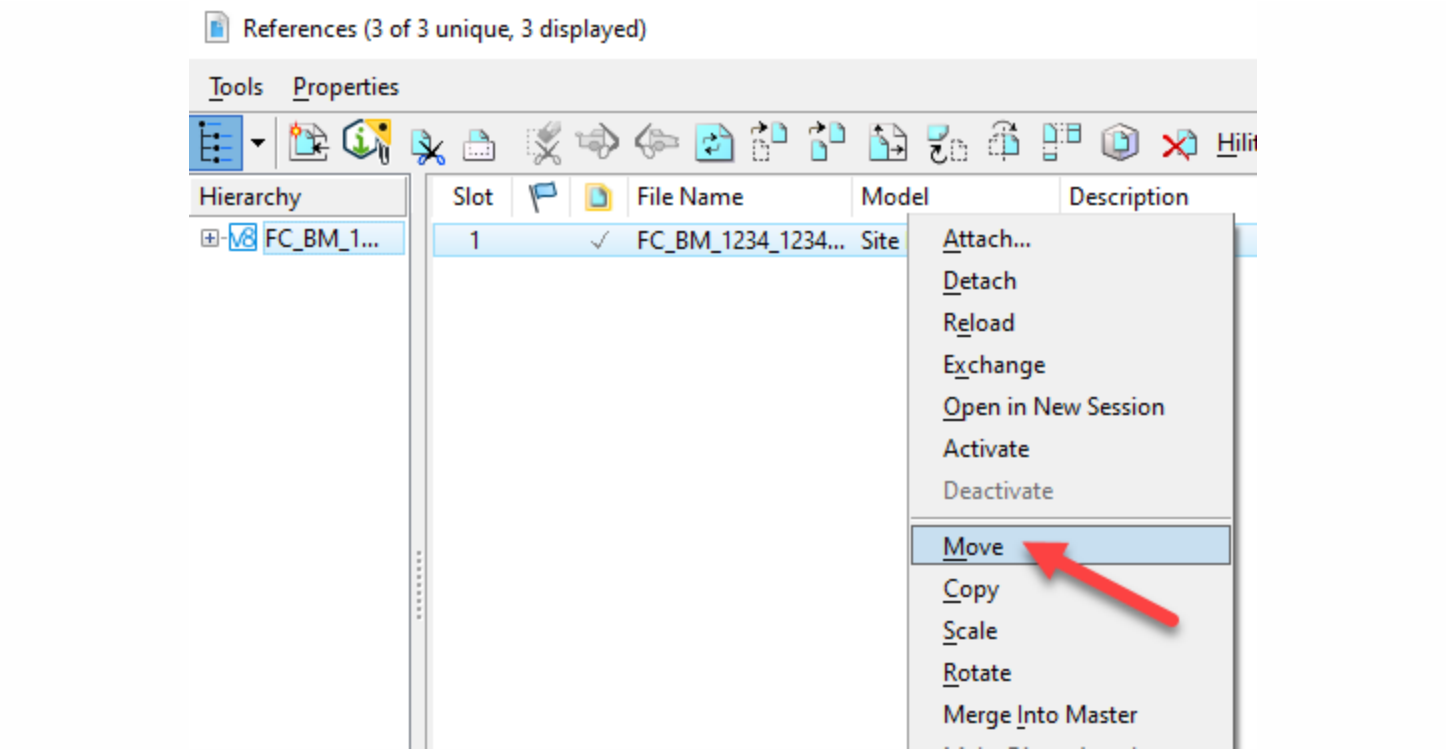


Figure 255

2. Follow the prompts to execute the move command. Select **Save Settings**.

9.6.2 Turn off levels

1. Open the desired sheet model and right-press and hold to bring up the contextual menu. From here, select **Turn Level Off by Element**.

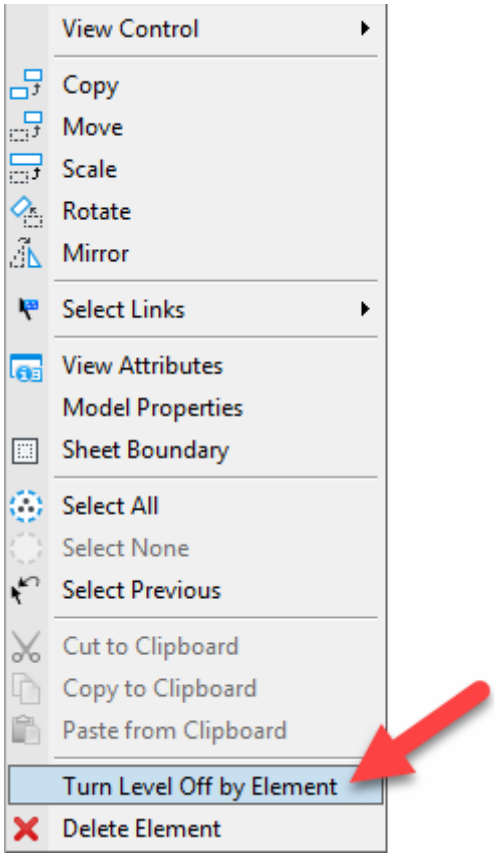


Figure 256

2. Issue a Data Point on the Named Boundary, hence turning off the level. Data Point on other elements for levels you would like turned off. Select **Save Settings**.

9.7 Create Blown Up Detail

1. Open the Default Design Model.
2. Use the Place Named Boundary tool and give your Detail a Name.
3. Place a Named Boundary around the area you would like to detail, follow the prompts.
4. On the Create Drawing dialog box Ensure the following options are set:

   Top Section
   - *Name*: ***Detail***
   - *Drawing Seed*: ***Misc Plan***

   Drawing Model Section
   - *Create Drawing Model*: ***Enabled***
   - *Annotation Scale*: ***Full Size 1" = ??' (Match Detail Scale below)***

   Sheet Model Section
   - *Create Sheet Model*: ***Enabled***
   - *Sheets*: ***Select the desired sheet that has already be created***
   - *Drawing Boundary*: ***New***
   - *Detail Scale*: 1" = ***??' enter the desired scale***
   - *Add to Sheet Index*: ***Disabled***
   - *Open Model*: ***Enabled***
5. In the Sheet Model, move the Referenced detail to the desired location.

9.8 Annotate the Drawing Models

Note: Annotation will be placed in both the Drawing Models and the Sheet Model.

- Call outs and Dimensions should be placed in the Drawing Models. Placing the Call Outs and Dimensions in the Drawing Model will make it easier to move each detail inside the Sheet Model's Border as the Features and Annotation will all move together.
- Notes that pertain to the whole sheet can be placed in the Sheet Models.

1. Open a Drawing Model and use the tools on the **CT DOT** Ribbon's, **Annotation** section to place **Call Outs**.

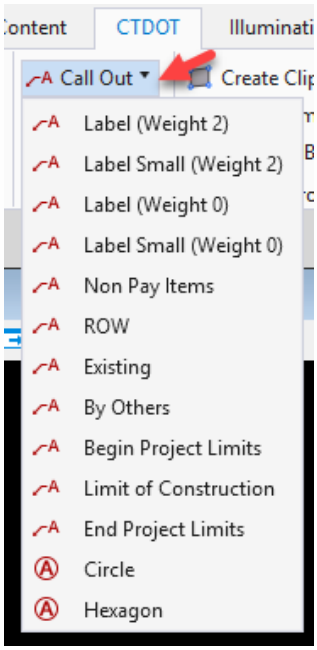


Figure 257

2. Place Dimensions in the Drawing Model. To place a Dimension, select either the **Vertical** or **Horizontal** Text Tool on the **CTDOT** ribbon, then select one of the desired **Dimensioning** tools. The Element Dimensioning dialog box will appear. Enable **Association** and follow the prompts to place the dimension.

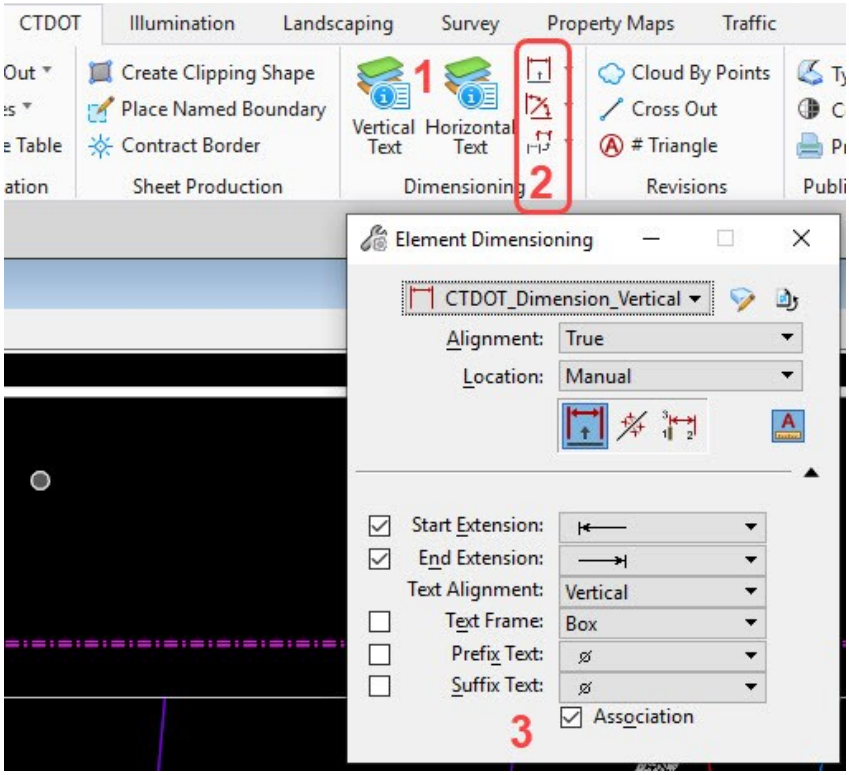

CTDOT
Illumination
Landscaping
Survey
Property Maps
Traffic
Create Clipping Shape
Place Named Boundary
Contract Border
Sheet Production
Vertical Text
Horizontal Text
1
2
Dimensioning
Cloud By Points
Cross Out
Triangle
Revisions
Element Dimensioning
CTDOT_Dimension_Vertical
Alignment: True
Location: Manual
Start Extension:
End Extension:
Text Alignment: Vertical
Text Frame: Box
Prefix Text:
Suffix Text:
Association
3

Figure 258

9.9 Annotate the Sheet Models

Note: Annotation will be placed in both the Drawing Models and the Sheet Model.

- Call outs and Dimensions should be placed in the Drawing Models. Placing the Call Outs and Dimensions in the Drawing Model will make it easier to move each detail inside the Sheet Model's Border as the Features and Annotation will all move together.
- Notes that pertain to the whole sheet can be placed in the sheet models.

1. Use the **Place Table** tool on the CT DOT Ribbon to place preconfigured Tables. Select the **General Notes** table and follow the prompts for placement.

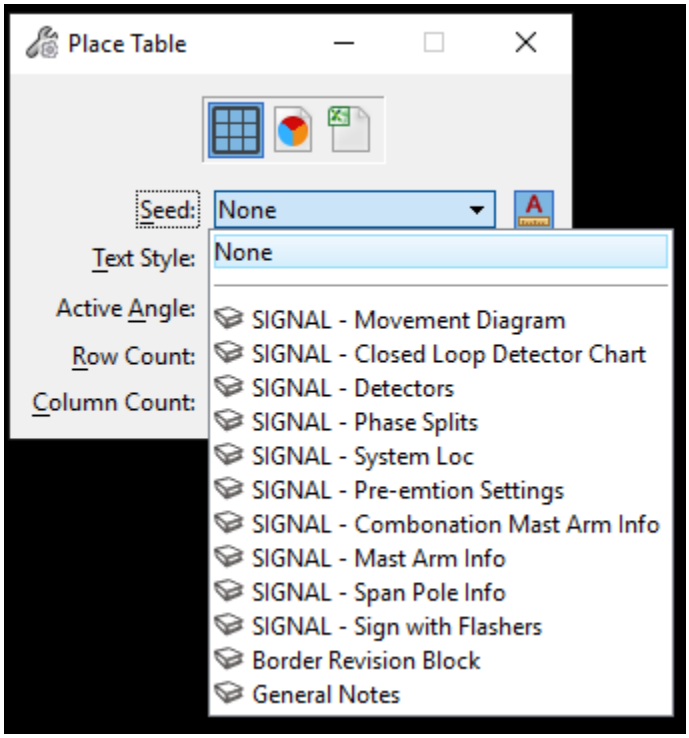


Figure 259

2. To add information to the table select the **Annotate** tab and choose **Edit Text**. Note: Avoid using the Element Selection tool to edit the table as this will lock up the file.

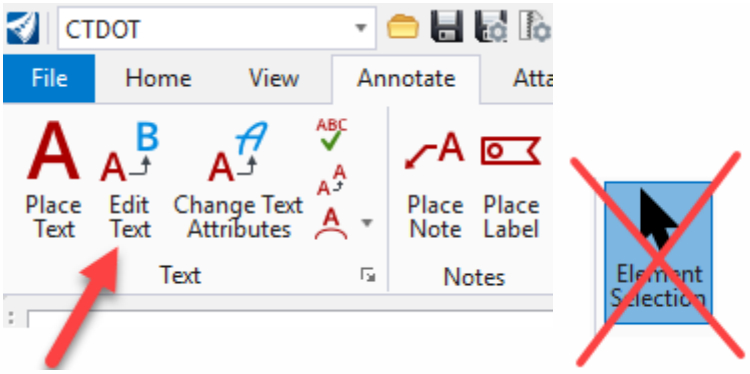


Figure 260

3. Use the tools on the **CT DOT** Ribbon's, **Annotation** section to place **Notes**.

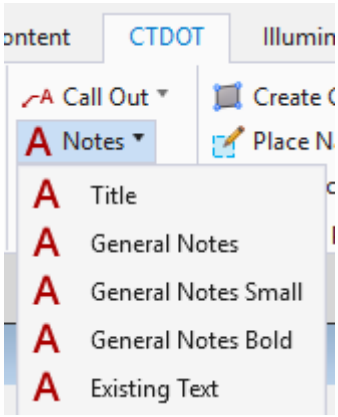


Figure 261

9.10 Detail Sheets from 2D Drawings

1. Continue using the DGN file created in this Module. Create a new Sheet Model, using the ***Seed2D – CT RoadSheet.dgn, 2D Sheet*** seed file.

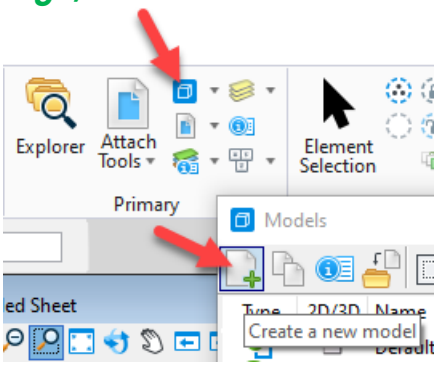


Figure 262

In the Create Model dialog box enter the following:

- Name: Miscellaneous Details
- Description: Miscellaneous Details
- Sheet Number: C-005
- Annotation Scale: Full Size 1 = 1

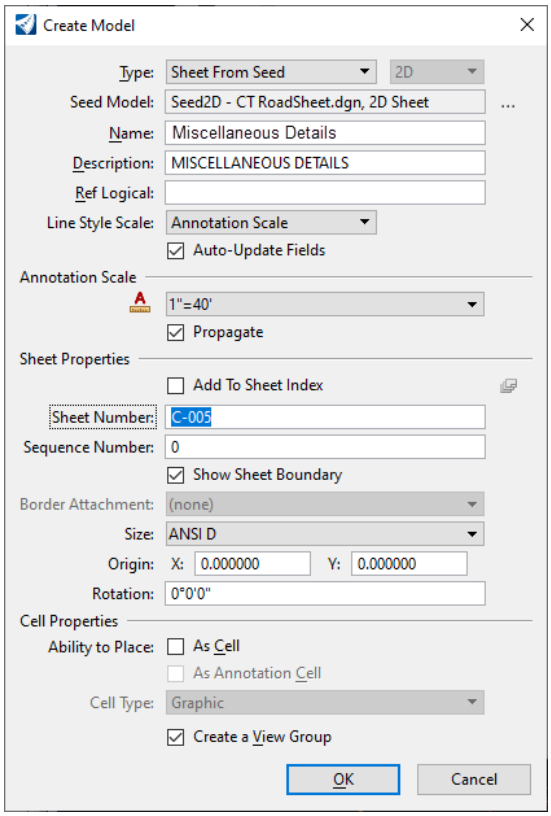


Figure 263

2. Activate the **CTDOT Workflow,** on the **CTDOT** tab, **Sheet Production** area select the **Borders** drop down and choose **Contract Border.** Attach the Contract Border to the Sheet Boundary.

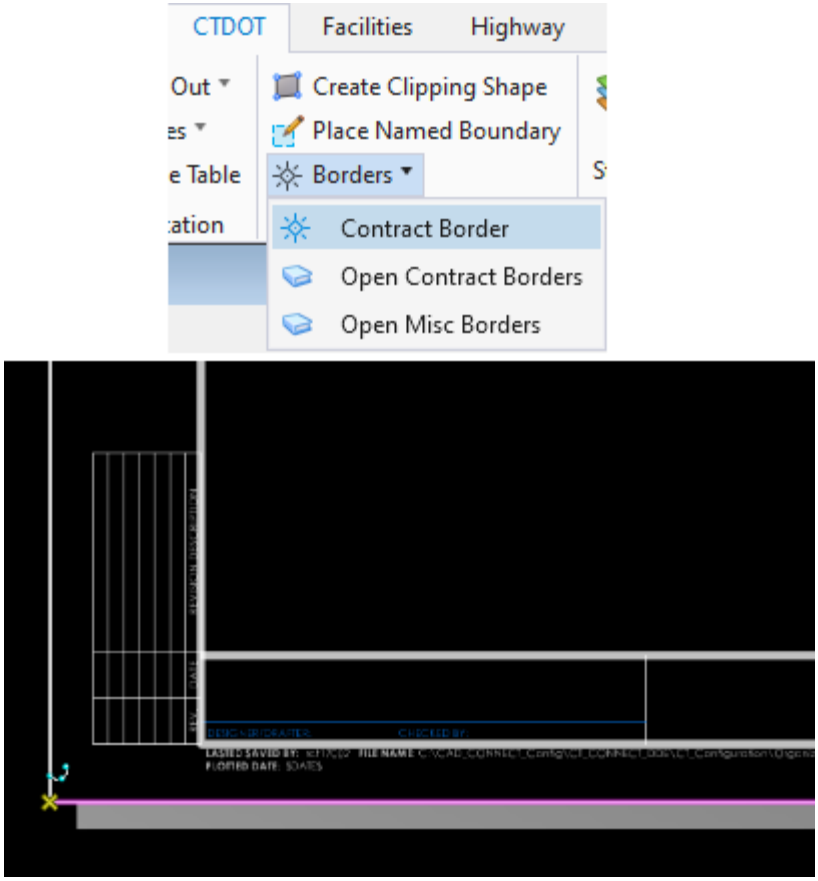


Figure 264

3. In Search type ***Update All Fields***, select the result and the **Drawing Title** and **Drawing Number** will propagate to what was entered when the sheet was created.

Figure 265

4. Create a new 2D Design Model, using the ***Seed2D – CT RoadDesign.dgn, Default*** seed file.

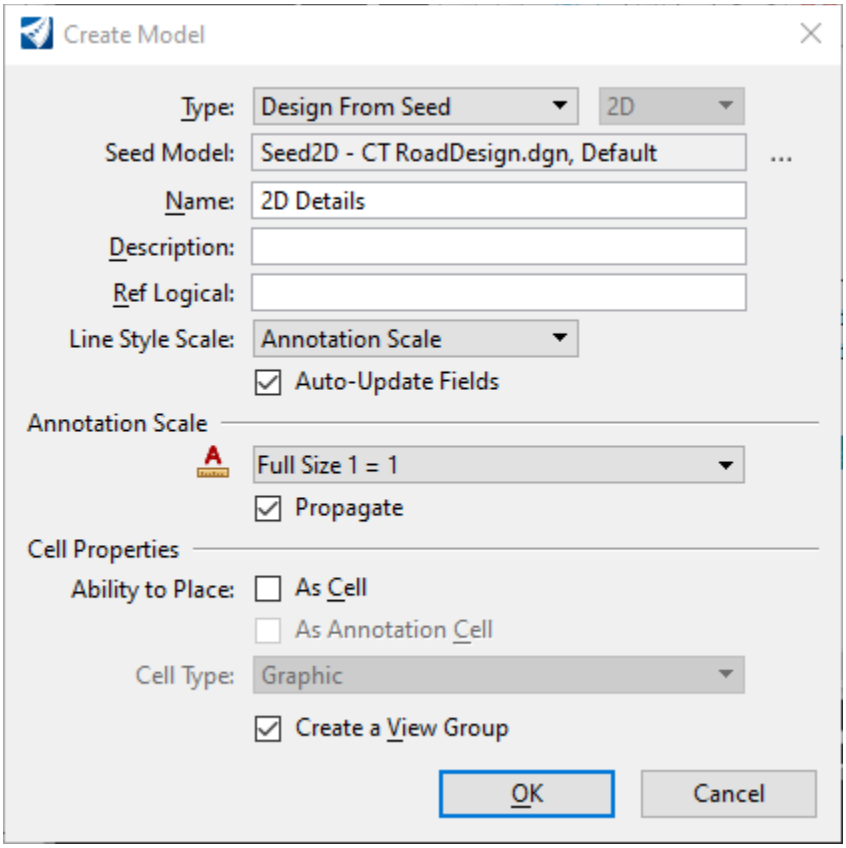


Figure 266

5. In the new 2D Design Model activate the **CTDOT Workflow**. On the **Home** tab, use the Placement, Manipulate and Modify tools to draft the line work for the Details. Multiple details can be placed in this design model as these will all be placed at their true size 1:1. There will be no dimensioning or text placed in this model, all annotation will be in the Sheet Model that will reference the 2D design model's line work.
6. In search type ***Detailing Symbol Styles***, select the result and the dialog box will open. Right click on ***CV DETAIL*** and select ***Activate***.
7. On the **CTDOT** Tab, **Sheet Production** section select **Create Clipping Shape,** this will set the correct level for the clipping shape. In the same section select the **Place Named Boundary** tool.
8. On the Place Named Boundary dialog box select the **By Two Point** icon, Name the Detail (***ANTI-TRACKING PAD***) and make sure **Create Drawing** is on. Follow the prompts and place a shape around one of the details.

   On the Place Named Boundary dialog box set:
   Drawing Seed: ***Place Sheet Only (Named Boundary)***
   Sheets: ***Select the Sheet Model created in step 1 of this section***
   Detail Scale: ***As needed***

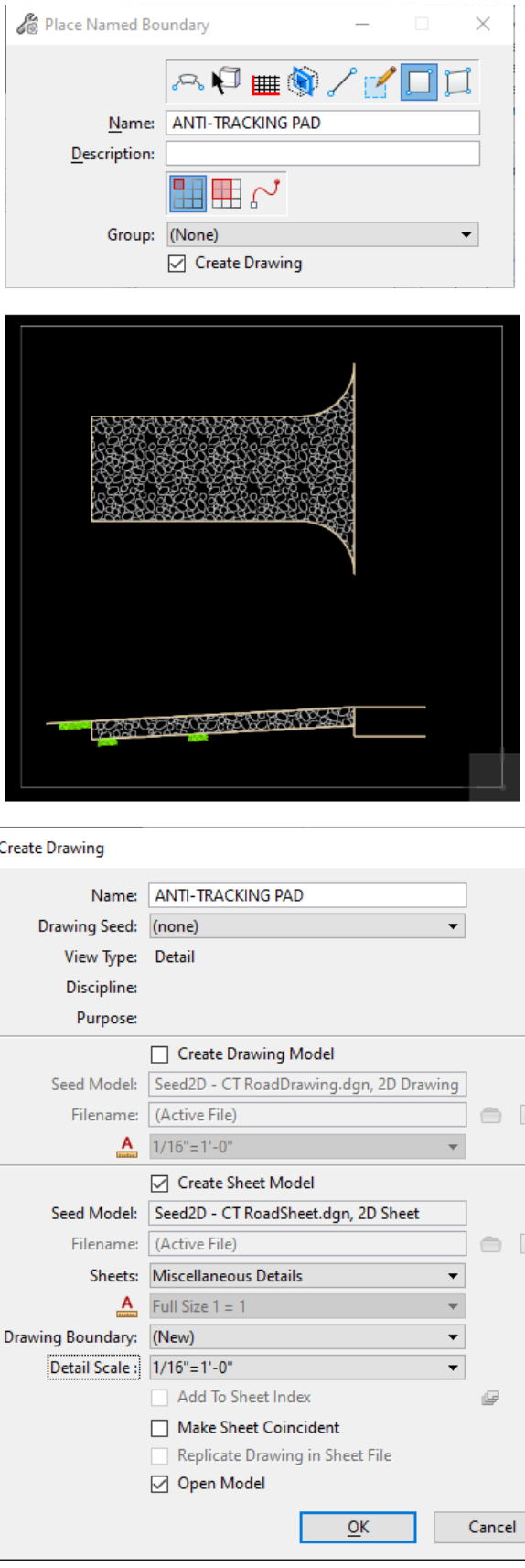

Place Named Boundary
Name: ANTI-TRACKING PAD
Description:
Group: (None)
Create Drawing
Create Drawing
Name: ANTI-TRACKING PAD
Drawing Seed: (none)
View Type: Detail
Discipline:
Purpose:
Create Drawing Model
Seed Model: Seed2D - CT RoadDrawing.dgn, 2D Drawing
Filename: (Active File)
1/16"=1'-0"
Create Sheet Model
Seed Model: Seed2D - CT RoadSheet.dgn, 2D Sheet
Filename: (Active File)
Sheets: Miscellaneous Details
Full Size 1 = 1
Drawing Boundary: (New)
Detail Scale: 1/16"=1'-0"
Add To Sheet Index
Make Sheet Coincident
Replicate Drawing in Sheet File
Open Model
OK
Cancel

Figure 267

9. The sheet Model will open, move the referenced detail to the desired location inside the sheet.
10. Open the 2D Design Model to create another Named Boundary around the same detail.
11. In search type ***Detailing Symbol Styles***. Select the result and the dialog box will open. Right click on ***CV Center Style*** and select ***Activate***.
12. On the **CTDOT** Tab, **Sheet Production** section select **Create Clipping Shape,** this will set the correct level for the clipping shape. In the same section select the **Place Named Boundary** tool.
13. On the Place named Boundary dialog box select the **By Two Point** icon, Name the Detail (***ANTI-TRACKING PAD – Different Scale***) and make sure **Create Drawing** is on. Follow the prompts and place a shape around the detail.

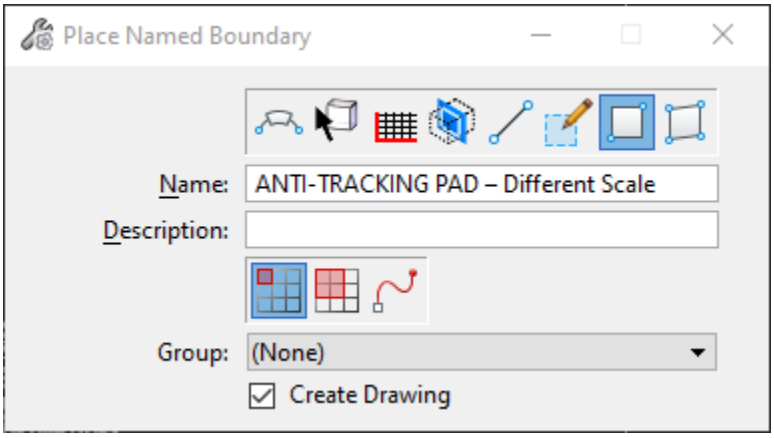


Figure 268

On the Create Drawing dialog box set:

- Drawing Seed: ***Place Sheet Only (Named Boundary)***
- Sheets: ***Select the Sheet Model created in step 1 of this section***
- Detail Scale: ***Different than used in Step 8***

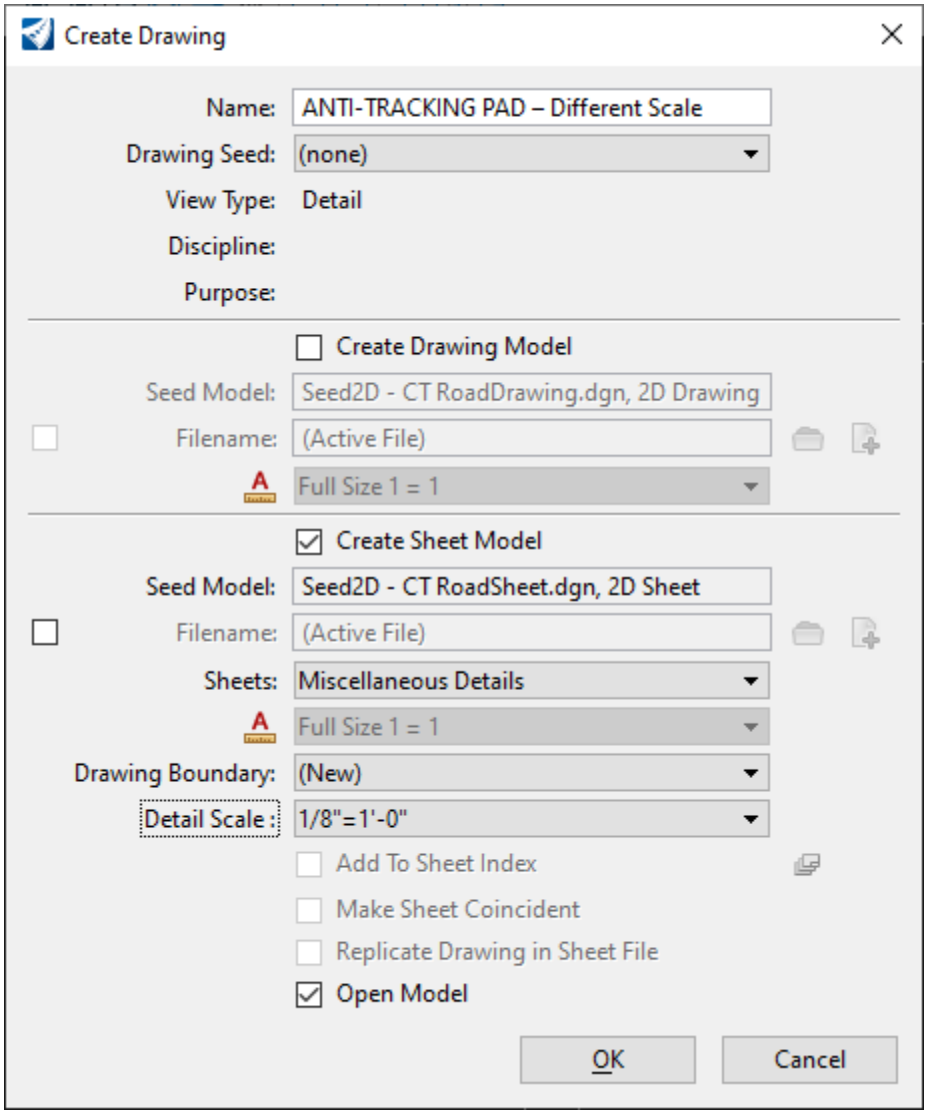


Figure 269

15. The Sheet Model will open, move the referenced detail to the desired location inside the sheet.
16. In the Sheet Model place dimensions on both details, notice they both dimension correctly even though they are two different sizes on the sheet.

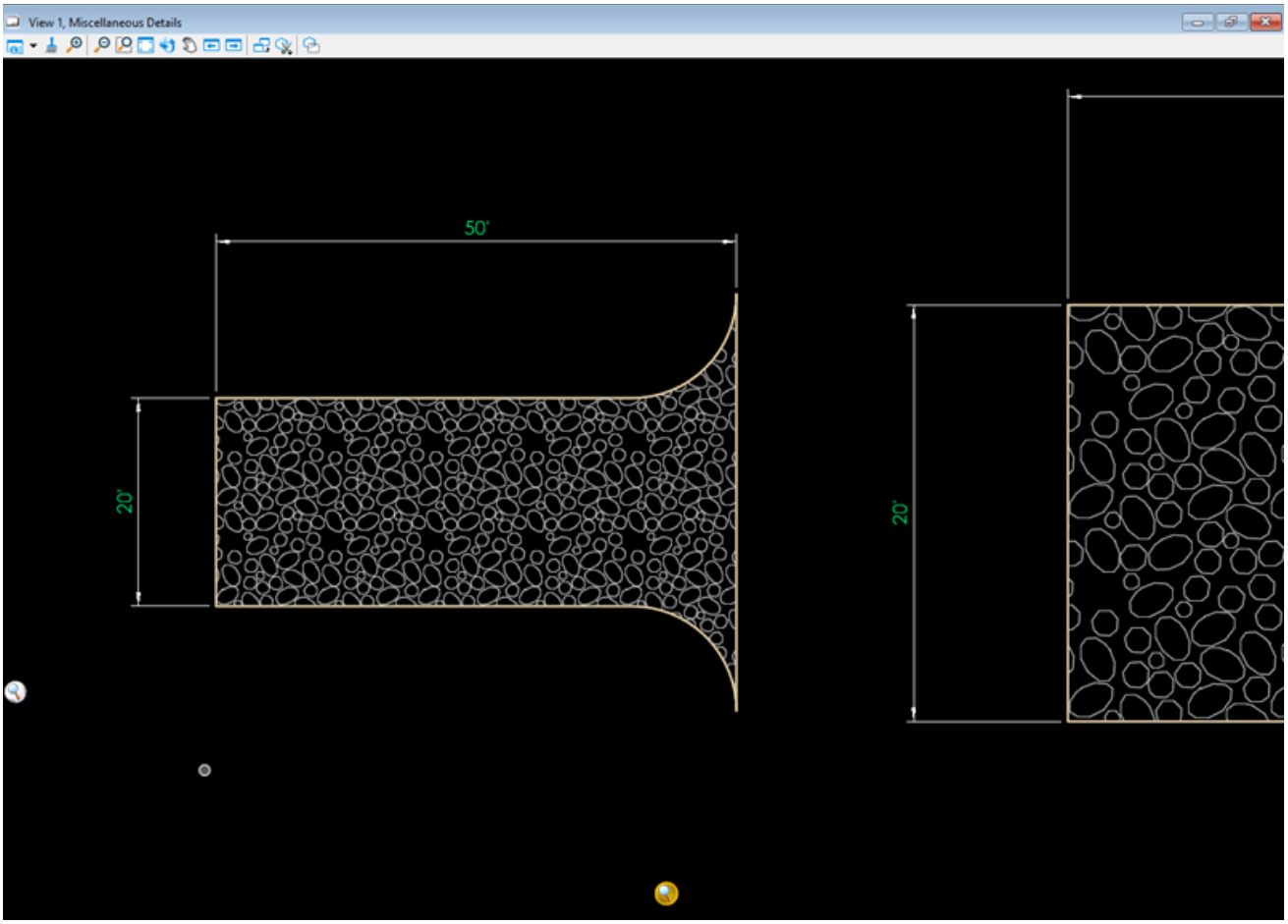


Figure 270

16. Review the titles of each detail and the Detailing Symbol Styles that were used. The first one used the ***CV DETAIL*** and the second ***CV Center Style***. ***CV DETAIL*** should be used if there is a need to call out this detail on another sheet.

Figure 271

Section 10 - Bridge Sheets

10.1 General Plan Sheet

This module will instruct users on how to create contract sheets using the Named Boundaries and Detailing Call Out tools. Users will create a DGN file that will be composed of different models to create the Sheet Model. This workflow is written to create detail sheets for a bridge created using OpenBridge Modeler. Similar detailing methods can be used for other 3D Structures created by using the Solids tools such as:

- Retaining Walls
- Tunnels
- Sign Supports
- Traffic Signal Support/Span Poles
- Drainage Structures/Box Culverts

Contract Sheet files will be stored in the Contract Plans folder. A DGN file will be created with the structure's Base Model referenced in, this file will house all the Sheet Models for the Structure.

When this file gets created it will only have a Design Model. The following Base Model DGN files will need to be referenced in:

- Bridge Base Model
- Survey files (ground topo and terrain)
- Other Design unit's Base Models (Highway, Traffic, Illumination and Landscape)
- The Named Boundary and Callout tools will be used to create additional models in this DGN file which will be a combination of Drawing and Sheet Models.

10.1.1 Create a New file

Before attempting to open or create DGN files users should make sure the following is in place:

1. CTDOT users should have the CTDOT CONNECT DDE synced through SharePoint with the COMPASS Project Synced along with the CAD Configuration.
2. Consultants should have CTDOT DDE properly installed or be syncing to the CTDOT DDE SharePoint/COMPASS system.
3. Make note of the **Coordinate System** you will be working in. If you have existing survey data, you will need to find out what system is being used **(NAD 83/NAVD 88 or NAD 27/NAVD 29).**

4. Log on to the CONNECTION Client. Bentley CONNECT licensing requires users to log into their Bentley account to secure a software license. CTDOT users should log in using your CTDOT email address and Bentley password. If you do not see the dialog box, select the ∧ icon on the bottom Windows Screen. Click on the Connection Client Icon and select Open.
5. Access OpenRoads through Accounting or the Customized Icon following
6. On the OpenRoads open screen select **Custom Configuration**, using the small drop-down arrows select the Workspace **CT_Workspace**, the needed **WorkSet** and **Role**.
7. Select the **New File** Icon. In the New dialog box browse to the ***Bridge|Contract_Plans*** folder.
8. The Seed file should be set to:

   …CT_Configuration|Organization|Seed|Bridge|Seed3D - CT BridgeDesign.dgn
9. In the ***File name*** field enter a name for your file using the CTDOT File Naming structure.

   Example: **SB_CP_1234_1234_Bridge#.dgn**
10. Select **Save** and the new file will open.
11. If you need the Geospatial Header in a different Datum, please follow instruction in Volume 2.

10.1.2 Set up the Design Model

1. Select the **CTDOT** workflow and click on the **Attach** tab, in the ***References Section*** click on **Attach Reference**.

   Reference the needed Proposed Base Model dgn files including but not limited to:

   - Bridge/Structures
   - Signal
   - Signing and Pavement Markings
   - Roadway Alignment
   - Highway
   - Drainage
   - Illumination
2. In the Attach Reference Box browse and select the desired file and click **Open**. In the Reference Attachment Dialog Box choose:

   - Model: Most likely it's "***Default***" but this could vary depending how the file has been set up.
   - Nested Attachments: ***No Nesting***
   - Global LineStyle Scale: ***Master***

3. Click **OK** to finish the attachment process.
4. Repeat Steps 1 - 3 for all Proposed Base Models
5. Reference the Existing Survey dgn files. Select the **CTDOT** workflow and click on the **Attach** tab, in the ***References Section*** click on **Attach Reference**.
6. In the Attach Reference Box browse to the ***Active Survey Folder*** and select the desired Existing Survey DGN file and click **Open**. In the Reference Attachment Dialog Box choose:
   - Model: Most likely it's "***Default***" but this could vary depending on how the file has been set up.
   - Nested Attachments: ***No Nesting***
   - Global LineStyle Scale: ***Master***
7. Click **OK** to finish the attachment process.
8. If the Survey does not line up with the Proposed Design File it is most likely an older Survey File that was created with V8i. Older files will need to be referenced in with certain settings to get them to line up in the correct geospatial location.
9. Select the **Home** Tab, in the **Primary Section** select the **Attach Tool** drop down and choose **References**. This will open the References Dialog box.
10. Turn **True Scale** off and set the Scale to ***1:1***.
11. The Existing Survey File reference will need its levels set to SCREENED for when the PDF plans are created. This can be done by using a specific **Logical Name** in the Reference Attachment Properties. ***SWW Ground Survey*** will leave all levels in the reference screened with the displayed line weights when the PDF is created.

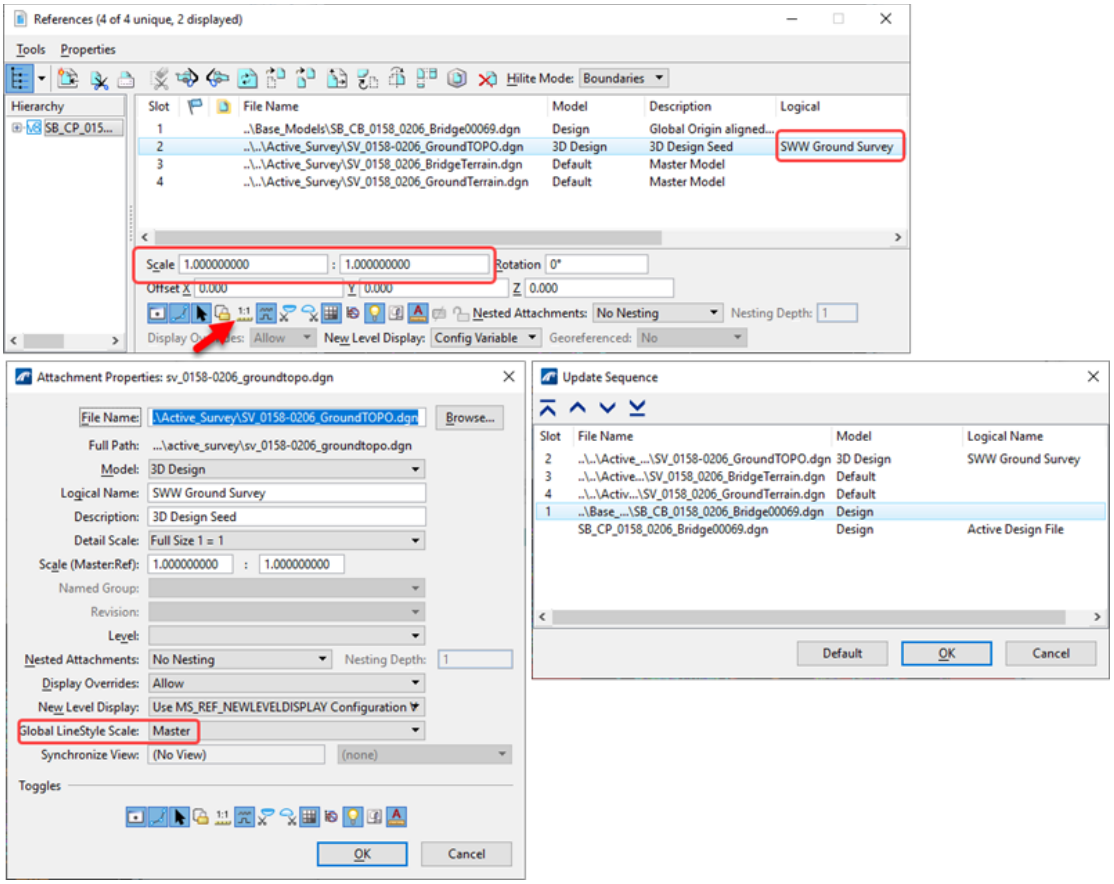


Figure 272

12. Right click in View 1 and select **2 Views Plan/3D**.

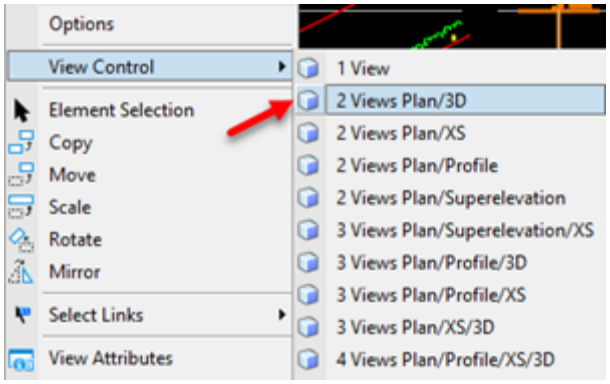


Figure 273

13. Select **Level Display** and turn off or on the desired levels in each Reference for Views 1 and 2.
14. Select **Save Settings**.

10.1.3 Create the General Plan

1. In the DGN file created in the section above, create a new 2D Design Model. In **Search** type ***Models*** and select the result. In the Models dialog box click on the **Create a new model** icon. On the Create Model dialog box select:

   Type: ***Design from Seed***

2. Change the Seed Model by clicking on the button next to **Seed Model**. On the Select File Containing Seed Model dialog box select ***Seed2d_CT Bridge.dgn***. Click the **Open** button. On the Select Models dialog select ***2D Design*** and **OK**.

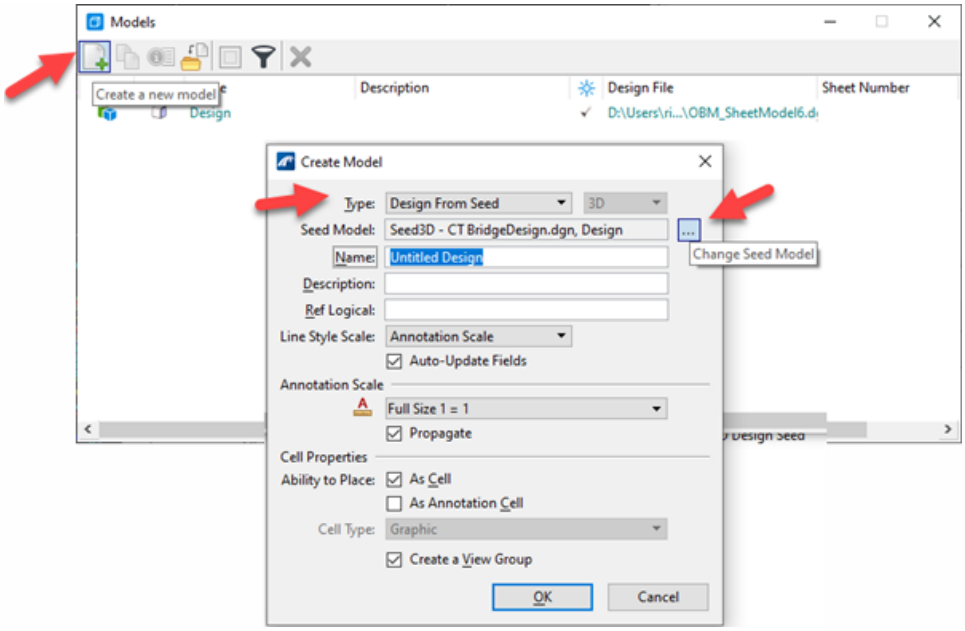


Figure 274

Figure 275

3. Name the Model ***2D Design*** and click **OK**.

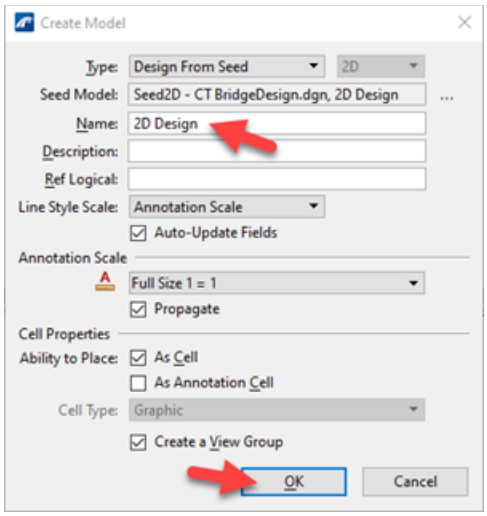


Figure 276

4. Reference in the 3D Model Created in the section above using a Nested Depth of 1. Fit View 1.
5. In **Search** type ***Detailing Symbol Styles*** and select the result. In the **Detailing Symbol Styles** dialog box activate the **Center Title Detailing Style**.

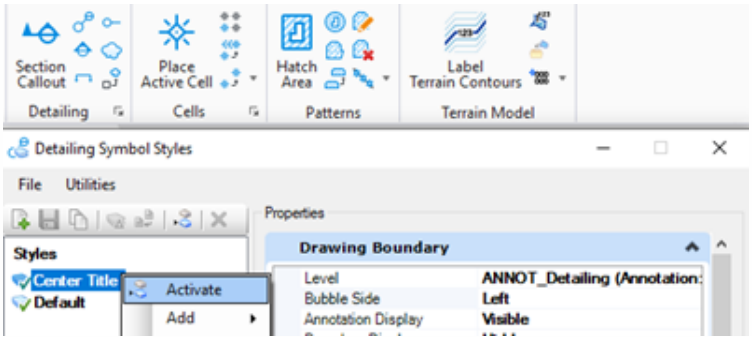


Figure 277

6. Rotate View 1 so the Bridge is Square with the view. In the Key-in enter ***rotate view element*** and follow the prompts to select a longitudinal line on the bridge. ***Note:*** *If the Key-in is not docked on the screen type Key-in in search to open the tool.*
7. Select **Save Settings**.
8. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Create Clipping Boundary** tool. This will update the Element Template to the correct level.

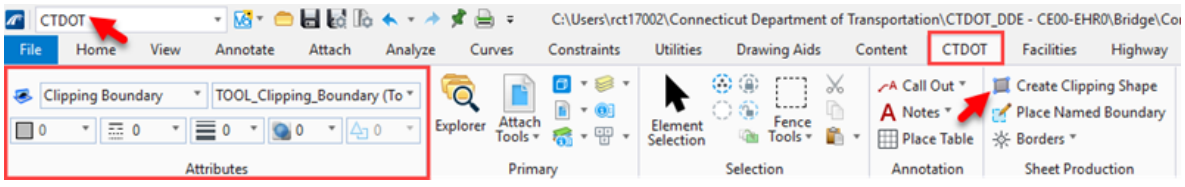


Figure 278

9. Select the **Place Named Boundary** tool and the Place Named Boundary dialog box will appear. In the Place Named Boundary dialog box set the following options:
    - Method (icon): ***By 2 Points***
    - Name: ***General Plan***
    - Mode (icon): ***Place Single Named Boundary***
    - Create Drawing: ***Enabled***

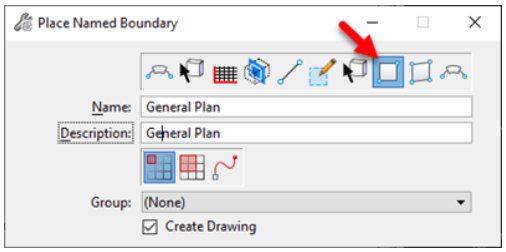


Figure 279

10. Follow the prompts to place a Named Boundary (Clipping Boundary) around the design. Data point first in the upper right and ending in the lower left. This element can be edited later to refine the shape and add additional points.
11. After accepting the placement of the named boundary the **Create Drawing** dialog box will appear. Ensure the following options are set:
    - Name: ***General Plan***
    - Drawing Seed: ***Plan (Named Boundary)***
    - Create Drawing Model: ***Enabled***
    - Annotation Scale: ***Match the Detail Scale in the Sheet Section***
    - Create Sheet Model: ***Enabled***
    - Sheets: ***New***
    - Annotation Scale: ***Full Size 1 = 1***
    - Drawing Boundary: ***New***
    - Detail Scale: ***1" = 30' (or as Desired)***
    - Add to Sheet Index: ***Disabled***
    - Open Model: ***Enabled***
12. Click **OK** to continue.

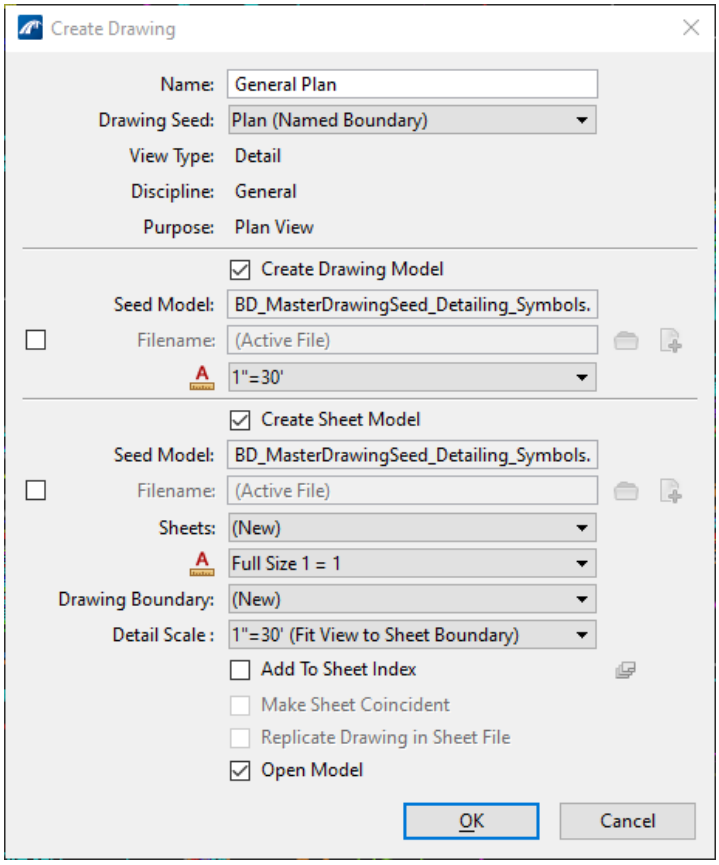


Figure 280

13. A Drawing Model and Sheet Model will be created. In the bottom left of the application select and view the three models that are now in the file.

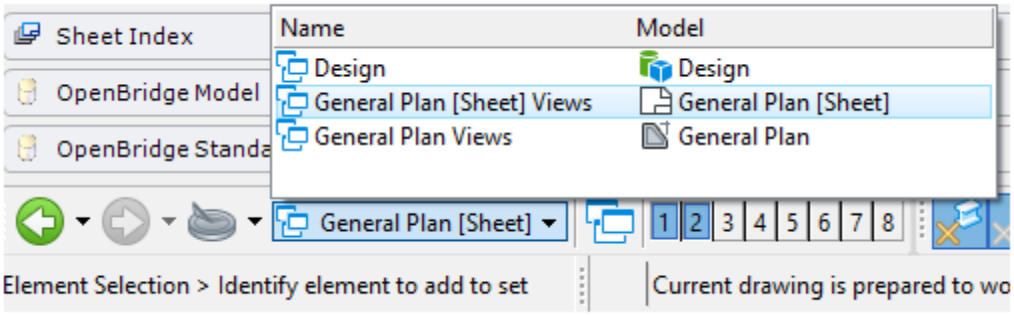


Figure 281

14. Open the Design Model and adjust the Named Boundary as needed.
15. Open the Sheet Model and move the **Referenced Plan View** of the Bridge to the Left Top of the sheet. Use the **Selection** tool to move the **Detail Title** as needed.

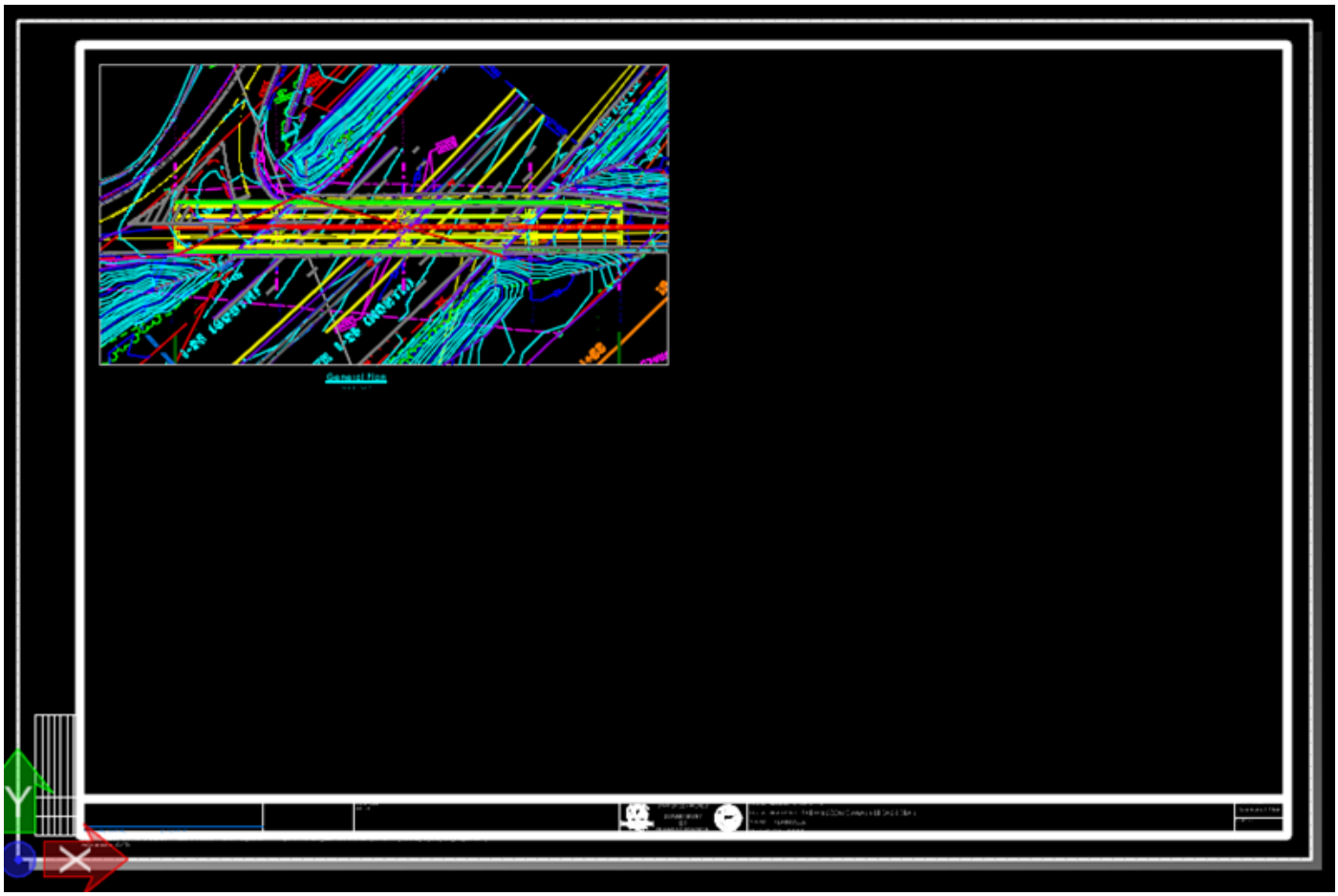


Figure 282

10.1.4 Edit the Title Block

In this section we will edit the title block information. In the Models Dialog select the Sheet Model and in the **Properties** dialog box enter the **"Drawing Title"** ***Description*** and **"Drawing Number"** ***Sheet Number***,

Note: *The Project Number, Project Description and Town(s) will be auto populated by the WorkSet Properties.*

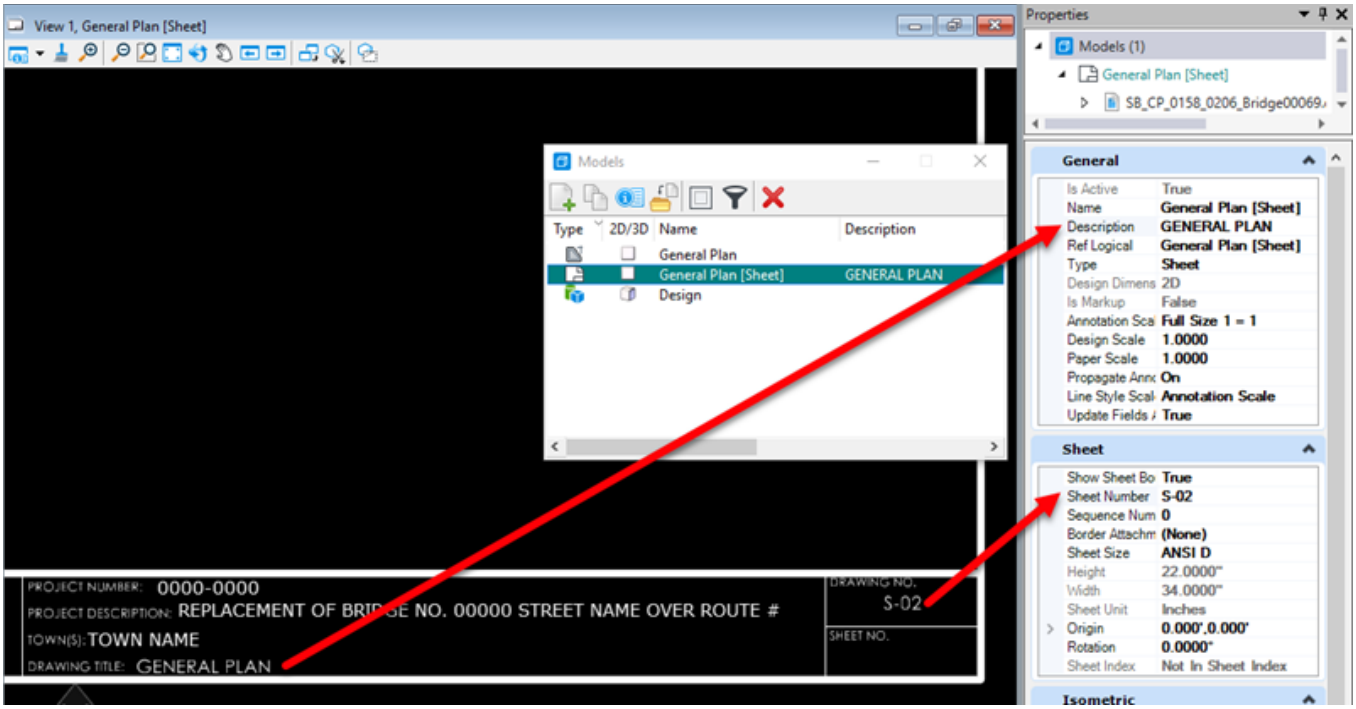

View 1, General Plan [Sheet]
Models
Type
2D/3D
Name
Description
General Plan
General Plan [Sheet]
GENERAL PLAN
Design
PROJECT NUMBER: 0000-0000
PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 00000 STREET NAME OVER ROUTE #
TOWN(S): TOWN NAME
DRAWING TITLE: GENERAL PLAN
DRAWING NO.
S-02
SHEET NO.
Properties
Models (1)
General Plan [Sheet]
SB_CP_0158_0206_Bridge00069
General
Is Active True
Name General Plan [Sheet]
Description GENERAL PLAN
Ref Logical General Plan [Sheet]
Type Sheet
Design Dimens 2D
Is Markup False
Annotation Sca Full Size 1 = 1
Design Scale 1.0000
Paper Scale 1.0000
Propagate Anno On
Line Style Scal Annotation Scale
Update Fields A True
Sheet
Show Sheet Bo True
Sheet Number S-02
Sequence Num 0
Border Attachm (None)
Sheet Size ANSI D
Height 22.0000"
Width 34.0000"
Sheet Unit Inches
Origin 0.000",0.000"
Rotation 0.0000°
Sheet Index Not In Sheet Index
Isometric

Figure 283

10.1.5 Add Additional Details to the Sheet

In this section we will add the following details to this sheet.

- Cross Section
- Elevation View
- Blow up Detail
- Isometric View

1. In the same dgn file created in the section above open the 3D Design Model.
2. Use the **CTDOT** workflow and click on the **Annotate** tab. In the **Detailing** section select **Section Callout**.

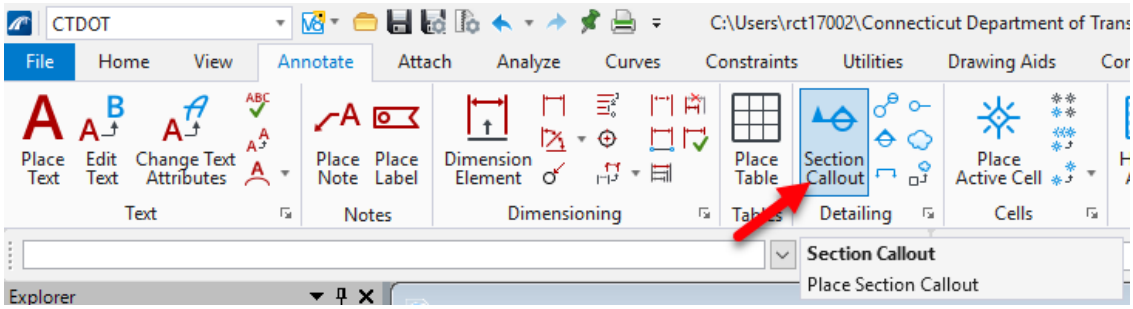


Figure 284

3. In the **Place Section Callout** dialog box select the following:

- **Drawing Seed: *Section - Centered***
- **Height: *From Model***
- **Toggle on *Create Drawing***

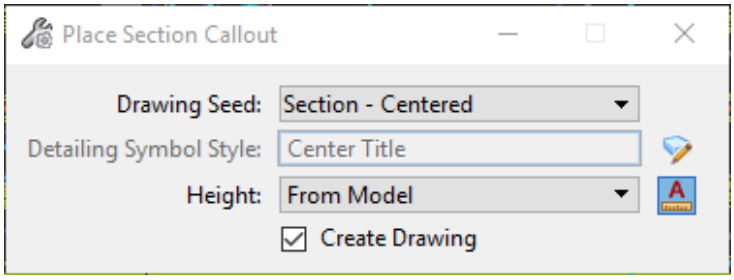


Figure 285

4. Follow the prompts to place a section cut.

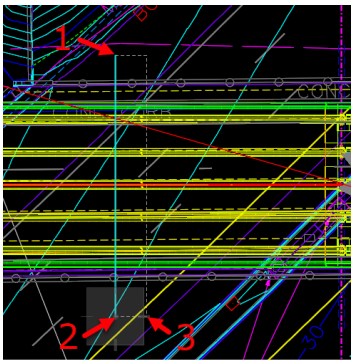


Figure 286

5. In the **Create Drawing** dialog box change **Sheets:** to ***General Plan [Sheet]***, this will place the Section in the previously created Sheet Model (General Plan). In the Sheet Model section select a ***Detail Scale*** and match the Drawing Model's ***Annotation Scale*** to that Detail Scale.

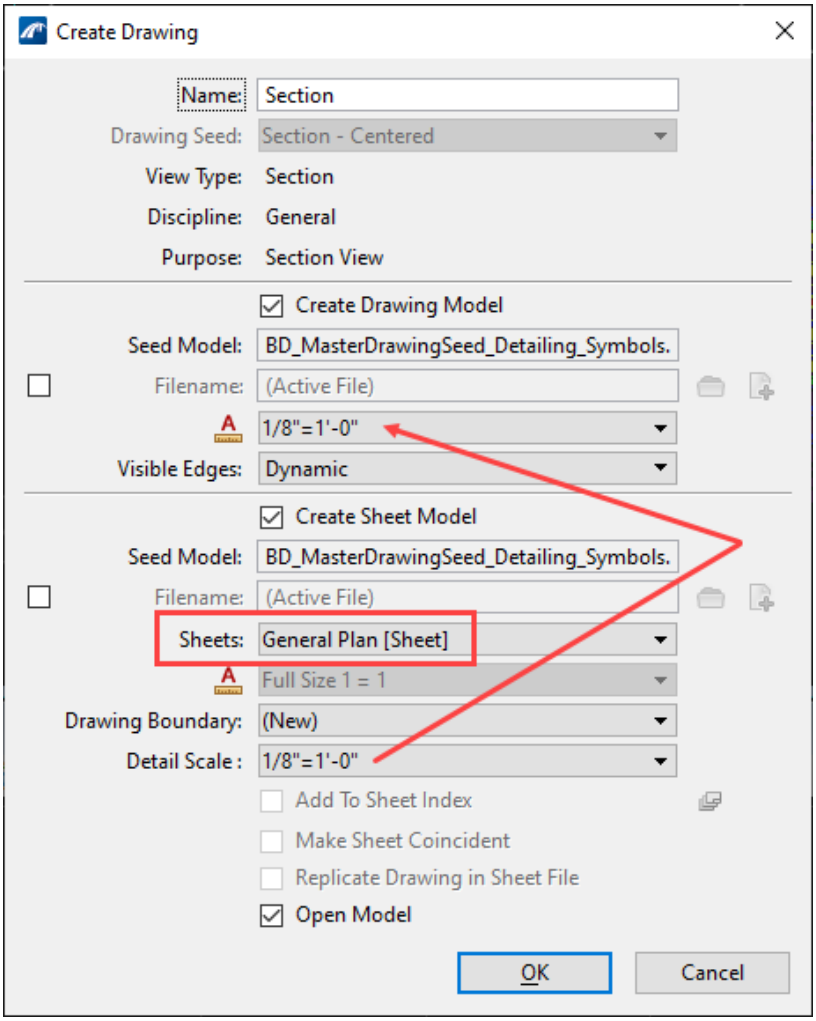


Figure 287

6. Open the Sheet Model and notice it may need to be clipped to show less of the elevation. Open the Design Model, in View 2 move the Clipping Shape limit closer to the deck.

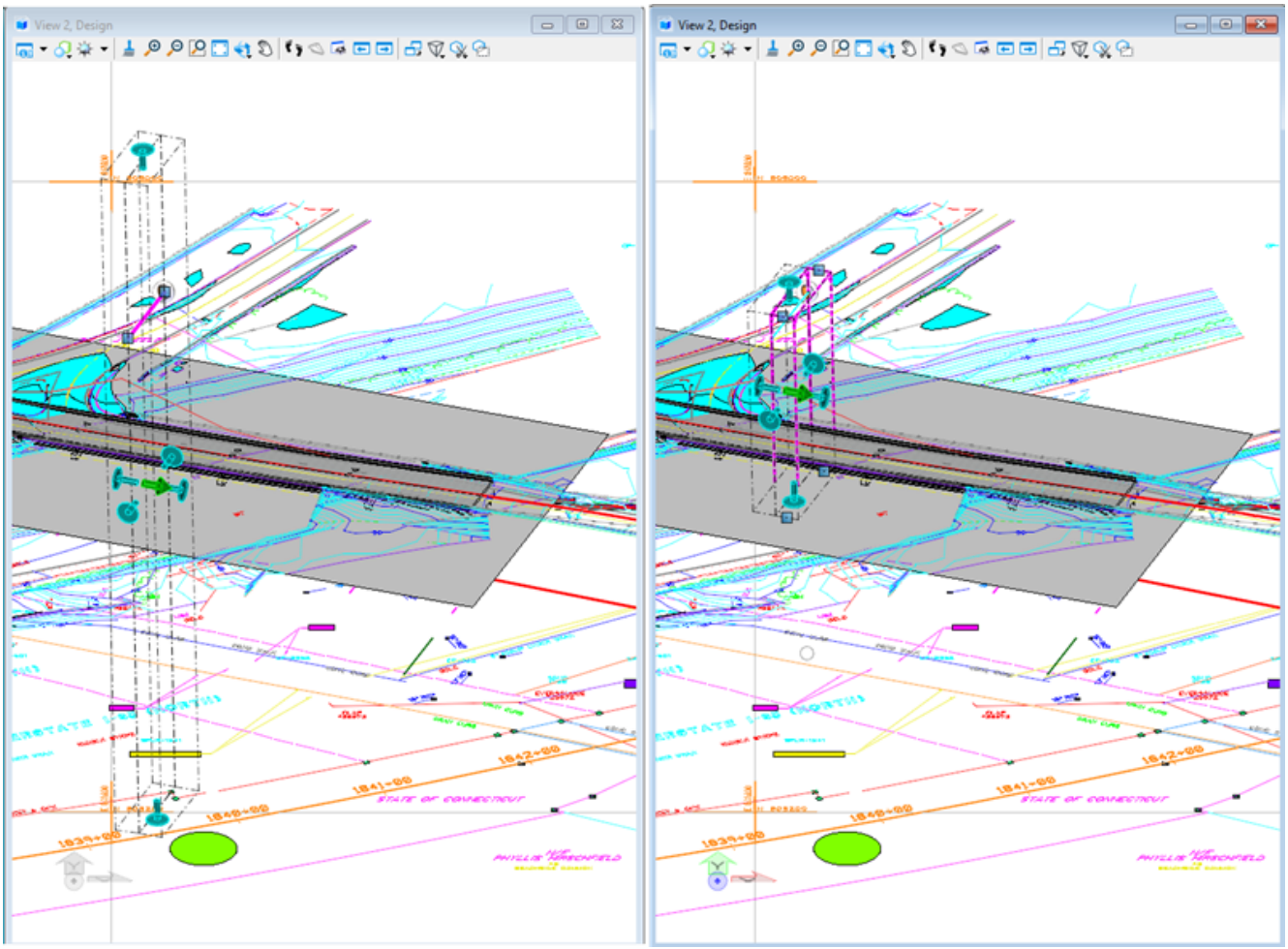


Figure 288

7. Open the Sheet Model and move the ***referenced Section*** to the **bottom right corner** of the sheet, notice the new clip is reflected. Move the Detail Symbol so it lines up in the center under the detail. Turn off the existing ground files and other referenced files that are not needed. For Reference files that have been kept on turn off the unneeded levels. **Save Settings**.

Figure 289

8. Return to the 3D Design Model
9. On the **CTDOT** workflow click on the **Annotate** tab. In the **Detailing** Section select **Elevation Call** out.

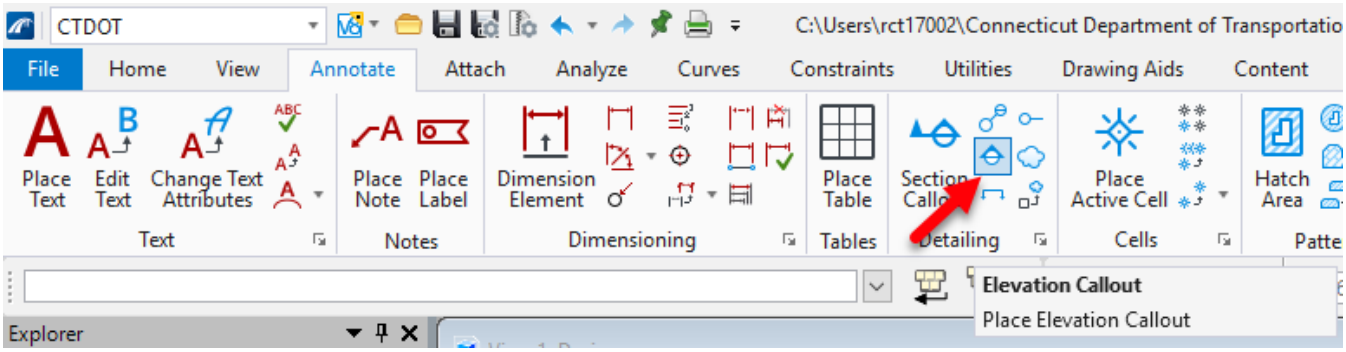


Figure 290

10. In the **Place Elevation Callout** dialog box select the following:

- **Drawing Seed: *Elevation - Centered***
- **Height: *From Model***
- **Toggle on *Create Drawing***

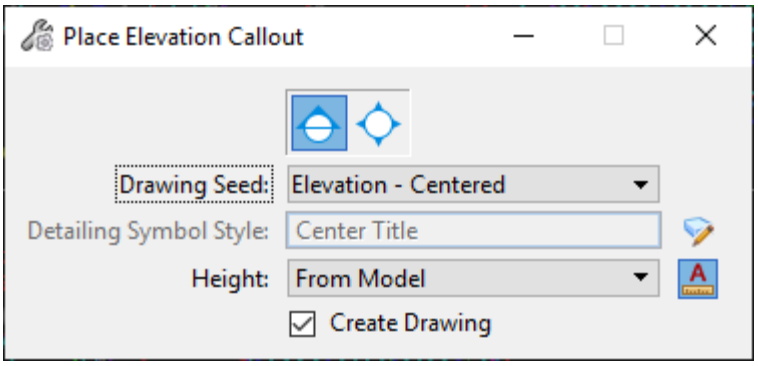


Figure 291

11. Follow the prompts to place a cut.

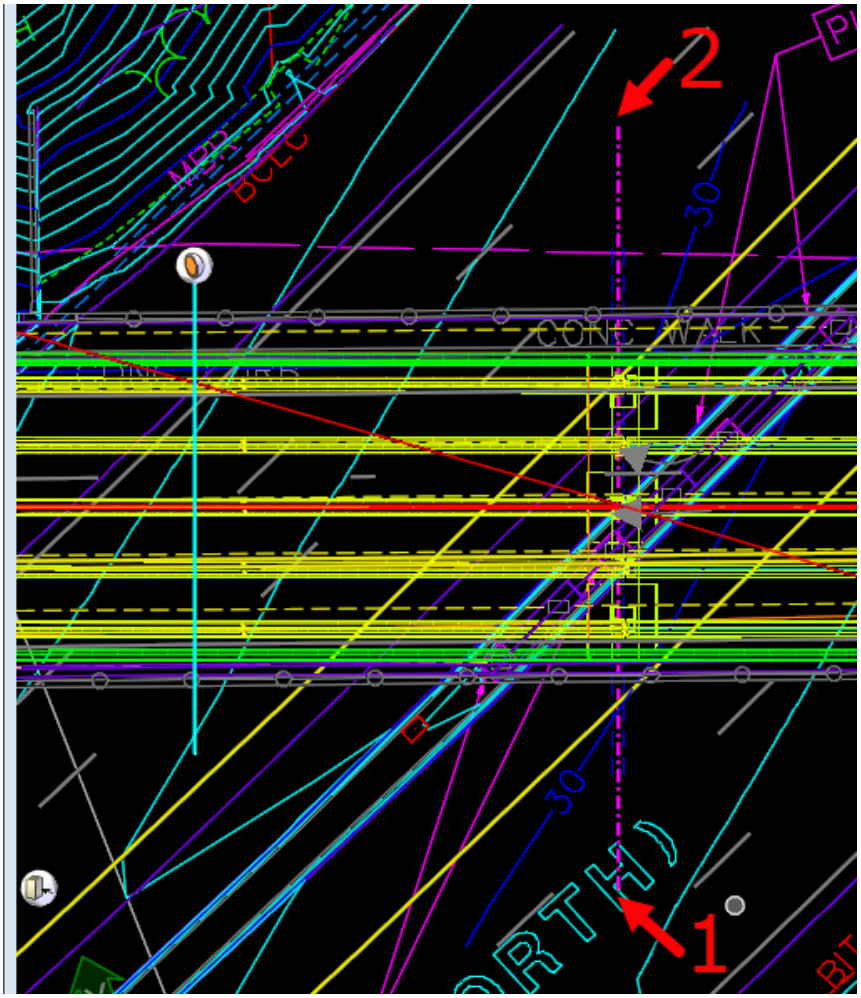
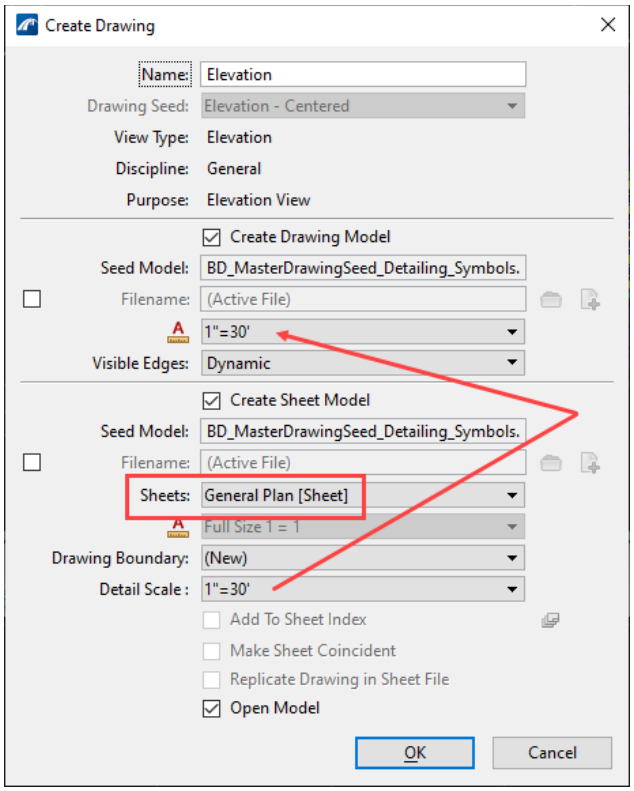


Figure 292

12. In the **Create Drawing** dialog box change **Sheets:** to ***General Plan [Sheet]***, this will place the Section in the previously created Sheet Model (General Plan). Set the **Detail Scale** to ***match the General Plan's Scale***. Match the Drawing Model's ***Annotation Scale*** to the Detail Scale.



13. In the 3D Model adjust the clipping as needed.
14. In the Sheet Model turn off the unneeded Reference files and Levels. **Save Settings**.

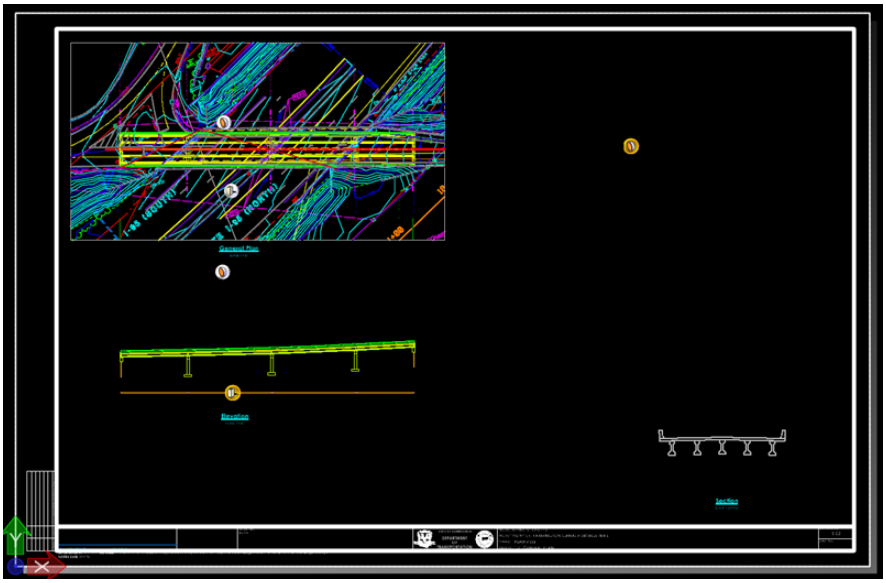


Figure 293

10.1.6 Place a Blow-up Detail

1. Open the **Section** Drawing Model.
2. In the **Models** dialog select the ***Section*** Drawing Model. In **Properties** change the **Annotation Scale** to ***1/8" = 1'-0"***.

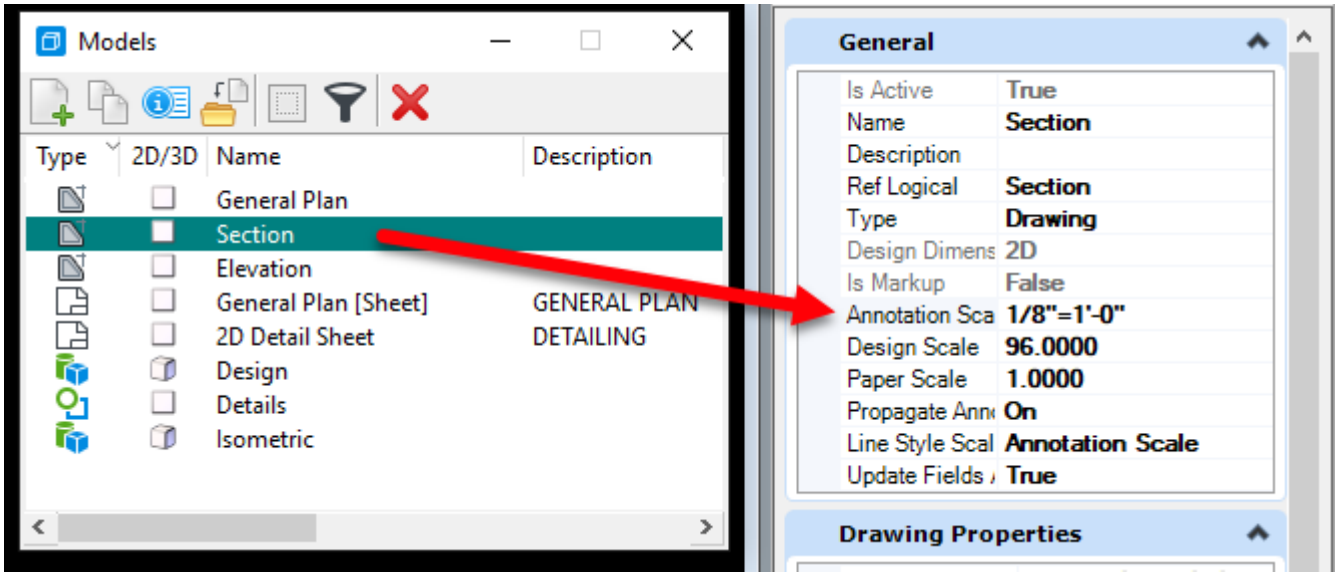


Figure 294

3. Use the **Place Detail Callout** tool, follow the prompts and place a circle around the area of the detail you need to blow-up.

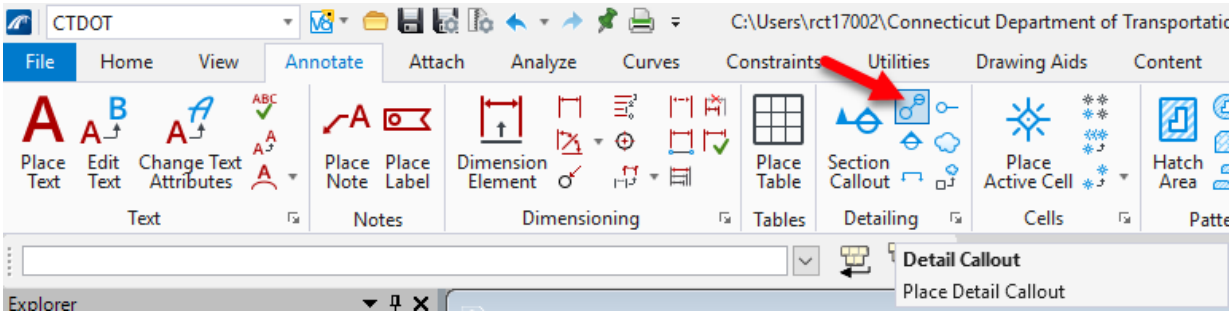


Figure 295

4. In the Place Detail Callout dialog box select the following:

   - **Drawing Seed: *Detail***
   - **Toggle on *Create Drawing***

   Select the desired **Placement Shape/Method** Icon (Circle, Oval, Rectangle or Existing Boundary).

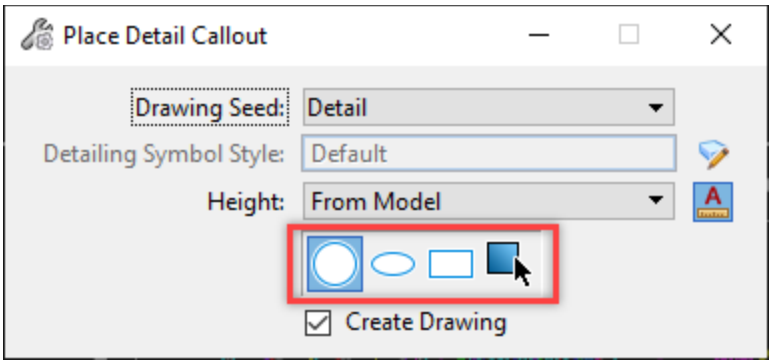


Figure 296

5. Follow the prompts.

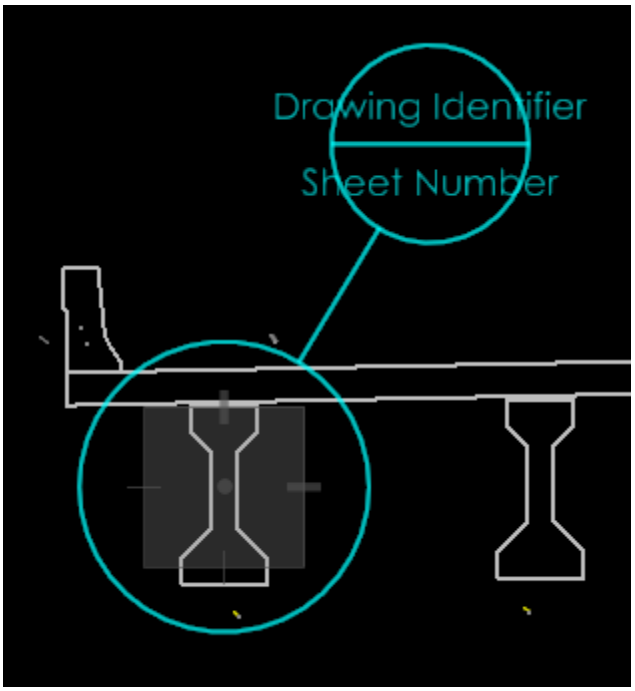


Figure 297

6. Give the Detail a ***Name*** and change **Sheets**: to ***General Plan***. Set the Detail Scale to match the Drawing Model's Annotation Scale that was set above in Step 2. Match the Drawing Model's ***Annotation Scale*** to the Detail Scale.

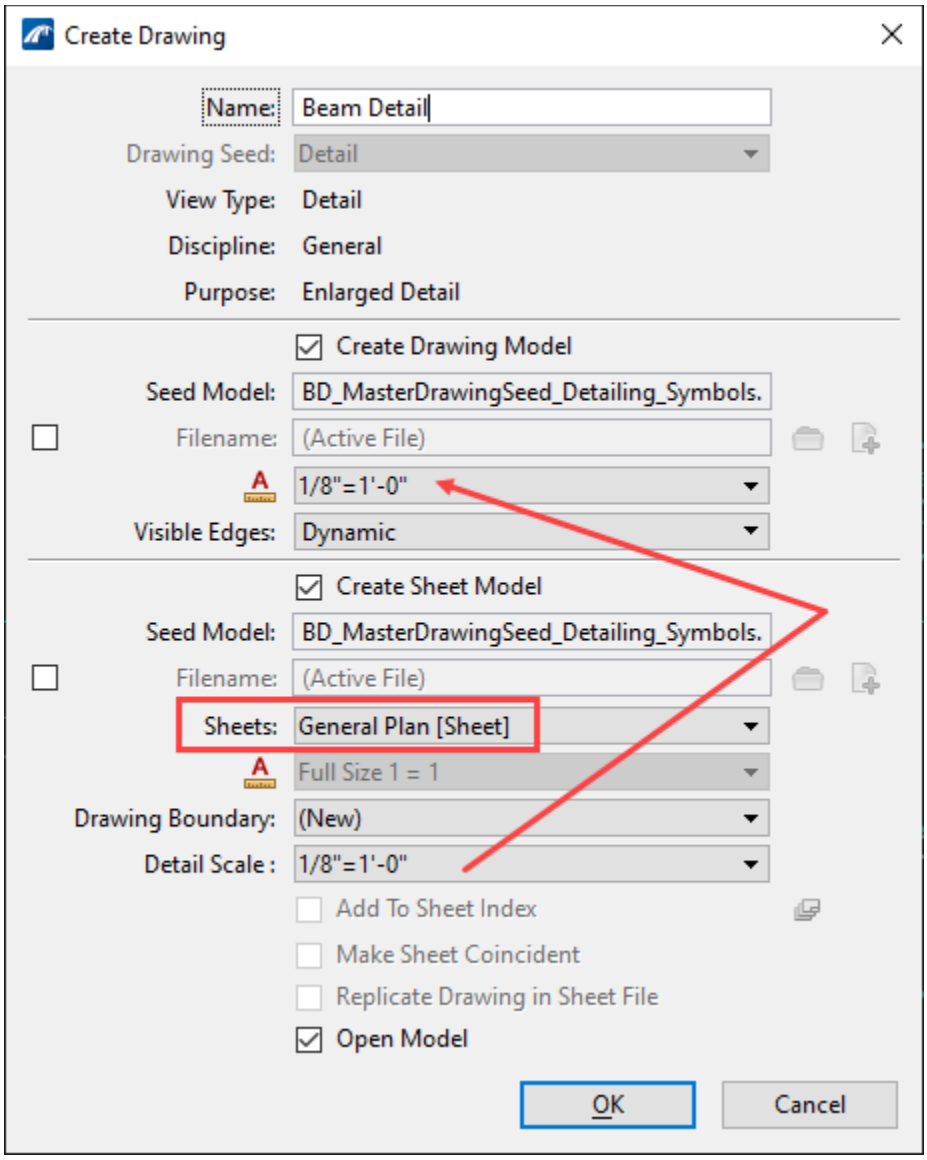


Figure 298

7. The General Plan Sheet will open. Move and Scale the Referenced Beam Detail as needed. Turn off un-needed levels and nested references. **Save Settings**.

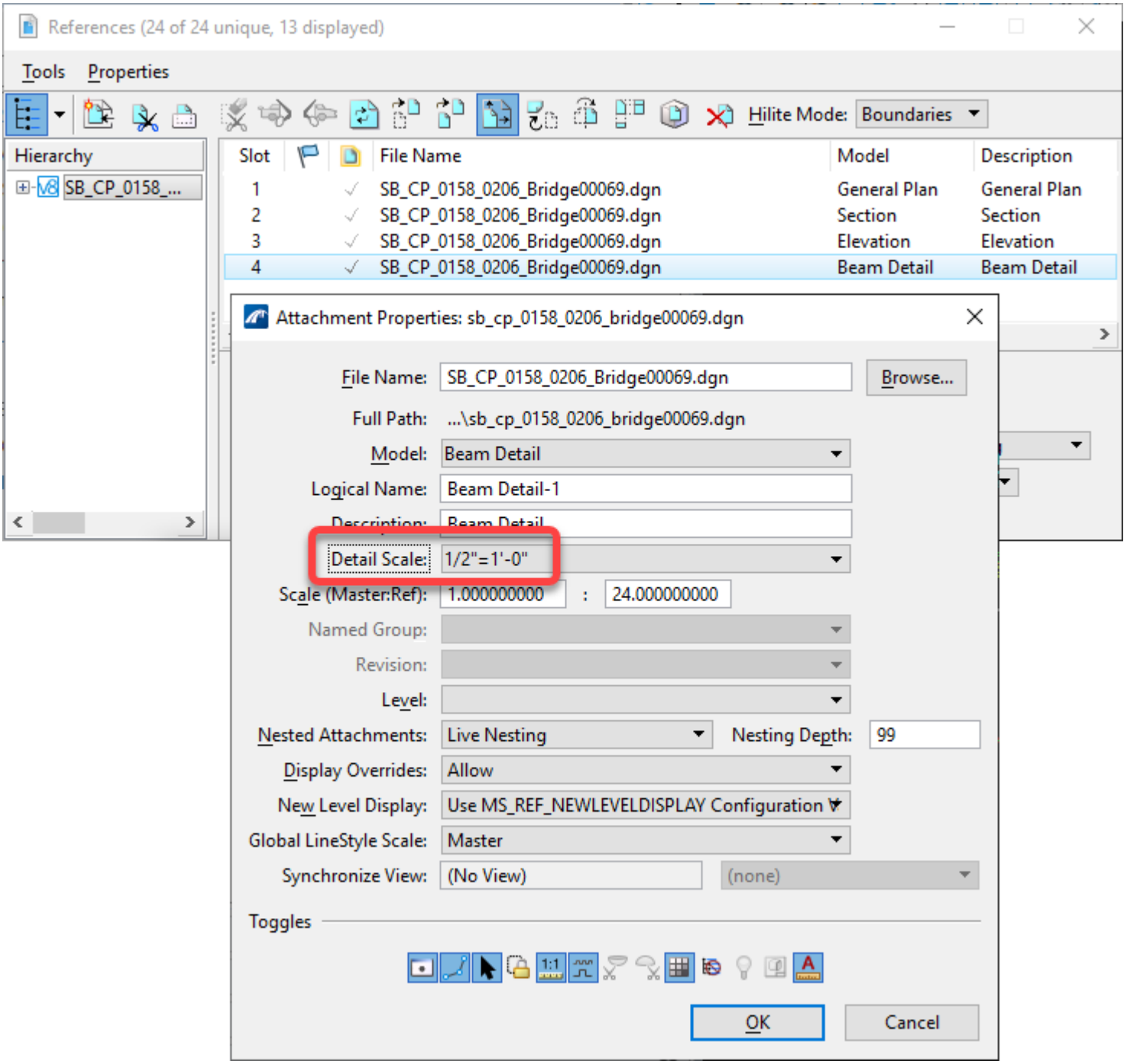


Figure 299

8. Click on the **Magnifying Glass** located on the Section Detail and click **Show Callouts**.

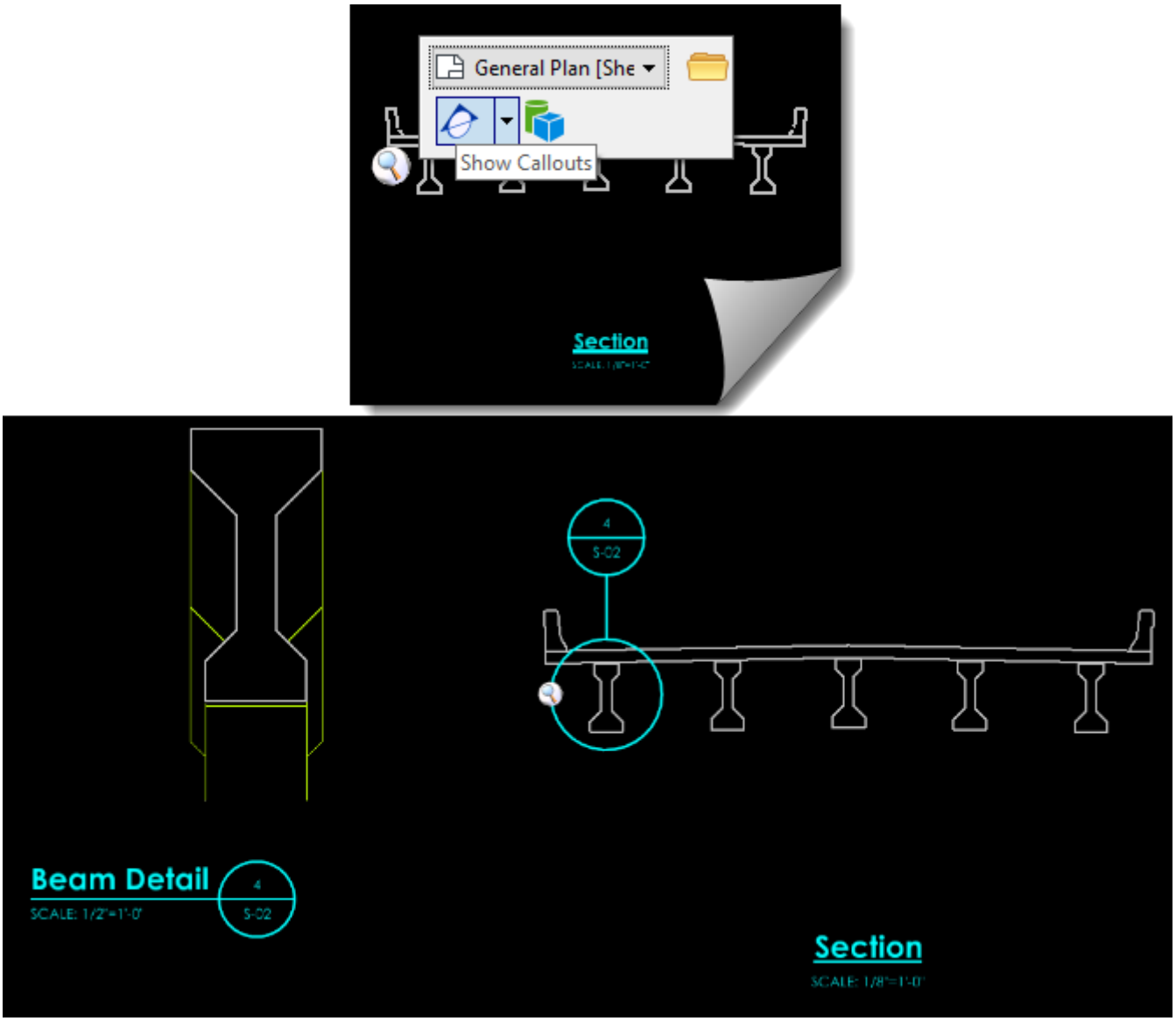

General Plan [She
Show Callouts
Section
4
S-02
Beam Detail
SCALE: 1/2"=1'-0"
4
S-02
Section

Figure 300

10.1.7 Place an Isometric View to the Sheet

1. Create a new 3D Design Model called ***Isometric View***. Edit the preset Ref Logical Name of General Plan as needed.

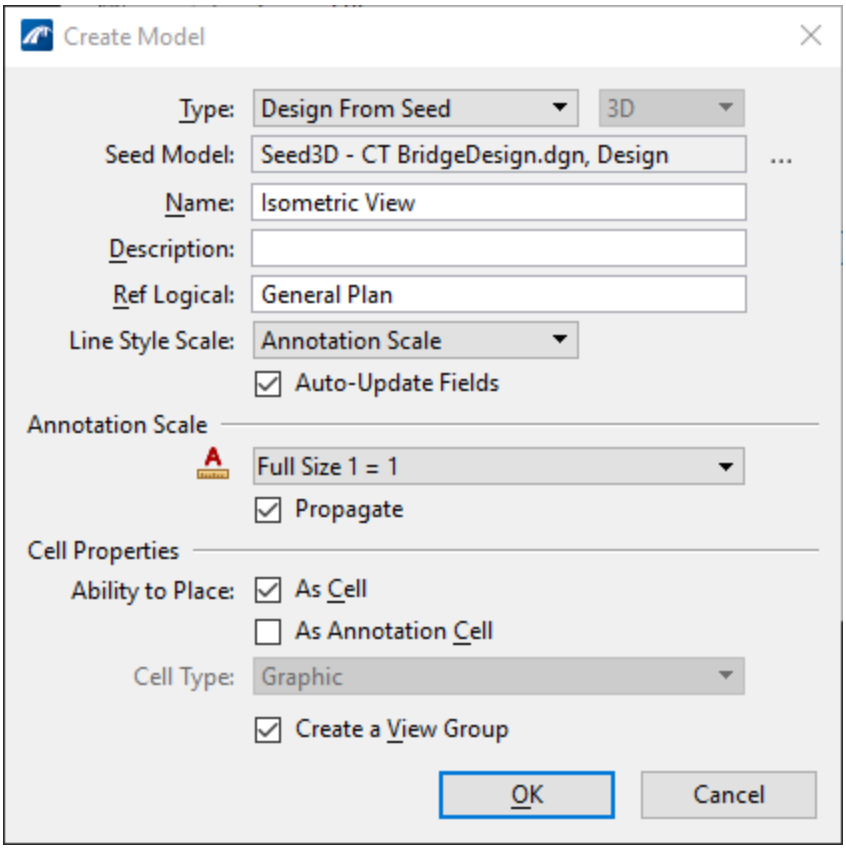


Figure 301

2. Reference in the original 3D Model named **Design** using a **Nested Depth** of ***1***. Turn off unneeded levels and reference files.
3. On the View Window select the **View Attributes** icon, choose a **Display Style**. Rotate the view as needed. **Save Settings**.

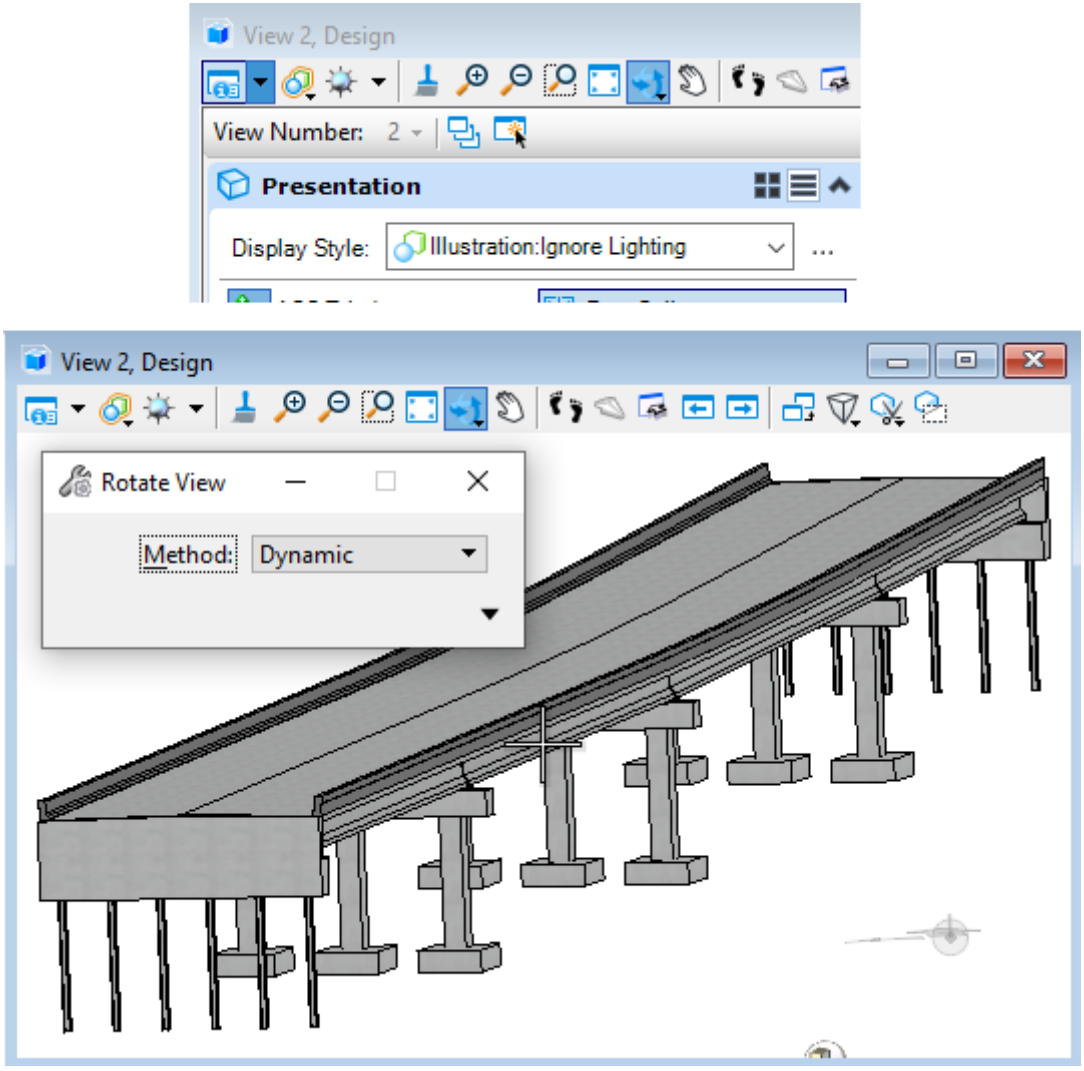


Figure 302

4. In **Search** type ***Saved Views*** and select the result. In the **Saved Views** dialog box click on the **Create Saved View** icon. Give your view a ***name*** and follow the prompts to create a Saved View.

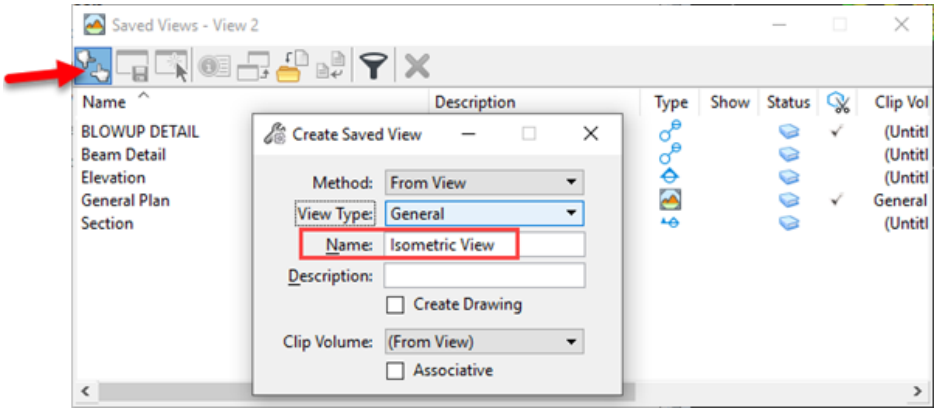


Figure 303

5. Open the General Plan Sheet Model.
6. In **Search** type ***Detailing Symbol Styles*** and select the result. In the **Detailing Symbol Styles** dialog box activate the **Center Title Detailing Style**.

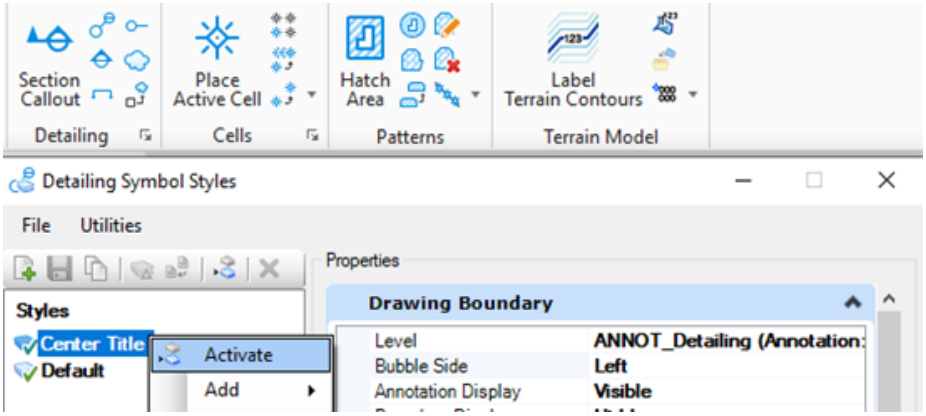


Figure 304

7. Reference the Saved View using the following settings:

- **Model: *Isometric View***
- **Orientation: *Isometric View***
- **Detail Scale: *1/16" = 1'-0"***
- **Nesting Attachments: *Live Nesting***
- **Nesting Depth: *2***

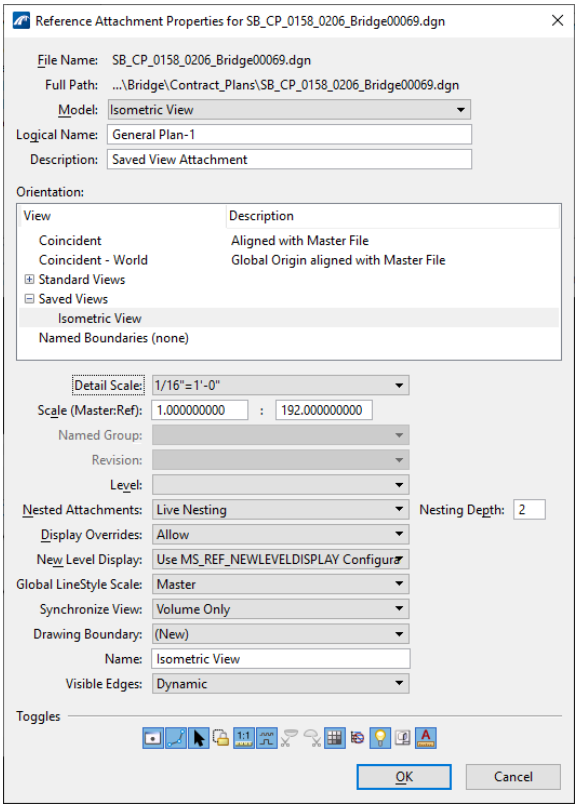


Figure 305

8. Move the Reference in the sheet as needed. **Save Settings**.

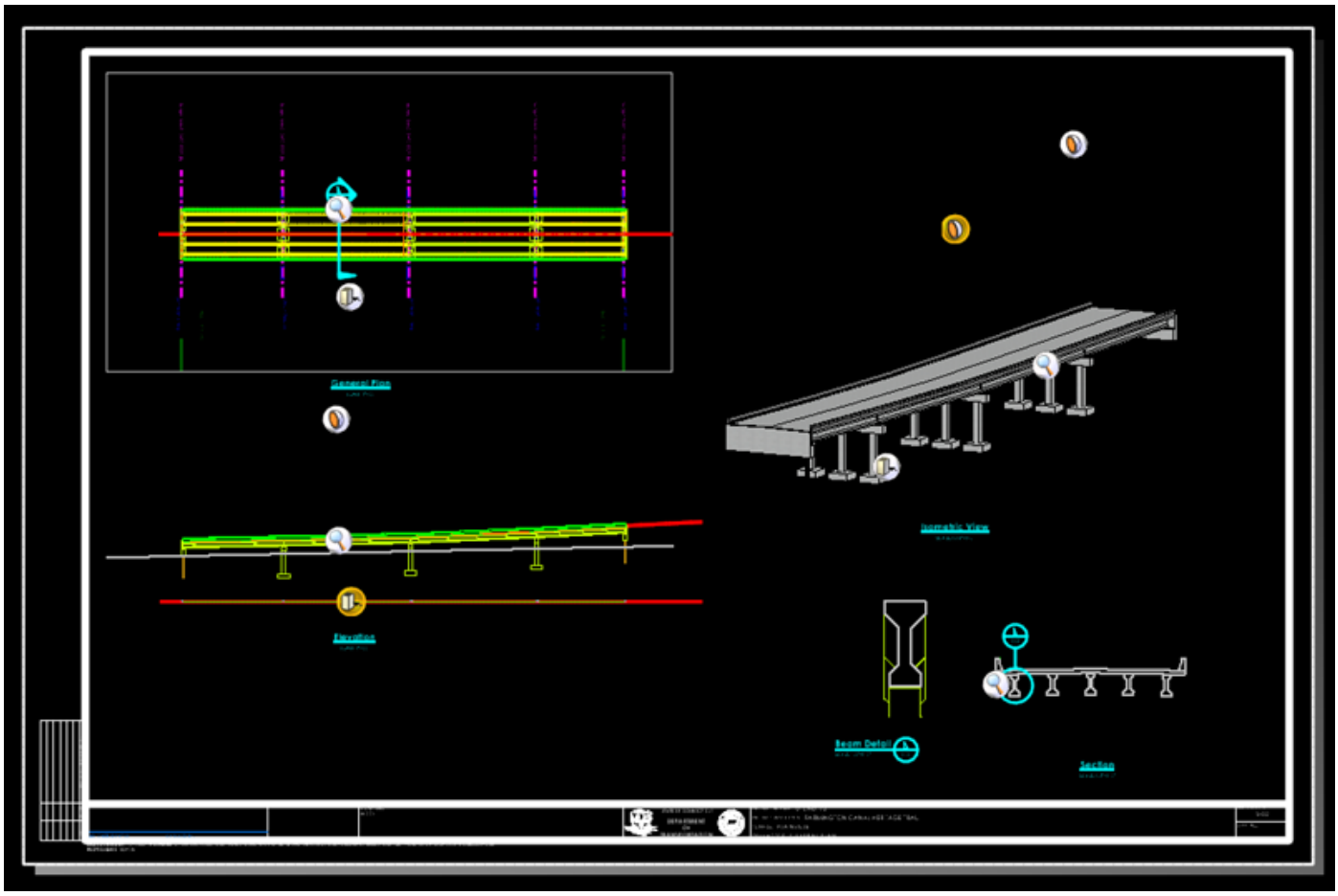


Figure 306

10.1.8 Annotate the Models

Most annotations for a detail should occur in the drawing model if there is one. The only annotation on the sheet model will be things like general notes, sheet border annotation, table of quantities, etc.

1. Open the desired Drawing or Sheet Model. Select the **CTDOT** Workflow and choose the **CTDOT** tab. In the **Dimensioning** section start by selecting the **Horizontal Text** icon and select the desired accuracy. This will set the proper dimension style and Level.
2. Second select the needed **Dimensioning Tool**.
3. Follow the prompts to place a dimension.

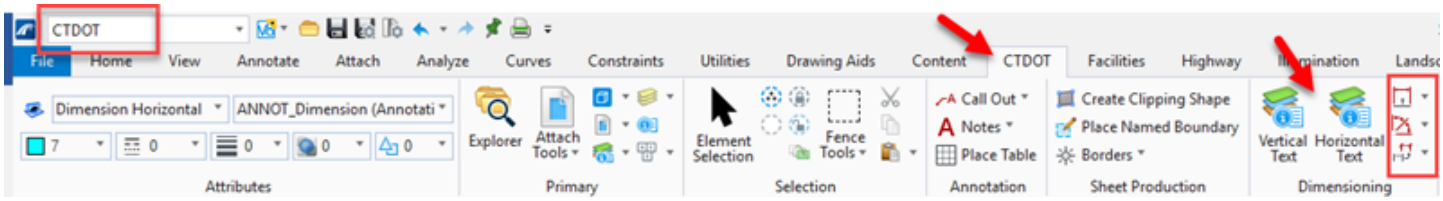


Figure 307

4. Select the **CTDOT** Workflow and choose the **CTDOT** tab. In the **Annotation** section select **Place Table**. There is a table seed for the General Notes available in the Table Tool. On the Place Table Dialog Box select **Seed: *General Notes*** and proceed to place the table.

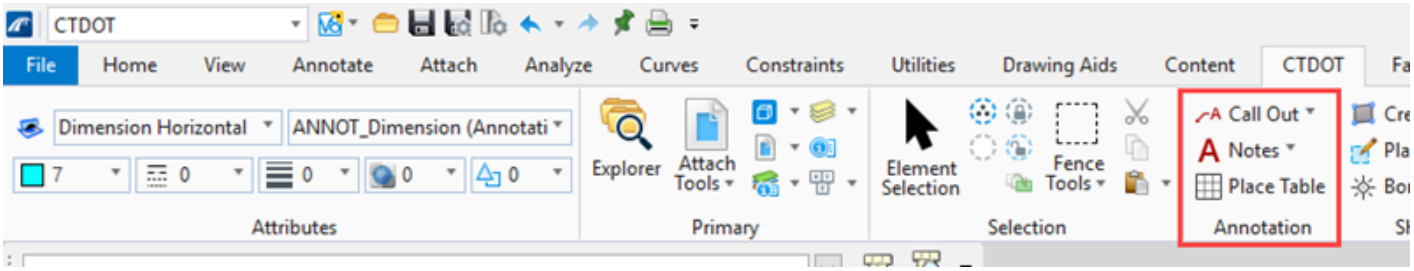


Figure 308

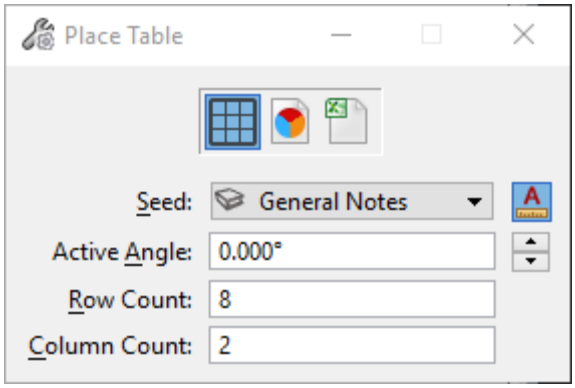


Figure 309

5. In the same **Annotation** section select the pull-down menus for **Call Outs** and **Notes** to place the needed annotation.
6. To place a call out with an inserted symbol use the following procedure. In the Annotation Section of the CTDOT tab select the Call Out Tool **Label Small (Weight 0)**

   Note: *Selecting the (Weight 0) options places the leader at a line weight of 0 and selecting the (Weight 2) options places the leader at a line weight of 2.*
7. In the Text box type the following: ***SYMMETRICAL ABOUT CL FIELD SPLICE***
8. In the Text box select only the ***CL*** text, select the **Insert Text Favorite** tool and scroll down to ***Symbol CL – Small***. The CL text will be replaced with the required Symbol.

   Note: Use the Text Favorite ***Symbol CL - Small*** in conjunction with Text Style **CTDOT_080** and ***Symbol CL*** for Text Style ***CTDOT_120***.
9. Follow the prompts to place your call out.

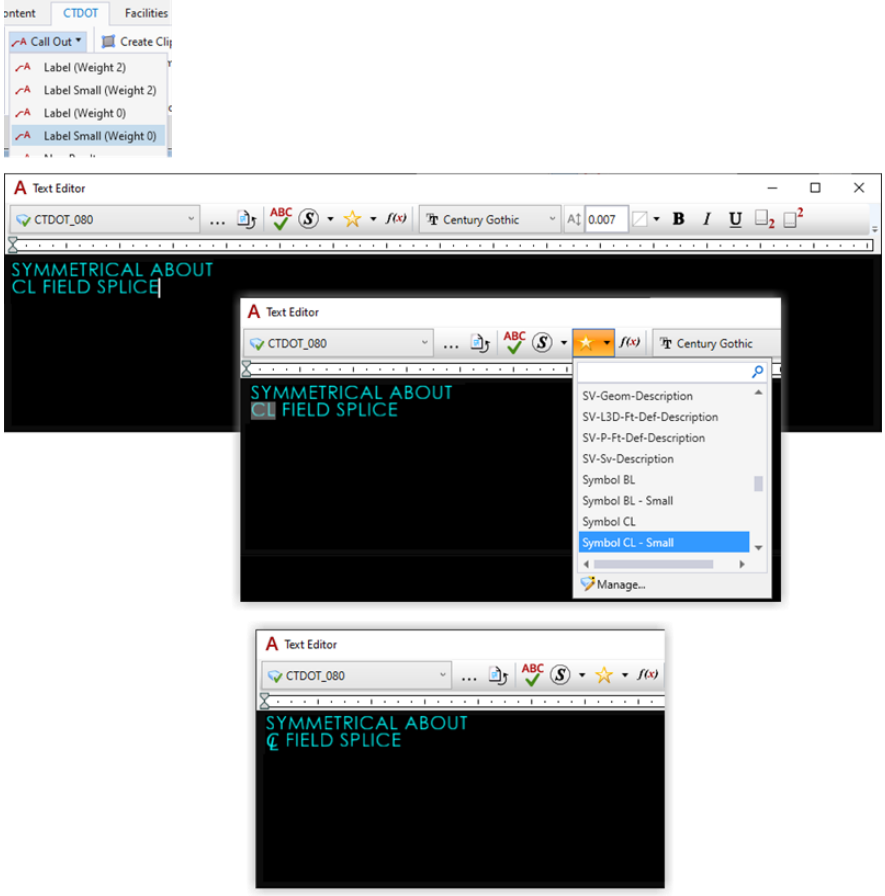


Figure 310

10.2 Civil Plans

10.2.1 View Set Up

Continue using the DGN file created in Volume 13 - M.4.1 General Plan Sheet and open the Design Model. We will use a referenced roadway alignment Base Model to create Plan, Profile and Cross Section Sheets. The (referenced) Alignment Base Model should have a horizontal alignment placed along with an active vertical alignment set. For more on creating alignment base models visit Volume 3 - Module 2 - Creating Alignments

1. The Referenced Existing Terrain should be set to active. In View 1 turn on the Reference with the needed terrain, select the terrain's boundary and on the pop-up tool select **Set As Active Terrain Model**.

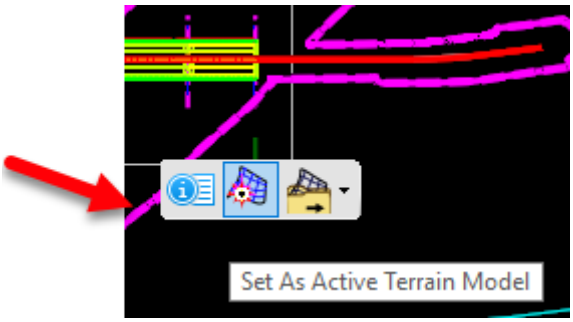


Figure 311

2. Open the Design Model, **Right click** in a View and Select **3 Views Plan/Profile/3D**.

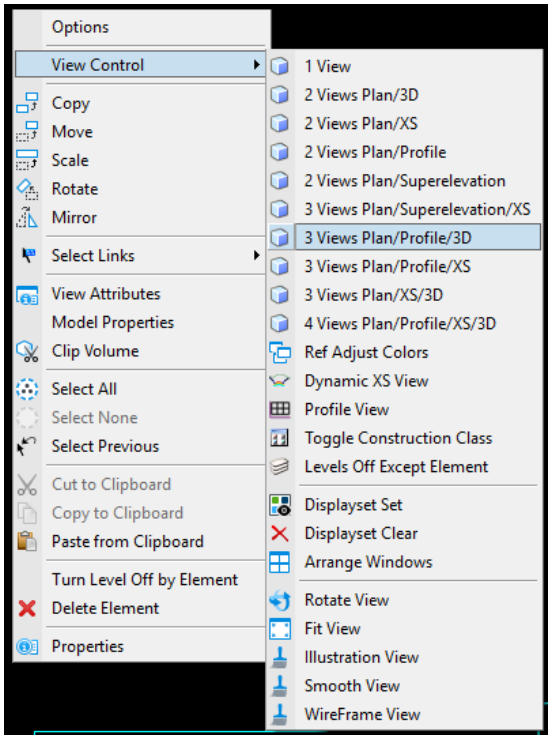


Figure 312

3. Follow the prompts to View the Profile. **Save Settings**.

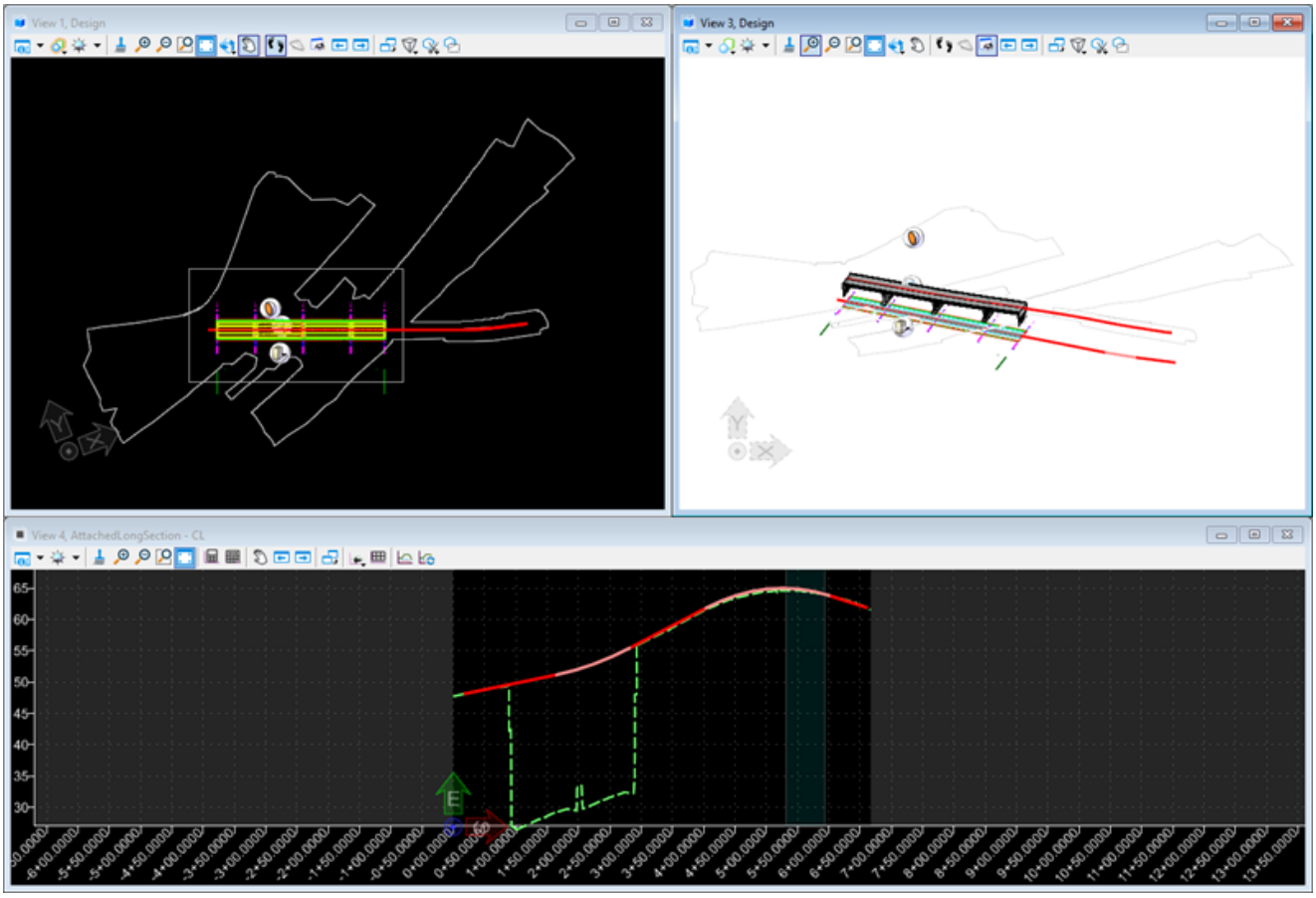


Figure 313

4. In View Group notice a ***Multi-Model View*** has been created.

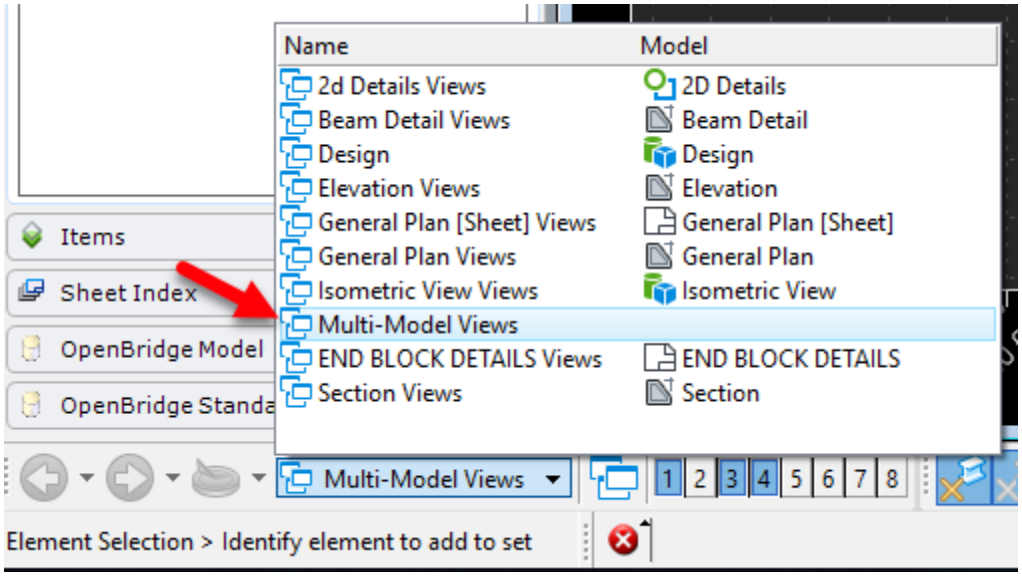


Figure 314

10.2.2 Create Civil Plan Sheet

1. In View Group select the **Multi-Model View**.
2. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section. Select the **Place Named Boundary** tool and the Place Named Boundary dialog box will appear. In the Place Named Boundary dialog box set the following options:
   - **Method (icon):** ***Place Named Boundary Civil Plan***
   - **Drawing Seed:** ***Select the desired scale***
   - **Name:** ***Plan 1***
   - **Group:** ***(New)***
   - **Name:** ***Match alignment name*** (Clicking on the horizontal alignment will also populate this name field with the name of the horizontal alignment.)
   - **Length:** ***Use Default Value or adjust as needed*** (length of alignment on one sheet).
   - **Left Offset:** ***Use Default Value or adjust as needed*** (offset from the alignment).
   - **Right Offset:** ***Use Default Value or adjust as needed*** (offset from the alignment).
   - **Overlap:** ***0*** (value of sheet overlapping the other)
   - **Boundary Chords:** ***Use Default Value or adjust as needed.***
   - **Create Drawing:** ***Enabled*** (so that the sheets are created as soon as the named boundaries are created)
   - **Show Dialog:** ***Enabled*** (used to override settings defined by the Drawing Seed if needed)
3. In the Plan view select the alignment along which the plan named boundaries will be created. The command line (lower left corner) will read: ***Place Named Boundary Civil Plan > Identify Path Element***. With the cursor, select the alignment.
4. Select the desired Start Location. Follow the prompts. Command Line: ***Place Named Boundary Civil Plan > Accept/Reject. Identify Path start point to place boundary***. Follow the prompts.
5. ***Note:*** *Add extra to the left of the start of your Stationing, example: Beginning Station is 100+00, at Start Location type in 99+00, this will move the named boundary to the left of the start of alignment. Bring your cursor back into the dialog box, enter the Start Station, click the Tab button, back in the view left click to Accept.*
6. Next select the ***Stop Location***. Command Line: ***Place Named Boundary Civil Plan > Identify Path end point to place boundary***. The named boundaries are displayed interactively as the cursor moves. Accept the endpoint location for the named boundary. Command Line: ***Place Named Boundary Civil Plan > Accept/Reject. Datapoint point in Plan View to place boundary. Identify Path end point to place boundary.***

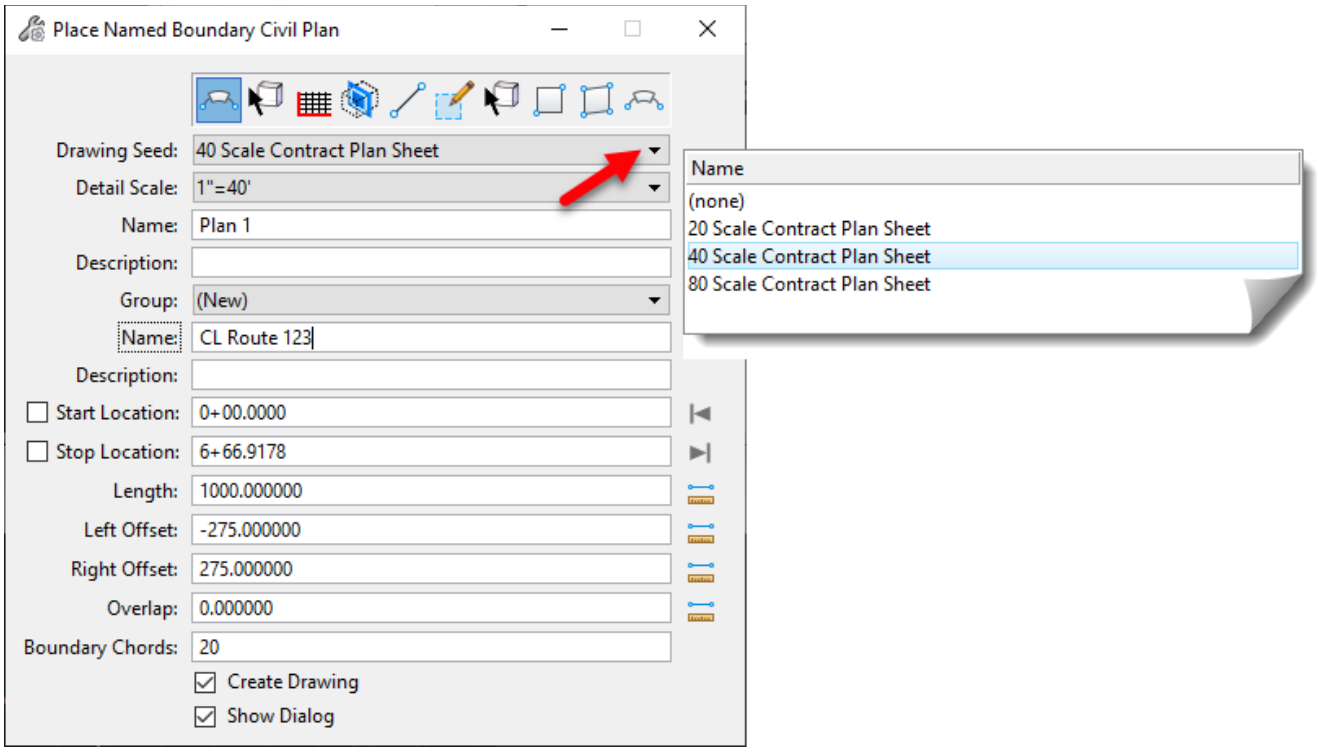
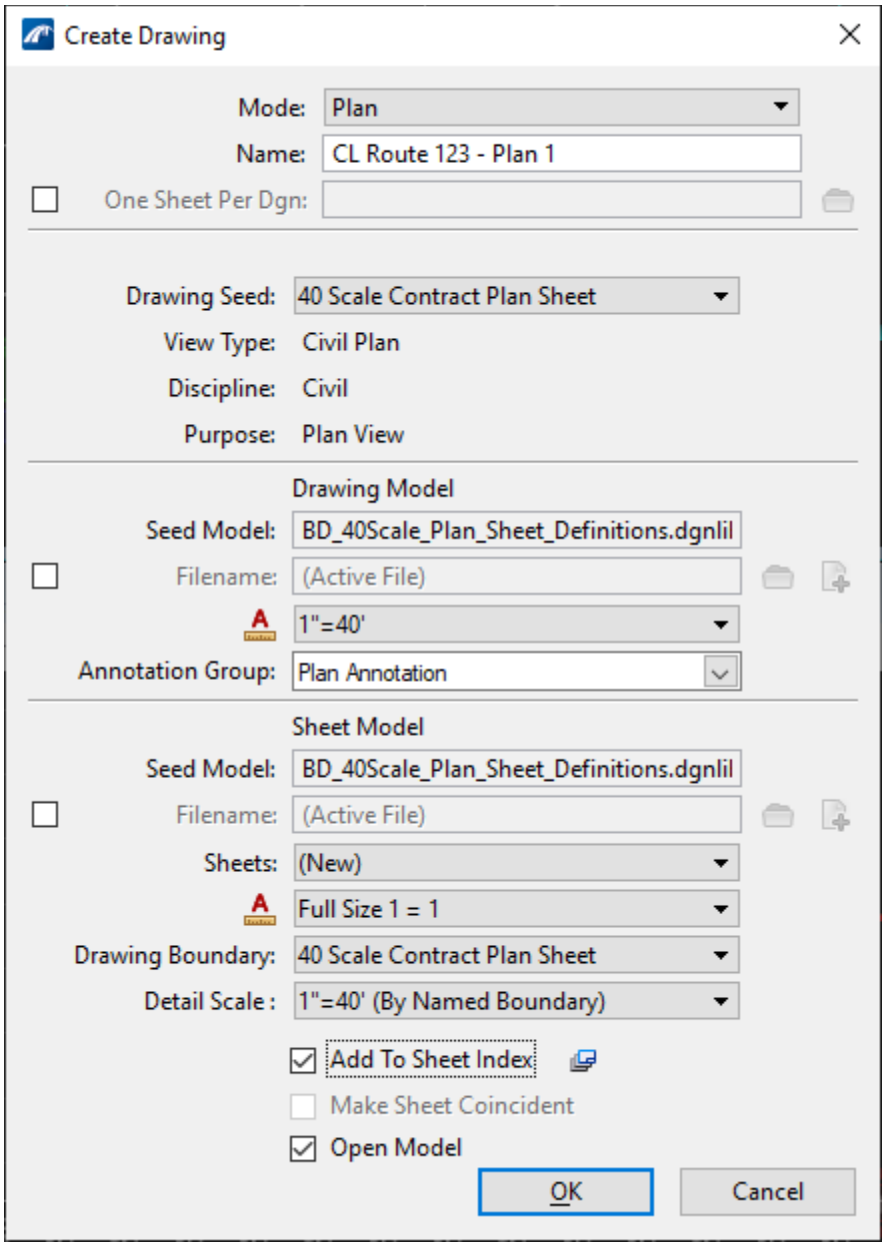


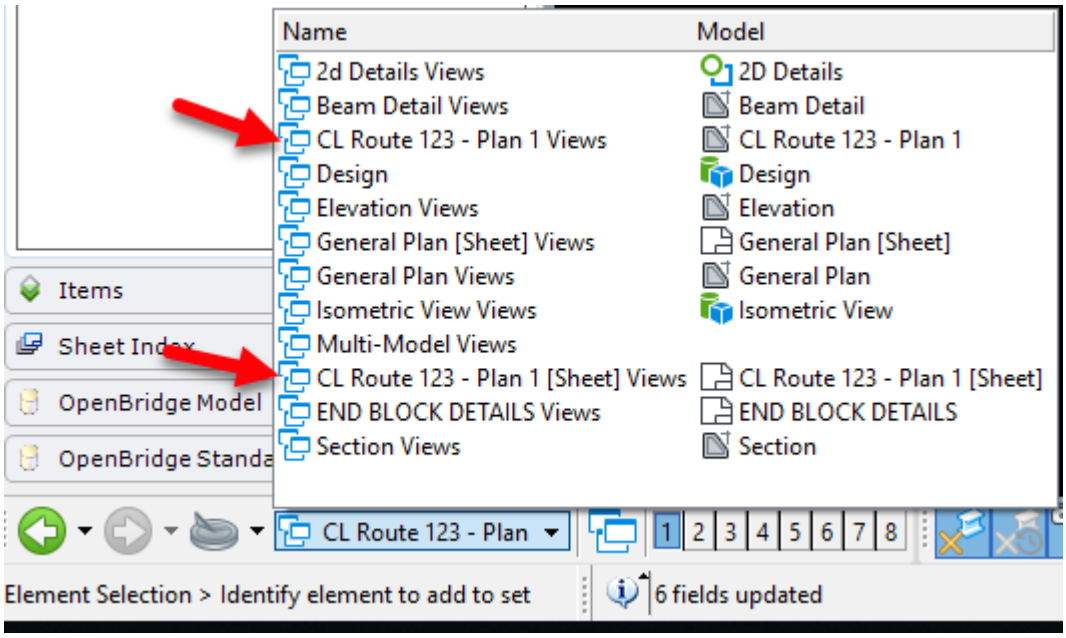
Figure 315

7. The **Create Drawing** dialog box will appear. Leave all the top settings as is.
8. Enable the ***Add to Sheet Index*** and the ***Open Model*** options.
9. Click **OK** to create the sheets. Follow the prompts in the lower left corner left click to define the named boundaries. Multiple left clicks may be required.

10. 

11. *Figure 316*

12. In the View Group dialog, you can now see the newly created drawing model(s) and sheet model(s).

13. 

14. *Figure 317*

10.2.3 Create Civil Profile Sheet

1. In View Group select the **Multi-Model View**.
2. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the **Place Named Boundary** tool and the Place Named Boundary dialog box will appear. In the Place Named Boundary dialog box set the following options:
   - **Method (icon):** ***Place Named Boundary Civil Profile.***
   - **Drawing Seed:** ***Select the desired scale.***
   - **Name:** ***Profile 1***
   - **Method:** ***Choose Station Limits*** or ***From Plan Group*** (The From Plan Group method matches the profile named boundaries to the plan named boundaries. The Station Limits method is used to defined profile named boundaries that are not matched to plan boundaries.)
   - **Group:** ***(New)***
   - **Name:** ***Match alignment name*** (Clicking on the horizontal alignment will also populate this name field with the name of the horizontal alignment.).
   - **Length:** ***Use Default Value or adjust as needed.***
   - **Vertical Exaggeration:** ***10***
   - **Available Profile Height:** ***Use Default Value or adjust as needed.***
   - **Top Clearance:** ***(toggled on) Use Default Value or adjust as needed.***
   - **Bottom Clearance:** ***(toggled on) Use Default Value or adjust as needed.***
   - **Elevation Datum:** ***Use Default Value or adjust as needed.***
   - **Station Datum:** ***Use Default Value or adjust as needed.***
   - **Use Terrains:** ***Enabled***

- **Use Active Vertical:** ***Enabled***
- **Create Drawing:** ***Enabled***
- **Show Dialog:** ***Enabled***

Follow the prompts in the lower left corner left, Command Line: ***Place Named Boundary Civil Profile > Identify Profile View*** click in the Profile View to define the named boundaries. More than one click is required.

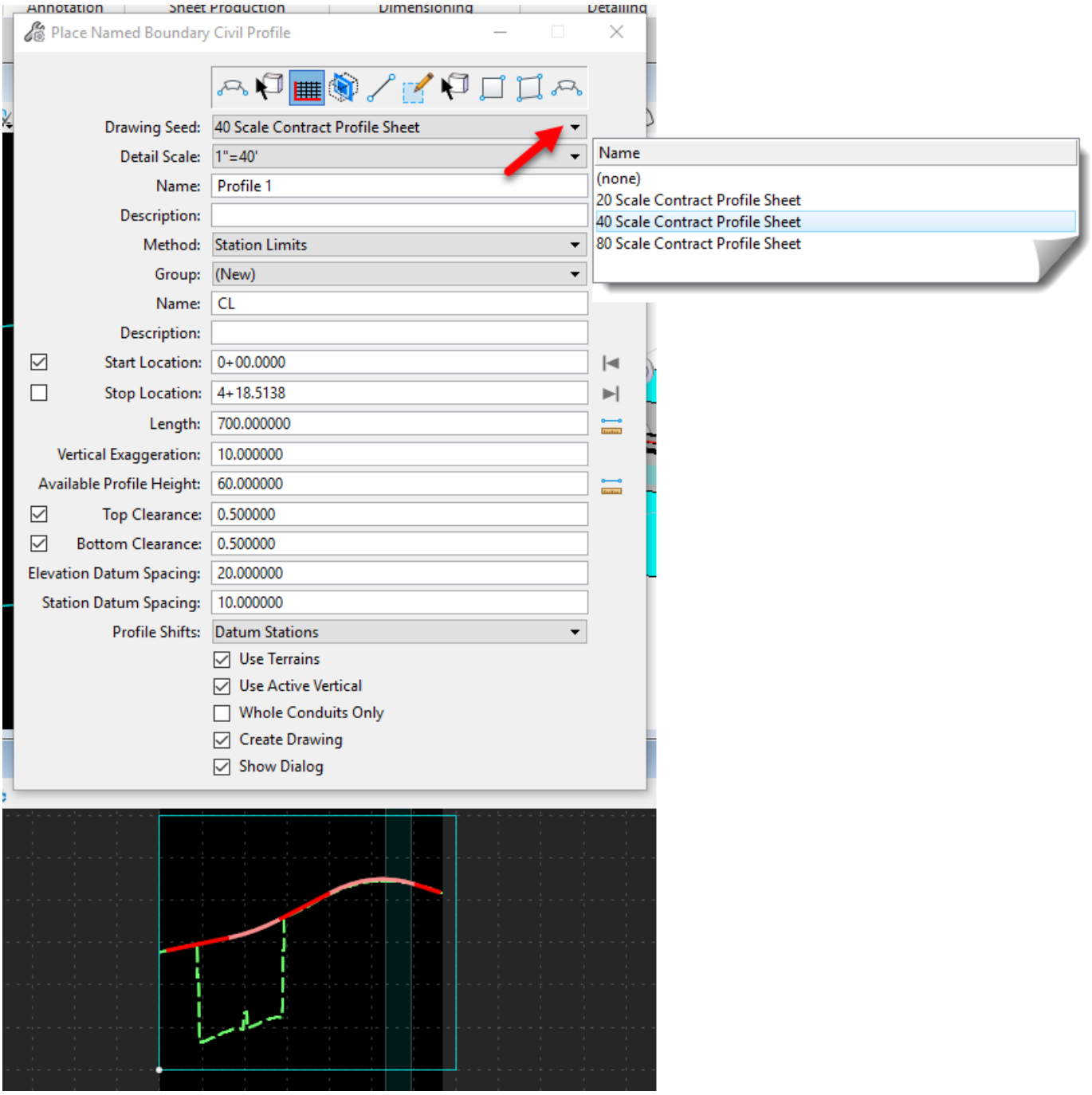


Figure 318

3. The **Create Drawing** dialog box will appear.

4. For **Sheets:** ***select a new sheet or chose to put the profile on a sheet that has already been created*****.**
5. Click **OK** to create the sheets. Follow the prompts in the lower left corner left click to define the named boundaries. Multiple left clicks may be required.

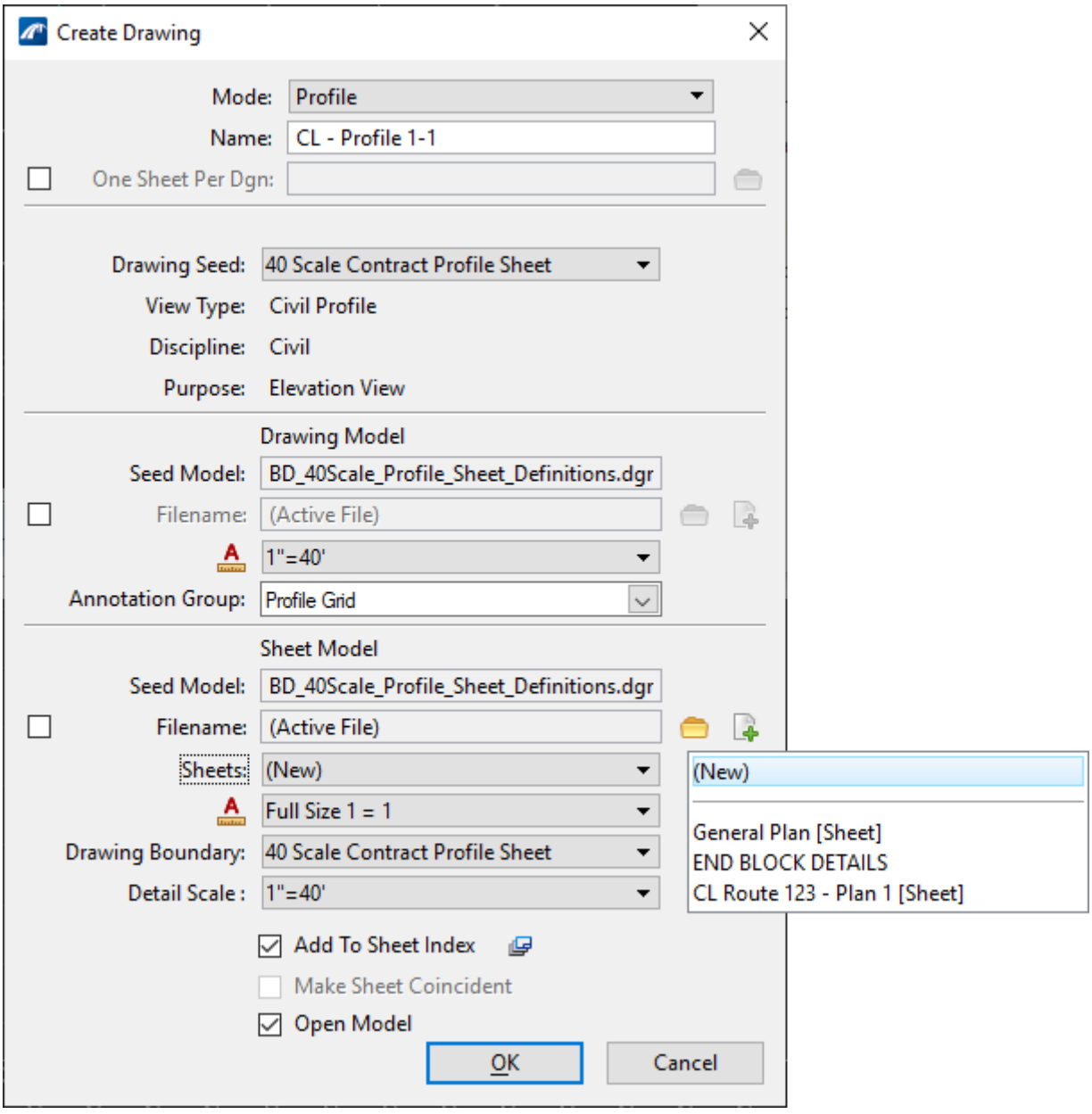


Figure 319

Please visit modules in OpenRoads Drawing Production for further instruction on the following items:

Review Plan and Profile Sheets

Review Named Boundaries

Adjust Sheet Layout

10.2.4 Create Civil Cross Section Sheets

We will use the Referenced Roadway/Bridge Alignment Base Model to create Profile Sheets. The (referenced) Alignment Base Model should have a horizontal alignment placed along with an active vertical alignment set.

1. In View Group select the **Multi-Model View**.
2. Select the **CTDOT** workflow and on the **CTDOT** tab locate the **Sheet Production** section and select the ***Place Named Boundary*** *tool*. In the Place Named Boundary dialog box set the following options:
   - **Method (icon): *Place Named Boundary Civil Cross Section.***
   - **Drawing Seed: *Select the desired scale.***
   - **Group: *(New)***
   - **Name: *Match the alignment name*** (Clicking on the horizontal alignment will also populate this name field with the name of the horizontal alignment.).
   - **Create Drawing: *Enabled***
   - **Show Dialog: *Enabled***

     The drawing seed has been set-up for the ANSI D size paper (34"x22"), and defaults include:
   - **Named Boundary**, for left and right offsets, section intervals, vertical exaggeration, and top and bottom clearances between sections (these can be changed if needed).
   - **Include Control Points**, these are usually the PC's, PI's, PT's of the horizontal alignment.
   - **Include Event Points Only**, this will require the user to establish an Event Point List (drainage crossings as example).

3. In the 2D view (default plan view), select the alignment along which the named boundaries (sheets) will be created. The command line (lower left corner) will read: ***Place Named Boundary Civil Cross Section > Identify Path Element***. With the cursor select the horizontal alignment. Now a light blue line should be visible on the

cursor. This allows the user to pick the start and stop locations of the named boundaries for cross sections.

4. Select the desired Start Location. Follow the prompts. Command Line: ***Place Named Boundary Civil Cross Section > Accept/Reject. Identify Path start point to place boundary***.

5. Next select the ***Stop Location***. Command Line: ***Place Named Boundary Civil Cross Section > Identify Path end point to place boundary***. The named boundaries are displayed interactively as the cursor moves. Accept the endpoint location for the named boundary. Command Line: ***Place Named Boundary Civil Cross Section > Accept/Reject. Datapoint point in Plan View to place boundary. Identify Path end point to place boundary.***

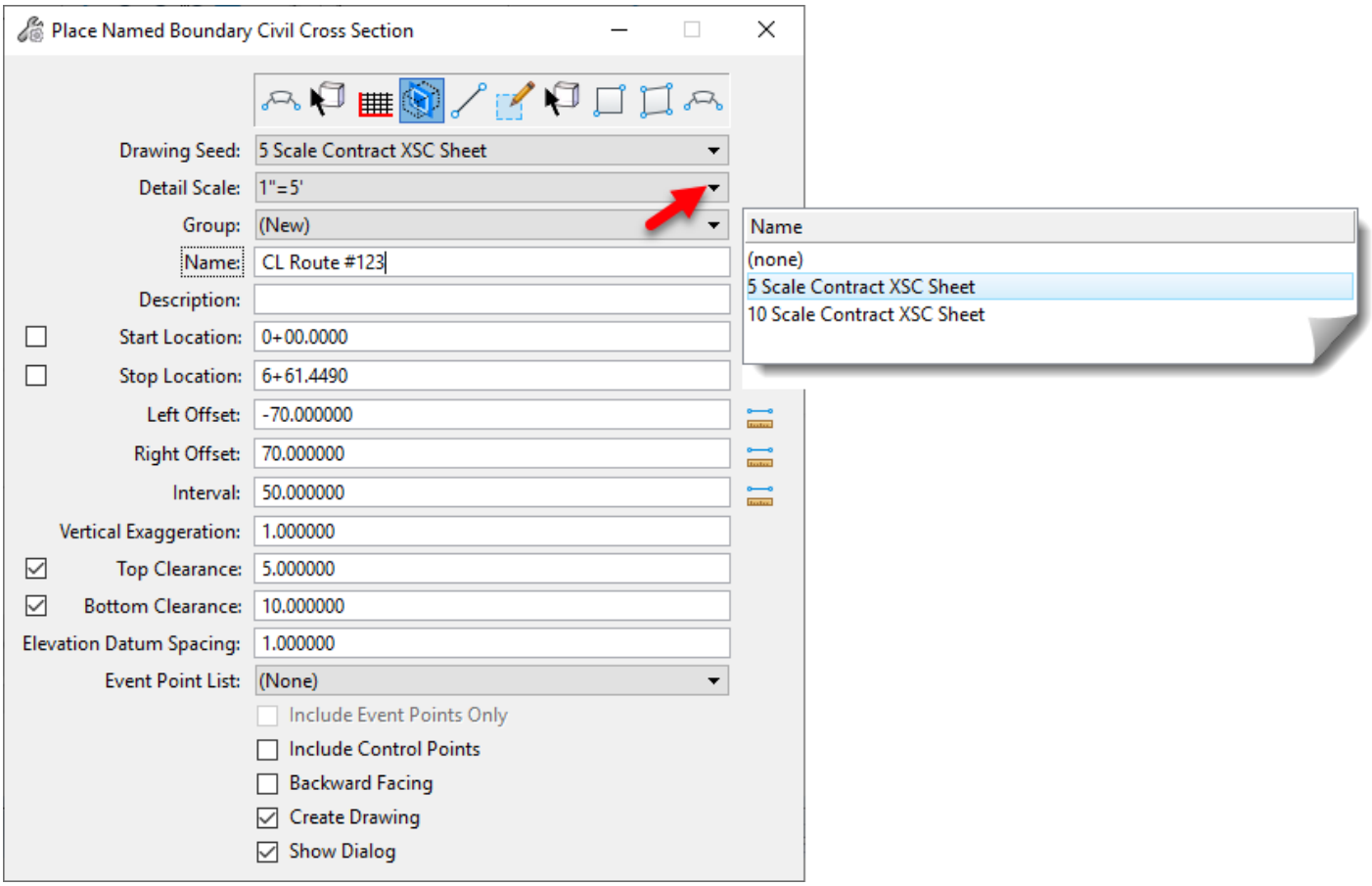


Figure 320

6. The **Create Drawing** dialog box will appear.

7. Click **OK** to create the sheets. At the bottom of the view windows, a gage will appear showing the progress of Sheets Created and then the progress of Drawing Models Annotated. When all is completed the last cross section sheet will be open.

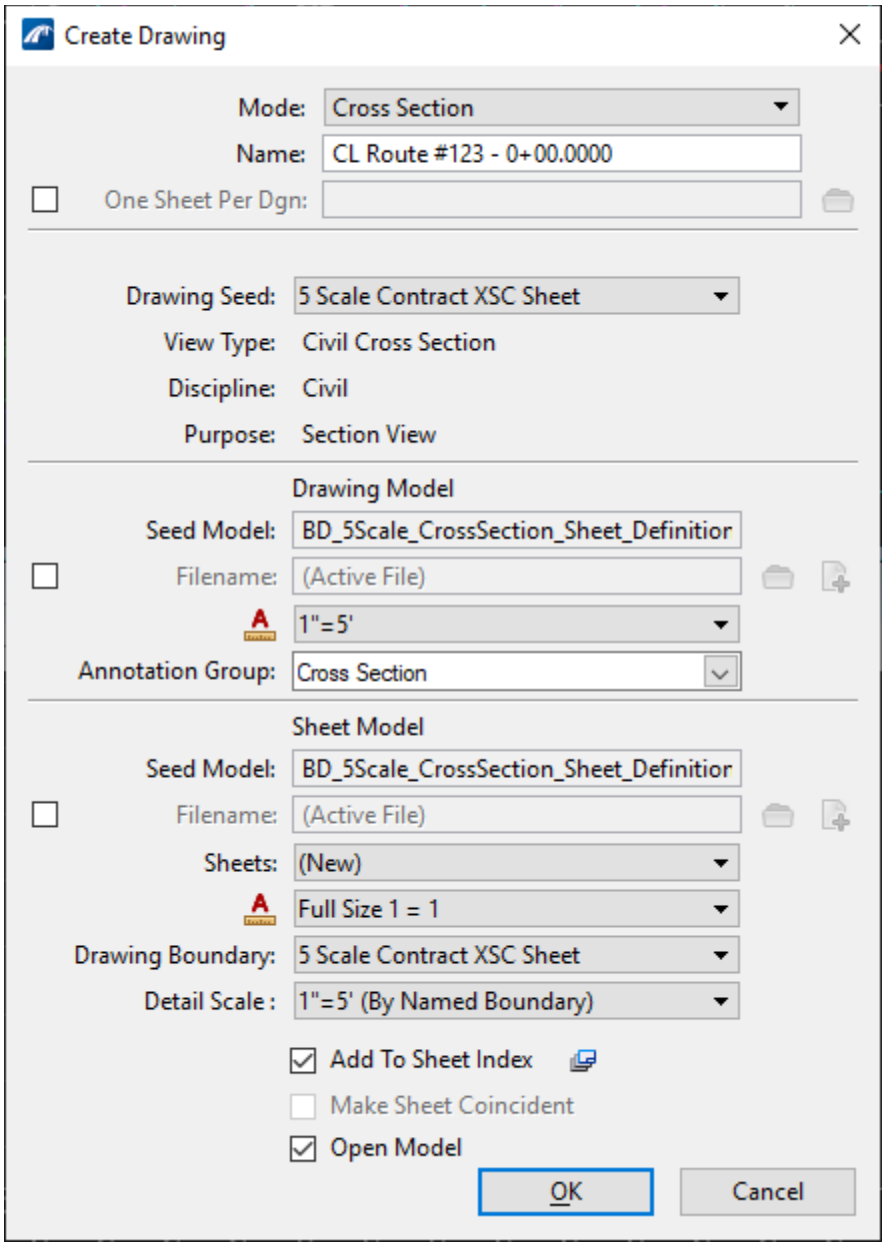

Create Drawing
Mode:
Cross Section
Name:
CL Route #123 - 0+00.0000
One Sheet Per Dgn:
Drawing Seed:
5 Scale Contract XSC Sheet
View Type:
Civil Cross Section
Discipline:
Civil
Purpose:
Section View
Drawing Model
Seed Model:
BD_5Scale_CrossSection_Sheet_Definitior
Filename:
(Active File)
1"=5'
Annotation Group:
Cross Section
Sheet Model
Seed Model:
BD_5Scale_CrossSection_Sheet_Definitior
Filename:
(Active File)
Sheets:
(New)
Full Size 1 = 1
Drawing Boundary:
5 Scale Contract XSC Sheet
Detail Scale :
1"=5' (By Named Boundary)
Add To Sheet Index
Make Sheet Coincident
Open Model
OK
Cancel

Figure 321

10.3 Detail Sheets from 2D Drawings

1. Continue using the DGN file created in Volume 13 - M.4.1 General Plan Sheet. Create a new Sheet Model, using the ***Seed2D – CT BridgeSheet.dgn, Sheet*** seed file.

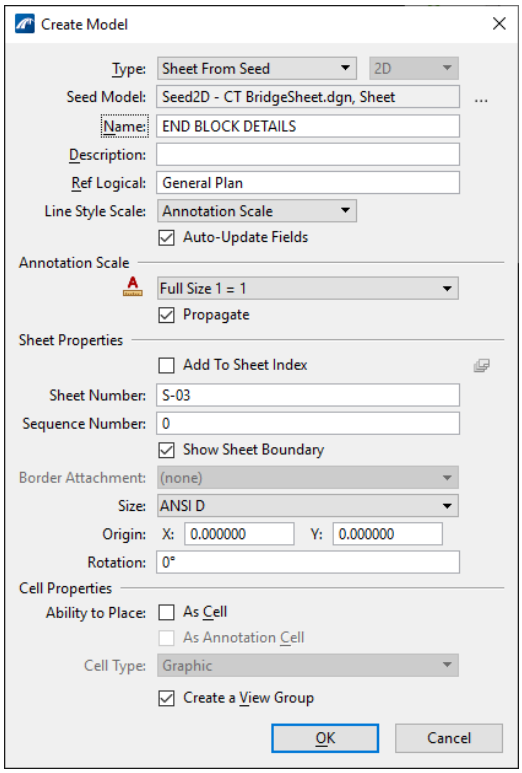


Figure 322

2. Create a new 2D Design Model, using the ***Seed2D – CT BridgeDesign.dgn, 2D Design*** seed file.

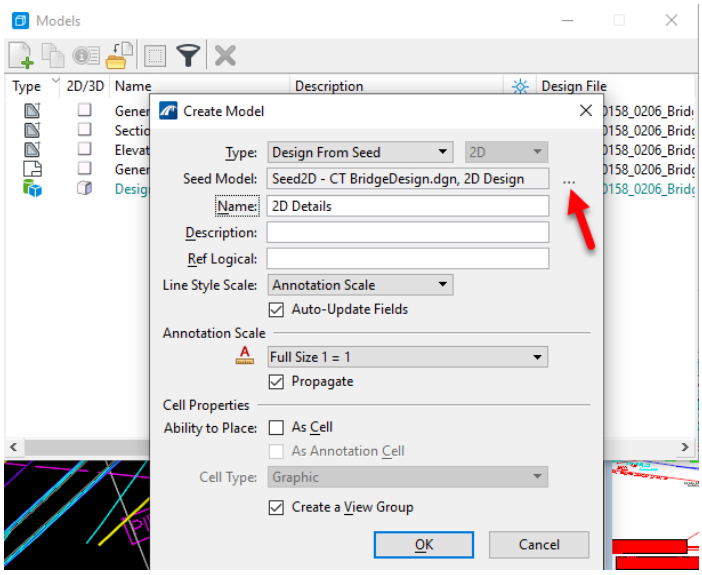


Figure 323

3. In the new 2D Design Model activate the **CTDOT Workflow**. On the **Home** tab, use the Placement, Manipulate and Modify tools to draft the line work for the Details. Multiple details can be placed in this design model as these will all be placed at their true size 1:1. For this exercise you will need to create at least 2 details. There will be no dimensioning or text placed in this model, all annotation will be in the Sheet Model that will reference the 2D design model's line work.
4. In search type ***Detailing Symbol Styles***. Select the result and the dialog box will open. Right click on ***Center Style*** and select ***Activate***.
5. On the **CTDOT** Tab, **Sheet Production** section select **Create Clipping Shape,** this will set the correct level for the clipping shape. In the same section select the **Place Named Boundary** tool.

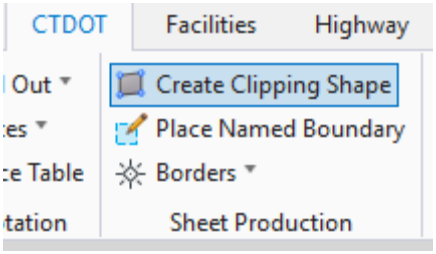


Figure 324

6. On the Place Named Boundary dialog box select the **By Two Point** icon, Name the Detail (***DETAIL - TYPICAL PARAPET END***) and make sure **Create Drawing** is on. Follow the prompts and place a shape around one of the details.

   On the Place Named Boundary dialog box set:

   Drawing Seed: ***Place Sheet Only (Named Boundary).***

   Sheets: ***Select the Sheet Model created in step 1 of this section.***

   Detail Scale: ***As needed.***

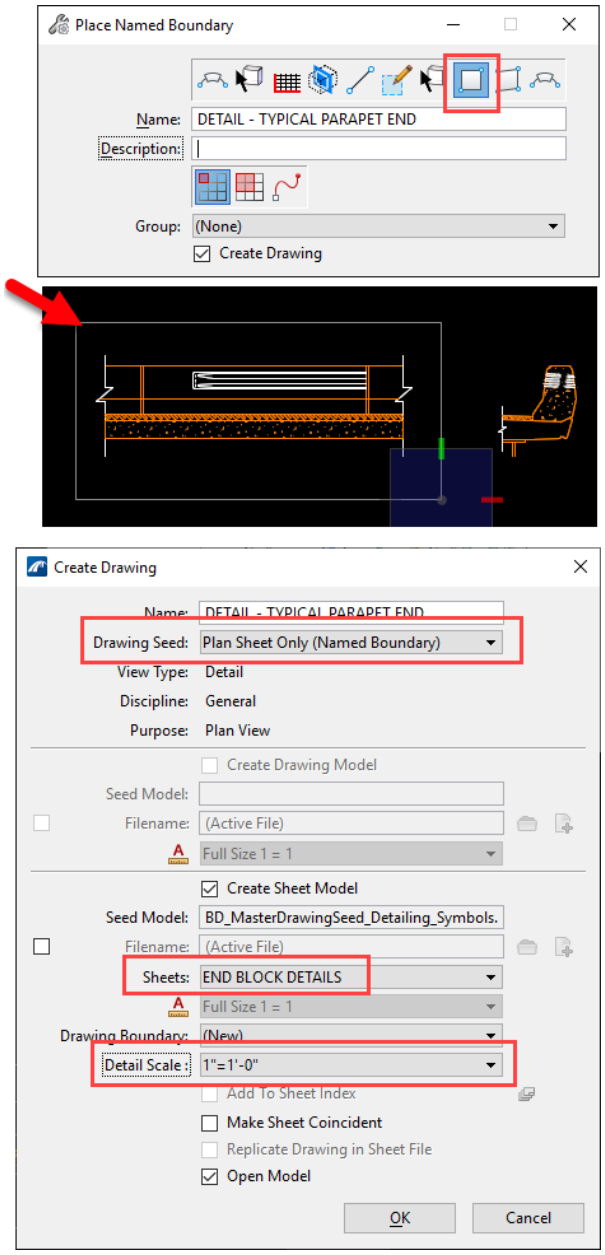


Figure 325

7. The sheet Model will open, move the referenced detail to the desired location inside the sheet.
8. Open the 2D Design Model to create another Named Boundary.
9. Activate the ***Default*** Detailing Symbol Style.
10. On the **CTDOT** Tab, **Sheet Production** section select **Create Clipping Shape,** this will set the correct level for the clipping shape. In the same section select the **Place Named Boundary** tool.
11. On the Place named Boundary dialog box select the **By Two Point** icon, Name the Detail (***SECTION – R-B 350 ATTACHMENT***) and make sure **Create Drawing** is on. Follow the prompts and place a shape around another detail.

    On the Place Named Boundary dialog box set:

    Drawing Seed: *Place Sheet Only (Named Boundary).*

    Sheets: *Select the Sheet Model created in step 1 of this section.*

    Detail Scale: *As needed.*

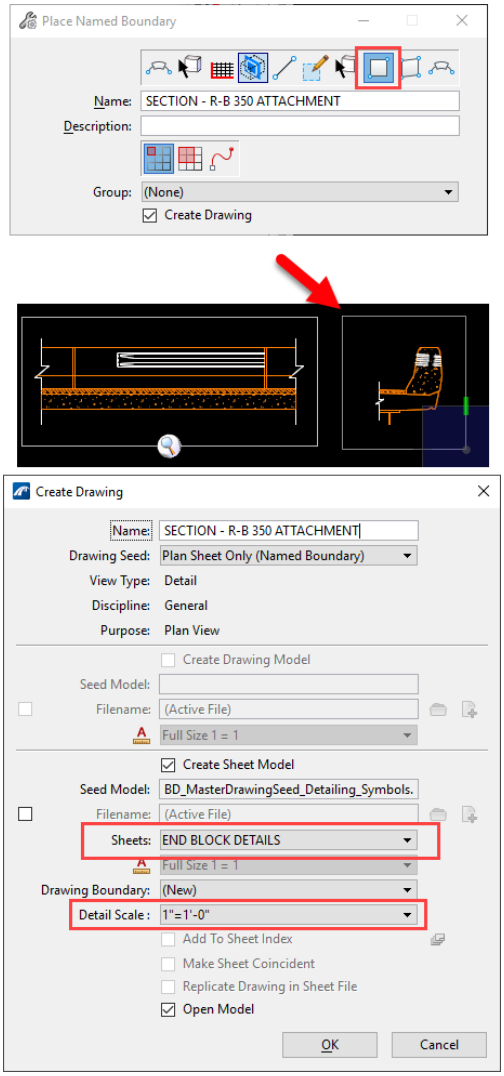


Figure 326

12. The Sheet Model will open, move the referenced detail to the desired location inside the sheet.

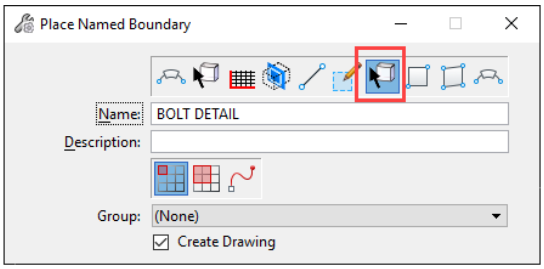
13. Open the 2D Design Model to create another Named Boundary, assure the Named Boundary Element Template is active. Zoom in and place a circle around a portion of a detail. On the Place Named Boundary dialog box select the **By Element** icon. Give the detail a name (***BOLT DETAIL***). Use a Detail Scale to enlarge the size on the Sheet.

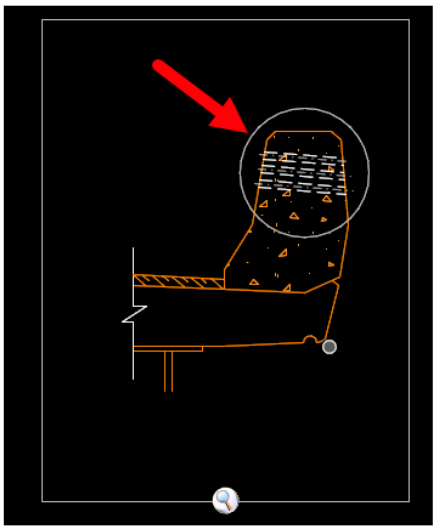
    On the Place Named Boundary dialog box set:

    Drawing Seed: ***Place Sheet Only (Named Boundary).***

    Sheets: ***Select the Sheet Model created in step 1 of this section.***

    Detail Scale: ***As needed.***





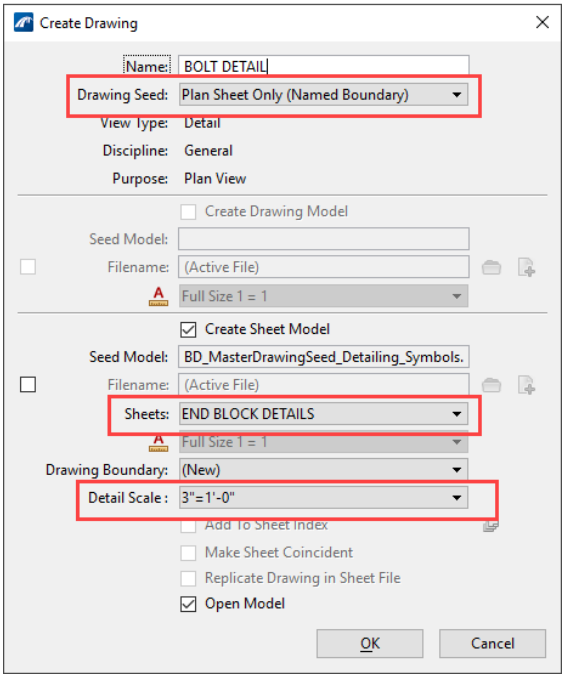


Figure 327

14. In the Sheet Model place dimensions on both details (the full detail and the blown-up detail, notice they both dimension correctly even though they are two different sizes on the sheet.

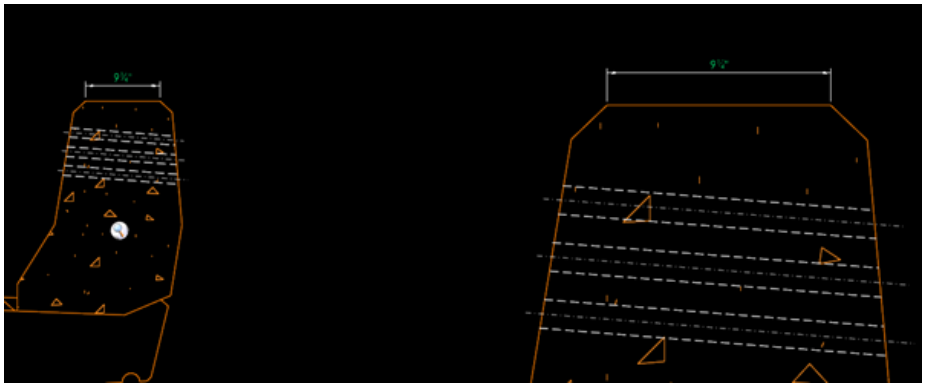


Figure 328

15. Use the **Section Call Out** tool and place a Detailing Symbol to indicate cut section. Edit the text in the Bubble to indicate the Detail it is referring to.

16. To Create a Step or a Gap in a Section or Plan Callout do one of the following:

    Right-click the callout and select **Create Step** from the pop-up menu or **Right-click** the callout and select **Create Gap** from the pop-up menu.

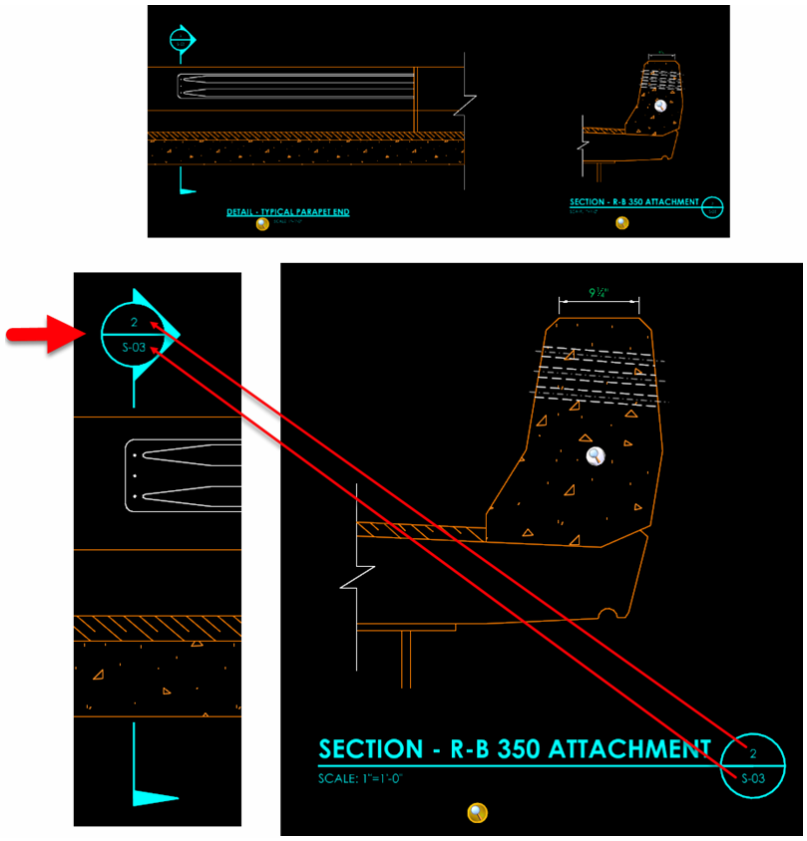


Figure 329

10.4 Place Welding Symbol

The tool **Place Welding Symbol** can be accessed through OpenBridge Designer that comes with the ProStructures component. It's important to note that users that only have OpenBridge Modeler and OpenRoads Designer installed will not be able to access this tool. This is how Bentley has decided to program and license this tool and it is no longer available as the "Detailer" MDL Application that ran on the MicroStation V8i platform. CTDOT put in a request to Bentley for a rewrite of this MDL Application to work across all their CONNECT Edition CAD programs, but they have decided to only offer it through OpenBridge Designer/ProStructures. CTDOT spent a considerable amount of time trying to get the Place Welding Symbol tool to work as well as the old MDL Detailer Application. We came up with this workflow to outline the workarounds needed until Bentley addresses the issues.

Three tools have been created on the **CTDOT** Workflow; **Bridge** Tab too address the workarounds settings for the Welding Symbol placement.

1. Set Welding Symbol Detail Accuracy
2. Label (Weight 0)
3. Open Welding Finishing Symbols

We have also placed access to the 4 Place Welding Symbol tool on the **CTDOT** workflow.

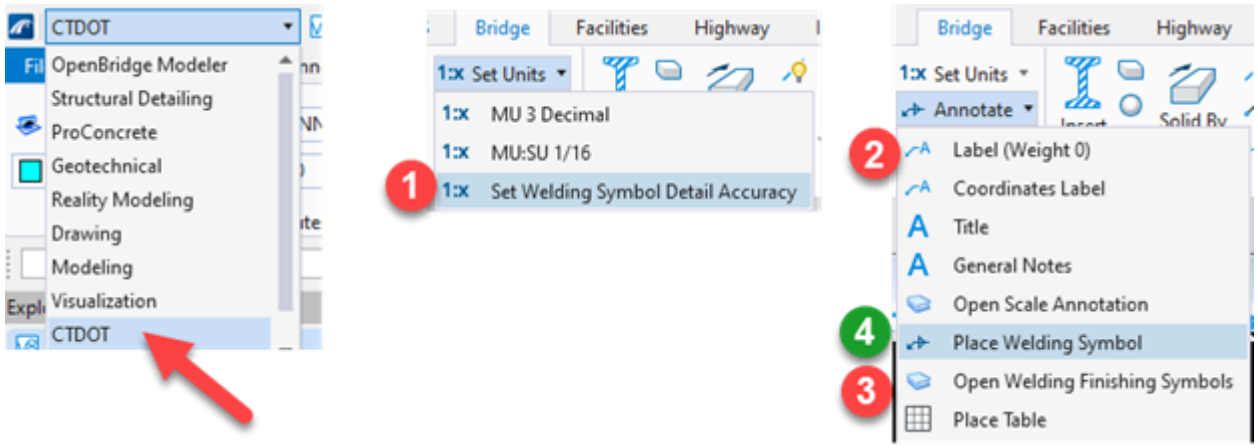


Figure 330

Steps:

1. Open the DGN File that will be used to place Welding Symbols.
2. Select the **CTDOT** Workflow, **Bridge** tab.In the **Detail** section select the **Set Units** pull down and choose **Set Welding Detail Accuracy**. This will set the Working Units to what is needed to have the numbers show correctly in the Welding Symbol.

   These are the settings that will be auto updated by the Set Welding Detail Accuracy tool:
   Format: ***MU***
   Master Unit: ***Inches*** Label: ***in***
   Sub Unit: ***Inches*** Label: ***in***

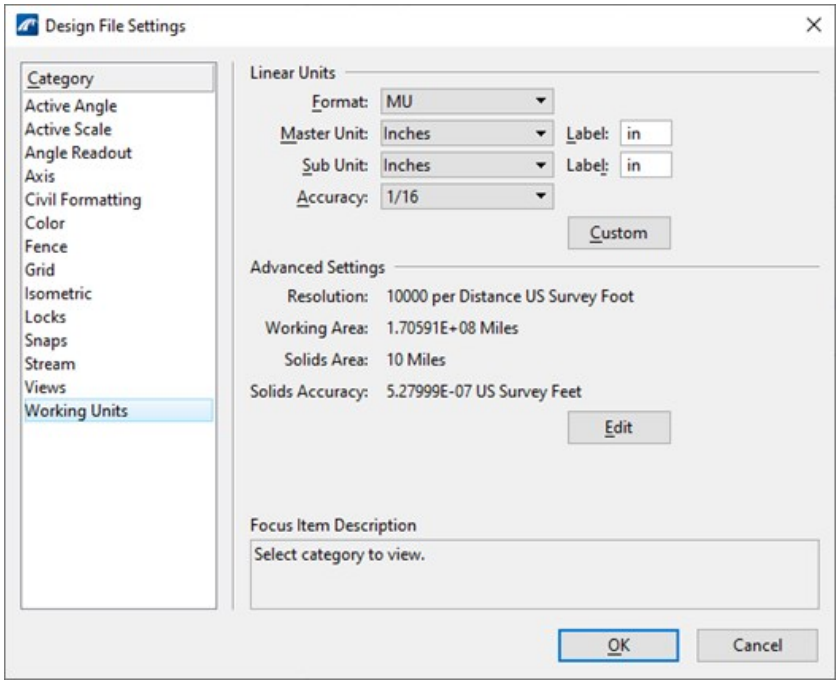


Figure 331

3. Remain on the **CTDOT** workflow **Bridge** tab, **Detail** section and select: ***Annotate > Label (Weight 0),*** this will set the needed Text Style.
4. To add a welding symbol, remain on the **CTDOT** workflow **Bridge** tab, **Detail** section and select: ***Annotate > Place Welding Symbol***
5. Select the  **Help** button at the bottom of the dialog box to access Bentley's online help. This will cover in detail the use of the Weld Styles Dialog Box.
6. Under **Level** select ***ANNOT_Label_Proposed***.

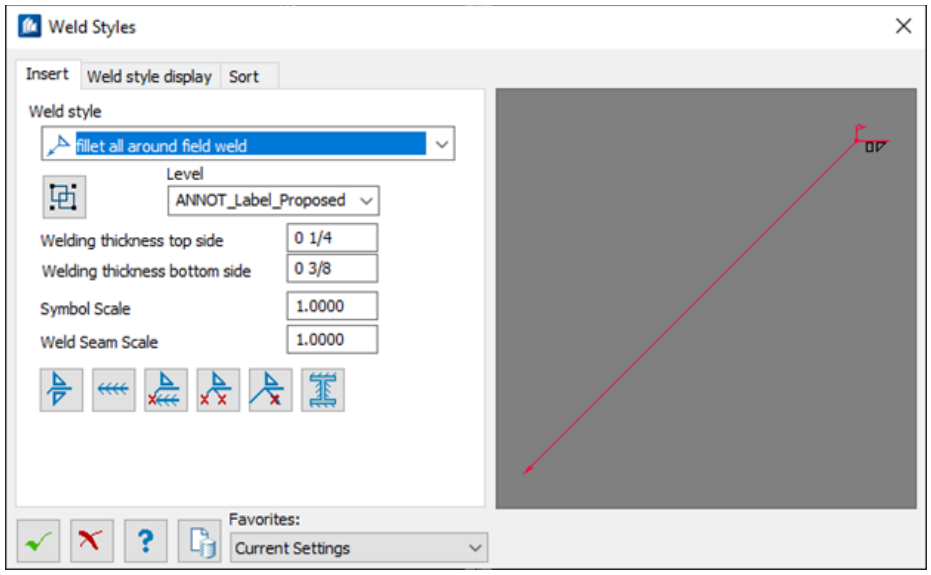


Figure 332

7. Select and fill in the following:
   - **Weld Style**, note: if the style needed is not listed just pick the closest one and this can be edited after placing the initial note.
   - **Welding Thickness** (add top side and bottom side if they are both needed)
   -  **Weld Group Settings**
8. Select  **Add Welding Symbol** and follow the prompts to place the symbol.
9. After placement the Symbol can be easily edited by double clicking on the symbol in the DGN. Edit as needed in the Welding Symbol Properties, when complete select the **Green OK check box**.

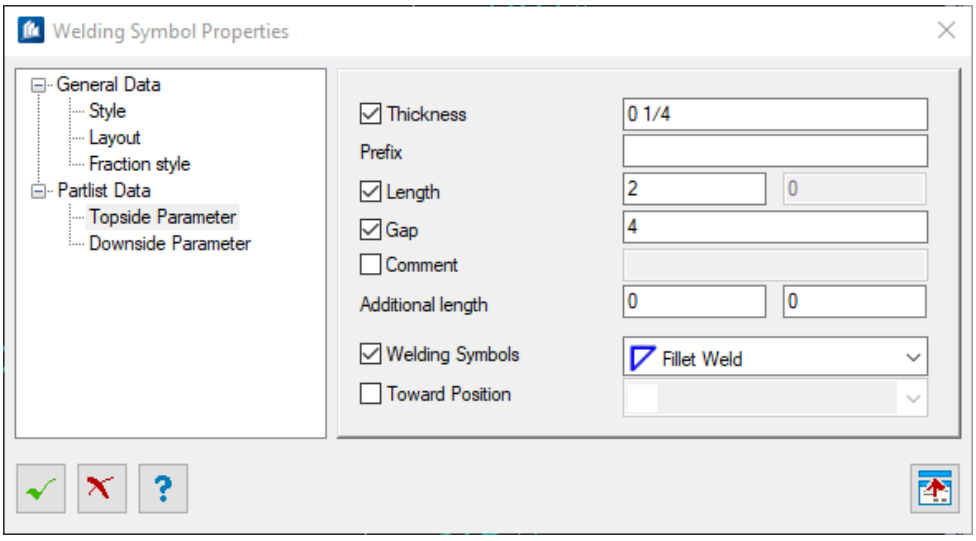


Figure 333

Please Note:

- The **Towards Position** button and options do not work to CTDOT standards so do not toggle this on, Finishing Symbols will be added using cells from a cell library (see step 10).
- The Fraction style can also be customized to use either Horizontal or Diagonal Stacking.

10. To add finishing symbols, remain on the **CTDOT** workflow **Bridge** tab, **Detail** section and select: ***Annotate > Open Welding Finishing Symbols***

    A Cell Library will open, select as needed and follow the prompts to place the cell near the welding Symbol.

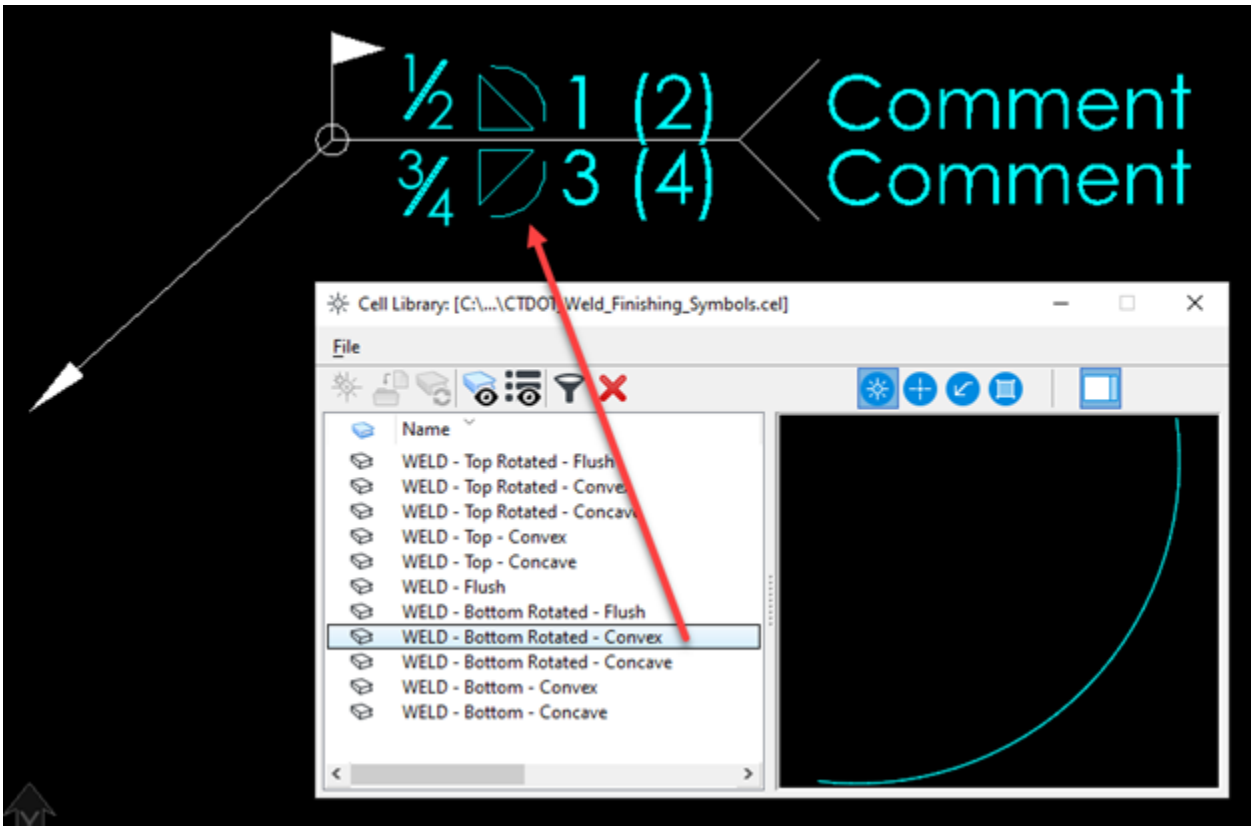


Figure 334

11. When you are done placing Welding Symbols select **Save Settings** to hold the Design Files settings for the next time you open the file or select other Design Files settings, working Units options as needed for other call outs.

Section 11 – Sheet Indexing

The Explorer Dialog Sheet Index Tab contains controls to manage sheet indexing.

A sheet index is an organized and named collection of sheet models from one or more design files. You may link any sheet model from any design file into a sheet index. You can then manage the properties of all the sheet models within the sheet index collectively. Sheet indexes may also be added to print organizer print sets for printing.

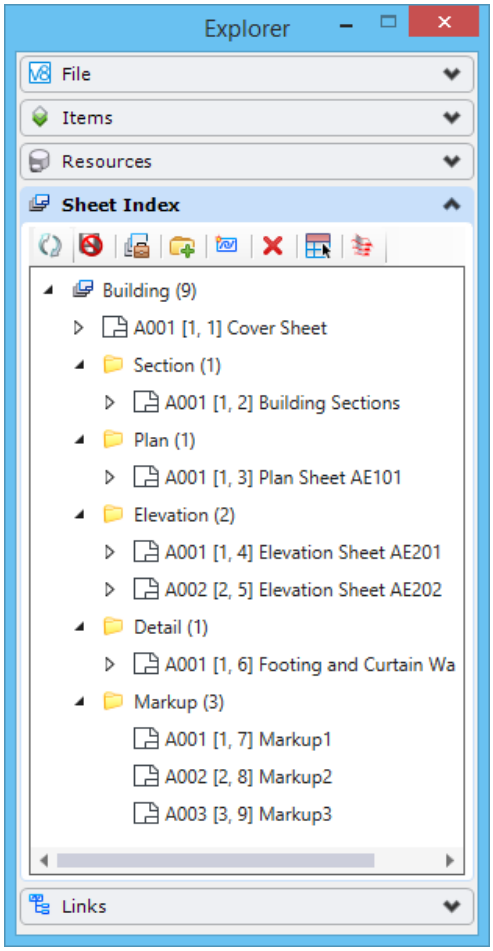


Figure 335

Refresh – Refreshes the content of the sheet index. Though the sheet index automatically refreshes when you make any changes, in some cases, you may need to refresh it manually by clicking this icon.

Open Sheet Index for Edit – Allows you to make changes to the sheet index. When you click this icon, other users cannot make changes to the sheet index.

Make Sheet Index Read Only – Turns off editing options on the sheet index. When you click this icon, the changes made to the sheet index are saved and other users can make changes to the sheet index.

Manage Sheet Index - Opens the Manage Sheet Index dialog in which you can manage the sheet index and its properties.

- Create Folder - Creates a new folder in the sheet index.
- Add Sheet - Opens the Add Sheet dialog from where you can select the file from which you want to add sheet links.
- Delete - Deletes the selected folder or sheet link from the sheet index. If the folder contains links or other folders, they are deleted as well.
- Place as Table - Starts the Place Table tool to place the index sheet. An index sheet contains properties of all the sheets in the sheet index that is placed as a table. Once placed, a report definition of the index sheet is also created in the Reports dialog.
- Open Print Organizer - Opens the Select Print Style dialog. Selecting the desired print style in the Select Print Style dialog and clicking OK opens the Print Organizer. The Sheet Index displays in the Print Organizer. You can compose a new print set file using the sheet index.

Reset pop-up menu for sheet index - Right-clicking the sheet index opens a pop-up menu with following options:

- Validate - Verifies that all the targets in the sheet index still exist in the locations to which the links point. If any targets do not exist, the sheet names turn red. They remain red until you revalidate and confirm that all targets in the folder exist in the specified locations.
- Add Sheet - Opens the Add Sheet dialog from where you can select the file from which you want to add sheet links.
- Update Sheet Model Properties - If you make changes to the properties in the sheet index, selecting this option updates those properties in the sheet model.
- Details - Opens the Details dialog displaying the properties of the sheet index.
- Properties - Opens the Properties dialog displaying the properties of the sheet index.

Reset pop-up menu for folders - Right-clicking a folder opens a pop-up menu with following options:

- Validate - Verifies that all the targets in the folder still exist in the locations to which the links point. If any targets do not exist, the sheet names turn red. They remain red until you revalidate and confirm that all targets in the folder exist in the specified locations.
- Add Sheet - Opens the Add Sheet dialog from where you can select the file from which you want to add sheet links.
- Update Sheet Model Properties - If you make changes to the properties in the sheet index, selecting this option updates those properties in the sheet model.
- Rename - Allows you to key in a new name for the selected folder.

- Details - Opens the Details dialog displaying the properties of the folder.
- Properties - Opens the Properties dialog displaying the properties of the folder.

Reset pop-up menu for sheet links - Right-clicking a sheet opens a pop-up menu with following options:

- Validate - Verifies that the target sheet still exists in the locations to which the links point. If any targets do not exist, the sheet names turn red. They remain red until you revalidate and confirm that all targets in the folder exist in the specified locations.
- Update Sheet Model Properties - If you make changes to the properties in the sheet index, selecting this option updates those properties in the sheet model.
- Open - Opens the selected sheet.
- Add Link to Element - Adds the sheet link to the selected element in the open DGN file.
- Details - Opens the Details dialog displaying the properties of the sheet link.

Properties - Opens the Properties dialog displaying the properties of the sheet link.

Section 12 Revisions

Revision List

4/12/2024

Volume	Section/Module	Description
13	Section 1	Modified the Contract Border Title Block integration - Designed By / Checked By
13	Module 2.3	New Module - Revision Index Sheet
13	Module 4.4	New Module - Place Welding Symbol